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2026-2028 | MAY 2, 2025

Wildfire Mitigation Base Plan

DOCKET NAME: 2026-2028 ELECTRICAL CORPORATION WILDFIRE MITIGATION PLANS
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List of Abbreviations

Abbreviation	Name
AAL	average annual loss
AAP	Advanced Protection Program
AAR	After-Action Review
ABI	Advanced Baseline Imager
ACI	Areas for Continued Improvement
ADA	Americans with Disabilities Act
ADO	Azure DevOps
AFN	Access and Functional Needs
AI	Artificial Intelligence
AMI	advanced metering infrastructure
ANSI	American National Standards Institute
API	Application Programming Interfaces
APP	Advanced Protection Program
API	Application Programming Interface
AQI	Air Quality Index
ARFS	Advanced Radio Frequency Sensors
AWS	Amazon Web Services
C&I	Commercial and Industrial
CAB	Change Advisory Board
CAL FIRE	California Department of Forestry and Fire Protection
Cal Poly WUI	Cal Poly San Luis Obispo Wildland Urban Interface Fire Institute
Caltrans	California Department of Transportation
CARE	California Alternate Rates for Energy
CAVA	Climate Adaptation Vulnerability Assessment
CBA	Cost-Benefit Analysis
CBO	Community Based Organization
CBR	Cost Benefit Ratio
CEADPP	Company Emergency and Disaster Preparedness Plan
CFR	Contract Fire Resources
CIS	Customer Information System
CMI	Customer Minutes of Interruption
CMP	Corrective Maintenance Program
CMPI	Coupled Model Intercomparison Project Phase 6

Abbreviation	Name
CNS	Customer Notification System
CoF	consequence of failure
CoRE	consequence of a risk event
CPUC	California Public Utilities Commission
CRA	Customized Resiliency Assessment
CRC	Community Resource Centers
CRI	Circuit Risk Index
CSTI	California Specialized Training Institute
D	Decision
DFM	dead fuel moisture
DOC-E	Department Operations Center-Electric
DWO	Dispatch Work Orders
EFD	Early Fault Detection
EOC	Emergency Operations Center
EOD	Emergency On-Duty
EPRI	Electric Power Research Institute
ERR	Enterprise Risk Registry
ESA	Energy Savings Assistance
ESP	Electric Standard Practice
EUP	Electric Underground Plan
FACT	Facilitating Access to Coordinated Transportation
FBP	Fixed Backup Power
FCC	Federal Communications Commission
FCP	Falling Conductor Protection
FEMA	Federal Emergency Management Agency
FERA	Federal Emergency Relief Administration
FPI	Fire Potential Index
FSCA	Fire Science and Climate Adaptation
FTP	File Transfer Protocols
FWI	Fire Weather Index
GAP	Generator Assistance Program
GCM	global climate models
GGP	Generator Grant Program
GIS	geographic information system
GO	General Order

Abbreviation	Name
GOES	Geostationary Operational Environmental Satellite
GRC	General Rate Case
HFTD	High Fire Threat District
HLC	hotline clamps
HPWREN	High Performance Wireless Research and Education Network
HRFA	High-Risk Fire Area
HSEEP	Homeland Security Exercise and Evaluation Program
ICE	Interruption Cost Estimator
ICS	Incident Command System
IIP	Intelligent Image Processing
IMP	Ignition Management Program
IOU	Investor-Owned Utilities
ISA	International Society of Arboriculture
ITLTRF	Inter-Tribal Long Term Recovery Foundation
IWRMC	International Wildfire Risk Modeling Consortium
kV	Kilovolt
LBNL	Lawrence Berkley National Laboratory
LEP	Limited English Proficiency
LFM	Live Fuel Moisture
LOCA2	Localized Constructed Analogs Version 2
LoRE	likelihood of a risk event
LPCN	Low Power Communication Network
MAVF	Multi Attribute Value Framework
MBL	Medical Baseline
MDT	Mobile Data Terminal
MHRP	Mobile Home Park Resilience Program
MOU	memoranda of understanding
NCAR	National Center for Atmospheric Research
NCEP	National Centers for Environmental Prediction
NDVI	Normalized Difference Vegetation Index
NERC	North American Electric Reliability Corporation
NIMS	National Incident Management System
NMS	Network Management System
NPV	Net Present Value
NWS	National Weather Service

Abbreviation	Name
O&M	operations and maintenance
OEIS or Energy Safety	Office of Energy Infrastructure Safety
OIC	Officer in Charge
OIR	Order Instituting Rulemaking
OMS	Outage Management System
OSHA	Occupational Safety and Health Administration
OTV	Onramp Total View
PEDS	protective equipment and device settings
PIC	Pre-Inspected and Clear
PIP	Pre-Inspected and Requires Pruning
$PM_{2.5}$	Particulate Matter 2.5 microns or smaller in diameter
PMO	Project and Program Management Office
PMU	phasor measurement unit
PoF	probability of failure
PoI	probability of ignition
PPM	Portfolio & Project Management
PQ	Power Quality
PRC	Public Resource Code
PSPS	Public Safety Power Shutoff
PUC	Public Utilities Code
QA/QC	Quality Assessment/Quality Control
QDR	Quarterly Data Report
QEW	qualified electrical worker
RAMP	Risk Assessment Mitigation Phase
RAWS	Remote Automated Weather Station
RDF or Risk OIR	Risk-Based Decision-Making Framework
REFCL	Rapid Earth Fault Current Limiter
RFW	Red Flag Warning
RIDI	Risk Informed Drone Inspections
RMSU	Risk Modeling Support Unit
RTU	Remote Terminal Units
S-MAP	Safety Model and Assessment Proceeding
SAP	Systems Applications and Processes
SAP PM	Systems Applications and Processes Plant Maintenance
SAIDI	System Average Duration Index

Abbreviation	Name
SAIFI	System Average Interruption Frequency Index
SAWTI	Santa Ana Wind Threat Index
SCADA	supervisory control and data acquisition
SDCCE	San Diego College of Continuing Education
SDG&E	San Diego Gas & Electric
SDSC	San Diego Supercomputing Center
SGF	Sensitive Ground Fault
SIF	Serious Injuries and Fatalities
SMS	Safety Management System
SOP	Standard Operating Procedure
SRA	State Responsibility Area
SRP	Sensitive Relay Profile
SSEC	Space Science and Engineering Center
SSP	Shared Socioeconomic Pathway
SVI	Social Vulnerability Index
SWO	Scheduling Work Orders
TCC	temporary construction and compliance
TCM	Transmission Construction and Maintenance
UCAR	University Corporation for Atmospheric Research
VMA	Vegetation Management Area
VMS	Vegetation Management System
VRI	Vegetation Risk Index
VSL	value of statistical life
WCAG	Web Content Accessibility Guidelines
WCRC	Wildfire & Climate Resiliency Center
WFA-E	Wildfire Analyst™ Enterprise
WFABBA	Wildfire Automated Biomass Burning Algorithm
WFI	Wireless Fault Indicator
WiNGS	Wildfire Next Generation System
WMP	Wildfire Mitigation Plan
WRF	Weather Research and Forecast
WSCAC	Wildfire Safety Community Advisory Council
WUI	Wildland Urban Interface

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2026-2028 Wildfire Mitigation Base Plan

Executive summary

1 EXECUTIVE SUMMARY

In January 2025, a 3-week weather event brought a rare combination of extreme Santa Ana winds, with gusts exceeding 100 miles per hour, critically low humidity levels, and a historic lack of rain in the Southern California region. San Diego County experienced the driest start to the rainy season in the past 174 years. In response to these threatening wildfire-weather conditions, San Diego Gas & Electric Company (SDG&E or Company) activated its Emergency Operations Center, where it utilized 222 of the nation's most sophisticated weather monitoring stations to continuously track wind speeds and wildfire conditions, helping to make informed decisions about communities at risk. Wind speeds in the county reached record highs, exceeding 62 wind-gust records across the territory. Public Safety Power Shutoff (PSPS) de-energizations were implemented as a crucial last resort wildfire prevention measure in response to unprecedented weather conditions that led to prolonged high-fire risk. These measures were essential for safeguarding lives, property, and entire communities during times of extreme fire risk.

The Palisades and Eaton fires in Los Angeles County are a devastating reminder of the ongoing wildfire risk in Southern California. These fires, which started on January 7 during a fierce Santa Ana windstorm, burned over 37,000 acres, destroyed thousands of structures, and tragically caused the loss of at least 29 lives[1]. They have a significant impact on the local economy, with estimates of property damage alone ranging from $28 to $54 billion.[2] Recovery and rebuilding efforts will take many years, and in the meantime affected communities are experiencing hazardous fire debris and other health, safety, and economic challenges.

While the causes of these fires remain undetermined, these recent events are a reminder that there are real-life consequences and impacts to our communities when conducting wildfire risk identification, assessment, and modeling. While improvements in risk modeling to accurately represent and quantify the risk are critical, SDG&E does not underestimate the real-life implications of delaying sustained mitigations while trying to perfect risk models.

SDG&E remains a leader in wildfire risk assessment and modeling. SDG&E's models have been scrutinized by stakeholders through multiple proceedings at the California Public Utilities Commission (CPUC), including the Risk Assessment Mitigation Phase (RAMP) and General Rate Case (GRC), and over multiple years of Wildfire Mitigation Plans (WMPs)and WMP Updates. SDG&E has worked to incorporate stakeholder feedback, where reasonable and feasible, and the risk modeling dialogue facilitated in part by Energy Safety has assisted in the continual enhancement of SDG&E's understanding of wildfire and PSPS risk in its service territory. SDG&E's successful track record over the past 16 years of avoiding a utility-related catastrophic wildfire in its service territory, despite being located in an area with some of the highest wildfire risk in the nation, is in part due to the Company's ongoing efforts to target and effectively mitigate risk through data-driven and risk-informed programs tailored to the location.

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[1] What we know about the victims killed in the California wildfires. 2025. NBC News. Updated February 12, 2025. https://www.nbcnews.com/news/us-news/california-wildfires-what-we-know-victims-killed-rcna188240

[2] Los Angeles wildfires caused billions of dollars in damage, economic impact will be felt for years, study finds. 2025. ABC7 Los Angeles. https://abc7.com/post/los-angeles-wildfires-caused-billions-dollars-damage-economic-impact-will-felt-years-study-finds/15960716/

SDG&E has not wavered from its commitment to continually reducing wildfire risk to promote the safety of its communities, customers, and employees. SDG&E's Test Year 2024 GRC decision, issued on December 23, 2024, however, rejected some of SDG&E's risk-informed efforts to forecast and fund the most effective and sustainable mitigations tailored to reduce wildfire and PSPS risk for the San Diego region. Further, the issuance of a Final Decision at the end of the 2024 Test Year combined with the reductions to SDG&E's wildfire mitigation hardening and vegetation management forecasts required the Company to revisit many of SDG&E's wildfire mitigation efforts planned from 2024 to 2027, covering much of the 2026-2028 WMP cycle[3] For these reasons, this 2026-2028 Base WMP reflects in part a reduced scope of work for 2026 and 2027, consistent with SDG&E's Test Year 2024 GRC.[4] Based on improvements in data and risk modeling, however, SDG&E continues to pursue alternative avenues to demonstrate the cost-effectiveness of grid hardening, including strategic undergrounding, as the most cost effective means to reduce wildfire and PSPS risk in a durable, long-term fashion.

SDG&E's 2026-2028 Base WMP describes SDG&E's ongoing efforts to reduce the risk of utility related wildfire, mitigate the risks of an ignition evolving into a catastrophic event, and reduce the customer impacts of PSPS. SDG&E remains committed to an optimized, sustainable wildfire mitigation strategy and will consider long-term mechanisms to accomplish these goals in a cost-effective, efficient manner. SDG&E's 2026-2028 Base WMP thus meets the requirements of Public Utilities Code (PUC) §8386 and should be approved.

1.1 PRIMARY GOAL

The safety of our customers, employees, and the communities we serve is one of SDGE's core values. Over the past 15 years, SDG&E has been committed to preventing utility-related catastrophic wildfires and to educating the public about emergency preparedness. The Company is currently implementing its 2023-2025 Base WMP[5] and has achieved key goals and objectives aimed at reducing the risk of catastrophic wildfires and mitigating the impacts of PSPS de-energizations. The 2026-2028 Base WMP builds on past successes, considers affordability, incorporates key lessons learned, and remediates identified areas for improvement.

In accordance with PUC § 8386(a), SDG&E constructs, maintains, and operates its electric system in a manner that minimizes the risk of catastrophic wildfire posed by its electric power lines and equipment. Building on over 15 years of wildfire prevention and mitigation work, the 2026-2028 Base WMP continues to focus on reducing wildfire risk and reducing the impact of PSPS de-energizations on customers.

[3] SDG&E will similarly request to adjust 2025 programs constrained by this funding in a Petition to Amend filed with OEIS. SDG&E emphasizes that the 2026 to 2028 WMP cycle is deeply impacted by the same funding constraints resulting from the GRC decision.

[4] SDG&E's Test Year 2024 GRC decision includes discussion of specific grid hardening targets propounded by intervening parties, including a recommended balance of covered conductor and undergrounding. The GRC decision, however, does not clearly bind SDG&E to meet those targets and SDG&E has flexibility to prioritize safety-related spending throughout the GRC cycle, provided it remains within its authorized funding levels. SDG&E has requested that the CPUC clarify this flexibility, and SDG&E requests that Energy Safety permit some revisions to SDG&E's 2026 and 2027 grid hardening programs in future petitions to amend or WMP Updates pending additional CPUC guidance.

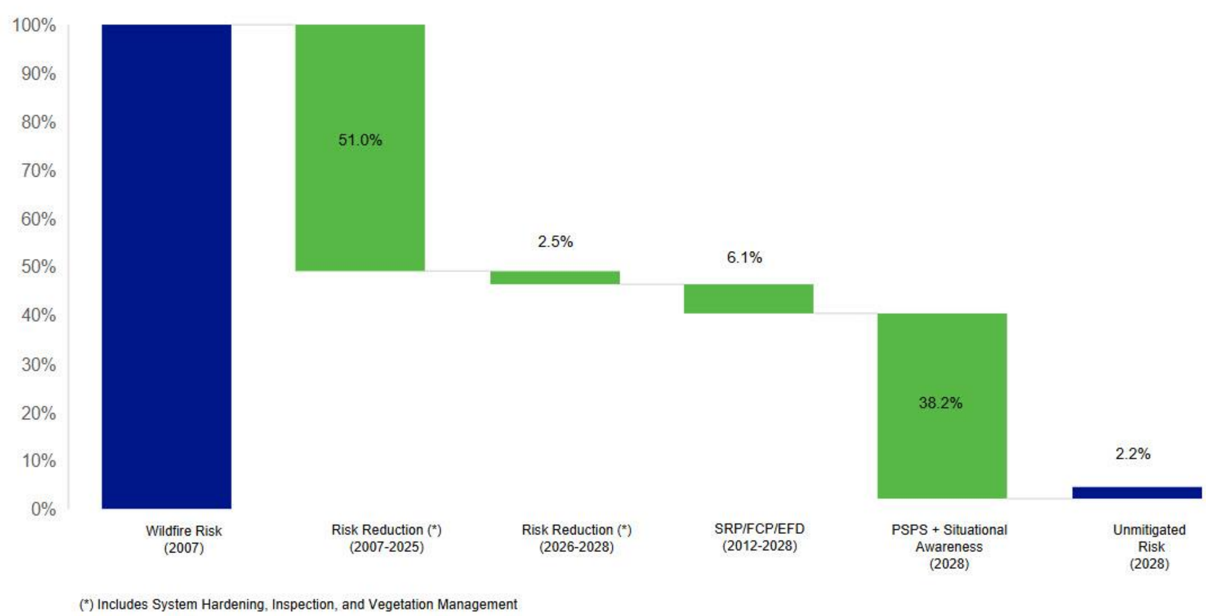
[5] 2023-2025 Wildfire Mitigation Plan; https://www.sdge.com/2023-wildfire-mitigation-plan

1.2 OBJECTIVES

The 2026-2028 Base WMP is part of an evolving, long-term wildfire mitigation strategy to transform SDG&E's current operational approach of managing wildfire and PSPS risk to a sustained approach where wildfire and PSPS risk are eliminated to the greatest extent possible. The operational approach includes mitigations such as PSPS de-energizations, asset inspections, vegetation management, and other interim grid hardening programs that enable grid monitoring and well-informed situational awareness. The ideal sustained approach includes grid hardening programs, such as Strategic Undergrounding and Combined Covered Conductor, that aim to eliminate as much wildfire risk as possible by mitigating against primary risk drivers and reducing the scale, scope, and frequency of PSPS de-energizations without introducing other reliability risks.

The grid hardening scope in the 2026 to 2028 WMP cycle is based on results of the Wildfire Next Generation System (WiNGS)-Planning model and GRC authorized funding, which will inform the plan through 2027. SDG&E plans to expand its grid hardening efforts in 2028, guided by the risk-informed methodology from the 2025 RAMP and the 2028 GRC. This expansion will be informed by the WiNGS-Planning model, which considers wildfire and PSPS risk at the circuit segment level and evaluates the effectiveness of both combined covered conductor installation and undergrounding of electric lines as mitigation alternatives. SDG&E's sustained mitigation approach is designed to keep affordability in mind and achieve risk reduction over a longer term through 2037. It plans to focus on residual risk and manage it in the interim via operational mitigations.

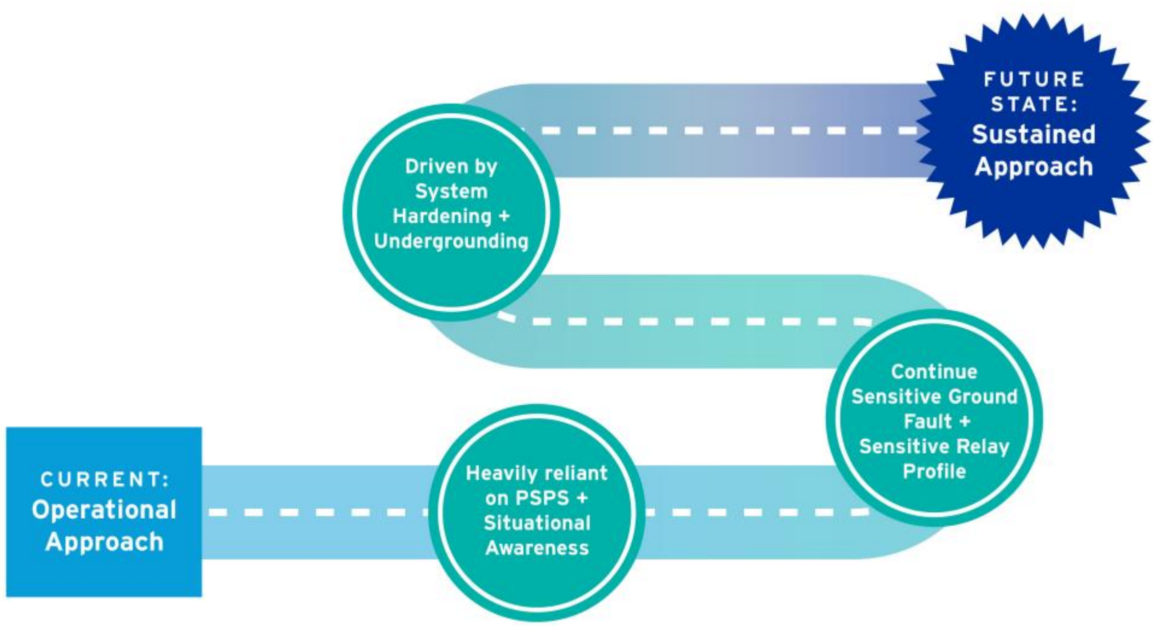
Figure 1-1: 2026-2028 Expected Risk Reduction



The sustained wildfire mitigation strategy considers life cycle costs of alternative mitigations to understand their long-term effectiveness and financial impact, ensuring that resources are allocated efficiently to maximize community safety and resilience. This approach avoids using only initial investment cost or only operational and maintenance costs for mitigation selection. SDG&E believes this approach best informs the selection of mitigations for each circuit segment. In addition to the risk assessment, this long-term risk reduction approach takes into account the number of assets to maintain, number of trees to manage, the PSPS related mitigations, and customer vulnerabilities. Total life cycle costs as part of the CBR provides the affordability lens we need so much to reduce cost impacts on customers.

SDG&E believes it is important to evaluate the risk assessment for the full portfolio of circuit segments in the High Fire Threat District (HFTD). This helps set a target risk reduction to guide overall risk reduction across the electric system. A circuit segment by segment risk analysis without considering the total risk reduction achieved and analyzing what can be achieved at what cost could leave some residual risk unmitigated. The remaining risk may be risk that can be mitigated at an optimum cost. Doing a portfolio-based risk analysis increases the likelihood of an optimized risk mitigation plan.

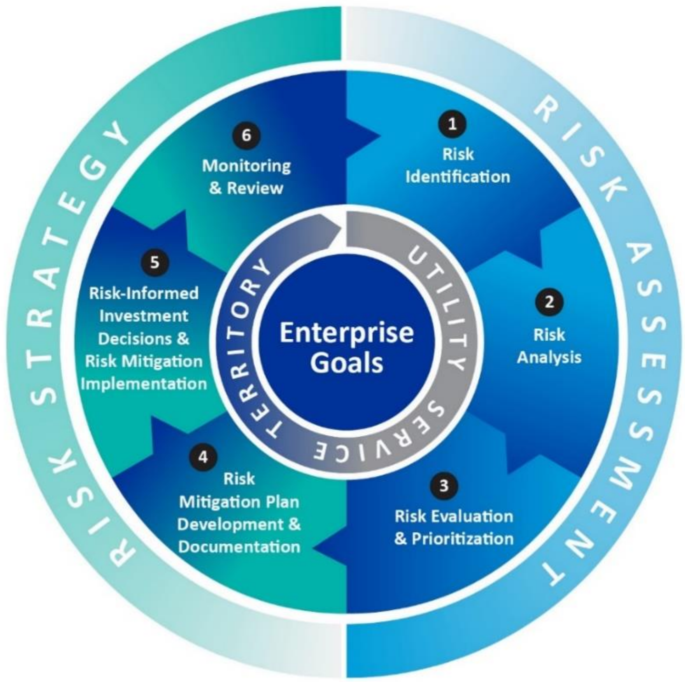
Figure 1-2: Long-Term Risk Reduction Approach



1.3 FRAMEWORK FOR DEVELOPMENT OF THE WMP

The core value of safety is reflected in SDG&E's mission to "improve lives and communities by building the cleanest, safest, and most reliable energy infrastructure company in America." Safety is foundational to SDG&E's goals and objectives and drives the risk-informed framework under which wildfire mitigation planning is developed. SDG&E's Enterprise Risk Management Framework shown in Figure 1-3 demonstrates the cyclical and continuous relationship between safety, wildfire risk identification, analysis and evaluation, and the development and implementation of cost-effective wildfire mitigation initiatives.

Figure 1-3: Enterprise Risk Management Framework for Development of the WMP



SDG&E's Enterprise Risk Management Framework is modeled after an internationally recognized risk management standard, ISO 31000 (Risk Management).[6] The framework consists of an enterprise risk management governance structure that addresses the roles of employees at various levels up to SDG&E's Board of Directors, along with various risk processes and tools.

SDG&E's risk management process is aligned with the Cycla Corporation's 10-Step Evaluation Method, which was adopted by the California Public Utilities Commission (CPUC) "as a common yardstick for evaluating maturity, robustness, and thoroughness of utility Risk Assessment and Mitigation Models and risk management frameworks." [7]SDG&E initiates its enterprise risk management process annually, resulting in the Enterprise Risk Registry (ERR), which is "[a]n inventory of enterprise risks at a snapshot in time that summarizes (for a utility's management and/or stakeholders such as the CPUC) risks that a utility may face. The ERR must be refreshed on a regular basis and can reflect the changing nature of a risk; for example, risks that were consolidated may be separated, new risks may be added, and the level of risks may change over time."[8]

The ERR thus presents enterprise-level risks, including safety-related and wildfire-related risks. Each risk has one or more risk owner(s) and one or more risk manager(s) responsible for ongoing risk assessments

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[6] ISO 31000; https://www.iso.org/iso-31000-risk-management.html/
[7] D.16-08-018 at 195, Ordering Paragraph 4
[8] D.18-12-014 p. 16-17; https://docs.cpuc.ca.gov/SearchRes.aspx?DocFormat=ALL&DocID=250266979

and overseeing the implementation of risk mitigation plans. The Enterprise Risk Management Framework utilizes both a "bottom-up" and "top-down" approach by seeking input from risk managers and risk owners to produce a finalized ERR. In addition, a portfolio of controls and mitigations is developed for each risk in the ERR. (i.e., projects or programs that are intended to reduce the likelihood of the risk and/or negative consequences should the risk occur). Wildfires involving SDG&E's infrastructure is the highest risk in the company's ERR and the annualized loss exposure, in equivalent dollars, is $3.032 billion including SDG&E's risk aversion attitude.

Despite risk management process efforts, adverse events do sometimes occur. When that happens, efforts, including implementation of response plans, development of role and responsibility descriptions and checklists, and facilitation of training and exercises, are designed to prepare the Company to respond safely and effectively.

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2026-2028 Wildfire Mitigation Base Plan

Responsible persons

2 RESPONSIBLE PERSONS

Executive-level owner with overall responsibility

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Program owners specific to each section of the plan

This section lists the program owner for each section of the 2026-2028 Base Wildfire Mitigation Plan (WMP). For general questions related to this WMP or the activities described herein, contact Kari Kloberdanz, Regulatory Business Manager: kkloberdanz@sdge.com, (415) 346-2386.

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2026-2028 Wildfire Mitigation Base Plan

Overview of base WMP

3 OVERVIEW OF BASE WMP

3.1 PRIMARY GOAL

In accordance with California Public Utilities Code (PUC) § 8386(a)[9], an electrical corporation must satisfy the following primary goal:

> *Each electrical corporation shall construct, maintain, and operate its electrical lines and equipment in a manner that will minimize the risk of catastrophic wildfire posed by those electrical lines and equipment.*

In accordance with PUC§8386(a), San Diego Gas & Electric (SDG&E) constructs, maintains, and operates its electric system in a manner that minimizes the risk of catastrophic wildfire posed by its electric power lines and equipment. The 2026-2028 Base Wildfire WMP continues to focus on reducing wildfire risk and reducing the impact of Public Safety Power Shutoff (PSPS) de-energizations.

3.2 PLAN OBJECTIVES

SDG&E's wildfire mitigation strategy emphasizes sustainable mitigations over operational controls to build a more resilient future. The goal is to eliminate as much wildfire risk as possible, rather than merely manage it. This approach aims for a future with fewer PSPS de-energizations, fewer unanticipated equipment issues, risk-informed vegetation management and inspections, and a more undergrounded grid system. In addition, stakeholder and customer outreach will foster a sustainable wildfire safety culture that future generations of employees and customers will uphold.

SDG&E's data-driven, risk-based approach considers both initial and lifecycle costs when evaluating mitigation alternatives, which prioritizes high-risk areas and identifies cost-effective strategies, ultimately reducing cost impacts on customers. For example, reviewing the total lifecycle costs for undergrounding powerlines shows a reduction in overall costs compared to installing covered wire on overhead powerlines due to avoided overhead maintenance, vegetation management, and PSPS costs.

Reducing the scale, scope, and frequency of PSPS de-energizations requires infrastructure hardening. SDG&E continues to strive for optimal operational efficiency and identifies opportunities for cost savings while maintaining safety and compliance. For instance, cost reductions for strategic undergrounding of electric lines have been achieved by gaining efficiencies such as reducing trench depths, using smaller conduit sizes when applicable, implementing new construction technologies when needed, and bundling projects, all without compromising safety.

3.2.1 PUBLIC SAFETY POWER SHUTOFF

Reducing the scale, scope, frequency, and impacts of PSPS de-energizations continues to be a core goal for SDG&E. In addition to continuing the implementation of grid hardening initiatives and resiliency programs to reduce the likelihood and consequences of PSPS de-energizations for customers, SDG&E is committed to expanding its education and communication efforts related to wildfire safety to customers

[9] "Each electrical corporation shall construct, maintain, and operate its electrical lines and equipment in a manner that will minimize the risk of catastrophic wildfire posed by those electrical lines and equipment." (Pub. Util. Code § 8386(a).)

in the service territory that are most prone to PSPS de-energizations. SDG&E evaluates many factors, such as wind gust conditions, fuel dryness, and the condition of assets, before deciding to shut off power. SDG&E is committed to continuously enhancing its WiNGS-Ops platform to support actions before, during, and after PSPS activations. This enhancement involves the ongoing integration of real-time data, the refinement of wildfire and PSPS risk assessments, the surfacing of critical data to inform decision-making, and the improvement of the user experience. The primary objective of SDG&E's WiNGS-Ops platform is to deliver precise data insights during PSPS activations, thereby minimizing the impact on communities while ensuring public safety.

3.2.2 GRID DESIGN, OPERATIONS, AND MAINTENANCE

SDG&E intends to reduce the risk of wildfires caused by utility equipment by implementing its grid hardening initiatives, while continuing to minimize impacts to customers from mitigations such as PSPS de-energizations. Programs such as the Combined Covered Conductor Program and Strategic Undergrounding Program will reduce the likelihood of risk events across some of SDG&E's highest risk drivers such as foreign object contacts, pole and conductor related failures. Other programs, such as the Advanced Protection Program (APP), do not prevent risk events from occurring, but instead reduce the chance that a risk event will result in an ignition by utilizing protection settings and/or equipment that addresses a specific failure mode known to lead to the ignition. Other programs reduce PSPS impacts to customers, including the PSPS Sectionalizing Program and customer resiliency programs. Strategic undergrounding also reduces the need for PSPS de-energizations.

SDG&E also intends to identify and resolve equipment conditions and failures on the grid before failures occur. Mandatory inspection programs are governed by General Order (GO) 165 and GO 95 and focus on safety and reliability conditions and are supplemented by risk-informed drone inspections that are intended to identify safety and wildfire-related conditions. Maintenance practices generally aim to resolve conditions based on priority level and location, with accelerated remediation timeframes in Tier 3 of the High Fire Threat District (HFTD).

3.2.3 VEGETATION MANAGEMENT AND INSPECTIONS

The Vegetation Management Program continues to focus on key risk-reduction strategies in addition to rules governed by GO 95, Public Resources Code (PRC)§4292, and PRC§4293 including annual inspections, Off Cycle Patrols, and Fuels Management activities within the HFTD. Vegetation Management continues to implement enhanced clearances during tree pruning and removal activities in the HFTD that exceed regulatory recommendations as a measure to reduce the likelihood of tree-related outages and ignitions.

The Fuels Management Program is aimed at further reducing risk of ignition around selected poles located in the HFTD that are subject to mandatory pole clearing requirements. This elective program exceeds the requirements of PRC§4292.

3.3 UTILITY MITIGATION ACTIVITY TRACKING IDS

SDG&E uses "Utility Mitigation Activity Tracking IDs" (Tracking IDs) throughout the WMP, as specified in the applicable Energy Safety Data Guidelines, to tie targets, narratives, and activities together.

3.4 PRIORITIZED LIST OF WILDFIRE RISKS AND RISK DRIVERS

OEIS Table 3-1: List of Risks and Risk Drivers to Prioritize

Priority	Risk	Risk Driver	x% of ignitions in HFTD	x% of overhead faults in HFTD ***	Topographical and Climatological Risk Factors
1	Equipment /facility failure or damage	Pole	2.3%	7.1%	n/a
2	Contact from object	Animal contact	27.9%	12.4%	Humidity, wind gust, elevation, FPI
3	Equipment /facility failure or damage	Fuse	2.3%	1.4%	Aspect
4	Unknown	Unknown	0.0%	28.5%	Temperature, humidity, slope, consequence and wind gust pertaining to the location, elevation
5	Contact from object	Land vehicle contact	11.6%	10.0%	Wind gust, elevation, slope, temperature, humidity
6	Equipment /facility failure or damage	Conductor	2.3%	4.9%	FPI, slope
7	Lightning	Lightning	0.0%	5.6%	FPI
8	Equipment /facility failure or damage	Cross arm	0.0%	4.0%	Slope, aspect, FPI
9	Equipment /facility failure or damage	Lightning arrestor	9.3%	1.9%	n/a
10	Equipment /facility failure or damage	Transformer	0.0%	4.1%	Wind gust
11	Equipment /facility failure or damage	Connector device *	9.3%	5.4%	Consequence pertaining to the location, slope
11	Equipment /facility failure or damage	Splice *	n/a	n/a	n/a
12	Equipment /facility failure or damage	Other	4.7%	0.4%	Temperature, elevation, humidity, wind gust
13	Vegetation contact	Fall-in (branch failure)	4.65%	2.5%	Wind gust, elevation, FPI, humidity
13	Vegetation contact	Fall-in (trunk failure)**	n/a	n/a	Wind gust, elevation, FPI, humidity
13	Vegetation contact	Fall-in (root failure)**	n/a	n/a	Wind gust, elevation, FPI, humidity
14	Contact from object	Other contact from object	2.3%	2.6%	n/a
15	Equipment /facility failure or damage	Switch	2.3%	0.2%	Consequence pertaining to the location, humidity

Priority	Risk	Risk Driver	x% of ignitions in HFTD	x% of overhead faults in HFTD ***	Topographical and Climatological Risk Factors
16	Contact from object	Balloon contact	9.3%	2.6%	Consequence pertaining to the location, wind gust, elevation, humidity
17	Equipment /facility failure or damage	Insulator and bushing	2.3%	0.8%	n/a
18	Equipment /facility failure or damage	Cutout	0.0%	1.4%	Consequence pertaining to the location, elevation, humidity
19	Contact from object	3rd party contact	2.3%	1.3%	FPI
21	Wire-to-wire contact	Wire-to-wire contact	2.3%	0.8%	Aspect, temperature, slope
22	Equipment /facility failure or damage	Anchor/guy	2.3%	0.7%	Consequence, wind gust, elevation, aspect, humidity
23	Contamination	Contamination	2.3%	0.2%	n/a
24	Vandalism/theft	Vandalism/ theft	0.0%	0.1%	n/a
25	Equipment /facility failure or damage	Capacitor bank	0.0%	0.4%	n/a
26	Equipment /facility failure or damage	Recloser	0.0%	0.3%	FPI
27	Contact from object	Aircraft vehicle	0.0%	0.2%	Elevation
28	Vegetation contact	Blow-in	0.0%	0.1%	Wind gust
29	Equipment /facility failure or damage	Voltage regulator/booster	0.0%	0.1%	Humidity
30	Vegetation contact	Grow-in	0.0%	0.1%	Slope
31	Equipment /facility failure or damage	Unknown	0.0%	0.1%	n/a
n/a	Contact from object	Unknown	0.0%	0.0%	n/a
n/a	Equipment /facility failure or damage	Relay	n/a	n/a	n/a
n/a	Equipment /facility failure or damage	Sectionalizer	n/a	n/a	n/a
n/a	Equipment /facility failure or damage	Tap	n/a	n/a	n/a
n/a	Equipment /facility failure or damage	Tie wire	n/a	n/a	n/a
n/a	Protective device operation	Protective device operation	n/a	n/a	n/a
n/a	Dig-in	Dig-in	n/a	n/a	n/a

** Connector and Splice related ignitions are tracked as one driver, Splice is grouped into the risk driver Connection Device as a combined priority ranking.*
***Vegetation Fall-in (trunk failure) and Fall-in (root failure) are grouped into one risk driver Fall-in (branch failure) as a combined priority ranking.*
**** This column was added by SDG&E.*

SDG&E defines overhead faults as risk events that have the potential to generate heat, potentially leading to ignitions. OEIS Table 3-1 categorizes the risk drivers observed on primary distribution conductors in HFTD portions of the service territory from 2019 to 2024. Most importantly, fuels and weather conditions pertaining to the location where the risk events occur are directly associated with the probability of ignitions. Therefore, the priority ranking of risk drivers is determined by four components of risk factors:

- Frequency of Ignition Events (Normalized) R_{freq}: this measures how often ignition events occur, adjusted to a common scale that is greater than or equal to 1.
- Propagation potential R_{con} (Normalized): quantified by average of wildfire 50th percentile consequences pertaining to the location of a risk event. The value is weighted (W_{con}) based on its distribution.
- Wind Gust Weight WR_{wind} : historical 99th percentile wind gusts at the location of a risk event, used as a weighted factor based on its distribution.
- Ignition Rate per Risk Event by FPI R_{rate}: this measures how likely an ignition event is to occur under different FPI conditions (FPI_W) for a given risk driver. This value is normalized to be less than or equal to 1.

Risk events associated with potential consequences below the 25th percentile indicate a lower probability of ignition and therefore these records are eliminated. Weights are applied when the likelihood of ignition increases. For instance, pole locations where the historical 99th wind gust percentile falls between the 25th to 50th, 50th to 75th, and 75th percentile or greater are weighted as 2^1, 2^2, and 2^3, respectively, compared to the baseline weight (2^0) used for locations below the 25th percentile. Similarly, the wildfire consequence value is weighted 2 times higher when the value is above the 50th percentile. Additionally, the ignition rate of a risk driver is weighted as 2^1 and 2^2 times when the FPI is elevated or extreme, respectively, compared to the baseline weight (2^0) when the FPI is normal.

A risk-driver score is calculated in two parts. The first part (R_1) aggregates three risk components associated with a risk event and is largely influenced by the number of potential wildfire consequences pertaining to locations associated with overhead events. The second part (R_2) quantifies the ignition rate per risk event for each driver, differentiating the risk-drivers that are more likely to result in ignitions especially during elevated and extreme FPI conditions. Sensitivity analyses were conducted to test the robustness of the weighting scheme in balancing these two risk scores, these two parts are weighted 0.6 and 0.4, respectively.

The overall risk-driver score is obtained by summing these weighted normalized scores. Finally, drivers are ranked in priority order based on their risk-driver scores as shown in the following calculation.

$$R_1 = R_{freq} \times W_{con} \times R_{con} \times WR_{wind}$$

$$R_2 = R_{rate} \times FPI_W$$

$$Risk\ Driver\ Score = 0.6 \times R_1 + 0.4 \times R_2$$

This methodology evaluates the consequences of risk events and ignition potential driven by critical wildfire risk factors, optimizing mitigation strategies to prioritize higher risk reduction. The risk score is partially influenced by the frequency of risk events. The top 16[10] (approximately 50 percent) risk drivers listed in OEIS Table 3-1 represent 94 percent of overhead faults related to primary distribution assets and 88 percent of ignitions associated with primary distribution assets pertaining to locations with 25th percentile or greater consequences. Of these, nine are equipment-related and five are due to foreign object contact. "Unknown" represents 28.5 percent of overhead faults but 0 percent of ignitions. SDG&E's mitigation strategy considers these risk drivers, focusing on foreign object contacts and equipment failures among the top risk drivers (refer to OEIS Table 3-2). Additionally, the Early Fault Detection (EFD) activity aims to reduce "unknown" related overhead faults.

Topographical and climatological risk factors, which include factors include FPI, temperature, humidity, wind gust, elevation, slope, and aspect associated with the location where risk events were observed, were evaluated. Test statistics method Mann Whitney Test was used to compare the sample mean of a risk driver to the sample mean of the other risk drivers. If the difference was statistically significant, this risk factor is noted in OEIS Table 3-1 as influential for a risk driver. These factors are evaluated based on the historical climatological data and current topographical characteristics of the locations associated with each risk driver.

3.5 PERFORMANCE METRICS

OEIS Table 3-2 lists the performance metrics SDG&E uses to evaluate the effectiveness of the WMP in reducing wildfire and outage program risk.

OEIS Table 3-2: Self-Identified Performance Metrics Table

Performance Metric*	Assumption that underlies the use of the metric	Section associated with the Performance Metric (state "WMP" if the metric applies to entire plan)	2026 Projected	2027 Projected	2028 Projected
Vegetation caused ignitions in the HFTD during FPI ratings of Elevated or higher	To evaluate the performance of risk reduction from vegetation mitigations during fire prone weather conditions	Section 9	1	1	1
Vegetation caused ignitions in the HFTD during an RFW	To evaluate the performance of risk reduction from vegetation mitigations during fire prone weather conditions	Section 9	1	1	1
Equipment caused ignitions in the HFTD during FPI ratings of Elevated or higher	To evaluate the performance of risk reduction from asset inspection and grid hardening during fire-prone conditions	Section 8	5	5	5

[10] Vegetation contact: Fall-in related drivers are grouped as one risk driver for priority ranking among all risk drivers.

Performance Metric*	Assumption that underlies the use of the metric	Section associated with the Performance Metric (state "WMP" if the metric applies to entire plan)	2026 Projected	2027 Projected	2028 Projected
Equipment caused ignitions in the HFTD during an RFW	To evaluate the performance of risk reduction from asset inspection and grid hardening during fire-prone conditions	Section 8	1	1	1
Equipment caused ignition rate in the HFTD during a High FPI rating	To evaluate the performance of risk reduction from asset inspection and grid hardening during fire-prone conditions	Section 8	0.03	0.03	0.03
Vegetation caused outages in the HFTD during an Elevated FPI	To evaluate the performance of risk reduction from vegetation mitigations during fire prone weather conditions	Section 9	4	4	4
Vegetation caused outages in the HFTD during an RFW	To evaluate the performance of risk reduction from vegetation mitigations during fire prone weather conditions	Section 9	1	1	1
Overhead faults on circuits in the HFTD during an Elevated FPI	To evaluate the performance of risk reduction from overall mitigations during fire-prone conditions	Section 8	135	135	135
Overhead faults on circuits in the HFTD during an RFW	To evaluate the performance of risk reduction from overall mitigations during fire-prone conditions	Section 8	11	11	11
Energized wire down events in the HFTD during an FPI of Elevated or higher	To evaluate the performance of risk reduction from grid hardening related mitigations during fire-prone conditions	Section 8	9	9	9
Energized wire down events in the HFTD during an RFW	To evaluate the performance of risk reduction from grid hardening related mitigations during fire-prone conditions	Section 8	1	1	1
Overhead fault rate in the HFTD during a High FPI	To evaluate the performance of risk reduction from overall mitigations during fire-prone conditions	Section 8	0.9	0.9	0.9

**Based on 2020-2024 averages*

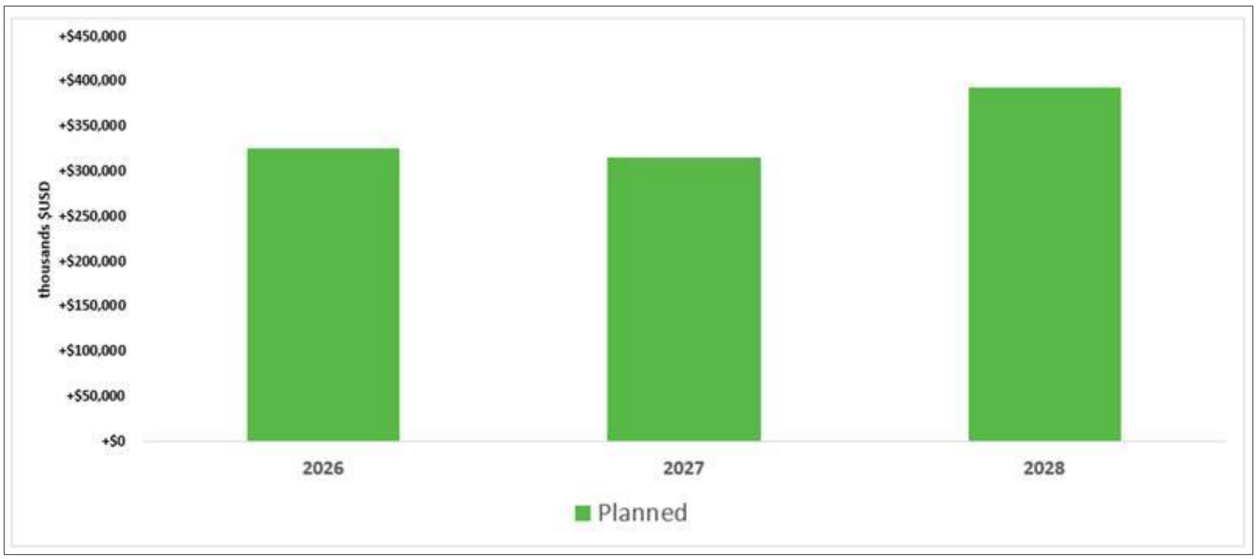
3.6 PROJECTED EXPENDITURES

OEIS Table 3-3: Summary of Projected WMP Expenditures

Year of WMP Cycle	Spend* (thousands $USD)
2026	Projected =$326,045
2027	Projected =$316,114
2028	Projected =$393,823

**Projected spend includes capital and O&M, direct costs only*

Figure 3-1: Summary of Projected WMP Expenditures



3.7 CLIMATE CHANGE

San Diego has four distinct climate zones: coastal areas, inland valleys, mountains, and deserts. The coastal region is characterized as moderate, with mild winters and cool summers due to the strong influence of the ocean. Fire risk is typically low due to high humidity in proximity to the ocean and predominately onshore flow, but coastal canyons can present a fire risk when fuel moistures are lowest. Moving from the coast to the inland valleys, daytime temperature increases and nighttime temperature decreases. Summer months are hotter and winters are cooler than in the coastal region. Humidity is moderate, with low annual rainfall. Inland valleys present a fire risk upon conclusion of winter rain and grass fires are common in the summer. In the fall, dry fuel moisture coupled with seasonal Santa Ana winds can increase fire potential from moderate to high for short periods of time. In the mountains, summer nights are cool and the days are warm. This region gets significantly more precipitation than coastal climates, with an annual average rainfall of 30 inches that can increase to 45 inches or more in wet years. Despite receiving the most rainfall during winter months, the mountain regions can be prone to fire risk in the fall and fires can grow rapidly. Winds can be gusty during Santa Ana conditions. The desert region features extremes with very hot summers and cool winter nights. Humidity is very low and water is scarce. Average annual rainfall in the desert is 6 inches, however fire risk is low due to lack of vegetation.

Changes to temperature, precipitation, and fire weather risk over the next century will have significant impacts on the service territory and are considered each time the WMP is drafted. Increasing temperatures can directly impact the frequency and severity of wildfires through increasing atmospheric demand and surface evapotranspiration. This leads to more frequent and longer drought conditions favorable for fuels (e.g., flammable soils and vegetation) to ignite, impacting the magnitude, timing, and frequency of wildfires.

Research in the most recent California's Fourth Climate Change Assessment (2018) suggests that precipitation in the region will increasingly come from fewer, stronger storms, which presents both flooding and water retention concerns, the latter of which could further exacerbate extreme wildfire conditions. The San Diego region experienced one of the driest starts to a water year since 1850 due to historically low precipitation levels from late 2024 to early 2025. The combination of this extremely dry start to the water year and damaging Santa Ana winds across the region led SDG&E to implement the largest PSPS activation since 2020.

As required by R.18-04-019,[11] SDG&E is currently conducting a system-wide Climate Adaptation Vulnerability Assessment (CAVA) looking at mid- and end-of-century climate change projections. This assessment utilizes the Localized Constructed Analogs Version 2 (LOCA2) dataset from Cal-Adapt, offering high-resolution downscaled projections for California from Global Climate Models (GCMs). LOCA2 provides finer spatial resolution (1/16th of a degree or 3 kilometers) and greater accuracy over complex terrains, making it essential for developing adaptation and resilience strategies at a local level. The analysis focuses on 2030, 2050, and 2070 as key years and considers the Shared Socioeconomic Pathway (SSP) framework using SSP2-4.5, SSP3-7.0, and SSP5-8.5 scenarios[12], pursuant to the Climate Change Adaptation Order Instituting Rulemaking (OIR). As part of its initial sensitivity and exposure analyses, SDG&E examined the 90th, 95th, and 99th percentiles of climate variables relative to the historical baseline. In the context of climate adaptation planning and vulnerability assessment, SDG&E is analyzing events with outsized impacts and magnitudes relative to historical values rather than to pre-defined thresholds.

Present day and future exposure to wildfires in the CAVA analysis will be determined using the annual number of days above the historical 95th percentile Canadian Forest Fire Weather Index (FWI), a popular wildfire metric in the referred literature (e.g., Goss et al. 2020), and historical burn probability data from the United States Department of Agriculture/United States Forest Service Wildfire Risk to Communities Dataset. The FWI is calculated using daily temperature, relative humidity, wind speed, and precipitation LOCA2 data to provide an understanding of how conducive the projected conditions are to wildfire development. The FWI relies on meteorological variables and therefore captures the

[11] R.18-04-019. April 26, 2018. Order Instituting Rulemaking to Consider Strategies and Guidance for Climate Change Adaptation.

[12] SSPs are defined by the Intergovernmental Panel on Climate Change (IPCC) in the IPCC 6th Assessment Report. https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf

environmental conditions that are conducive to wildfire but does not include important factors of wildfire risk and spread, such as vegetation/fuel availability and type; ignition (i.e., natural vs. human-caused); and fire suppression and management. In addition to direct wildfire exposure analysis, the CAVA analysis will also explore cascading impacts, multifaceted weather, and climate events that occur in succession and can lead to more significant impacts than when they occur individually. Relevant to wildfire, this includes enhanced warming exacerbating extreme drought and wildfire and debris flow caused by extreme precipitation following a wildfire event.

Using the annual number of days above the historical 95th percentile FWI and historical wildfire probability, the CAVA analysis aims to identify assets that are most exposed to wildfire. The analysis is intended to evaluate how the exposure of individual assets and asset classes to wildfire will change over the century, considering median changes as well as extreme changes in exposure magnitude. The vulnerability analysis in CAVA, together with continuous updates to the best available climate data, are used to give a more complete picture of the potential impacts of climate change on wildfire risk and mitigation activities. In addition to FWI, the CAVA analysis will leverage California's upcoming Fifth Climate Change Assessment (2026) when made available, including its wildfire projection that is being updated with the latest Coupled Model Intercomparison Project Phase 6 (CMIP6) GCM simulation results. The wildfire projection in the California's Fifth Climate Change Assessment is expected to provide a more refined view of future wildfire risk in Southern California by accounting for high-resolution vegetation/land use and forest management scenarios, as well as ignition sources, and using actionable variables such as burned acreage.

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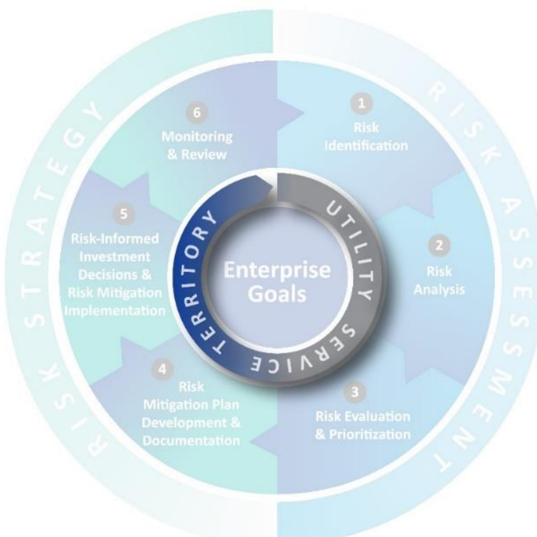
Overview of the service territory

4 OVERVIEW OF THE SERVICE TERRITORY

4.1 SERVICE TERRITORY

Evaluation of the utility service territory is a critical component of the Enterprise Risk Management Framework (see Figure 4-1) (see Section 5.1.1 for a review of the Enterprise Risk Management Framework). Understanding the territory in which SDG&E operates and the community it serves allows for the necessary risk assessment and development of risk strategies.

Figure 4-1: Utility Service Territory of the Enterprise Risk Management Framework

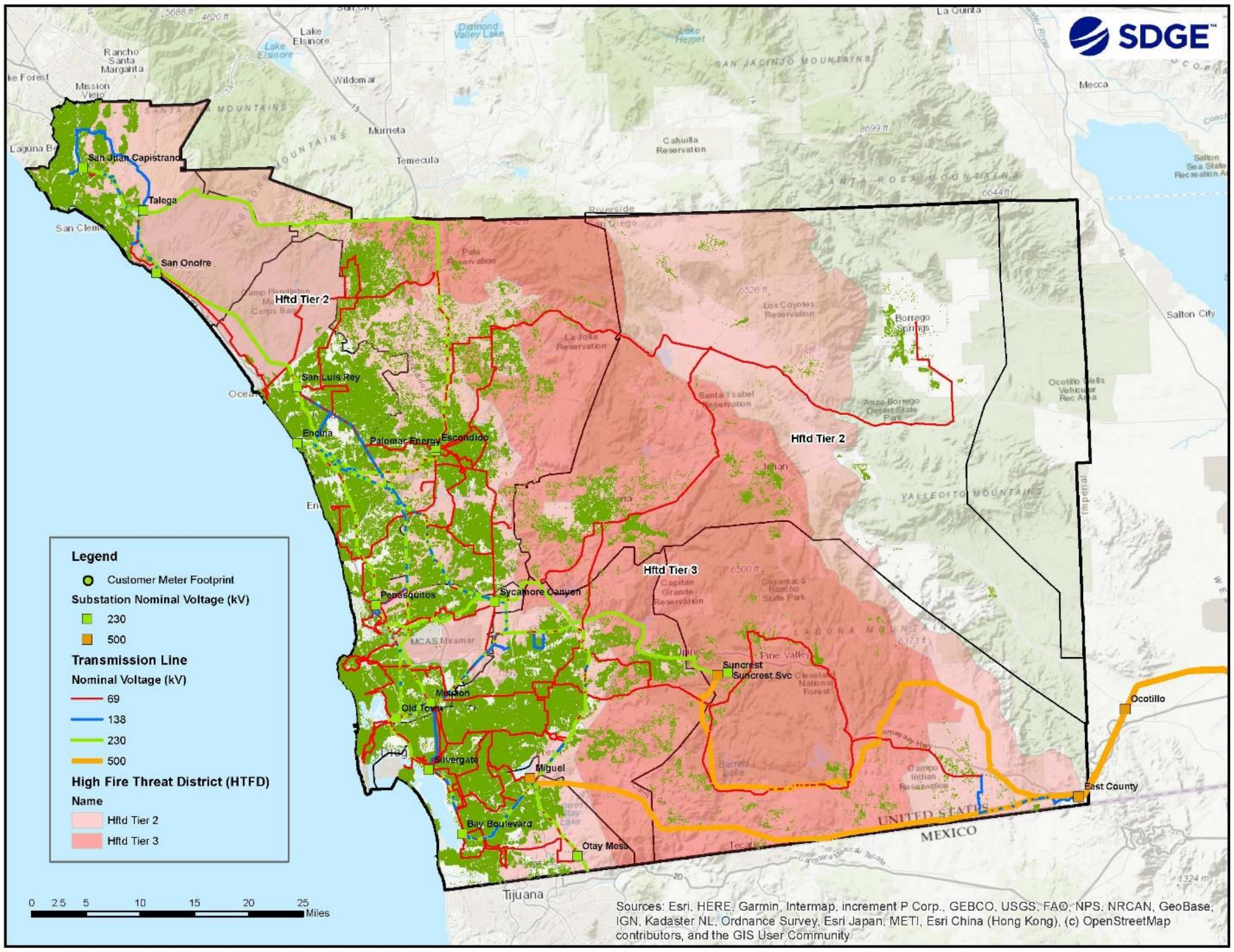


OEIS Table 4-1: High-Level Service Territory Components

Characteristic	HFTD Tier 2	HFTD Tier 3	Non-HFTD	Total
Area served (square miles)	1,396	1,426	1,574	4,396
Number of customers served (meters)	173,368	32,228	1,332,248	1,537,844
Overhead transmission lines (circuit miles)	724	268	821	1,813
Overhead distribution lines (circuit miles)	1,781	1,592	2,940	6,313
Underground transmission lines (circuit miles)	42	9	141	192
Underground distribution lines (circuit miles)	2,352	601	8,407	11,360

SDG&E supplies power to a population of 3.7 million people through 1.5 million electric meters across 25 communities in San Diego and southern Orange Counties. SDG&E's service territory spans approximately 4,400 square miles of which 64 percent is located within the HFTD. The geospatial layers of the service territory components can be found here: https://arcg.is/r9aiH3

Figure 4-2: Service Territory (polygons) and Distribution of Customers Served



"In 2018, the CPUC adopted a fire threat map to identify areas of heightened fire risk for use by utilities in planning risk reduction activities. Developed in collaboration with California Department of Forestry and Fire Protection (CAL FIRE), the Office of Emergency Services, utilities, and stakeholders, this map breaks down the wildfire risk in a utility's service district into three tiers. Tier 1 areas of the service territory have an acceptable level of wildfire risk, Tier 2 areas have an elevated risk, and Tier 3 areas have an extreme risk."[13] About two-thirds of the service territory is within Tier 2 and Tier 3 of the HFTD. Other portions are in areas defined as Wildland Urban Interface (WUI) by the CAL FIRE. The WUI is the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetation fuels (as defined in Appendix A).

The San Diego region encompasses a variety of habitats, such as marsh, coastal sage scrub, chaparral, grassland, riparian, woodlands, forest, and desert. Several habitats and species in the region are considered sensitive by state and federal agencies, local jurisdictions, and conservation organizations.

San Diego County is home to a diverse climate due to the complex topography and proximity to the Pacific Ocean. Given that the prevailing westerly winds lead to onshore flow across the service territory,

[13] CPUC Wildfire and Wildfire Safety web page; https://www.cpuc.ca.gov/industries-and-topics/wildfires

the Pacific Ocean significantly modifies temperatures. Typically, this area has cooler summers and warmer winters in comparison to other cities at similar latitudes. The marine layer, which develops from onshore flow, brings increased humidity and more mild temperatures to the coastal areas.

Occasionally during the fall and winter months, synoptic weather systems bring offshore (easterly) flow across the service territory. Offshore flow tends to bring breezy winds and arid air from the deserts into the foothills, valleys, and coastal areas, which tends to increase fire potential. The highest fire potential usually occurs during the autumn months since this coincides with the climatologically hottest time of the year and the preceding dry season.

Average annual rainfall varies significantly across San Diego County, ranging from roughly 10 inches along the coast to 20 to 40 inches across the mountains. Most rainfall occurs during the late autumn and winter months via atmospheric river events, with occasional monsoonal thunderstorms during the summer months. It is important to note that over the past 10 years, San Diego has seen an increased tendency towards drought conditions with seasonal rainfall totals falling below the 30-year climatological means.

4.2 CATASTROPHIC WILDFIRE HISTORY

There have been two utility-ignited fire events in the service territory in the past 20 years that meet the definition of a catastrophic wildfire (see Appendix A for definition). Both events occurred during the same storm in October of 2007. The Witch Creek-Guejito Fire[14] and the Rice Fire[15] began during an extremely strong Santa Ana wind event that resulted in at least 15 fires in the Southern California region that reached over 1,000 acres in the span of 10 days.

Since 2007, SDG&E has continued to report utility-related ignitions consistent with Decision (D.)19-07-015[16] on an annual basis and has built a culture of fire prevention and mitigation.

The service territory has experienced catastrophic fires attributed to non-utility causes since 2007 including the May Fires of 2014 (26,001 acres), the Border Fire of 2016 (7,609 acres), and the Valley Fire of 2020 (16,390 acres). Other fires have impacted the service territory but did not meet the stated thresholds.

OEIS Table 4-2: Catastrophic Electrical Corporation Wildfires

Ignition Date	Fire Name	Official Cause	Fire Size (acres)	No. of Fatalities	No. of Structures Destroyed and Damaged	Financial Loss (US$)	Lesson(s) Learned
10/21/2007	Witch Creek – Guejito Fire (fires merged)	CAL FIRE Reports determined that the causes of the ignition were, among other	197,990	2	1,736	$2.4 billion*	SDG&E learned the importance of situational awareness and has since developed a weather station and camera network, operational standards for work or stoppage of work under elevated and extreme conditions, risk

[14] CAL FIRE Witch Fire Incident Information web page; https://web.archive.org/web/20190115032722/http:/cdfdata.fire.ca.gov/incidents/incidents_details_info?incident_id=225
[15] CAL FIRE Rice Fire Information web page; https://www.fire.ca.gov/incidents/2007/10/22/rice-fire/
[16] D.19-07-015; https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M309/K821/309821775.PDF

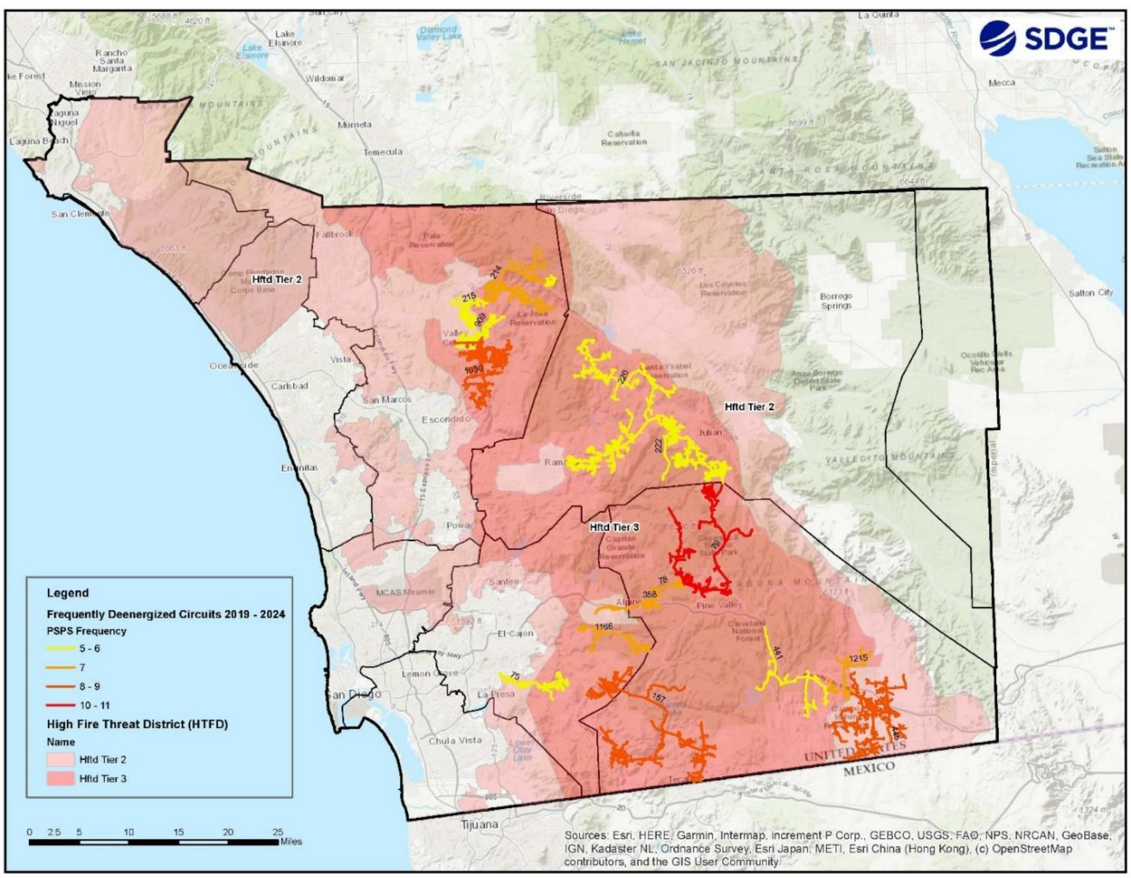
Ignition Date	Fire Name	Official Cause	Fire Size (acres)	No. of Fatalities	No. of Structures Destroyed and Damaged	Financial Loss (US$)	Lesson(s) Learned
		factors, power lines					assessment and strategy for grid hardening prioritized by risk and improved its alliance with communication infrastructure providers to address maintenance issues.
10/22/2007	Rice Fire	CAL FIRE Reports determined that the causes of the ignition were, among other factors, power lines	9,472	0	248	$2.4 billion*	SDG&E had similar lessons learned as from the Witch Creek-Guejito fire and also learned the importance of vegetation management improvements and achieving better clearances in a timely manner.

**$2.4 billion represents the consolidated settlement of claims and associated costs related to the Witch Creek and Rice fires.*

4.3 FREQUENTLY DE-ENERGIZED CIRCUITS

See OEIS Table 4-3 for a list of circuits and a breakdown of mitigation efforts. Figure 4-3 shows frequently de-energized circuits in the service territory.

Figure 4-3: Frequently De-energized Circuits



OEIS Table 4-3: Frequently De-energized Circuits

Entry #	Circuit ID	Name of Circuit	Dates of Outages	Number of Customers Hours of PSPS per Outage	Measures Taken, or Planned to Be Taken, to Reduce the Need for and Impact of Future PSPS of Circuit	Estimated Annual Decline in PSPS Events and PSPS Impact on Customers
1	1030	1030	Oct 10-11, 2019 Oct 24-25, 2019 Oct 30-31, 2019 Sept 9, 2020 Dec 2–4, 2020 Dec 7–9, 2020 Dec 23–24, 2020 Dec 9-11, 2024	556 3,830 34,959 204 90,733 70,063 1,121 76,079	Strategic Undergrounding: 44.61 miles completed to date; 8.77 miles planned for 2025; 59.5 miles planned for 2027-2028 that will be extended to 2031-2032 due to 2024-27 GRC Decision funding prioritization PSPS Sectionalizing: 7 SCADA reclosers available for sectionalizing Situational Awareness: 6 weather stations on circuit Customer Resiliency Programs: 175 customers have participated to date; customers will be invited to participate in 2025	60,844 fewer customer hours of PSPS per year
2	1166	1166	Oct 24-25, 2019 Oct 30-31, 2019 Dec 2-4, 2020 Dec 7-8, 2020 Dec 23-24, 2020 Nov 25-26, 2021 Dec 9-11, 2024	8,411 3,639 12,881 873 4,578 3,360 5,804	PSPS Sectionalizing: 3 SCADA reclosers available for sectionalizing Situational Awareness: 2 weather stations on circuit Customer Resiliency Programs: 60 customers have participated to date; customers will be invited to participate in 2025	5,957 fewer customer hours of PSPS per year
3	1215	1215	Oct 24-26, 2019 Oct 30-31, 2019 Oct 27, 2020 Dec 2-4, 2020 Dec 7-8, 2020 Nov 6-7, 2024 Dec 9-11, 2024	6,431 5,180 922 6,066 2,591 4,362 6,986	Strategic Undergrounding: 1.4 miles to be completed in 2025; 0.5 miles planned for 2025, 14.9 miles planned for 2026, and 8.1 miles planned for 2027 will be extended to 2029-30 due to 2024-27 GRC Decision funding prioritization PSPS Sectionalizing: 4 SCADA reclosers available for sectionalizing Situational Awareness: 1 weather station on circuit Customer Resiliency Programs: 30 customers have participated to date; customers will be invited to participate in 2025	2,758 fewer customer hours of PSPS per year

Note: Full table is provided in Appendix F

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Risk methodology and assessment

5 RISK METHODOLOGY AND ASSESSMENT

Effective risk modeling helps utilities reduce the likelihood of wildfires, protect communities, and ensure a more resilient electrical grid, while also improving financial planning and resource allocation. This section provides an overview of the scope and methodologies SDG&E applies for the purpose of risk quantification.

The Enterprise Risk Management Framework, used to develop the WMP, is based on the Settlement[17] that the utilities and intervenors reached in the CPUC's Safety Model Assessment Proceeding (S-MAP) and approved by the Commission as the guiding framework for conducting risk assessments for RAMP and used in quantifying and analyzing RAMP Risks. For purposes of the 2023-2025 Base WMP and the 2021 RAMP filing, the Multi-Attribute Value Function (MAVF) method was used to calculate risk scores, including wildfire and PSPS risks. The S-MAP's successor proceeding, the Risk-Based Decision-Making Framework (Risk OIR or RDF) Phase II[18] and Phase III Decisions,[19] have continued to evolve risk quantification requirements, therefore SDG&E will file its 2025 RAMP per the modified RDF Appendix A. To align risk methodologies and quantifications between this 2026-2028 Base WMP and the 2025 RAMP, SDG&E presents all its risk assessments based on the RDF guidelines.

SDG&E's risk modeling has been vetted in multiple regulatory arenas mentioned above and will continue to be evaluated in areas such as its current 2025 RAMP proceeding. SDG&E continues to explore opportunities to improve its analytics capabilities and enhance its risk models to better inform decisions. This entails transitioning to the Cost-Benefit Framework developed for the 2025 RAMP filing and evaluating risk at the conductor-span level. A risk modeling improvement plan continues to be managed and refined, which includes the evaluation of additional factors in risk models, such as climate vulnerability assessment, and further breaking out the assessment of risk drivers. Additionally, modeling design and architecture will continue to be enhanced, allowing for the tracking and validation of various model risk components, establishing a formalized process for conducting independent reviews, and further exploring the expanded use of models to inform selection and prioritization of initiatives other than installation of covered conductor and undergrounding of electric lines.

5.1 METHODOLOGY

5.1.1 OVERVIEW

The WMP is developed using SDG&E's Enterprise Risk Management Framework, which is modeled after the internationally recognized risk management standard ISO 31000 (Risk Management)[20]. The Enterprise Risk Management Framework consists of a governance structure that addresses the roles of employees at various levels up to the Board of Directors, along with various risk processes and tools.

The enterprise risk management process defines enterprise goals; analyzes the service territory; identifies, manages, and mitigates enterprise risks; and provides consistent, transparent, and repeatable

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[17] D.18-12-014; https://docs.cpuc.ca.gov/SearchRes.aspx?DocFormat=ALL&DocID=250266979
[18] D.22-12-027
[19] D.24-05-064
[20] ISO 31000; https://www.iso.org/iso-31000-risk-management.html/

results. This process is largely aligned with the Cycla Corporation's 10-Step Evaluation Method, which was adopted by the Commission "as a common yardstick for evaluating maturity, robustness, and thoroughness of utility Risk Assessment and Mitigation Models and risk management frameworks."[21] The enterprise risk management process results in an annual inventory of enterprise risks, called the Enterprise Risk Registry (ERR). The CPUC defines an ERR as "[a]n inventory of enterprise risks at a snapshot in time that summarizes (for a utility's management and/or stakeholders such as the CPUC) risks that a utility may face. The ERR must be refreshed on a regular basis and can reflect the changing nature of a risk; for example, risks that were consolidated may be separated, new risks may be added, and the level of risks may change over time."[22]

The ERR presents enterprise-level risks, including safety-related and wildfire-related risks. Each risk has one or more risk owners responsible and accountable for the risk and one or more risk managers responsible for ongoing risk assessments and overseeing the implementation of risk management plans. Input from risk managers and risk owners is used to finalize the ERR. Therefore, the Enterprise Risk Management Framework is both a "bottom-up" and "top-down" approach. Each risk in the ERR also has an associated set of mitigations (i.e., projects or programs that reduce the likelihood of the risk and/or negative consequences should a risk event occur).

For the ERR, risks are evaluated using an enterprise risk evaluation matrix with impact and likelihood as the risk dimensions. The evaluation is conducted after considering the existing infrastructure, controls, and mitigations that are currently planned or under construction, resulting in estimates of residual risk scores for the base year.

Figure 5-1 describes the Enterprise Risk Management Framework.

21 D.16-08-018 p. 195; https://docs.cpuc.ca.gov/SearchRes.aspx?DocFormat=ALL&DocID=165862364
22 D.18-12-014 p. 16-17; https://docs.cpuc.ca.gov/SearchRes.aspx?DocFormat=ALL&DocID=250266979

Figure 5-1: Enterprise Risk Management Framework

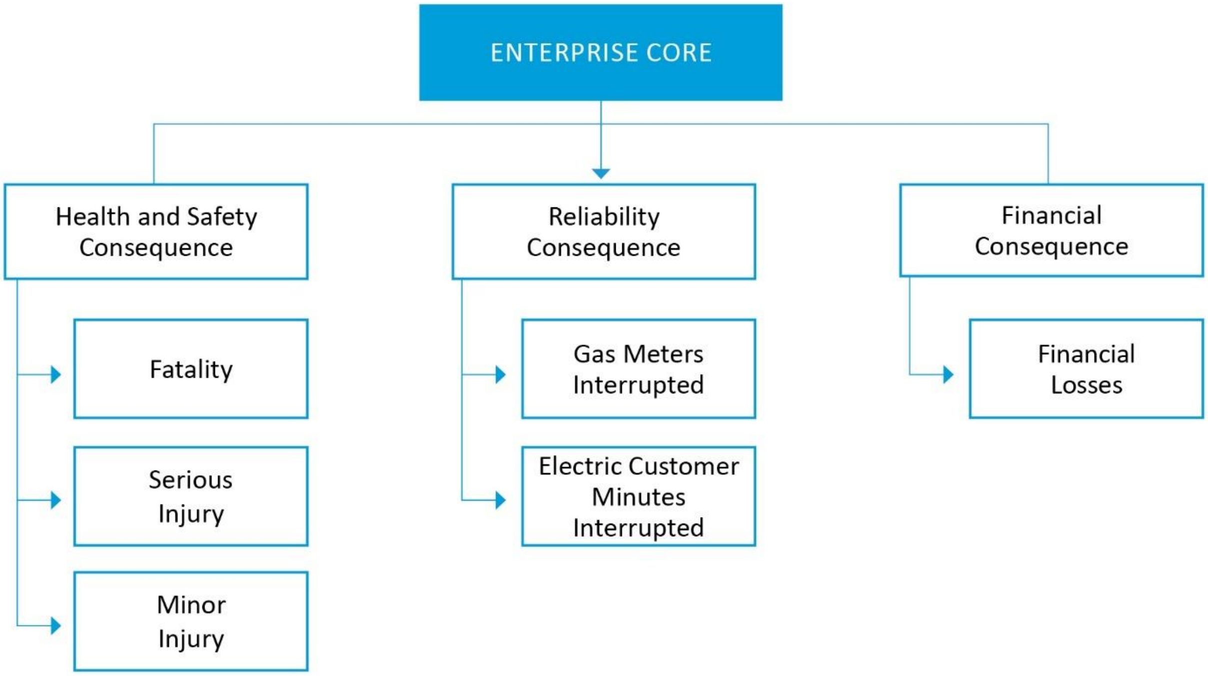
Risk identification is the process of finding, recognizing, and describing risks. The Enterprise Risk Management organization first works with various business units to update existing risk information and identify enterprise-level risks that have emerged or accelerated since the last assessment. This includes the identification of risk events, their causes, and potential consequences. This is then summarized in a Risk Bow Tie, defined as "a way to systematically and consistently evaluate the drivers/triggers, possible outcomes, and potential consequences of a risk event" and "the left side of the risk bow tie identifies potential drivers and/or triggers that may lead to a risk event (center of the risk bow tie), and the right side shows the potential consequences."[23]

At the enterprise level, risk is quantified by estimating the likelihood and consequences of a risk event. The likelihood of a risk event (LoRE) is estimated as the projected annual frequency of a risk event, while the consequence of a risk event (CoRE) is estimated based on the attributes defined by the Cost-Benefit Approach.[24] This risk quantification process is used to discuss and inform quantitative risk assessments, including for wildfire, PSPS, and protective equipment and device settings (PEDS) baseline risk estimations and risk models. Figure 5-2 shows the Enterprise CoRE Attributes.

[23] Risk Assessment Mitigation Phase (RAMP-B) Enterprise Risk Management Framework, p. B-4.

[24] D.22-12-027 Phase II Decision Adopting Modifications to the Risk-Based Decision-Making Framework Adopted in Decision

Figure 5-2: Enterprise CoRE Attributes and Sub-Attributes



To calculate a risk score, the following steps are followed:

1. The LoRE for a given year is estimated using available historical data. In the absence of such data, inputs from various teams, including Meteorology, Risk Analytics, Emergency Management, Electric Operations, and other subject matter experts are used to estimate the LoRE values.
2. The average and tail consequence values for each attribute and sub-attribute are estimated based on the range of known possible outcomes.
3. The Enterprise Risk Management Framework is used to obtain a single consequence value in dollars, known as CoRE.
4. Finally, the risk score is calculated by multiplying the LoRE and the CoRE.

Note that averages or expected values and Tail risk values are used for LoRE and CoRE estimations.

The Enterprise CoRE model consists of three main attributes (Safety, Reliability, and Financial) and sub attributes that are combined into a monetized risk score. This allows comparison between risks and mitigation alternatives on a uniform scale.

The attributes and their respective sub-attributes and dollar equivalencies are summarized in SDGE Table 5-1.

SDGE Table 5-1: CoRE Attributes and Dollar Equivalencies

Attributes	Sub-Attributes	2023 Dollar Equivalency	2025 Dollar Equivalency
Safety	Fatality	$15.2 million per fatality	$15.97 million per fatality

Attributes	Sub-Attributes	2023 Dollar Equivalency	2025 Dollar Equivalency
Safety	Serious Injury	$3.84 million per serious injury	$4.03 million per serious injury
Safety	Minor Injury	$45,000 per minor injury	$45,000 per minor injury
Electric Reliability (SDG&E Only)	n/a	$3.67 per CMI*	$3.85 per CMI*
Gas Reliability	Gas Meter Experiencing Outage	$3,382	$3,553
Financial	US Dollar	$1	$1

**Customer Minutes Interrupted (CMI) is measure for electric outages that includes the number of customers affected and duration*

For the Safety attribute and in accordance with the RDF's guidance,[25] SDG&E uses the Department of Transportation's 2023 value of statistical life (VSL) as a baseline. To reflect the higher income and inflation trends in California relative to the United States, the VSL was adjusted in accordance with the California Price Index and income multipliers.

Safety sub-attribute values and dollar equivalencies are shown in SDGE Table 5-2 and are applied in calculating the annualized pre-mitigated risk and mitigation benefits relating to the Safety attribute. The wildfire risk sub-attribute is no longer included because it corresponded with previous methodologies to quantify safety impacts resulting from wildfires.

SDGE Table 5-2: Safety Sub-Attributes, Values, and Dollar Equivalencies

Safety Sub-Attributes	Relative Value	2023 Dollar Equivalency	2025 Dollar Equivalency
Fatality	1	$15.2 million	$15.97 million
Serious Injury	0.253	$3.84 million	$4.03 million
Minor Injury	0.003	$0.045 million	$0.047 million

In accordance with the RDF's guidance on standard dollar valuations,[26] the Electric Reliability attribute is captured in terms of customers experiencing electric outages. Previously, electric reliability was quantified in terms of two sub-attributes: outage duration (i.e., System Average Duration Index [SAIDI]) and outage frequency (i.e., System Average Interruption Frequency Index [SAIFI]). For the 2026 to 2028 WMP cycle, the Electric Reliability attribute CoRE has been modified to be valued by Customer Minutes of Interruption (CMI). CMI is monetized using the Lawrence Berkley National Laboratory's (LBNL). Interruption Cost Estimator (ICE) version 1.0,[27] calibrated with specific SDG&E's customer demographics, historical billing and load information, regional economic measures, and utility operational data.

The Financial attribute focuses primarily on impacts to the public and does not include any impacts related to shareholder financial interests, such as fines to shareholders, stock price changes, changes in

[25] D.22-12-027

[26] D.22-12-027

[27] At the time of SDG&E's 2025 RAMP filing, ICE 1.0 version 2 was the LBNL model that was available. Within a reasonable timeframe and as needed, SDG&E will update its approach accordingly after the slated successor tool, ICE 2.0, becomes available.

credit ratings, or unrecoverable legal fees. Like the other attributes, the Financial attribute is used to estimate aspects of impacts from risk events. However, different types of costs are measured in this attribute. The two general types of costs are societal damage (e.g., including physical damages, lost wages, and relocation costs) and utility repair costs (e.g., labor, materials). Precision for the Financial attribute is difficult to achieve as risk events are rarely reported with a single summation of all financial impacts. Depending on the risk event, differing approaches were used to estimate the financial impacts. The Financial attribute's monetization, equivalent to 1 U.S. dollar, is applied in calculating the annualized pre-mitigated risk and mitigation benefits relating to Financial attribute CoRE.

Once LoRE and CoRE are calculated, wildfire risk can be calculated for wildfire risk, PSPS risk, and PEDS risk (see Section 5.2.1 Risk and Risk Component Identification for calculation details). Briefly:

The wildfire risk score is the product of wildfire LoRE and wildfire CoRE

$$WF\ Risk\ =\ WF\ LoRE\ \times\ WF\ CoRE$$

The PSPS risk score is the product of PSPS LoRE and PSPS CoRE

$$PSPS\ Risk\ =\ PSPS\ LoRE\ \times\ PSPS\ CoRE$$

The PEDS risk score is the product of PEDS LoRE and PEDS CoRE

$$PEDS\ Risk\ =\ PEDS\ LoRE\ \times\ PEDS\ CoRE$$

The Overall wildfire, PEDS and PSPS risk is the summation of WF Risk, PSPS Risk, and PEDS Risk

$$Overall\ Wildfire\ and\ PSPS\ Risk\ =\ WF\ Risk +\ PSPS\ Risk + PEDS\ Risk$$

5.2 RISK ANALYSIS FRAMEWORK

The risk analysis framework uses the WiNGS models to determine overall wildfire and overall outage program risk.

The WiNGS-Planning model is used to calculate wildfire, PSPS, and PEDS risk. It was developed to aid with the allocation of grid hardening initiatives across the HFTD by assessing the expected risk and cost associated with available grid hardening initiatives.

The WiNGS-Ops model was developed to assess whether the advantages of proactive de-energization outweigh the potential safety risks to the public during extreme fire weather conditions. It quantifies these two opposing scenarios at the feeder-segment level based on 3-day weather forecasts ingested daily. The WiNGS-Ops model assesses overall wildfire and PSPS risk, which are aligned to the Electric and Operations (Asset Based) subcomponents of Overall Utility Risk.

Numerous factors are evaluated in the quantification of risk. PSPS risk is significantly influenced by the topography of the circuit feeder segment and its association with weather stations. Factors like wind speed, historical tree strikes, vegetation density, asset hardening, and asset health feed into the pole/span conditional PoI model. PoF models incorporate historical weather conditions, with an emphasis on wind gusts, and correlates these conditions with site-specific factors, asset attributes, and tree inventory data. Social and physical vulnerability aspects are considered with respect to consequence modeling, such as AFN customers for PSPS CoRE as well as acres burned and buildings destroyed for Wildfire CoRE. A general WiNGS-Planning and WiNGS-Ops model process flow diagram depicting the various model elements and process steps and their interactions is detailed in Figure 5-6. Additionally, Section 1 of Appendix B details SDG&E's risk model inventory, summarizing the different factors evaluated for each model. The impacts of climate change and access capacities to wildfire risk continue to be evaluated.

Because the individual elements of risk assessment can be interdependent, SDG&E aims to make the interfaces between the various risk models and activities internally consistent. Several key assumptions are made to represent the physical world and/or to simplify calculations. These include assumptions around PSPS impacts, wildfire-related risks, and some mitigation attributes. For more information around risk modeling assumptions and limitations, see OEIS Table 5-1.

Specifically, the WiNGS-Planning model incorporates the following factors (see Section 5.2.3 for a detailed explanation including an outline of risk modeling assumptions and limitations):

- Equipment/Assets: Equipment and asset characteristics are factored into the likelihood models and are included in Asset PoF × PoI.
- Topography: Topography characteristics are incorporated into the likelihood (PoI) and consequence (fire propagation) models.
- Weather: Weather conditions are integrated into the likelihood of failure (PoF), likelihood of ignition (PoI), and consequence (wildfire propagation) models.
- Vegetation: Vegetation conditions are integrated into the likelihood of failure (PoF), likelihood of ignition (PoI), and consequence (wildfire propagation) models.
- Climate Change: Climate change effects are not currently included in SDG&E's risk modeling. SDG&E is conducting a system wide CAVA that examines mid and end of century climate change projections. SDG&E will update its risk modeling methodology when new data becomes available.
- Social Vulnerability: Customer type and location data are used as inputs for the PSPS and PEDS consequence models.
- Physical Vulnerability: Customer type and location data are used as inputs for the PSPS and PEDS consequence models.
- Access Capacities: Customer type and location data are used as inputs for the PSPS and PEDS consequence models.

5.2.1 RISK AND RISK COMPONENT IDENTIFICATION

The first step of the Enterprise Risk Management Framework is Risk Identification (see Figure 5-3). The Risk Identification step involves the identification of hazards and the determination of the likelihood of hazards. Figure 5-4 shows the process for identifying overall utility risk.

Figure 5-3: Risk Identification Step of the Enterprise Risk Management Framework

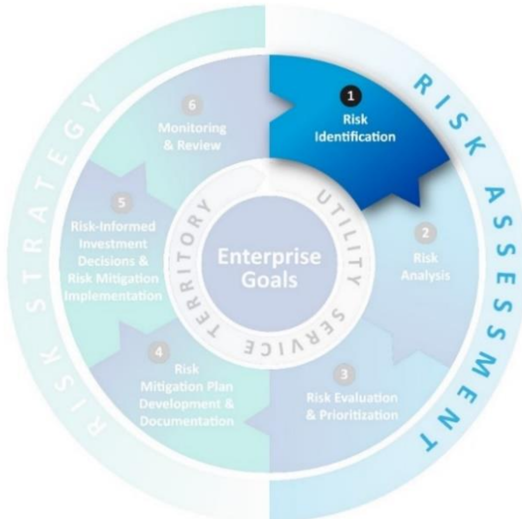
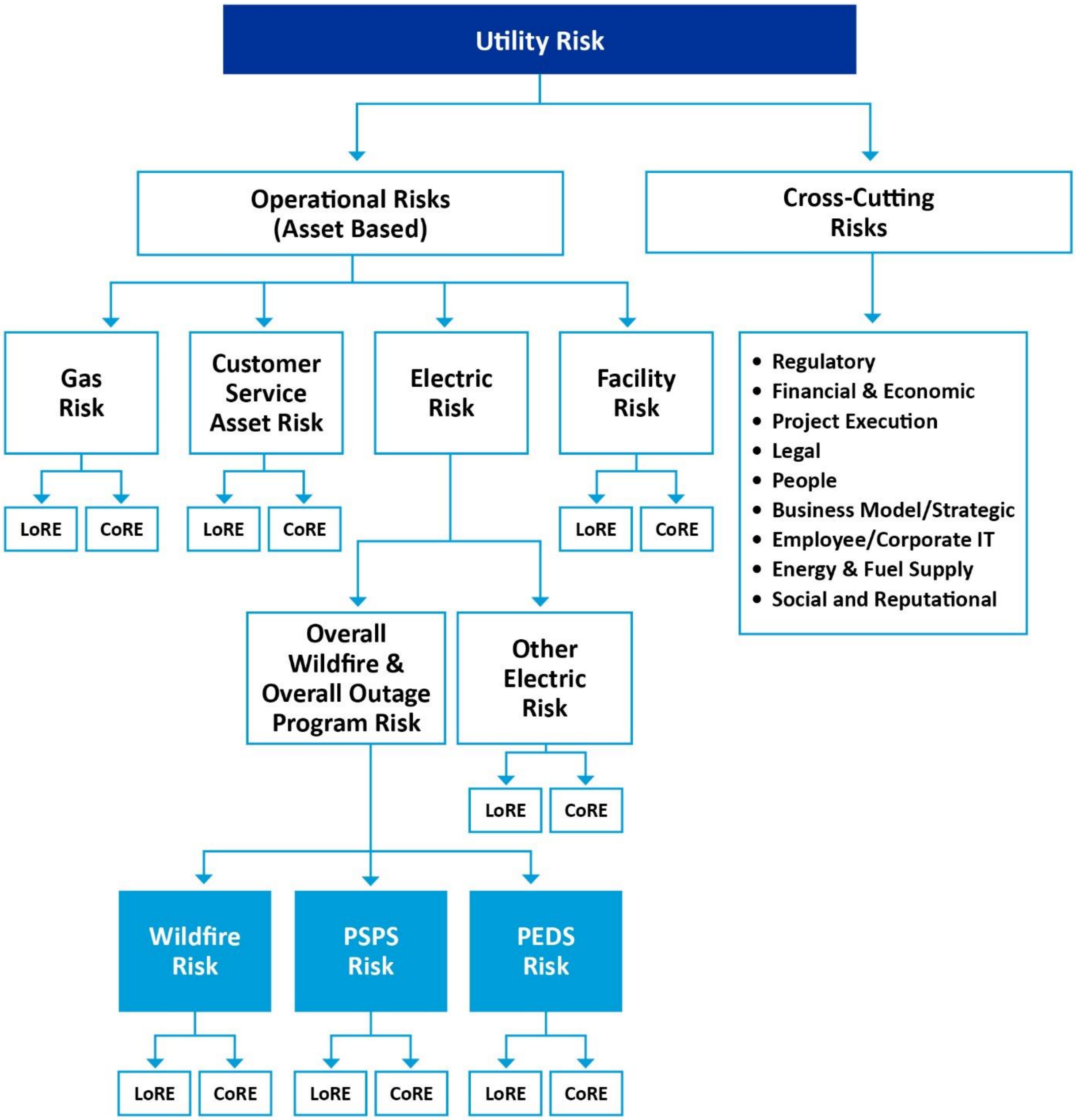


Figure 5-4: Enterprise Utility Risk Overview



Utility Risk: Risks that arise from the operation and delivery of potentially inherently hazardous commodities (electricity and gas).

Operational Risks (Asset-Based): Risks associated with the safe and reliable operation of assets designed to deliver commodities (electricity and gas). These include Gas Risk, Customer Service Asset Risk, Electric Risk, and Facility Risk.

Cross-Cutting Risks: Risks to support functions that may impact one or more aspects of the operational risks. These are risks that may not be directly associated with one risk but could affect all operational risks.

Overall Wildfire & Overall Outage Program Risk: Risks that reflect the aggregate potential of adverse impacts to people, property, critical infrastructure, or other valued assets. Part of Electric Risk, they are made up of the total expected annualized impact from ignition and PSPS de-energizations at a specific location. This metric is a summation of the wildfire, PSPS, and PEDS risk scores.

Wildfire Risk: The total expected and percentiles (tail) annualized impacts from ignitions caused by SDG&E electrical asset at a specific location.

PSPS Risk: The total expected and percentiles (tail) annualized impacts from a PSPS de-energization at a specific location. PSPS risk is significantly influenced by the topology of the circuit feeder segment and its association with weather stations. Additionally, the number and type of customers, enterprise assumptions, and event-specific assumptions also play crucial roles in determining the risk.

PEDS Risk: The total expected and percentiles (tail) annualized impacts from PEDS at a specific location.

LoRE: The probability or likelihood that a specific risk event will occur. Assesses the potential frequency of risk events at each feeder-segment based on historical data and subject matter expertise.

CoRE: The measurement of the potential impact or consequence of a risk event if it occurs based on safety, reliability, and financial impacts.

5.2.1.1 WINGS-PLANNING AND WINGS-OPS MODELS

The WiNGS-Planning model is used to calculate wildfire, PSPS, and PEDS risk used in the aggregated overall wildfire and overall outage program risk components. It was developed to aid with the allocation of grid hardening initiatives across the HFTD by assessing the expected risk and cost associated with available grid hardening initiatives.

The WiNGS-Planning risk framework is built upon the Cost-Benefit Framework developed for the 2025 RAMP filing[28,29]. It evaluates risk as a probability distribution of estimated cost incurred at the conductor-span granularity level, which is then aggregated to the feeder-segment granularity level to perform decision optimization for grid-hardening mitigation selections. The model output is used to guide investment decisions by helping prioritize mitigation selections based on a cost-benefit analysis framework with the goal of implementing a cost-effective approach to minimize the expected impact of wildfires, PSPS de-energization, and PEDS-driven outages on the grid.

The WiNGS-Planning production model adheres to a strict software versioning process for its code base. Grid hardening prioritization guidance utilizing model outputs is done at discrete points in time to provide guidance years in advance, leveraging the latest validated production model version.

The WiNGS-Ops model was developed to assess whether the advantages of proactive de-energization outweigh the potential safety risks to the public during extreme fire weather conditions. It quantifies these two opposing scenarios at the feeder-segment level based on 3-day weather forecasts ingested

[28] D.22-12-027
[29] D.24-05-064

daily. The WiNGS-Ops model assesses overall wildfire and PSPS risk, which are aligned to the Electric and Operations (Asset Based) subcomponents of Overall Utility Risk (see Figure 5-4).

For every feeder-segment identified as a potential candidate for de-energization, the WiNGS-Ops model quantifies wildfire and PSPS risk as well as identifies wind gust thresholds for which de-energization would likely produce a favorable outcome for customers and the public. The comparative assessments of wildfire and PSPS risks are calculated from segment-specific criteria, including factors such as weather, customers, assets, enterprise assumptions, and event-specific assumptions.

The risk calculation process for the WiNGS-Planning and WiNGS-Ops models is described in Figure 5-6.

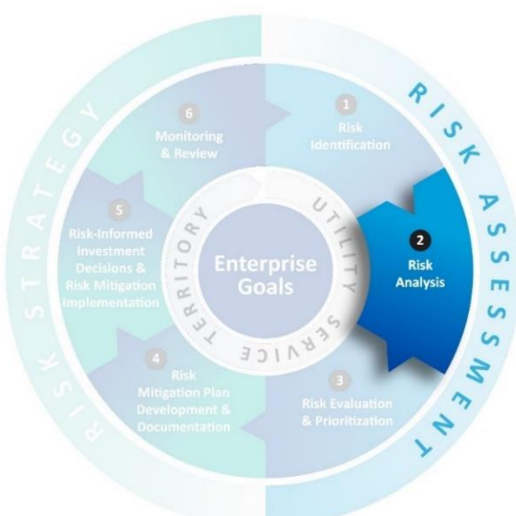
Several models and sub models provide insights to WiNGS-Ops and WiNGS-Planning regarding wildfire and PSPS risk during fire weather conditions to inform PSPS de-energization and long-term grid-hardening decisions. These model families integrate numerous inputs across weather, asset, customer information, event-specific assumptions, and other external source data categories, as shown in Figure 5-6. Models include:

- Likelihood of Failure and Ignition Models: Estimate the likelihood of span- and pole-based ignitions based on fault drivers.
- Wildfire Consequence Models: Rely on simulations of potential wildfire impacts in the service territory based on historical fire weather and forecasted weather conditions.
- PSPS and PEDS Consequence Models: Utilize historical data, subject matter expert assumptions, and the Cost-Benefit Framework to assess the potential consequences of utility outages for each SCADA sectionalizing device in the HFTD.

5.2.2 RISK AND RISK COMPONENTS CALCULATION

The second step of the Enterprise Risk Management Framework is Risk Analysis (see Figure 5-5). Part of Risk Analysis is calculating risks and risk components.

Figure 5-5: Risk Analysis Step of the Enterprise Risk Management Framework



This section provides an explanation of how wildfire Risk, PSPS Risk, and PEDS Risk LoRE and CoRE are estimated to establish baseline risk estimates for every feeder segment in the HFTD.

Wildfire risk is highly situational and is influenced by numerous dynamic variables such as weather conditions, vegetation, situational awareness, and suppression resources. Many risk drivers are beyond a utility's control, including man-made debris, animal contacts, vehicle incidents, and human activities. While wildfires are infrequent (low probability) events, their significant (high consequence) impacts highlight the importance of careful risk assessment. Therefore, advanced modeling techniques and diverse data sources are utilized to better estimate risk and collaboration with industry experts, academic institutions, government agencies, is conducted that includes analyses of estimated wildfire spread, acres burned, and the number of buildings affected or destroyed.

To effectively address the low probability but high consequence impacts of wildfires, as well as the more frequent but relatively less severe impacts of PSPS de-energizations and PEDS, risk assessments have transitioned to a probabilistic framework. This framework involves creating probability distributions to estimate the likelihood of the full range of potential risk consequences a given feeder-segment may exhibit.

The transition has involved the enhancement of risk assessment tools, improving modeling capabilities to address diverse risk scenarios, perform sensitivity analysis, and evaluate the impact of extreme events, resulting in an optimized long-term strategy that enhances public safety and minimizes disruption to customers during extreme fire weather conditions. Additionally, it aligns risk modeling requirements from the most recent California Public Utilities Commission (CPUC)[30] decision with the 2026-2028 Wildfire Mitigation Plan Technical Guidelines[31] and addresses the following Areas for Continued Improvement (ACIs) (defined by Energy Safety) (see Appendix D for details on ACIs):

- SDGE-25U-01. Calculating Risk Scores using Maximum Consequence Values
- SDGE-23B-04. Incorporation of Extreme Weather Scenarios into Planning Models
- SDGE-25U-03. Third-Party Recommendations for Model Improvements

A general WiNGS-Planning and WiNGS-Ops model process flow diagram depicting the various model elements and process steps and their interactions is detailed in Figure 5-6.

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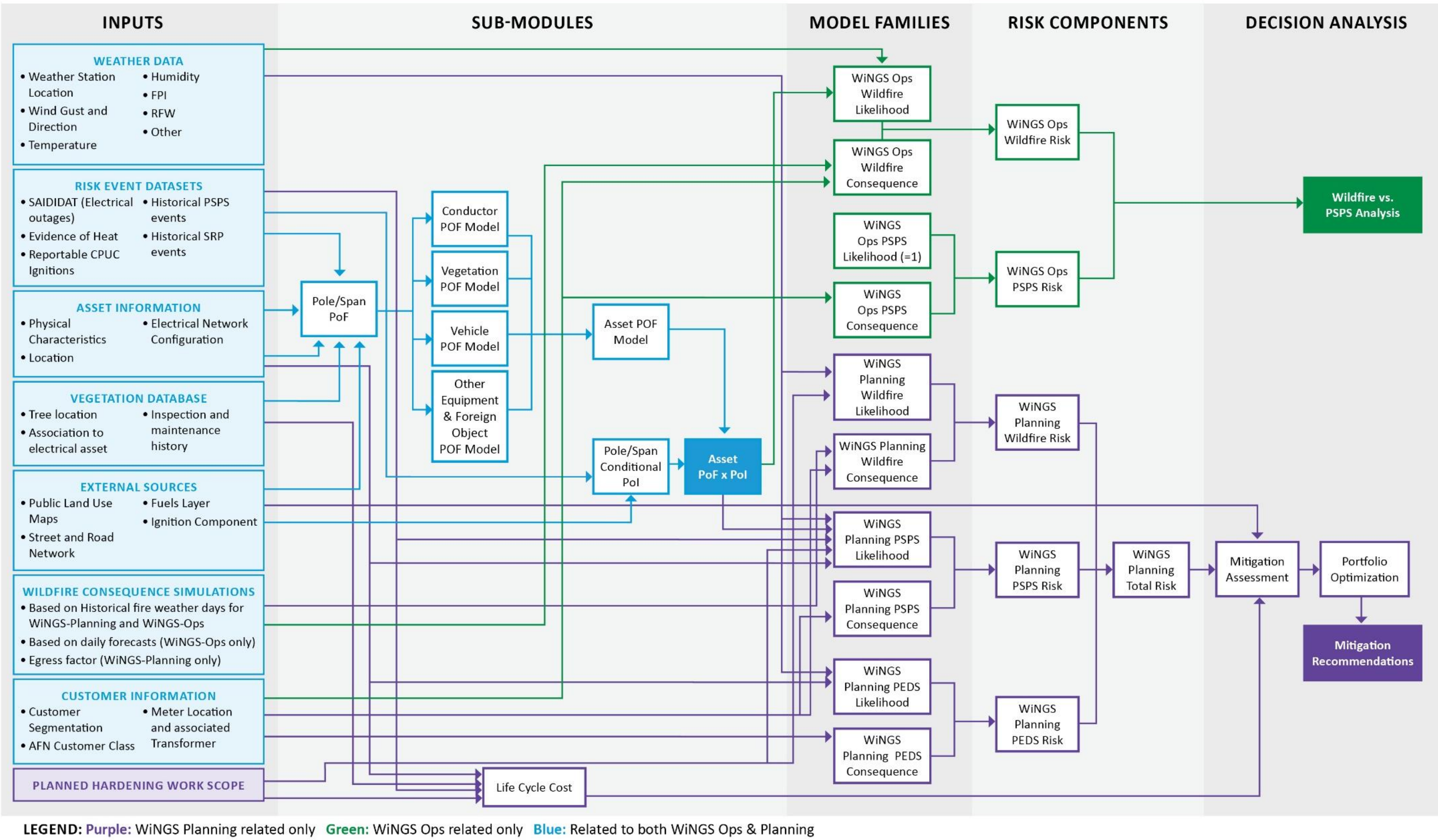
[30] D.24-05-064

[31] 2026-2028 Wildfire Mitigation Plan Technical Guidelines; https://energysafety.ca.gov/what-we-do/electrical-infrastructure-safety/wildfire-mitigation-and-safety/wildfire-mitigation-plans/2026-28-wildfire-mitigation-plan-guidelines/

Figure 5-6: WiNGS-Planning and Ops Calculation Schematic



5.2.2.1 LIKELIHOOD OF RISK EVENT

The LoRE component of the WiNGS-Planning and WiNGS Ops models leverages a variety of data to calculate the likelihood (depicted as a probability distribution) of a risk event occurring in a year. SDGE Table 5-3 shows the risk components for LoRE. For further information on how LoRE is used in Wings-Planning and WiNGS-Ops (including ignition likelihood, burn probability, and PSPS likelihood), see Appendix B.

SDGE Table 5-3: Risk Components for LoRE

Risk Component	Description
Wildfire Likelihood	Simulates annual frequency of ignition event occurrences leading to potential wildfires, leveraging probabilistic PoI values and simulated wind speeds.
Other Equipment & Foreign Object Probability of Failure	Estimates the likelihood and frequency of other equipment and foreign object failure (e.g, fuse damages, animal interference, vandalism, etc.) at every span in the service territory.
Vegetation Probability of Failure	Estimates the likelihood and frequency of a vegetation failure (i.e., tree strike causing a wire down) at every span in the service territory.
Conductor Probability of Failure	Estimates the likelihood and frequency of a conductor failure (i.e., wire down) at every span in the service territory.
Vehicle Contact Probability of Failure	Estimates the likelihood and frequency of a vehicle contact failure at every pole in the service territory.
Pole/Span Conditional Probability of Ignition	Estimates the likelihood and frequency of an electrical outage leading to an ignition within the service territory.
PSPS Likelihood	Estimates the probability that a given feeder-segment would be proactively de-energized due to PSPS on a given high-fire day. For WiNGS-Ops, a PSPS Likelihood of 1 is assumed.
Burn Likelihood	Subject matter expertise is used to select a representation of the worst fire weather days in the service territory. The burn probability is assumed to be 100% for these days.
PEDS Outage Likelihood	Simulates annual frequency of PEDS outage event impact occurrences in a specific location of the grid.

5.2.2.2 CONSEQUENCE OF RISK EVENT

Consequence of Risk Event (CoRE) is calculated utilizing the Cost Benefit Framework. Given the occurrence of a risk event (wildfire, PSPS, or PEDS), this framework is used to estimate the potential consequences across the three main attributes (Safety, Reliability, and Financial) to determine a total consequence value in dollars. Refer to Section 5.1.1 Overview for a discussion and justification of each attribute.

5.2.2.2.1 Wildfire CoRE

Wildfire consequence estimations are derived from Technosylva's FireSight™ simulations (also known as WFA-E WRRM). These simulations assess fire behavior at each asset location under historical worst-case fire weather conditions. For more information on fire weather scenarios used to estimate wildfire consequence see Section 5.3.1 Design Basis Scenarios.

Technosylva's wildfire modeling incorporates weather variables, detailed fuel layers, and a 24-hour unsuppressed fire spread model to estimate potential ignition size (acres burned) and impact (buildings destroyed) both at and around asset locations within the service territory.

- Safety Attribute: Assumptions for Serious Injuries and Fatalities (SIF) estimates are based on a review of historical wildfire data and are updated when new data is available. SIFs estimates are translated into monetary values using the methods outlined in Section 5.1.1 Overview.
- Reliability Attribute: Assumptions for CMI estimates are derived from a review of historical outage data and are updated as new data becomes available. CMI estimates are translated into monetary values using the methods outlined in Section 5.1.1 Overview.
- Financial Attribute: This attribute is calculated from historical wildfire records (acres burned and structures destroyed). Due to the difficulty of determining the precise financial losses of wildfire events and the lack of a single source of financial impacts from wildfire, subject matter expert assumptions are made when translating acres burned and buildings destroyed into a financial dollar estimate. Wildfire events primarily have costs related to property damage, personal injury or fatality, suppression costs, environmental damage and remediation, lost economic output for various reasons (including work closures and employee unavailability), and personal relocation. Available data is used to approximate financial impacts and assumptions will continue to be modified as new information becomes available. In addition, partnerships with industry leader companies and academia institutions will continue in order to better estimate the financial impact of a catastrophic wildfire in SDG&E's communities.

SDGE Table 5-4: Attributes for Wildfire Consequence

Risk Component	Wildfire Consequence
Safety	Equivalent Safety Serious Injuries and Fatalities (SIF) are calculated based on Technosylva estimates of structures destroyed. Assumption: To estimate the total number of equivalent fatalities per structure destroyed a 0.00617 factor is assumed. This factor is estimated based on an internal analysis conducted on the CAL FIRE dataset.
Reliability	Subject matter expert conservative assumption to estimate Customer Minutes Interrupted (CMI) values based on estimates of outage duration and assumed restoration duration. These CMI estimates are subsequently monetized using the $/CMI value provided in SDGE Table 5-1. Assumption: Restoration time is 24 hours
Financial	Subject matter expert conservative assumption to translate buildings destroyed and acres impacted estimated by Technosylva simulations to financial dollars. Assumptions: Suppression and restoration cost: $2,350/acres burned; Structure Destroyed cost: $1,000,000/structure destroyed

5.2.2.2.2 PSPS CoRE

To calculate the potential impacts of PSPS de-energizations, the duration of de-energization by feeder segment and the number and type of downstream customers affected by de-energization on each feeder segment are considered. These values are used to determine natural unit values for the three consequence attributes.

- Safety Attribute: Safety consequence is estimated based on historical PSPS de-energizations across California and reviewed to understand the frequency, duration, and magnitude (customer affected) of PSPS de-energization. As the safety impact of a PSPS de-energization is not the same for all customer types, a Customer Type Value Consequence is estimated to represent different levels of safety impacts. Based on subject matter expert assumptions, different weighting (or scaling factors) is applied to each customer meter to increase the number of SIFs downstream of each supervisory control and data acquisition (SCADA) Sectionalizing device. Customer Type Value Consequence include:
    - Critical Facilities and Critical Infrastructure: Customers based on the CPUC's De-Energization proceeding definition.
    - Community Vulnerability: AFN customers based on the CPUC's definition of AFN customers
    - Other: All other customers that do not fall in either the critical or AFN categories
- Reliability Attribute: Subject matter expert assumptions for CMI estimates are based on a review of historical CMI values associated with past PSPS de-energizations in the service territory.
- Financial Attribute: Per customer and per PSPS de-energizations, a potential financial impact is estimated based on subject matter expert assumptions based on the per diem rates applicable to San Diego, CA, for the fiscal year 2023, with the assumption of accommodating four family members per electrical meter. A Commercial and Industrial (C&I) multiplier is also included to quantify the reliability impact of these customers during the PSPS de-energization.

SDGE Table 5-5: Attributes for PSPS Consequence

Risk Attribute	PSPS Consequence
Safety	Subject matter expert conservative assumption to estimate the potential number of Serious Injuries and Fatalities (SIF) created by a PSPS de-energization. Assumption: 1 fatality per 10 billion customer minutes de-energized. Estimated based on a review of historical PSPS de-energizations in California (2018-2021).
Reliability	Customer Minutes Interrupted (CMI) estimates are calculated directly from the number of customers impacted at each feeder segment with varying event durations based on historical and projected durations of PSPS de-energizations. Assumption: CMI estimates are subsequently monetized using the $/CMI value provided in SDGE Table 5-1.
Financial	Subject matter expert conservative assumption to estimate the potential financial loss experienced by customers affected by a PSPS de-energization. Assumption: For residential customers a $482 cost per event is calculated using the per diem rates applicable to San Diego, California, as of September 2024, with the assumption of accommodating four family members per customer meter. For C&I customers, a $1,446 cost per event* is estimated.

**Financial values as of February 2025. A factor of three is assumed for C&I customers: https://www.federalpay.org/perdiem/2025/california/san-diego*

5.2.2.2.3 PEDS CoRE

The PEDS consequence model follows a similar approach to the PSPS CoRE model because it is modeled as a reliability outage occurring during extreme fire weather days. The following assumptions are considered to establish PEDS consequences.

- Safety Attribute: The same assumptions used for PSPS SIF estimates are applied to the Safety component of PEDS. PEDS duration estimates are derived from a review of historical PEDS outages. These SIF estimates are then converted into monetary values using the monetization methods outlined in Section 5.1.1 Overview.
- Reliability Attribute: Assumptions for CMI estimates are derived from a review of historical PEDS outage data and are updated as new data becomes available. CMI estimates are translated into monetary values using the methods outlined in Section 5.1.1 Overview.
- Financial Attribute: Due to the limited data on the financial impacts of a PEDS outage, SDG&E relies on conservative estimates from subject matter experts. These estimates are based on high-level projections of overhead line patrol costs during periods of elevated or extreme fire weather conditions.

SDGE Table 5-6: Attributes for PEDS Consequence

Risk Attribute	PEDS Consequence
Safety	Subject matter expert conservative assumption to estimate the potential number of Serious Injuries and Fatalities (SIF) created by a PEDS reliability outage event. Assumption: 1 fatality per 10 billion customer minutes de-energized. This assumption is estimated based on a review of historical PSPS de-energizations in California (2018-2021).
Reliability	Customer Minutes Interrupted (CMI) estimates are calculated directly from the number of customers impacted at each feeder segment, with varying event durations based on historical and projected durations of PEDS de-energizations. Assumption: CMI estimates are subsequently monetized using the $/CMI value provided in SDGE Table 5-1.
Financial	Subject matter expert conservative assumption to estimate the potential financial loss by a PEDS de-energization event. Assumption: Based on historical overhead line patrol costs during elevated or extreme fire weather conditions. Whether conducted on foot or by helicopter, a 10% ratio of the expected reliability cost is assumed.

SDG&E regularly works with industry experts, academia, government agencies, and other stakeholders to better understand and quantify the impact of PSPS de-energizations, PEDS, and catastrophic wildfires through analyses on estimated wildfire spread, acres burned, and buildings impacted or destroyed. For further information on how CoRE is used in Wings-Planning and WiNGS-Ops (including wildfire consequence, wildfire hazard intensity, wildfire exposure potential, wildfire vulnerability, PSPS consequence, PSPS exposure potential, PSPS vulnerability), see Appendix B.

5.2.2.3 RISK

In 2024 the WiNGS-Planning model methodology was updated to incorporate the WiNGS-Ops probabilistic framework. WiNGS-Planning now utilizes statistical and machine learning models developed with historical electrical outage data and ignitions and correlated with historical asset characteristics, vegetation, site-specific conditions, and weather conditions, in order to capture the influence of wind gust and wind direction variables at the time of the outage and ignition. By analyzing these correlations and the influence of other variables, insights into the probability of failure and ignition across various wind gust scenarios can be determined.

The model's risk event probability distributions developed from a Monte Carlo based framework not only allows SDG&E to generate statistical estimates of potential wildfires, PSPS de-energizations, and PEDS, but also allows for the simulation of various scenarios of grid hardening initiatives to assess the expected risk reduction at each feeder-segment within the service territory.

Any probabilistic decision-making framework designed to reduce catastrophic events relies on three primary inputs: the probability of an undesirable event occurring, the consequence (or cost) of that event, and the expected reduction in risk, which includes selecting appropriate mitigation measures (e.g., strategic undergrounding). Additionally, it involves evaluating the residual risk remaining in the system after the mitigation is applied and understanding the lifecycle activities and costs associated with reducing either the probability or the consequence of the event.

At a basic level, risk associated with an undesirable event is its probability multiplied by its consequence. As a result, the calculated risk of a low-consequence, high-probability event might be the same as the risk of a high-consequence, low-probability event. While equating these risks may be mathematically rigorous and accepted in some risk assessment frameworks, multiple studies suggest that society may not view these risks as equivalent.[32,33,34] Society tends to be more accepting of frequent, low-consequence events (e.g., short-duration outages) but is intolerant of rare but devastating events, such as large-scale wildfires.

Risk-informed decision-making frameworks can be formulated to recognize this aversion towards devastating events and better align the consequences of potential disasters with society's perception of the costs, a concept known as Risk Attitude. The degree of risk aversion is typically incorporated into a decision model through the introduction of a mapping function that converts the measurable consequence—whether it be in dollars, safety, reliability, or other metrics—into an equivalent social cost. Informed decisions that are indifferent between the range of outcomes towards varying consequences of risk events follow a risk-neutral approach, with a 1:1 ratio of consequence to social cost. Conversely, in a risk-averse approach, consequences are mapped to societal costs using a convex nonlinear function that disproportionately penalizes losses from high-consequence events, such as a massive wildfire impacting communities, the environment, and resulting in multibillion-dollar losses, compared to lower-consequence events.

One typical functional form used for risk-averse scaling is a power law equation with $f(x) = x^{\alpha}$, where $\alpha > 1$[35]. Figure 5-7 illustrates a risk neutral scenario (green line) and the risk attitude function used by SDG&E, with a parameter value (α) of 1.47 (blue line). For the Safety attribute, this function converts the number of fatalities associated with an event into an adjusted figure that reflects SDG&E's risk aversion towards catastrophic events. This adjusted number is then translated into a dollar estimate using the

[32] Slovic, P., Lichtenstein, S., and Fischhoff, B. 1984. Modeling the Societal Impact of Fatal Accidents. Management Science. 30. 464-474. 10.1287/mnsc.30.4.464.

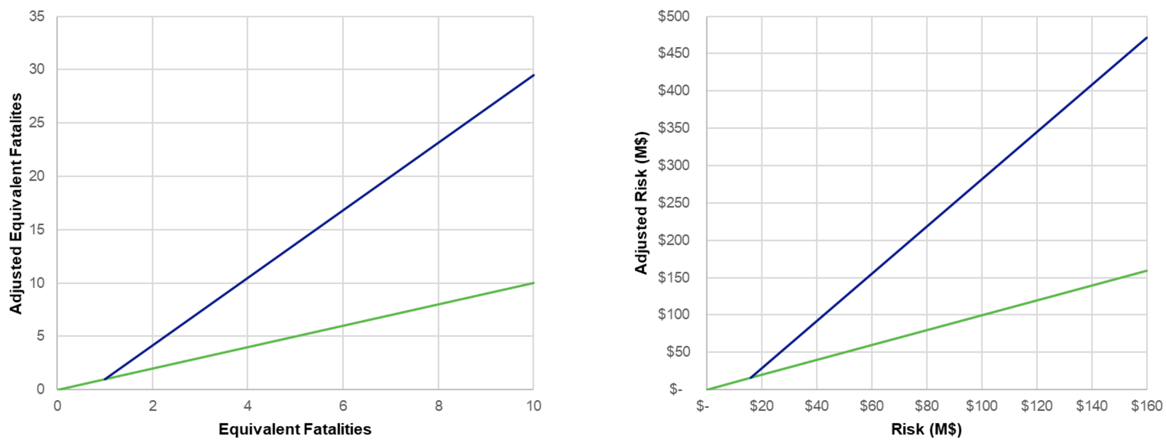
[33] Griesmeyer, J. M., Simpson, M., and Okrent, D. 1980. Use of risk aversion in risk acceptance criteria? https://doi.org/10.2172/5230500

[34] Hammerton, M., Jones-Lee, M.W., and Abbott, V. 1982 Technical Note—Equity and Public Risk: Some Empirical Results. Operations Research 30(1):203-207. https://doi.org/10.1287/opre.30.1.203
Griesmeyer, J. M., Simpson, M., and Okrent, D. 1980. Use of risk aversion in risk acceptance criteria? https://doi.org/10.2172/5230500

[35] Griesmeyer, J. M., Simpson, M., and Okrent, D. 1980. Use of risk aversion in risk acceptance criteria? https://doi.org/10.2172/5230500

2025 VSL dollar equivalency. For the Reliability and Financial event estimates, which are also measured in dollars, the 2025-VSL dollar equivalency is used to create an equivalent number of fatalities. This number is then scaled to reflect SDG&E's risk aversion and subsequently translated into a dollar estimate using the 2025 VSL dollar equivalency.

Figure 5-7: SDG&E Convex Risk Aversion Function



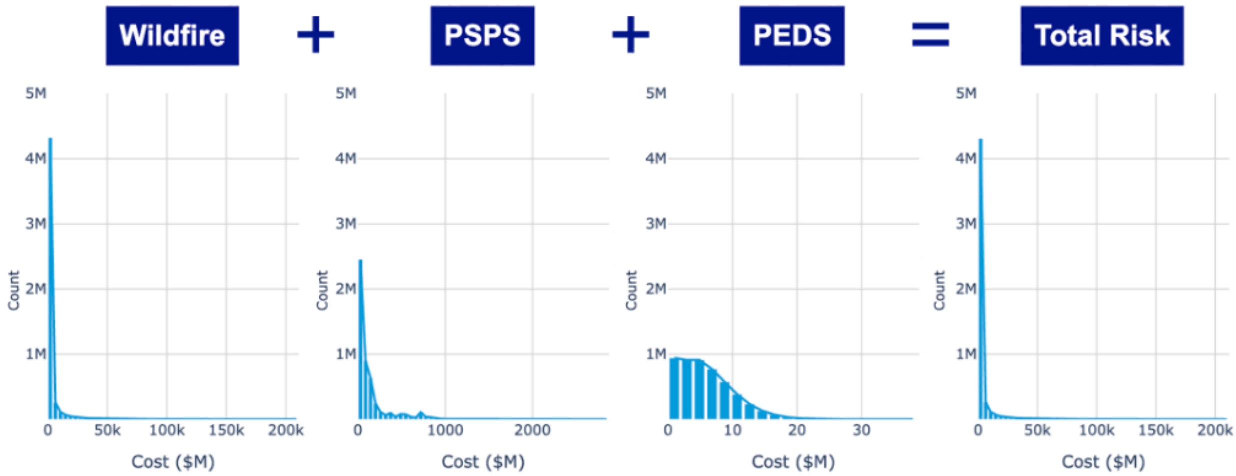
The primary motivation for incorporating a Risk Attitude function into SDG&E's risk-informed decision framework is to emphasize a aversion to highly devastating disasters. These events not only incur substantial costs due to loss of life and physical destruction but also impose significant intangible social and economic impacts on the affected communities. By integrating this risk aversion framework, SDG&E aims to better account for these potential societal impacts and prioritize wildfire mitigation measures in the riskiest areas of its service territory.

SDGE Table 5-7 and Figure 5-8 illustrate SDG&E's wildfire, PSPS, and PEDS risk levels, measured in millions of dollars in the HFTD, incorporating risk attitude at various points of the distribution. Understanding not only the expected average annual loss (AAL) but also the full spectrum of potential outcomes is crucial for risk assessment and selection and prioritization of mitigation. See SDGE Table 5-7 for detailed wildfire, PSPS, and PEDS risk levels across feeder segments.

SDGE Table 5-7: Pre-Mitigation Wildfire, PSPS, PEDS, and Overall Utility Risk estimates for the Service Territory

Percentiles	Annual Return Period (Years)	Wildfire Millions $	PSPS Millions $	PEDS Millions $	Overall Utility Risk Millions $
P50	20	$14	$63	$5	$171
P98	50	$36,165	$785	$16	$36,305
P99	100	$52,108	$866	$18	$52,245
P100	---	$210,980	$2,876	$39	$211,825
AAL	1	$2,892	$135	$6	$3,032

Figure 5-8: HFTD Risk Including Risk Aversion Attitude



Note: The term "pre-mitigation analysis," in the language of the Settlement Decision refers to required preactivity analysis conducted prior to implementing control or mitigation activity, see D.18-12-014 at Attachment A, A-12.

For further information on how risk is calculated in Wings-Planning and WiNGS-Ops see Appendix B.

Model methodology, inputs, assumptions, and technical solutions, including cloud computing and front-end visualizations, are continuously refined and optimized, ensuring it remains a robust tool for grid-hardening decision-making. In addition, SDG&E regularly collaborates with industry experts, academia, other California Investor-Owned Utilities (IOUs), government agencies, and various stakeholders to better understand and quantify the impact of catastrophic wildfires and PSPS de-energizations. These collaborations may lead to updates and enhancements in the model, ensuring it remains effective in supporting risk-based decision-making.

5.2.3 KEY ASSUMPTIONS AND LIMITATIONS

OEIS Table 5-1: Risk Modeling Assumptions and Limitations

Assumption	Justification	Limitation	Applicable Models
Average duration of PSPS de-energization for every SCADA Sectionalizing Device	Historical average PSPS de-energization in the service territory, along with subject matter expertise, is used to determine this value.	Estimating the potential duration of a PSPS de-energization at each SCADA Sectionalizing Device is a complex task as multiple variables are in play (e.g., weather forecast, firefighting resources, existing wildfires, crew availability).	- WiNGS-Ops - WiNGS-Planning - PSPS Risk
Customer impact scaling factor (Wildfire, PSPS, PEDS Vulnerability)	Subject matter expertise is used to determine a scaling factor to more accurately represent PSPS impacts to the critical and vulnerable population.	There is a lack of reliable data on how to quantify PSPS impacts on customers, specifically to subsets of customers such as critical and vulnerable.	- WiNGS-Ops - WiNGS-Planning - PSPS Risk
Serious injuries and fatalities (SIFs) per customer minute de-energized	Historical data and subject matter expertise is used to determine an estimation of the potential number of fatalities	There is a lack of historical data on serious injuries or fatalities due to PSPS de-energizations in California.	- WiNGS-Ops - WiNGS-Planning - PSPS Risk

Assumption	Justification	Limitation	Applicable Models
	and serious injuries due to a PSPS.		
Financial impact during a PSPS de-energization	Subject matter expertise is used to estimate this value based on proxies derived from the federal per diem rate for lodging, meals, and incidentals in San Diego County.	There is a lack of historical data on financial impacts to SDG&E customers due to PSPS de-energizations.	- WiNGS-Ops - WiNGS-Planning - PSPS Risk
Number of SIFs per structure destroyed in case of a wildfire	Subject matter expertise is used to estimate this value based on worst-case estimations of acres burned calculated by Technosylva.	Estimating fatalities per structure destroyed in the service territory is challenging due to several factors. This metric is highly dependent on the availability and effectiveness of firefighting resources, the timeliness and clarity of evacuation notices, the specific location of the event, and the prevailing weather conditions at the time.	- WiNGS-Ops - WiNGS-Planning - Wildfire Risk
Outage duration in case of a wildfire	Subject matter expertise is used to estimate this value based on estimates of outage duration and assumed restoration duration.	Estimating restoration time following a catastrophic wildfire is inherently challenging due to the numerous variables involved. The severity of the event plays a crucial role, as more severe wildfires can cause extensive damage to infrastructure, making restoration efforts more complex and time-consuming. Additionally, factors such as the availability of resources, accessibility of affected areas, weather conditions, and the extent of damage to critical infrastructure all contribute to the difficulty in providing accurate restoration time estimates.	- WiNGS-Ops - WiNGS-Planning - Wildfire Risk
Financial impacts in case of a wildfire	Subject matter expertise is used to estimate this value based on simulation outputs of buildings destroyed and acres impacted output.	Property value estimates are based on general assumptions and do not take into account the size, condition, location, or market value of the property	- WiNGS-Ops - WiNGS-Planning - Wildfire Risk
Annual risk event rates	Historic data is used to normalize wildfire, PSPS, and PEDS risks and quantify expected value averages.	Annual frequency rates are calibrated based on historical observations, ensuring they accurately reflect past trends. However, these rates do not account for potential future conditions or changes. This means that while the model provides a reliable estimate based on historical data, it may not fully capture the impact of evolving factors such as climate change, new infrastructure developments, or changes in vegetation and land use.	- WiNGS-Ops - WiNGS-Planning - PSPS Risk
Burn probability	Subject matter expertise is used to select a representation of the worst fire weather days in the service territory. The burn probability is assumed to be 100% for these days.	Subject matter experts select these days to balance a representative sample of days with fire weather conditions present in the HFTD. This approach aims to accurately estimate the potential impacts of catastrophic wildfires while considering current weather conditions, community insights, and local knowledge (e.g., terrain,	- WiNGS-Ops - WiNGS-Planning - Wildfire Risk

Assumption	Justification	Limitation	Applicable Models
		fuels, vegetation). Additionally, it takes into account computational resources, given the time and cost involved in conducting this analysis.	
Wildfire hazard intensity	Data from the 125 worst fire weather days is identified by subject matter experts at SDG&E and is used by Technosylva to calculate this value. Technosylva simulated outputs include flame length, rate of spread, acres burned, buildings threatened, buildings destroyed, and population impacted.	Technosylva unsuppressed simulations have a duration of 24 hours. Wildfire consequence values are calculated based on acres burned and structures destroyed.	- WiNGS-Ops - WiNGS-Planning - Wildfire Risk
PEDS annual frequency	This value is determined using historical data on PEDS outage durations in HFTD portions of the service territory.	This annual frequency may not accurately represent future outage frequencies, as the number of future device installations and outages are unknown and difficult to estimate. SDG&E activates settings only during extreme or elevated fire weather conditions.	WiNGS-Planning
PEDS event consequence values	This value is determined using historical data on PEDS outage durations recorded in the SAIDIDAT database.	Historical duration and CMI estimates may not accurately reflect future PEDS consequence impact estimates.	WiNGS-Planning
Annual PSPS de-energization during high fire risk days	This value is determined using meteorology subject matter expertise and historical event records.	The current methodology is calibrated using past PSPS de-energizations and may not adequately account for the increasing frequency and severity of fire weather conditions.	WiNGS-Planning
Overhead-to-underground mile conversion rate	This contingency value is applied to non-roadway miles to account for additional miles to underground.	Roadway miles based on buffer of roadway with intersecting spans	WiNGS-Planning
Grid-hardening lifecycle years	Subject matter expertise is used to determine this value.	Expected lifespan in years	WiNGS-Planning
Mitigation installation cost-per-mile	Historical grid-hardening data and subject matter expertise are used to determine this value.	Does not take into account site and grid specific attributes	WiNGS-Planning
Mitigation efficacy rates	Data on efficacy studies for each mitigation option is used to determine this value.	Limited to internal risk event data available	WiNGS-Planning
Hardening-State Station Alert Speed Thresholds	Operational wind gust thresholds determined during the latest PSPS are used to determine this value.	These thresholds are defined for each event and take into account numerous factors, such as the magnitude and severity of forecasted weather conditions, fuel moisture content, available firefighting resources, and other relevant variables. This comprehensive approach ensures that the PSPS alert thresholds are tailored to the specific circumstances of each event,	WiNGS-Planning

Assumption	Justification	Limitation	Applicable Models
		enhancing the effectiveness of the response and minimizing risks to public safety.	

5.3 RISK SCENARIOS

Risk scenarios considered relate to wildfire, PSPS, and PEDS mitigation investment planning as well as refined strategic shutoff of sectionalizing devices during PSPS de-energizations. WiNGS-Planning and WiNGS-Ops models share common base frameworks. For example, both models are built upon leveraging statistical and machine learning probability of failure (PoF) and probability of ignition (PoI) models that are trained and tested on historical observations (weather, outages, asset attributes). However, special consideration for the modeling aspects of each model is required.

WiNGS-Planning

Design considerations for WiNGS-Planning center around a long-term vision for reducing wildfire, PSPS, and PEDS risk in the HFTD, optimized for cost-effective prioritization of wildfire mitigation hardening efforts. To determine primary design considerations, an assessment of accurate current and future projected representation of asset and local conditions that could contribute to the risk of wildfire, PSPS de-energization, and PEDS outages is conducted. This assessment is performed at the conductor-span granularity, defined as a structure-to-structure conductor unit (e.g. a single 3-phase conductor and all attached structures/equipment tied to it, including its upstream and downstream poles). This granularity of risk assessment is performed to capture the specific risk factors relevant to each localized conductor-span unit of the larger grid, which helps identify targeted areas in the grid that pose the largest risk with respect to possible wildfire, PSPS, and PEDS de-energizations.

Monte-Carlo simulations leveraging PoI and PoF models, historical risk event distributions, and Technosylva's FireSight™ ignition spread simulations are performed utilizing a Cost-Benefit Framework to assess a probability of occurrences across all assessed outcomes for any given unit of the grid, thereby producing return intervals and probabilistic outcomes of current and projected long-term risk posed by the grid. This is performed for wildfire, PSPS, and PEDS risk as separate probability distributions that help inform grid-hardening decisions by leveraging statistical relevance as opposed to relying solely on average values.

Grid-hardening mitigation prioritization is performed at the feeder-segment level of granularity within the model, which involves assessing the alternative probability distribution for each grid-hardening strategy option available in the model, utilizing mitigation efficacy studies. These alternative what-if scenario risk profiles are then used to prioritize the optimal grid-hardening strategy for each feeder-segment unit in scope.

WiNGS-Ops

The WiNGS-Ops model assesses whether the advantages of proactive de-energization outweigh the potential safety risks to the public. WiNGS-Ops quantifies these two opposing scenarios following the enterprise risk quantification framework to inform the dynamic and complex de-energization decision on a segment-by-segment basis. PSPS de-energizations, although effective against potential ignitions under extreme wildfire conditions, have negative impacts to communities. To model the impacts of PSPS de-energizations, a 100-percent likelihood of de-energization is assumed for those areas experiencing severe weather conditions. The consequence of a PSPS de-energization is modeled assuming subject matter expert conservative estimates on each attribute (Safety, Reliability, and Financial).

WiNGS-Ops leverages dynamic real-time data from the PoI and PoF models and estimate likelihoods based on current and forecasted weather conditions. Wildfire consequences are calculated by simulating ignition impacts using historical fire weather conditions for each overhead asset location in the HFTD. Additionally, these simulation outputs are compared to 3-day weather forecasts to provide a more accurate assessment during PSPS activations. By combining historical data with short-term weather predictions, the potential impacts of wildfires can be better estimated, and response strategies can be more effectively planned during Santa Ana weather conditions.

Technosylva's Wildfire Analyst™ products are used to conduct modeling, deliver modeling outputs, and monitor and visualize results. Daily model simulations based on a 3-day weather forecast are stored in SDG&E's cloud and can be visualized in both Technosylva software and the WiNGS-Ops visualization platform.

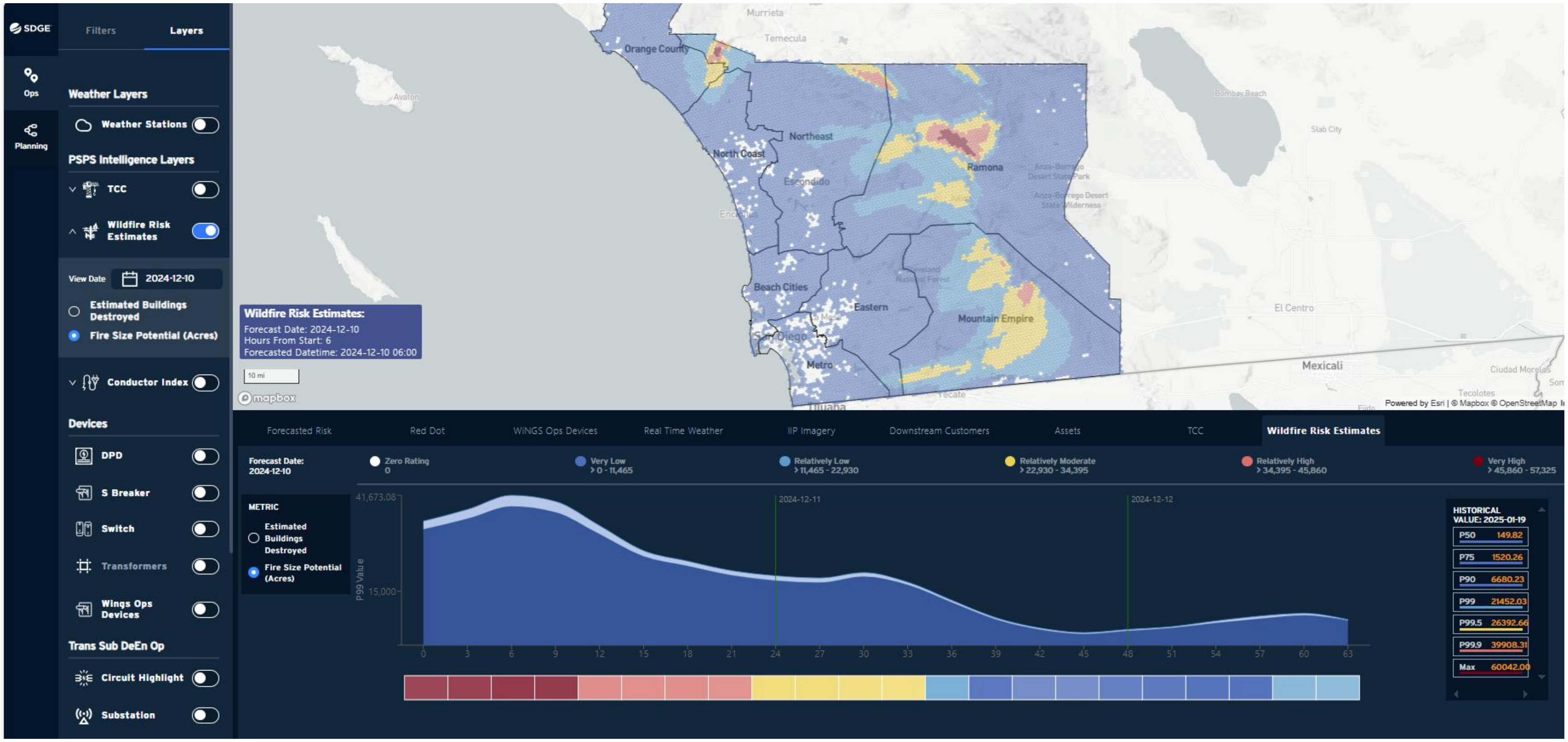
Wildfire behavior modeling and risk analysis is applied to address two different, yet similar, scenarios.

First, the modeling is used along with the Weather Research and Forecast (WRF), which provides historical weather data re-analysis, to support the long-term mitigation planning process. FireSight™ also known as WFA-E WRRM, quantifies risk metrics (estimates of acres burned and building destroyed) from millions of wildfire simulations using the numerous defined Weather Research and Forecast (WRF) weather scenarios. This wildfire consequence data is then combined with internally developed PoF and PoI models to define risk values, which support prioritization decision-making for asset hardening and related mitigation efforts.

Second, FireRisk™ is used with daily WRF-based weather forecast data to calculate consequence-based risk metrics for all assets as possible ignition sources to support operational requirements. Other key input datasets, such as surface and canopy fuels, live fuel moisture (LFM), and dead fuel moisture (DFM), are developed daily using machine learning models to calculate wildfire behavior outputs as part of the risk analysis model. Wildfire risk forecasts are derived daily, or sometimes twice daily, with a multi-day outlook at 3-hour intervals. This information is used as input into key decision-making related to operational requirements, such as PSPS de-energizations, resource allocation and deployment, and field operations. This data is essential for situational awareness during PSPS de-energizations, as shown in Figure 5-9.

Figure 5-9 shows a screenshot from the WiNGS-Ops visualization platform that displays potential estimates of acres burned on December 10, 2024, illustrating the extent and magnitude of fire weather across the service territory. The map displays daily worst-case estimates of acres burned for a specific day and hour, while the time series plot below the map shows potential estimates based on the weather forecasts received for each day. These estimates are used to inform decision-making during de-energization and re-energization processes. This visualization not only helps identify impacted areas but also indicates when the peak of the event will be reached and when it will subside.

Figure 5-9: WiNGS-Ops Fire Visualization Platform Screenshot



5.3.1 DESIGN BASIS SCENARIOS

The WiNGS-Planning model utilizes the statistical and machine learning models detailed in Appendix B. These deterministic and regression models are developed using historical electrical outage data and ignitions, including CPUC-reportable ignitions and evidence of heat collected from Fire Coordination and District Engineers. The models correlate this data with historical asset, vegetation, and site-specific conditions, as well as weather conditions, with a particular focus on capturing the influence of wind gust and wind direction variables at the time of the outage and ignition. By analyzing these correlations, the models offer valuable insights into the probability of failure and ignition across various known wind gust regimes and help to understand how different wind and fuel conditions impact the likelihood of electrical outages and ignitions.

The models are trained on a decade of historical records and predict the probability of failure and ignition using two years of historical weather and fuels data from the weather station network. This method calculates failure and ignition rates at the pole and span level under diverse weather and fuel conditions, offering a comprehensive overview of potential outcomes. Model outputs are reviewed by risk data scientists, Fire Coordination, Meteorology, and Engineering experts, which validates the models, identifies future improvements, and ensures that fire behavior is assessed across various scenarios.

For fire weather scenarios used to estimate potential wildfire impacts, fire behavior scenarios are evaluated for a selection of 125 days spanning from 2013 to 2021 that represent the worst fire weather days in the service territory. Days are selected and reviewed by experts from the Meteorology, Fire Science, Engineering, and Risk Analytics groups to properly account for the most critical fire weather conditions in the service territory and promote accurate risk assessments. The selection of fire weather days is based on the following criteria:

- Historical Data Analysis: Subject matter experts analyze historical weather data from 2013 to 2021 to identify days with extreme fire weather conditions. Due to the extreme fire weather conditions experienced in November 2024 and January 2025, SDG&E is now evaluating the inclusion of these recent days.
- Weather Conditions: Particular attention is given to days with high wind gusts, wind direction, temperature, and humidity levels that contribute to fire risk.
- Asset and Site-Specific Conditions: The conditions of electrical assets and specific site characteristics are considered to understand their vulnerability during extreme weather events.
- FPI: Weather indices such as the FPI are used to quantify and compare fire risk levels on different days

OEIS Table 5-2: Summary of Design Scenarios

Scenario ID	Design Scenario	Purpose
WL1	Wind Load Condition 1 – Baseline	This baseline scenario is modeled using 2 years of historical weather and fuel data analysis.
WL2	Wind Load Condition 2 – Very High	This very high scenario is modeled using 2 years of historical weather and fuel data analysis, as it incorporates the 95th percentile wind gust

Scenario ID	Design Scenario	Purpose
		conditions recorded in the service territory within the selected years for the analysis.
WL3	Wind Load Condition 3 – Extreme	This extreme scenario is modeled using 2 years of historical weather and fuel data analysis, as it incorporates the 99th percentile wind gust conditions recorded in the service territory within the selected years for the analysis.
WL4	Wind Load Condition 4 – Credible Worst Case	This credible worst-case scenario is modeled using 2 years of historical weather and fuel data analysis, as it incorporates the maximum wind gust conditions recorded in the service territory within the selected years for the analysis.
VG1	Vegetation Condition 1 – Existing Fuel Load (based on extreme weather conditions) and existing Vegetation Tree inventory assets	The existing fuel load conditions and current tree inventory datasets within the service territory are incorporated into the probability of failure models and the conditional probability of ignition model. The model assumes the surface fuel layer as of the end of 2023. SDG&E is currently collaborating with Technosylva to update this layer.
VG2	Vegetation Condition 2 – Short-Term Forecasted Fuel Load conditions	Short-term potential changes in fuel conditions throughout the service territory are not currently included in wildfire simulations. However, future model updates or sensitivity analysis studies may incorporate simulations of these changes in fuel conditions, if deemed informative.
VG3	Vegetation Condition 3 – Long-Term Extreme Forecasted Fuel Load conditions	Long-term potential changes in fuel conditions throughout the service territory are not currently included in wildfire simulations. However, future model updates or sensitivity analysis studies may incorporate simulations of these changes in fuel conditions, if deemed informative.
WV1	Weather Conditions (WL1 + WL2 +WL3+ WL4) and Vegetation Conditions (VG1) during historical worst fire weather days in SDG&E's service territory	Millions of simulated year events are used to capture all potential permutations of weather, vegetation, and fire weather conditions within the service area. This comprehensive simulation approach allows for a thorough analysis and understanding of various scenarios, enhancing the accuracy of safety, reliability, and financial estimates. Additionally, it helps identify the most appropriate and cost-effective solutions for grid hardening at each feeder segment in HFTD.

In 2022, SDG&E began developing two applications to visualize the output of the WiNGS-Ops and WiNGS-Planning models. These applications aim to explore different scenarios to guide long-term investment decisions and provide real-time risk estimates for wildfire and PSPS risks. Scenario analysis enhancements for both applications are continuously implemented to improve user experience, risk identification, and data management. These efforts incorporate robust governance practices and optimize the overall architecture to enhance model accuracy, data traceability, and overall system efficiency.

The WiNGS-Planning visualization platform enables users to explore an interactive map that displays the current and projected wildfire and PSPS risk across the grid and explore various alternative grid-hardening portfolios by adjusting input factors that would influence optimal grid-hardening strategy recommendations. The WiNGS-Ops visualization platform is designed to provide real-time information about wildfire and PSPS risks, guiding risk-based de-energization decisions during high-risk events. Users can perform scenario analysis by exploring different expected PSPS de-energization durations and comparing them to forecasted wildfire risk estimates.

The platform integrates diverse datasets necessary for making informed de-energization and long-term investment decisions. These datasets include estimates of wildfire and PSPS risks, risk projections year-to-year taking into account grid-hardening plans and future model recommendations, the number and type of customers downstream of any SCADA sectionalizing device, the grid network hierarchy, and an interactive map that identifies the location of SCADA sectionalizing devices as well as current and historical weather conditions.

Both the WiNGS-Planning and WiNGS-Ops visualization platforms are utilized for emergency response, mitigation investment planning, and public safety. Expansion of the platform to other climate-related events, such as extreme heat waves, flooding, and severe storms, is currently being reviewed. This expansion would enhance the ability to manage a broader range of climate-related risks, supporting the safety and resilience of infrastructure and communities. Additionally, it would contribute to affordability by optimizing resource allocation and reducing the costs associated with emergency responses and long-term mitigation strategies.

5.3.2 EXTREME-EVENT/HIGH UNCERTAINTY SCENARIOS

SDG&E does not currently analyze extreme events or highly uncertain scenarios. Instead, the WiNGS-Planning model is designed to incorporate historical weather conditions experienced within the service territory. The model can simulate a variety of weather conditions based on past data, providing a robust framework for risk analysis based on known conditions. By focusing on historical weather patterns, the model can accurately reflect the range of conditions that have been observed over time, allowing for more reliable predictions and effective planning.

To model longer-term scenarios with higher uncertainty requires an assessment of the entire service territory beyond the current focus on overhead lines in the HFTD. Furthermore, evaluating extremely low-probability events, including those unrelated to wildfire risk and outside the HFTD, offers minimal benefit. Such events are unlikely to provide significant insights for mitigation prioritization. Conducting these analyses would also necessitate substantial coordination with other agencies to define scenarios, validate inputs, establish credible modeling parameters and model results, and ensure a comprehensive evaluation.

However, the potential incorporation of climate change scenarios based on the latest climate modeling projection datasets that are being produced with the support from California Energy Commission are currently being evaluated. These include temperature, precipitation, humidity, and wildfire projections that are available on daily and hourly frequency at high-resolution granularity (3-kilometer by 3-kilometer pixels), which will be made available through Cal-Adapt Analytics Engine[36]. These projections are produced via statistical and dynamical downscaling methods using some of the best performing (GCM simulations from the latest CMIP6). CMIP6 experiments use SSP scenarios that represent a wide range of climate change outcomes arising from differing greenhouse gas emissions and climate change policies. These CMIP6 GCM climate change simulations were also used for the United Nation's

[36] https://cal-adapt.org/

Intergovernmental Panel on Climate Change Sixth Assessment Report (2023), Fifth National Climate Assessment (2023), and the upcoming California's Fifth Climate Change Assessment (2026).[37,38,39,40]

SDG&E remains committed to collaborating with industry partners, academic institutions, stakeholder groups, and other IOUs to continuously refine and enhance its risk models, ensuring they effectively account for the anticipated impacts of future climate change on wildfire risk. SDG&E will update its current risk model methodology when new scientific data become available and thorough evaluations are conducted.

The WiNGS-Ops model was originally developed to address extreme fire weather events, where the probability of a PSPS de-energization is very high. The use of the WiNGS-Ops model is important during days with extreme fire weather conditions, as it helps ensure that appropriate measures are taken to mitigate the risks of wildfires and PSPS de-energizations associated with severe fire weather in the service territory.

OEIS Table 5-3: Summary of Extreme-Event Scenarios

Scenario ID	Extreme-Event Scenario	Purpose
n/a	Extreme Event Scenarios	Not applicable for WiNGS-Planning as this model is designed to incorporate historical weather conditions experienced within the service territory.

[37] https://www.energy.ca.gov/programs-and-topics/topics/research-and-development/climate-data-and-analysis-working-group-c-dawg
38 United Nations Intergovernmental Panel on Climate Change Sixth Assessment Report. 2023. Available at https://www.ipcc.ch/assessment-report/ar6/
39 Fifth National Climate Assessment. 2023. Available at https://nca2023.globalchange.gov/
40 California's Fifth Climate Change Assessment. 2026. Available at https://lci.ca.gov/climate/icarp/climate-assessment/

5.4 SUMMARY OF RISK MODELS

OEIS Table 5-4: Summary of Risk Models

ID	Risk Component	Design Scenario(s)	Key Inputs	Source of Inputs (Data and/or Models)	Key Outputs	Units
1 (WiNGS-Ops WiNGS-Planning)	Safety Impacts	Refer to Section 5.2.2.2 Consequence of Risk Event, for a detailed description of the methodology and assumptions.	- Expected number of customers affected by wildfire or PSPS de-energization event - Scaling factors for AFN customer impacts - PSPS de-energization duration - Number of acres burned conversion factors to estimate the number of serious injuries and fatalities from customers impacted - Cost-benefit conversion factors	Wildfire, PSPS, and PEDS models	The expected number of serious injuries and fatalities for a wildfire or PSPS de-energization event	Estimates (in dollars) based on cost-benefit framework
2 (WiNGS-Ops WiNGS-Planning)	Reliability Impacts	Refer to Section 5.2.2.2 Consequence of Risk Event, for a detailed description of the methodology and assumptions.	- Expected number of customers affected by wildfire or PSPS de-energization - Scaling factors for AFN customer impacts - PSPS de-energization duration - Number of acres burned conversion factors to estimate the number of serious injuries and fatalities from customers impacted - Cost-benefit conversion factors	Wildfire, PSPS, and PEDS models	The expected reliability impact	Estimates (in dollars) based on cost-benefit framework
3 (WiNGS-Ops WiNGS-Planning)	Financial Impacts	Refer to Section 5.2.2.2 Consequence of Risk Event, for a detailed description of the methodology and assumptions.	- Expected number of customers affected by wildfire or PSPS de-energization event - Scaling factors for AFN customer impacts - PSPS de-energization duration - Number of acres burned conversion factors to estimate the number of serious injuries and fatalities from customers impacted - Cost-benefit conversion factors	Wildfire, PSPS, and PEDS models	The expected financial impact	Estimates (in dollars) based on cost-benefit framework
4 (WiNGS-Ops WiNGS-Planning)	Burn Probability	Assumed 100% for selected days to represent the worst fire weather days in the service area.	Subject matter experts select a representative sample of days with fire weather conditions present in HFTD portions of the service territory. This approach aims to accurately estimate the potential impacts of catastrophic wildfires while considering current weather conditions, community insights, and local knowledge (e.g., terrain,	Meteorology, Fire Science, Engineering, and Risk Analytics identify historical weather conditions representing the	Representative weather conditions where ignitions could lead to wildfires that could result in fatalities, widespread	unitless

ID	Risk Component	Design Scenario(s)	Key Inputs	Source of Inputs (Data and/or Models)	Key Outputs	Units
			fuels, vegetation). It also takes into account computational resources, given the time and cost to conduct the analysis.	worst fire weather days in the service territory	property destruction, and multi-billion-dollar liabilities. These conditions could also necessitate proactive power shutoffs, which impact customers, communities, and local economies.	
5 (WiNGS-Ops WiNGS-Planning)	Wildfire Hazard Intensity	Calculated by Technosylva for the 125 worst fire weather days identified by subject matter experts. Simulated outputs include flame length, rate of spread, acres burned, buildings threatened, buildings destroyed, and population impacted.	- Technosylva unsuppressed simulations that have a duration of 24 hours - Wildfire consequence values, which are calculated based on acres burned and structures destroyed	Meteorology, Fire Science, Engineering, and Risk Analytics identify historical weather conditions representing the worst fire weather days in the service territory	Estimates of acres burned and structures destroyed at asset locations for different weather conditions.	- Acres -Number of structures destroyed
6 (WiNGS-Ops WiNGS-Planning)	Wildfire Likelihood	Weather conditions (WL1 + WL2 +WL3+ WL4) and vegetation conditions (VG1) during the historical worst fire weather days in the service territory.	- Historical weather station data - Historical electrical outages (SAIDIDAT) - CPUC reportable ignitions - SDG&E evidence of heat records - GIS attributes - Surface fuel layer	See Appendix B	Wildfire LoRE	Outage and ignition rates per mile
7 (WiNGS-Ops WiNGS-Planning)	Wildfire Consequence	Maximum buildings destroyed combined with maximum acres affected per segment.	Probability distribution of potential ignition consequences based on the 125 worst fire weather days in the service territory at ignition points along overhead electrical assets.	Technosylva's simulation inputs: 125 worst fire weather days, fuel surface layer, and 24-hour	Safety, reliability, and financial consequence estimates.	Estimates (in dollars) based on cost-benefit framework

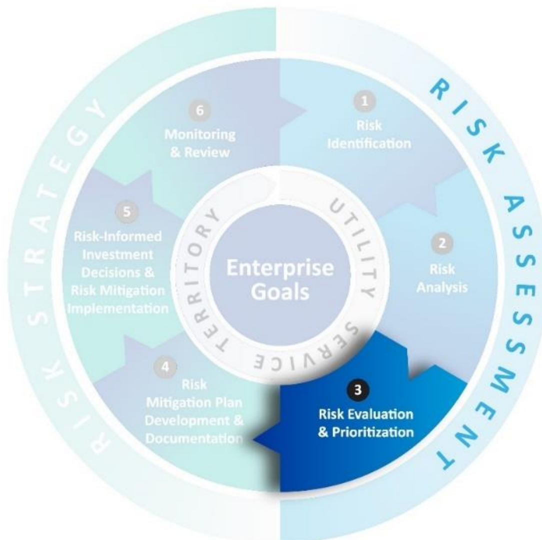
ID	Risk Component	Design Scenario(s)	Key Inputs	Source of Inputs (Data and/or Models)	Key Outputs	Units
				unsuppressed simulation.		
8 (WiNGS-Planning)	PSPS Likelihood	The probability of a SCADA sectionalizing device experiencing de-energization is calculated based on historical events.	- Historical weather station data - Historical PSPS de-energization events - GIS asset attributes - Distribution grid connectivity	-Weather station data - GIS asset data	PSPS LoRE	Number of events per year
9 (WiNGS-Planning)	PSPS Consequence	Weather conditions (WL1 + WL2 +WL3+ WL4) and vegetation conditions (VG1) during the historical worst fire weather days in the service territory.	- Number and type of customers de-energized - Expected duration of PSPS	- Customer information - PSPS duration assumptions	PSPS CoRE	Estimates (in dollars) based on cost-benefit framework
10 (WiNGS-Ops)	PSPS Likelihood	Likelihood = 1	Assumption based on weather and fuel conditions during extreme fire weather conditions that meet the criteria for initiating a PSPS.	Subject matter expert assumptions	PSPS LoRE	Unitless
11 (WiNGS-Ops)	PSPS Consequence	- Event specific assumptions - 24-hour de-energization event	- Number and type of customers de-energized - Expected duration of PSPS	- Customer information - PSPS duration assumptions - Grid connectivity	PSPS CoRE	Unitless
12 (WiNGS-Planning)	PEDS Likelihood	The probability of a SCADA sectionalizing device experiencing an outage due to device settings or protective equipment. Calculated based on historical events.	Historical outage events when settings are enabled	Historical SAIDIDAT outage information	PEDS LoRE	Number of events per year
13 (WiNGS-Planning)	PEDS Consequence	Estimated PEDS consequence values at each SCADA sectionalizing device where protective equipment and device settings are enabled.	- Number of customers minutes interrupted - Expected duration of PEDS event	- Customer information - PEDS duration assumptions	PEDS CoRE	Estimates (in dollars) based on cost-benefit framework
14 (WiNGS-Ops)	PEDS Likelihood	n/a	n/a	n/a	n/a	n/a

ID	Risk Component	Design Scenario(s)	Key Inputs	Source of Inputs (Data and/or Models)	Key Outputs	Units
	PEDS Consequence					
15 (WiNGS-Planning WiNGS-Ops)	Customer impact scaling factor	Scaling factors of the Safety attribute determined by subject matter expertise to artificially elevate the safety risk estimates for PSPS Critical Facilities, Urgent, Essential, Sensitive, Life Support, MBL, and AFN customers	Customer counts for PSPS Critical Facilities, Urgent, Essential, Sensitive, Life Support, MBL, and AFN customers that are associated to each SCADA sectionalizing device.	GIS production via AWS	Customer counts per category	Integers
16 (Wildfire Likelihood)	Conductor PoF	Weather conditions (WL1 + WL2 +WL3+ WL4) and vegetation conditions (VG1) during the historical worst fire weather days in the service territory.	- Historical Weather conditions - Historical conductor failures - Asset location and attributes	See Appendix B	Number of asset failures per hour and per mile	Failures/(mile-hour) that are aggregated to failures/year
17 (Wildfire Likelihood)	Vegetation PoF	Weather conditions (WL1 + WL2 +WL3+ WL4) and vegetation conditions (VG1) during the historical worst fire weather days in the service territory.	- Historical Weather conditions - Historical vegetation failures - Asset location and attributes	See Appendix B	Number of asset failures per hour and per mile	Failures/(mile-hour) that are aggregated to failures/year
18 (Wildfire Likelihood)	Vehicle Contact PoF	Weather conditions (WL1 + WL2 +WL3+ WL4) and vegetation conditions (VG1) during the historical worst fire weather days in the service territory.	- Historical weather conditions - Historical vehicle to asset contacts - Asset location and attributes of nearby roads	See Appendix B	Number of asset failures per hour and per mile	Failures/(mile-hour) that are aggregated to failures/year
19 (Wildfire Likelihood)	Other Equipment & Foreign Object PoF	Weather conditions (WL1 + WL2 +WL3+ WL4) and vegetation conditions (VG1) during the historical worst fire weather days in the service territory.	- Historical Weather conditions - Historical conductor failures due to non-wind-related events or external objects (e.g., animals, balloons, transformers, etc.) - Asset location and attributes	See Appendix B	Number of asset failures per hour and per mile	Failures/(mile-hour) that are aggregated to failures/year
20 (Wildfire Likelihood)	Pole/Span Conditional PoI	Weather conditions (WL1 + WL2 +WL3+ WL4) and vegetation conditions (VG1) during the historical worst fire weather days in the service territory.	Weather conditions and asset level probability of failure models (PoF) and conditional ignition probability model (PoI)	See Appendix B	Ignitions per hour and per mile	Ignitions/(mile-hour) that are aggregated to ignitions/year

5.5 RISK ANALYSIS RESULTS AND PRESENTATION

The third step of the Enterprise Risk Management Framework is Risk Evaluation and Prioritization (see Figure 5-10).

Figure 5-10: Risk Evaluation & Prioritization Step of the Enterprise Risk Management Framework



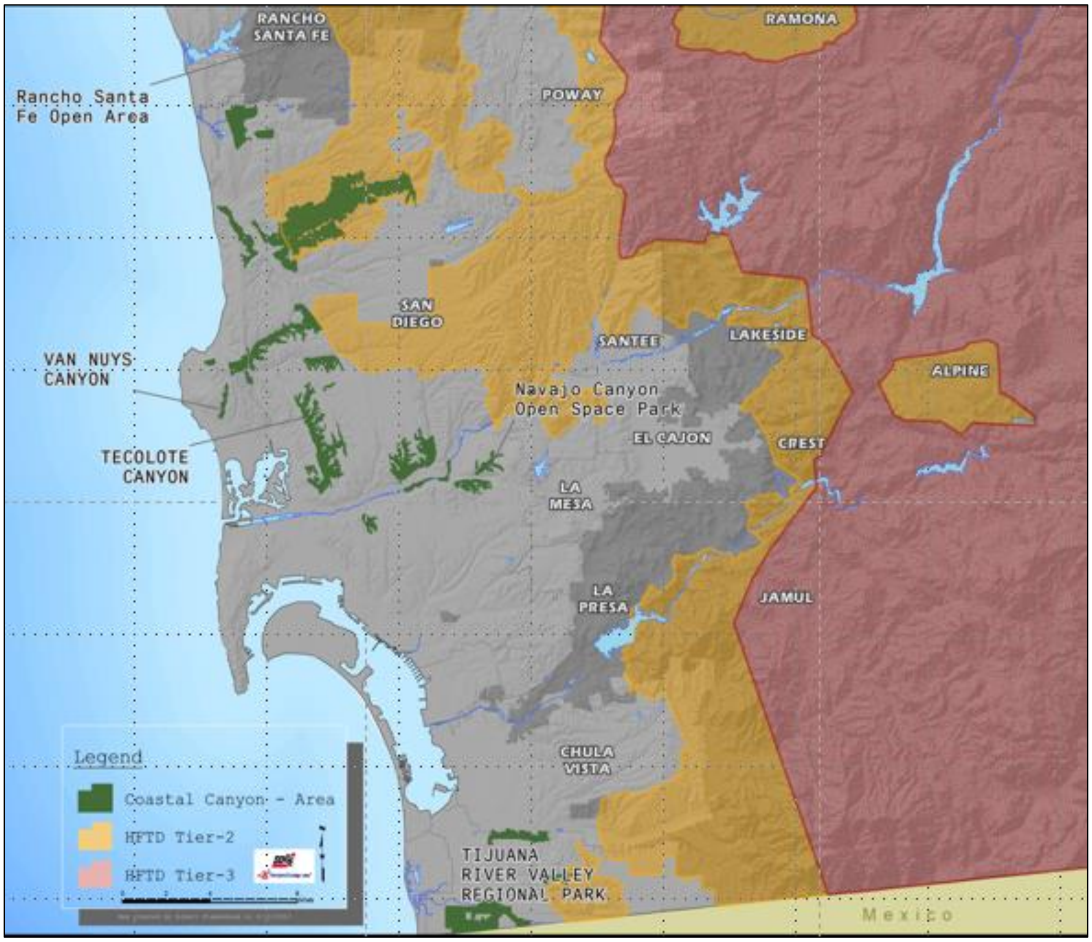
HFTD polygons are used to identify the geographic scope of mitigation planning. This includes Tiers 2 and 3 of the HFTD as defined in D.17-01-009.[41] In addition, portions of circuits that have experienced a PSPS de-energization have been included within the risk mitigation scope. Within the service territory, the HFTD largely comprises the inland and mountainous regions west of the deserts.

5.5.1 TOP RISK AREAS WITHIN THE HFRA

SDG&E has evaluated high fire areas outside of the HFTD, including the WUI as defined in Appendix A and higher-risk urban areas such as costal canyons or wildland open spaces as defined by SDG&E Operational departments in conjunction with Fire Science. Within the service territory, the WUI boundary largely exists to the west of Tier-2 of the HFTD but overlaps the HFTD in many areas. Urban areas are focused exclusively in the coastal areas or wildland open spaces of the service territory and comprise a much smaller area than the HFTD as shown in Figure 5-11.

[41] D.17-01-009 Section 4.1.2.4.2, p. 24-25; https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M172/K762/172762082.PDF

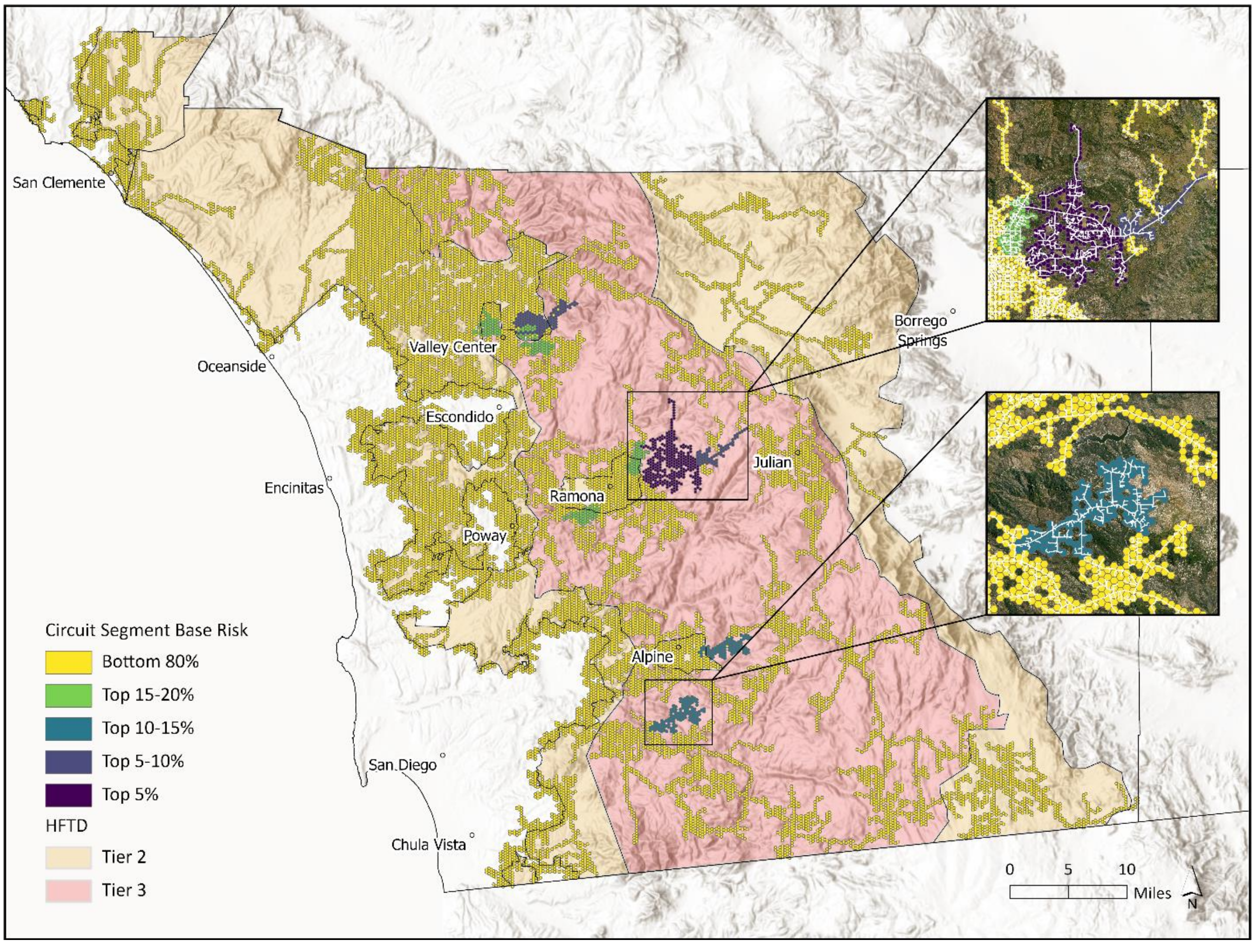
Figure 5-11: Higher-Risk Urban Areas in Relation to HFTD



5.5.1.1 GEOSPATIAL MAPS OF TOP-RISK AREAS WITHIN THE HFRA

WiNGS-Planning calculates a probability distribution for its output, enabling risk to be categorized using various statistics (e.g., mean, p90) and expected return periods. Analyzing the full probability distribution of each circuit-segment provides the most comprehensive view of the territorial risk. For simplicity, Figure 5-12 shows the mean overall risk value. Different statistics reveal that the same risk bucketing categories appear in several parts of the service territory.

Figure 5-12: Map of Service Territory with HFTD Circuit-Segments Categorized by Mean Overall Risk (as of 2025)



5.5.1.2 PROPOSED UPDATES TO THE HFTD

Annually, subject matter experts assess HFTD boundaries and consider potential changes. The variables used to create the HFTD are weighed, and any suggested modifications or new information is discussed and evaluated. To date, SDG&E has not suggested any adjustments to the HFTD. Recent modeling initiatives evaluated the wildfire risk of coastal canyons and the WUI for mitigation. Both efforts resulted in the exclusion of each proposed addition. Polygons in the WUI layer focused on the developed areas near vegetated areas and did not include the vegetated areas themselves. In addition, these areas did not necessarily have overhead electric lines. While this layer may serve to prioritize the adjacent developed areas for fire infrastructure and suppression planning, it does not yield a usable layer for identifying areas where an energized wire down could spark a wildfire, or areas at heightened risk for ignition due to interference from vegetation.

The coastal canyon analysis evaluated risk areas identified by subject matter experts, CAL FIRE data, and historical fire history. The analysis found that wildfire risk associated with coastal canyons was lower than that associated with current HFTD segments, making scoping of grid-hardening initiatives within coastal canyon segments a lower priority. Based on these two analyses, SDG&E does not propose any additions or removals from the HFTD. SDG&E will continue to monitor risk in the service territory to analyze the need for adjustment of risk boundaries.

SDG&E evaluates its HFTD boundaries on a regular basis and looks forward to working with stakeholders and agencies including Energy Safety, the CPUC, and CAL FIRE, to formalize any new proposed modifications.

5.5.2 TOP RISK-CONTRIBUTING CIRCUITS/SEGMENTS/SPANS

OEIS Table 5-5, created with data from the beginning of 2025, shows the top 5 percent of segments from the latest version of WiNGS-Planning ranked by Overall Utility Risk per mile (see the full table in Appendix F). This list also includes segments that contribute to more than 1 percent of the Overall Utility risk.

OEIS Table 5-5: Summary of Top-Risk Circuits, Segments, or Spans

Risk Ranking	Circuit, Segment, or Span ID	Overall Utility Risk Score	Wildfire Risk Score	Outage Program Risk Score	Top Risk Contributors	Total Miles	Version of Risk Model Used
1	78-782R	$7,202,316	$7,167,197	$35,119	Wildfire	1.72	(3, 192, 0, '2025-01-01')
2	975-22R	$6,417,038	$5,152,705	$1,264,334	Wildfire	1.65	(3, 192, 0, '2025-01-01')
3	222-1988R	$3,619,436	$3,592,934	$26,502	Wildfire	0.95	(3, 192, 0, '2025-01-01')
4	222-1986R	$79,194,349	$78,602,170	$592,179	Wildfire	21.26	(3, 192, 0, '2025-01-01')
5	78-35R	$5,696,336	$5,695,327	$1,009	Wildfire	1.53	(3, 192, 0, '2025-01-01')
6	1250-671R	$6,815,428	$6,443,061	$372,367	Wildfire	2.00	(3, 192, 0, '2025-01-01')
7	237-1765R	$28,249,252	$28,064,039	$185,213	Wildfire	8.34	(3, 192, 0, '2025-01-01')
8	222-1990R	$45,106,640	$44,939,414	$167,226	Wildfire	14.24	(3, 192, 0, '2025-01-01')
9	358-682F	$37,602,118	$37,073,061	$529,058	Wildfire	12.51	(3, 192, 0, '2025-01-01')
10	970-1341R	$12,961,613	$12,917,272	$44,341	Wildfire	4.40	(3, 192, 0, '2025-01-01')

Note: Full table is provided in Appendix F

5.6 QUALITY ASSURANCE AND QUALITY CONTROL

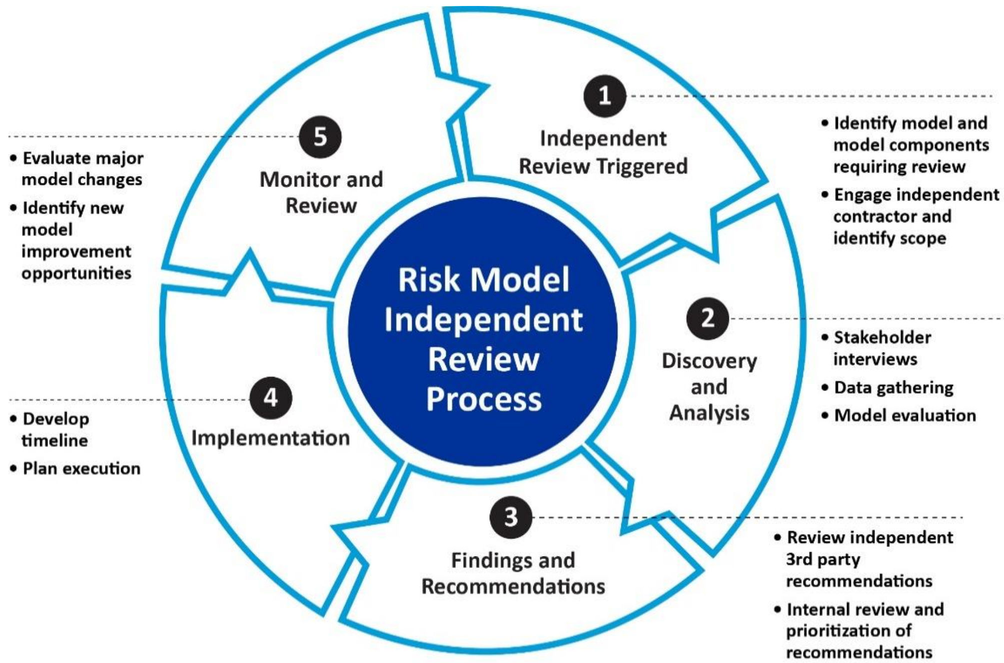
5.6.1 INDEPENDENT REVIEW

Independent Review Process/Additional Review Triggers/Routine Review Schedule

The WiNGS-Planning and WiNGS-Ops models are reviewed internally on an ongoing basis. The independent review process, as depicted in Figure 5-13, can be triggered routinely on an annual basis or following a major model change(s) per model versioning standards detailed in Section 5.6.2.3 Version Control. Initial activities for independent review include identifying the model and model components requiring review as well as engaging an independent contractor with a defined scope. The contractor conducts an in-depth discovery phase consisting of stakeholder interviews, data gathering, and model evaluation and presents findings and recommendations. An internal review then assesses and prioritizes findings and recommendations for enhancements or model improvements and an implementation timeline and execution plan are developed.

In addition to independent reviews, SDG&E collaborates with technical advisors, explores internal review boards, is involved with the International Wildfire Risk Modeling Consortium (IWRMC), collaborates with other IOUs and external vendors, and seeks best practices when developing risk models.

Figure 5-13: Independent Review Process



Results, Recommendations, and Disposition

An independent third-party review of data and inputs took place in August 2022, which resulted in several data and model governance findings. Recommendations included:

1. Migrate Excel + Frontline to Python
2. Control the source with Git
3. Version model releases
4. Apply coding standards
5. Automate manual steps in code
6. Decompose functionality into discrete, testable components
7. Create unit and end-to-end testing
8. Convert optimization to Python

Many of these recommendations have been implemented by the Python and AWS migration or are in progress.

In November 2022, another third-party review took place that evaluated model code, infrastructure, and data management processes according to best practices. Industry-recognized standards, such as the Amazon Web Services (AWS) Well Architected Approach and the 12-factor application development pattern, were referenced in this review process to assemble industry recognized best practices.

In 2022 WiNGS-Ops underwent an internal review to determine areas of improvement. The model was updated to align with software development best practices by integrating source control, code optimization, and a multi-stage production environment.

By the end of 2024, this commitment to continuous improvement in risk analytics has further evolved. The WiNGS-Ops model now incorporates advanced machine learning algorithms and real-time data integration, significantly improving the accuracy and reliability of wildfire and PSPS risk assessments during periods of concern.

SDGE Table 5-8 and SDGE Table 5-9 show findings and recommendations for WiNGS-Planning and WiNGS-Ops that are in the process of being assessed, prioritized, and road mapped. In addition, SDG&E began a third-party study in 2025 that will document further findings and recommendations.

SDGE Table 5-8: WiNGS-Planning Third Party Recommendations

Recommendation Name	Description	Severity Level and Impact	Target Deadline (EOY)	Status
Data Ownership	Ensure that there is an integrated function, such that communication from specific data owners is cohesive and timely. This would ensure the communication of definitions, use, bounds for validity, and decisions on changes. Data owners would also be responsible for ensuring that the data is up to date and accessible.	Severity Level: Medium – lack of communication from data owners may result in unexpected changes and diminished data integrity. The data owner is accountable for the use, quality and protection of a dataset.	2027	In progress
Calculation Ownership	Assign owners of specific constants (e.g., PSPS risks) and calculation methodologies such that their definitions and approaches are agreed, documented and uniform across the business. This is to ensure that any colloquial terms used for aggregated data assets are consistent such that an output like "miles of span in HFTD in one group's calculation is the same as another's.	Severity Level: Low – a calculation owner will be accountable for ensuring calculation methodologies are clearly defined and are used appropriately and consistently.	2027	In progress
Model Value	In order to quantify the value the model brings to the business, define a measurable metric that clearly shows what benefit the model is providing in order to evaluate if the value offsets the costs. A potential metric could be tracking the percent Electric System Hardening (ESH) deviates from the model recommendations.	Severity Level: Low – while not directly affecting the model output, it is best practice to regularly evaluate the value a model brings to a business to determine future growth and investment.	2027	In progress
Initiation Stage Documentation	Document the initiation stage in order to capture critical elements of the initial planning stage. This includes defining what problem this model will solve, what is the feasibility of the model, who are the end users and how do they want to ingest the model outputs, who are the subject matter experts and what is their ability to participate in the model development, who	Severity Level: Medium – due to the lack of documentation from the initiation of the WiNGS-Planning model, there are several assumptions and decisions that were made that cannot be explained now that the	2026	In progress

Recommendation Name	Description	Severity Level and Impact	Target Deadline (EOY)	Status
	will be the business owner of the model, what are the initial assumptions and how were they determined, and confirmation that all relevant business areas have taken full sponsorship of the project. Additional details on why certain decisions were made with respect to model generation are also critical to document in the initiation process.	original stakeholders are no longer with the company.		
Data Documentation and Dictionaries	Document for all input data, which should include the data owner, the context of the data, data collection methodology, structure and organization of the data, data validation and quality assurance steps, data manipulations from raw data, and data confidentiality, access and use conditions. If applicable, it should also include any calculations used to derive any of the fields, data dictionary of input data into those calculations, assumptions, references to methodologies or assumptions, and any limitations of the data. This will ensure a detailed understanding of the data that can be referenced as needed. Additionally, develop data dictionaries for all input data, which should list all the data fields. Each data field listing should include a description, data type, acceptable numerical ranges or classification values if applicable, units, if mandatory, null or missing value definition, effective date, and update information (including date of update, by who, what was updated, and why). This will ensure a thorough understanding of each data field, as well as a reference for data validation steps.	Severity Level: Low – not having documentation or data dictionaries do not prevent the model from running, however, there is a risk of misunderstanding the data, or if there is turnover on the data science team, new team members will have a more challenging time referencing and understand the data inputs.	2026	In progress
Data Input Validation	Implement an automated data validation check for every data input to look for outliers, errors, text control, contradictions, etc. Each of these validation checks should have associated documentation that includes what to do when data is missing or anomalous. Examples of how outliers, errors, contradictions, etc. are detected and how corrections are performed in a demonstratable way should be provided if necessary.	Severity Level: Medium – there is currently a lot of reliance on source data owners to validate their data, which can lead to errors and reduce data quality.	2026	In progress
LiDAR Tree Data	Update tree locations based on available LiDAR data to present a more accurate count of strikes per mile input for the circuit segments.	Severity Level: Medium – updating tree locations will likely change the tree strike potentials for circuit segments.	2027	Not Started

Recommendation Name	Description	Severity Level and Impact	Target Deadline (EOY)	Status
Derived Data Validation	In line with recommendation R3.2, incorporate data validation steps when new fields are derived to ensure the generated data is explainable, and include documentation that explains the validation steps taken and what to do when data is missing or anomalous. Provide examples of how flagged data is detected and how corrections are performed in a demonstratable way if necessary.	Severity Level: Medium – validating derived data is an important step for ensuring the most accurate model outputs. Some values are valid on their own which allows them to make it through the initial data ingest validation step, but when put in context with another value, it may indicate the data is an outlier.	2026	In progress
Mean Value Assessment	Conduct a detailed assessment of the instances where mean values are utilized in the calculations in order to determine if the approach would correctly account for outliers, potentially presenting a less risky situation than is accurate.	Severity Level: Medium – if it is determined that using mean values does not correctly account for outliers and a decision to use something other than mean values is made, then the data will change, which will result in a change to the risk score.	2027	In progress
Stakeholder Involved Sensitivity Analysis	Conduct a more robust sensitivity analysis at a regular cadence (as outlined in ASTM E 1355 Section 10). Business stakeholders should be made aware of this sensitivity analysis and should be invited to participate in choosing the variables and their value ranges. The business users should then be involved in all output reviews and have the suggested changes/remediation actions presented to them, such that the impacts may be fully understood and agreed with.	Severity Level: Medium – a sensitivity analysis will provide the end users a better understanding of how different values affect the model as well as help identify which values are influencing the model the most. This will allow the end users to make more informed decisions when determining if they need to deviate from the model results.	2028	In progress
Customer Type Multiplier Sensitivity Analysis	Perform a sensitivity analysis on the results of the customer type weight multipliers to evaluate if any unintended bias has resulted by adding weights to certain types of customers. This could include understanding the distribution of medical baseline and urgent customers relative to certain areas that may result in a decreased hardening priority.	Severity Level: Medium – if the results of the study indicate that the different customer type multipliers have the potential to adversely impact certain communities or demographics and the multiplier values are adjusted, that will result in changes to the CoRE model outputs and may	2028	In progress

Recommendation Name	Description	Severity Level and Impact	Target Deadline (EOY)	Status
		change the mitigation rank for certain segments.		
Formalize Model Validation Process	Devise and document formal process for validating the overall model outputs. This can be completed by comparing the run's results with previous iterations' outputs as well as identifying outputs that appear erroneous. It is also recommended to engage the end users to incorporate any additional thoughts or checks they have into the validation process.	Severity Level: Low – a formalized model validation process will instill greater trust by end users by knowing how the model results are validated prior to receiving the outputs and can reference any generated validation reports.	2027	In progress
Formalize External Feedback Management Process	Create formalized demand management process for external parties to provide feedback and request adjustments to the models. This will ensure that as the team, model, and user base continue to grow, there is a robust mechanism through which updates may be requested, tracked, and implemented in the Cloud environment.	Severity Level: Low – this will not directly affect the model outputs; however, this is an important validation step between model developers and end users to continue to facilitate model development, accuracy, and value to the business.	2026	In progress
Standardize Model Notifications	Create a standardized approach for how model update notifications are delivered and work with end users to capture the correct granularity and details that they would need to understand the changes.	Severity Level: Low – this recommendation will not have any effect on the model output but ensures that the appropriate level of communication is delivered between the development team and the end users.	2028	In progress
Unit Testing	Incorporate unit testing to ensure all functions are performing as expected.	Severity Level: Low – this recommendation will only affect the model if any functions are not performing as they should.	2026	Completed
Aws Billing Limits	Introduce billing limits for certain sandbox/development activities such that there is not a risk of an unintended spike in cloud costs for a development error.	Severity Level: Low – this recommendation is to ensure that model costs are monitored and meet the set budget.	2026	In progress
AWA Access Control	Review access control principles, focused on two areas, review the default access periods so access is revoked if someone doesn't access for a given period of time and consider enabling row or column-level	Severity Level: Low – following the security pillar from the 6 pillars of the AWS Well-Architected Framework	2026	In progress

Recommendation Name	Description	Severity Level and Impact	Target Deadline (EOY)	Status
	security to ensure users only access certain subsets of data most relevant and appropriate to them, which will become more necessary in the WiNGS-Planning visualization tool.	will ensure the confidentiality and integrity of the data and prevent unauthorized access and changes to the model and systems.		
Single Cloud Vendor Consolidation	In the future, consolidate services under one cloud provider for ease of use, integration, and billing. This can ensure that future updates to any of the cloud services are always made in a way to keep compatibility and seamless integration with the other developed components.	Severity Level: Low – this recommendation has no impact on the output of the WiNGS-Planning model but would allow for greater efficiency in use of cloud services.	2026	Not Started
AWS Athena Consolidation	With improved Governance of the data, create only one instance of AWS Athena, with the GIS and Flat File data combined into the Data Mesh layer. With the data available in the Data Mesh, appropriate ownership and controls must be established such that any shared data is used within the bounds of its intended purpose.	Severity Level: Low – reducing from multiple instances of AWS Athena down to one would ensure efficiency of use and a lower overhead to manage, monitor, and maintain.	2026	In progress
Separate Access On AWS	Create separation in the access to Cloud workspaces as the products mature.	Severity Level: Low – this would allow more control over access control, budget planning, and spend tracking for the separate groups.	2026	In progress

SDGE Table 5-9: WiNGS-Ops Risk Modeling Updates

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
1	Data Owner Communication	Ensure that there is an integrated function, such that communication from specific data owners is cohesive and timely. Definitions, use, bounds for validity, and decisions on potential changes would be communicated. Data owners would also ensure that data is up to date and accessible.	Severity Level: Medium – lack of communication from data owners may result in unexpected changes and diminished data integrity.	2026	In Progress
2	Calculation Ownership	Assign owners of specific constants (e.g., PSPS risks) and calculation methodologies such that their definitions and approaches are agreed, documented and uniform across the business. This is to ensure that any colloquial terms used for aggregated data assets are consistent such that an output like	Severity Level: Low – a calculation owner will be accountable for ensuring calculation methodologies are clearly defined and are used appropriately and consistently.	2026	In progress

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
		"miles of span in HFTD in one group's calculation is the same as another's.			
3	Model Ownership	Implement broader model ownership in the form of a board/ group with regular meeting cadence to agree to higher-level changes and adjustments, reviewing output of sensitivity analysis and changes prior to implementation. This would ensure that the direction of overall model enhancements and improvements is agreed amongst the Developers, Wildfire Mitigation team, and the Business users.	Severity Level: Low – without regular communication between all stakeholders, the direction and prioritization of model development and improvements can be missed.	2027	In Progress
4	EAMP Data Experts	Onboard an internal team to share subject matter expertise responsibility for EAMP/Asset 360. EAMP/Asset 360 provides a rich asset data source used in modeling. The data itself is a clean and curated version of GIS and Asset Management data. Currently, the program is operated by external contractors who also remain as the data source subject matter experts. The source, including all dictionaries and implemented manipulations, should also be fully documented such that any new user may easily gain a complete understanding of the data and its use.	Severity Level: Medium – with a continued reliance on external parties for this critical data source, the team will not gain full ownership, understanding, and control over the underlying data. Internal subject matter expertise in the data source will ensure a robust and future-proof mechanism for data understanding, questions, and data updates.	2025	Complete
5	OIR Requirements	Build and maintain a formalized report that tracks OIR requirements and how they were carried out in order to ensure that all Order Instituting Rulemaking (OIR) requirements are met and prevent possible violations. Having this existing documentation will not only confirm what the requirements are and if and how they were completed but will also be ready to pass along to the OIR as appropriate.	Severity Level: Low – this will help prevent potential violations from the OIR by tracking all the requirements and how they were completed.	2026	In Progress
6	Model Change Documentation	Create a formal process through which requirements for model changes are captured, tracked, and completed against. This will ensure that changes are understood and captured correctly and will allow success criteria to be defined and assessed against by the end users in their approval of model changes.	Severity Level: Low – without a documented process, requirements and requested changes may be incorrectly implemented or the end users may not have an easy mechanism for change approval.	2026	In Progress

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
7	Initiation Stage Documentation	Document the initiation stage in order to capture critical elements of the initial planning stage. This includes defining what problem this model will solve, what is the feasibility of the model, who are the end users and how do they want to ingest the model outputs, who are the subject matter experts and what is their ability to participate in the model development, who will be the business owner of the model, what are the initial assumptions and how were they determined, and confirmation that all relevant business areas have taken full sponsorship of the project. Additional details on why certain decisions were made with respect to model generation are also critical to document in the initiation process.	Severity Level: Low – without this documentation in place, future developers and end users may have a more difficult time understanding the decisions and assumptions that were made, which subject matter experts to turn to for input, how the model will be measured for success, or the original problem and objectives.	2026	In Progress
8	Data Input Validation	Implement an automated data validation check for every data input to look for outliers, errors, text control, contradictions, etc. Each of these validation checks should have associated documentation that includes what to do when data is missing or anomalous. This should be implemented in the inference pipeline and should be consistent with data validation performed by the WiNGS-Ops data science team during their exploratory data analysis process.	Severity Level: Medium – there is currently a lot of reliance on source data owners to validate their data, which can lead to errors and reduce data quality.	2026	In Progress
9	SAIDIDAT Data Ingestion	Perform a direct query of SAIDIDAT data from its source database. This eliminates the reliance on individuals and prevents potential human error.	Severity Level: Low – manual data request and transfers are reliant on the requestor to ask for the information. Automating the request process may be a better way to obtain updated outage history data on a scheduled basis rather than on an as-requested basis.	2026	In Progress
10	Alternative Land Use Data Source	Work closely with the SANGIS team to incorporate service territory areas currently not covered in their existing coverage data, as well as request more frequent than annual data updates. This would ensure the models have access to the same information as the rest of San Diego	Severity Level: Low – models run on data which has not been recently refreshed or on imputed data based on mean values may provide inaccurate outputs. This may cause a model to under-represent the potential consequence of an	2026	Not Started

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
		County and are up to date during a red flag warning event.	ignition due to a missing at-risk land use.		
11	Model Improvement Limitations	Do not develop or incorporate additional features to the models. Due to the time pressures and resource constraints, the team does not have the capacity to further improve models in this manner.	Severity Level: Low – impact would be minimal due to the models' existing satisfactory performance but might represent a missed opportunity for continued model improvements and enhancement.	2026	In Progress
12	Class Imbalance Approaches	Test other approaches to handling class imbalanced data, including up-sampling, SMOTE, and ADASYN, in order to determine the most applicable method for each model.	Severity Level: Medium – down-sampling excludes significant amounts of data which may result in an unrepresentative data sample being used for training and testing the model.	2026	In Progress
13	Algorithm Testing	Test other algorithms to ensure that the most suitable algorithm is used to solve the problem, balancing complexity of understanding and training with accuracy of modeling outputs.	Severity Level: Low – without validating that there isn't a more suitable algorithm for the model, the team cannot be certain that they have built the most suitable model for the specific application.	2026	In Progress
14	Conductor Model Retrain	Retrain the conductor model based on data from 2015 to present, utilizing the 2022 data for testing and validation. This will ensure the most representative data is utilized in construction and training to create the most accurate and useful modeling outputs.	Severity Level: Medium – based on the most recent data used for validation, the model under-represented the potential risk due to conductor failure. Re-training this model would generate a more representative output.	2026	In Progress
15	Same Data Sources	Train the models on the same data sources that would be utilized for inference in production such that the resulting outputs are most relevant and applicable.	Severity Level: Medium – as the models were trained on different source data, the learned data relationships may not be representative of what would be seen in the EOC. As a result, outputs of the models may not be as accurate as if the data used for training was the same source as used in inference.	2026	In Progress
16	GIS Cleaning	Consider a larger program of GIS data cleaning, validating, and improvement and investigate if existing GIS red lining processes can be leveraged to ensure the GIS system of record for assets represents the most accurate view of assets in the service territory. This would ensure that any modeling application or activation event	Severity Level: Low – it is critical that decisions in the EOC are made based upon the most accurate representation of the assets in the field.	2027	Not Started

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
		would consider that most accurate understanding when making data-driven decisions.			
17	Hyper-parameter Tuning	Implement the approach used for tuning hyper-parameters in the foreign object model, GridSearchCV, for tuning hyper-parameters in the vehicle contact model.	Severity Level: Low – consistent use of techniques across models ensures that the quality and robustness of each model is uniform and contributes to an optimal output.	2026	Not Started
18	Brier Score	Use the full Brier score such that the outputs are unaffected by population size. This will enable Brier scores to be compared across different versions of a model to allow model improvements to be validated.	Severity Level: Low – a modified Brier score might be inadvertently used to compare models with different sample sizes. This would give an inaccurate view of the performance comparison and could result in an incorrect modeling decision.	2027	Not Started
19	Class Imbalance Validation Methodology	For the vehicle contact model, incorporate a nested cross validation where one fold is an out-of-period imbalanced data split for the final validation and the other fold is split for training and testing on balanced sampled data set. This would provide an additional method for validating the accuracy of the model. Ensure the right metric is used for the evaluation, as some metrics are better for evaluation when there is class balance (ROC AUC) and others are better for when there is class imbalance (Precision-Recall AUC).	Severity Level: Medium – validating imbalanced data with this approach checks performance of the model against real class distribution.	2027	Not Started
20	Uniform Model Testing	Establish a consistent and agreed approach for model testing across the team such that each member may be sure of the optimal model and be in agreement when training is complete. This will ensure consistency across models and build credibility with the end users.	Severity Level: Low – models may have differing levels of robustness without a uniform, defined, and agreed upon approach to testing.	2026	In Progress
21	Data Documentation	Provide detailed documentation for all data that is ingested into the models The documentation is the responsibility of the data owners and should contain pertinent information such as the data owner, data collection methodology, data dictionary, structure of the data, data validation and quality assurance steps taken, data manipulations from the raw data, and confidentiality, access and use	Severity Level: Low – without detailed documentation, there is a risk the data can be misinterpreted, or if there is turnover or new hires on the WiNGS-Ops Data Science or Advanced Analytics teams, they may have a more challenging time referencing and understanding the data inputs.	2026	In Progress

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
		conditions. This will ensure a detailed understanding of the data that can be reference as needed, critical for ground truth data.			
22	Back-casting Model Validation Process	Create a more holistic and reliable model validation process to allow automated back-casting for each model change. This would allow for greater confidence in the updated version of each model. Given the snapshots of data are now maintained in the cloud, this ensures that this process would be simpler to perform.	Severity Level: Low – without an automated and uniform approach to model output validation, validating each new model release will be a time-consuming and inconsistent process.	2026	In Progress
23	Back-casting Data Capture	Ensure that all necessary data and calculation components are captured, including the network configuration, at the time of a PSPS activation to help streamline future back-casting exercises.	Severity Level: Low – implementing this would allow for the automated and uniform approach mentioned in R7.1 and could be enacted for model back-casting.	2027	In Progress
24	End User Formalized Validation Process	Establish a formalized validation process by the end users that will establish consistency in the validation approach and also build credibility with OEIS by demonstrating the results are reviewed in a specific and systematic way.	Severity Level: Low – without a formalized validation process, there is the potential for end users to validate the model differently every time a new model version is released. This may result in missing an important check or reviewing an output that differs from a previous model version.	2026	In Progress
25	Centralize Models	Migrate the conductor training model and PSPS model scripts to Azure DevOps Repos. This will ensure development on local machines are version controlled, tracked appropriately, and accessible by the team. This will also allow models to leverage cloud compute capabilities, meaning that more advanced models may be produced. Additionally, the PSPS model should be passed to the inference team such that the entire WiNGS-Ops model can be executed through the inference pipeline.	Severity Level: Medium – current processes limiting version control and access could introduce errors and confusion in the correct version that should be run in production. Full cloud migration would limit the risk of this issue.	2027	In Progress
26	Profiler	Run a profiler to help understand the resource consumption of the various operations in the model. This can potentially resolve performance bottlenecks and help the model execute faster.	Severity Level: Low – this recommendation does not affect the model output but may improve the runtime performance of the model.	2027	In Progress

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
27	Unit Testing	Incorporate unit testing to ensure all functions are performing as intended and errors are more easily isolated when they occur. Unit tests also check that the code still functions as expected after making changes, which builds code stability.	Severity Level: Medium – Without unit testing, there is no assurance that the code will function correctly and that there are no undiscovered bugs. This can lead to poor quality modeling results and wasted time and resources spent debugging.	2027	In Progress
28	Docstrings	Ensure all python functions have docstrings, which will ensure that all functions are correctly documented and definitions, descriptions, and decision point reasoning are captured. Docstring best practice for a function includes a brief description of what the function is and what it is used for, any arguments that are passed, labeling what is required and what is optional, and determining any restrictions on when the function can be called or any exceptions that are raised.	Severity Level: Low – this recommendation will not affect the model outputs but is a best practice to follow when writing code.	2027	In Progress
29	Internal Resources Embedded into Each Team	Ensure there is a skilled and knowledgeable base of internal resources involved in each aspect of the WiNGS-Ops modeling process such that reliance on external parties is reduced.	Severity Level: Low – the Advanced Analytics team is skilled and knowledgeable so there is minimal risk to the model outputs at this stage.	2027	In Progress
30	Cloud Consolidation	Consolidate services under one cloud provider for ease of use, integration, and billing. This can ensure that future updates to any of the cloud services are always made in a way to keep compatibility and seamless integration with the other developed components.	Severity Level: Low – this recommendation has no impact on the output of the WiNGS-Ops model but would allow for greater efficiency in use of cloud services. Although cloud services may work together across different vendors, they are optimized to work most effectively when combined with services belonging to one single cloud provider.	2027	Not Started
31	Pipeline Deployment Documentation	Create robust and granular documentation of the deployment pipeline, which would ensure a lower reliance on the experience of resources.	Severity Level: Medium – without this documentation, a continued reliance on external resources would be mandatory as there would be no straightforward mechanism through which internal resources could inform themselves on the finer details of the inference pipeline.	2027	In Progress

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
32	Limitations Documentations	Document the limitations of the models that underpin the WiNGS-Ops outputs and ensure that these are fully understood by the business users. This will ensure that any decisions made based on the result of the WiNGS-Ops model are made from the most informed position.	Severity Level: Medium – without understanding the limitations of the model, sub-optimal decisions may be made due to a misinterpretation of the results.	2026	In Progress
33	Full Model Lifecycle Documentation	Document the full lifecycle of each model in training and in inference such that the knowledge, skills and experience of the team is captured for future use. This would also enable training and onboarding of new resources to be more straightforward and regulatory filings to be completed more swiftly. Example pieces to include in this documentation are the problem formulation process, all decision points and reasonings, and future plans and intentions.	Severity Level: Low – the team is knowledgeable in the models they have constructed so any risk is reduced. In most cases there is only one team member with discrete knowledge of the specific model.	2027	In Progress
34	Weather Sanitization Ownership Update	Update the technical ownership of the weather sanitization repository and any other repositories that may have changed ownership.	Severity Level: Medium – the script is well understood by multiple parties, however there is no single owner to drive decisions or improvements.	2026	In Progress
35	Missing Data Outputs	Correct data issues such that all segments have an outputted value from the WiNGS-Ops model. Failing that, provide full communication and explanation to the end users for those segments where a WiNGS-Ops output was unable to be generated. This would ensure that awareness of these missing values is gained and decisions are not based on the omission of those segments in the model outputs.	Severity Level: Medium – while the PSPS de-energization decision takes other inputs aside from WiNGS-Ops, without a complete model output for every segment, it is conceivable that the decision maker will lose trust with WiNGS-Ops model if a PSPS de-energization decision would need to be made for a segment that has no WiNGS-Ops output.	2026	In Progress
36	Cold Storage	Consider the use of cold storage for long-term storage of snapshots or model runs which do not need to be accessed regularly. This would reduce the overall costs of the cloud infrastructure, which will become more important as the models and data sets mature and grow in size.	Severity Level: Low – as the size of files being stored currently is not large, use of cold storage would have a minimal effect on the cost of cloud services, though remains a best practice recommendation.	2027	Not Started
37	Error Monitoring Dashboard	Develop a monitoring dashboard that provides real-time error monitoring and a view of the model runs such that issues may be highlighted and resolved in a timely manner.	Severity Level: Low – existing monitoring allow for errors to be identified; however, advanced monitoring would allow a more streamlined	2026	In Progress

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
			process for error identification and remediation.		
38	Global ID Cleaning	Clean the data such that all Global IDs are valid and the amount of feeders without output results due to invalid global IDs decreases. This will prevent situations where the WiNGS-Ops model is unable to produce risk scores.	Severity Level: Medium – having up to 10% of feeders without risk scores could cause a loss of credibility within the organization when the model is needed to provide data driven insights for PSPS de-energization decision making.	2026	In Progress
39	Issue Reporting Process	Create a formalized process for issue reporting from the end users to the development teams. This should be simple and streamlined such that any issues may be raised, quantified, and remediated quickly.	Severity Level: Low – currently there is no prescribed process, which could lead to confusion as to the point of escalation for issues. This may result in a delay to any remediation activity and impact the quality of outputs.	2026	In Progress
40	Action & Tasks Log	Document meetings and create a backlog for actions/tasks so they can be prioritized, tracked, and completed against. This will ensure that all tasks are captured and implemented as intended and miscommunication is avoided.	Severity Level: Low – without a formalized process of documentation and action tracking, there may be more instances of misunderstanding of intention between teams, which might result in a sub-optimal outcome or re-work in remediating the concern.	2027	In Progress
41	Questions and Model Changes Tracking	Create a formalized process for questions and model changes ahead of each activation event. In addition, track changes to model code and outputs through formal version control. This will mean that the decision points and actions taken are formally documented and easily explainable if a reference is required, which may aid answering regulatory questions or post-event report preparation.	Severity Level: Low – the current process will result in a more time-consuming post-activation event reporting process. This may mean a period of potential re-work to establish the reasoning behind certain tweaks and decisions taken in the model pre-event.	2027	In Progress
42	WiNGS-Ops Overall Versioning Process	Create an overall WiNGS-Ops model versioning process such that changes or updates to any component of WiNGS-Ops results in a version iteration. This ensures that users have a clear indication of when a model methodology has changed. This may help the users understand which models may be easily compared.	Severity Level: Low – the current versioning methodology may result in inaccurate comparisons being made by end users across models.	2027	In Progress

5.6.2 MODEL CONTROLS, DESIGN, AND REVIEW

5.6.2.1 MODULARIZATION

The WiNGS-Planning and WiNGS-Ops models utilize a modular approach to risk modeling, ensuring that each component of the wildfire risk assessment process is independently evaluated and optimized. This modularization allows for precise tracking and control of changes and enhancements over time, facilitating a more transparent and comprehensive review by subject matter experts such as Risk Analysts, Data Scientists, and Machine Learning-Ops engineers. By breaking down the complex interactions between models and sub-models into distinct modules, the propagation of small changes in assumptions or inputs can be more effectively managed and analyzed, improving the accuracy and reliability of the overall risk assessment. The code base for both models is maintained in a strict git code repository that is version controlled.

The WiNGS-Ops model, for example, includes separate modules for the PoF and PoI models, consequence models, inference pipelines, and validation analysis. Each module operates independently but integrates seamlessly within the broader framework, allowing for detailed traceability, auditability, and reproducibility. Additionally, the WiNGS-Planning model leverages an extensive python-based validation script utilizing the pytest package that is run with every model version update. This produces row and summary level statistic comparisons across every output of the model associated with the previous and new model code version. This comparison output alongside the code change performed is then validated utilizing a thorough git pull-request process by a subject matter expert Data Scientist to ensure model code alterations are producing effects to the output as expected.

5.6.2.2 REANALYSIS

Modularization in risk modeling, as implemented in WiNGS-Planning and WiNGS-Ops, significantly enhances the flexibility and adaptability of these tools. This approach not only facilitates more precise and targeted updates but also supports comprehensive retrospective analysis. For instance, the timestamping feature and secure archiving of all input variables, Python library versions, and assumptions ensure that results can be reproduced accurately on a specific version of the model code under chosen conditions (e.g. time-specific attributes, alternate assumptions). The metadata behind every model run is subsequently securely stored within AWS cloud databases, so all model outputs are fully traceable down to their data inputs, assumptions, and model code. This capability allows results to be highly reproducible and optimally flexible, which is crucial for accurate data reporting and performing scenario analysis.

5.6.2.3 VERSION CONTROL

SDG&E leverages AWS for input/output and model versioning, which facilitates traceability, reproducibility, and auditability. AWS offers a secure and scalable environment for managing version control, allowing for the precise tracking of changes over time. Therefore, any modifications to the models or input data can be traced back to their source, enhancing transparency and accountability. Industry best practices, such as utilizing peer review and following a major, minor, patch, and post-release structure, are also followed.

5.7 RISK ASSESSMENT IMPROVEMENT PLAN

A gap assessment of risk models was conducted for the 2023-2025 Base WMP that identified opportunities for improvement in the 2026 to 2028 WMP cycle. These improvement actions were evaluated and prioritized for implementation based on:

- Ease of implementation: data availability, resource availability, and current capabilities
- Value: a qualitative and relative assessment of the value added by implementing the improvement in terms of further advancing risk mitigation efforts or improving efficiencies

The gap assessment resulted in the identification of timeframes for implementing each action as outlined in OEIS Table 5-6. Actions are assigned to one of the following areas of improvement:

- RA-1: Risk assessment methodology
- RA-2: Design basis
- RA-3: Risk presentation
- RA-4: Risk event tracking
- RA-6: Data engineering optimization

Improvements previously listed as part of RA-5: Risk-informed decision making in the 2023-2025 Base WMP have been captured in RA-3: Risk presentation.

5.7.1 RISK ASSESSMENT METHODOLOGY

The current risk assessment methodology can be enhanced by incorporating additional factors and advancing risk modeling methodologies. This would improve the accuracy and predictability of risk assessments, leading to more effective risk mitigation and resource allocation.

Several improvements to risk assessment methodology are planned, including incorporating SVI, expanding collaboration with Moody's RMS to integrate stochastic approaches to fire consequence modeling and estimate PSPS de-energization duration, developing templates for standardizing model creation, validation, and deployment in cloud environments, and improving modularity and flexibility of existing models and ensure compatibility with AWS.

SDG&E is currently focused on creating, validating, and enhancing its models for use in the HFTD; however, a flexible architecture and visualization platform to expand model capabilities to the rest of the service territory is being developed. This will require automation of remaining subject matter expertise-driven inputs to the model and further output validation.

5.7.2 DESIGN BASIS

The current design basis can be improved to better account for probabilities and uncertainties around expected event impacts, particularly in the context of climate change. This improvement would enhance the accuracy and predictability of risk assessments, leading to more effective risk mitigation and resource allocation.

Efforts to enhance the design basis will continue in the 2026 to 2028 WMP cycle. This includes exploring the incorporation of climate change factors into risk event probabilities to improve the accuracy and predictability of the models. Additionally, subject matter experts will be consulted to ensure alignment around the approach and implications of integrating climate change factors into risk event probabilities. These measures are intended to enhance decision-making and evaluation of projected scenarios, ensuring the models reflect more accurate risk assessments.

5.7.3 RISK PRESENTATION

The WiNGS-Ops and WiNGS-Planning visualization platforms can be improved to provide quicker and easier access to reliable data. Enhancements in this area would facilitate more informed decision-making regarding de-energization and mitigation investments and would improve overall system stability and user experience.

Efforts to improve, expand, and enhance the visualization platform will continue in the 2026 to 2028 WMP cycle. This includes identifying potential enhancements for existing visualizations and instituting regular meetings with internal subject matter experts, visualization developers, and platform users to ensure the precision of displayed data and pinpoint areas for improvement.

Enhancing the visualization platform will provide quick and easy access to reliable data, improving the efficiency of de-energization decisions and overall platform stability. Regular reviews with subject matter experts will ensure the precision of displayed data and continuous improvement of visualizations.

5.7.4 RISK EVENT TRACKING

The current risk event tracking procedures can be improved by implementing comprehensive third-party reviews and developing more robust validation processes. This would enhance the quality and reliability of the models, ensuring more accurate and dependable risk assessments. These improvements will lead to better risk management and more effective decision-making.

Efforts to develop a more comprehensive procedure will continue in the 2026 to 2028 WMP cycle. This includes implementing independent third-party reviews for all models to ensure their quality and reliability. Additionally, regular meetings will be instituted with internal subject matter experts, model developers, and system users to establish an internal tracking system for model issues and independent audit findings. These measures will promote confidence in the risk assessments and pinpoint areas for improvement through thorough validation processes.

Developing a more comprehensive procedure and maintaining third-party reviews for all models will ensure the quality and reliability of the models. This enhancement will provide a thorough validation process, promoting confidence in the risk assessments. Implementing independent third-party reviews will add an extra layer of scrutiny, ensuring that data, models, and pipelines are accurately audited and any issues are promptly addressed.

5.7.5 DATA EGINEERING OPTIMIZATION

The current model architecture and data pipelines can be optimized to better handle comprehensive sensitivity analyses and uncertainty assessments. Additionally, implementing robust mechanisms for tracking model errors and ensuring the quality and reliability of models through third-party reviews would further enhance the system.

Efforts to optimize model architecture and data pipelines will continue in the 2026 to 2028 WMP cycle. This includes enhancing the model architecture to facilitate comprehensive sensitivity analyses and uncertainty assessments. Additionally, regular meetings will be instituted with internal subject matter experts, model developers, and system users to establish an internal tracking system for model issues and independent audit findings, ensuring the quality and reliability of the models and pinpointing areas for improvement through third-party reviews.

Optimizing model architecture and pipelines will establish a robust framework for evaluating uncertainties in model predictions. This enhancement will enable comprehensive sensitivity analyses, ensuring that the models can accurately assess various inputs and conditions. Additionally, tracking model errors and maintaining third-party reviews will ensure the quality and reliability of the models. These measures will promote diligent monitoring of remediation efforts, ensuring that any issues are promptly identified and addressed.

OEIS Table 5-6: Utility Risk Assessment Improvement Plan

Key Risk Assessment Area	Proposed Improvement	Type of Improvement	Expected Value Add	Timeframe and Key Milestones	Model
RA-1, risk assessment methodology	RA-1-A. Incorporate Social Vulnerability Index (SVI)	Model Enhancements	Incorporating the SVI into wildfire CoRE and PSPS CoRE risk assessments would incorporate insights from social vulnerability metrics and improve equity in the evaluation of potential impacts on communities during both wildfires and PSPS de-energizations.	2026: Integrate SVI factor into wildfire and PSPS consequence models	WiNGS-Ops WiNGS-Planning
RA-1, risk assessment methodology	RA-1-B. Retrain models and explore new methodologies	Model Enhancements	Integrating Moody's RMS into the wildfire CoRE model may lead to insights into long-duration fires that incorporate fire suppression activities.	2026-2028: Expand existing collaboration with Moody's RMS to assess their stochastic approach to fire consequence modeling. Ongoing efforts for model improvement	WiNGS-Ops WiNGS-Planning
RA-1, risk assessment methodology	RA-1-C. Estimate PSPS de-energization duration	Model Enhancements	Estimating PSPS de-energization duration and customer minutes impacted for each segment provides additional insights and context for PSPS de-energization decision-making. Estimates include all customers and the medical baseline, AFN, and socially vulnerable subsets.	2026-2028: Integrate PSPS de-energization duration into wildfire and PSPS CoRE models	WiNGS-Ops WiNGS-Planning
RA-1, risk assessment methodology	RA-1-D. Develop templates for standardizing the creation, validation, and deployment of models in cloud environments	Data Governance and Data Architecture	Templates will enhance efficiency, promote consistency, and facilitate easier management of models.	2026-2028: Develop and integrate templates into process, collect feedback, and refine and finalize templates	WiNGS-Ops WiNGS-Planning
RA-1, risk assessment methodology	RA-1-E. Retrain PoF and PoI models and explore new methodologies	Model Enhancements	Enhancing the modularity and flexibility of the existing PoF and PoI models (e.g. vegetation and conductor) will allow predictions beyond the boundaries of the HFTD and enhance the accuracy and predictability of the models.	2026-2028: Modify the current model code to ensure compatibility with AWS. Incorporate new features and observations	WiNGS-Ops WiNGS-Planning
RA-1, risk assessment methodology	RA-1-F. Retrain the condition PoI model and explore new methodologies	Model Enhancements	Retraining the condition PoI model will enhance the accuracy and predictability of the model.	2026-2028: Collaborate with Technosylva to investigate the integration of LFM daily values into the existing condition PoI model	WiNGS-Ops WiNGS-Planning
RA-2, design basis	RA-2-A. Continued evaluation of probabilities	Model Enhancements	Incorporating climate change factors will enhance the accuracy, predictability, and data quality of	2026-2028: Explore incorporating climate change factors into risk event probabilities	WiNGS-Planning

Key Risk Assessment Area	Proposed Improvement	Type of Improvement	Expected Value Add	Timeframe and Key Milestones	Model
	and uncertainties around expected event impacts		the model as well as improve decision making around evaluation of projected scenarios.		
RA-3, risk presentation	RA-3-A. Improve, expand, and enhance the WiNGS-Ops and WiNGS-Planning visualization platform.	Visualization Platform	Enhancing the visualization platform would facilitate quick and easy access to reliable data, faster initial loads, and overall stability of the platform. Identify potential enhancements for existing plots, tables, and graphs to elevate user experience and facilitate efficient risk information transfer.	2026-2028: Ongoing efforts for improvement of the visualization platform	WiNGS-Ops WiNGS-Planning
RA-3, risk presentation	RA-3-B. Institute subject matter expert visualization review	Visualization Platform	Regular review of the platform would ensure the precision of displayed data, enhance existing visualizations, and pinpoint areas for improvement.	2026-2028: Institute regular meetings with subject matter experts, visualization developers, and platform users. Establish a process for collecting and evaluating feedback.	WiNGS-Ops WiNGS-Planning
RA-4, risk event tracking	RA-4-A. Develop a more comprehensive procedure and maintain third-party reviews for all models	Model Validation and User Acceptance	More comprehensive procedures will ensure quality of the models.	2026-2028: Implement a more comprehensive independent third-party review process to conduct audits on data, models, and pipelines	WiNGS-Ops WiNGS-Planning
RA-6, data engineering optimization	RA-6-A. Optimize model architecture and pipelines to allow for sensitivity analysis	Data Governance and Data Architecture	Optimization will facilitate in-depth sensitivity analysis and comprehensive assessment of uncertainties. This encompasses refining the model architecture for a detailed examination of its responses to diverse inputs and conditions, which will establish a robust framework to evaluate uncertainties in model predictions.	2026-2028: Initiate enhancements to model architecture, review methodologies, and optimize feature engineering. Refine the model architecture for a detailed examination of its responses to diverse inputs and conditions.	WiNGS-Ops WiNGS-Planning
RA-6, data engineering optimization	RA-6-B. Track model error	Model Validation and User Acceptance	A tracking system will promote diligent monitoring of remediation efforts.	2026-2028: Establish an internal tracking system for model issues and independent audit findings	WiNGS-Ops WiNGS-Planning

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2026-2028 Wildfire Mitigation Base Plan

Wildfire Mitigation Strategy

6 WILDFIRE MITIGATION STRATEGY

SDG&E's wildfire mitigation strategy continues to evolve with enhancements made to risk modeling, and methodology continues to be refined to consider initial investments but also conduct a comprehensive and detailed analysis of the lifecycle costs of various mitigation alternatives. This thorough evaluation aims to accurately capture the total cost implications over time, ensuring that the most cost-effective and sustainable solutions are implemented. By examining and comparing factors such as operations and maintenance, operational efficiency, and potential savings from avoided risks, SDG&E can prioritize grid-hardening investments that offer the greatest long-term benefits.

The WiNGS-Planning model has incorporated additional inputs and refinements leading to the planned strategic undergrounding of approximately 1,000 miles of electric lines and planned installation of 220 miles of covered conductor between 2026 and 2037. This portfolio will reduce the risk of wildfire and significantly reduce the impacts of PSPS de-energizations to customers on frequently impacted circuits. This strategy will continue to be refined in line with the goals of safe, affordable, and resilient electric service.

6.1 RISK EVALUATION

6.1.1 APPROACH

This WMP is developed using an Enterprise Risk Management Framework, which is modeled after an internationally recognized risk management standard, ISO 31000. The Enterprise Risk Management Framework includes several key components: identifying, analyzing, evaluating, and prioritizing risks; developing and documenting mitigation plans; making risk-informed investments decisions; and implementing, monitoring, and reviewing risk mitigation efforts (see Section 5.2 Risk Analysis Framework for details).

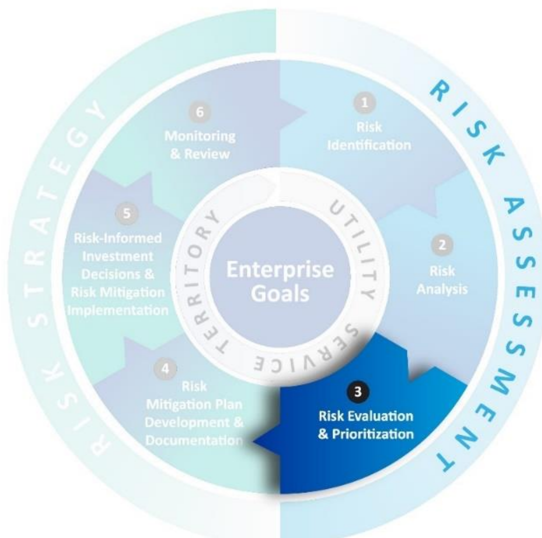
Long-term risk reduction strategy not only considers initial investments but also the lifecycle costs of mitigation alternatives to capture the total cost implications of mitigations over time. By examining and comparing factors such as operations and maintenance, operational efficiency, and potential savings from avoided risks, grid-hardening investments that offer the greatest long-term benefits at the lowest cost are prioritized. The goal is to reduce wildfire risk, enhance system resilience, reduce overall costs, and minimize disruptions for customers, ultimately promoting a safer and more reliable energy infrastructure.

For example, an analysis of the total lifecycle costs, including both installation and long-term operational expenses, associated with covered conductor installations and undergrounding of electric lines, revealed that strategic undergrounding is more cost-effective for most feeder segments in the HFTD, specifically for feeder segments in proximity to vegetation. This is because undergrounding of electric lines significantly reduces or eliminates routine maintenance costs such as vegetation management, wood pole intrusive inspections, drone and overhead visual inspections, and the costs associated with PSPS de-energizations. Consequently, undergrounding not only enhances system reliability and safety but also offers substantial long-term financial benefits compared to the use of covered conductors.

6.1.2 RISK-INFORMED PRIORITIZATION

The third step of the Enterprise Risk Management Framework is Risk Evaluation and Prioritization (see Figure 6-1). A data-driven and risk-based approach enables site-specific risk assessments to identify and implement tailored mitigation strategies. This method considers every location's unique characteristic and vulnerability, providing a comprehensive depiction of the full impacts of wildfires, as well as the disruptions caused by PSPS de-energizations in high wind-affected regions of the service territory.

Figure 6-1: Risk Evaluation & Prioritization Step of the Enterprise Risk Management Framework



The WiNGS-Planning model is used to calculate wildfire, PSPS, and PEDS risk used in the aggregated overall wildfire and overall outage program risk components. WiNGS-Planning prioritization analysis is performed at the circuit-segment level, which is required to establish segment parameters. The WiNGS-Planning model is used to analyze feeder segments in Tier 2 and Tier 3 of the HFTD, segments with historical PSPS de-energizations, and higher-risk urban areas such as coastal canyons or wildland open spaces. The higher-risk urban areas were identified by subject matter experts based on WUI boundary maps and historical wildfires. However, to align with EUP requirements and guided by Senate Bill 884, SDG&E will focus its wildfire and PSPS grid hardening mitigations on feeder segments within the HFTD.

By concentrating on detailed characteristics of feeder segments, such as assets, weather, fuels, vegetation, and the resulting risk levels, SDG&E can develop an optimized strategy to mitigate wildfire, PSPS, and PEDS risks.

The WiNGS-Planning model creates the ranking of circuit-segments in the service territory using a Monte Carlo-based event simulation framework that produces individual risk event probability distributions for wildfire, PSPS, and PEDS de-energizations. Consequences of these risk event occurrences are converted to dollar amounts to assess the range and probability of three risk attributes: safety, reliability, and financial impacts. Using a uniform unit of measurement (dollar amount) across all three risk attributes allows for consistent assessments. Cost distribution statistics, encompassing the mean and various percentiles, are utilized to evaluate potential feeder segments for risk mitigation efforts, including long-term and operational activities. This approach focuses on feeder segments projected to incur the most significant financial losses over time.

The WiNGS-Planning model estimates the baseline risk and quantifies the expected risk reduction for both Combined Covered Conductor and Strategic Undergrounding for each feeder segment. These individual risk reductions are evaluated within the cost-benefit framework outlined by the Risk OIR Phase II[42] and Phase III Decisions[43]. This framework models risk reduction, installation, and operations and maintenance (O&M) costs, considering inflation and various benefit discount rates scenarios over the expected 55-year lifetime of the assets.

Once the outputs from WiNGS-Planning are reviewed and approved by the Risk Analytics team, the final mitigation selection process begins. This involves a group of subject matter experts, including Electric System Hardening engineers, fire coordination personnel, meteorologists, risk data scientists, and construction engineers. They review the outputs of the WiNGS-Planning model and the resulting cost-benefit ratios, discussing the feasibility, benefits (risk reduction), and unmitigated (residual) risks of deploying Combined Covered Conductor or Strategic Undergrounding. Additionally, the group evaluates the advantages of “bundling” the hardening of upstream feeder segments to optimize PSPS risk reduction and leverage economies of scale by reducing permitting and mobilization costs.

SDG&E is currently developing an optimization algorithm to identify feeder-segments which, when bundled, may present net cost reduction opportunities. The optimization algorithm selects feeder-segment bundles that, when upgraded, would minimize the anticipated residual wildfire and PSPS risks while maintaining a cost-benefit ratio greater than 1 (i.e., a net benefit) for the upgraded bundle. The output of this process is a list of projects consisting of bundled segments eligible for combined covered conductor and undergrounding. Potential cost efficiencies of the proposed bundles are then determined, and cost-benefit ratios are updated to inform the group of subject matter experts in their discussions on mitigation selection.

There are some constraints in the WiNGS-Planning model around feasibility, land-right usage, and the availability and occurrences of historical events to train sub models. See Section 5.2.3 Key Assumptions and Limitations for additional information on key assumptions and limitations. See Section 6.1.3.3.4 Monitoring Progress toward Targets with Known Limitations and Constraints for feasibility constraints and limitations to Strategic Undergrounding and Combined Covered Conductor implementation.

See Section 6.1.3.2.6 Mitigation Initiative Prioritization to Reduce Wildfire and PSPS Risk for details on the desktop feasibility review.

6.1.2.1 PRIORITIZED LIST OF RISKS

Wildfire and Outage Program risk scores are combined to form an Overall Wildfire Risk score for a specific segment. Wildfire Risk, Outage Program Risk, and Overall Utility Risk are analyzed to rank feeder segments across the service territory. OEIS Table 6-1 presents the top 10 feeder segments based on Overall Utility Risk (the full table is presented in Appendix F).

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[42] D.22-12-027

[43] D.24-05-064

OEIS Table 6-1: List of Prioritized Areas in an Electrical Corporations Service Territory Based on Overall Utility Risk

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
1	222-1986R	21.26	$79,194,349	$78,602,170	$592,179	2.611537%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
2	237-30R	33.47	$65,515,492	$64,815,659	$699,833	2.160458%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
3	909-451	20.60	$55,252,375	$54,850,769	$401,606	1.822019%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
4	222-1990R	14.24	$45,106,640	$44,939,414	$167,226	1.487450%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
5	908-2038R	17.93	$41,258,574	$40,800,964	$457,611	1.360555%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
6	524-69R	34.17	$40,375,331	$39,985,025	$390,306	1.331429%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
7	358-682F	12.51	$37,602,118	$37,073,061	$529,058	1.239979%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
8	1458-601R	15.45	$37,077,302	$36,838,604	$238,698	1.222672%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
9	1021-1748F	17.73	$35,156,122	$34,811,511	$344,612	1.159319%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
10	909-805R	13.42	$32,313,161	$32,075,253	$237,908	1.065568%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Note: Full table is provided in Appendix F

6.1.3 ACTIVITY SELECTION PROCESS

The WiNGS-Planning model is used for segment risk ranking, segment cost benefit analysis, and portfolio analysis and informs scoping for capital programs, including grid hardening initiatives in the HFTD. Mitigations evaluated in the WiNGS-Planning model are strategic undergrounding of electric lines and installing covered conductor combined with advanced protection settings, as these initiatives are the most effective at reducing risk events on utility equipment. SDG&E's wildfire mitigation strategy continues to provide a hybrid grid hardening approach, aimed at balancing long-term risk reduction with the cost of installing combined covered conductor mitigations and undergrounding of electric infrastructure. The approach considers costs for operational mitigations such as vegetation management, PSPS de-energizations, pre- and post- PSPS feeder segment PSPS patrols, asset inspections, and maintenance costs tied to both strategic undergrounding and covered conductor installation to prioritize mitigation selection.

SDG&E's risk framework is built upon the recent RDF OIR Phase II[44] and Phase III Decision[45] Cost-Benefit Framework, which is required for SDG&E's 2025 RAMP filing. This framework is used to obtain segment risk ranking, segment Cost Benefit Ratio (CBR) analysis, and portfolio analysis. It informs the scoping for investment decisions, including grid hardening initiatives in the HFTD.

Mitigations are selected by considering their risk reduction estimates, as well as both upfront installation and lifecycle costs. Lifecycle costs are essential to making informed and cost-effective decisions in infrastructure investments. They encompass not only the initial investment in mitigation measures but also the ongoing costs of maintenance, operations, and potential upgrades. Mitigations are modeled for Combined Covered Conductor and Undergrounding with an assumed lifespan of 55 years to comply with the EUP risk modeling reporting requirements guided by Senate Bill 884.

By evaluating these costs over the expected lifespan of the project, SDG&E makes financially sustainable choices that maximize long-term benefits rather than simply minimizing upfront expenditures. Without proper consideration of lifecycle costs, solutions that appear cost-effective initially may lead to higher expenses over time due to maintenance, failures, or inefficiencies.

One of the key reasons to consider lifecycle costs is that risk mitigation efforts often involve trade-offs between short-term and long-term savings. For example, installing stronger poles (steel poles) during the deployment of covered conductor or undergrounding electric lines may require significant initial capital, but these measures can substantially reduce future repair costs, emergency response expenses, and service disruptions. Lifecycle cost analysis helps select, justify, or reject mitigation investments, and avoids opting for the least expensive solution up front, which could lead to higher costs down the line due to increased failures, maintenance needs, or safety hazards.

Several established techniques are used to perform lifecycle cost analysis, each providing a structured approach to evaluating long-term financial impacts such as Net Present Value (NPV) and Cost-Benefit Analysis (CBA). As mentioned in Section 5.2.1.1 WiNGS-Planning and WiNGS-Ops Models, SDG&E utilizes the cost benefit analysis to quantify wildfire and PSPS risk baselines, risk reductions, and prioritize

[44] D.22-12-027
[45] D.24-05-064

mitigations at the circuit segment level. In addition to lifecycle cost benefits, the risk-informed strategy identifies strategic undergrounding as the optimal long-term approach due to:

- Undergrounding costs are expected to decrease as efficiencies are gained. This is done by implementing new construction technology, reducing trench depths and conduit size when applicable, strategic bidding, and bundling projects.
- While the installation of Combined Covered Conductor can reduce PSPS risk during low to moderate Santa Ana weather events, it is not effective during extreme fire weather conditions with high wind gusts. Maximum PSPS risk reduction is achieved only through the deployment of undergrounding, which provides a more robust solution by eliminating the risk of overhead lines sparking fires during adverse weather conditions.
- In addition to wildfire and PSPS mitigation benefits, undergrounding significantly enhances the resilience and reliability of the electrical grid by protecting infrastructure from environmental hazards such as flying debris, lightning strikes, vegetation and animal contacts. This results in fewer outages thereby improving overall system performance.

6.1.3.1 IDENTIFYING AND EVALUATING MITIGATION INITIATIVES

6.1.3.1.1 Procedures for Identifying and Evaluating Initiative Activities

In D.22-12-027,[46] issued on December 21, 2022, the CPUC replaced the 2018 S-MAP Settlement Agreement with a new RDF. As a result, the MAVF was replaced by a Cost-Benefit Approach that includes standardized dollar valuations of risk event consequences.

As described in Section 5.2.1.1 WiNGS-Planning and WiNGS-Ops Models, WiNGS-Planning makes use of the Cost-Benefit Approach and evaluates wildfire, PSPS, and PEDS impacts at the span/segment level. Investment and prioritization decisions for risk mitigations can be made at the circuit-segment level. Risk reduction benefits are assessed by comparing the change between pre-mitigation and post-mitigation risk for viable mitigation options and evaluating the costs of installation and long-term maintenance of those mitigation options. The pre-mitigation risk is the risk preceding the start of a mitigation activity and considers existing attributes of the system at the time of the model run. Evaluation of the risk benefit (in dollars) and installation and maintenance costs are performed to evaluate the risk buy-down estimate on a per circuit-segment basis for each mitigation option, or a CBR. This metric is produced for each unique risk attribute, wildfire, PSPS, and PEDS, as well as the Overall risk, helping inform the specific cost-benefit impact expected for each mitigation type in the model and for every circuit-segment.

6.1.3.1.2 Initiative Activities that Address Local Wildfire Risk Drivers

Local wildfire risk drivers include downed conductors, foreign object/vegetation contacts, and equipment failures. Of these, risk drivers tied to overhead line risk exposure represent the greatest risk. Strategic undergrounding of electric lines is the most effective method of reducing wildfire risk as it reduces the impact of overhead line risk exposure and the likelihood for high winds to adversely impact grid assets. Additionally, it reduces the need for PSPS de-energizations if all overhead exposure in a circuit is undergrounded. Given the high number of miles that overhead lines cover, cost-benefit

[46] D.22-12-027; https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M500/K014/500014668.PDF

calculations developed in the WiNGS-Planning model suggest prioritization of strategic undergrounding of electric lines within the HFTD. Data on historic PSPS de-energizations, wind conditions, and other criteria are reviewed to determine where undergrounding of electric lines will have the largest impact to address local risk drivers.

In addition to strategic undergrounding, installation of covered conductors is effective at reducing risk events on utility equipment and can raise the threshold for PSPS de-energizations to higher wind speeds compared to bare conductor hardening. For example, during the PSPS activation that occurred December 9 to December 11, 2024, the wind gust threshold was increased to 50 miles per hour for two feeder segments with covered conductor installed. See the SDG&E Public Safety Power Shutoff Post-Event Report: December 9 to December 11[47] for details.

6.1.3.1.3 Characterization and Incorporation of Uncertainties

The WiNGS-Planning model harnesses stochastic modeling to assess risk event uncertainties. By employing a Monte Carlo probability framework that runs millions of event simulations, it evaluates three critical risk outputs: wildfire, PSPS, and PEDS, each producing distinct event cost probability distributions that are combined with various statistics and probabilities to inform mitigation decisions. This risk event simulation approach ensures that uncertainties are characterized and seamlessly integrated into strategic planning efforts.

D.22-12-027 requires the use of standardized dollar valuations for risk consequences, which is reflected in the latest version of the WiNGS-Planning model. However, as with the current decision-making process leveraged in WiNGS-Planning, proposed mitigations and inputs will continue to need additional subject matter expertise and review.

Generating grid hardening mitigation alternatives based on the WiNGS-Planning outputs is a crucial step in a comprehensive, multi-layered decision-making process that ensures the effective allocation of resources, maximizes risk reduction, and enhances the resilience of the electrical grid against wildfire PSPS, and PEDS de-energizations. While the WiNGS-Planning model provides a quantitative assessment of wildfire and PSPS risk reduction and a preliminary preference for mitigation between Combined Covered Conductor or Undergrounding at each feeder segment, the proposed mitigations must also undergo subject matter expert review. This review is accomplished through a desktop feasibility analysis that includes considerations such as geography, pole loading, asset engineering standards, environmental factors, permitting, and other concurrent hardening projects (see Figure 6-2 for details).

During the development and selection of input assumptions, as well as during the subject matter expert review, SDG&E teams identify and evaluate the impact of uncertainties in the evaluation and decision-making process. This includes recognizing potential sources of uncertainty, such as variations in weather conditions affecting PSPS likelihoods, and conducting sensitivity analyses on the most impactful assumptions, such as assumed installation or O&M costs per mile.

[47] Microsoft Word - R1812005 SDGE PSPS Post-Event Report Dec 9-11, 2024 (FINAL WORD 3_15 pm)

6.1.3.1.4 Potential Initiatives for Risk Drivers Included in List of Prioritized Circuit Segments

See SDGE Table 6-1 for a summary of potential initiatives for risk drivers, activity effectiveness, and implementation costs. For activity risk reduction, see OEIS Table 6-3.

Uncertainties for activities listed in SDGE Table 6-1 include land rights, environmental restrictions, permitting, material availability and supply chain constraints, and private property owners' consent, all of which can result in delays to implementation. These challenges are considered in desktop feasibility review and again in design when scoping a mitigation, as these are often outside of SDG&E's control and may require changes to original design, scope, and schedule of a project.

See OEIS Table 13-1: Lessons Learned for solutions to reduce potential impacts of uncertainties related to land rights and permitting. SDG&E established a new long-term demand forecasting capability to improve advanced ordering for long lead-time materials including steel poles. The process involves modeling historical material usage and adjusting that forecast for expected program changes for over a dozen different programs, including but not limited to Strategic Undergrounding, Combined Covered Conductor, Traditional Hardening, Strategic Pole Replacement Program, and Risk Informed Drone Inspections (RIDI). The individually modeled material demands across all programs are aggregated for advanced purchasing company wide. Having aggregated demand totals by each material type allows SDG&E to better reserve factory capacity 1 to 2 years in advance of material deliveries.

SDGE Table 6-1: Potential Mitigation Activities for Risk Drivers included in List of Prioritized Circuit Segments

Risk Driver (from OEIS Table 6-1)	Initiative	Activity	Tracking ID	Activity Effectiveness	Expected Implementation Cost (K$)	CapEx	O&M	Uncertainties / Potential Impacts	Implementation Schedule
Contact from Object	Grid Design and System Hardening	Strategic Undergrounding	WMP.473	99%	$435,575.00	$430,561.00	$5,014.00	See Section 6.1.3.1.4	2026-2028
Contact from Object	Grid Design and System Hardening	Combined Covered Conductor	WMP.455	59%	$212,401.00	$208,317.00	$4,084.00	See Section 6.1.3.1.4	2026-2028
Contact from Object	Grid Design and System Hardening	Advance Protection	WMP.463	8%	$6,354.00	$5,793.00	$561.00	See Section 6.1.3.1.4	2026-2028
Contact from Object	Grid Design and System Hardening	Early Fault Detection	WMP.1195	16%	$7,613.00	$7,604.00	$9.00	See Section 6.1.3.1.4	2026-2028
Contact from Object	Public Safety Power Shutoff	PSPS	n/a	n/a	n/a**	n/a**	n/a**	See Section 6.1.3.1.4	2026-2028
Contact from Object	Grid Operations and Procedures	Sensitive Relay Profile	n/a	n/a	n/a***	n/a***	n/a***	See Section 6.1.3.1.4	2026-2028
Contact from Object	Asset Inspections	Distribution Overhead Detailed Inspections	WMP.478	29%	$3,004.00	$0.00	$3,004.00	See Section 6.1.3.1.4	2026-2028
Contact from Object	Asset Inspections	Distribution Wood Pole Intrusive Inspections	WMP.483	29%	$2,536.00	$0.00	$2,536.00	See Section 6.1.3.1.4	2026-2028
Contact from Object	Asset Inspections	Risk-Informed Done Inspections	WMP.522	29%	$104,208.00	$70,625.00	$33,583.00	See Section 6.1.3.1.4	2026-2028
Contact from Object	Asset Inspections	Distribution Overhead Patrol Inspections	WMP.488	29%	$852.00	$0.00	$852.00	See Section 6.1.3.1.4	2026-2028
Contact from Object	Asset Inspections	Transmission Overhead Detailed Inspections	WMP.479	28%	$3,425.00	$3,380.00	$45.00	See Section 6.1.3.1.4	2026-2028
Contact from Object	Asset Inspections	Transmission Infrared Inspections	WMP.482	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Contact from Object	Asset Inspections	Transmission Wood Pole Intrusive Inspections	WMP.1190	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Contact from Object	Asset Inspections	Transmission Overhead Patrol Inspections	WMP.489	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Vegetation Contact	Grid Design and System Hardening	Strategic Undergrounding	WMP.473	99%	$435,575.00	$430,561.00	$5,014.00	See Section 6.1.3.1.4	2026-2028

Risk Driver (from OEIS Table 6-1)	Initiative	Activity	Tracking ID	Activity Effectiveness	Expected Implementation Cost (K$)	CapEx	O&M	Uncertainties / Potential Impacts	Implementation Schedule
Vegetation Contact	Grid Design and System Hardening	Combined Covered Conductor	WMP.455	59%	$212,401.00	$208,317.00	$4,084.00	See Section 6.1.3.1.4	2026-2028
Vegetation Contact	Vegetation Management and Inspections	Off-cycle patrol	WMP.508	1%	$4,399.00	$0.00	$4,399.00	See Section 6.1.3.1.4	2026-2028
Vegetation Contact	Vegetation Management and Inspections	Prune and Removal	WMP.501	1%	$91,017.00	$0.00	$91,017.00	See Section 6.1.3.1.4	2026-2028
Vegetation Contact	Public Safety Power Shutoff	PSPS	n/a	n/a	n/a**	n/a**	n/a**	See Section 6.1.3.1.4	2026-2028
Vegetation Contact	Grid Operations and Procedures	Sensitive Relay Profile	n/a	n/a	n/a***	n/a***	n/a***	See Section 6.1.3.1.4	2026-2028
Vegetation Contact	Asset Inspections	Distribution Overhead Detailed Inspections	WMP.478	29%	$3,004.00	$0.00	$3,004.00	See Section 6.1.3.1.4	2026-2028
Vegetation Contact	Asset Inspections	Distribution Wood Pole Intrusive Inspections	WMP.483	10%	$2,536.00	$0.00	$2,536.00	See Section 6.1.3.1.4	2026-2028
Vegetation Contact	Asset Inspections	Risk-Informed Done Inspections	WMP.552	29%	$104,208.00	$70,625.00	$33,583.00	See Section 6.1.3.1.4	2026-2028
Vegetation Contact	Asset Inspections	Distribution Overhead Patrol Inspections	WMP.488	10%	$852.00	$0.00	$852.00	See Section 6.1.3.1.4	2026-2028
Vegetation Contact	Asset Inspections	Transmission Overhead Detailed Inspections	WMP.479	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Vegetation Contact	Asset Inspections	Transmission Infrared Inspections	WMP.482	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Vegetation Contact	Asset Inspections	Transmission Wood Pole Intrusive Inspections	WMP.1190	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Vegetation Contact	Asset Inspections	Transmission Overhead Patrol Inspections	WMP.489	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Equipment / facility failure or damage	Grid Design and System Hardening	Strategic Undergrounding	WMP.473	99%	$435,575.00	$430,561.00	$5,014.00	See Section 6.1.3.1.4	2026-2028
Equipment / facility failure or damage	Grid Design and System Hardening	Combined Covered Conductor	WMP.455	59%	$212,401.00	$208,317.00	$4,084.00	See Section 6.1.3.1.4	2026-2028

Risk Driver (from OEIS Table 6-1)	Initiative	Activity	Tracking ID	Activity Effectiveness	Expected Implementation Cost (K$)	CapEx	O&M	Uncertainties / Potential Impacts	Implementation Schedule
Equipment / facility failure or damage	Grid Design and System Hardening	Advance Protection	WMP.463	8%	$6,354.00	$5,793.00	$561.00	See Section 6.1.3.1.4	2026-2028
Equipment / facility failure or damage	Grid Design and System Hardening	Early Fault Detection	WMP.1195	16%	$7,613.00	$7,604.00	$9.00	See Section 6.1.3.1.4	2026-2028
Equipment / facility failure or damage	Asset Inspections	Distribution Overhead Detailed Inspections	WMP.478	29%	$3,004.00	$0.00	$3,004.00	See Section 6.1.3.1.4	2026-2028
Equipment / facility failure or damage	Asset Inspections	Transmission Overhead Detailed Inspections	WMP.479	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Equipment / facility failure or damage	Asset Inspections	Risk-Informed Done Inspections	WMP.552	29%	$104,208.00	$70,625.00	$33,583.00	See Section 6.1.3.1.4	2026-2028
Equipment / facility failure or damage	Asset Inspections	Distribution Wood Pole Intrusive Inspections	WMP.483	29%	$2,536.00	$0.00	$2,536.00	See Section 6.1.3.1.4	2026-2028
Equipment / facility failure or damage	Asset Inspections	Distribution Overhead Patrol Inspections	WMP.488	29%	$852.00	$0.00	$852.00	See Section 6.1.3.1.4	2026-2028
Equipment / facility failure or damage	Asset Inspections	Transmission Infrared Inspections	WMP.482	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Equipment / facility failure or damage	Asset Inspections	Transmission Wood Pole Intrusive Inspections	WMP.1190	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Equipment / facility failure or damage	Asset Inspections	Transmission Overhead Patrol Inspections	WMP.489	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Equipment / facility failure or damage	Grid Design and System Hardening	Strategic Pole Replacement	WMP.1189	39%	$18,996.00	$18,492.00	$504.00	See Section 6.1.3.1.4	2026-2028

Risk Driver (from OEIS Table 6-1)	Initiative	Activity	Tracking ID	Activity Effectiveness	Expected Implementation Cost (K$)	CapEx	O&M	Uncertainties / Potential Impacts	Implementation Schedule
Equipment / facility failure or damage	Grid Design and System Hardening	Traditional Hardening	WMP.475	39.43%	$11,618.00	$9,559.00	$2,059.00	See Section 6.1.3.1.4	2026-2028
Equipment / facility failure or damage	Public Safety Power Shutoff	PSPS	n/a	n/a	n/a**	n/a**	n/a**	See Section 6.1.3.1.4	2026-2028
Equipment / facility failure or damage	Grid Operations and Procedures	Sensitive Relay Profile	n/a	n/a	n/a***	n/a***	n/a***	See Section 6.1.3.1.4	2026-2028
Wire-to-wire contact	Grid Design and System Hardening	Traditional Hardening	WMP.475	39.43%	$0.00	$0.00	$0.00	See Section 6.1.3.1.4	2026-2028
Wire-to-wire contact	Grid Design and System Hardening	Strategic Undergrounding	WMP.473	99%	$435,575.00	$430,561.00	$5,014.00	See Section 6.1.3.1.4	2026-2028
Wire-to-wire contact	Grid Design and System Hardening	Combined Covered Conductor	WMP.455	59%	$212,401.00	$208,317.00	$4,084.00	See Section 6.1.3.1.4	2026-2028
Wire-to-wire contact	Public Safety Power Shutoff	PSPS	n/a	n/a	n/a**	n/a**	n/a**	See Section 6.1.3.1.4	2026-2028
Wire-to-wire contact	Grid Operations and Procedures	Sensitive Relay Profile	n/a	n/a	n/a***	n/a***	n/a***	See Section 6.1.3.1.4	2026-2028
Wire-to-wire contact	Asset Inspections	Distribution Overhead Detailed Inspections	WMP.478	29%	$3,004.00	$0.00	$3,004.00	See Section 6.1.3.1.4	2026-2028
Wire-to-wire contact	Asset Inspections	Distribution Wood Pole Intrusive Inspections	WMP.483	29%	$2,536.00	$0.00	$2,536.00	See Section 6.1.3.1.4	2026-2028
Wire-to-wire contact	Asset Inspections	Risk-Informed Done Inspections	WMP.552	29%	$104,208.00	$70,625.00	$33,583.00	See Section 6.1.3.1.4	2026-2028
Wire-to-wire contact	Asset Inspections	Distribution Overhead Patrol Inspections	WMP.488	29%	$852.00	$0.00	$852.00	See Section 6.1.3.1.4	2026-2028
Wire-to-wire contact	Asset Inspections	Transmission Overhead Detailed Inspections	WMP.479	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Wire-to-wire contact	Asset Inspections	Transmission Infrared Inspections	WMP.482	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028

Risk Driver (from OEIS Table 6-1)	Initiative	Activity	Tracking ID	Activity Effectiveness	Expected Implementation Cost (K$)	CapEx	O&M	Uncertainties / Potential Impacts	Implementation Schedule
Wire-to-wire contact	Asset Inspections	Transmission Wood Pole Intrusive Inspections	WMP.1190	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Wire-to-wire contact	Asset Inspections	Transmission Overhead Patrol Inspections	WMP.489	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Contamination	Grid Design and System Hardening	Strategic Undergrounding	WMP.473	99%	$435,575.00	$430,561.00	$5,014.00	See Section 6.1.3.1.4	2026-2028
Contamination	Grid Design and System Hardening	Combined Covered Conductor	WMP.455	59%	$212,401.00	$208,317.00	$4,084.00	See Section 6.1.3.1.4	2026-2028
Contamination	Public Safety Power Shutoff	PSPS	n/a	n/a	n/a**	n/a**	n/a**	See Section 6.1.3.1.4	2026-2028
Contamination	Grid Operations and Procedures	Sensitive Relay Profile	n/a	n/a	n/a***	n/a***	n/a***	See Section 6.1.3.1.4	2026-2028
Contamination	Asset Inspections	Distribution Overhead Detailed Inspections	WMP.478	29%	$3,004.00	$0.00	$3,004.00	See Section 6.1.3.1.4	2026-2028
Contamination	Asset Inspections	Distribution Wood Pole Intrusive Inspections	WMP.483	29%	$2,536.00	$0.00	$2,536.00	See Section 6.1.3.1.4	2026-2028
Contamination	Asset Inspections	Risk-Informed Done Inspections	WMP.552	29%	$104,208.00	$70,625.00	$33,583.00	See Section 6.1.3.1.4	2026-2028
Contamination	Asset Inspections	Distribution Overhead Patrol Inspections	WMP.488	29%	$852.00	$0.00	$852.00	See Section 6.1.3.1.4	2026-2028
Contamination	Asset Inspections	Transmission Overhead Detailed Inspections	WMP.479	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Contamination	Asset Inspections	Transmission Infrared Inspections	WMP.482	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Contamination	Asset Inspections	Transmission Wood Pole Intrusive Inspections	WMP.1190	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Contamination	Asset Inspections	Transmission Overhead Patrol Inspections	WMP.489	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Unknown	Asset Inspections	Distribution Overhead Detailed Inspections	WMP.478	29%	$3,004.00	$0.00	$3,004.00	See Section 6.1.3.1.4	2026-2028
Unknown	Asset Inspections	Distribution Wood Pole Intrusive Inspections	WMP.483	29%	$2,536.00	$0.00	$2,536.00	See Section 6.1.3.1.4	2026-2028

Risk Driver (from OEIS Table 6-1)	Initiative	Activity	Tracking ID	Activity Effectiveness	Expected Implementation Cost (K$)	CapEx	O&M	Uncertainties / Potential Impacts	Implementation Schedule
Unknown	Asset Inspections	Distribution Overhead Patrol Inspections	WMP.488	29%	$852.00	$0.00	$852.00	See Section 6.1.3.1.4	2026-2028
Unknown	Asset Inspections	Transmission Overhead Detailed Inspections	WMP.479	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Unknown	Asset Inspections	Transmission Wood Pole Intrusive Inspections	WMP.1190	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Unknown	Asset Inspections	Transmission Overhead Patrol Inspections	WMP.489	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Unknown	Asset Inspections	Transmission Infrared Inspections	WMP.482	28%	n/a*	n/a*	n/a*	See Section 6.1.3.1.4	2026-2028
Unknown	Asset Inspections	Risk-Informed Done Inspections	WMP.552	29%	$104,208.00	$70,625.00	$33,583.00	See Section 6.1.3.1.4	2026-2028
Unknown	Grid Design and System Hardening	Strategic Undergrounding	WMP.473	99%	$435,575.00	$430,561.00	$5,014.00	See Section 6.1.3.1.4	2026-2028
Unknown	Grid Design and System Hardening	Combined Covered Conductor	WMP.455	59%	$212,401.00	$208,317.00	$4,084.00	See Section 6.1.3.1.4	2026-2028
Unknown	Grid Design and System Hardening	Early Fault Detection	WMP.1195	16%	$7,613.00	$7,604.00	$9.00	See Section 6.1.3.1.4	2026-2028
Unknown	Grid Design and System Hardening	Advance Protection	WMP.463	8%	$6,354.00	$5,793.00	$561.00	See Section 6.1.3.1.4	2026-2028
Unknown	Public Safety Power Shutoff	PSPS	n/a	n/a	n/a**	n/a**	n/a**	See Section 6.1.3.1.4	2026-2028
Unknown	Grid Operations and Procedures	Sensitive Relay Profile	n/a	n/a	n/a***	n/a***	n/a***	See Section 6.1.3.1.4	2026-2028

** Transmission only activities are funded by FERC*

*** PSPS costs cannot be projected*

**** For Sensitive Relay Profile, see Grid Operations and Procedures initiatives*

6.1.3.1.5 Evaluation of Mitigation Alternatives

SDG&E conducts a cost-benefit analysis to compare the expected risk reduction and lifecycle costs of Strategic Undergrounding and Combined Covered Conductor, which is used to prioritize grid hardening mitigation. The WiNGS-Planning model estimates wildfire, PSPS, and PEDS risk reductions for each feeder segment in Tier 2 and Tier 3 of the HFTD.

Based on risk reduction estimates from the WiNGS-Planning model, SDG&E identifies a mitigation recommendation for each feeder segment, which is reviewed by the Electric System Hardening for further evaluation. During the scoping process, a desktop feasibility study is conducted to evaluate the feasibility of the proposed mitigation. Segments upstream and downstream of the selected segment are also assessed to determine whether undergrounding or combined covered conductor is optimal (see Section 6.1.2 Risk-Informed Prioritization). Consecutive segments may be bundled together to maximize PSPS risk reduction and achieve economies of scale. In addition, Electric Distribution Planning engineers check wildfire projects for any capacity grid needs identified on the associated circuit or circuits. These capacity grid needs, and associated upgrades required to mitigate the grid needs, are identified in the annual Distribution Planning Process. As part of the check, Electric Distribution Planning engineers confirm Distribution Planning Process results and assess if there are changes in scope since the completion of the annual Distribution Planning Process. Upgrades or reconfigurations may be added to the scope of the wildfire projects, as needed.

Strategic Undergrounding Program

Strategic undergrounding of electric lines converts overhead systems to underground, providing the dual benefits of nearly eliminating utility-related wildfire risk and the need for PSPS de-energizations. Cost savings reflected in updated versions of the WiNGS-Planning model were obtained by using reduced trench depths, using reduced conduit size when applicable, implementing new construction technology, when possible, strategically bidding and bundling projects, avoiding and coordinating resurfacing conflicts, and streamlining and updating the processes, procedures, and policies.

To calculate the wildfire risk reduction for strategic undergrounding of electric lines, data on historical ignitions associated with underground equipment, pre-mitigation overhead system risk event rates, and ignitions rates were analyzed. Specifically, the effectiveness of strategic undergrounding was measured by dividing total CPUC-reportable ignitions associated with undergrounded electric lines by total ignitions.

Combined Covered Conductor Program

Combined covered conductor is a widely accepted term to distinguish from bare conductor. The term indicates that the installed conductor utilizes triple extruded layers consisting of a semi-conducting sheath, an insulating polyethylene sheath, and an abrasion resistant XLPE external cover to provide incidental contact protection.

6.1.3.2 ACTIVITY PRIORITIZATION

Activities identified by WiNGS-Planning, namely, Combined Covered Conductor and Strategic Undergrounding, are currently built upon the Cost-Benefit Framework developed for the 2025 RAMP filing. This decision recognizes that the utilities will not be bound to select mitigation strategies based solely on model outputs and may consider other factors that inform initiative prioritization. Risk mitigation impacts are quantified using monetized and standardized risk consequences to the most practicable extent; however, prioritization choices continue to be influenced by factors such as labor resources, technology, and modeling limitations and/or uncertainties affecting the analyses.

6.1.3.2.1 Evaluation of Potential Mitigation Initiatives

Once the baseline risk per segment has been established, the next step is evaluating the effect and costs of different mitigations. For each mitigation, there is an associated percentage decrease in wildfire and outage program risk impact. For wildfire risk mitigation effectiveness, internal and external subject matter expertise is used to estimate the impact of a mitigation on various wildfire triggers (e.g., animal contact, vegetation contact). Where possible, additional analyses are conducted using internal data (e.g., historical fault data). For PSPS impact reduction, internal subject matter expertise and historical event data are used to estimate the reduction in PSPS likelihood for the individual segment probability tied to each mitigation. The mitigation cost is calculated by applying a representative cost per mile for installation and future expected O&M expenses to the specific circuit segment. For undergrounding of electric lines, a mileage contingency related to the conversion of overhead electric lines to underground is also considered. By analyzing estimates of risk reduction, unmitigated (residual) risk, and long-term cost assessments at the circuit-segment level, a cost-benefit value is calculated for each mitigation associated with each circuit-segment within the WiNGS-Planning model scope.

Because the PSPS risk on a segment is influenced by the PSPS probability of upstream segments, hardening mitigations that occur upstream of feeder segments will also influence the risk on downstream segments. Thus, a mitigation's impact on a segment must be considered with other segments on the same circuit. The dynamic nature of the WiNGS-Planning model updates the maximum upstream PSPS probability of a segment as mitigations upstream are determined.

D.22-12-027 maintains that PSPS de-energizations must be modeled within the RDF as a risk, not just as a mitigation. For instance, to quantify the potential impact of PSPS de-energizations, the Lawrence Berkeley National Laboratory is studying the impacts of outages in participating territories nationwide, which the CPUC has directed California IOUs to participate in. In preparation for its 2025 RAMP, SDG&E plans to work with Lawrence Berkeley National Laboratory in its refinement of standardized and monetized risk consequences, e.g., reliability, and this external subject matter expertise may be incorporated into future WiNGS-Planning PSPS risk assessments where applicable.

6.1.3.2.2 Identification of Mitigation Initiatives

The CPUC's decision to transition to a new RDF for 2025 RAMP has resulted in new cost-effectiveness measures and investment decisions for mitigations, though this will not be completely defined until the new framework is fully developed. At that time, WiNGS-Planning models will reflect the new CPUC-mandated methodologies. It is important to note that the CPUC, in its decision, recognized that CBRs will not and should not be the sole determinative factors to prioritize investments. Non-quantitative factors, regulatory requirements, and other factors will continue to be considered in the context of choosing the best risk mitigation investment strategies.

WiNGS-Planning analyzes each circuit-segment for installation of covered conductor, strategic undergrounding of electric lines, or no-mitigation to optimize and compare the risk reduction and associated cost. Utilizing varied constraints and risk target goals, including risk reduction percentages, total scenario cost, and Cost Benefit analysis thresholds, different scenarios can be run across the full scope of circuit-segments considered, resulting in a unique set of mitigations and scenario outputs (e.g., total risk reduction, total cost, strategic underground mitigation mileage). Currently, CBA outputs from WiNGS-Planning are used to determine investment mitigations that reduce risk. Although the risk reduction targets are often aimed at cost effectiveness, annual performance objectives, mileage targets, and other limitations and constraints are also considered to inform investment decisions.

Sensitivity analyses are employed to validate CBA and mitigation sections of the WiNGS-Planning model. Constants, including cost per mile estimates and CBA thresholds, are adjusted to determine how sensitive the mitigation recommendations are to different size variable adjustments.

Given the size and scale of the service territory, a risk-based approach, along with geographic considerations, is used to prioritize mitigation initiatives. Wildfire and PSPS mitigations are prioritized within the HFTD, with a focus on Tier 3. HFTD Tiers are used as a proxy for more detailed risk-modeling to prioritize areas with extreme risk from wildfires first, followed by areas of elevated risk. In some cases, however, the WiNGS-Planning model may recommend a scope of work that prioritizes Tier 2 areas over Tier 3 based on the risk of the circuit segment.

Mitigations proposed by the WiNGS-Planning model then undergo subject matter expert review. This is accomplished via the desktop feasibility analysis, which includes geography, loading, specific standards, environmental, and other projects. Reference Figure 6-2.

6.1.3.2.3 Resource Optimization

CBRs are incorporated into the WiNGS-Planning decision-making process to maximize risk reduction and optimize resources. The WiNGS-Planning model selects the more efficient use of funding and resource allocation to focus mitigation deployment on wildfire risk reduction.

Due to the recent General Rate Case (GRC) decision and reduced funding for strategic undergrounding, SDG&E plans to scale down or suspend ongoing projects in the 2026 to 2028 WMP cycle. SDG&E is exploring the submission of an EUP in accordance with Senate Bill 884, which could provide funding to resume these projects prior to 2028. As part of its long-term strategy to mitigate wildfire risks and reduce PSPS impacts, SDG&E aims to resume these projects by securing funding through the EUP or the next GRC cycle in 2028.

For strategic undergrounding projects, the project management team works with supply management to bundle and bid projects strategically, expediting schedules while maintaining construction quality. Fixed pricing leverages efficiencies and the contractor's direct knowledge of site conditions in exchange for a fixed price and is used with contractors that have demonstrated outstanding performance. Projects in the same area are often bundled to streamline supply management efforts and reduce overall cost. In addition, civil and electrical work are bid out separately to minimize cost and expedite schedules.

The Strategic Undergrounding Program works with the logistics business unit to provide material forecasting for long lead time materials or materials that have low quantities in stock. Ordering material ahead of time reduces the chance of delays to construction and energization planned dates. Working closely with Logistics allows the project management team to minimize any foreseeable issues with material acquisition and find solutions before the schedule is impacted.

Continuous process improvements are another way cost is reduced. Some examples of process improvements are:

- Removing unnecessary data in the design documents
- Reviewing the design package in the field at 30 percent completion with construction, design, and environmental personnel
- Developing new design standards that make construction more efficient

The Combined Covered Conductor Program currently uses three primary construction contractors and multiple internal crews to perform electrical construction work associated with installation of covered conductor. The civil work (pole hole and anchor digging), helicopter, traffic control, and dedicated fire watch are typically sub-contracted. In 2025 and 2026, approximately 50 percent of the electric work is expected to be performed by contractors and 50 percent by internal crews. Using internal crews to perform the electrical work avoids time and effort required to bid and manage contractors, making the process more efficient and often less expensive. Contracted work is competitively bid and bundle with as many jobs as possible to get economies of scale and minimize mobilization costs.

In February of 2025 the Project and Program Management Office (PMO) service contract was re-bid and awarded to four vendors. These services include project and program management, document control, scheduling, financial management, material management support, permitting support, and construction support. One of these venders will be selected to take over project and program management duties of the Combined Covered Conductor Program. This vendor will be expected to look for process efficiencies and project and program cost reductions and should be on-boarded by July 2025. Engineering and design services will be competitively bid in 2025 with new contract awards expected in 2026. The new contractor will be tasked with increasing efficiencies and reducing costs associated with engineering and design services, including for Combined Covered Conductor hardening projects.

For both the Strategic Undergrounding and Combined Covered Conductor Programs, processes have been updated and streamlined to shorten the design duration while maintaining technical quality and integrity. Examples include:

- Completing field constructability reviews earlier in the process
- Resurfacing coordination to avoid repaving
- Implementing a permit strike team
- Collaborating and partnering with design firms to define expectations and processes
- Building a relationship with San Diego County and their inspectors
- Re-evaluating program contracting strategy

For more details on Combined Covered Conductor and Strategic Undergrounding Programs see Section 8.2.1 Combined Covered Conductor Installation (WMP.455) and 8.2.2 Undergrounding of Electric Lines and/or Equipment (WMP.473) respectively.

6.1.3.2.4 Interrelationships between Initiative Activities

A combination of grid hardening mitigations can be concurrently deployed to maximize wildfire, PSPS, and PEDS risk reduction while also optimizing long-term costs.

When SDG&E evaluates the installation of covered conductors, a comprehensive assessment of existing assets is conducted to determine if pole replacements are necessary based on detailed pole loading calculations. The need for new electrical equipment, such as fuses, transformers, and lightning arresters, is also considered and new assets are installed alongside covered conductors. Furthermore, advanced protection solutions like Early Fault Detection (EFD) and Falling Conductor Protection (FCP) are assessed and implemented to enhance the system's effectiveness against various risk drivers. The evaluation of additional sectionalizing devices to minimize the number of customers affected by PSPS de-energizations is also conducted, with new devices potentially being installed. These combined mitigation measures enhance the effectiveness of covered conductor installations against ignitions by an estimated 58 percent. Overhead asset inspections and vegetation management activities also continue on lines with covered conductors. Additionally, PSPS de-energizations and Sensitive Relay Profiles (SRP) are utilized during periods of extreme fire weather.

When considering undergrounding of electric lines, there are no advanced protection mitigations that are considered for concurrent deployment that will enhance risk reduction because undergrounding is estimated to be 98.92 percent effective. However, other activities like early fault detection, enhanced infrared inspections and Power Quality (PQ) monitoring could be deployed for reliability and infrastructure integrity benefits.

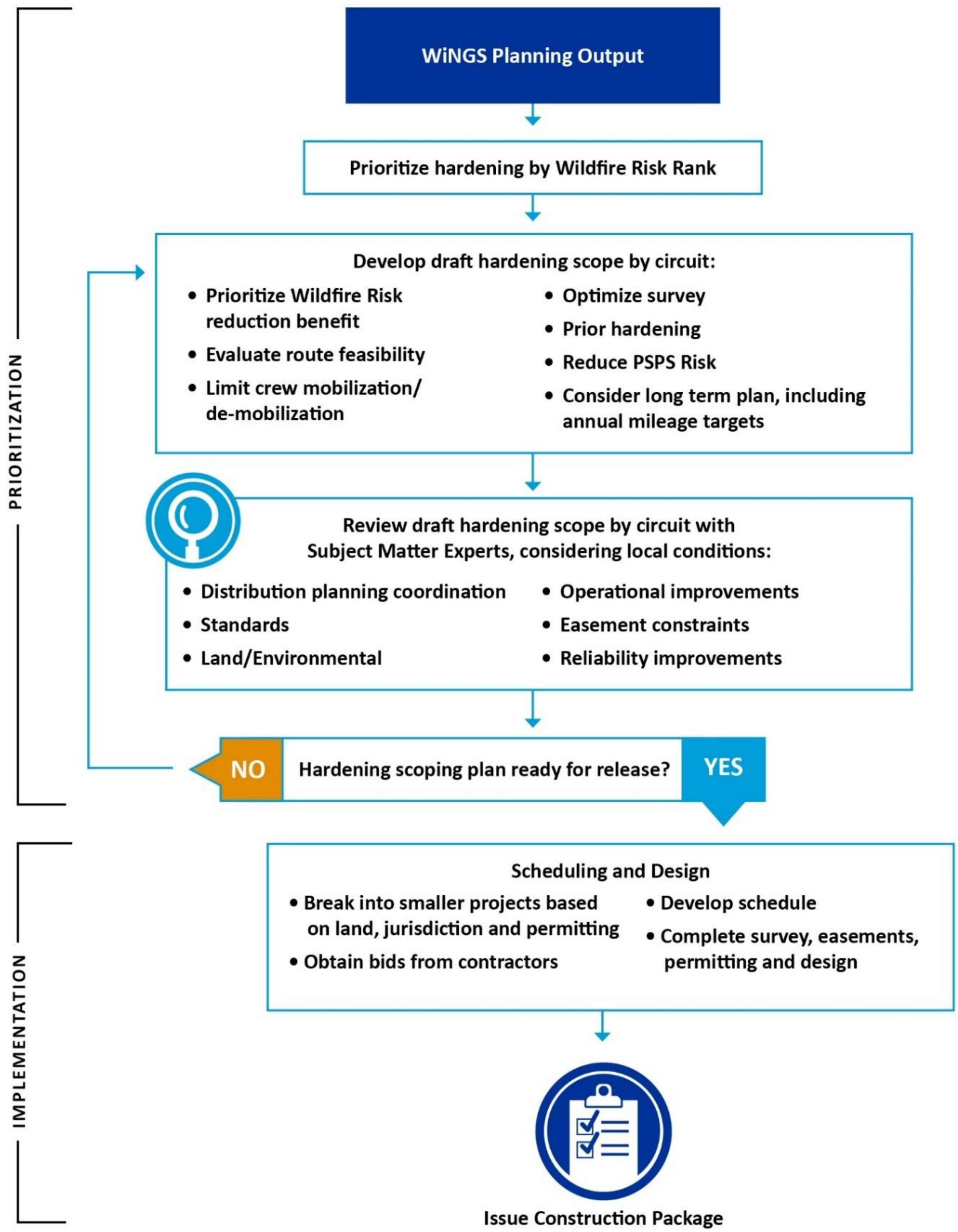
Strategic undergrounding can have higher initial costs than other system hardening options, but it provides a long-term solution by nearly eliminating all the risk of ignitions from overhead exposure. Operational mitigations such as asset inspections, vegetation management, and PSPS de-energizations are less costly and can be implemented more swiftly. However, when these operational mitigations are combined with covered conductor, the cost becomes comparable to strategic undergrounding. While operational mitigations manage the wildfire risk, they require ongoing maintenance and do not eliminate the risk of ignitions. This tradeoff requires careful consideration of costs and wildfire risk reduction.

6.1.3.2.5 Activity Prioritization

As wildfire projects are developed, there is integration between Electric Distribution Planning, Electric System Planning, and Electric Engineering where engineers are engaged to check for any capacity grid needs identified on the associated circuit or circuits.

6.1.3.2.6 Mitigation Initiative Prioritization to Reduce Wildfire and PSPS Risk

Figure 6-2: High-Level Mitigation Prioritization to Reduce Wildfire and PSPS Risk



The WiNGS-Planning model makes one of three recommendations to mitigate risk for circuit-segments with overhead exposure in the HFTD: 1) strategic undergrounding of electric lines, 2) installation of covered conductor, 3) no mitigation. For segments where a mitigation is selected, interim or alternative mitigations outside of undergrounding electric lines and installing covered conductor may be implemented to reduce the risk (see Section 6.2.2 Interim Activities). The WiNGS Planning model will identify those circuit segments with the greatest wildfire risk.

Development of Draft Hardening Scope

The draft hardening scope is a preliminary layout of the hardening project, developed through a desktop analysis. It is developed through a process that considers wildfire and PSPS risk, route feasibility, geography, long-term planning and prior hardening.

The primary drivers for selecting a circuit-segment mitigation project are wildfire risk (a direct output from WiNGS-Planning) and the PSPS de-energization history and risk of the circuit. The PSPS review considers both upstream and downstream topography, wind speeds, and recommended mitigations to optimize the overall mitigation plan for the circuit. For more information, see Section 6.1.2 Risk-Informed Prioritization.

The draft hardening scope is developed through consideration of wildfire risk reduction benefit, PSPS risk reduction, route feasibility, geographic considerations, consideration of the long-term hardening plan, and prior hardening.

A desktop analysis is performed that includes geospatially accurate information to assess optimal routing and terrain considerations for feasibility. The scoping team works to optimize routes, especially in the case of undergrounding, to provide service to customers in the most efficient manner possible. Optimization includes following existing rights of way and avoiding known environmental or permitting challenges. For example, strategic underground routing is best achieved along existing roads. Additionally, awareness of rivers and streams helps avoid water crossings and provides the ability to identify areas to avoid, such as preserves.

Limiting projects to geographically proximate locations can optimize survey time (reducing travel times for teams fielding the fire hardening scope), limit mobilization/demobilization for construction crews, and optimize use of existing laydown yards.

Long-term planning is also considered to meet year-over-year mileage targets. This includes development of a healthy backlog of feasible, cost-effective projects that will not be affected if other projects are delayed by permitting or other challenges.

To minimize community disruptions and avoid replacing newly installed equipment, moratoriums are put in place and may only be lifted upon expiration or by leadership exception. These moratoriums affect the prioritization and scheduling (i.e., the planned scope year) for implementing fire hardening measures, such as undergrounding or covered conductor, mitigations for circuits or segments previously hardened through traditional programs.

Subject Matter Expert Review

After circuit-segment mitigation projects have been selected and prioritized, a subject matter expert review is conducted that includes a loading analysis, a design and construction standards review, a land/environmental assessment, operational and reliability improvement evaluation, and identification of easement constraints.

As wildfire projects are developed, Electric Distribution Planning engineers check for any capacity grid needs identified on the associated circuit or circuits. These capacity grid needs, and associated upgrades are identified in the annual Distribution Planning Process driven by anticipated load growth. As part of the check, Electric Distribution Planning engineers confirm the Distribution Planning Process results and assess if there are changes in scope since the completion of the previous Distribution Planning Process. Upgrades or reconfigurations may be brought into scope of the wildfire projects, as needed.

Next, a review of construction standards is conducted. Construction Standards indicate appropriate situations for each mitigation type. For example, in extra heavy loading districts above 5,000 feet, covered conductors cannot be installed and therefore a strategic undergrounding solution would need to be selected. Standards also dictate available cable and conductor sizes.

Land/environmental overlap is also assessed for each project. By knowing the jurisdiction up front, projects can be broken into sections with similar timelines. Sections are reviewed by Environmental Management who assigns a score based on any environmental constraints that could negatively impact the project schedule, such as impacts to cultural resources, water resources, and biological resources. Impacts to resources are mitigated by options such as rerouting or going trenchless.

Hardening projects provide an opportunity to make engineering enhancements that improve reliability. This may include additional circuit ties or additional sectionalizing.

Permitting requirements are identified as early as possible to accurately scope and schedule each project. Agencies such as Cleveland National Forest, California Department of Transportation (Caltrans), and the Bureau of Indian Affairs typically have longer permitting lead times compared to San Diego County permits. When working with these agencies, project managers get involved early to define a clear permitting approach and strategy.

Implementation

After subject matter expert review, the scope is typically divided into smaller projects based on land jurisdiction and permitting. A finalized scope is then developed for each project and sent out to contractors to bid. The finalized scope is also used to develop schedules for each project.

At the 30 percent design submittal stage, every project team performs a constructability walk, where construction experts walk the entire route with the design and environmental teams and other necessary stakeholders to identify and resolve any potential construction and environmental issues before final design, which reduces instances of field change orders.

In addition, a geotechnical investigation is typically conducted at each job location to identify soil conditions in the area. For example, a rocky subsurface, which is common in the back country, is a difficult subsurface for underground construction and should be identified early in the design process to minimize design changes.

6.1.3.3 ACTIVITY SCHEDULING

6.1.3.3.1 Mitigation Initiative Scheduling

For both Combined Covered Conductor and Strategic Undergrounding Programs, project scheduling is developed and updated by dedicated resources working in conjunction with project teams. Once the project scope is finalized, a project schedule is created using Primavera P6, starting with a standard template that is based on typical activities and durations for each step of the project lifecycle. The schedule is then updated based on the history of projects and adjustments to activities, durations, and activity relationships based on the specific constraints and requirements of each project. Throughout the project lifecycle, the project schedule is routinely reviewed and updated based on input from project team members.

6.1.3.3.2 Mitigation Implementation Timeline

Combined Covered Conductor and Strategic Undergrounding projects have a similar implementation timeframe; combined covered conductor projects are typically completed in 20 to 35 months and undergrounding projects are typically completed in 24 to 36 months. During that timeframe, segments that are awaiting construction are mitigated through operational mitigations such as PSPS de-energizations and SRP.

Reference Section 6.2.2 Interim Activities

6.1.3.3.3 Evaluation and Selection of Interim Activities

Information on the evaluation and selection of interim activities can be found in Section 6.2.2 Interim Activities.

6.1.3.3.4 Monitoring Progress toward Targets with Known Limitations and Constraints

Progress toward annual targets is monitored in several ways. For the Strategic Undergrounding and Combined Covered Conductor Programs, project schedules are developed based on typical activities and durations for each step in the project lifecycle and based on the history and known industry timeframes. Activities that drive schedules include land rights, research, interpretation, acquisition, environmental review, and permitting. When a resource constraint is identified that would impact multiple projects within the electric portfolio, the Portfolio Management and Project Controls business unit is notified. This business unit collects project forecasts across the electric portfolio and creates and applies prioritization framework. Custom reports for tracking are developed and meetings to discuss issues and resolution are planned. These measures are usually short term and transferred to responsible business units to maintain once the resource becomes less constrained. Projects are tracked weekly through an internal WMP Dashboard to stay informed of all activities in the project life cycle.

Projects are planned based on reasonable historical timelines; however, there are limitations and constraints that are outside of the utility's control, as well as constraints and timelines unique to a specific project. Land rights acquisitions, environmental processes, and permitting often dictate the final schedule for construction. Some permitting processes can take from 6 months to over 1 year to complete. In some cases, obtaining land rights can take months or even years, especially if legal processes must be used to obtain proper land rights and/or gain access. Knowing that some of these constraints are out of a utility's control, progress is monitored by meeting with the agency or landowner regularly to get updates and provide information as necessary to not only move the process along, but also to utilize additional scope to help meet annual targets.

6.1.3.3.5 Measuring Effectiveness of Mitigation Initiatives

Several efficacy studies have been completed to determine the effectiveness of initiatives to prevent wildfires. These studies have been refreshed using the most updated data to show continued effectiveness and will continue to be updated annually, with the addition of new studies as needed.

- Determination of Average Distribution Ignition Percentages by Location and Operating Risk Condition – Section 10.6.1 Existing Calculation Approach and Use
- Understanding the Effectiveness of Recloser Protocols - Section 8.7.1.2 Automatic Recloser Settings (WMP.1018)
- Impact of Sensitive Relay Settings at Reducing Ignitions from Risk Events – Section 8.7.1.1 Protective Equipment and Device Settings (WMP.991)
- Impact of Inspection Programs at Finding and Repairing Equipment Issues – Section 8.3.1.3 Accomplishments, Roadblocks, and Updates
- Impact of Early Fault Detection Program – ACI SDGE-25U-05 (Appendix D)
- Traditional Overhead Hardening – Section 8.2.5.1.3 Impact of the Activity on Wildfire Risk
- Transmission Overhead Hardening – Section 8.2.4.3 Impact of the Activity on Wildfire Risk

SDG&E tries to validate the effectiveness values and methodologies of individual mitigation measures. In addition, a study was initiated that aims to explore the impact of combined mitigation strategies, providing a comprehensive understanding of their overall effectiveness, installation cost, and total lifecycle cost. Preliminary study findings indicate that undergrounding of electric lines is the most effective mitigation measure, surpassing other combinations, including the Combined Covered Conductor Program with FCP and EFD. The results of the study are currently under review and will be refined in future iterations. For example, the following improvements are currently being considered:

Conditions at time of the outage/ignition: To accurately calculate mitigation effectiveness, it is essential to incorporate specific conditions such as weather patterns, seasonal variations, fuel types, and asset locations into the performance evaluation. SDG&E is currently developing a comprehensive data source that captures all this information.

Effect of Operational Mitigations: The contribution of operational mitigations to overall mitigation effectiveness requires further evaluation. Currently, a simplified approach is used to assess the complexity of vegetation management effectiveness by associating asset inspections primarily with poles rather than considering the entire span. SDG&E is currently reviewing its vegetation management practices and outage information to enhance this analysis.

System Traceability and Accurate Categorization of Outage Data: Upstream and downstream system traceability and the precise categorization of outage data are crucial for advanced protection mitigation effectiveness characterizations. For example, to properly assess the efficacy of the FCP, it is essential to identify which poles within a circuit are monitored by FCP rather than assuming all poles in the circuit have FCP coverage. SDG&E is currently reviewing its outage information and creating network tracing tools to properly capture the impact of this type of outages.

6.1.3.4 KEY STAKEHOLDERS FOR DECISION MAKING

SDG&E executive management generally oversees SDG&E's operational decisions regarding wildfire mitigation; various levels of SDG&E management then operationalize and implement WMP initiatives. SDG&E works closely with public and community partners to share wildfire-related information, and stakeholder input is considered during the decision-making process as reasonable and appropriate. Stakeholders are kept informed and educated through meetings, phone calls, and workshops. Further, SDG&E's decisions are informed by regulatory guidance and requirements, including SDG&E's GRC, which authorizes funding for WMP initiatives. OEIS Table 6-2 lists stakeholders and their roles in wildfire mitigation decision making.

OEIS Table 6-2: Stakeholder Roles and Responsibilities in the Decision-Making Process

Stakeholder	Stakeholder Point of Contact	Electrical Corporation Point of Contact	Stakeholder Role	Engagement Methods	Activity	Level of Engagement for Activity
SDG&E Wildfire Council	Executive Leadership	SDG&E VP - Wildfire & Climate Science	Provide executive-level review of and direction regarding wildfire mitigation activities.	Monthly meeting	Report wildfire mitigation progress, evaluate risk mitigations, and discuss wildfire safety culture and strategies to enhance risk reduction	SDG&E executive and employees
SDG&E Board Safety Committee	SDG&E Board Safety Committee Chair	Executive Leadership	Provide oversight regarding safety matters affecting the Company.	Quarterly meeting	Review safety matters impacting SDG&E, lessons learned, and review company safety trends	SDG&E management and employees
Wildfire Safety Community Advisory Council	Executive Leadership	SDG&E Chief Operating Officer	Gather input and feedback from community stakeholders regarding wildfire and PSPS safety matters at the SDG&E executive leadership and Board level.	Quarterly meeting	Discuss wildfire community risks and community needs	Local community leaders, SDG&E Board Safety Committee leadership, SDG&E executive management and employees.
Fire Directors Steering Team	Director members at SDG&E	Director of Wildfire Mitigation	Provide input and review wildfire mitigation and PSPS mitigation initiatives	Monthly meeting	Report wildfire mitigation progress, evaluate risk mitigations, and discuss wildfire safety culture and strategies to reduce risk	Operational directors
Regional Emergency	Working Group Lead	Emergency Operations Services Manager	The working group provides information on local jurisdictional planning efforts. The electrical	Bi-monthly meetings	Provide update on planning, preparedness, and response to all	Federal, State, Local

Stakeholder	Stakeholder Point of Contact	Electrical Corporation Point of Contact	Stakeholder Role	Engagement Methods	Activity	Level of Engagement for Activity
Manager Working Group			corporation provides information on wildfire mitigations within local jurisdictions		hazards facing the Utility.	
County Fire Chiefs	Committee members and leadership	Fire Science and Coordination Program and OFER	Provide an open line of communication between teams.	Monthly meeting	Provide updates on utility hazards training and coordination.	Federal, State, Local
Local, State, and Federal Fire Agencies	Specific to Agencies, typically chief level and above. Can include other ranks within departments depending on the need and complexity of a request.	Fire Science and Coordination and OFER	Internal annual review of standard practice and external review of fire prevention plans, coordinated with the agencies having jurisdiction. All agencies have the ability to call and discuss incidents, plans, and mitigations at any time and input is incorporated as necessary.	24/7 On Call and various professional relationships	Coordinate, train, and respond with first responders. Coordinate projects and support objectives.	Federal, State, Local
San Diego County Evacuation Planning Committee	Committee members and leadership (members include fire agencies, law enforcement, and emergency operations)	Fire Science and Coordination Program Manager and OFER	Serve as a cooperator during evacuations and repopulation operations and provide utility related expertise. Other agencies provide information based on their area of expertise.	Monthly and Quarterly Meetings	Participate in meetings, provide feedback and execute utility portions of evacuations orders and warnings	Federal, State, Local
San Diego County Training Chiefs	Training Chiefs	Fire Science and Coordination and OFER	Coordinate with and trains local first responders on utility safety and emerging technologies. Sponsor and participate in the planning and execution of an annual county-wide wildland drill, providing subject matter expertise and participants.	Monthly meetings and at training events	Attend meetings and organize, develop, schedule, and execute trainings.	Federal, State, Local
Unified Disaster Council	Director of San Diego County Office of Emergency Services	Director of Emergency Management	County provides information on regional emergency/ disaster mitigation programs. SDG&E provides information on wildfire mitigations within the county.	Bi-monthly meetings	Provide update on planning, preparedness, and response to all hazards facing the Utility.	Federal, State, Local
Southern CA Tribal Emergency	Director of San Diego County Office of Emergency Services	Sr. Tribal Affairs Manager	The working group coordinates and shares planning efforts. SDG&E provides information on wildfire mitigation.	Quarterly meetings	Share knowledge on emergency preparedness.	Share resources and on occasion host meetings

Stakeholder	Stakeholder Point of Contact	Electrical Corporation Point of Contact	Stakeholder Role	Engagement Methods	Activity	Level of Engagement for Activity
Managers Group						
Tribal Working Group	Climate Science Alliance	Sr. Tribal Affairs Manager	The working group coordinates and shares planning efforts. SDG&E provides support and information on wildfire mitigation.	Bi-monthly meetings	Share traditional and climate science knowledge.	Share resources and on occasion provide presentations

6.2 WILDFIRE MITIGATION STRATEGY

The fourth step of the Enterprise Risk Management Framework is Risk Mitigation Plan Development & Documentation (see Figure 6-3).

Figure 6-3: Risk Mitigation Plan Development & Documentation Step of the Enterprise Risk Management Framework

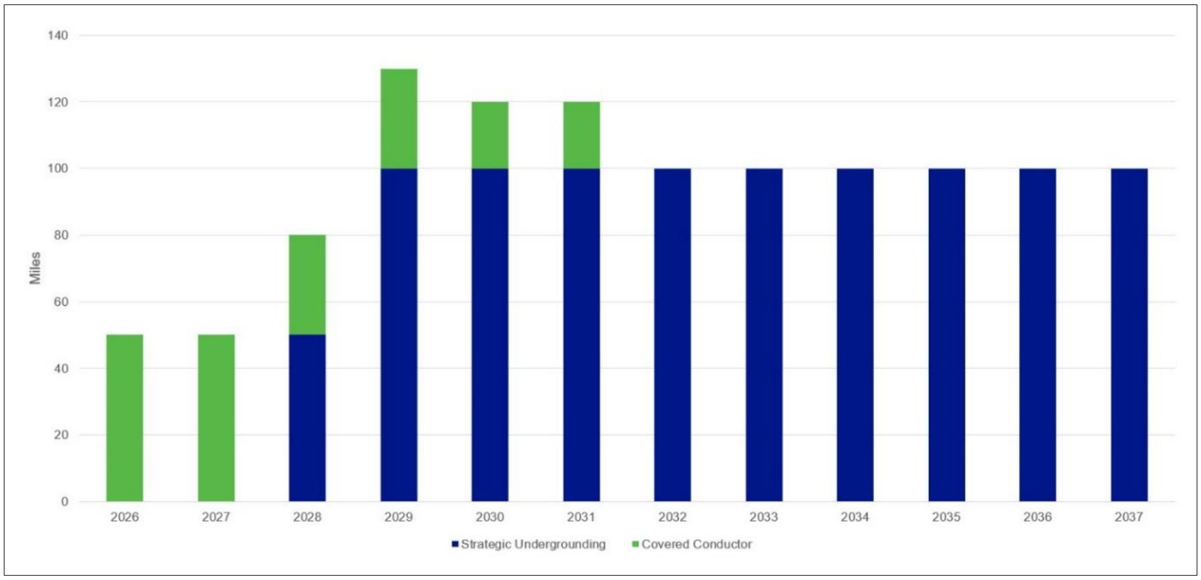
6.2.1 ANTICIPATED RISK REDUCTION

6.2.1.1 PROJECTED OVERALL RISK REDUCTION

Grid hardening efforts for the 2026 to 2028 WMP cycle are based on the WiNGS-Planning model and funding authorized by the 2024 GRC, which will guide the plan through 2027. In 2028, SDG&E, pending approval from the CPUC, intends to expand its grid hardening initiatives using the risk-informed methodology from the 2025 RAMP and the 2028 GRC, this expansion will be guided by the WiNGS-Planning model.

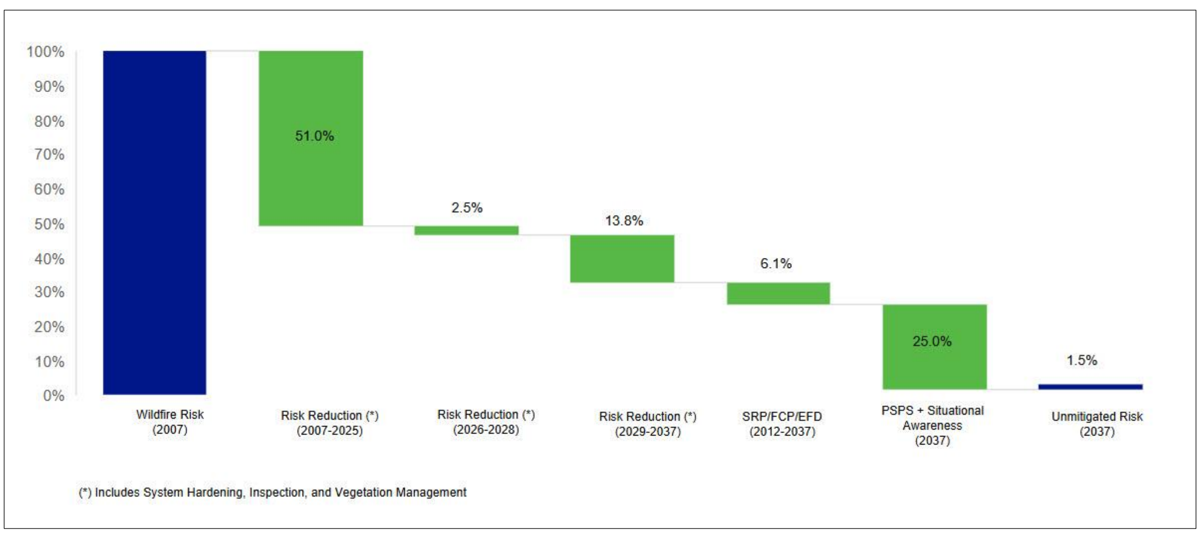
As shown in Figure 6-4 and Figure 6-5, SDG&E's long-term mitigation approach aims to balance affordability and risk reduction by implementing mitigation investments at a slower pace to reach a majority of its wildfire risk reduction with less reliance on PSPS de-energizations by 2037. SDG&E aims to implement its sustained wildfire mitigation strategy by securing funding through available regulatory review mechanisms, which may include submission of an EUP in accordance with Senate Bill 884, or through the GRC process. Once grid hardening mitigations are deployed, the remaining risk in the system would be managed through operational mitigations, such as PSPS de-energization and SRP.

Figure 6-4: Wildfire Hardening Targets



Risk methodology will continue to be refined, and targets will continue to be revised to optimize the portfolio of undergrounding electric lines and installation of covered conductors. SDG&E is dedicated to working with industry partners, academic institutions, stakeholder groups, and other IOUs to continually improve its risk models to ensure the risk models accurately reflect the expected impacts of future climate change on wildfire risk. SDG&E will revise its current risk model methodology as new scientific data emerges and evaluations are performed.

Figure 6-5: Estimated Wildfire Risk Reduction 2007-2037



6.2.1.2 RISK IMPACT OF ACTIVITIES

OEIS Table 6-3 shows the wildfire risk reduction projection from the WiNGS-Planning model for Combined Covered Conductor and Strategic Undergrounding Programs.

OEIS Table 6-3: Risk Impact of Activities

Initiative Activity	Initiative Activity Section #	Activity Effectiveness – Overall Risk	Activity Effectiveness – Wildfire Risk	Activity Effectiveness- Outage Program Risk[a]	Cost-Benefit Score - Overall Risk	Cost-Benefit Score - Wildfire Risk	Cost-Benefit Score – Outage Program Risk[b]	% HFTD Covered	% HFTD/ HFRA Covered[c]	Expected % Risk Reduction	Model(s) Used to Calculate Risk Impact
Combined Covered Conductor (WMP.0455)	8.2.1	58%	58%	n/a[d]	1.52	1.52	n/a	3.85%	n/a	34.66%	WiNGS-Planning v4.0
PSPS Sectionalizing Enhancements (WMP.461)[e]	8.2.11.1	n/a	n/a	n/a	n/a	n/a	n/a	100%	n/a	n/a	WiNGS-Planning v4.0
Microgrids (WMP.462)	8.2.7	100%[f]	0%	100%[f]	0	0[g]	0	0.18%	n/a	100%	WiNGS-Planning v4.0
Advanced Protection (WMP.463)	8.2.8.1	8%	8%	n/a	7.42	7.42	n/a	5.95%	n/a	1.86%	WiNGS-Planning v4.0
Strategic Undergrounding (WMP.473)	8.2.2	99%	99%	99%[h]	11.73	11.73	n/a	0.01%	n/a	98.38%	WiNGS-Planning v4.0
Distribution Overhead System Hardening (WMP.475)	8.2.5.1	39%	39%	n/a	2.36	2.36	n/a	0.36%	n/a	3.12%	WiNGS-Planning v4.0
Distribution Overhead Detailed Inspections (WMP.478)	8.3.1	29%	29%	n/a	106.80	106.80	n/a	100.00%	n/a	7.76%	WiNGS-Planning v4.0
Transmission Overhead Detailed Inspections (WMP.479)	8.3.2	28%	28%	n/a	n/a[i]	n/a[i]	n/a[i]	100%	n/a	n/a[i]	WiNGS-Planning v4.0
Detailed Inspections (WMP.494)	9.2.1	1%	1%	n/a	5.69	5.69	n/a	100.00%	n/a	0.97%	WiNGS-Planning v4.0
Fuels Management (WMP.497)	9.7	1%	1%	n/a	0.12	0.12	n/a	0.69%	n/a	0.03%	WiNGS-Planning v4.0
Off-Cycle Patrol (WMP.508)	9.2.2	1%	1%	n/a	13.16	13.16	n/a	100.00%	n/a	0.97%	WiNGS-Planning v4.0

Initiative Activity	Initiative Activity Section #	Activity Effectiveness – Overall Risk	Activity Effectiveness – Wildfire Risk	Activity Effectiveness-Outage Program Risk[a]	Cost-Benefit Score - Overall Risk	Cost-Benefit Score - Wildfire Risk	Cost-Benefit Score – Outage Program Risk[b]	% HFTD Covered	% HFTD/ HFRA Covered[c]	Expected % Risk Reduction	Model(s) Used to Calculate Risk Impact
Pole Clearing (Brushing) (WMP.512)	9.4	1%	1%	n/a	3.05	3.05	n/a	30.43%	n/a	0.98%	WiNGS-Planning v4.0
Strategic Pole Replacement (WMP.1189)	8.2.3.2	39%	39%	n/a	4.40	4.40	n/a	0.83%	n/a	1.41%	WiNGS-Planning v4.0
Early Fault Detection (WMP.1195)	10.3.1	16%	16%	n/a	76.35	76.35	n/a	32.99%	n/a	15.56%	WiNGS-Planning v4.0
Distribution Overhead Patrol Inspections (WMP.488)	8.3.7	10%	10%	n/a	191.1	191.1	n/a	100.00%	n/a	7.34%	WiNGS-Planning v4.0
Distribution Wood Pole Intrusive Inspections (WMP.483)	8.3.4	10%	10%	n/a	20.86	20.86	n/a	23.58%	n/a	4.91%	WiNGS-Planning v4.0
Risk-Informed Drone Inspections (WMP.552)	8.3.6	29%	29%	n/a	54.95	54.95	n/a	26.97%	n/a	1.56%	WiNGS-Planning v4.0

a. SDG&E does not currently calculate mitigation effectiveness for outage program risk except for WMP.462 and WMP.473.

b. SDG&E's current methodology is designed to calculate the wildfire CBR and is not currently equipped to generate distinct CBR calculations for wildfire and outage program risks.

c. SDG&E does not use HFRA boundaries.

d. SDG&E does not directly calculate the effectiveness of PSPS and PEDS outage mitigations. However, the WiNGS-Planning model estimates risk reduction by simulating an increase in the alert wind gust thresholds.

e. SDG&E does not calculate the CBR and risk reduction for this mitigation. See section 8.2.11.1.4 for details.

f. Activity Effectiveness is when Microgrid is in operation.

g. The Microgrid activity is not designed to mitigate wildfire risk directly. Therefore, CBR and effectiveness specific to wildfire risk are zero.

h. Activity effectiveness percentage is based on subject matter expert assumption.

i. Transmission programs are funded through FERC allocations and, as such, are not included in the calculation of CBR or risk reduction metrics within the WMP.

Values in OEIS Table 6-3 are derived from the following calculations:

Activity Effectiveness – Overall Utility Risk, Wildfire Risk, and Outage Program Risk

To calculate the activity effectiveness on Overall Utility Risk, the activity effectiveness on wildfire and outage program risk must first be determined, which are inputs used to estimate the risk reduction of Strategic Undergrounding and Combined Covered Conductor Programs in the WiNGS-Planning model. For mitigation activities not calculated in WiNGS-Planning, mitigation effectiveness is used in the cost-benefit calculation templates to estimate the corresponding wildfire, PSPS, and PEDS risk reductions. The mitigation activity effectiveness is measured by the percentage decrease in risk attributed to each activity.

To calculate the activity effectiveness on Wildfire Risk, ignition data from the CPUC-reported ignition dataset collected over the past 5 years is used, along with the Evidence of Heat dataset, which is gathered and maintained by the Fire Coordination team. The wildfire mitigation effectiveness is calculated for each program (e.g., strategic undergrounding, strategic pole replacement, vegetation management) by adding the effectiveness contributions from each driver using the following formula:

$$Mitigation\ Effectivenes\ (\%) = \frac{\sum_{n=1}^{\infty}\big((\text{Number of Ignitions per Driver }) \times (Mitigation\ Effectiveness)\big)}{Total\ number\ of\ Ignitions}$$

Where the *Total number of Ignitions* and the *Number of Ignitions per Driver* include evidence of heat and CPUC reportable ignitions and the *Mitigation Effectiveness* is estimated per driver by internal subject matter experts.

Currently, SDG&E does not calculate a Mitigation Effectiveness metric for PSPS and PEDS risk reductions. Consequently, there are no calculations presented in the Outage Program Risk column of OEIS Table 6.3 except for the Strategic Undergrounding and Combined Covered Conductor Programs, where PSPS and PEDS risk reductions are calculated using the WiNGS-Planning model. For strategic undergrounding, SDG&E assumes a 99% reduction of wildfire and PSPS risk upon deployment. When modeling risk reductions in PSPS from combined covered conductor, operational wind-gust thresholds are simulated at the event level by increasing the de-energization threshold from 45 miles per hour to 55 miles per hour, resulting in an overall PSPS risk reduction.

Cost Benefit Score - Overall Utility Risk, Wildfire Risk, and Outage Program Risk

CBRs, calculated using the Enterprise risk modeling framework,[48] are derived from the risk reductions provided by WiNGS-Planning. The CBR formula assesses utility risk reduction for every feeder-segment in monetary terms, divided by the total capital and O&M expenses incurred over the lifecycle of the mitigation, as well as the costs of foundational activities required to operationally maintain these mitigations.

Overall Utility risk reduction is determined through the analysis of baseline risks, mitigation effectiveness, and segment-specific activities. Inflation over the program's lifespan is also applied to the O&M costs. This enables an assessment of work execution and expenditure during the WMP cycle.

[48] D.24-05-064

The RDF requires calculating CBRs with three different discount rates. CBRs are calculated for each mitigation program according to the RDF requirements, but for simplicity and clarity, only the WACC results are presented in Appendix G.

The CBR for a mitigation or control is calculated as follows:

$$\text{CBR} = \frac{\text{Benefit (Risk Reduction)}}{Cost} = \frac{\sum_t \text{Benefit}_t}{\text{PV}_{dis}[\text{Cost}_T]}$$

$$\text{Risk Reduction} = \sum_t \text{Benefit}_t = \sum_t \text{PV[PreMitigation Risk}_T] - \text{PV[PostMitigation Risk}_T]_t$$

Where, the *Present Value (PV)* of the total *Risk Reduction* is calculated as

$$\text{PV[Risk Reduction}_T] = (PV[\text{Wildfire}] + PV[\text{PSPS}] + PV[\text{PEDS}])$$

And

$$\text{PV}[X] = \left(\text{PV}_{r_{\text{dis}_s}}\left[\text{LoRE}_T * \text{CoRE}_T^{\text{Safety}}\right] + \text{PV}_{r_{\text{dis}_r}}\left[\text{LoRE}_T * \text{CoRE}_T^{\text{Reliability}}\right] + \text{PV}_{r_{\text{dis}_f}}\left[\text{LoRE}_T * \text{CoRE}_T^{\text{Financial}}\right]\right)$$

where r_{dis_s}, r_{dis_r}, and r_{dis_f} are the discount rates for the Safety, Reliability, and Financial attributes, respectively.

The net present value is calculated as:

$$\text{PV}_{r_{\text{dis}}}[\text{Cost}_T] = \text{Cost}_{t_0} \cdot \left(\frac{1 + r_{\text{inf}}}{1 + r_{\text{dis}}}\right)^{(T-t_0)}$$

<u>Percentage of HFTD Covered</u>

To calculate the percentage of the HFTD covered for each activity, the number of overhead miles in scope within HFTD is divided by the total number of overhead miles present in HFTD.

For example, if the expected miles of Distribution Overhead System Hardening for the 2026 to 2028 WMP cycle is 6.5 miles and there is a total of 3,373 miles in the HFTD, then the percentage covered for Distribution Overhead System Hardening (WMP.475) is:

$$\%\text{HFTD Covered} = \frac{units\text{ of activity in HFTD}}{\text{total units within HFTD}} \times 100 = \frac{6.5}{3{,}373} \times 100 = 0.192\%$$

<u>Percentage of HFTD/HFRA Covered</u>

SDG&E does not utilize HFRA boundaries; therefore, this metric is marked as not applicable in OEIS Table 6-3.

<u>Expected Risk Reduction</u>

To calculate the percentage of Risk Reduction for each activity, the following formula is used:

$$\text{Expected \% Risk Reduction} = \frac{PreMitigationRisk - PostMitigationRisk}{\text{PreMitigationRisk}} \times 100$$

For Combined Covered Conductor and Strategic Undergrounding, the *PreMitigationRisk* is calculated in the WiNGS-Planning model for every feeder segment and for feeder segments in scope for Strategic Undergrounding and Combined Covered Conductor and the *PostMitigationRisk* is calculated in WiNGS-Planning.

For other activities, the *PreMitigationRisk* and *PostMitigationRisk* are calculated using the following formula:

$$PostMitigationRisk_{Activity} = PreMitigationRisk - \sum_{n=1}^{Feeders\ in\ Scope} \left(ME_{Activity} \times \mathrm{PreMitigationRisk}_{Wildfire}\right)$$

For example, if SDG&E implements a mitigation activity with a 75 percent effectiveness in five feeder segments with the following pre-mitigated risk values during the 3-year WMP cycle,

Feeder-Segment	**Wildfire (M$)**	**PSPS (M$)**	**PEDS (M$)**	**Total (M$)**
feeder_segment_1	$85.00	$10.00	$5.00	$100.00
feeder_segment_2	$170.00	$20.00	$10.00	$200.00
feeder_segment_3	$255.00	$30.00	$15.00	$300.00
feeder_segment_4	$340.00	$40.00	$20.00	$400.00
feeder_segment_5	$425.00	$50.00	$25.00	$500.00
Total	$1,275.00	$150.00	$75.00	$1,500.00

Then the post-mitigation risk can be calculated as:

$$PostMitigationRisk_{Activity\_ABC} = \$1{,}500 - 0.75 \times (\$1{,}275) = \$543.75$$

Therefore, the expected overall risk reduction is:

$$\text{Expected \% Risk Reduction} = \frac{\$1{,}500 - \$543.75}{\$1{,}500} \times 100 = 63.75\%$$

6.2.1.3 PROJECTED RISK REDUCTION ON HIGHEST-RISK CIRCUITS OVER THE THREE-YEAR WMP CYCLE

OEIS Table 6-4: Summary of Risk Reduction for Top-Risk Circuits

Circuit, Segment, or Span ID	Initial Overall Utility Risk	2026 Activities	2026 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk	2028 Activities	2028 Overall Utility Risk
441-23R	$3,518.18	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$3,049.64	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$1,848.13	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,315.16
441-27R	$4,750.29	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$4,053.58	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$3,106.65	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,462.13
441-30R	$5,349.12	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$4,636.94	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$2,443.65	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,464.97
442-728R	$11,572.37	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$10,362.66	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$8,712.53	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$7,739.82
442-758F	$550.12	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$471.14	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$390.19	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$307.22
445-1311R	$9,632.59	['Oh Patrol Inspections', 'Fuel Management', 'Traditional Hardening', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Drone Inspections', 'Detailed Inspections', 'Pole Brushing']	$8,140.79	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$5,628.25	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$4,240.75

Note: Full table is provided in Appendix F

6.2.2 INTERIM ACTIVITIES

While permanent grid hardening measures such as combined covered conductor installations and strategic undergrounding are the most effective ways to reduce wildfire and PSPS risks for electric utilities, these mitigations require significant time for scoping, designing, and construction. Therefore, interim mitigations are essential to manage the risk until the permanent solutions are completed. Both combined covered conductor installations and undergrounding projects have similar timeframes, typically taking 20 to 35 months and 24 to 36 months, respectively, to complete. It is estimated that it will take SDG&E around 10 years to complete all projects in the combined covered conductor and undergrounding portfolio. During this period, interim mitigations such as PSPS de-energizations, backup battery programs, and other measures are necessary and therefore implemented.

Interim mitigations are assessed by cross-functional teams to consider the various risks attributed to the electrical infrastructure or to initiate corrective actions from inspections such as the replacement of high-risk equipment or the implementation of operational procedures. This work is performed in the HFTD to address wildfire and PSPS risk and may occur on circuits that are part of the long-term deployment of Combined Covered Conductor or Strategic Undergrounding Programs. Projects are limited in size and scope dependent on the type of interim mitigation.

Historically, operational wildfire risk mitigations such as PSPS de-energizations, lowering alert speed thresholds for temporary configuration and compliance poles, inspections, and disabling dynamic protective device reclosing mechanisms have proven to be essential interim mitigations during severe fire weather. However, these mitigations do not eliminate the need for asset or vegetation inspections, nor do they remove the necessity for pre- and post-event patrols to ensure community safety during extreme fire weather.

The Risk Analytics team has completed several efficacy studies to determine the effectiveness of initiatives to prevent wildfires (see Section 6.1.3.3.5 Measuring Effectiveness of Mitigation Initiatives). Studies are refreshed annually, and results are shared with cross-functional teams. Results are analyzed to determine if there are any changes in mitigation effectiveness and if so, what impact there may be on prioritization and implementation strategy.

The interim initiatives shown in SDGE Table 6-2 address wildfire risk, PSPS risk, or both. The aim of these interim measures is to manage the risk until the permanent grid hardening mitigation projects (combined covered conductors or undergrounding) are completed.

SDGE Table 6-2: Interim Mitigations Initiatives

Interim Mitigation Initiative	Interim Risk	Goal of Interim Mitigation	Frequency of Occurrence and Potential Consequences of Risk Event(s) Addressed by the Improvement/Initiative
Microgrids (WMP.462)	Some customers have a higher potential to be affected by PSPS de-energizations	Decrease the number of customers affected by a PSPS de-energization	More customers will have a higher risk of PSPS de-energizations and higher PSPS impacts.
Sensitive Relay Profile (SRP)	The high amount of energy available when faults occur	Change settings to reduce fault energy and fire risk	There will be a greater risk of equipment/facility failure or damage, wire to wire contact,

Interim Mitigation Initiative	Interim Risk	Goal of Interim Mitigation	Frequency of Occurrence and Potential Consequences of Risk Event(s) Addressed by the Improvement/Initiative
	during times of extreme fire risk could lead to ignitions		contact due to objects or vegetation, and unknown contamination.
Strategic Pole Replacement Program (WMP.1189)	Poles nearing the end of their useful life have a higher failure potential	Replace high-risk equipment	Increase in risk events from equipment/facility failure or damage
PSPS Sectionalizing Enhancements (WMP.461)	Large customer counts between sectionalizing devices result in more customers with an increased risk of PSPS de-energizations	Decrease the number of customers affected by a PSPS de-energization	More customers will have a higher risk of PSPS de-energizations and higher PSPS impacts.
Standby Power Program (WMP.468)	Customers in rural areas have a higher potential to be affected by PSPS de-energization	Reduce PSPS impacts on rural, backcountry customers by providing backup power generation during a PSPS de-energization	More customers will have a higher risk of PSPS de-energizations and higher PSPS impacts.
Generator Assistance Program (WMP.467)	Some customers have a higher potential to be affected by PSPS de-energization	Provide rebates for portable generators to enhance customer preparedness for PSPS de-energization	More customers will have a higher risk of PSPS de-energizations and higher PSPS impacts.
Automatic Recloser Settings (WMP.1018)	High amount of energy available when faults occur during times of extreme fire risk	Reduce the potential for unwanted energy release after fault has occurred	There will be a greater risk of equipment/facility failure or damage, wire to wire contact, contact due to objects or vegetation, and unknown contamination.
Contracted Fire Resources (CFRs)	Electric crews risk events while performing work during elevated and extreme conditions	Suppress an ignition before it can grow	There will be a greater risk of an ignition propagation and therefore greater wildfire consequences.
PSPS	High wind events and high fire potential	Reduce the potential for asset-caused ignitions during extreme weather events	There will be a greater risk of equipment/facility failure or damage, wire to wire contact, contact due to objects or vegetation, and unknown contamination.
Corrective Maintenance Program (WMP.1433)	Equipment failure or contact from objects could cause an ignition or fault	Reduce the risk of equipment failure from issues found during asset inspections	There will be an increase in the likelihood of faults or ignitions.
Prune and Removal (Clearance) (WMP.501)	Contact from vegetation could cause an ignition or fault	Reduce the risk of ignitions or faults due to vegetation contact	There will be an increase in the likelihood of faults or ignitions.
Pole Clearing (WMP.512)	Non-exempt equipment may spark, arc, and/or fail, causing hot particles to fall to the base of the pole and potentially cause an ignition	Reduce the consequence of an ignition	There will be a greater risk of an ignition propagation and therefore greater wildfire consequences.

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2026-2028 Wildfire Mitigation Base Plan

Public Safety Power Shutoff

7 PUBLIC SAFETY POWER SHUTOFF

7.1 OVERVIEW

Proactive de-energization of overhead infrastructure for safety remains an important component of SDG&E's wildfire mitigation strategy. SDG&E recognizes the challenges that de-energization events pose for customers, communities, and public safety partners. Therefore, the use of PSPS de-energization is a measure of last resort with the need to promote safety during high fire risk conditions. SDG&E's primary objective is to ensure public safety by preventing ignitions during periods of high-fire weather and minimizing the scope, duration, and impact of PSPS on as many customers as possible.

The efficacy of mitigations to reduce PSPS risk and consequence heavily depends on weather, environmental, and system conditions. Further, emerging changes to temperature, precipitation, and fire weather risk over the next century may significantly impact the service territory. For instance, in 2025, the San Diego region experienced one of the driest beginnings of the water year since 1850 due to historically low precipitation levels. Additionally, research suggests that precipitation in the region will increasingly come from fewer, stronger storms, presenting both flooding and water retention concerns.[49] Fluctuations in rainfall, humidity, and fuel moisture that could result from these changes could exacerbate extreme wildfire conditions and, therefore, the need for PSPS de-energizations. See Section 3.7 Climate Change for more information on climate change impacts.

SDG&E mitigates PSPS impacts through a combination of grid hardening, situational awareness, and risk analytics. Grid hardening initiatives, such as the Strategic Undergrounding Program and the PSPS Sectionalizing Enhancement Program, strengthen grid resilience and reduce wildfire risk by placing power lines underground and installing switches to isolate high-risk areas. While these grid hardening programs are primarily aimed at wildfire risk reduction, the associated PSPS risk reduction from these programs further emphasizes their benefit. Situational awareness tools, including weather stations with real-time data capabilities, help monitor weather conditions and determine the necessity of de-energization. Additionally, risk analytics tools such as WiNGS-Ops provide automated visibility of infrastructure, enabling precise regulation of wind speed thresholds and better decision-making. Together, these strategies minimize the impact of PSPS de-energizations on customers and improve overall grid resilience.

7.2 PROCESS FOR INITIATING A PSPS DE-ENERGIZATION

Implementing PSPS protocols is a serious decision that SDG&E approaches thoughtfully and with intention. Extensive situational awareness data and expert input are utilized when determining whether to de-energize. Since the first proactive de-energization for safety and risk-reduction in 2013, the decision-making process has been continually refined and improved to reflect emerging regulatory requirements, additional data and analytics, and stakeholder feedback. Given the dynamic and ever-changing nature of wildfire conditions, there is no "one size fits all" approach to implementing PSPS protocols, and each situation is unique.

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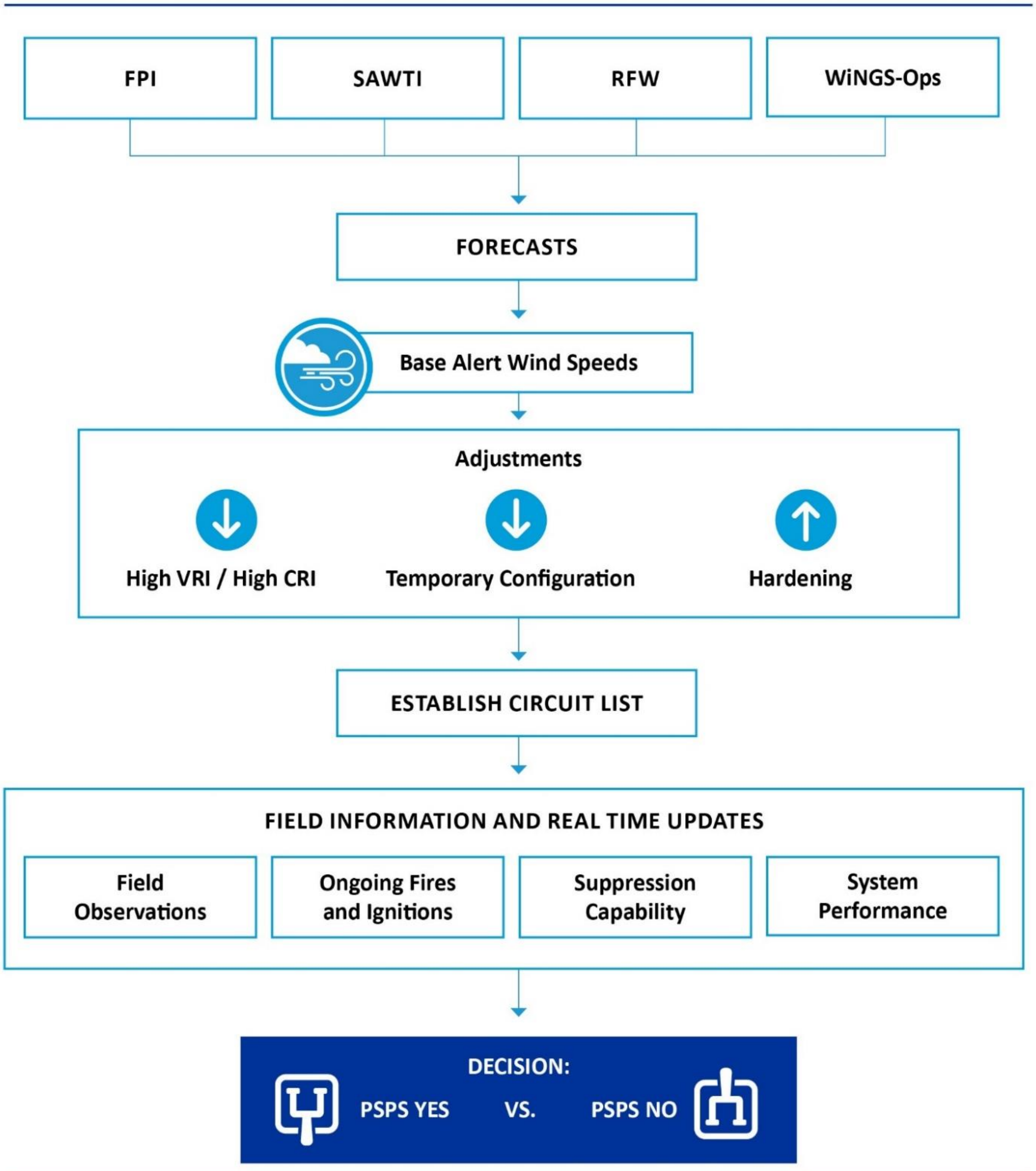
[49] California's Fourth Climate Change Assessment; https://climateassessment.ca.gov/

Multiple factors inform the decision to de-energize, which are quantified into infrastructure and environmental risk factors. Infrastructure risk includes information regarding the status of assets in the field, including unresolved issues found during inspections, active temporary construction/configuration of the electrical system that may cause equipment to have de-rated mechanical strength, and a Circuit Risk Index (CRI) that identifies locations in the electrical system with a potential for higher failure rates. Field environment issues may include real-time observations from qualified electrical workers (QEWs), local fire authority response and fire suppression capability at the time of an activation, and wind conditions. These factors are compiled by circuit segment to inform decisions to de-energize parts of the electrical system (see Figure 7-1).

Baseline alert wind speeds are used to quantify infrastructure risk into actionable criteria. They are determined separately for each device associated with a weather station and are based on a variety of factors such as historical wind speeds, the Vegetation Risk Index (VRI), and the CRI. Alert wind speed thresholds are lowered if the VRI or the CRI rating is high (see Figure 7-1). Other factors such as maintenance issues, existing construction, other real time observations, ongoing fires and/or ignitions, suppression capabilities, and/or system protection could lower the thresholds for de-energization.

Additionally, wind speed thresholds are adjusted based on location, historical wind records, vegetation, and asset conditions for each circuit segment in scope. This surgical approach allows SDG&E to define higher alert speed thresholds for circuit segments with covered conductor installed.

Figure 7-1: PSPS Decision-Making Framework



In 2024, WiNGS-Ops was upgraded to provide a more automated way of identifying temporary construction and compliance (TCC) poles (see ACI SDGE-25U-03 in Appendix D). TCC poles are structures with temporary configuration due to ongoing construction or compliance issues awaiting repairs. This kind of automated visibility of infrastructure helps regulate the base alert wind speed thresholds for circuit segments, allowing for a more surgical understanding of the state of assets and potentially limiting PSPS impacts.

The Risk Modeling Support Unit (RMSU) provides advanced analytics support during PSPS activations. This group is integral to the PSPS response team, offering WiNGS-Ops model insights and analytics before, during, and after PSPS de-energizations. The RMSU utilizes the latest data and predictive models to enhance the accuracy and effectiveness of PSPS de-energizations. By continuously updating skills and implementing technology enhancements, the team improves wildfire and PSPS risk management, strengthens operational capabilities, and contributes to overall safety through data-driven decision-making. Efforts to collaborate with industry experts, academic researchers, and internal stakeholders have resulted in a robust and adaptive risk analytics framework that is used to inform decisions and manage resources effectively during extreme fire weather conditions while keeping public safety as a top priority.

7.3 PSPS IMPACT REDUTION ON FREQUENTLY DE-ENERGIZED CIRCUITS

SDG&E's comprehensive mitigation efforts support the entire electric grid with a focus on specific areas of circuits with a high risk of PSPS de-energizations. See OEIS Table 4-3 for a list of frequently de-energized circuits and a breakdown of mitigation efforts.

SDG&E's primary strategy for mitigating PSPS risk involves reducing or eliminating the risk by deploying Strategic Undergrounding. This program is deployed in areas where substantial PSPS de-energization reductions can be gained. Due to SDG&E's recent GRC decision, which significantly reduced mileage targets and budget through 2027, the Strategic Undergrounding Program will be suspended, delaying any significant PSPS impact reductions originally associated with this program.

The PSPS Sectionalizing Enhancement Program is a key initiative that strategically installs switches to isolate high-risk areas for potential de-energization. For instance, switches are placed on circuits with significant underground sections, allowing customers to remain energized during weather events. Leveraging situational awareness and meteorological forecasts, SDG&E uses sectionalization equipment to transfer customers to adjacent circuits unaffected by PSPS de-energizations or to exclude them from the scope of de-energization. By combining weather stations with sectionalizing devices, SDG&E can de-energize only the sections of circuits experiencing extreme wind events.

To further improve situational awareness, SDG&E deploys tools such as 30-second read capabilities on weather stations that allow for real-time observations. These capabilities help determine if and where sustained wind gusts occur and whether de-energization is required for safety, or if winds are an anomaly that can be safely withstood by the infrastructure.

Customer resiliency programs such as the Standby Power Program, Customized Resiliency Assessments (CRAs), and the Generator Assistance Program (GAP) play a crucial role in reducing the consequence of PSPS de-energizations for vulnerable customers. Since late 2019, SDG&E has offered iterations of these programs, and as of year-end 2024, 9,641 customers have been provided with alternative sources of power during PSPS de-energizations. Customers who have experienced PSPS de-energizations will be invited to participate in these programs in 2025. See Section 8.2.11 Other Grid Topology Improvements to Mitigate or Reduce PSPS Events for more information on these customer resiliency programs.

Additionally, a reserve of backup batteries is available for expedited delivery during active PSPS de-energizations. These units are pre-charged and delivered within 1 to 4 hours to eligible customers who call SDG&E's Customer Contact Centers or 211 in need of emergency backup power that cannot be met through other available services.

Strategic placement of microgrids serve to reduce PSPS impacts. SDG&E employs fixed asset microgrid sites with existing renewable energy resources, along with microgrid sites that depend on mobile energy resources. For example, during the January 2025 PSPS activations, Mountain Empire High School, a new microgrid site, was able to remain open during PSPS de-energizations.

The Community Resource Center (CRC) program offers temporary support to communities affected by PSPS de-energizations by providing essential resources. These include access to water, snacks, ice, seating, water for livestock/animals, and charging stations for cell phones and medical devices, along with up-to-date event-specific information. During colder months, SDG&E supplements its offerings with warming items such as warm beverages, blankets, beanies, neck gaiters, socks, gloves, and hand warmers. In January 2025, the Boulevard CRC additionally provided warm meals and access to warm running water with Americans with Disabilities Act (ADA)-compliant showers and restrooms to residents. CRC planning begins immediately after a weather forecast indicates any chance of adverse weather, ensuring resources are available to impacted communities when PSPS de-energizations occur.

Operational mitigations such as enhanced inspections, vegetation management, and fine-tuning sensitive relay profile settings may also serve to mitigate some PSPS risk.

7.4 LESSONS LEARNED

For a list of lessons learned from PSPS de-energizations that occurred since the 2023-2025 Base WMP, refer to OEIS Table 13-1.

Wildfire Safety | SDGE™

2026-2028 Wildfire Mitigation Base Plan

Grid design, operations and maintenance

8 GRID DESIGN, OPERATIONS, AND MAINTENANCE

Once a risk mitigation plan is developed and documented, SDG&E uses a comprehensive approach to identify a portfolio of risk mitigation initiatives. This includes identification of detailed design, implementation, operations, and long-term maintenance of mitigations. The fifth step of the Enterprise Risk Management Framework is Risk-Informed Investment Decisions & Risk Mitigation Implementation (see Figure 8-1).

Figure 8-1: Risk-Informed Investment decision & Risk Mitigation Implementation Step of the Enterprise Risk Management Framework

8.1 TARGETS

8.1.1 QUALITATIVE TARGETS

8.1.2 QUANTITATIVE TARGETS

SDG&E's grid hardening programs are aimed at reducing the risk of wildfires caused by utility equipment and minimizing PSPS impacts on customers. Programs such as the Combined Covered Conductor Program and Strategic Undergrounding Program can prevent risk events from occurring across several drivers like energized wire down and foreign object contact. Strategic undergrounding reduces the need for mitigations such as PSPS de-energizations while also reducing the risk of utility-caused wildfires. Programs such as advanced protection do not prevent risk events from occurring but instead reduce the chance that a risk event will result in an ignition by utilizing protection settings and/or equipment that address specific failure modes known to lead to an ignition. Other programs reduce PSPS impacts on customers, including the PSPS Sectionalizing Enhancement Program and generator programs that promote customer resiliency.

SDG&E's inspection and maintenance programs are intended to identify and resolve equipment conditions on the grid to reduce the risk of equipment failures. Mandatory inspection programs are governed by GO 165 and GO 95 and focus on safety and reliability conditions and are supplemented by risk-informed drone inspections that are intended to identify safety and wildfire-related conditions. Maintenance practices generally aim to resolve conditions based on priority level and location, with accelerated remediation timeframes in Tier 3 of the HFTD.

OEIS Table 8-1: Grid Design, Operations, and Maintenance Targets by Year

Initiative	Quantitative or Qualitative Target	Activity (Tracking ID #)	Previous Tracking ID (if applicable)	Target Unit	2026 Target / Status	% Planned in HFTD for 2026	% Planned in HFRA for 2026	% risk reduction for 2026	2027 Total/ Status	% Planned in HFTD for 2027	% Planned in HFRA for 2027	% risk reduction for 2027	2027 Total/ Status	% Planned in HFTD for 2028	% Planned in HFRA for 2028	% risk reduction for 2028	3-year total	Section; Page number
Work Orders	Qualitative	Corrective Maintenance Program (CMP) (WMP.1433) - Repair wildfire-related conditions within established timeframes	n/a	n/a	By 12/31/2026, complete repairs within required timeframes	n/a	n/a	n/a	By 12/31/2027, complete repairs within required timeframes	n/a	n/a	n/a	By 12/31/2028, complete repairs within required timeframes	n/a	n/a	n/a	n/a	8.6; p. 188
Equipment Maintenance and Repair	Qualitative	Transmission Asset Health (WMP.1458) - Analyze asset health for transmission shield wire, insulators, and hardware; explore proactive replacement strategies	n/a	n/a	By 12/31/2026, begin data analysis of asset health, current condition, and outage history of transmission equipment	n/a	n/a	n/a	By 12/31/2027, continue analysis of transmission equipment, and review and adjust replacement strategies	n/a	n/a	n/a	By 12/31/2028, continue analysis of transmission equipment, and review and adjust replacement strategies	n/a	n/a	n/a	n/a	8.4; p. 171
Grid Ops and Procedures	Qualitative	Personnel Training (WMP.1452)- Examine electric line crew training and incorporate updates annually.	n/a	n/a	By 12/31/2026, update electric line crew training.	n/a	n/a	n/a	By 12/31/2027, update electric line crew training.	n/a	n/a	n/a	By 12/31/2028, update electric line crew training.	n/a	n/a	n/a	n/a	8.7; 194
Workforce Planning	Qualitative	Workforce Planning (Asset Mgmt) - Consult with subject	n/a	n/a	By 12/31/2026, update Storm and PSPS	n/a	n/a	n/a	By 12/31/2027, update Storm and	n/a	n/a	n/a	By 12/31/2028, update Storm and	n/a	n/a	n/a	n/a	8.8; p. 201

Initiative	Quantitative or Qualitative Target	Activity (Tracking ID #)	Previous Tracking ID (if applicable)	Target Unit	2026 Target / Status	% Planned in HFTD for 2026	% Planned in HFRA for 2026	% risk reduction for 2026	2027 Total/ Status	% Planned in HFTD for 2027	% Planned in HFRA for 2027	% risk reduction for 2027	2027 Total/ Status	% Planned in HFTD for 2028	% Planned in HFRA for 2028	% risk reduction for 2028	3-year total	Section; Page number
		matter experts to update the Storm and PSPS curriculum. (WMP.1453)			training with lessons learned.				PSPS training with lessons learned.				PSPS training with lessons learned.					
Other grid topology improvements to mitigate or reduce PSPS events	Qualitative	Standby Power Program: (WMP.468) Assess and enable resiliency and backup power solutions for eligible non-residential customers in the high fire threat district.	n/a	n/a	By 12/31/2026, enable backup power solutions of priority sites.	n/a	n/a	n/a	By 12/31/2027, enable backup power solutions of priority sites.	n/a	n/a	n/a	By 12/31/2028, enable backup power solutions of priority sites.	n/a	n/a	n/a	n/a	8.2.11; p. 145
Other grid topology improvements to mitigate or reduce PSPS events	Qualitative	Customized Resiliency Assessments: (WMP.1432) Assess and enable resiliency and backup power solutions for eligible residential customers in the high fire threat district.	n/a	n/a	By 12/31/2026, offer resiliency support for eligible customers.	n/a	n/a	n/a	By 12/31/2027, offer resiliency support for eligible customers.	n/a	n/a	n/a	By 12/31/2028, offer resiliency support for eligible customers.	n/a	n/a	n/a	n/a	8.2.11; p. 145
Other grid topology improvements to mitigate or reduce PSPS events	Qualitative	Generator Assistance Program: (WMP.467) Provide rebates on backup power	n/a	n/a	By 12/31/2026, enable rebates for backup power	n/a	n/a	n/a	By 12/31/2027, enable rebates for backup power	n/a	n/a	n/a	By 12/31/2028, enable rebates for backup power	n/a	n/a	n/a	n/a	8.2.11; p. 145

Initiative	Quantitative or Qualitative Target	Activity (Tracking ID #)	Previous Tracking ID (if applicable)	Target Unit	2026 Target / Status	% Planned in HFTD for 2026	% Planned in HFRA for 2026	% risk reduction for 2026	2027 Total/ Status	% Planned in HFTD for 2027	% Planned in HFRA for 2027	% risk reduction for 2027	2027 Total/ Status	% Planned in HFTD for 2028	% Planned in HFRA for 2028	% risk reduction for 2028	3-year total	Section; Page number
		solutions for eligible customers in the high fire threat district.			solutions for eligible customers.				solutions for eligible customers.				solutions for eligible customers.					
Grid Design and System Hardening	Quantitative	Combined Covered Conductor (WMP.455)	n/a	Miles	50	100%	n/a	23.82%	50	100%	n/a	34.43%	30	100%	n/a	43.89 %	130	8.2.1; p. 131
Grid Design and System Hardening	Quantitative	PSPS Sectionalizing Enhancements (WMP.461)	n/a	Switches	7	100%	n/a	n/a	6	100%	n/a	n/a	5	100%	n/a	n/a	18	8.2.11; p. 145
Grid Design and System Hardening	Quantitative	Microgrids (WMP.462)	n/a	Microgrids	0	n/a	n/a	n/a	0	n/a	n/a	n/a	1	100%	n/a	100%	1	8.2.7; p. 140
Grid Design and System Hardening	Quantitative	Advanced Protection (WMP.463)	n/a	Nodes	30	100%	n/a	1.81%	30	100%	n/a	1.89%	30	100%	n/a	1.88%	90	8.2.8.1; p. 141
Grid Design and System Hardening	Quantitative	Strategic Undergrounding (WMP.473)	n/a	Miles	0	n/a	n/a	n/a	0	n/a	n/a	n/a	50	100%	n/a	98.38 %	50	Section 8.2.2; p. 132
Grid Design and System Hardening	Quantitative	Distribution Overhead System Hardening (WMP.475)	n/a	Miles	6.53	100%	n/a	3.12%	0	n/a	n/a	n/a	0	n/a	n/a	n/a	6.53	8.2.5.1; p. 137
Grid Design and System Hardening	Quantitative	Transmission Overhead Hardening (WMP.543)	n/a	Miles	6.02	100%	n/a	n/a	11.94	100%	n/a	n/a	3	100%	n/a	n/a	20.96	8.2.5.2; p. 139
Grid Design and System Hardening	Quantitative	Transmission Overhead Hardening (Distribution	n/a	Miles	1.2	100%	n/a	n/a	7.1	100%	n/a	n/a	3	100%	n/a	n/a	11.3	8.2.5.2; p. 139

Initiative	Quantitative or Qualitative Target	Activity (Tracking ID #)	Previous Tracking ID (if applicable)	Target Unit	2026 Target / Status	% Planned in HFTD for 2026	% Planned in HFRA for 2026	% risk reduction for 2026	2027 Total/ Status	% Planned in HFTD for 2027	% Planned in HFRA for 2027	% risk reductio n for 2027	2027 Total/ Status	% Planned in HFTD for 2028	% Planned in HFRA for 2028	% risk reducti on for 2028	3-year total	Section; Page number
		Underbuild) (WMP.545)																
Grid Design and System Hardening	Quantitative	Strategic Pole Replacement (WMP.1189)	n/a	Poles	200	93%	n/a	1.35%	200	86%	n/a	1.50%	200	70%	n/a	1.36%	600	8.2.10; p. 144
Asset Inspections	Quantitative	Distribution Overhead Detailed Inspections (WMP.478)	n/a	Inspections	21,924	100%	n/a	8.10%	17,779	100%	n/a	7.02%	11,537	100%	n/a	7.76%	51,240	8.3.1; p. 153
Asset Inspections	Quantitative	Transmission Overhead Detailed Inspections (WMP.479)	n/a	Inspections	2,447	83%	n/a	n/a	2,524	81%	n/a	n/a	2,545	87%	n/a	n/a	7,516	8.3.2; p. 155
Asset Inspections	Quantitative	Transmission Infrared Inspections (WMP.482)	n/a	Inspections	7,294	84%	n/a	n/a	7,294	84%	n/a	n/a	7,294	84%	n/a	n/a	21,882	8.3.3; p. 157
Asset Inspections	Quantitative	Distribution Wood Pole Intrusive Inspections (WMP.483)	n/a	Inspections	1,214	100%	n/a	2.62%	5,477	100%	n/a	3.94%	11,923	100%	n/a	5.33%	18,614	8.3.4; p. 159
Asset Inspections	Quantitative	Transmission Wood Pole Intrusive Inspections (WMP.1190)	n/a	Inspections	68	100%	n/a	n/a	196	100%	n/a	n/a	24	100%	n/a	n/a	288	8.3.5; p. 161
Asset Inspections	Quantitative	Risk-Informed Drone Inspections (WM.552)	n/a	Inspections	6,500	85%	n/a	1.24%	6,500	96%	n/a	1.54%	6,500	98%	n/a	1.91%	19,500	8.3.6; p. 162
Asset Inspections	Quantitative	Distribution Overhead Patrol Inspections (WMP.488)	n/a	Inspections	84,678	100%	n/a	7.34%	84,678	100%	n/a	7.34%	84,678	100%	n/a	7.34%	254,034	8.3.7; p. 166

Initiative	Quantitative or Qualitative Target	Activity (Tracking ID #)	Previous Tracking ID (if applicable)	Target Unit	2026 Target / Status	% Planned in HFTD for 2026	% Planned in HFRA for 2026	% risk reduction for 2026	2027 Total/ Status	% Planned in HFTD for 2027	% Planned in HFRA for 2027	% risk reductio n for 2027	2027 Total/ Status	% Planned in HFTD for 2028	% Planned in HFRA for 2028	% risk reducti on for 2028	3-year total	Section; Page number
Asset Inspections	Quantitative	Transmission Overhead Patrol Inspections (WMP.489)	n/a	Inspections	7,454	84%	n/a	n/a	7,454	84%	n/a	n/a	7,454	84%	n/a	n/a	22,362	8.3.8; p. 167
Asset Inspections	Quantitative	Substation Patrol Inspections (WMP.492)	n/a	Inspections	381	100%	n/a	n/a	381	100%	n/a	n/a	381	100%	n/a	n/a	1,143	8.3.9; p. 169

8.2 GRID DESIGN AND SYSTEM HARDENING

8.2.1 COMBINED COVERED CONDUCTOR INSTALLATION (WMP.455)

8.2.1.1 TRACKING ID

WMP.455

8.2.1.2 OVERVIEW OF THE ACTIVITY

The Combined Covered Conductor Program (WMP.455) replaces bare conductors with covered conductors in the HFTD and, as needed, includes additional equipment replacements and installations such as structures, lighting arrestors, fuses, connectors, and avian protection. Covered conductors are manufactured with an internal semiconducting layer and external insulating ultraviolet-resistant layers to provide incidental contact protection. The WiNGS-Planning model is utilized to prioritize installation within the HFTD.

Targets for the 2026 to 2028 WMP cycle are provided in OEIS Table 8-1.

8.2.1.3 IMPACT OF THE ACTIVITY ON WILDFIRE RISK

Trend Analysis

Implementation of the Combined Covered Conductor Program began in 2020. As of the end of 2024, 183 miles were reinforced with covered conductors. Due to the limited extent of implementation and available data, it is not yet feasible to conduct a comprehensive trend analysis of the program.

SDG&E participated in a Joint IOU study that resulted in a detailed assessment of the efficacy of covered conductors by driver. The effectiveness of the Combined Covered Conductor Program varies based on each ignition cause (e.g., the activity reduces ignitions caused by animal contact, balloon contact, and vegetation contact by an estimated 90 percent while it reduces ignitions caused by vehicle contact by an estimated 20 percent). By applying these findings to ignition counts and evidence of heat data, it was determined that the use of combined covered conductors results in a 46 percent efficacy in risk reduction.

Wildfire Risk Reduction

This program reduces the likelihood of ignitions because covered conductors are manufactured with an internal semiconducting layer and external insulating ultraviolet-resistant layers to provide incidental contact protection. All connections are insulated, and any exposed conductor ends are covered with insulation. This program includes installation of additional equipment such as lightning arrestors, transformer bushings, fuses, and other equipment use avian cover-up material that can also provide incidental contact protection. Combined Covered Conductor does not impact the consequence of ignitions.

For the target scoped in the 2026 to 2028 WMP cycle, the expected risk reduction is 23.82 percent for 2026, 34.43 percent in 2027, and 43.89 percent in 2028.

For an explanation of the calculation, a list of assumptions, and justifications for each assumption see Appendix G.

8.2.1.4 IMPACT OF THE ACTIVITY ON OUTAGE PROGRAM RISK

Trend Analysis

A trend analysis cannot be completed due to a lack of significant miles of combined covered conductor installed.

Outage Program Risk Reduction

In 2024, Combined Covered Conductor installation was completed on three circuit-segments. During the Santa Ana events at the end of 2024 and in early 2025, SDG&E increased the wind speed thresholds for de-energization of these circuit-segments to a maximum of 50 miles per hour, slightly reducing the likelihood of a PSPS de-energization. Wind speeds during these events, however, exceeded SDG&E's de-energization thresholds, necessitating PSPS de-energizations for those circuit segments as a last resort. As more circuit-segments become fully hardened with Combined Covered Conductor installations, the windspeed threshold is expected to be raised for those segments as well, resulting in a slight reduction of PSPS risk.

8.2.1.5 UPDATES TO ACTIVITY

There were no updates made to this activity in the 2023 to 2025 WMP cycle.

For a list of planned future improvements and updates to the program, refer to the qualitative and quantitative targets in OEIS Table 8-1.

While WMP initiative activities are not scoped to account for future grid needs, SDG&E considers future grid needs in planning and design of grid hardening initiative activities. See Section 6.1.3.2.5 Activity Prioritization for more information.

8.2.1.6 COMPATIBLE ACTIVITIES

The Combined Covered Conductor Program has incorporated additional equipment replacements and installations, such as structures, lighting arrestors, fuses, connectors, and avian protection. This program can be feasibly deployed in combination with the following activities to increase wildfire risk reduction (see Section 6.1.3.2 Activity Prioritization for details on the evaluation of compatible mitigations):

- Distribution Pole Replacements (Section 8.2.3.1)
- Strategic Pole Replacement (Section 8.2.3.2)
- Advanced Protection Program (APP) (Section 8.2.8.1)
- Early Fault Detection (EFD) (Section 10.3.1)
- Sensitive Ground Fault (SGF) Protection (Section 8.2.8.1)
- Sensitive Relay Profile (SRP) Settings (Section 8.7.1.1)
- Fallen Conductor Protection (FCP) (Section 8.2.8.1)

8.2.2 UNDERGROUNDING OF ELECTRIC LINES AND/OR EQUIPMENT (WMP.473)

8.2.2.1 TRACKING ID

WMP.473

8.2.2.2 OVERVIEW OF THE ACTIVITY

The Strategic Undergrounding Program (WMP.473) converts overhead systems to underground, providing the dual benefits of significantly reducing wildfire risk and the need for PSPS de-energizations. This program is deployed in the HFTD as well as in areas where substantial reductions in PSPS de-energizations can be gained through strategic installation of the underground electric system.

The Strategic Undergrounding Program is primarily prioritized and scoped through the use of the WiNGS-Planning model, hardening scope considerations, subject matter experts, and local conditions as outlined in Section 6.1.3.2.6 Mitigation Initiative Prioritization to Reduce Wildfire and PSPS Risk.

Targets for the 2026 to 2028 WMP cycle are provided in OEIS Table 8-1.

8.2.2.3 IMPACT OF THE ACTIVITY ON WILDFIRE RISK

Trend Analysis

Over the last 5 years, the ignition risk effectiveness is 99 percent on segments that are undergrounded.

Wildfire Risk Reduction

This program reduces the likelihood and consequence of ignitions because it converts overhead systems to underground.

For the target scoped in the 2026 to 2028 WMP cycle, the expected risk reduction is 98.38 percent.

For an explanation of the calculation, a list of assumptions, and justifications for each assumption see Appendix G.

8.2.2.4 IMPACT OF THE ACTIVITY ON OUTAGE PROGRAM RISK

Trend Analysis

Taking into account the Strategic Undergrounding Program's project completions since 2019 and the expected completions through 2028, this activity is projected to reduce PSPS impacts by about 138,000 customer hours annually on SDG&E's frequently de-energized circuits.

Outage Program Risk Reduction

Subject matter experts from Meteorology, Fire Science, Engineering, and Risk Analytics groups are currently assessing the effectiveness of existing underground infrastructure considering the most recent fire weather conditions and PSPS de-energizations that occurred from November 2024 to January 2025 in order to determine the frequency and duration of PSPS de-energizations on undergrounded segments and assess the value of this data for inclusion in SDG&E's risk models. In addition, subject matter experts are evaluating the criteria for selecting future undergrounding projects based on the hardening status of upstream and downstream feeder segments. With this new approach, SDG&E aims to maximize PSPS risk reduction while balancing ignition risk reduction in the most cost-effective manner.

8.2.2.5 UPDATES TO ACTIVITY

In light of SDG&E's recent Test Year 2024 GRC decision and the reduction in SDG&E's forecasts related to wildfire mitigation, the Strategic Undergrounding Program will be essentially suspended beginning in 2026 unless additional funding is secured. SDG&E continues to enhance its risk modeling to further demonstrate the cost-effectiveness of undergrounding, particularly when lifecycle costs for these capital enhancements are compared to the need for continuous maintenance and inspections of above-ground infrastructure as well as the ongoing operational and economic costs of PSPS de-energizations. Based on these enhancements, SDG&E anticipates that it will continue to support undergrounding infrastructure in high-risk areas as the most cost-effective approach to reducing wildfire and PSPS risk. See Section 6.1.3.2.3 Resource Optimization for details.

For a list of planned future improvements and updates to the program and a timeline for the 2026 to 2028 WMP cycle, refer to the qualitative and quantitative targets in OEIS Table 8-1.

While WMP initiative activities are not scoped to account for future grid needs, SDG&E considers future grid needs in planning and design of grid hardening initiative activities. See Section 6.1.3.2.5 Activity Prioritization for more information.

8.2.2.6 COMPATIBLE ACTIVITIES

There are no additional activities that can be feasibly deployed in combination with this activity to increase wildfire risk reduction (see Section 6.1.3.2 Activity Prioritization for details on the evaluation of compatible mitigations).

8.2.3 DISTRIBUTION POLE REPLACEMENTS AND REINFORCEMENTS

8.2.3.1 DISTRIBUTION POLE REPLACEMENT AND REINFORCEMENT PROGRAM

8.2.3.1.1 Tracking ID

WMP.458

8.2.3.1.2 Overview of the Activity

The Distribution Pole Replacement and Reinforcement Program replaces deteriorated distribution wood poles and other asset-related components identified through inspection programs (e.g., Corrective Maintenance Program [CMP] and wood pole intrusive inspections) to reduce the risk of ignitions.

This program does not have specific targets as all replacement work is reactive and based on findings from asset inspection programs. See Section 8.3, 8.4, 8.5, and 8.6 for more information on distribution inspections and CMP. Proactive pole replacements are performed as part of the Strategic Pole Replacement Program (see Section 8.2.3.2 Strategic Pole Replacement Program).

8.2.3.1.3 Impact of the Activity on Wildfire Risk

By replacing deteriorated wood distribution poles, this program reduces the likelihood of equipment failures that could lead to an ignition. It does not impact the consequence of ignitions. Since CMP includes other mitigations, a specific wildfire risk reduction on Distribution Pole Replacements and Reinforcement Program cannot be calculated.

8.2.3.1.4 Impact of the Activity on Outage Program Risk

This program focuses on reducing wildfire risk. It has no impact on outage program risk.

8.2.3.1.5 Updates to Activity

No changes were made to this program in the 2023 to 2025 WMP cycle and none are expected to be made in the 2026 to 2028 WMP cycle.

8.2.3.1.6 Compatible Activities

This program can be feasibly deployed in combination with the following activities to increase wildfire risk reduction (see Section 6.1.3.2 Activity Prioritization for details on the evaluation of compatible mitigations):

- Combined Covered Conductor (Section 8.2.1)
- Distribution Overhead System Hardening (Section 8.2.5.1)
- APP (Section 8.2.8.1)
- EFD (Section 10.3.1)
- SGF Protection (Section 8.2.8.1)
- SRP Settings (Section 8.7.1.1)
- FCP (Section 8.2.8.1)

8.2.3.2 STRATEGIC POLE REPLACEMENT PROGRAM (WMP.1189)

8.2.3.2.1 Tracking ID

WMP.1189

8.2.3.2.2 Overview of the Activity

The Strategic Pole Replacement Program focuses on the replacement of gas-treated wood poles in fire prone areas of the service territory, including Tier 2 and 3 of the HFTD and the WUI. Additionally, it addresses poles that require remediation as identified through the pole loading remediation program. Some projects may involve only pole-top work on adjacent structures to support the scope of pole replacements or to address issues identified by the pole loading remediation program.

This program targets high-risk poles that are gas treated (also known as Cellon treatment) and set in concrete or soil and are otherwise not forecast to be addressed by other programs such as the Combined Covered Conductor Program or the Strategic Undergrounding Program. Because the average age of gas treated poles is 50 years, these poles are nearing the end of their useful life and are known to have a higher failure potential. Gas treated poles have a higher propensity for dry rot due to the pole's interaction with moisture in the soil, and poles set in concrete are more difficult to inspect.

Poles identified through the Pole Loading Remediation Program are also included in the scope of this program. These poles will be replaced or will require pole-top only work to remediate issues identified through pole loading calculations. This may include pole replacement, pole-top re-arrangement, retensioning of primary and/or secondary conductor, anchor modifications, or other modifications as necessary.

Permitting, land rights, environmental mitigation, material availability, customer concerns, or a combination of these factors can impact the pole replacement and/or pole top work schedule. Where feasible, poles are bundled together to minimize the impact to the community and gain efficiency in the design, environmental, permitting, land rights, and construction process. In most cases a single work order package will bundle poles that are adjacent or within a few spans of each other and that require similar land rights, permitting, and/or environmental mitigation.

Targets for the 2026 to 2028 WMP cycle are provided in OEIS Table 8-1.

8.2.3.2.3 Impact of the Activity on Wildfire Risk

Trend Analysis

A trend analysis cannot be completed due to a lack of historical data for this program.

Wildfire Risk Reduction

By replacing deteriorated wood distribution poles and performing pole-top work to remediate issues identified through pole loading calculations, this program reduces the likelihood of equipment failures that could lead to an ignition. It does not impact the consequence of ignitions.

For the target scoped in the 2026 to 2028 WMP cycle, the expected risk reduction is 1.35 percent in 2026, 1.50 percent in 2027, and 1.36 percent in 2028.

For an explanation of the calculation, a list of assumptions, and justifications for each assumption see Appendix G.

8.2.3.2.4 Impact of the Activity on Outage Program Risk

This program focuses on reducing wildfire risk. It has no impact on outage program risk.

8.2.3.2.5 Updates to Activity

In 2024, poles identified through the pole loading remediation program were added to the scope of this program.

For a list of planned future improvements and updates to the program and a timeline for the 2026 to 2028 WMP cycle, refer to the qualitative and quantitative targets in OEIS Table 8-1.

8.2.3.2.6 Compatible Activities

This program can be feasibly deployed in combination with the following activities to increase wildfire risk reduction (see Section 6.1.3.2 Activity Prioritization for details on the evaluation of compatible mitigations):

- Combined Covered Conductor (Section 8.2.1)
- Distribution Overhead System Hardening (Section 8.2.5.1)
- Distribution Underbuild (Section 8.2.5.2)
- APP (Section 8.2.8.1)
- EFD (Section 10.3.1)
- SGF Protection (Section 8.2.8.1)
- SRP Settings (Section 8.7.1.1)
- FCP (Section 8.2.8.1)

8.2.4 TRANSMISSION POLE/TOWER REPLACEMENTS AND REINFORCEMENTS (WMP.472)

8.2.4.1 TRACKING ID

WMP.472

8.2.4.2 OVERVIEW OF THE ACTIVITY

The Transmission Pole/Tower Replacement and Reinforcement Program replaces deteriorated transmission wood poles and other asset-related components identified through inspection programs (e.g., CMP and wood pole intrusive inspections) to reduce the risk of ignitions.

This program does not have specific targets as all replacement work is reactive and based on findings from asset inspection programs. See Section 8.3, 8.4, 8.5, and 8.6 for more information on transmission inspections and CMP.

8.2.4.3 IMPACT OF THE ACTIVITY ON WILDFIRE RISK

See Section 8.4 Equipment Maintenance and Repair (WMP.1130) and Section 8.6 Work Orders for more on failure and ignition rates and CMP trends.

8.2.4.4 IMPACT OF THE ACTIVITY ON OUTAGE PROGRAM RISK

This program focuses on reducing wildfire risk. It has no impact on the outage program risk.

8.2.4.5 UPDATES TO ACTIVITY

No changes were made to this program in the 2023 to 2025 WMP cycle and none are expected to be made in the 2026 to 2028 WMP cycle.

8.2.4.6 COMPATIBLE ACTIVITIES

This program can be feasibly deployed in combination with the following activities to increase wildfire risk reduction.

- Transmission System Hardening (Section 8.2.5.2)

8.2.5 TRADITIONAL OVERHEAD HARDENING

8.2.5.1 DISTRIBUTION OVERHEAD SYSTEM HARDENING (TRADITIONAL) (WMP.475)

8.2.5.1.1 Tracking ID

WMP.475

8.2.5.1.2 Overview of the Activity

The Distribution Overhead System Hardening Program is focused on fire prone areas including the HFTD and WUI, and includes the following type of hardening activities:

- Replacement of wood poles with steel
- Replacement of bare conductors with new bare conductor
- Post-construction true-up remediation work

- In some cases, the permanent removal of overhead facilities

Targets for the 2026 to 2028 WMP cycle are provided in OEIS Table 8-1.

8.2.5.1.3 Impact of the Activity on Wildfire Risk

Trend Analysis

An efficacy study was performed to determine the measured effectiveness of overhead distribution hardening on the distribution system in the unique conditions of San Diego County. On average, the unhardened system saw an average of 13.65 risk events per 100 miles per operating year while the hardened system saw an average of 8.27 risk events per 100 miles per operating year. This represents a 39 percent reduction in risk in hardened system areas.

For an explanation of the calculation, see Appendix G.

Wildfire Risk Reduction

For the target scoped in the 2026-2028 WMP, the expected ignition risk reduction from the program in the 2026 will be 3.12 percent. It does not impact the consequence of ignitions.

For a detailed explanation of the calculation, a comprehensive list of assumptions, and justifications for each assumption, please refer to Appendix G.

8.2.5.1.4 Impact of the Activity on Outage Program Risk

This program focuses on reducing wildfire risk. It has no impact on the outage program risk.

8.2.5.1.5 Updates to Activity

No changes were made to this program in the 2023 to 2025 WMP cycle and none are expected to be made in the 2026 to 2028 WMP cycle.

For a list of targets, planned future improvements, and a timeline for the 2026 to 2028 WMP cycle, refer to OEIS Table 8-1.

While WMP initiative activities are not scoped to account for future grid needs, SDG&E considers future grid needs in planning and design of grid hardening initiative activities. See Section 6.1.3.2.5 Activity Prioritization for more information.

8.2.5.1.6 Compatible Activities

This program can be feasibly deployed in combination with the following activities to increase wildfire risk reduction (see Section 6.1.3.2 Activity Prioritization for details on the evaluation of compatible mitigations):

- Distribution Pole Replacements (Section 8.2.3.1)
- Strategic Pole Replacement (Section 8.2.3.2)
- APP (Section 8.2.8.1)
- EFD (Section 10.3.1)
- SGF Protection (Section 8.2.8.1)
- SRP Settings (Section 8.7.1.1)

- FCP (Section 8.2.8.1)

8.2.5.2 TRANSMISSION SYSTEM HARDENING PROGRAM (WMP.543, WMP.545)

8.2.5.2.1 Tracking ID

WMP.543, WMP.545

8.2.5.2.2 Overview of the Activity

The Transmission System Hardening Program is mostly comprised of Transmission Overhead Hardening (WMP.543) and Transmission Overhead Hardening (Distribution Underbuild) (WMP.545). Transmission Overhead Hardening replaces wood poles with steel poles, replaces aging conductors with high-strength conductors, and increases conductor spacing in the HFTD to reduce the chance of risk events and ignitions. Distribution Underbuild replaces overhead distribution equipment that is attached to the same poles and along the same route as the work that is completed through overhead transmission hardening. SDG&E achieves cost efficiencies by including Distribution Underbuild work with overhead transmission work due to the ability to combine charges such as design and labor.

The Transmission System Hardening Program prioritizes hardening activity in the HFTD.

Targets for the 2026 to 2028 WMP cycle are provided in OEIS Table 8-1.

8.2.5.2.3 Impact of the Activity on Wildfire Risk

Trend Analysis

See SDGE Table 8-4 for 2022-2024 failure and ignition rates associated with transmission infrastructure.

Wildfire Risk Reduction

Hardening overhead transmission lines in the HFTD reduces the likelihood of ignition due to foreign object line contacts, wire slaps, and equipment failure during high wind conditions. By replacing wood poles with steel poles, replacing aging conductors with high strength conductors, and designing to known local wind conditions, the risk of equipment failure is reduced during adverse weather conditions. Correspondingly, increasing conductor spacing reduces the risk of vegetation contact and wire slaps during adverse weather conditions. The program does not reduce the consequence of ignitions.

Over the past several years, enhancement of the WiNGS-Planning model has primarily focused on probability of failure and ignition models for distribution lines, including both primary and secondary miles, largely because hardening of the 69 kilovolt (kV) and 138 kV transmission system has been completed. As a result, there are currently no transmission risk reduction estimates based on the Cost-Benefit Framework. However, SDG&E is actively considering additional assessments of transmission associated risk based on asset health. See Section 8.4 Equipment Maintenance and Repair (WMP.1130).

8.2.5.2.4 Impact of the Activity on Outage Program Risk

This program focuses on reducing wildfire risk. It has no impact on the outage program risk.

8.2.5.2.5 Updates to Activity

Focus of the program shifted from the 69 kV and 138 kV system to 230 kV and 500 kV lines. This will be evaluated in the 2026 to 2028 WMP cycle. See Section 8.4.1 Maintenance Strategies for further discussion on transmission strategies.

For a list of planned future improvements and updates to the program and a timeline for the 2026 to 2028 WMP cycle, refer to the qualitative and quantitative targets in OEIS Table 8-1.

While WMP initiative activities are not scoped to account for future grid needs, SDG&E considers future grid needs in planning and design of grid hardening initiative activities. See Section 6.1.3.2.5 Activity Prioritization for more information.

8.2.5.2.6 Compatible Activities

This program can be feasibly deployed in combination with the following activities to increase wildfire risk reduction (see Section 6.1.3.2 Activity Prioritization for details on the evaluation of compatible mitigations):

- Transmission Pole / Tower Replacement (Section 8.2.4)

8.2.6 EMERGING GRID HARDENING TECHNOLOGY INSTALLATIONS AND PILOTS

SDG&E is not currently piloting additional grid hardening technologies.

8.2.7 MICROGRIDS (WMP.462)

8.2.7.1 TRACKING ID

WMP.462

8.2.7.2 OVERVIEW OF THE ACTIVITY

The Microgrid Program operates permanent and temporary microgrids (i.e. backup generators) that can be electrically isolated during a PSPS de-energization, thereby maintaining electric service to customers within the microgrid boundary who might otherwise be affected. The majority of microgrids are in the HFTD. Microgrids located outside the HFTD under this program are aimed at reducing risk to areas frequently impacted by PSPS de-energizations.

Operation of microgrids utilizes SDG&E's weather forecasting technologies to identify pre-determined backup generators and microgrid locations that could be engaged during a PSPS de-energization. As part of the pre-determination process for temporary microgrids, backup generators are appropriately sized prior to deployment to ensure adequate load support for impacted customers.

Additionally, conventional generators and mobile batteries are deployed to create temporary microgrid solutions to support communities and CRCs and, to the extent feasible, minimize traditional generator run-time during extended PSPS de-energizations.

SDG&E plans to install one remote grid by 2028, which will provide standalone, decentralized energy resources and utility infrastructure for continuous, permanent energy delivery in lieu of providing retail distribution services using traditional utility infrastructure (e.g., distribution lines). This remote grid solution can mitigate otherwise costly hardening efforts for long distribution lines with minimal customer loading. The Remote Grid program was approved by the CPUC via Resolution E-5308 on March 21, 2024.

Targets for the 2026 to 2028 WMP cycle are provided in OEIS Table 8-1.

8.2.7.3 IMPACT OF THE ACTIVITY ON WILDFIRE RISK

This program is primarily focused on mitigating the impacts of PSPS by reducing electric service interruptions for customers who would otherwise be affected by PSPS de-energizations. The operation of microgrids complements the reduction risk of ignitions caused by electric service lines that are de-energized during a PSPS de-energization. It does not impact wildfire risk.

8.2.7.4 IMPACT OF THE ACTIVITY ON OUTAGE PROGRAM RISK

Trend Analysis

Over the 2023 to 2025 WMP cycle, implementation of the program has cumulatively provided 1,557 customers with 2,344 hours of electrical power during PSPS de-energizations.

Outage Program Risk Reduction

Over the 2026 to 2028 WMP cycle, microgrids are expected to reduce PSPS impacts to a total of approximately 1,557 cumulative customers (based on previous cycles). This number is calculated based on the locations of permanent and temporary microgrids and the customers they serve and is used to estimate the reduction in PSPS impacts to calculate the CBR. Because microgrids are designed to keep customers energized throughout the duration of a PSPS de-energization, the effectiveness of the mitigation is estimated to be 100 percent. This number does not include nearby customers who are not energized by the microgrid (and could experience a PSPS de-energization) but nevertheless benefit from critical locations being energized by the microgrid.

8.2.7.5 UPDATES TO ACTIVITY

There were no updates made to this activity in the 2023 to 2025 WMP cycle.

For a list of planned future improvements and updates to the program and a timeline for the 2026 to 2028 WMP cycle, refer to the qualitative and quantitative targets in OEIS Table 8-1.

8.2.7.6 COMPATIBLE ACTIVITIES

There are no additional activities that can be feasibly deployed in combination with this activity to increase wildfire risk reduction (see Section 6.1.3.2 Activity Prioritization for details on the evaluation of compatible mitigations).

8.2.8 INSTALLATION OF SYSTEM AUTOMATION EQUIPMENT

8.2.8.1 ADVANCED PROTECTION (WMP.463)

8.2.8.1.1 Tracking ID

WMP.463

8.2.8.1.2 Overview of the Activity

The APP develops and implements advanced protection technologies within electric substations and on the electric distribution system. It aims to prevent or mitigate the risks of fire incidents, provide better transmission and distribution sectionalization, create higher visibility and situational awareness in fire-prone areas, and allow for the implementation of new relay and automation standards in locations where protection coordination is difficult due to lower fault currents attributed to high impedance faults.

Advanced technologies such as microprocessor-based relays with synchrophasor/phasor measurement unit (PMU) capabilities, real-time automation controllers, auto-sectionalizing equipment, line monitors, direct fiber lines, private LTE, and wireless communication radios comprise the portfolio of devices that are installed in substations and on distribution circuits to allow for a more comprehensive protection system and greater situational awareness in fire-prone areas of the HFTD. Advanced protection technologies implemented by this program include:

- FCP designed to trip distribution and transmission overhead circuits to de-energize broken conductors before they can reach the ground.
- SGF protection for detecting high impedance faults resulting from downed overhead conductors that result in very low fault currents.
- SRP settings enabled remotely on distribution equipment to reduce fault energy and fire risk.
- High accuracy fault location for improved response time to any incident on the system.
- Remote relay event retrieval and reporting for real-time and post-event analysis of system disturbances or outages.
- SCADA communication to all field devices for added situational awareness.
- Increased sensitivity and speed of transmission protection systems to reduce fault energies and provide swifter isolation of transmission system faults.
- Protection integration with emerging telecommunications technologies such as direct fiber, Private LTE, and wireless radios as a means of facilitating the communication infrastructure needs of APP.

The program replaces aging substation infrastructure such as obsolete electro-mechanical relays, aging solid-state relays, aging microprocessor relays and Remote Terminal Units (RTUs) within the HFTD. New circuit breakers incorporating microprocessor-based relays, RTUs, and high-speed packet-based communication equipment are also installed in substations. On distribution circuits within the HFTD, the program coordinates with other SDG&E overhead system hardening programs to strategically install or replace sectionalizing devices, line monitors, direct fiber lines, and communication radios to facilitate the requirements of advanced protection systems.

Targets for the 2026 to 2028 WMP cycle are provided in OEIS Table 8-1.

8.2.8.1.3 Impact of the Activity on Wildfire Risk

Trend Analysis

A trend analysis cannot be completed due to a lack of historical data on this mitigation.

Wild iRisk ReducWion

For the target scoped in the 2026 to 2028 WMP cycle, the expected risk reduction is 1.81 percent in 2026, 1.89 percent in 2027, and 1.88 percent in 2028. It does not impact the consequence of ignitions.

For an explanation of the calculation, a list of assumptions, and justifications for each assumption see Appendix G.

8.2.8.1.4 Impact of the Activity on Outage Program Risk

This program focuses on reducing wildfire risk. It has no impact on outage program risk.

8.2.8.1.5 Updates to Activity

The scope of FCP has been adjusted to focus zones of protection on primary feeder routes where installation and communications are more conducive to deployments, with EFD deployments focusing on shorter laterals or areas where construction is more costly or challenging. In areas scoped for undergrounding of electric lines, the FCP deployment and/or EFD scope has been adjusted to cover remaining overhead sections where practicable.

For a list of planned future improvements and updates to the program and a timeline for the 2026 to 2028 WMP cycle, refer to the qualitative and quantitative targets in OEIS Table 8-1.

8.2.8.1.6 Compatible Activities

This program can be feasibly deployed in combination with the following activities to increase wildfire risk reduction (see Section 6.1.3.2 Activity Prioritization for details on the evaluation of compatible mitigations):

- Combined Covered Conductor (Section 8.2.1)
- Distribution Overhead System Hardening (Section 8.2.5.1)
- Distribution Pole Replacements (Section 8.2.3)
- Distribution Underbuild (Section 8.2.5.2)
- Strategic Pole Replacement (Section 8.2.3.2)
- APP (Section 8.2.8.1)
- EFD (Section 10.3.1)
- SGF Protection (Section 8.2.8.1)
- SRP Settings (Section 8.7.1.1)
- FCP (Section 8.2.8.1)

8.2.9 LINE REMOVAL (IN THE HFTD)

8.2.9.1 TRACKING ID

N/A – Line removals are related to the Strategic Undergrounding and Combined Covered Conductor, or Overhead Traditional Hardening Programs and as such, do not have a separate Utility Initiative Tracking ID.

8.2.9.2 OVERVIEW OF THE ACTIVITY

SDG&E proactively removes overhead lines as part of the Strategic Undergrounding and Combined Covered Conductor Programs. For example, if a circuit segment is planned to be undergrounded, all associated overhead infrastructure would be removed. For covered conductor installations, overhead distribution lines are removed from service if they are no longer in use.

There are no targets for this activity for the 2026 to 2028 WMP cycle. See OEIS Table 8-1 for targets related to strategic underground, installation of covered conductor and grid hardening.

8.2.9.3 IMPACT OF THE ACTIVITY ON WILDFIRE RISK

Impacts to wildfire risk associated to line removals are summarized in the following initiatives:

- Strategic Undergrounding Program (see Section 8.2.2)
- Combined Covered Conductor Program (see Section 8.2.1)
- Overhead Traditional Hardening (see Section 8.2.5.1 and Section 8.2.5.2)

8.2.9.4 IMPACT OF THE ACTIVITY ON OUTAGE PROGRAM RISK

Impacts to PSPS risk associated with line removals are summarized in the following initiatives:

- Strategic Undergrounding Program (see Section 8.2.2)
- Combined Covered Conductor Program (as a future enhancement) (see Section 8.2.1)

8.2.9.5 UPDATES TO ACTIVITY

No changes were made to this program in the 2023 to 2025 WMP cycle and none are expected to be made in the 2026 to 2028 WMP cycle.

8.2.9.6 COMPATIBLE ACTIVITIES

For compatible activities, see Strategic Undergrounding Program (see Section 8.2.2) and Combined Covered Conductor Program (see Section 8.2.1)

8.2.10 OTHER GRID TOPOLOGY IMPROVEMENTS TO MINIMIZE RISK OF IGNITIONS

There are no additional WMP activities that address other grid topology improvements to minimize risk of ignition.

8.2.11 OTHER GRID TOPOLOGY IMPROVEMENTS TO MITIGATE OR REDUCE PSPS EVENTS

8.2.11.1 PSPS SECTIONALIZING ENHANCEMENT PROGRAM (WMP.461)

8.2.11.1.1 Tracking ID

WMP.461

8.2.11.1.2 Overview of the Activity

The PSPS Sectionalizing Enhancement Program installs sectionalizing devices in strategic locations, improving the ability to isolate high-risk areas for potential de-energization. For example, switches are installed on predominantly underground circuits to isolate upstream overhead sections, allowing customers on the underground portion of the circuit to remain energized during weather events. Additionally, relating weather stations with sectionalizing devices is used to de-energize only sections of circuits that are experiencing extreme wind events.

Targets for the 2026 to 2028 WMP cycle are provided in OEIS Table 8-1.

8.2.11.1.3 Impact of the Activity on Wildfire Risk

This program focuses on reducing PSPS risk. It has no impact on the wildfire risk.

8.2.11.1.4 Impact of the Activity on Outage Program Risk

By increasing the number of sectionalizing devices on higher PSPS risk circuits, SDG&E can reduce the number of customers that have the potential to be impacted by a PSPS de-energization or potentially reduce the duration of de-energizations based on local wind events.

In order to optimize the placement of sectionalizing devices, SDG&E will determine the scope of devices to be installed at the beginning of each year of the cycle. This timeline allows SDG&E to coordinate the locations with hardening programs and with the support of a potentially evolving WiNGS model. For example, locations for new sectionalizing devices can be selected to avoid conflict with future undergrounding projects as these future undergrounding projects would supersede the benefits of the sectionalizing. SDG&E also intends to leverage available PSPS de-energization to select additional locations, and future PSPS de-energizations may inform locations that were not impacted by previous PSPS. Additionally, as layout of the distribution system changes (e.g., through load cutovers or new developments), additional locations may be identified. This timeline and scoping approach intend to optimize the placement of switches that will be most beneficial to customers. For these reasons, SDG&E is unable to determine Outage Program risk reduction.

8.2.11.1.5 Updates to Activity

No changes were made to this program in the 2023 to 2025 WMP cycle and none are expected to be made in the 2026 to 2028 WMP cycle.

For a list of planned future improvements and updates to the program and a timeline for the 2026 to 2028 WMP cycle, refer to the qualitative and quantitative targets in OEIS Table 8-1.

While WMP initiative activities are not scoped to account for future grid needs, SDG&E considers future grid needs in planning and design of grid hardening initiative activities. See Section 6.1.3.2.5 Activity Prioritization for more information.

8.2.11.1.6 Compatible Activities

This program can be feasibly deployed in combination with the following activities to increase wildfire risk reduction (see Section 6.1.3.2 Activity Prioritization for details on the evaluation of compatible mitigations):

- Combined Covered Conductor (Section 8.2.1)
- Distribution Overhead System Hardening (Section 8.2.5.1)
- Strategic Pole Replacement (Section 8.2.3.2)
- SGF Protection (Section 8.2.8.1)
- SRP Settings (Section 8.7.1.1)
- FCP (Section 8.2.8.1)

8.2.11.2 STANDBY POWER PROGRAM (WMP.468)

8.2.11.2.1 Tracking ID

WMP.468

8.2.11.2.2 Overview of the Activity

The Standby Power Program targets non-residential customer sites that provide community service in HFTD portions of the service territory and are in regions served by circuits that experience frequent PSPS de-energizations. The program offers backup power solutions to enhance resiliency, including permanent standby generators, permanent backup batteries powered by solar arrays, and related equipment, depending on site requirements, feasibility, and costs. The program identifies sites based on meter, circuit, and PSPS de-energization, and assesses potential backup power solutions to enhance resiliency of the building and in support of the community it serves to mitigate the impacts of PSPS de-energizations.

Targets for the 2026 to 2028 WMP cycle are provided in OEIS Table 8-1.

8.2.11.2.3 Impact of the Activity on Wildfire Risk

This program focuses on reducing impacts of PSPS de-energizations. It has no impact on the wildfire risk.

8.2.11.2.4 Impact of the Activity on Outage Program Risk

This program does not reduce outage program risk but instead reduces the PSPS impacts for vulnerable customers.

8.2.11.2.5 Updates to Activity

This program has historically consisted of the Fixed Backup Power (FBP) Program targeting residential and commercial customers and the Mobile Home Park Resilience Program (MHRP) targeting mobile home park clubhouses. Beginning in 2026, the FBP Program targeting residential customers will transition to the CRA Program as described in Section 8.2.11.3. The Standby Power Program will continue to provide offerings for non-residential sites in the HFTD that that provide community service, depending on site requirements, feasibility, and cost.

For a list of planned future improvements and updates to the program and a timeline for the 2026 to 2028 WMP cycle, refer to the qualitative and quantitative targets in OEIS Table 8-1.

8.2.11.2.6 Compatible Activities

There are no additional activities that can be feasibly deployed in combination with this activity to increase wildfire risk reduction (see Section 6.1.3.2 Activity Prioritization for details on the evaluation of compatible mitigations).

8.2.11.3 CUSTOMIZED RESILIENCY ASSESSMENTS (WMP.1432)

8.2.11.3.1 Tracking ID

WMP.1432

8.2.11.3.2 Overview of the Activity

The Customized Resiliency Assessments (CRA) Program is a new program that will replace both the Generator Grant Program (GGP) and the FBP residential offering that was part of the Standby Power Program (see Section 8.2.11.2). The goal of the program is to provide customers that experience PSPS de-energizations with resiliency assessments to better understand their resiliency to de-energizations and their awareness of the portfolio of services and resources available. These customers are provided information to help prepare for potential de-energizations and wildfires, such as 211 San Diego, CRCs, and other services offered by CBOs. Participating customers are also evaluated for potential backup power solutions including permanent and portable options and may be referred to the GAP (see Section 8.2.11.4) and other programs as appropriate.

The program also plans to provide qualifying customers with options to request temporary backup power solutions during periods when the EOC is activated for potential PSPS de-energizations.

Targets for the 2026 to 2028 WMP cycle are provided in OEIS Table 8-1.

8.2.11.3.3 Impact of the Activity on Wildfire Risk

This program focuses on reducing impacts of PSPS de-energizations. It has no impact on the wildfire risk.

8.2.11.3.4 Impact of the Activity on Outage Program Risk

This program does not reduce outage program risk but instead reduces the PSPS impacts for vulnerable customers.

8.2.11.3.5 Updates to Activity

The CRA Program will launch in early 2026.

For a list of planned future improvements and updates to the program and a timeline for the 2026 to 2028 WMP cycle, refer to the qualitative and quantitative targets in OEIS Table 8-1.

8.2.11.3.6 Compatible Activities

This program is used in combination with the GAP. One of the objectives of the CRA Program is to evaluate customers for eligibility for potential backup power measures, including those provided through the GAP.

8.2.11.4 GENERATOR ASSISTANCE PROGRAM (WMP.467)

8.2.11.4.1 Tracking ID

WMP.467

8.2.11.4.2 Overview of the Activity

The GAP focuses on enhancing resiliencies for all customers who reside in Tiers 2 and 3 of the HFTD and may be impacted by PSPS de-energizations.

The GAP offers rebates for portable fuel generators and portable power stations to encourage customers to acquire backup power options to mitigate the impacts of PSPS de-energizations. The target audience is customers who reside within Tiers 2 and 3 of the HFTD and have experienced at least one PSPS de-energization since 2019. Eligible customers receive program materials via mail and email campaigns and are directed to an online portal to verify account information and learn more about the program. In addition, customers enrolled in customer assistance programs are eligible for an enhanced rebate on these backup power solutions. The program also provides the option for customers to receive one rebate for a fuel generator and one rebate for a portable power station to accommodate various backup power needs.

Targets for the 2026 to 2028 WMP cycle are provided in OEIS Table 8-1.

8.2.11.4.3 Impact of the Activity on Wildfire Risk

This program focuses on reducing impacts of PSPS de-energizations. It has no impact on the wildfire risk.

8.2.11.4.4 Impact of the Activity on Outage Program Risk

This program does not reduce outage program risk but instead reduces the PSPS impacts for vulnerable customers.

8.2.11.4.5 Updates to Activity

Changes since the 2023-2025 Base WMP include an increased rebate amount for portable power stations and an additional rebate for California Alternate Rates for Energy (CARE) and Federal Emergency Relief Administration (FERA) customers.

For a list of planned future improvements and updates to the program and a timeline for the 2026 to 2028 WMP cycle, refer to the qualitative and quantitative targets in OEIS Table 8-1.

8.2.11.4.6 Compatible Activities

This program is used in combination with CRA. One of the objectives of the CRA Program is to evaluate customers for eligibility for potential backup power measures, including those provided through the GAP.

8.2.12 OTHER TECHNOLOGIES AND SYSTEMS NOT LISTED ABOVE

8.2.12.1 IGNITION MANAGEMENT PROGRAM (WMP.558)

8.2.12.1.1 Tracking ID

WMP.558

8.2.12.1.2 Overview of the Activity

The Ignition Management Program (IMP) is a foundational program that does not mitigate the risk of wildfire directly but is critical in understanding the overall wildfire risks and effectiveness of mitigations in relation to assets. This program, in conjunction with other foundational activities, allows for mitigation prioritization, the calculation of CBRs, and aids in the selection of mitigations and controls to reduce the risk of wildfires.

The IMP collects data from internal stakeholders to track ignition and potential ignitions, perform root cause analysis of incidents to determine the exact cause of the failure, and detect patterns or correlations. When a cause of the failure is determined, the mode of failure is reported to the appropriate mitigation owner for remedy. This program also supports the regulatory processes associated with Energy Safety and CPUC ignition reporting requirements.

There are no targets for this activity for the 2026 to 2028 WMP cycle.

8.2.12.1.3 Impact of the Activity on Wildfire Risk

This program is foundational to supporting and informing SDG&E's wildfire mitigation efforts. It has no direct impact on the risk of wildfire.

8.2.12.1.4 Impact of the Activity on Outage Program Risk

This program has no impact on outage program risk.

8.2.12.1.5 Updates to Activity

Changes since the 2023-2025 Base WMP include updates to process flows and reporting tools utilized by field personnel when gathering information related to ignitions and evidence of heat events. Additionally, training for field personnel and the incorporation of regulations such as Reg 29300 and ESRB 12 into reporting process have also been added into the program.

No changes are expected to be made to this program in the 2026 to 2028 WMP cycle.

8.2.12.1.6 Compatible Activities

There are no additional activities that can be feasibly deployed in combination with this activity to increase wildfire risk reduction (see Section 6.1.3.2 Activity Prioritization for details on the evaluation of compatible mitigations).

8.2.13 STATUS UPDATES ON ADDITIONAL TECHNOLOGIES BEING PILOTED

There are no additional technologies being piloted.

8.3 ASSET INSPECTIONS

SDG&E implements comprehensive, multi-faceted transmission and distribution inspection and patrol programs that consist of detailed inspections, visual patrols, infrared inspections, and other various specialty patrols, inspections, and assessments. Inspections and patrols of all structures, attachments, and conductor spans aim to identify facilities and equipment that may not meet PRC§4292, PRC§4293, or GO 95 rules. OEIS Table 8-2 outlines transmission and distribution asset inspection programs by type.

The scope and frequency of most inspection programs is regulated by GO 165, which requires service territory-wide inspections of electric distribution systems. This program, generally referred to as the Corrective Maintenance Program (CMP), helps mitigate wildfire risk by providing information about the condition of the electric distribution system, including facilities within the HFTD. With this information, potential infractions can be addressed before they result in a safety or reliability event.

GO 165 establishes inspection cycles and record-keeping requirements for utility distribution equipment. In general, utilities must patrol their systems once a year in urban areas and in Tier 2 and Tier 3 of the HFTD. In addition to patrols, utilities must conduct detailed inspections at a minimum of every 5 years for overhead lines and conductor and sub-equipment. The 5-year cycle of detailed inspections of overhead facilities is mandated by GO 165.

In general, priority levels for inspection findings for overhead facilities are defined by GO 95, Rule 18:

- Level 1: Immediate safety and/or reliability risk with high probability for significant impact
- Level 2: Variable (non-immediate high to low) safety and/or reliability risk
- Level 3: Acceptable safety and/or reliability risk

Correction timeframes are also established by GO 95, Rule 18 and are described in more detail in Section 8.6 Work Orders. Correction timeframes may be extended under reasonable circumstances per GO 95, Rule 18.

OEIS Table 8-2: Asset Inspection Frequency, Method, and Criteria

Type	Inspection Activity (Program)	Frequency or Trigger (Note 1)	Method of Inspection (Note 2)	Governing Standards & Operating Procedures	Cumulative Quarterly Target 2026, Q1	Cumulative Quarterly Target 2026, Q2	Cumulative Quarterly Target 2026, Q3	Cumulative Quarterly Target 2026, Q4	Cumulative Quarterly Target 2027, Q1	Cumulative Quarterly Target 2027, Q2	Cumulative Quarterly Target 2027, Q3	Cumulative Quarterly Target 2027, Q4	Cumulative Quarterly Target 2028, Q1	Cumulative Quarterly Target 2028, Q2	Cumulative Quarterly Target 2028, Q3	Cumulative Quarterly Target 2028, Q4	% of HFRA and HFTD Covered Annually by Inspection Type	Condition Find Rate Level 1	Condition Find Rate Level 2	Condition Find Rate Level 3
Distribution	Distribution Overhead Detailed Inspections (WMP.478)	5 years	Ground	GO 165, 95	5,481	10,962	16,443	21,924	4,444	8,888	13,332	17,779	2,884	5,768	8,652	11,537	20%	0.12%	2.39%	n/a
Transmission	Transmission Overhead Detailed Inspections (WMP.479)	3 years	Ground	GO 165, 95 FAC-501-WECC	433	917	1,685	2,447	913	1,437	2,127	2,524	654	1,325	1,980	2,545	33%	0.25%	7.52%	0.66%
Transmission	Transmission Infrared Inspections (WMP.482)	Annual	Aerial (helicopter) Ground	GO 165, 95	0	0	7,294	7,294	0	0	7,294	7,294	0	0	7,294	7,294	100%	0.00%	0.00%	0.00%
Distribution	Distribution Wood Pole Intrusive Inspections (WMP.483)	10 years	Ground	GO 165, 95	303	606	909	1,214	1,369	2,738	4,107	5,477	3,000	6,000	9,000	11,923	0 - 10%*	0.05%	0.92%	n/a
Transmission	Transmission Wood Pole Intrusive Inspections (WMP.1190)	8 years	Ground	GO 165, 95	17	34	51	68	49	98	147	196	6	12	18	24	0 - 10%*	0.00%	0.79%	0.00%
Distribution	Risk-Informed Drone Inspections (WMP.552)	Risk-based in HFTD and WUI	Aerial - drone Ground	n/a	1,625	3,250	4,875	6,500	1,625	3,250	4,875	6,500	1,625	3,250	4,875	6,500	7%	0.44%	21.68%	n/a
Distribution	Distribution Overhead Patrol Inspections (WMP.488)	Annual	Ground	GO 165, 95	21,170	42,340	63,510	84,678	21,170	42,340	63,510	84,678	21,170	42,340	63,510	84,678	100%	0.01%	0.24%	n/a

Type	Inspection Activity (Program)	Frequency or Trigger (Note 1)	Method of Inspection (Note 2)	Governing Standards & Operating Procedures	Cumulative Quarterly Target 2026, Q1	Cumulative Quarterly Target 2026, Q2	Cumulative Quarterly Target 2026, Q3	Cumulative Quarterly Target 2026, Q4	Cumulative Quarterly Target 2027, Q1	Cumulative Quarterly Target 2027, Q2	Cumulative Quarterly Target 2027, Q3	Cumulative Quarterly Target 2027, Q4	Cumulative Quarterly Target 2028, Q1	Cumulative Quarterly Target 2028, Q2	Cumulative Quarterly Target 2028, Q3	Cumulative Quarterly Target 2028, Q4	% of HFRA and HFTD Covered Annually by Inspection Type	Condition Find Rate Level 1	Condition Find Rate Level 2	Condition Find Rate Level 3
Transmission	Transmission Overhead Patrol Inspections (WMP.489)	Annual	Aerial - helicopter	GO 165, 95 FAC-501-WECC	7,121	7,121	7,121	7,454	7,121	7,121	7,121	7,454	7,121	7,121	7,121	7,454	100%	0.00%	0.04%	0.00%
Substation	Substation Patrol Inspections (WMP.492)	Monthly or Bi-monthly	Ground	GO 174	90	192	282	381	90	192	282	381	90	192	282	381	100%	n/a**	n/a**	n/a**

**HFTD inspections vary by year and are determined by a regional master schedule.*

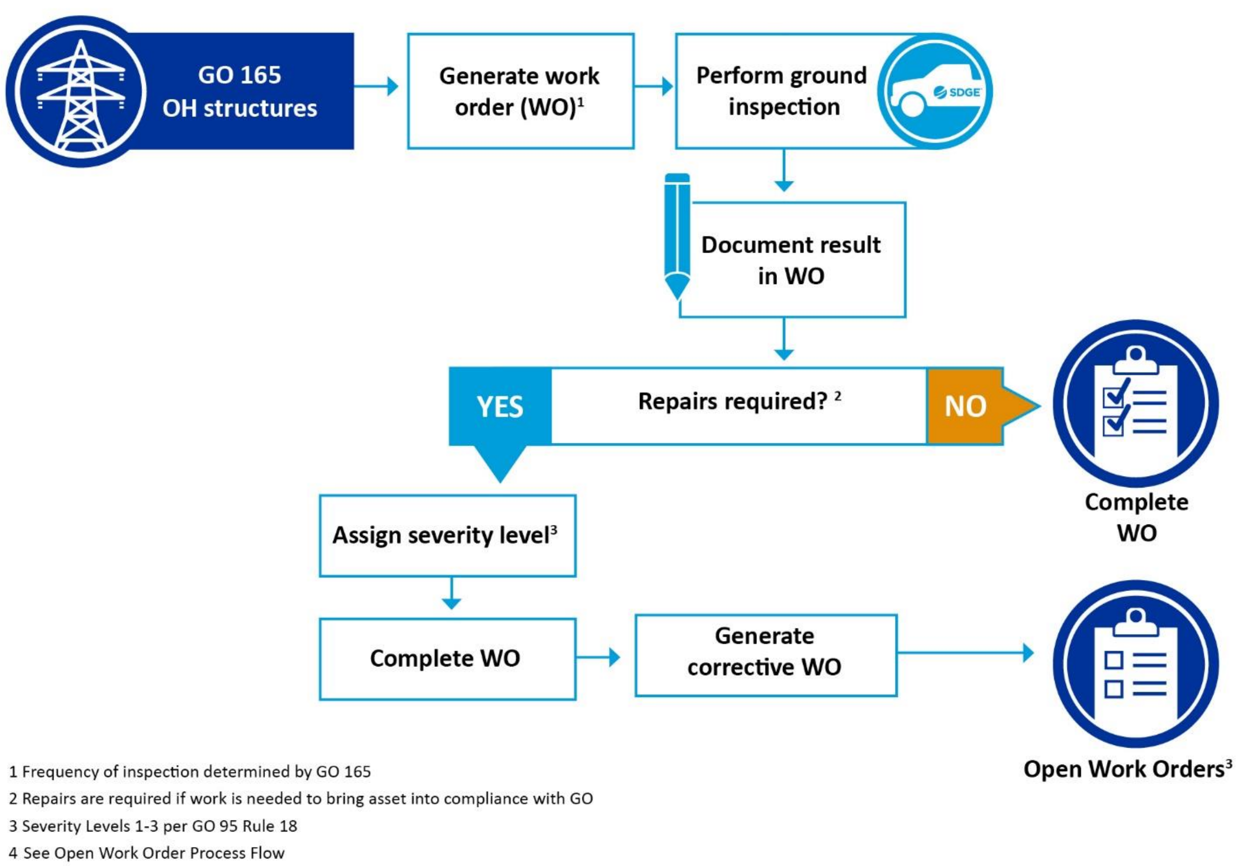
***Substation patrol inspection findings are not subject to GO 95, Rule 18 Levels.*

8.3.1 DISTRIBUTION OVERHEAD DETAILED INSPECTIONS (WMP.478)

8.3.1.1 OVERVIEW

Distribution overhead detailed inspections include a thorough visual assessment of the pole, attachments and conductor and cables. Where appropriate, individual pieces of equipment may be opened, tested, or operated to assess the condition. In addition, if warranted, the use of infrared or other tools (e.g. drones, binoculars, measurement devices) may be utilized by the inspector. Records of the inspections are maintained that include the circuit, area, facility or equipment inspected, the inspector, the date of the inspection, and any problems (or items requiring corrective action) identified during each inspection, as well as the scheduled date of corrective action. Corrective maintenance items identified are prioritized to meet or exceed the timeframes required in GO 95, Rule 18. This prioritization considers the component identified, the location of the structure and surrounding terrain, and the severity of the condition. Figure 8-2 outlines this process.

Figure 8-2: Distribution Detailed Overhead Inspections Process Flow



8.3.1.2 FREQUENCY OR TRIGGER

Distribution overhead detailed inspections are performed every 5 years for overhead lines and conductor and sub-equipment, as mandated by GO 165. The frequency/trigger of Distribution Overhead

Detailed Inspections is shown in OEIS Table 8-2. In compliance with GO 165, SDG&E's work management system tracks the inspection cycle for each overhead asset requiring inspection and issues work orders by intervals to verify that the inspection occurs within 5 years, defined as 12 consecutive calendar months starting the first full calendar month after an inspection is performed plus three full calendar months, not to exceed the end of the calendar year in which the next inspection is due.

8.3.1.3 ACCOMPLISHMENTS, ROADBLOCKS, AND UPDATES

The Distribution Overhead Detailed Inspections program measures success by completing all inspections within the 5-year period by the inspection interval compliance due date.

Roadblocks encountered while implementing this program include access issues related to customers, difficult terrain, and labor resources. Access issues related to customers continue to be addressed by first attempting to resolve the issue directly with the customer, such as coordinating an inspection time if they have pets or livestock. Issues that cannot be resolved directly with the customer are elevated internally as needed. Difficult terrain issues are resolved using additional tools such as drones or helicopters to capture high resolution imagery or using high-powered binoculars and other devices that can provide information about the health of the facility. Finally, labor resource issues are in the process of being mitigated through the development of a new Qualified Line Inspector 6-month training program that aims to reduce workforce pressures on QEWs.

Strict timelines imposed by GO 165 related to the definition of year and inspection interval create challenges when trying to implement a more risk-informed approach to the timing and frequency of the Distribution Overhead Detailed Inspection Program. During the 2026 to 2028 WMP cycle, SDG&E plans to work with the CPUC to determine whether modifications to GO 165 could allow for a more proactive, risk-informed approach to inspections.

No changes were made to the scope or frequency of this program since the 2023-2025 Base WMP. There are no planned improvements for the 2026 to 2028 WMP cycle.

A study was performed to measure the effectiveness of repair timeframes at preventing equipment failures. Results of the study also provided baseline data for the estimation of the effectiveness of inspection programs at preventing risk events and ignitions. The results show that CMP and repair timeframes are 99.98 percent effective at preventing equipment failures (see SDGE Table 8-1).

SDGE Table 8-1: Risk Event Rate with Pending Infractions

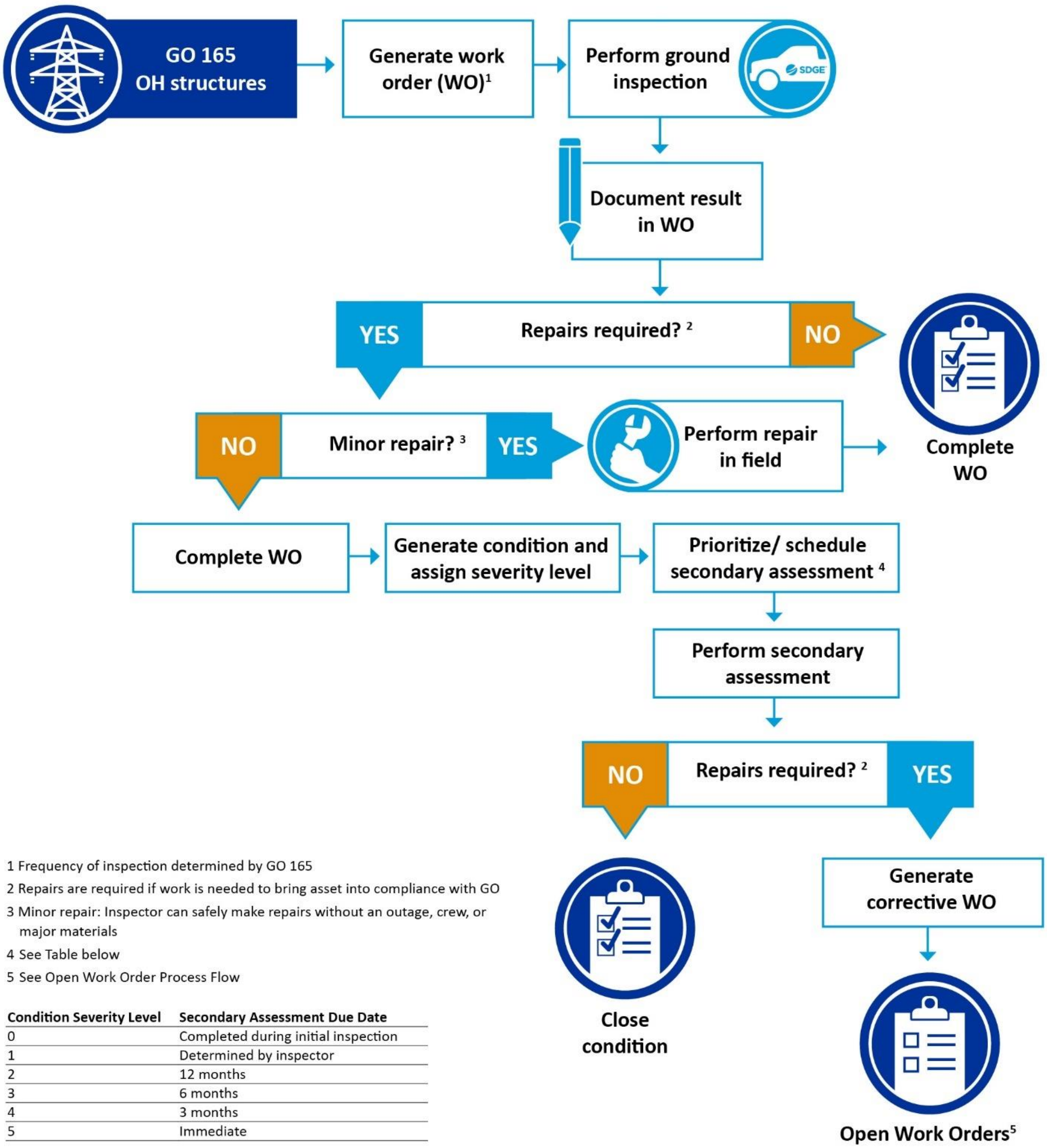
Risk Event Type	9-Year Total	Annual Average
Risk events with wildfire related pending infractions	7	0.78
Total equipment risk events	1,148	128
Risk event rate with pending infractions	0.61%	0.61%
Wildfire Infractions Repaired	35,598	3955

8.3.2 TRANSMISSION OVERHEAD DETAILED INSPECTIONS (WMP.479)

8.3.2.1 OVERVIEW

For transmission overhead detailed inspections, qualified inspectors (patrollers) visit every structure scheduled for that inspection interval, visually assessing all components of the structure and conductor. By physically visiting the structures, patrollers can assess each structure for current and future maintenance requirements. As conditions are identified, internal condition codes are assigned that are used to prioritize the condition based on the risk and severity. This prioritization considers the component identified, the location of the structure and surrounding terrain, and the severity of the condition. It also prioritizes work to meet or exceed the timeframes required in GO 95, Rule 18. Figure 8-3 outlines the process for transmission overhead detailed inspections.

Figure 8-3: Transmission Detailed Overhead Inspections Process Flow



1 Frequency of inspection determined by GO 165
2 Repairs are required if work is needed to bring asset into compliance with GO
3 Minor repair: Inspector can safely make repairs without an outage, crew, or major materials
4 See Table below
5 See Open Work Order Process Flow

Condition Severity Level	Secondary Assessment Due Date
0	Completed during initial inspection
1	Determined by inspector
2	12 months
3	6 months
4	3 months
5	Immediate

8.3.2.2 FREQUENCY OR TRIGGER

The frequency/trigger of the Transmission Overhead Detailed Inspections is shown in OEIS Table 8-2. Detailed inspections in the HFTD are prioritized prior to early fall. Detailed inspections are also supplemented by risk-informed drone inspections as described in Section 8.3.6 Risk-Informed Drone Inspections (WMP.552).

8.3.2.3 ACCOMPLISHMENTS, ROADBLOCKS, AND UPDATES

The Transmission Overhead Detailed Inspections Program measures success by identifying and repairing risk conditions within established timeframes.

Roadblocks encountered while implementing this program included environmental and access challenges. These challenges were addressed through administrative processes to engage and collaborate with other internal groups to help obtain permits, releases, and customer contacts and track follow ups to completion.

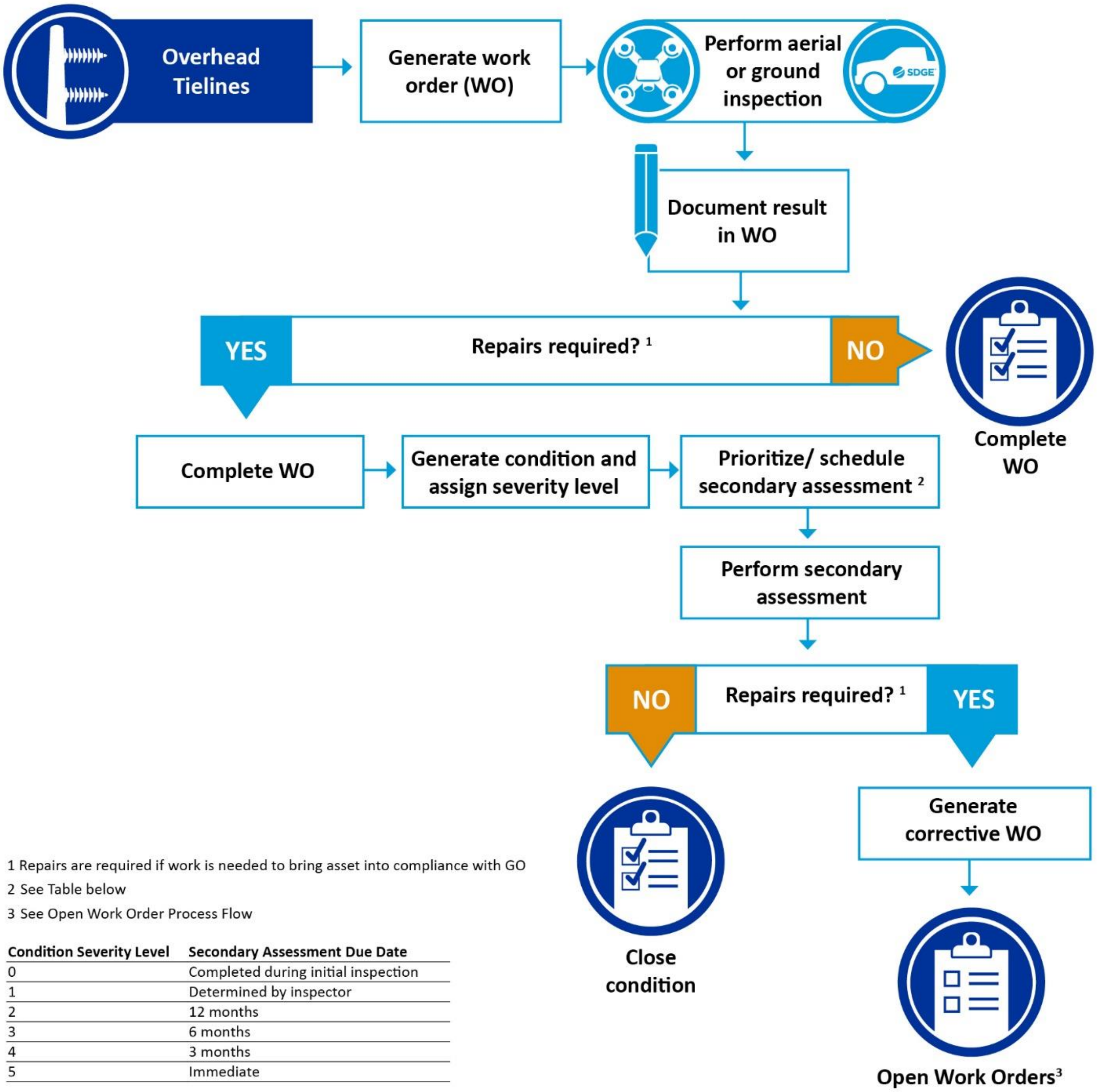
Since the 2023-2025 Base WMP, the existing practice of performing inspections in the WUI was incorporated into the WMP reporting. There are no planned improvements for the 2026 to 2028 WMP cycle.

8.3.3 TRANSMISSION INFRARED INSPECTIONS (WMP.482)

8.3.3.1 OVERVIEW

Transmission infrared inspections utilize infrared technology to examine the radiation emitted by transmission electrical equipment and connections to determine if there are potential issues. For infrared inspections, thermographers inspect every tieline scheduled for the year, looking at electrical components of the structure. As conditions are identified, internal severity codes are assigned that are used to prioritize assessment of conditions found. Findings are documented and required repair work is tracked through completion. Infrared patrols on transmission lines are most effective during higher loading conditions, therefore they typically begin in the warmer months. As failing connections and equipment may cause hotspots on structures and equipment, all energized transmission lines are included in the scope of this program. Figure 8-4 outlines the process for transmission infrared inspections.

Figure 8-4: Transmission Infrared Inspections Process Flow



1 Repairs are required if work is needed to bring asset into compliance with GO

2 See Table below

3 See Open Work Order Process Flow

Condition Severity Level	Secondary Assessment Due Date
0	Completed during initial inspection
1	Determined by inspector
2	12 months
3	6 months
4	3 months
5	Immediate

8.3.3.2 FREQUENCY OR TRIGGER

The frequency/trigger of the Transmission Infrared Inspections Program is shown in OEIS Table 8-2. Transmission infrared inspections are currently completed on an annual basis for all energized tielines, including those in the HFTD. Non-routine infrared inspections may be performed prior to weather events based on meteorological data. Wind speed, FPI, and other factors are also analyzed to prioritize inspections prior to Red Flag Warning (RFW) or other events. Inspections in the HFTD are prioritized prior to early fall. Inspections are also supplemented by risk-informed drone inspections as described in Section 8.3.6.

8.3.3.3 ACCOMPLISHMENTS, ROADBLOCKS, AND UPDATES

The Transmission Infrared Inspections program measures success by identifying and repairing risk conditions within established timeframes.

This program did not encounter any roadblocks.

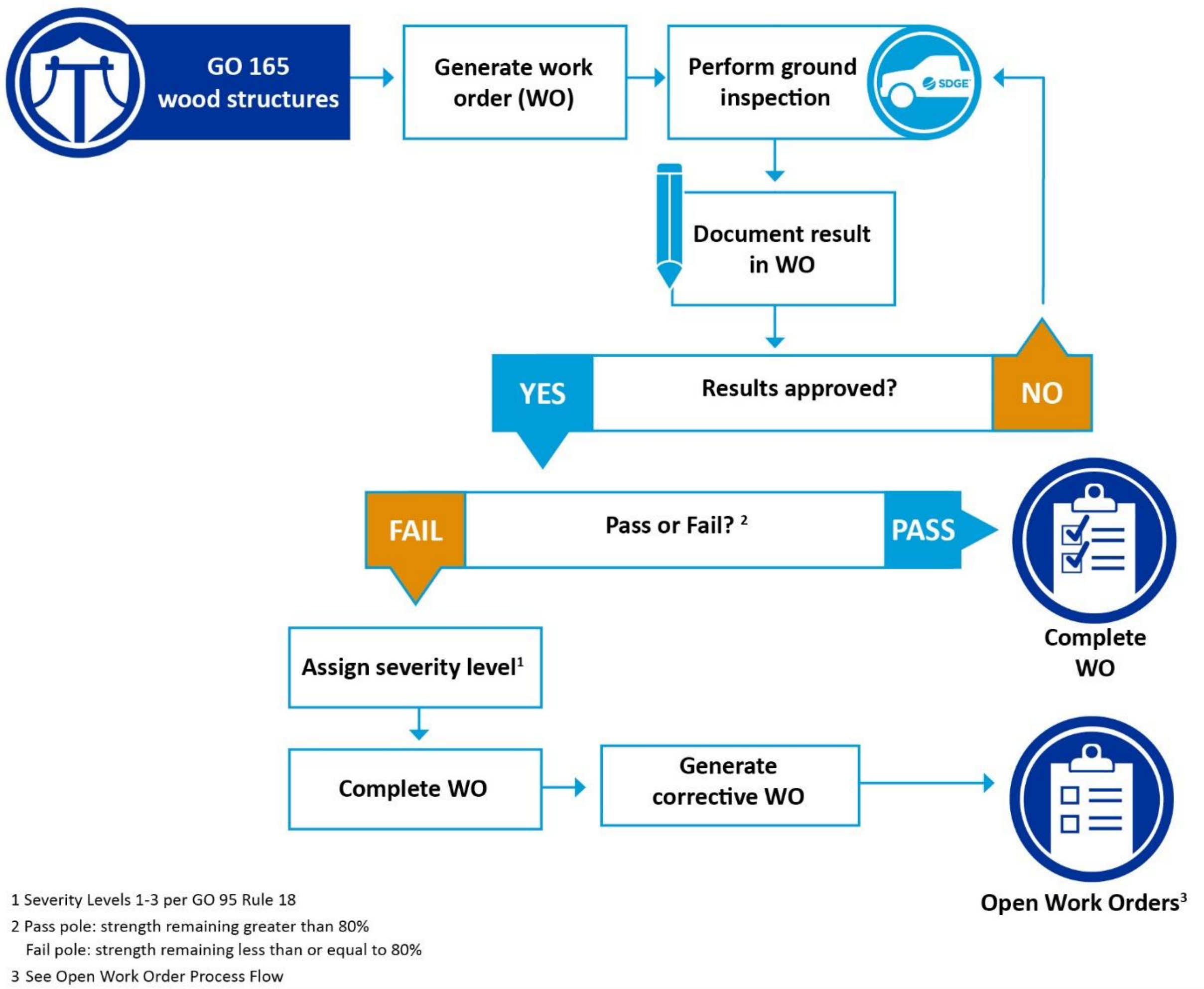
Since the 2023-2025 Base WMP, the existing practice of performing inspections in the WUI was incorporated into the WMP reporting. There are no planned improvements for the 2026 to 2028 WMP cycle.

8.3.4 DISTRIBUTION WOOD POLE INTRUSIVE INSPECTIONS (WMP.483)

8.3.4.1 OVERVIEW

An intrusive inspection typically involves a visual assessment of a pole for any structural damage or deterioration, a sound and bore of the pole to identify internal cavities, and an excavation around the pole base below ground-line (if possible). Below ground excavation may not be possible where the pole is encased in concrete or where there are other obstacles, such as fences, walls, landscaping or rock. This data is used to calculate the remaining pole strength utilizing industry standards. The pole passes inspection if the remaining strength is greater than 80 percent. If the remaining strength is less than 80 percent, the pole is recommended for reinforcement or replacement. Figure 8-5 outlines the wood pole intrusive inspection process.

Figure 8-5: Wood Pole Intrusive Inspections Process Flow (Transmission and Distribution)



8.3.4.2 FREQUENCY OR TRIGGER

GO 165 requires all wood poles over 15 years of age to be intrusively inspected within 10 years and all poles that previously passed intrusive inspection to be inspected intrusively again on a 20-year cycle. Distribution wood pole intrusive inspections are performed on a 10-year cycle, except where an off-cycle inspection occurred in accordance with GO 95, Rule 44 requirements. In those situations, a wood pole inspection may be performed at a greater frequency than 10 years and/or may alter the subsequent inspection period to a maximum of 15 years.

The frequency/trigger of the Distribution Wood Pole Intrusive Inspections is shown in OEIS Table 8-2. Non-routine intrusive inspections may occur when current pole strength (percent strength remaining) information is needed for pole loading calculations during design work per GO 95, Rule 44.

8.3.4.3 ACCOMPLISHMENTS, ROADBLOCKS, AND UPDATES

The Distribution Wood Pole Intrusive Inspections program measures success by completing all wood pole intrusive inspections due in that inspection year by the end of the year.

Roadblocks encountered while implementing this program include access issues related to customers, difficult terrain, and labor resources. Access issues related to customers continue to be addressed by first attempting to resolve the issue directly with the customer, such as coordinating an inspection time if they have pets or livestock. Issues that cannot be resolved directly with the customer are elevated internally as needed. In addition, because intrusive inspections typically involve a minimal amount of ground disturbance around the base of the pole, authorizations to perform this work in environmentally sensitive areas or higher risk areas (e.g. department of defense land, railroad right of way, or along busy roadways) can require additional time and resources to perform. The frequency of non-routine inspections to support other WMP initiatives, such as grid hardening and asset replacement programs, can also impact routine work (reference GO 95, Rule 44).

No changes were made to the scope or frequency of this program since the 2023-2025 Base WMP. For a list of planned future improvements supporting distribution wood pole intrusive inspections, see qualitative targets for asset management and inspection enterprise systems in OEIS Table 12-1.

8.3.5 TRANSMISSION WOOD POLE INTRUSIVE INSPECTIONS (WMP.1190)

8.3.5.1 OVERVIEW

An intrusive inspection typically involves an excavation around the pole base and/or a sound and bore of the pole at ground-line and an estimate of the pole strength is determined utilizing industry-wide standards. Depending on estimate of the pole strength, the pole either passes inspection, is reinforced with a steel truss, or is replaced. The replacement and reinforcement process and corrective work for replacement and reinforcement are described in Section 8.6 Work Orders. See Section 8.3.4 Distribution Wood Pole Intrusive Inspections (WMP.483) for details on wood pole intrusive inspections.

8.3.5.2 FREQUENCY OR TRIGGER

GO 165 requires all wood poles over 15 years of age to be intrusively inspected within 10 years, and all poles that previously passed intrusive inspection to be inspected intrusively again on a 20-year cycle. Transmission wood pole intrusive inspections are performed on an 8-year cycle. The frequency/trigger of the Transmission Wood Pole Intrusive Inspections is shown in OEIS Table 8-2. Non-routine intrusive inspections may occur when current pole strength (percent strength remaining) information is needed for pole loading calculations during design.

SDG&E has a mature transmission inspection and maintenance program and participates in internal and external desktop and field audits with positive results. Industry standards and emerging technologies are also reviewed to verify that best maintenance practices are utilized.

8.3.5.3 ACCOMPLISHMENTS, ROADBLOCKS, AND UPDATES

The Transmission Wood Pole Intrusive Inspections program measures success by completing all intrusive inspections by the inspection due date.

Roadblocks encountered while implementing this program include access issues related to customers, difficult terrain, and labor resources. Access issues related to customers continue to be addressed by first attempting to resolve the issue directly with the customer, such as coordinating an inspection time if they have pets or livestock. Issues that cannot be resolved directly with the customer are elevated internally as needed. In addition, because intrusive inspections typically involve a minimal amount of ground disturbance around the base of the pole, authorizations to perform this work in environmentally sensitive areas or higher risk areas (e.g. department of defense land, railroad right of way, or along busy roadways) can require additional time and resources to perform. The frequency of non-routine inspections to support other WMP initiatives, such as grid hardening and asset replacement programs, can also impact routine work (reference GO 95, Rule 44).

Since the 2023-2025 Base WMP, the existing practice of performing inspections in the WUI was incorporated into the WMP reporting. There are no planned improvements for the 2026 to 2028 WMP cycle.

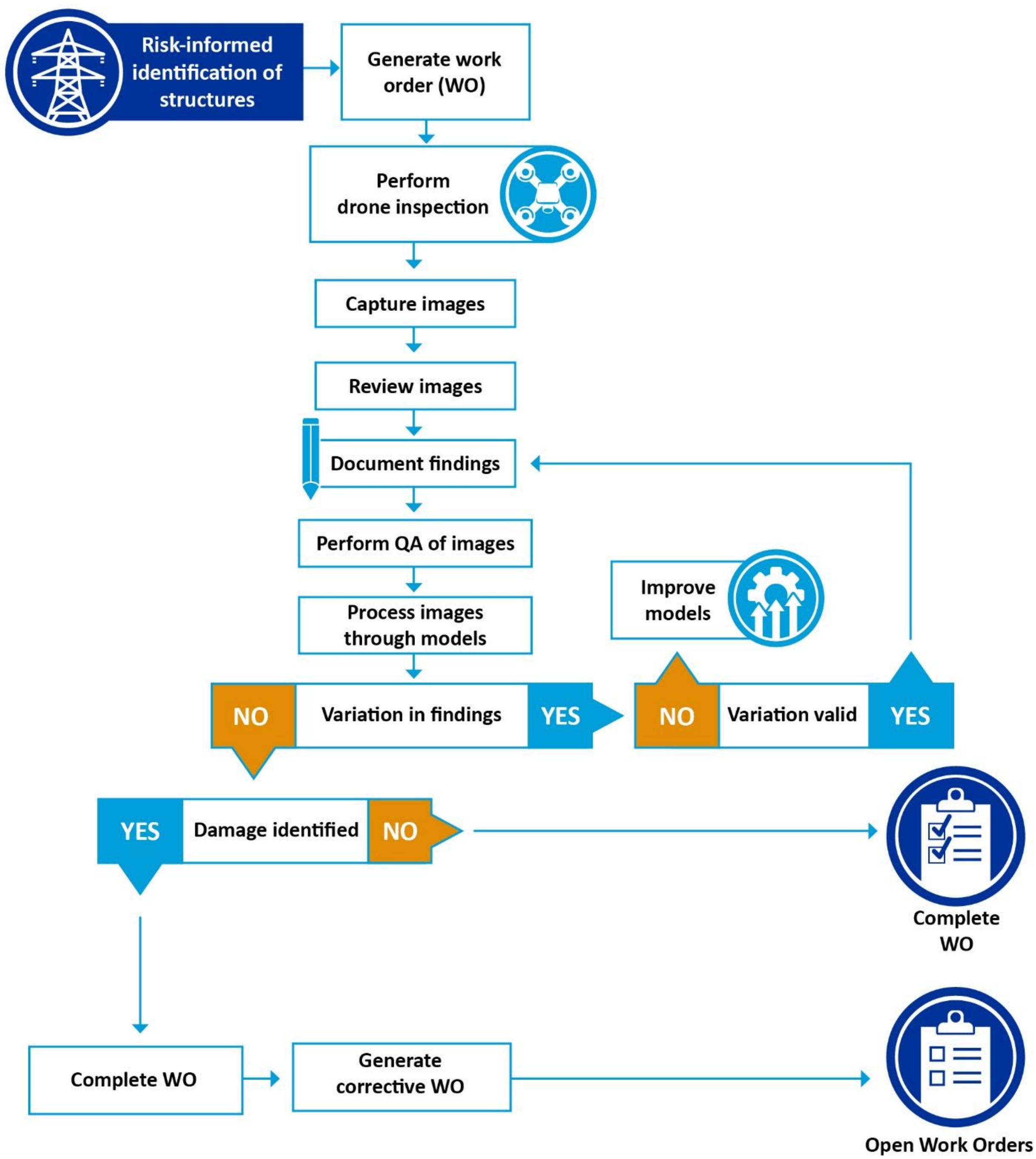
8.3.6 RISK-INFORMED DRONE INSPECTIONS (WMP.552)

8.3.6.1 OVERVIEW

The Risk-Informed Drone Inspections (RIDI) Program involves flight planning, drone flight and image capture, field observations, image assessment, determination of issues, and repair. Imagery collected by drones improves traditional ground inspections by providing inspectors with a “birds eye view” of overhead facilities, as well as high resolution imagery of overhead equipment and components. The use of drones to collect imagery enhances an inspector’s ability to identify potential fire hazards related to certain types of issues or where conditions such as terrain and vegetation density make full detailed inspections challenging. Issues that are more readily observed by the RIDI Program include damaged arresters, damaged insulators, issues with pole top work, issues with armor rods, crossarm or pole top damage, exposed connections, loose hardware, improper splices, and damaged conductors. Figure 8-6 outlines the RIDI process.

Images and inspection findings have also been used to build asset identification and damage detection models that allow Intelligent Image Processing (IIP) technology to process imagery data, improve the quality of RIDI assessments, and enhance the Inspection Prioritization Model. IIP models enhance the ability to process large amounts of data quickly with less dependency on human resources.

Figure 8-6: Risk-Informed Drone Inspections Process Flow



8.3.6.2 FREQUENCY OR TRIGGER

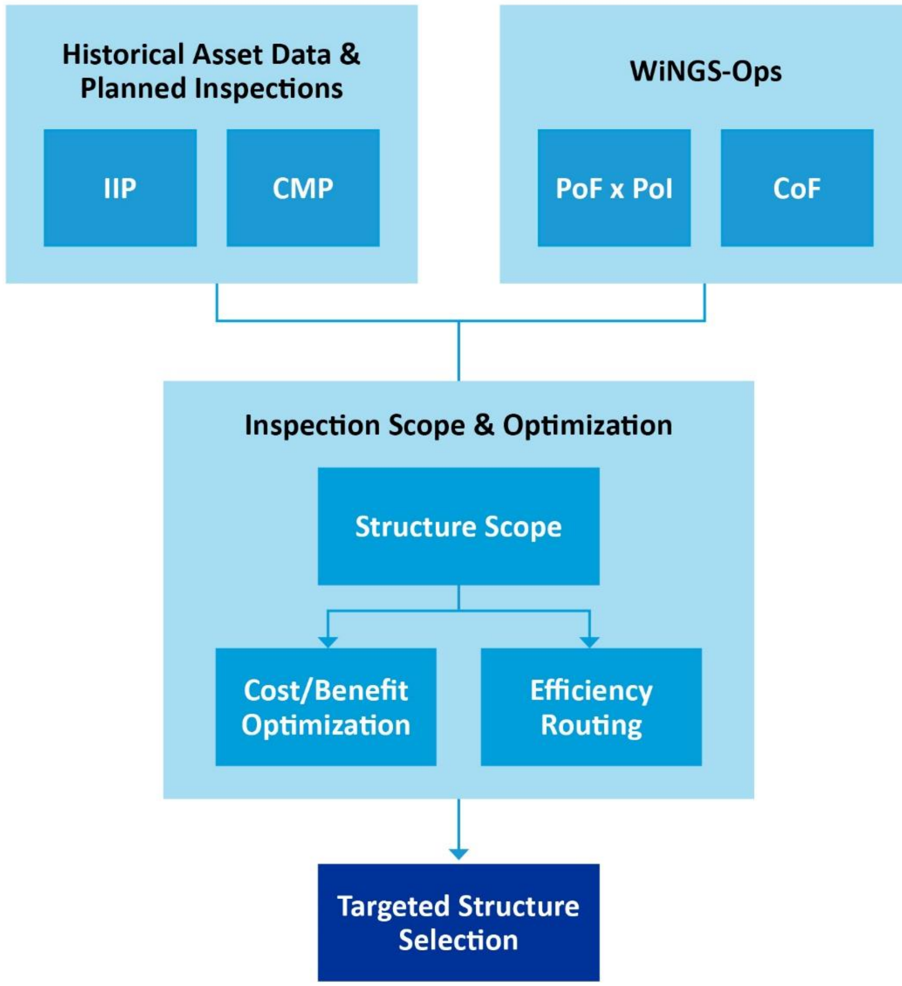
Risk-informed drone inspections consider the highest risk overhead structures within the HFTD and WUI. Structures selected for inspection are identified using a semi-automated Inspection Prioritization Model that combines PoF and consequence of failure (CoF) to determine structure risk and account for navigation efficiency. The inspection prioritization process is shown in Figure 8-7. The Inspection Prioritization Model aligns with existing methods that quantify risk and is easily modified to account for new attributes or changes in scope. Where possible, enhancements have been made to the Systems Applications and Processes (SAP) system to cancel inspections for overhead poles that are selected for RIDI assessments if compliance with GO 165 requirements could be satisfied by RIDI inspections. However, the inspection interval requirements in GO 165 make it challenging to cancel a GO 165 inspection even when the pole will be inspected by the RIDI Program in the same calendar year.

Once the highest-risk structures have been identified, desired risk reduction is balanced with cost efficiency to determine the number of inspections in the RIDI Program. The optimization consists of a thorough risk analysis considering volume and severity of findings against expected risk outcomes.

Ad-hoc drone inspections of transmission structures and components for operational and reliability reasons are performed as needed. In addition, inspections of transmission structures and components are performed where distribution is present (i.e., where there is distribution underbuild on a transmission structure) or as part of a special inspection. Situations that may result in ad-hoc drone inspections of transmission structures include:

- If a fault or failure occurs or if there is data indicating a fault or failure may occur
- Prior to or after a severe weather or safety event
- If a comprehensive ground inspection is not possible or difficult due to access issues
- To support or supplant a climbing inspection

Figure 8-7: RIDI Inspection Prioritization Model



8.3.6.3 ACCOMPLISHMENTS, ROADBLOCKS, AND UPDATES

The RIDI Program measures success by continuing to identify and mitigate potential fire hazards and refining the Inspection Prioritization Model to improve its predicative capabilities. IIP model development and accuracy improvements are also an accomplishment of the program.

Similar to other inspection programs, roadblocks include customer access issues, land use restrictions, and permitting issues. However, authorizations to fly drones on Department of Defense and California State Parks lands have been acquired and a more robust customer outreach process has been implemented to reduce access issues and negative customer interactions. Pilot safety along busy roadways is another challenge, which has been mitigated by providing pilots with aviation safety support personnel at specific locations when needed.

The scope of the RIDI Program has evolved since the 2023-2025 Base WMP. While the Inspection Prioritization Model is used to determine which structures to inspect in a given year, further risk and cost optimization analyses are now conducted to determine how many inspections are optimal to perform.

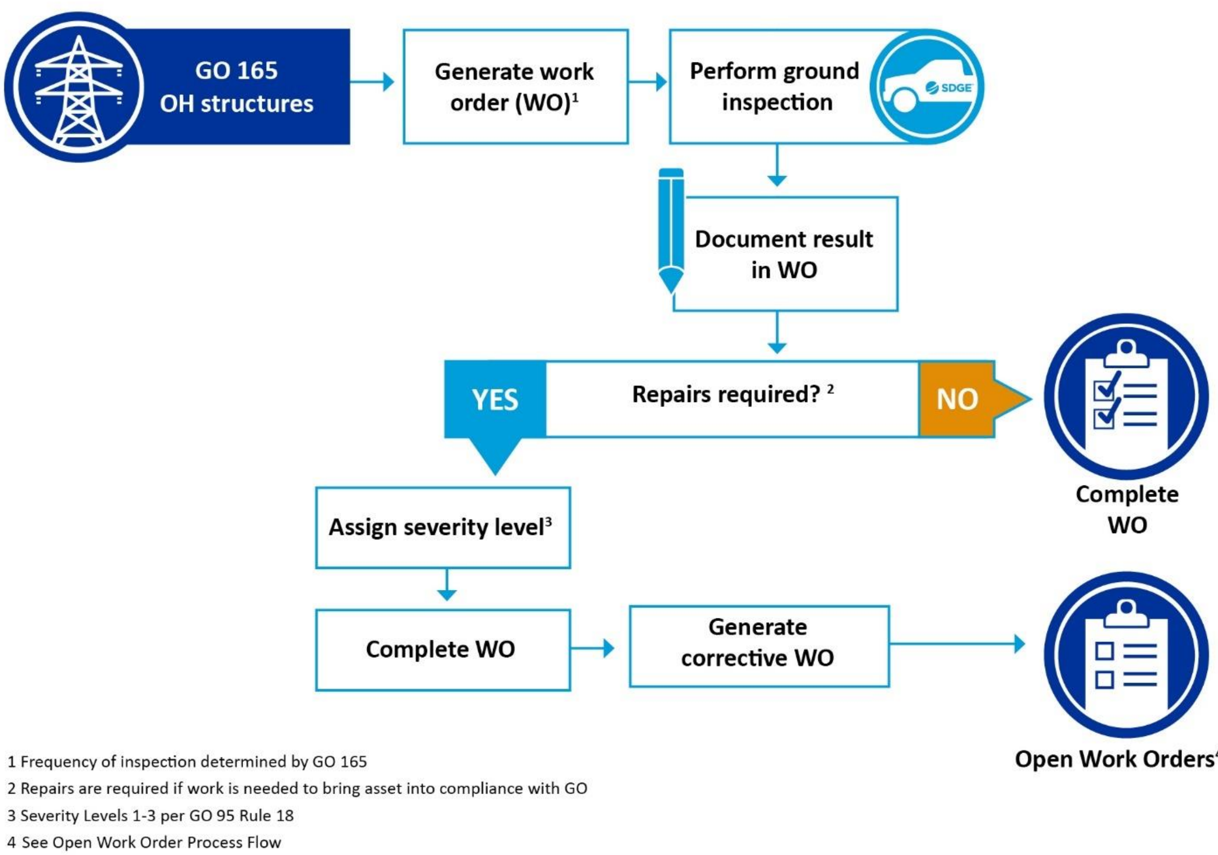
For a list of planned future improvements for supporting risk-informed drone inspections, see qualitative targets for asset management and inspection enterprise systems in OEIS Table 12-1.

8.3.7 DISTRIBUTION OVERHEAD PATROL INSPECTIONS (WMP.488)

8.3.7.1 OVERVIEW

Distribution overhead patrol inspections consist of a visual inspection of applicable utility equipment and structures that is designed to identify obvious structural problems and hazards. Distribution overhead patrol inspections may be satisfied by other inspections, such as overhead detailed inspections or RIDI. The corrective work resulting from patrol inspections is described in Section 8.6 Work Orders. Figure 8-8 outlines the distribution overhead patrol inspection process.

Figure 8-8: Distribution Patrol Inspections Process Flow



8.3.7.2 FREQUENCY OR TRIGGER

GO 165 requires utilities to patrol their systems annually in Tier 2 and 3 of the HFTD and in urban areas. Patrol inspections in rural areas outside of the HFTD are required once every 2 years. However, as a long-standing practice, SDG&E performs patrol inspections in all areas on an annual basis. The frequency/trigger of the Distribution Overhead Patrol Inspections is shown in OEIS Table 8-2. In compliance with GO 165, SDG&E's work management system tracks the inspection cycle for each overhead asset requiring inspection and issues work orders by intervals to verify that the inspection occurs each year as defined as 12 consecutive calendar months starting the first full calendar month after an inspection is performed, plus three full calendar months, not to exceed the end of the calendar year in which the next inspection is due.

Additionally, non-routine patrol inspections may occur for safety, reliability, or operational needs. For example, patrol inspections are performed on all distribution structures potentially affected prior to and after a PSPS de-energization.

8.3.7.3 ACCOMPLISHMENTS, ROADBLOCKS, AND UPDATES

The Distribution Overhead Patrol Inspections program measures success by completing all patrols on applicable equipment and structures annually within required inspection intervals.

Roadblocks encountered while implementing this program include access issues related to customers, difficult terrain, and labor resources. Access issues related to customers continue to be addressed by first attempting to resolve the issue directly with the customer, such as coordinating an inspection time if they have pets or livestock. Issues that cannot be resolved directly with the customer are elevated internally as needed. Difficult terrain issues are resolved using additional tools such as drones or helicopters to capture high resolution imagery or high-powered binoculars and other devices that can provide information about the health of the facility. Finally, labor resource issues are in the process of being mitigated through the development of a new Qualified Line Inspector 6-month training program that aims to reduce workforce pressures on QEWs.

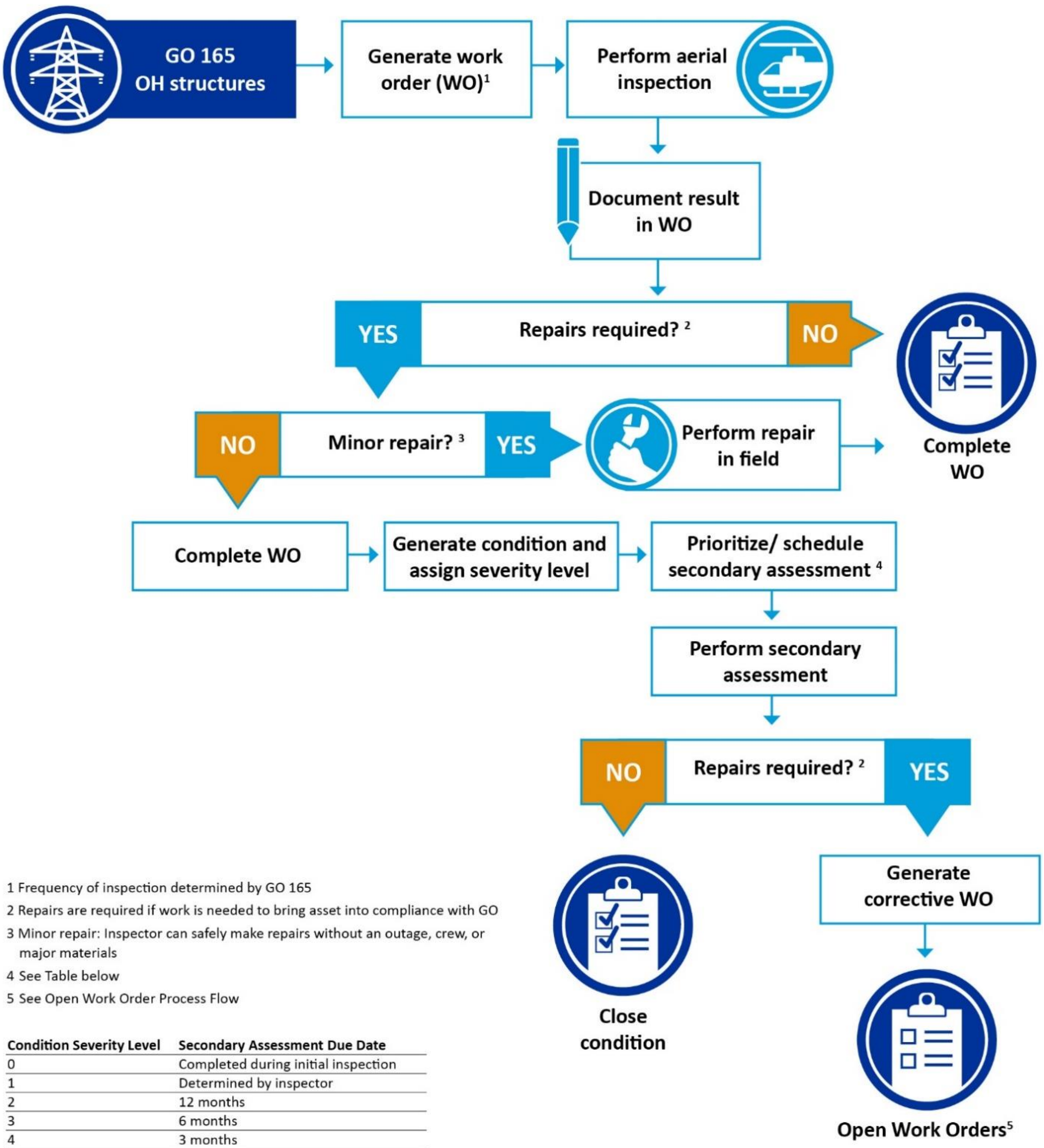
No changes were made to this program since the 2023-2025 Base WMP. For a list of planned future improvements supporting patrol inspections, see qualitative targets for asset management and inspection enterprise systems in OEIS Table 12-1.

8.3.8 TRANSMISSION OVERHEAD PATROL INSPECTIONS (WMP.489)

8.3.8.1 OVERVIEW

Transmission visual patrols are conducted annually on all overhead tielines, including those in the HFTD and the WUI. Visual patrols provide an overhead view of structures and components to identify larger issues that could pose a fire risk or risk to public safety. The corrective work resulting from patrol inspections is described in Section 8.6 Work Orders. Figure 8-9 outlines the transmission overhead patrol inspection process.

Figure 8-9: Transmission Overhead Patrol Inspections Process Flow



1 Frequency of inspection determined by GO 165
2 Repairs are required if work is needed to bring asset into compliance with GO
3 Minor repair: Inspector can safely make repairs without an outage, crew, or major materials
4 See Table below
5 See Open Work Order Process Flow

Condition Severity Level	Secondary Assessment Due Date
0	Completed during initial inspection
1	Determined by inspector
2	12 months
3	6 months
4	3 months
5	Immediate

8.3.8.2 FREQUENCY OR TRIGGER

The frequency/trigger of the Transmission Overhead Patrol Inspections is shown in OEIS Table 8-2. Inspections in the HFTD are prioritized prior to early fall. Inspections are also supplemented by risk-informed drone inspections as described in Section 8.3.6 Risk-Informed Drone Inspections (WMP.552).

For existing programs, a 5-year historical average of hit rates (number of issues found at a given priority level/total inspections) was calculated and utilized to forecast future years based on the number of inspections in the HFTD for these programs. Failure rate calculations (i.e., how many risk events would occur within a year if inspections and repairs are not performed within the prescribed timeframes) were utilized to convert issues found into risk events. Finally, the average ignition rate for transmission risk events and ignitions in the HFTD was utilized to convert from risk events avoided to ignitions avoided. The ignitions avoided is calculated on an annual basis.

8.3.8.3 ACCOMPLISHMENTS, ROADBLOCKS, AND UPDATES

The Transmission Overhead Patrol Inspections program measures success by identifying and repairing risk conditions within established timeframes.

No roadblocks were encountered while implementing this program.

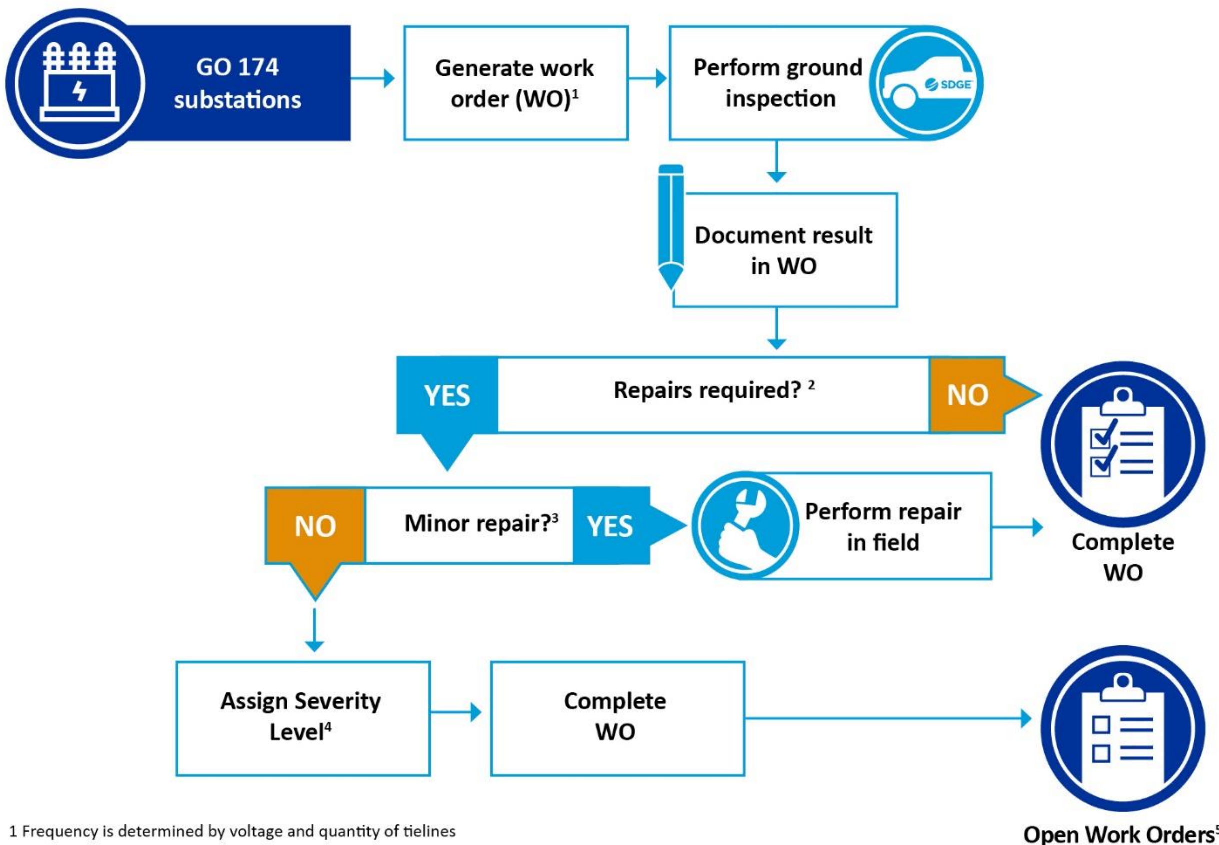
Since the 2023-2025 Base WMP, the existing practice of performing inspections in the WUI was incorporated into the WMP reporting. There are no planned improvements for the 2026-2028 WMP cycle.

8.3.9 SUBSTATION PATROL INSPECTIONS (WMP.492)

8.3.9.1 OVERVIEW

The Substation Inspection and Maintenance Program identifies substation equipment deterioration to make repairs or replacements before a failure occurs, as mandated by GO 174. The program is conducted primarily for reliability; however, it also provides incidental wildfire mitigation benefits within the HFTD and the WUI. The Substation Inspection and Maintenance Program schedules routine inspections at recurring cycles. These inspections consist of a monthly or bimonthly patrol inspection where equipment is inspected and problems, such as oil leaks, are identified. When issues are identified during an inspection, corrective work orders are opened with a severity level of either immediate (within 7 days) or within the next 12 months. While patrol inspections primarily focus on substation assets, corrective maintenance and vegetation management defensible space in the switchyard are also addressed. The corrective work for substation patrol inspections is described in Section 8.6 Work Orders. Figure 8-10 outlines the substation patrol inspection process.

Figure 8-10: Substation Patrol Inspection Workflow



1 Frequency is determined by voltage and quantity of tielines running in/out of the substation
2 Repairs are required if work is needed to bring asset into compliance with GO or SDG&E standards
3 Minor repair: Inspector can safely make repairs without an outage, crew, or major materials
4 See Table
5 See Open Work Order Process Flow

Substation Severity Levels and Corrective Action Timeframe

Severity Code Level	Corrective Action Due Date
Severity Code 1	7 days
Severity Code 2	12 months

8.3.9.2 FREQUENCY OR TRIGGER

The frequency/trigger of Substation Patrol Inspections is shown in OEIS Table 8-2.

Visual inspections are conducted on a monthly basis for “Priority 1” substations, defined as having either an operating voltage above 200 kV or having four or more transmission lines or generator interconnection points at or above 69 kV. All other stations fall into “Priority 2,” and visual inspections are conducted once every 2 months.

8.3.9.3 ACCOMPLISHMENTS, ROADBLOCKS, AND UPDATES

The Substation Patrol Inspections program measures success by finding and addressing safety conditions found during substation inspections.

No roadblocks were encountered while implementing this program.

Since the 2023-2025 Base WMP, a system enhancement was implemented to autogenerate corrective maintenance orders for frequently identified findings, such as vegetation overgrowth, during patrol inspections. There are no planned improvements for the 2026 to 2028 WMP cycle.

8.3.10 DISCONTINUED ASSET INSPECTION PROGRAMS

8.3.10.1 DISTRIBUTION INFRARED INSPECTIONS (WMP.481)

Distribution Infrared Inspections will be discontinued in 2026 due to a historically low find rate. In 2024, 6,656 inspections were completed with a Level 1 find rate of 0.045 and a Level 2 find rate of 0.916 percent.

Infrared technology is still an integral tool and will continue to be used during routine and responsive patrols and inspections as needed to help identify and mitigate any potential issues. Additional detail is noted in ACI SDGE-25U-08 Distribution Infrared Inspections (see Appendix D).

8.3.10.2 TRANSMISSION 69 KV TIER 3 VISUAL INSPECTIONS (WMP.555)

Transmission 69 kV Tier 3 Visual Inspections will be discontinued in 2026 due to a historically low find rate. Between 2020 and 2024, only 3 conditions were found out of 7,360 inspections, resulting in a 0.04 percent find rate. This is a non-mandated program and will be augmented by Transmission Overhead Detailed Inspections and the PSPS activation 72-hour protocol, which includes pre-patrols before damaging wind events.

These supplemental inspections were started before tie line hardening was completed.

8.3.11 ASSET INSPECTION PILOT PROGRAMS

There are no plans for any asset inspection pilot programs.

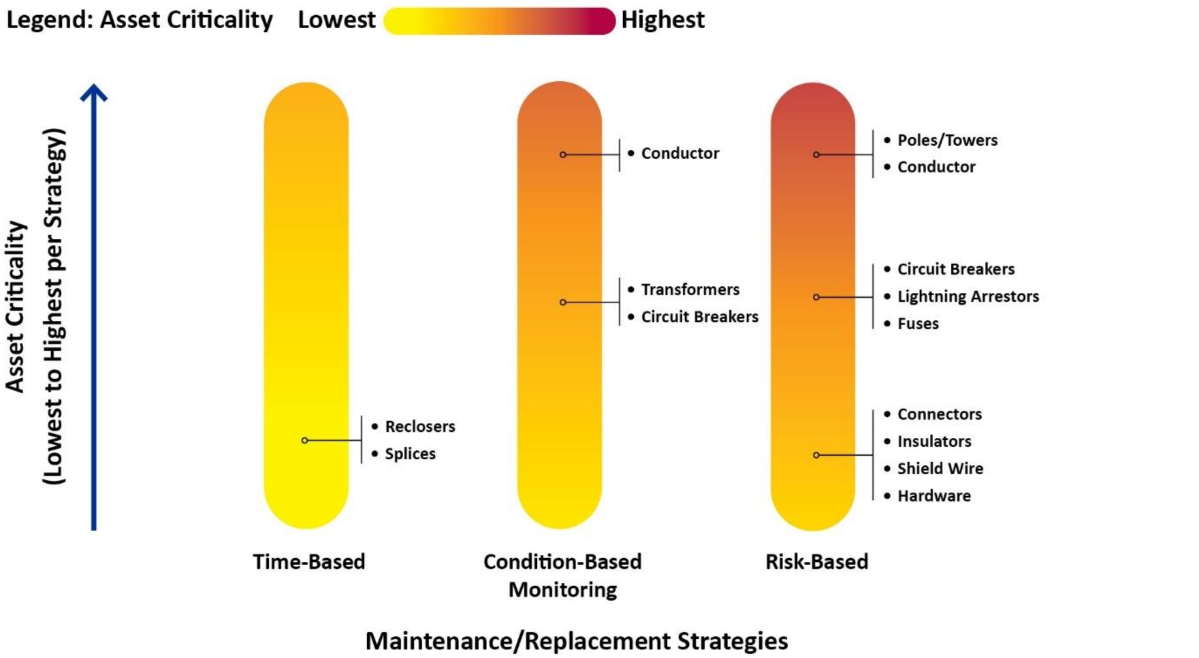
8.4 EQUIPMENT MAINTENANCE AND REPAIR (WMP.1130)

8.4.1 MAINTENANCE STRATEGIES

SDG&E operates within a Safety Management System (SMS) founded on a proactive, risk-informed, data-driven approach to effectively manage risk and safety. SMS is a systematic, enterprise-wide framework to collectively manage and reduce risk and exposure and promote continuous improvement in safety performance through deliberate, routine, and intentional processes. SMS processes include the identification, prevention, control, and mitigation of potential safety incidents (e.g., fire, asset failure, injury). SMS processes are also a foundational guide to SDG&E's maintenance strategies.

Asset maintenance and replacement strategies vary by equipment type and are determined based on asset criticality. Replacement strategies promote public safety and meet or exceed regulatory mandates and industry best practices. At a minimum, all equipment is maintained with a time-based inspection cycle and corrective work is performed within GO 95 timeframes via the CMP. See Section 8.6 Work Orders for more discussion on CMP. Figure 8-11 summarizes the strategies that are utilized for each equipment type based on asset criticality. SDGE Table 8-2 defines current maintenance and replacement strategies by equipment type and identifies specific programs and initiatives.

Figure 8-11: Asset Criticality and Maintenance/Replacement Strategies



SDGE Table 8-2: Maintenance and Replacement Strategies

Maintenance/ Replacement Strategy	Definition	Equipment Type	WMP Initiative (or other)
Reactive	This strategy is utilized to maintain or replace an asset or equipment when an asset or equipment is operated until it stops functioning per its specifications. This is a reactionary strategy since the asset or equipment is only replaced when it fails. It is used for lower risk assets that do not impact public safety.	All equipment,* when needed	Asset Inspections: WMP.478; WMP.479; WMP.482; WMP.483; WMP.1190; WMP.488; WMP.489; WMP.492
Time-based (Interval-based)	This strategy is utilized to repair or replace an asset or equipment that does not meet acceptance criteria found during a routine, cyclical inspection. The inspection cycle may be determined by regulatory mandates, equipment manufacturer recommendation, or industry best practice.	All equipment* as required	Asset Inspections: WMP.478; WMP.479; WMP.482; WMP.483; WMP.488; WMP.489; WMP.492; WMP.1190; WMP.1433
Condition-based Monitoring	This strategy is utilized to maintain or replace an asset or equipment when certain attributes of the asset or equipment exceed the defined thresholds as alerted by a continuous monitoring system. This strategy requires continuous monitoring and analysis of key health data of an asset such as age, location, gassing, number of operations, electrical loading, and temperature.	Conductors	Early Fault Detection WMP.1195
Risk-based	This strategy is utilized to maintain or replace an asset or equipment based on the probability and consequence of failure. While the automated condition-based strategy considers the health of the asset, which	Poles/Towers Conductor Insulators	Grid Hardening Initiatives: WMP.455; WMP.473; WMP.1189;

Maintenance/ Replacement Strategy	Definition	Equipment Type	WMP Initiative (or other)
	is often a proxy for the likelihood of failure, the risk-based strategy considers the consequence of failure of the assets in addition to the health of the asset.	Shield Wire Hardware	WMP.543; WMP.545 Risk-based inspections WMP.552

** All equipment includes capacitors, circuit breakers, connectors, including hotline clamps, conductor, including covered conductor, fuses, including expulsion fuses, distribution pole, lightning arrestors, reclosers, splices, transmission poles/towers, transformers, non-exempt equipment,[50] pre-GO 95 legacy equipment, and other equipment not listed.*

Maintenance and replacement of assets beyond time-based maintenance that is required by regulation is determined based on asset condition and risk when such information is available. Technology, such as ARFS and PQ meters used for EFD, is utilized as a condition-based monitoring tool and can trigger a patrol inspection when an incipient fault or discharges are detected on a conductor. In addition, the Asset 360 platform was created to enable development of asset health indices, equipment failure analysis, and predictive risk modeling. Such analysis can result in the need for a proactive maintenance or replacement strategy. Some examples include grid hardening initiatives (see Section 8.2 Grid Design and System Hardening), replacing fiber-wrapped poles where the fiber wrap is at the end of its life, transmission lattice tower hardening, and polymer insulator replacements.

In December 2024, SDG&E de-energized a 500-kV line for the first time due to fire weather and high winds. De-energization of the bulk electric system is typically avoided due to the reliability risk to the service territory. However, with evolving weather patterns that may more frequently leave the region susceptible to fire weather concerns during periods of peak Santa Ana winds, SDG&E has begun the process of assessing high wind speeds across all transmission infrastructure as well as evaluating aging infrastructure on otherwise hardened lines. The 500-kV line that was de-energized was built in the early 1980s when windspeeds were lower than what was experienced during 2024 and 2025. SDG&E plans to consider the necessity for additional weather stations and explore the possibility of designing existing lines for higher windspeeds.

SDG&E is also considering the use of enhanced inspection techniques for transition lines. Because the structures that hold these lines are the tallest in the service territory, they cannot be visually inspected by an inspector on the ground. Existing techniques such as visual, infrared, and aerial photography will continue to be used. In addition, helicopter and drone techniques will be explored as a safer, more cost-effective way to inspect these lines.

SDG&E is developing a comprehensive asset strategy for its transmission infrastructure. Historically, risk-based assessments have driven the replacement of assets such as conductors, towers, and poles, and associated hardware. Insulators are replaced as necessary during construction. However, some equipment and hardware may deteriorate faster than the assets they support. Based on historical failures, inspection history, and weather conditions, proactive replacement is sometimes warranted. SDG&E is evaluating shield wires, insulators, and hardware such as shackles and bolts as possible

[50] "Non-exempt" in this instance pertaining to equipment that must comply with clearances specified within PRC § 4292 and PRC § 4293.

candidates for proactive replacement programs. Targets for the 2026 to 2028 WMP cycle are provided in OEIS Table 8-1.

8.4.2 TIMEFRAME FOR REMEDIATION

Table SDGE Table 8-3 and SDGE Table 8-4 show a list of inspection findings, priority levels, and timeframes for remediation of distribution and transmission findings, respectively.

SDGE Table 8-3: Timeframe for Remediation of Distribution Findings

Condition	Severity	Priority Level	Timeframe for Remediation*
Damaged/Missing Pole Hardware	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Damaged/Missing Pole Hardware	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
SDG&E Leaning Pole or Potential Overload	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
SDG&E Leaning Pole or Potential Overload	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Private Property Caused Pole Inaccessible	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Private Property Caused Pole Inaccessible	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
SDG&E/Vegetation Caused Pole Inaccessible or Cannot Locate	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
SDG&E/Vegetation Caused Pole Inaccessible or Cannot Locate	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Open/Damaged Ground	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Open/Damaged Ground	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Damaged Arrestor/Insulator/Dead-end	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical

Condition	Severity	Priority Level	Timeframe for Remediation*
Damaged Arrestor/Insulator/Dead-end	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Oil Leak	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Oil Leak	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD

Note: Full table is provided in Appendix F

**Timeframe is determined by GO 95, Rule 18*

SDGE Table 8-4: Timeframe for Remediation of Transmission Findings

Condition	Severity	Priority Level	Timeframe for Remediation*
Balloon-Mylar	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Balloon-Mylar	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Assessment Required	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Assessment Required	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Cracked	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Cracked	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Woodpecker Hole(s)	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Woodpecker Hole(s)	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
3 Guys-1Rod	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD

Condition	Severity	Priority Level	Timeframe for Remediation*
Assessment Required	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Backed Out-Off	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Bent	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD

Note: Full table is provided in Appendix F
**Timeframe is determined by GO 95, Rule 18*

8.4.3 FAILURE AND IGNITION CAUSES

8.4.3.1 FAILURE CAUSES

When a piece of equipment fails, a crew or troubleshooter responds to the incident and verifies that the scene is safe. They then submit an equipment failure report and bring the equipment back to their district.

Engineering and work method teams investigate the failed equipment for potential causes such as material defects, workmanship issues, age-related deterioration, or other factors. Depending on the age and potential cause, the equipment may be sent back to the vendor for an additional root cause analysis.

Based on the results of these analyses, engineering and work method teams may work with the manufacturer to make corrections, further evaluate current work practices, or evaluate trends with manufacturer parts or installation techniques. When changes are required to improve safety, these changes are communicated through newsletters and reports. Consistent communication occurs between front-line workers and internal teams to evaluate if further changes are required.

8.4.3.2 IGNITION CAUSES

From 2022 to 2024, SDG&E reported a total of 44 total ignitions in the HFTD that met the criteria for CPUC reportable ignitions as defined in D. 14-02-015. These ignitions resulted in a total of 70.5 acres burned, with 59 of those acres coming from two fires that were each caused by contact from an object (bird and balloon). Of the 44 total ignitions, 15 were attributed to equipment failure, and those fires resulted in a total of 2.7 acres burned.

SDG&E follows a standard procedure for incident response, evaluation, and mitigation to support the public and first responders. Areas of origin are left undisturbed until permission can be granted by the agency that has jurisdiction over the incident. When safe, information related to possible causes is gathered, such as pieces of electrical equipment, burned balloons, or pictures of animal remains. A secondary data stream is also created if a fire is determined to be electric in origin and meets the criteria for a CPUC reportable fire. When applicable, an analysis is performed to determine possible causes.

Utilizing probable cause analysis, the appropriate mitigation strategy is then determined. For example, if a circuit is in an area with an elevated FPI rating, sensitive relays may be implemented to prevent an ignition. Additionally, a dedicated fire patrol is present when performing activities that have caused ignitions in the past.

SDGE Table 8-5 shows ignition rates and causes and failure rates.

SDGE Table 8-5: Ignition Rate and Failure Rate

Equipment Type	Distribution Failure Rate*	Distribution Ignition Rate**	Transmission Failure Rate*	Transmission Ignition Rate**
Capacitors	0.525%	0.00%	0.00%	0.00%
Circuit Breakers	0.128%	n/a	0.251%	n/a
Connectors	0.169%	5.36%	0.00%	0.00%
Conductor	0.011%	1.49%	0.01%	0.00%
Transformers	0.064%	0.83%	0.00%	0.00%
Fuses+cutouts	0.080%	3.85%	0.00%	0.00%
Distribution pole	0.031%	0.00%	n/a	n/a
Lightning arrestors/Insulator/bushing	0.082%	0.19%	0.00%	0.00%
Reclosers	0.131%	0.00%	0.00%	0.00%
Splices	0.000%	0.00%	n/a	0.00%
Transmission poles/towers	n/a	n/a	0.01%	0.00%
Anchor/Guy	0.011%	0.20%	0.01%	0.00%
Switch	0.045%	14.29%	0.00%	0.00%
Crossarm	0.018%	0.00%	0.01%	0.00%

Note: 2022-2024 historical data

** Failure Rate: Failed equipment resulting in faults*

*** Ignition Rate: Total ignitions caused by actual failures that lead to faults*

8.5 QUALITY ASSURANCE AND QUALITY CONTROL

8.5.1 OVERVIEW, OBJECTIVES, AND TARGETS

OEIS Table 8-3: Grid Design, Asset Inspections, and Maintenance QA and QC Program Objectives

QA/QC Activity Name	QA/QC Activity Tracking ID	Initiative/Activity Being Audited	Tracking ID	Quality Program Type	Objective of the Quality Program
Quality assurance/quality control of Distribution Detailed Inspections	WMP.491	Distribution Detailed Inspections	WMP.478	QA/QC	Ensure SDG&E inspection procedures are being adhered to
Quality assurance/quality control of Transmission Inspections	WMP.1191	Transmission Overhead Detailed Inspections	WMP.479	QA / QC	Ensure inspections are following SDG&E's procedures for inspections

QA/QC Activity Name	QA/QC Activity Tracking ID	Initiative/Activity Being Audited	Tracking ID	Quality Program Type	Objective of the Quality Program
Quality assurance/quality control of Risk-Informed Drone Inspections	WMP.1192	Risk-Informed Drone Inspections	WMP.552	QA/QC	Ensure SDG&E inspection procedures are being adhered to
Quality assurance/quality control of Wood Pole Intrusive (Transmission & Distribution)	WMP.1193	Wood Pole Intrusive (Transmission & Distribution)	WMP.483, WMP.1190	QA/QC	Ensure SDG&E inspection procedures are being adhered to
Quality assurance/quality control of Corrective Maintenance Program	WMP.1434	Corrective Maintenance Program	WMP.1433	QA/QC	Ensure SDG&E repair procedures are being adhered to
Quality assurance/quality control of Substation Inspections	WMP.1194	Substation Patrol Inspections	WMP.492	QA/QC	Ensure SDG&E substation inspection procedures and checklists are being adhered to
Quality assurance/quality control of Grid hardening	WMP.1435	Grid Hardening	WMP.455, WMP.473, WMP.475, WMP.543, WMP.545, WMP.461, WMP.463, WMP.1195, WMP.1189	QA/QC	Validate work is performed in accordance with project documents, standards, specifications, and codes, as applicable

OEIS Table 8-4: Grid Design, Asset Inspections, and Maintenance QA and QC Activity Targets

QA/QC Activity Name	Initiative/Activity Being Audited	Type of Audit	Population / Sample Unit	2026: Population Size	2026: Sample Size	2027: Population Size	2027: Sample Size	2028: Population Size	2028: Sample Size	Percent of Sample in the HFTD	Confidence level / MOE	2026: Pass Rate Target	2027: Pass Rate Target	2028: Pass Rate Target
Quality assurance/quality control of Distribution Detailed Inspections (WMP.491)	Distribution Overhead Detailed Inspections (WMP.478)	Field and Desktop	Findings	Population size, determined based on findings from inspections, is unknown at this time. See Section 8.5.3 Sampling Plan.	50% of findings found during inspection	Population size, determined based on findings from inspections, is unknown at this time. See Section 8.5.3 Sampling Plan.	50% of findings found during inspection	Population size, determined based on findings from inspections, is unknown at this time. See Section 8.5.3 Sampling Plan.	50% of findings found during inspection	100%	n/a*	95%	95%	95%
Quality assurance/quality control of Transmission Inspections (WMP.1191)	Transmission Overhead Detailed Inspections (WMP.479)	Field and Desktop	Findings	Population size, determined based on findings from inspections, is unknown at this time. See Section 8.5.3 Sampling Plan.	100% of conditions identified during inspection	Population size, determined based on findings from inspections, is unknown at this time. See Section 8.5.3 Sampling Plan	100% of conditions identified during inspection	Population size, determined based on findings from inspections, is unknown at this time. See Section 8.5.3 Sampling Plan.	100% of conditions identified during inspection	100%	n/a*	n/a see Section 8.5.4 Pass Rate Calculation	n/a see Section 8.5.4 Pass Rate Calculation	n/a see Section 8.5.4 Pass Rate Calculation
Quality assurance/quality control of Wood Pole Intrusive (Transmission & Distribution) (WMP.1193)	Transmission Wood Pole Intrusive Inspections (WMP.1190) & Distribution Wood Pole Intrusive Inspections (Distribution) (WMP.483)	Field	Intrusive Inspections	1282	5%	5673	5%	11947	5%	100%	n/a*	95%	95%	95%
Quality assurance/quality control of Risk-Informed Drone Inspections (WMP.1192)	Risk-Informed Drone Inspections (WMP.552)	Desktop	Drone Inspections	6,500	15%	6,500	15%	6,500	15%	90%	n/a*	98%	98%	98%

QA/QC Activity Name	Initiative/Activity Being Audited	Type of Audit	Population / Sample Unit	2026: Population Size	2026: Sample Size	2027: Population Size	2027: Sample Size	2028: Population Size	2028: Sample Size	Percent of Sample in the HFTD	Confidence level / MOE	2026: Pass Rate Target	2027: Pass Rate Target	2028: Pass Rate Target
Quality assurance/quality control of Substation Inspections (WMP.1194)	Substation Patrol Inspections (WMP.492)	Field	Findings	45	18	45	18	45	18	100%	n/a*	90%	90%	90%
Quality assurance/quality control of Corrective Maintenance Program (WMP.1434)	Corrective Maintenance Program (WMP.1433)	Field and Desktop	OH Fire or Safety Related Corrective Actions	Population size determined based on number of Corrective Action Repairs needed.	1%	Population size determined based on number of Corrective Action Repairs needed.	1%	Population size determined based on number of Corrective Action Repairs needed.	1%	100%	n/a*	90%	90%	90%
Quality assurance/quality control of Grid Hardening (WMP.1435)	Grid Hardening (WMP.455, WMP.473, WMP.475, WMP.543, WMP.545, WMP.461, WMP.463, WMP.1195, WMP.1189)	Field and Desktop	Overhead: Pole or Tower Underground: Location (e.g., handhole, pad-mounted equipment, etc.)	Population size determined based on completed Grid Hardening work.	95% of Population Size	Population size determined based on completed Grid Hardening work.	95% of Population Size	Population size determined based on completed Grid Hardening work.	95% of Population Size	100%	95% / 2%	95%	95%	95%

**SDG&E does not calculate Confidence Level/MOE for Transmission, Distribution, or Substation programs.*

8.5.2 QA AND QC PROCEDURES

8.5.2.1 GRID DESIGN AND SYSTEM HARDENING

QA/QC of Grid Hardening: Combined Covered Conductor (WMP.455), Strategic Undergrounding (WMP.473), Distribution Overhead System Hardening (WMP.475), Transmission Overhead Hardening (WMP.543), Transmission Overhead Hardening (Distribution Underbuild) (WMP.545), Advanced Protection (WMP.463), Early Fault Detection (WMP.1195), Strategic Pole Replacement Program (WMP.1189), and PSPS Sectionalizing Enhancements (WMP.461)

Quality Assessment/Quality Control (QA/QC) of electric transmission and distribution facilities constructed within the WMP initiatives defined above are conducted by the Portfolio & Project Management (PPM) Quality Assurance & Quality Control team.

Procedures:

- Portfolio & Project Management Quality Assurance & Quality Control Plan, Revision 0, dated December 31, 2023
- ESP 1028: Priority CMP Corrective Action Business Process, Revision 0, dated September 6, 2019
- ESP 1031: Emergency CMP Corrective Action Business Process, Revision 0, dated September 6, 2019

8.5.2.2 ASSET INSPECTIONS

QA/QC of Transmission Inspections (WMP.1191)

QA/QC of transmission inspections is also referred to as secondary assessments for conditions identified during inspection. The process for these secondary assessments is outlined in SDG&E's internal transmission line maintenance practices for the purpose of validating inspection results.

Procedure: TCM 807, Section 5.2 Condition Assessment; Version 8G, effective December 16, 2024

QA/QC of Distribution Detailed Inspections (WMP.491)

QA/QC of distribution detailed inspections documents whether any additional fire or safety issues were identified or whether any fire or safety issues were misidentified (i.e. modification or cancellation of the finding). Additionally, randomly selected audits are also conducted to document whether any potential fire or safety issues were observed that were not identified during the inspection.

Procedure: ESP 612; effective January 1, 2025

QA/QC of Risk-Informed Drone Inspections (WMP.1192)

QA/QC of risk-informed drone inspections focuses solely on identifying potential fire and safety related hazards and is performed by an Inspection Supervisor.

Procedure: ESP 612; effective January 1, 2025

QA/QC of Wood Pole Intrusive Inspections (Transmission and Distribution) (WMP.1193)

For QA/QC of wood pole intrusive inspections, auditors are required to perform a field visit to visually verify inspector's documented results, evaluating the following: drill holes and plugs are recent and in good condition, inspection tags and reject tags are in place, pole data and identification tags are installed, severe damage is identified, trusses on reinforced poles are in good condition, and pole data consistency is maintained.

Additionally, the auditor uses a hammer to sound the pole and confirm that the pole does not exhibit an obvious hollow sound.

Procedure: Procedures are developed and maintained by third-party contractors that perform these inspections.

QA/QC of Substation Inspections (WMP.1194)

QA/QC of substation inspections is performed as outlined in SDG&E's internal procedures. Completed substation patrol inspections are periodically reviewed by a Construction Supervisor for quality control of regulatory requirements, relevancy, and internal considerations.

Procedure: 510.040 Substation Inspector Maintenance Order Reporting and Tracking; effective July 11, 2023

8.5.2.3 EQUIPMENT MAINTENANCE AND REPAIR

QA/QC of Corrective Maintenance Program (WMP. 1434)

Procedure: ESP 612; effective January 1, 2025

8.5.3 SAMPLING PLAN

8.5.3.1 GRID DESIGN AND SYSTEM HARDENING

QA/QC of Grid Hardening: Combined Covered Conductor (WMP.455), Strategic Undergrounding (WMP.473), Distribution Overhead System Hardening (WMP.475), Transmission Overhead Hardening (WMP.543), Transmission Overhead Hardening (Distribution Underbuild) (WMP.545), Advanced Protection (WMP.463), Early Fault Detection (WMP.1195), Strategic Pole Replacement Program (WMP.1189), and PSPS Sectionalizing Enhancements (WMP.461)

QA/QC measures are employed to provide assurances that WMP work is built in accordance with applicable codes, contracts, standards, and specifications, and complete a key milestone within the construction process. Therefore, a sampling rate of at least 95 percent is implemented for initiatives with substantive scopes of work in the HFTD to achieve satisfactory pass rates when incorporating calculated margins of error. These selected sampling rates in tandem with historical sample proportions produce satisfactory compliance rates for the risk profile associated with the facilities impacted by these WMP initiatives.

8.5.3.2 ASSET INSPECTIONS

QA/QC of Transmission Inspections (WMP.1191)

The construction supervisor performs an audit of 100 percent of conditions identified during inspections to validate findings or confirm no further maintenance is required. Secondary assessments are prioritized based on severity level of the condition and HFTD region.

QA/QC of Distribution Detailed Inspections (WMP.491)

This program audits 50 percent of potential safety and fire hazard issues in the HFTD identified during inspection. The audit is performed by a District Supervisor via a field visit or a desktop review of images collected during the inspection within 1 month following the end of the month the inspection was completed. Additionally, 5 percent of inspections in the HFTD that have no findings are randomly selected for audit by a quality assurance advisor. This audit, which occurs within 1 month following the end of the month the inspection was completed, can involve either a field visit or a desktop review of images collected during the inspection.

QA/QC of Risk-Informed Drone Inspections (WMP.1192)

An Inspection Supervisor reviews 15 percent of inspections via desktop review of images. In addition, 100 percent of images collected during the inspection are processed through damage detection machine learning models. The Inspection Supervisor reviews any discrepancies that are identified by the models to validate the result.

QA/QC of Wood Pole Intrusive Inspections (Transmission and Distribution) (WMP.1193)

This program targets 5 percent of completed inspections and reinforcements and utilizes an automated randomizer selection tool to select the structures.

QA/QC of Substation Inspections (WMP.1194)

The sample size for substations within the HFTD is 20 percent every 6 months. Of the 45 substations within HFTD, 9 are sampled every 6 months, for a total of 18 annually.

8.5.3.3 EQUIPMENT MAINTENANCE AND REPAIR

QA/QC of Corrective Maintenance Program (WMP.1434)

Audits are conducted on 1 percent of the total completed repairs related to potential safety or fire hazard issues within the HFTD each quarter or a minimum of five infractions, whichever is greater.

8.5.4 PASS RATE CALCULATION

8.5.4.1 GRID DESIGN AND SYSTEM HARDENING

QA/QC of Grid Hardening: Combined Covered Conductor (WMP.455), Strategic Undergrounding (WMP.473), Distribution Overhead System Hardening (WMP.475), Transmission Overhead Hardening (WMP.543), Transmission Overhead Hardening (Distribution Underbuild) (WMP.545), Advanced Protection (WMP.463), Early Fault Detection (WMP.1195), Strategic Pole Replacement Program (WMP.1189), and PSPS Sectionalizing Enhancements (WMP.461)

Applicable Electric Standard Practices (ESPs) are used to categorize the severity of observations identified during quality control processes. A 'passing' facility is characterized as a facility that is constructed without any priority or emergency observations, as defined in ESP 1028 and ESP 1031.

The sample units used to generate pass rates are:

- For overhead facilities, the sample unit is defined as each pole within a job package that is impacted by the scope of the job, which typically features a single pole or structure (tower).

- For underground facilities, the sample unit is defined as each location within a job package that is impacted by the scope of the job (i.e., padmount facility [e.g., transformer, fuse cabinet, switch, etc.] or subsurface facility [e.g., manhole or handhole])

8.5.4.2 ASSET INSPECTIONS

For all asset inspection audit programs, the failure rate (if applicable to the program) and the types of issues missed are reviewed by the Program Management team and discussed with Inspection Supervision or Construction Supervision (for corrective action repairs). If the pass rate for the program is less than the targeted pass rate, further analysis is performed to determine whether it is a systemic concern or more focused on specific individuals. Subsequently, an appropriate corrective action plan is developed to provide additional training to the larger qualified inspector group or just on an individual basis.

QA/QC of Transmission Inspections (WMP.1191)

SDG&E does not define pass/fail of inspections due to the time between the initial inspection and the secondary assessment (QA/QC) activity, which can be a few days to several months depending on severity. Thus, the QA/QC is not determinative of whether an inspector passed or failed the initial inspection as conditions found during the secondary assessment may not have been present at the time of initial inspection.

QA/QC of Distribution Detailed Inspections (WMP.491)

For detailed distribution inspections and drone inspections, any changes made by the auditor to fire or safety issues (such as additions, modifications, or cancellations) result in an inspection failure. The number of failures in each process category is divided by the total number of inspections within the category to determine the failure rate for that audit process. The target pass rate for these inspection programs is 95 percent.

For additional, randomly selected audits, any potential fire or safety findings identified and validated during the audit are classified as an inspection fail.

QA/QC of Risk-Informed Drone Inspections (WMP.1192)

The audit sampling percentage for the Inspection Supervisor is 15 percent. If the success rate falls below 98%, the audit sample size will be reevaluated to consider a higher audit sample.

QA/QC of Wood Pole Intrusive Inspections (Transmission and Distribution) (WMP.1193)

The number of single inspection failures is divided by the total number of inspections performed to determine the failure rate for that audit process. The target pass rate for these inspections is set at 85 percent for 2026 with a goal to increase the pass rate to 95 percent by the end of the 2026 to 2028 WMP cycle.

QA/QC of Substation Inspections (WMP.1194)

The substation inspection pass rate of 90 percent is calculated by multiplying the total completed substations in HFTD by the sample size. Periodic review has yet to inform any changes or enhancements to the inspection program or training procedures.

8.5.4.3 EQUIPMENT MAINTENANCE AND REPAIR

QA/QC of Corrective Maintenance Program (WMP.1434)

The number of single inspection failures is divided by the total number of inspections performed to determine the failure rate for this audit process. The target pass rate for these inspections is set at 90 percent.

8.5.5 OTHER METRICS

8.5.5.1 GRID DESIGN AND SYSTEM HARDENING

QA/QC of Grid Hardening: Combined Covered Conductor (WMP.455), Strategic Undergrounding (WMP.473), Distribution Overhead System Hardening (WMP.475), Transmission Overhead Hardening (WMP.543), Transmission Overhead Hardening (Distribution Underbuild) (WMP.545), Advanced Protection (WMP.463), Early Fault Detection (WMP.1195), Strategic Pole Replacement Program (WMP.1189), and PSPS Sectionalizing Enhancements (WMP.461)

Several key performance indicators are used to evaluate the effectiveness of QA and QC programs and procedures, such as Average Non-Critical Findings per Structure Location and Average Priority or Emergency Findings per Structure/Location.

These metrics are quantified quarterly and categorized by construction team to identify trends and common findings and to drive continuous improvement.

8.5.5.2 ASSET INSPECTIONS

QA/QC of Transmission Inspections (WMP.1191)

This program does not use additional metrics to address effectiveness.

QA/QC of Distribution Detailed Inspections (WMP.491)

This program does not use additional metrics to address effectiveness.

QA/QC of Risk-Informed Drone Inspections (WMP.1192)

This program does not use additional metrics to address effectiveness.

QA/QC of Wood Pole Intrusive Inspections (Transmission and Distribution) (WMP.1193)

This program does not use additional metrics to address effectiveness.

QA/QC of Substation Inspections (WMP.1194)

This program does not use additional metrics to address effectiveness.

8.5.5.3 EQUIPMENT MAINTENANCE AND REPAIR

QA/QC of Corrective Maintenance Program (WMP.1434)

This program does not use additional metrics to address effectiveness.

8.5.6 DOCUMENTATION OF FINDINGS

8.5.6.1 GRID DESIGN AND SYSTEM HARDENING

QA/QC of Grid Hardening: Combined Covered Conductor (WMP.455), Strategic Undergrounding (WMP.473), Distribution Overhead System Hardening (WMP.475), Transmission Overhead Hardening (WMP.543), Transmission Overhead Hardening (Distribution Underbuild) (WMP.545), Advanced Protection (WMP.463), Early Fault Detection (WMP.1195), Strategic Pole Replacement Program (WMP.1189), and PSPS Sectionalizing Enhancements (WMP.461)

One important quality control measure for grid hardening and design is the post-construction inspection due diligence, as defined in the Portfolio & Project Management Quality Assurance & Quality Control Plan.

Within this process, qualified company representatives inspect the as-built facility for compliance to project documents, code, standards, and specifications. If non-conformities (i.e., findings) are identified during the inspection, a post-construction inspection report (i.e., punchlist) is created and distributed to the appropriate stakeholders for remediation.

Data analysis is performed to quantify inspections performed, issues identified, and their severity level (repair deadline). These metrics are quantified quarterly and categorized by construction team to identify trends, common findings, and drive continuous improvement.

8.5.6.2 ASSET INSPECTIONS

QA/QC of Transmission Inspections (WMP.1191)

SDG&E does not directly track the number of specific findings for QA/QC of transmission inspections. Refer to Section 8.5.2 QA and QC Procedures.

QA/QC of Distribution Detailed Inspections (WMP.491)

Any new or modified findings are reviewed with the inspector and supervisor for validation and then input into the work management system for repair within established compliance timeframes. The audit results are collected to allow for tracking and reporting. Trends are monitored and trainings are delivered either individually or through annual and/or ad hoc refresher trainings as appropriate.

The audit records include the Facility ID, the auditor's name, the date audited, and the results. Audit findings that are not considered potential fire or safety issues are documented and feedback is provided to the inspector and their supervisor but are not considered a fail of the inspection audit and are not reported to OEIS in SDG&E's quarterly data report (QDR).

QA/QC of Risk-Informed Drone Inspections (WMP.1192)

Any confirmed discrepancies identified during the desktop review or as a result of the machine learning model are added to the final inspection results sent to the work management system. Discrepancies are discussed with the inspector and/or inspection team, as appropriate, during regular team meetings. Trends are tracked and updates to inspection requirements are incorporated into initial and refresher training materials as needed.

QA/QC of Wood Pole Intrusive Inspections (Transmission and Distribution) (WMP.1193)

Audit results are reviewed by the inspection manager and confirmed results are shared with the intrusive inspectors and leadership. Work is reissued to intrusive inspectors when discrepancies are identified, and corrections are performed within 2 weeks of the finding. Trending discrepancies are identified and addressed with root cause investigations and field visits.

QA/QC of Substation Inspections (WMP.1194)

The Construction Supervisor documents the completion of the review and any noted deficiencies in a maintenance order for the relevant substation. The documentation includes the route, date, substation name, inspector name, and a checklist of items reviewed. The deficiencies are noted on a form that resides in the maintenance order. If any discrepancies are found, the Construction Supervisor conducts a near real-time training with inspectors including an example of the deficiency followed by a display of the correct course of action.

8.5.6.3 EQUIPMENT MAINTENANCE AND REPAIR

QA/QC of Corrective Maintenance Program (WMP.1434)

Audit results are documented and include the Facility ID, auditor, date of audit, inspection finding, corrective action, and any nonconformance in the corrective action. Audit results are categorized based on severity (i.e. incomplete work, potential fire or safety finding, non-conformance with SDG&E standard, deviation from engineering design, or non-safety related non-conformance with GO 95) and reviewed with Construction Supervisors, Construction Managers, and District Managers on a quarterly basis. Trends are documented and training is conducted as appropriate.

8.5.7 CHANGES TO QA AND QC SINCE LAST WMP AND PLANNED IMPROVEMENTS

8.5.7.1 GRID DESIGN AND SYSTEM HARDENING

QA/QC of Grid Hardening: Combined Covered Conductor (WMP.455), Strategic Undergrounding (WMP.473), Distribution Overhead System Hardening (WMP.475), Transmission Overhead Hardening (WMP.543), Transmission Overhead Hardening (Distribution Underbuild) (WMP.545), Advanced Protection (WMP.463), Early Fault Detection (WMP.1195), Strategic Pole Replacement Program (WMP.1189), and PSPS Sectionalizing Enhancements (WMP.461)

During the 2023 to 2025 WMP cycle, work began to update internal documents (e.g., Portfolio & Project Management Quality Assurance & Quality Control Plan) to reflect the latest processes and procedures related to post-construction inspection quality assurance and quality control practices. These enhancements are anticipated to be incorporated into QA and QC documentation prior to 2026.

During the 2026 to 2028 WMP cycle, additional QC measures for the Strategic Undergrounding Cable & Connector jobs will be implemented to align with overhead QC processes and procedures. This change will promote compliance with applicable standards, specifications, and codes and create a centralized imagery repository of underground as-built imagery for future use cases.

8.5.7.2 ASSET INSPECTIONS

QA/QC of Transmission Inspections (WMP.1191)

No changes were made to QA/QC of transmission inspections since the last WMP submission and there are no planned improvements for the 2026 to 2028 WMP cycle.

QA/QC of Distribution Detailed Inspections (WMP.491)

Prior to 2025, this program was comprised of District Supervisors performing an audit of 1.5 percent of total inspections completed in the prior quarter. Because this percentage included inspections in both HFTD and non-HFTD areas, the percentage of audits that occurred within the HFTD was less than 1.5 percent on a quarterly basis. Starting in 2025, the program was modified to include two new audit processes, reduce the timeframe between the inspection and the audit and increase the percentage of audits performed. Trends, including pass/fail results, continue to be monitored and inform corrective actions, such as retraining. For details on changes to this program see ACI SDGE-25U-07 in Appendix D.

QA/QC of Risk-Informed Drone Inspections (WMP.1192)

Starting in 2025, the audit sample size for the Inspection Supervisor's desktop review is 15 percent. This modification was implemented based on high pass rate trends observed over the past 2 years and due to the maturity of machine learning damage detection models. The audit sample rate of 100 percent is maintained for images processed through the damage detection models. If the success rate falls below the target, the audit sample size will be reevaluated.

QA/QC of Wood Pole Intrusive Inspections (Transmission and Distribution) (WMP.1193)

Starting in 2025, the audit sample size for wood pole intrusive inspections was based on the pass rate trends. If audit results in any one quarter fall below a 95 percent pass rate, then the audit sample size is maintained at 10 percent in the subsequent quarter. If the pass rate meets or exceeds 95 percent, then the audit sample size is reduced to 5 percent for the following quarter.

QA/QC of Substation Inspections (WMP.1194)

No changes were made to QA/QC of substation inspections since the 2023-2025 Base WMP and there are no future improvements planned.

8.5.7.3 EQUIPMENT MAINTENANCE AND REPAIR

QA/QC of Corrective Maintenance Program (WMP.1434)

Starting in 2026, SDG&E will perform audits of 1 percent potential fire and safety issues repaired within the HFTD. This change will increase the number of audits performed on higher-risk issues in the highest-risk areas of the service territory.

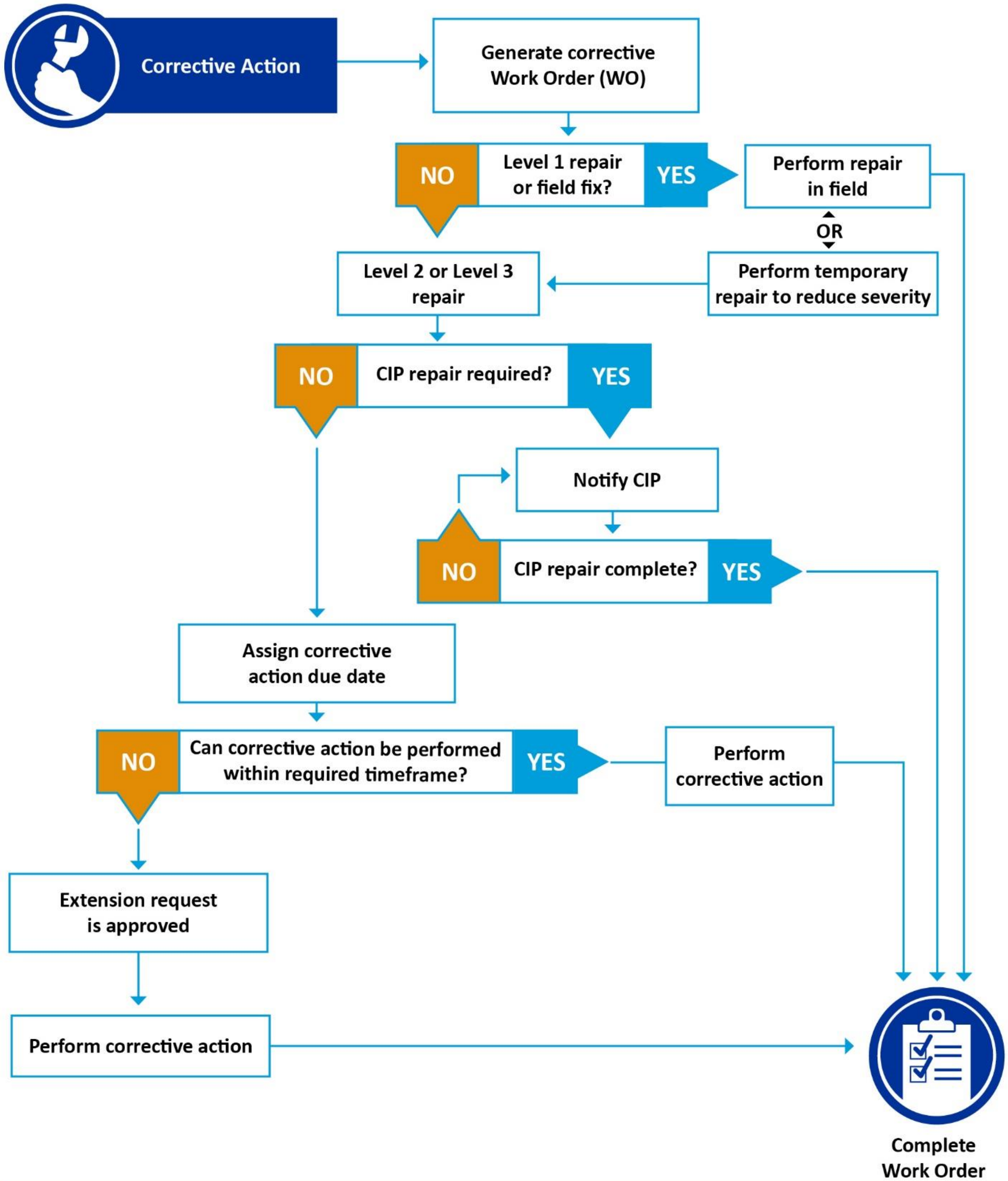
8.6 WORK ORDERS

8.6.1 PROCEDURES DOCUMENTING THE WORK ORDER PROCESS

GO 95 defines the requirements for corrective maintenance for transmission and distribution assets. SDG&E's Corrective Maintenance Program (WMP.1433) is managed through initiation, prioritization, and completion of corrective work orders. Practice and procedure documents related to the management of work orders include assigning appropriate compliance deadlines, prioritizing emergency and potential hazard issues, cancelling and completing work orders, deferring work orders, and managing access issues with customers. SDG&E adheres to all GO regulations for addressing corrective maintenance within required timeframes and, when applicable, exceeds requirements based on severity level and region prioritization. Targets for the 2026 to 2028 WMP cycle are provided in OEIS Table 8-1.

Figure 8-12 outlines the CMP process beginning with initiation of corrective repairs resulting from inspections.

Figure 8-12: Open Work Orders: Corrective Maintenance



8.6.2 PLAN FOR CORRECTING PAST DUE WORK ORDERS, IF APPLICABLE

Past due work orders as of December 31, 2024, are all are non-emergency or deferred work under reasonable circumstances per GO 95, primarily due to permitting delays and access issues. Open work orders are reviewed and prioritized monthly to minimize the need for deferrals. When necessary, deferred work in the HFTD is reassessed to determine if any issues have worsened or pose an imminent threat that requires immediate action.

8.6.3 PRIORITIZATION OF WORK ORDERS

Several factors are considered when prioritizing work orders including the severity of the damage, whether the issue is a potential safety or fire hazard, and the region the work is in (i.e. Tier 3, Tier 2, non-HFTD) Severity levels are determined at the time of the inspection, which corresponds to GO 95, Rule 18 priority levels that dictate the timeframe for remediation. See Section 8.4.2 Timeframe for Remediation.

In 2025, SDG&E will begin to assess open work orders with a risk-based approach to determine the impact that open conditions may have on customers impacted by potential PSPS de-energizations. Wind speed thresholds during a PSPS de-energization are influenced by open conditions on the grid, and in some cases may be reduced if warranted. For example, where the wind speed threshold for a healthy asset might be 45 miles per hour, it could be reduced to 35 miles per hour if there is damage present. Thus, SDG&E will begin to assess whether accelerating open work orders will decrease the number of potential customers impacted by PSPS de-energizations. See Section 13.3 Discontinued Activities and OEIS Table 13-1 for additional discussion.

8.6.4 PROCEDURE FOR MONITORING/REINSPECTING OPEN WORK ORDERS

For transmission inspection programs, TCM Maintenance Practice TCM 807 vG; Sections 5, 6.1 and 6.2 provide procedures for monitoring and/or re-inspecting open work orders. Additionally, patrollers reference previously submitted conditions in their mobile application and are provided with an open condition report when inspecting a tieline.

For distribution inspection programs with deferred work orders, reassessments may be performed in the HFTD to identify whether any issues have worsened or present an imminent threat that requires additional action. In addition, open corrective work orders may be reviewed prior to a weather event, such as a RFW, to reevaluate the severity of the issue and determine if the repair should be prioritized for completion prior to the event.

In some cases, the work order completion may be deferred due to factors such as permitting or environmental compliance. For example, Caltrans permit approvals typically take 6 to 12 months. If a deferral is needed, findings are reassessed to determine whether the severity of the issue does not support a delay in completion of the work order. Supervisors then monitor these locations and collaborate with Caltrans or other entities to expedite work order completion through an emergency process to mitigate any potential safety issues.

When applicable, patrols of open work orders related to potential safety or fire hazards are performed before and after severe weather events to re-verify the status of the issue, and to expedite repairs of any items that could pose a safety or fire hazard during the weather event.

8.6.5 OPEN WORK ORDER TRENDS

Deferred work orders are reviewed on a case-by-case basis to determine whether the delay in completion of the work order is reasonable and in compliance with GO 95, Rule 18 requirements. Once approved, deferrals are reviewed on a minimum of a 6-month basis until resolved. Overall, 4 to 5 percent of work orders have been deferred on average, with an increase occurring in 2024 primarily due to material delays and manpower shortages (see Figure 8-13). However, 94 percent of past due work orders are resolved within 6 months of the original due date and 100 percent are resolved within approximately 1 year (see Figure 8-14).

Deferrals are primarily needed due to permitting delays and customer access issues. Additionally, weather (e.g. RFW or storm event) and outage scheduling may impact the ability to complete work orders within the initial timeframe.

The types of findings in the backlog vary from potential safety and reliability items, such as damaged poles or crossarms, to more minor compliance issues such as signage. For distribution, the equipment types within the backlog include damaged poles, hardware, transformers, and switches. The increase in open work orders in 2024 was mainly due to supply chain issues with steel poles, transformers and anchor rod extensions, as well as resource issues related to line crews deliveries.

SDG&E strives to improve efficiency associated with repair work without compromising safety. For example, if a pole is scoped within another planned project or initiative, such as the Strategic Undergrounding Program, the work order may be deferred to reduce the potential for redundancy within the planned project or initiative. Similarly, if work is identified on the same circuit segment and outages can be minimized without compromising safety, work orders may be consolidated to minimize impacts to customers and decrease crew and mobilization costs.

Open work orders are regularly monitored, and findings are reassessed to determine whether the severity of the issue supports a deferral. For example, Caltrans permits typically take 6 to 12 months to be approved. SDG&E Construction Supervisors monitor these locations and collaborate with Caltrans to expedite work order completion through an emergency process to mitigate any potential safety issues.

When applicable, patrols of open work orders related to potential safety or fire hazards are performed before and after severe weather events to validate the issue hasn't worsened and to expedite repairs of any items that could pose a safety or fire hazard during a weather event.

If a reassessment determines that the condition has worsened and/or poses an imminent safety threat, then the prioritization of the work order is revaluated, and the work order is either expedited or a temporary repair is performed.

Figure 8-13: Annual Percentage of Deferred Work Orders

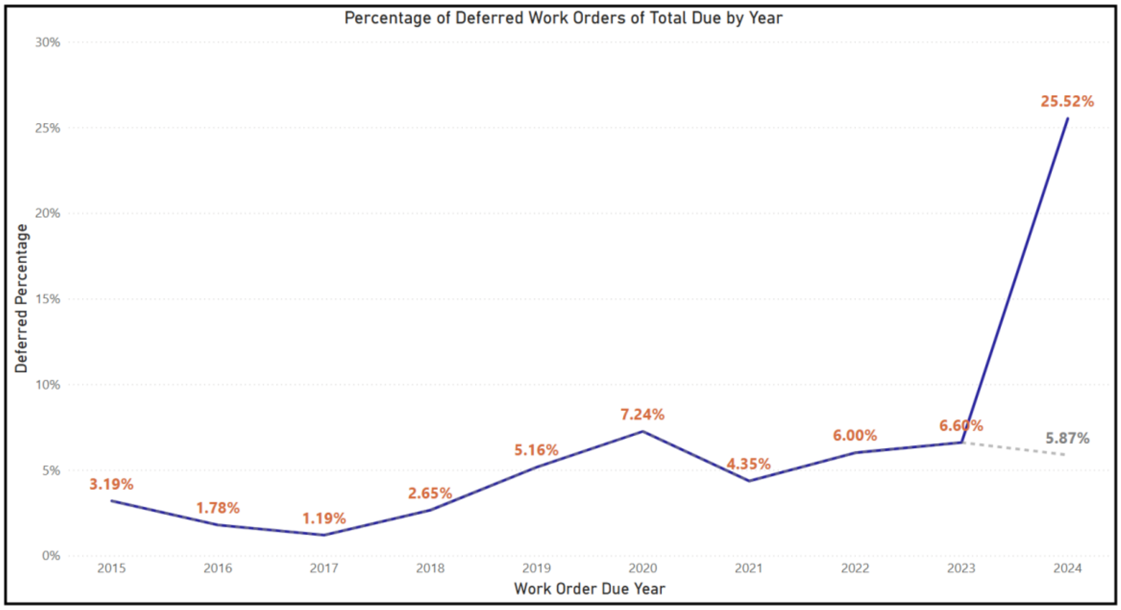
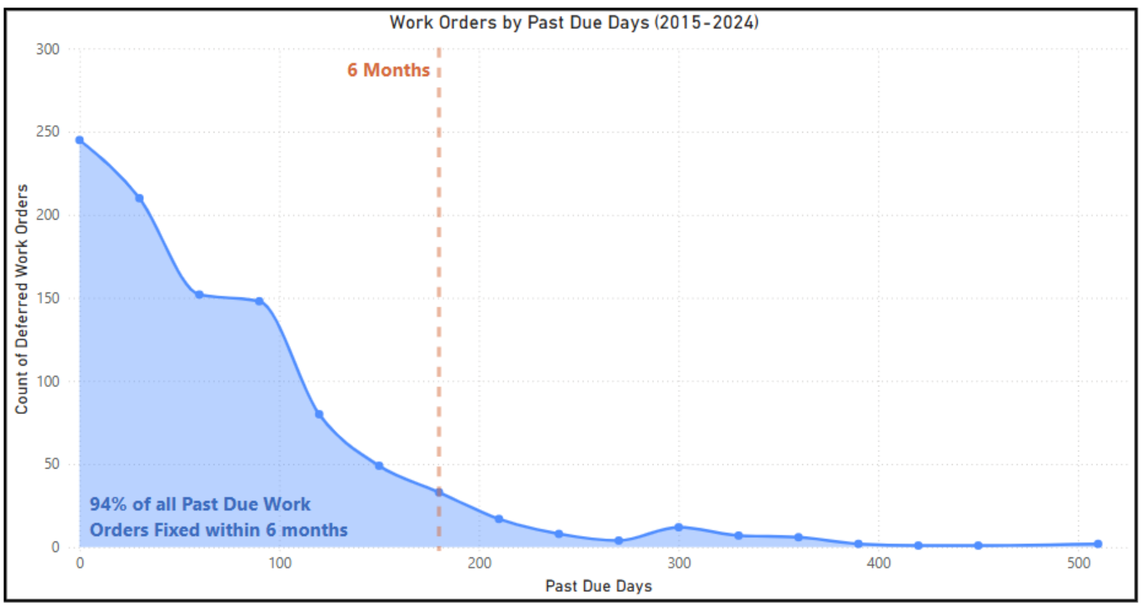


Figure 8-14: Work Orders by Number of Days Past Due



OEIS Table 8-5: Number of Past Due Asset Work Orders Categorized by Age

HTFD Area	0-30 Days	31-90 Days	91-180 Days	181+ Days
Transmission HFTD Tier 2	0	0	0	0
Transmission HFTD Tier 3	0	0	0	0
Distribution HFTD Tier 2	0	9	10	7
Distribution HFTD Tier 3	21	18	26	3

OEIS Table 8-6: Number of Past Due Asset Work Orders Categorized by Age for Priority Levels

Priority Level	0-30 Days	31-90 Days	91-180 Days	181+ Days
Priority 1	0	0	0	0
Priority 2	21	27	36	10
Priority 3	0	0	0	0

8.7 GRID OPERATIONS AND PROCEDURES

8.7.1 EQUIPMENT SETTINGS TO REDUCE WILDFIRE RISK

8.7.1.1 PROTECTIVE EQUIPMENT AND DEVICE SETTINGS (WMP.991)

Overview

Advanced SGF relay settings are employed to detect high impedance ground faults on the electric distribution system to prevent potential ignitions. Additionally, during periods of extreme fire potential, SDG&E enables SRP settings in affected areas to limit fault energy in the event of a fault on the electric distribution system. Operating procedures dictate the use of SRP settings, recloser settings, and general service restoration requirements in the HFTD depending on wildfire risk levels. SGF settings are employed year-round on the overhead electric distribution system. In addition, SRP settings are enabled when the FPI has a rating of Extreme or when weather conditions may warrant a PSPS de-energization.

Analysis of Reliability and Safety Impacts

The purpose of SRP and SGF protective settings is to minimize or eliminate the chance of an ignition in the event of a fault on electric lines. SDG&E reviews and adjusts these settings annually to improve reliability where possible. SRP is implemented in a risk-based fashion during periods of high wildfire risk, which is approximately 7 percent of the year.

OEIS Table 8-7: Top Ten Impacted Circuits from Changes to PEDS in the Past 3 Years

Circuit/Circuit Segment ID	Circuit/Circuit Segment Name	Circuit Length Overhead Circuit Miles	Number of Outages in Past 3 Years	Cumulative Outage Duration	Cumulative Number of Customers Impacted by Outages	Cumulative Customer Minutes*
237	C237	75	3	1,706	3,410	861,520
520	C520	97	1	1,008	541	543,517
1233	C1233	28	3	1,609	878	465,162
442	C442	37	2	797	1,374	363,757
288	C288	2	1	853	895	263,556
222	C222	97	1	775	1,025	243,195
230	C230	42	1	352	961	240,520
448	C448	79	1	445	1,026	191,595

Circuit/Circuit Segment ID	Circuit/Circuit Segment Name	Circuit Length Overhead Circuit Miles	Number of Outages in Past 3 Years	Cumulative Outage Duration	Cumulative Number of Customers Impacted by Outages	Cumulative Customer Minutes*
235	C235	14	1	248	731	181,288
599	C599	39	1	63	2,458	143,473
212	C212	114	1	263	518	124,838
859	C859	7	1	211	751	120,517
73	C73	58	1	224	495	105,478
444	C444	43	1	360	294	101,670
356	C356	38	1	230	1	230

**This column was added by SDG&E and is not in the 2026-2028 Wildfire Mitigation Plan Technical Guidelines*

Percent of Time Enabled in the Past 3 years

Over the past 3 years, SRP settings were enabled on a total of 84 days across select circuit segments based on weather conditions. This resulted in settings being enabled for an average of 7.7 percent, covering 129 circuits and accounting for 3,049 distribution overhead miles in the HFTD during those days.

Estimate of Effectiveness of Reducing Wildfire Risk

During days with an FPI rating of Extreme or during RFWs, sensitive relay settings are enabled on reclosers within the HFTD and coastal circuits with high fire risk. Sensitive relay settings improve the sensitivity of fault detection and the speed at which faults are cleared. They also reduce the energy of the fault as much as possible, consequently reducing the heat generated by the fault and resulting in less ignitions.

An efficacy study was completed to determine the impact of sensitive relay settings at reducing ignitions from risk events. The efficacy study demonstrated a reduction in ignition percentage from 2.9 percent to 0 percent (see Appendix G for calculations). From 2015 to 2023, there were zero ignitions by primary faults downstream of devices with sensitive relay settings enabled.

8.7.1.2 AUTOMATIC RECLOSER SETTINGS (WMP.1018)

Overview

Reclosing in electrical infrastructure refers to the automatic process where a circuit breaker or switch (recloser), trips open due to a fault or disturbance and is automatically closed again after a programmed delay. If the fault was temporary, power is restored. If the fault persists, the circuit breaker or switch (recloser) will trip open again and then attempt to close again per its settings. Circuit breakers and switches are typically set to reclose twice before locking out and preventing any more automatic closes. The goal is to automatically restore power to the system without human intervention, particularly if the fault was temporary or a momentary event, like a lightning strike or a tree branch temporarily touching the power line.

Given the potential of an unsafe restoration of power resulting in an ignition, reclosing settings have been turned off in the HFTD since 2017. Manual reclosing without patrol is performed only when the FPI rating is Normal. SDG&E does not enable automatic recloser settings in the HFTD, and 100 percent of overhead lines have reclosing capabilities. Reclosing settings are not changed in response to off-normal events.

OEIS Table 8-8: Top Ten Impacted Circuits from Changes to PEDS in the Past 3 Years

Circuit/Circuit Segment ID Recloser	Number of Outages in Past 3 Years	Cumulative Outage Duration	Cumulative Number of Customers Impacted by Outages	Cumulative Customer Minutes*
364	9	1,184	60,876	4,606,674
237	10	3,517	15,173	2,190,224
322	2	438	16,818	2,181,048
415	5	3,104	13,164	2,002,316
325	4	1,789	16,689	1,783,980
214	17	7,410	6,603	1,460,141
RA2	3	1,062	2,918	1,385,607
520	12	3,653	11,088	1,258,592
781	5	1,238	25,936	1,212,009
286	4	1,216	20,283	1,211,621

**This column was added by SDG&E and is not in the 2026-2028 Wildfire Mitigation Plan Technical Guidelines*

Percent of Time Enabled in the Past 3 years

Throughout the past 3 years, recloser settings were enabled in 47 percent of the non-HFTD portion of the service territory, spanning a total of 2,940 miles annually.

Estimate of Effectiveness of Reducing Wildfire Risk

Prior to 2017, reclosing in the HFTD was disabled on days with an FPI rating of Elevated or Extreme. After 2017, reclosing was disabled in the HFTD year-round regardless of the FPI rating to further reduce the risk of ignitions. An efficacy study of 2019 to 2024 data was conducted to understand the effectiveness of recloser protocols. The study reviewed historical risk events that were isolated by reclosers to measure the effectiveness of disabling reclosing at reducing faults and ignitions over the last 5 years. By measuring faults on the system by HFTD Tier and weather condition, the number of additional faults avoided by turning reclosing off under certain conditions was estimated. The faults avoided were then multiplied by the relevant HFTD ignition rate to estimate the number of ignitions avoided per year.

The results show that disabling reclosing reduces ignitions by an average of 4.9 per year in Tier 2 of the HFTD and 4.7 per year in Tier 3 of the HFTD (see SDGE Table 8-6, SDGE Table 8-7, and SDGE Table 8-8 for calculations). Figure 8-15 shows the number of actual faults with reclosing operation and an estimation of additional faults avoided by turning reclosing off under certain conditions.

SDGE Table 8-6: Faults by HFTD Tier and Weather Condition

HFTD Tier	FPI Rating	2019	2020	2021	2022	2023	5-Year Average
Non-HFTD	Normal	151	137	188	149	165	158
Non-HFTD	Elevated	23	59	53	29	14	36
Non-HFTD	Extreme	1	3	0	0	0	1
Tier 2	Normal	51	41	38	36	55	44
Tier 2	Elevated	39	38	47	27	11	32
Tier 2	Extreme	2	1	0	5	0	2
Tier 3	Normal	43	31	45	24	40	37
Tier 3	Elevated	41	57	31	19	15	33
Tier 3	Extreme	1	0	0	2	0	1

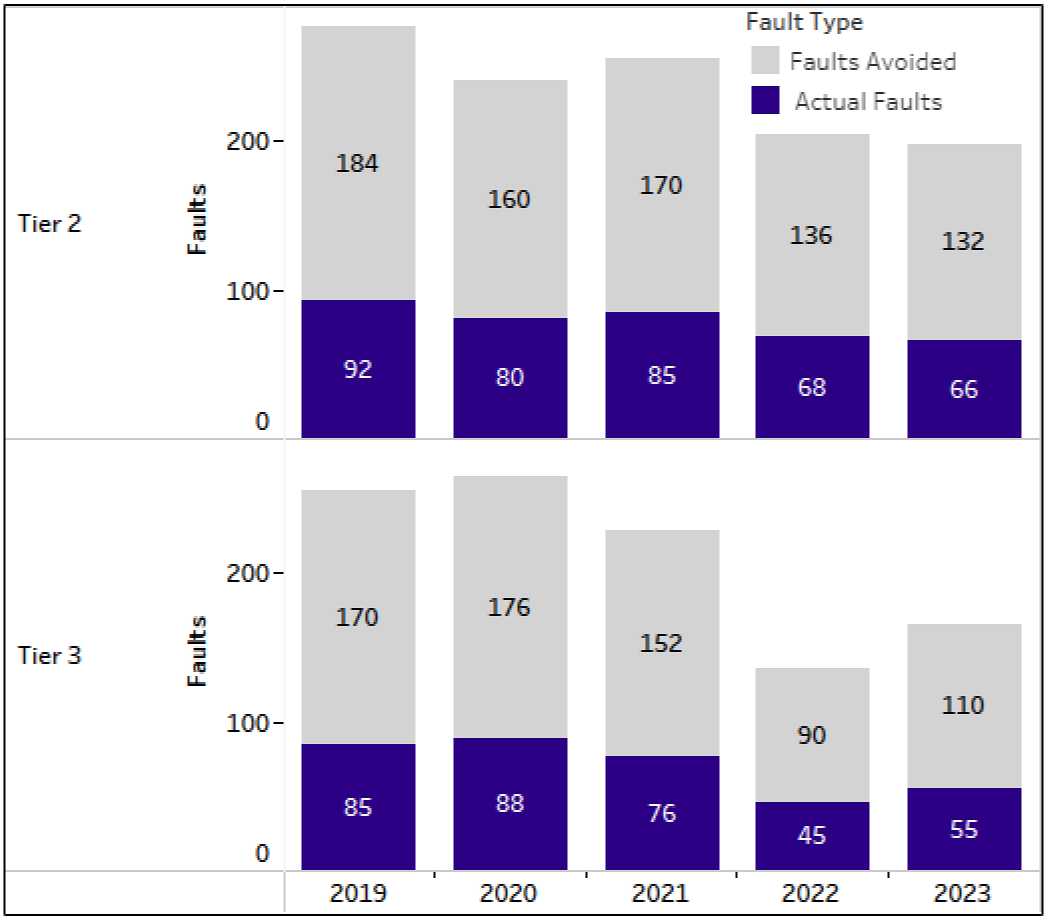
SDGE Table 8-7: 5-Year Average Ignition Rate

Tier	Normal	Elevated	Extreme
Tier 2	2.26%	3.37%	22.22%
Tier 3	1.37%	5.38%	14.29%

SDGE Table 8-8: Estimated Faults and Ignitions Avoided

Avoidance Type	HFTD Tier	FPI Rating	2019	2020	2021	2022	2023	5-Year Average
Estimated Faults Avoided	Tier 2	Normal	102	82	76	72	110	88.4
Estimated Faults Avoided	Tier 2	Elevated	78	76	94	54	22	64.8
Estimated Faults Avoided	Tier 2	Extreme	4	2	0	10	0	3.2
Estimated Faults Avoided	Tier 3	Normal	86	62	90	48	80	73.2
Estimated Faults Avoided	Tier 3	Elevated	82	114	62	38	30	65.2
Estimated Faults Avoided	Tier 3	Extreme	2	0	0	4	0	1.2
Estimated Ignitions Avoided	Tier 2	n/a	5.8	4.9	4.9	5.7	3.2	4.9
Estimated Ignitions Avoided	Tier 3	n/a	5.9	7	4.6	3.3	2.7	4.7
Estimated Ignitions Avoided	Total	n/a	11.7	11.8	9.5	8.9	5.9	9.6

Figure 8-15: Results of Reclosure Protocols in Fault Avoidance



8.7.1.3 SETTINGS OF OTHER EMERGING TECHNOLOGIES

SDG&E does not employ Rapid Earth Fault Current Limiters. SDG&E performed a Rapid Earth Fault Current Limiter (REFCL) study from 2020 to 2021. The purpose of the study was to identify the requirements, costs, and benefits of implementing a REFCL scheme at a single transmission-distribution substation feeding 3 distribution circuits in Tier 3. Results of the study showed that the cost to implement REFCL was too significant considering the need for distribution circuit and substation rebuilds. See SDG&E's 2022 WMP Update, Section 4.4.2.10 for the full study.[51]

8.7.2 GRID RESPONSE PROCEDURES AND NOTIFICATIONS

Multiple technologies are deployed to narrow the location of detected issues on the system, including the use of SCADA and Wireless Fault Indicators. If an issue is intermittent and not found during patrol and subsequent service restoration, an after-event fault analysis is performed to investigate potential fault locations in order to resolve the issue.

Priorities are based on customer impacts unless a fire ignition or other safety issue is present, in which case those incidents would take priority. If no safety issue is present, critical public infrastructure is

[51] SDG&E's 2022 WMP Update is available at: https://www.sdge.com/2022-wildfire-mitigation-plan

given the highest priority, after which resources are deployed to the incidents with the largest customer impacts.

SDG&E has multiple channels for detecting wildfire ignitions. Fire Coordination notifies appropriate personnel of incidents that may impact them in the service territory and Electric Troubleshooters are dispatched to any outage on the system detected through customer calls or advanced metering alarms.

The camera network is used to monitor the service territory and provide situational awareness year-round, with cameras panning to specific areas of interest during PSPS de-energizations or extreme weather events (see Section 10.4.1.2 Cameras (WMP.1343)). During the PSPS restoration phase, Contract Fire Resources (CFRs) are coupled with SDG&E crews as each circuit segment is restored to prevent ignitions and mitigate any ignition that occurs. All fire activities are coordinated with first responders and training is performed throughout the year to make sure there is efficient coordination during real world incidents.

SDG&E stages resources to minimize response times based on wildfire risk levels. During days with an FPI rating of Extreme or conditions that generally warrant a PSPS de-energization, staffing of emergency responders is increased around the clock and staff is placed in the areas of highest risk to minimize response times.

8.7.3 PERSONNEL WORK PROCEDURES AND TRAINING IN CONDITIONS OF ELEVATED FIRE RISK

8.7.3.1 WORK PROCEDURES DURING DIFFERENT LEVELS OF WILDFIRE RISK

Work activities and associated fire mitigations throughout the service territory are designated for specific FPI ratings (e.g., Normal, Elevated, Extreme, or RFW) as defined in ESP 113.1 SDG&E Operations and Maintenance Wildland Fire Prevention Plan. As the fire potential increases in severity, activities that present an increased risk of ignition have additional mitigation requirements. Where risk cannot be mitigated, work activity might cease. All field personnel are required to be trained on SDG&E's fire prevention procedures annually. Fire prevention and safety are also discussed at pre-job briefings and are built into standard work practices. These standard practices are not exclusive to the HFTD and are implemented in all areas of the service territory where at-risk activities are performed adjacent to wildland fuels. The current and predicted FPI are publicly available on the SDG&E Weather app and through daily communications.

8.7.3.2 PROCEDURES FOR DEPLOYMENT OF FIRE PREVENTION AND IGNITION MITIGATION RESOURCES AND EQUIPMENT

Procedures and routine practices for working in areas adjacent to wildland fuels are detailed in ESP 113.1. Risk levels are determined by the FPI rating for that zone of the service territory.

The following summarizes the work activity guidelines for each Operating Condition:

- Normal Condition: Normal operating procedures are followed with baseline tools present at work sites, appropriate buffers between heat sources and flammable fuels, and equipment meeting appropriate standards.

- Elevated Condition: Certain at-risk work activities may require additional mitigation measures in order to proceed with work. Additional mitigations may include but are not limited to a Dedicated Fire Patrol, additional water on site, and/or barriers between work and vegetation.
- Extreme or RFW Condition: Most overhead work activities will cease except where not performing the work would create a greater risk than doing so. In those cases where at-risk work needs to be performed, a Fire Coordinator is consulted, and additional mitigation steps are implemented. Status of work, ceased or continued, is documented.

Field personnel are trained annually in ESP 113.1, which governs work practices during different wildfire risk levels. Field personnel and operating teams receive daily notifications or more frequent notifications when operating conditions change. Additionally, the current FPI is made available via a weather application and website.

8.7.3.2.1 Procedures Regarding Deployment of Fire Mitigation Resources and Equipment (WMP.518)

Worksites are required to have increasing levels of wildfire prevention mitigation based on the activity being performed and the FPI rating as stated in ESP 113.1. This could be as simple as carrying wildfire suppression tools to having a dedicated fire resource observing work.

When work activities reach a level of fire risk where a dedicated resource is required, SDG&E and contract personnel utilize a qualified fire resource with specific training and experience (listed in ESP 113.1). While these resources can be ordered throughout the year, SDG&E takes the proactive step of supplying field crews with 12 to 17 daily resources once the fire environment and FPI begin to indicate elevated risk. This daily staffing changes from year to year but typically runs from June through the end of November. SDG&E also works to align with the staffing of seasonal resources of the local, state, and federal agencies in the service territory.

These qualified resources, referred to as CFRs, are staffed by two personnel that have the appropriate amount of training, water, and tools to meet the needs of the work activity. The use of CFRs is not limited to the HFTD as ESP 113.1 requires a dedicated fire patrol for specific activities when they are performed adjacent to wildland fuels and there is elevated risk present. The primary missions of CFRs are fire prevention and compliance. Secondarily, they can take action to mitigate an ignition and communicate with fire agencies should one occur. At-risk activities for which a dedicated fire patrol is utilized include hot work, vegetation clearing, and energized switching.

During periods of extreme fire potential, regular work with at risk activities is cancelled. CFRs are deployed with SDG&E personnel for emergency work and play an important role in fire prevention during the PSPS de-energization and restoration process.

8.7.3.2.2 Aviation Firefighting Program (WMP.557)

The Aviation Firefighting Program focuses on reducing the consequences of wildfires through suppression of fire spread. Under certain conditions, a wildfire that is not suppressed may grow rapidly and uncontrollably, endangering public safety and electrical infrastructure. Fire agencies could divert local aerial resources to fight wildfires outside of the service territory, leaving the service territory with limited or no aerial firefighting response capabilities. To mitigate this risk, the aviation firefighting program serves as a wildfire suppression resource that is always available in the region.

Resources consist of two Sikorsky UH-60 Blackhawk helitankers, which are Type 1 firefighting helicopters, defined as carrying over 700 gallons of water to fight fires. The Blackhawks are capable of dropping up to 850 gallons of water. Additionally, their hardware is configured for night vision device flight and they are capable of night firefighting with the appropriate crew, training, and CAL FIRE support. In 2022 a Sikorsky S-70M was purchased, which is being outfitted for firefighting with a 1,000-gallon tank and is expected to be in service in 2026.

SDG&E has agreements with the County of San Diego, CAL FIRE, and the Orange County Fire Authority for aerial firefighting within the service territory. Dispatch of aviation firefighting assets is performed through CAL FIRE and these assets support the initial attack strategy to contain wildfires to less than 10 acres. SDG&E employs flight operations staff to assist in dispatching aerial assets 365 days per year, throughout the service territory. This allows the assets to be launched rapidly once dispatched by CAL FIRE.

The effectiveness of the Aviation Firefighting Program will continue to be analyzed using internal and external data. The current subject matter expert consensus is that the program reduces overall wildfire consequence of utility-associated ignitions, and therefore wildfire risk, by approximately 4 percent; based on the knowledge of the equipment and operations, coupled with anecdotal evidence of recent history. Importantly, this 4 percent is only the measure of the reduction of utility-associated wildfires, and the overall benefit of the program to the community is likely much larger.

8.8 WORKFORCE PLANNING

SDGE Table 8-9: Workforce Planning, Asset Inspections

Asset Type	Worker Title	Minimum Qualifications for Target Role	Applicable Certifications	Reference to Electrical Corporation Training/ Qualification Programs
Distribution	Line Inspector	Successful completion of 6-month Overhead Detailed Inspection training program; IBEW status in good standing; Valid California driver's license	Overhead and underground Inspection Training	Overhead CMP Detailed Inspection Training (STU EL310)
Distribution	Distribution Lineman	Journeyman Lineman having completed an accredited apprenticeship program; International Brotherhood of Electrical Workers (IBEW) Journeyman Lineman status in good standing; Class A California Driver's License	Qualified electrical worker (QEW), Overhead and/or Underground Inspection Training	Line Assistant and Apprenticeship Program
Distribution	Fault Finding Specialist	Journeyman Lineman having completed an accredited apprenticeship program; IBEW Journeyman Lineman status in good standing; 4-week Relief Fault Finder (RFF)	QEW, Overhead and/or Underground Inspection Training	Line Assistant and Apprenticeship Program RFF Course

Asset Type	Worker Title	Minimum Qualifications for Target Role	Applicable Certifications	Reference to Electrical Corporation Training/ Qualification Programs
		class completed and associated written and practical exams passed		
Distribution	Electric Troubleshooter	Journeyman Lineman having completed an accredited apprenticeship program; IBEW Journeyman Lineman status in good standing; Complete 7-week Relief Trouble Shooter (RETS) class and pass written and practical exams	QEW, Overhead and/or Underground Inspection Training	Line Assistant and Apprenticeship Program
Distribution	Working Foreman	Journeyman Lineman having completed an accredited apprenticeship program; IBEW Journeyman Lineman status in good standing; 6 months' experience in both overhead and underground electric during the past three years; Construction Standards and Practices tests passed	QEW, Overhead and/or Underground Inspection Training	Line Assistant and Apprenticeship Program
Distribution	Distribution Construction Supervisor	6+ years construction and maintenance experience	QEW, Overhead and/or Underground Inspection Training	Line Assistant and Apprenticeship Program Essentials of Supervision
Distribution	Inspection and Treatment Foreman	Pesticide handler training; Valid class C driver's license; First aid/CPR qualified	n/a	n/a
Distribution	Auditor	Demonstrated education or experience to audit the work as appropriate. Training on the use of audit software or processes and awareness training on scope of audit and schedule deadlines.	n/a	n/a
Transmission	Transmission Lineman	Journeyman Lineman having completed an accredited apprenticeship program; IBEW Journeyman Lineman status in good standing; Class A California Driver's License	QEW, Overhead and/or Underground Inspection Training	Line Assistant and Apprenticeship Program
Transmission	Transmission Patroller	Journeyman Lineman having completed an accredited apprenticeship program; IBEW Journeyman Lineman status in good standing; Class A California Driver's License; 18 months experience in overhead and underground transmission construction and maintenance within the past 3 years	QEW, Overhead and/or Underground Inspection Training	Line Assistant and Apprenticeship Program
Transmission	Working Foreman-Electric Transmission	Journeyman Lineman having completed an accredited apprenticeship program; IBEW Journeyman Lineman status in good standing; Valid California Class A driver's license; Class A Medical Certificate; 18 months' experience in transmission construction and Energized High Voltage hotline maintenance within the past 5 years	QEW, Overhead and/or Underground Inspection Training	Line Assistant and Apprenticeship Program

Asset Type	Worker Title	Minimum Qualifications for Target Role	Applicable Certifications	Reference to Electrical Corporation Training/ Qualification Programs
Transmission	Thermographer	Part 107 drone license or must obtain within first year; Level I Infrared Certification or must obtain within first year	Thermography certificate; QEW or Electrician	n/a
Transmission	Senior Thermographer	Part 107 drone license or must obtain within first year; Level III Infrared Certification or must obtain within first year	Thermography certificate; QEW or Electrician	n/a
Transmission	Transmission Construction Supervisor	6+ years construction and maintenance experience	QEW, Overhead and/or Underground Inspection Training	Line Assistant and Apprenticeship Program
Transmission	Inspection and Treatment Foreman	Pesticide handler training; Valid class C driver's license; First aid / CPR qualified	n/a	Essentials of Supervision
Substation	Substation Inspector	Substation Electrician Journeyman having completed electrician apprenticeship program; Valid California Class A driver's license	QEW	Electrician Apprenticeship Program
Substation	Substation Construction Supervisor	Journeyman with 5+ years' experience	QEW	Electrician Apprenticeship Program; Essentials of Supervision

SDGE Table 8-10: Workforce Planning, Grid Hardening

Transmission or Distribution	Worker Title	Minimum Qualifications for Target Role	Applicable Certifications	Reference to Electrical Corporation Training/ Qualification Programs
Distribution	Apprentice Lineman	9 months' experience as Line Assistant; Valid California driver's license; Must have held previous position for at least 9 months	No special certification required	Line Assistant and Apprenticeship Program
Distribution	Cable Splicer	Journeyman Lineman	No special certification required	Line Assistant and Apprenticeship Program; Essentials of Supervision
Distribution	Construction Manager-Electric	Bachelor's Degree or equivalent experience; 8 years' experience	No special certification required	Essentials of Supervision
Distribution	Construction Supervisor-Electric	High School Diploma or GED; 6 years' experience; Complete 2-day program at Skills Training Center or complete outside program	No special certification required	Line Assistant and Apprenticeship Program; Essentials of Supervision
Distribution	District Manager	High School Diploma or GED; 10 years' experience	No special certification required	Essentials of Supervision

Transmission or Distribution	Worker Title	Minimum Qualifications for Target Role	Applicable Certifications	Reference to Electrical Corporation Training/ Qualification Programs
Distribution	Electric Troubleshooter	Complete 7-week RETS class and pass written and practical exams	Journeyman Lineman	Line Assistant and Apprenticeship Program; RETS Training
Distribution	Fault Finder	Complete 4-week RFF class and pass written and practical exams	Journeyman Lineman	Line Assistant and Apprenticeship Program; RFF Training
Distribution	Field Construction Advisor (FCA)	Journeyman Lineman	QEW	Line Assistant and Apprenticeship Program
Distribution	Foreman	Journeyman Lineman	QEW	Line Assistant and Apprenticeship Program
Distribution	Foreman (Splicing)	Journeyman Lineman	QEW	Line Assistant and Apprenticeship Program
Distribution	Groundman	n/a	No special certification required	n/a
Distribution	Journeyman Lineman	Journeyman Lineman	QEW	Line Assistant and Apprenticeship Program
Distribution	Line Assistant (non QEW)	Successfully pass Company administered aptitude and skills tests; Valid California Class A driver's license; Pass a DMV physical examination and DOT drug screen; Must have held previous position for at least 9 months	No special certification required	Line Assistant and Apprenticeship Program
Distribution	Distribution Lineman	Complete the minimum 3-year 6000-hour Lineman Apprentice program at the Skills Training Center and assigned Districts; Complete a 3-year, 480-hour college-level program to be qualified to take the Journeyman Lineman's test; Pass the Journeyman Lineman test	QEW	Line Assistant and Apprenticeship Program
Distribution	Working Foreman-Electric Distribution	6 months' experience in both overhead and underground electric during the past 3 years; Valid California Class A driver's license; Class A Medical Certificate; Must have held previous position for at least 9 months	QEW	Line Assistant and Apprenticeship Program
Transmission	Construction Manager-Electric	Bachelor's Degree or equivalent experience; 8 years' experience	QEW	Essentials of Supervision
Transmission	Construction Supervisor-Electric	High School Diploma or GED; 6 years' experience	No special certification required	Line Assistant and Apprenticeship Program; Essentials of Supervision
Transmission	Line Assistant (non QEW)	Successfully pass Company administered aptitude and skills tests; Valid California Class A driver's license; Pass a DMV physical examination and DOT drug screen; Must have held previous position for at least 9 months	No special certification required	Line Assistant and Apprenticeship Program

Transmission or Distribution	Worker Title	Minimum Qualifications for Target Role	Applicable Certifications	Reference to Electrical Corporation Training/ Qualification Programs
Transmission	Supv II - E Trans As Plg & Ops	Bachelor's Degree or equivalent experience; 5 years' experience; Professional Engineer License	No special certification required	n/a
Transmission	Transmission Lineman	Complete the minimum 3-year 6000-hour Lineman Apprentice program at the Skills Training Center and assigned Districts; Complete a 3-year, 480-hour college-level program to be qualified to take the Journeyman Lineman's test; Pass the Journeyman Lineman test	QEW	Line Assistant and Apprenticeship Program
Transmission	Transmission Patroller	Valid California Class A driver's license; Class A Medical Certificate; 18 months experience in overhead and underground transmission construction and maintenance within the past 3 years; Must reside within the service territory	QEW	Line Assistant and Apprenticeship Program
Transmission	Working Foreman-Electric Transmission	Valid California Class A driver's license; Class A Medical Certificate; 18 months' experience in transmission construction and EHV hotline maintenance within the past 5 years; Must have held previous position for at least 9 months	QEW	Line Assistant and Apprenticeship Program; Essentials of Supervision
Transmission	Field Construction Advisor (FCA)	Journeyman Lineman	QEW	Line Assistant and Apprenticeship Program
Transmission	Apprentice Lineman	n/a	No special certification required	n/a
Transmission	Journeyman Lineman	Journeyman Lineman	QEW	Line Assistant and Apprenticeship Program
Transmission	Groundman	n/a	No special certification required	n/a
Transmission	Operator	Crane license if operating a crane	No special certification required	n/a

SDGE Table 8-11: Workforce Planning, Risk Event Inspection

Worker Title	Minimum Qualifications for Target Role	Applicable Certifications	Reference to Electrical Corporation Training/ Qualification Programs
Electric Troubleshooter	Journeyman Lineman who completed an accredited apprenticeship program; IBEW Journeyman Lineman status in good standing; Complete 7-week RETS class and pass the associated written and practical exams	QEW	RETS Training; Line Assistant and Apprenticeship Program

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Vegetation management and inspections

9 VEGETATION MANAGEMENT AND INSPECTIONS

Vegetation management is comprised of the assessment, intervention, and management of vegetation in proximity to electrical infrastructure, including pruning and removal of trees and other vegetation around electrical infrastructure for safety, reliability, and risk reduction. SDG&E's Vegetation Management Program consists of the following activities: Detailed Inspections, Off-Cycle Patrols, Tree Pruning and Removal, Pole Clearing, Auditing, and Fuels Management. These activities involve several components, including tracking and maintaining a database of inventory trees and poles, detailed and off-cycle inspections, pruning and removing trees for conductor clearance, replacing unsafe trees with compatible species, and quality compliance to verify work quality and contractual adherence. The Vegetation Management System (VMS), called PowerWorkz, is used to track and record inventory assets (trees and poles) and manage work activities.

9.1 TARGETS

9.1.1 QUALITATIVE TARGETS

9.1.2 QUANTITATIVE TARGETS

OEIS Table 9-1: Vegetation Management Targets by Year (Non-inspection Targets)

Initiative	Quantitative or Qualitative	Activity (Tracking ID)	Previous Tracking ID, if applicable	Target Unit	2026 Target/Status	% Risk Reduction for 2026	2027 Target/Status	% Risk Reduction for 2027	2028 Target/Status	% Risk Reduction 2028	3-year Total	Section; Page Number
Wood & Slash Management	Qualitative	Sustainability (WMP.1460) - As part of the company sustainability goal, SDG&E will explore additional options of diverting green waste from landfills to recycling facilities.	n/a	n/a	By year end, engage Supply Management Department to research prospective recycling vendors.	n/a	By year end, enter service agreement with new recycling vendor(s) to divert green waste.	n/a	By year end, continue engaging additional vendor opportunities to reach company goal.	n/a	n/a	9.5; p. 214
Workforce Planning (Vegetation Management)	Qualitative	Workforce Planning (Vegetation Management) (WMP.506) - Manage vegetation management workforce through qualification and certification requirements.	n/a	n/a	Manage vegetation management workforce through qualification and certification requirements.	n/a	Manage vegetation management workforce through qualification and certification requirements.	n/a	Manage vegetation management workforce through qualification and certification requirements.	n/a	n/a	9.13; p. 229
Integrated Vegetation Management	Quantitative	Fuels Management (WMP.497)	n/a	Pole	500	0.03%	500	0.03%	500	0.03%	1,500	9.7; p. 215
Defensible Space	Qualitative	See Substation Patrol Inspections (WMP.492) Activity- There are no planned improvements.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	9.6; p. 214

OEIS Table 9-2: Vegetation Inspections and Pole Clearing Targets by Year

Activity (Program)	Tracking ID	Previous Tracking ID, if applicable	Target Unit	Cumulative (Cml.) Quarterly Target 2026 Q1	Cml. Quarterly Target 2026, Q2	Cml. Quarterly Target 2026, Q3	Cml. Quarterly Target 2026, Q4	Cml. Quarterly Target 2027, Q1	Cml. Quarterly Target 2027, Q2	Cml. Quarterly Target 2027, Q3	Cml. Quarterly Target 2027, Q4	Cml. Quarterly Target 2028, Q1	Cml. Quarterly Target 2028, Q2	Cml. Quarterly Target 2028, Q3	Cml. Quarterly Target 2028, Q4	% HFTD Covered in 2026	% Risk Reduction for 2026	% Risk Reduction for 2027	% Risk Reduction for 2028	3- year Total	Activity Timeline Target	Section; Page Number
Detailed Inspection	WMP.494	n/a	Inspections	60,080	140,365	207,680	255,000	60,080	140,365	207,680	255,000	60,080	140,365	207,680	255,000	100%	0.97%	0.97%	0.97%	765,000	12/31/2028	9.2; p. 209
Off-Cycle Patrol	WMP.508	n/a	VMAs	25	44	92	106	25	44	92	106	25	44	92	106	100%	0.97%	0.97%	0.97%	318	12/31/2028	9.2; p. 209
Pole Clearing	WMP.512	n/a	Poles	4,479	12,196	20,875	22,000	4,479	12,196	20,875	22,000	4,479	12,196	20,875	22,000	100%	0.98%	0.98%	0.98%	66,000	12/31/2028	9.4; p. 212

9.2 VEGETATION MANAGEMENT INSPECTIONS

OEIS Table 9-3: Vegetation Management Inspection Frequency, Method, and Criteria

Type	Inspection Activity (Program)	Area Inspected	Frequency
Transmission and Distribution	Detailed Inspections (WMP.494)	HFTD	Annual
Transmission and Distribution	Off-Cycle Patrols (WMP.508)	HFTD	Annual

9.2.1 DETAILED INSPECTIONS (WMP.494)

9.2.1.1 OVERVIEW AND AREA INSPECTED

Detailed Inspections are performed annually throughout the HFTD and consist of a Level 2 inspection. A Level 2 inspection is a 360-degree visual assessment of trees located within the utility strike zone evaluating the crown, trunk, canopy, and above-ground roots for hazards to the overhead electric facilities. Trees in the utility strike zone are assessed for tree growth and hazard potential. The utility strike zone is defined as the area where trees are tall enough to impact the overhead facilities. Detailed inspections are conducted concurrently for distribution and transmission conductors where they are collocated within the utility corridor. Detailed inspections determine whether vegetation will encroach the required minimum clearance distance or otherwise impact the lines within the annual cycle.

Detailed Inspections occur annually based on the Master Schedule, which remains static year to year. Detailed Inspections may be performed by either International Society of Arboriculture (ISA)-Certified or non-ISA Certified Arborists. During inspection activity, the electronic records for inventory trees are updated.

9.2.1.2 PROCEDURES

- Program Overview Guide; Version November 1, 2024
- Pre-Inspection Activity; Version November 1, 2024

9.2.1.3 CLEARANCE

During Detailed Inspections, the inspector makes the determination whether vegetation will encroach the relevant minimum clearance requirement within the annual cycle. This determination is made by estimating the closest distance (clearance) between the tree and the power line considering the potential growth rate of the tree. However, the inspector does not prescribe the post-pruning clearance. Clearance determinations are made by the tree pruners during the Tree Pruning and Removal Activity and take into consideration multiple factors such as species, growth rate, wind, tree health, and proper pruning cuts. See Section 9.3 Pruning and Removal for further discussion.

Clearances are recorded in the inventory tree record as the distance in feet between the overhead electrical conductors and the closest portion of the vegetation and are expressed as a range of values. Trees are visually assessed from multiple perspectives when determining clearance, and consideration is given to changing external influences throughout the annual cycle that may impact clearance, such as wind sway, line sag, and snow load. Minimum radial clearance requirements are set forth by PRC §4292, GO 95 Rule 35, and North American Electric Reliability Corporation (NERC) FAC-003-5.

Clearances for high-risk species of vegetation are determined during Off-Cycle Patrols. See Section 9.2.2Off-Cycle Patrols (WMP.508) for more information on Off-Cycle Patrols.

9.2.1.4 FALL-IN MITIGATION

Fall-in risks, such as hazard trees, are identified through Detailed Inspections and Off-Cycle Patrols. A fall-in risk may include conditions such as dead, diseased, dying, or structural defects. Inspectors are trained to recognize such conditions and assess the reasonable risk of the vegetation impacting the lines within the annual cycle. The inspector also determines whether the hazardous condition can be mitigated by pruning or if complete removal of the tree is required. This determination is then recorded as either a pruning or removal condition code within the inventory tree record.

9.2.1.5 SCHEDULING

Detailed Inspections are performed annually in the HFTD as determined by the Master Schedule. This inspection program is based on a fixed frequency and is triggered by the regulatory requirements of CPUC GO 95, Rule 35; PRC§4293; and NERC FAC-003-5. compliance.

Section 9.2.2 Off-Cycle Patrols (WMP.508) for discussion on scheduling Off-Cycle Patrols targeting high risk species.

9.2.1.6 UPDATES

No significant changes were made to this program since the 2023-2025 Base WMP.

9.2.2 OFF-CYCLE PATROLS (WMP.508)

9.2.2.1 OVERVIEW AND AREA INSPECTED

Off-Cycle Patrols are performed in the HFTD. The scope and process are similar to Detailed Inspections where vegetation within the utility strike zone is assessed for tree growth and hazard potential. Off-Cycle Patrols also target Century plant (Agave americana) and bamboo because of their relatively fast and unpredictable growth. These patrols are effective at intercepting the growth of these species, preventing line contact and reducing the risk of ignition. The inspector determines any work that is required prior to the next routine scheduled tree pruning based on the Vegetation Management Area's (VMA's) activity schedule. Off-Cycle Patrols are performed by ISA-Certified Arborists, who may be internal SDG&E employees ("Patrollers") or contracted personnel. Unlike Detailed Inspections, where all tree records are updated during the inspection, during Off-Cycle Patrols, only inventory tree records that require work are updated.

9.2.2.2 PROCEDURES

- Program Overview Guide; Version November 1, 2024
- Pre-Inspection Activity; Version November 1, 2024

9.2.2.3 CLEARANCE

The process for determining and documenting clearances during Off-Cycle Patrols is the same as Detailed Inspections (see Section 9.2.1.3 Clearance).

9.2.2.4 FALL-IN MITIGATION

The process for determining fall-in risk during Off-Cycle Patrols is the same as Detailed Inspections (see Section 9.2.1.4 Fall-in Mitigation).

9.2.2.5 SCHEDULING

Off-Cycle Patrols are performed in the HFTD annually according to the Master Schedule. SDG&E endeavors to complete most of these patrols prior to the fall season when weather and vegetation fuel conditions become more conducive to fire. The Off-Cycle Patrol schedule is also influenced by risk prioritization at the VMA level. VMAs with a higher historical frequency of hazard trees, Memos (priority work), and tree-related outages are assigned a higher risk ranking. Off-Cycle Patrols in VMAs with a higher risk ranking are generally scheduled to occur closer to the beginning of the fall season, unless the Detailed Inspection in the same VMA occurs around the same timeframe.

During Off-Cycle Patrols, if a tree is found to be near the power lines or exhibits an elevated threat, the tree will be treated as a “Memo” and issued to the tree pruning contractor to work on a priority basis. Memos are assigned ‘Same Day/Next Day’ or ‘Group' based on condition and urgency. Same Day/Next Day Memos are processed within 1 to 2 days of inspection, while Group Memos are scheduled to be completed within 30 days of inspection (see Section 9.3.3 Scheduling for details on Memo scheduling).

9.2.2.6 UPDATES

No significant changes were made to this program since the 2023-2025 Base WMP. In addition, SDG&E is considering modifying Off-Cycle Patrols to a condition-based versus schedule-based model using data modeling to prioritize which areas in the HFTD to target, as detailed in ACI SDGE-23B-16 (Appendix D).

9.3 PRUNING AND REMOVAL (WMP.501)

9.3.1 OVERVIEW

Tree pruning and removal is the activity of cutting vegetative material (branches, limbs, trunk) for the purpose of maintaining safe, reliable, and compliant clearance between trees and overhead electrical conductors. The Tree Pruning and Removal Activity follows American National Standards Institute (ANSI) A300 and ISA best management practices. Clearances are determined by the tree pruning contractor at the time of pruning based on multiple factors including species, growth rate, minimum required clearance, wind sway, line sag, proper pruning practices, and tree health. Clearances established at time-of-pruning must be sufficient to provide safety and compliance with applicable regulatory requirements for at least one annual cycle.

9.3.2 PROCEDURES

- Program Overview Guide; Version November 1, 2024
- Tree Pruning and Removal Activity; Version November 1, 2024

9.3.3 SCHEDULING

Tree pruning Scheduling Work Orders (SWO) for each VMA are generated within the PowerWorkz work management system. The SWO is the annual work activity assigned to the tree contractor and includes inventory trees that were identified as requiring work. “Child” dispatch work orders (DWO) are created within the "parent" SWO and are assigned to the tree crew(s) working in the VMA. In aggregate, multiple DWOs comprise all the assigned assets within an SWO. After a tree is pruned or removed, the inventory tree record is updated by the tree crew as "complete". After assigned work within a DWO is completed and inventory tree records are updated, the tree contractor completes the DWO. Once all assigned DWOs are completed, the tree contractor completes the SWO in the database.

Routine tree pruning and removal follows the annual Master Schedule and generally begins 2 to 3 months following inspections. Tree contractors are assigned multiple VMAs each month and are scheduled to complete the assigned monthly block of VMAs within a 2-month time period. Work within a DWO may be delayed based on access restrictions, customer refusals, or environmental constraints. Such work will be deferred until the issue is resolved and work can safely commence.

Urgent or emergency tree pruning or removal is issued to the contractor as a "Memo". Memos are trees that require priority pruning before the routine-scheduled timeframe. Examples of memos may include trees with a non-compliant clearance, an imminent hazardous tree condition, or any other unplanned or unscheduled work. A Memo is recorded within the inventory tree record using the appropriate condition code.

Memos, including some hazard ("reliability") trees, are classified and assigned 'Same Day/Next Day' or 'Group' based condition and priority. The Memo classification is as follows:

- Same Day/Next Day Memos: Vegetation in direct or intermittent contact, or non-compliant, with primary or transmission conductors are processed as a same/next day Memo. Trees that have visible defects or structural weakness and present an imminent threat to the overhead facilities may also be processed as a same/next day Memo.
- Group Memos: Vegetation within the required minimum vegetation clearance but does not meet the criteria of a same/next day memo is issued within a multi-tree unit Group Memo. Trees that have a visible defect or structural weakness that may cause the tree to fail before the routine-scheduled pruning may be issued within a Group Memo.

9.3.4 UPDATES

No significant changes were made to this program since the 2023-2025 Base WMP, and none are planned for the 2026 to 2028 WMP cycle.

9.4 POLE CLEARING (WMP.512)

9.4.1 OVERVIEW

Pole clearing is a mandatory activity of maintaining a fuel break around power poles that are subject to the clearance requirement by removing vegetation that could ignite or propagate a fire. Pole clearing is required within the State Responsibility Area (SRA) to comply with PRC §4292 for poles that carry specific, "non-exempt" equipment. Non-exempt equipment may arc, spark, or fail, causing hot particles to fall to the ground, potentially resulting in an ignition. PRC §4292 requires clearing of vegetation at ground level within a 10-foot radius from the outer circumference of non-exempt poles and towers (also called "subject" poles and towers). PRC §4292 also requires removal of live vegetation to a height of 8 feet above ground within the 10-foot cylinder, and the removal of dead vegetation within the cylinder up to the height of the conductors. Poles with exempt equipment are not subject to the pole clearing activity.

At its discretion, SDG&E may elect to retain certain vegetation within the required clearance area for pole clearing that is deemed to be exempt[52] from PRC §4292.

9.4.2 PROCEDURES

- Program Overview Guide; Version November 1, 2024
- Pole Clearing Activity, Version November 1, 2024
- Pole Brush Pre-Inspectors/Auditors Procedures; Version November 1, 2024
- Pole Clearing Activity Vegetation Clearance Exemptions; Version January 3, 2025

9.4.3 SCHEDULING

Pole Clearing SWOs are generated within the PowerWorkz work management system according to the Pole Clearing Master Schedule, which identifies all utility poles to be cleared within each VMA and the scheduled start and finish dates. The SWO is the assigned work activity to the pole clearing contractor and includes all related pole assets in the VMA identified as requiring work. "Child" dispatch work orders (DWO) are created within the "parent" SWO and are assigned to the pole crew(s) working in the VMA. In aggregate, multiple DWOs comprise all the assigned assets within the SWO. After a pole is cleared, the pole clearance record is updated as complete in the database. After assigned work within a DWO is completed and records are updated, the contractor completes the DWO. Once assigned DWOs are completed, the contractor completes the SWO in the database. A pole may require multiple clearing activities within an annual cycle to maintain compliance.

The general pole clearing activities and timeframes to complete the assigned work are as follows:

- Herbicide assessment and customer notification: 2 to 3 months
- Herbicide application: 2 to 3 months
- Mechanical pole clearing: 4 to 5 months
- Re-clear pole clearing: 4 months

9.4.4 UPDATES

Since the 2023-2025 Base WMP, SDG&E has ceased performing pole clearing on poles with exempt equipment, such as hotline clamps (HLC). Previously, these poles were cleared as a discretionary measure, however, they are not required to be cleared under PRC §4292 and HLCs are on CAL FIRE's list of equipment exempt from pole clearing requirements. The determination to stop clearing poles with exempt equipment was made due to the evaluation of cost efficiencies, environmental impacts, impacts to customers, and the general absence of ignition data associated with exempt equipment.

For a list of updated targets and a timeline for the 2026 to 2028 WMP cycle, refer to OEIS Table 9-2.

[52] See California Code of Regulations, Title 14, Section §1255.

9.5 WOOD AND SLASH MANAGEMENT

9.5.1 OVERVIEW

Wood and slash management is a component of tree pruning and removal and pole clearing activities. Vegetation debris is generally chipped on site and/or removed from the property the same day the work is performed. Some jobs may require debris to be removed from site at a later date due to access, volume of debris, or customer availability. Large diameter wood debris (generally greater than 6 to 8 inches) is cut into manageable lengths and left on site. When requested, SDG&E and tree pruning contractors may leave wood debris and wood chips on a landowner's property for customer utilization.

Debris associated with tree operations is removed from channels and banks of watercourses (e.g., rivers, streams, lakes, and wetlands) in accordance with environmental regulations such as California Department of Fish and Wildlife section 1600 (Fish and Game Code); California Department of Fish and Wildlife Lake and Streambed Alteration Program; and the guidance of California Forest Best Practice Rules.

Vegetation debris (i.e., slash) associated with fuels management activities (see Section 9.7 Integrated Vegetation Management) is typically removed from a project site unless it is determined that a portion of the debris can be utilized for soil cover or other purposes. SDG&E may also leave debris on site as chipped material for ground cover or landscaping upon a property owner's request.

Wood debris generated from vegetation management activities (e.g., tree pruning, pole clearing, fuels management) is delivered to local landfills or delivered to a recycling facility to be processed into reusable products such as mulch or landscaping material.

9.5.2 PROCEDURES

See Section 9.3.2 Procedures

9.5.3 SCHEDULING

Wood and slash generated from pruning, removal and pole clearing activities is generally removed from the site the same day work is performed unless the customer requests it remain on site or if it is of large diameter. See Section 9.3.2 Procedures and 9.4.3 Scheduling for scheduling on Pruning and Removal and Pole Clearing, respectively.

9.5.4 UPDATES

No significant changes were made to this program since the 2023-2025 Base WMP.

For a list of updated targets and a timeline for the 2026 to 2028 WMP cycle, refer to OEIS Table 9-1.

9.6 DEFENSIBLE SPACE

9.6.1 OVERVIEW

See Section 8.3.9 Substation Patrol Inspections (WMP.492) for information on actions taken to reduce the ignition probability and wildfire consequence due to contact with substation equipment.

9.6.2 PROCEDURES

See Section 8.3.9 Substation Patrol Inspections (WMP.492)for information.

- 510.003 Transmission Substation Maintenance Practices; Version 21; July 15, 2024

9.6.3 SCHEDULING

See Section 8.3.9 Substation Patrol Inspections (WMP.492) for information on substation patrol inspection scheduling and prioritization.

9.6.4 UPDATES

See Section 8.3.9 Substation Patrol Inspections (WMP.492)for information on updates.

9.7 INTEGRATED VEGETATION MANAGEMENT: FUELS MANAGEMENT (WMP.497)

9.7.1 OVERVIEW

Traditional integrated vegetation management practices include controlling vegetation within utility corridors in low-growth, stable plant communities through methods such as the use of herbicides. Because of the relative lack of vegetation density along its major transmission corridors, SDG&E does not engage in these traditional integrated vegetation management activities. However, SDG&E's Fuels Management activity is another measure to help reduce the risk of ignition and fire propagation.

The Fuels Management activity is a discretionary activity performed in the HFTD that reduces risk in high fire threat areas that could result from equipment failure or a wire-down event. This mitigation measure is intended to protect infrastructure in the event of a wildfire that originates outside of SDG&E rights-of-way. The scope of the activity involves thinning vegetation at ground level within a 50-foot radius surrounding the pole. Vegetation is reduced to approximately 30 percent ground cover within the cleared radius. Native and sensitive species are selectively retained where possible. This activity is predominantly performed around poles that are subject to the requirements of PRC §4292 because the ignition risk at these locations is relatively higher due to the equipment on the pole.

9.7.2 PROCEDURES

- Fuels Management Scope of Work; Version 1; February 15, 2025
- SDG&E Fuels Modification Program Annual Report; Version February 2025

9.7.3 SCHEDULING

Fuels Management activities are typically scheduled to occur early in the first quarter of the calendar year before the onset of bird nesting season in mid-February and can resume when nesting season concludes (around September 1). Most of the work is therefore conducted in late fall and early winter.

SDG&E determines structures (poles) each year that will receive fuels management based on site conditions and vegetation. The selection is also influenced by the annual frequency of fuels management to determine whether a pole should be kept on a maintenance cycle of clearing. Work site locations are previewed in the field to determine feasibility and are also pre-screened for environmental impact to determine any work exclusions or constraints.

Since Fuels Management is a discretionary, non-mandated activity, property owner authorization is required and may reduce the scope of poles initially selected. Customer outreach and notification is performed to engage customers on the scope of work.

9.7.4 UPDATES

No significant changes were made to this program since the 2023-2025 Base WMP.

For a list of updated targets and a timeline for the 2026 to 2028 WMP cycle, refer to OEIS Table 9-2.

9.8 PARTNERSHIPS

OEIS Table 9-4: Partnerships in Vegetation Management

Partnerships Agency/Organization	Activities	Objectives	Electrical Corporation Role	Anticipated Accomplishments
Fire Safe Council of San Diego County	Residential chipping program, home survivability assessments, roadside brushing (vegetation removal), and fuel break construction	1 - Community protection (defensible space), 2 - Electric infrastructure protection/resilience, 3 - Evacuation route improvement	Collaboration in the planning phase and funding of the implementation.	2026-2028: Planned annual treatments: 190 acres, 400 homes, and 400 electric poles.
Viejas Band of Kumeyaay Indians	Residential defensible space and roadside brushing	1 - Community protection (defensible space), 2 - Electric infrastructure protection/resilience	Collaboration in the planning phase and funding of the implementation.	2026-2028: Planned annual treatments: 97 acres, 94 homes, & 94 electric poles.
Campo Band of Diegueno Mission Indians	Fuel break maintenance	1 - Community protection (defensible space), 2 - Electric infrastructure protection/resilience	Collaboration in the planning phase and funding of the implementation.	2026-2028: Annual maintenance: 2 miles of fuel break totaling 43 acres, 7 transmission towers
San Diego Regional Fire & Emergency Services Foundation	Support Fire Safe Councils across the County in activities such as vegetation management/ removal, green waste chipping events, defensible space assistance, community education, and home hardening	1 - Community protection (defensible space)	Funding the implementation.	2025: Support at least 10 Fire Safe Councils across 18 zip codes primarily in the HFTD. Provide education and training to all FSC at the EOC and Resilience Center.

Partnerships Agency/Organization	Activities	Objectives	Electrical Corporation Role	Anticipated Accomplishments
Inter-Tribal Long Term Recovery Foundation	Provide wildfire preparedness supplies and workshops including cultural burning for resilience.	1 - Community education, 2 - Community protection (defensible space)	Funding of the implementation	Partnership with the Climate Science Alliance's Collaboration of Native Nations for Climate Transformation and identify and train Tribal cultural burn technicians and practitioners.

9.8.1 FIRE SAFE COUNCIL OF SAN DIEGO COUNTY

9.8.1.1 OVERVIEW

This community and electric infrastructure protection collaboration is based on a 5-year term memorandum of understanding (MOU) with an option for renewal. Funding is awarded annually based on an agreed-upon statement of work. Projects include the residential Defensible Space Chipping Program, home survivability assessments, roadside brushing (vegetation removal), and other fuel reduction/ignition management projects adjacent to electric infrastructure. There is a cost-share component included in the program whereby homeowners contribute time and effort in preparation for chipping. There is also an assistance program for homeowners who are low income, physically disabled, or elderly. The projects focus on homes and communities within Tier 2 and 3 of the HFTD that have electric infrastructure on or adjacent to properties.

9.8.1.2 PARTNERSHIP HISTORY

SDGE Table 9-1 details the history of SDG&E's collaborative efforts with the Fire Safe Council of San Diego County. Projects include the chipping and roadside fuel reduction. The homes listed in the table are the number of homes that are utilizing the projects, the poles/towers are the electric infrastructure included in the projects, and the miles are the length of roadside fuel reduction. The average of 0.5 acres was used per home.

SDGE Table 9-1: Fire Safe Council of San Diego County Project History

Year	Amount	Projects	Acres	Homes	Miles	Poles/Towers
2021	$500K	1	200	105	0	120
2022	$1.1M	2	398	133	4	103
2023	$1.2M	2	279	183	0	233
2024	$1.5M	2	189	408	24	438
2025	$1M	2	TBD*	TBD*	TBD*	TBD*

**Project scopes for 2025 have not been determined*

9.8.1.3 FUTURE PROJECTS

The MOU with the Fire Safe Council of San Diego County Project History is anticipated to remain in effect for the years 2026, 2027, and 2028. There will be no planning or payments until the fall of each prior year. Projects are anticipated to replicate prior years and accomplishments are dependent on budget obligations.

9.8.2 VIEJAS BAND OF KUMEYAAY INDIANS

9.8.2.1 OVERVIEW

This community and electric infrastructure protection relationship is based on a 5-year term MOU with an option for renewal. Funding is awarded annually based on an agreed upon statement of work. Projects include residential defensible space mowing, roadside mowing, fuel break construction and maintenance, and other fuel reduction and ignition management projects adjacent to electric infrastructure. There is an assistance program for homeowners for the physically disabled or elderly. The projects focus on homes of Tribal members within Tier 3 of the HFTD with electric infrastructure on or adjacent to properties.

9.8.2.2 PARTNERSHIP HISTORY

SDGE Table 9-2 details the history of SDG&E's collaboration with the Viejas Band of Kumeyaay Indians. Projects include defensible space mowing, roadside mowing, and fuel break construction and maintenance. The homes listed in the table are the number of homes that are utilizing the projects, the poles/towers are the electric infrastructure included in the projects, and the miles are the length of roadside mowing.

SDGE Table 9-2: Viejas Band of Kumeyaay Indians Project History

Year	Amount	Projects	Acres	Homes	Miles	Poles/Towers
2019	$27K	2	35	94	0	114
2020	$24K	2	55	94	4	114
2021	$50K	2	97	94	0	94
2022	$20K	2	0	0	24	29
2023	$75K	2	97	94	3	94
2024	$90K	2	97	94	3	94
2025	$0	TBD*	TBD*	TBD*	TBD*	TBD*

**Project scopes for 2025 have not been determined*

9.8.2.3 FUTURE PROJECTS

The MOU with the Viejas Band of Kumeyaay Indians is anticipated to remain in effect for the years 2026, 2027, and 2028. There will be no planning or payments until the fall of each prior year. Projects are anticipated to replicate prior years and accomplishments dependent on budget obligations.

9.8.3 CAMPO BAND OF DIEGUENO MISSION INDIANS

9.8.3.1 OVERVIEW

This community and electric infrastructure protection collaboration is based on a 5-year term MOU with the option for renewal. Funding is awarded annually based on an agreed upon statement of work. Annual work (projects) includes fuel break construction and maintenance located on the perimeter of the reservation. This work provides wildland fire protection for the reservation as well as protection for a 500-kV transmission corridor. This project is part of a larger interagency fuels program, which connects to a fuel break conducted by the Bureau of Land Management and CAL FIRE. This partnership provides funding for construction and maintenance of a fuel break on Tribal land within Tier 3 of the HFTD.

9.8.3.2 PARTNERSHIP HISTORY

SDGE Table 9-3 details the history of SDG&E's relationship with the Campo Band of Diegueno Mission Indians. Projects include fuel break construction and maintenance. The homes listed in the table are the number of homes that are utilizing the projects, the poles/towers are the electric infrastructure included in the projects, and the miles are the length of the fuel break.

SDGE Table 9-3: Campo Band of Diegueno Mission Indians

Year	Amount	Projects	Acres	Homes	Miles	Poles/Towers
2010	$53K	1	43	0	2	7
2012	$36K	1	43	0	2	7
2016	$33K	1	43	0	2	7
2018	$26K	1	20	0	0.5	7
2020	$19K	1	43	0	2	7
2023	$22K	1	43	0	2	7
2025	$0	TBD*	TBD*	TBD*	TBD*	TBD*

**Project scopes for 2025 have not been determined*

9.8.3.3 FUTURE PROJECTS

The MOU with the Campo Band of Diegueno Mission Indians is anticipated to remain in effect for the years 2026, 2027, and 2028. There will be no planning or payments until the fall of each prior year. Projects are anticipated to replicate prior years and accomplishments are dependent on budget obligations.

9.8.4 SAN DIEGO REGIONAL FIRE & EMERGENCY SERVICES FOUNDATION

9.8.4.1 OVERVIEW

SDG&E provides grant support to the Regional Fire Foundation, which is then directed to over 40 Fire Safe Councils within San Diego County. Local FSCs are volunteer organizations created to help protect homes and neighborhoods from the devastating effects of wildfires. As grassroots, community-led organizations, they mobilize residents to protect their homes, neighborhoods, and environments from wildfire. Fire Safe Councils implement projects such as hazardous fuel reduction programs, local wildfire protection planning, and homeowner training.

9.8.4.2 PARTNERSHIP HISTORY

SDG&E has collaborated with the Regional Fire Foundation since 1996. While specific projects have varied over the last three decades, the last 10 years have been focused on supporting. In 2023, the most recent year with complete data available, SDG&E provided $80,000, which was approximately one-third of the total funding, that allowed FSCs to accomplish the following:

- 900,000 cubic feet of vegetation removed
- 162 tons of metal, trash and electronics removed during community clean ups
- 650 residences with new address signage
- 80 Community wildfire and preparedness events held countywide
- 8,000 people attended FSC events and over 1,000 residences served

9.8.4.3 FUTURE PROJECTS

SDG&E plans to continue to support the Regional Fire Foundation and FSCs focused on the same goals of vegetation removal, community clean-ups and wildfire preparedness.

9.8.5 INTER-TRIBAL LONG TERM RECOVERY FOUNDATION

9.8.5.1 OVERVIEW

SDG&E's collaboration with the Inter-Tribal Long Term Recovery Foundation (ITLTRF) dates to 2010. The mission of ITLTRF is to help American Indian people and Tribal communities affected by wildfires and other disasters recover and increase their resiliency. SDG&E's support has focused on the Tribal Preparedness and Resilience Program. Through this program, 15 tribes in the HFTD in San Diego County receive financial support to host workshops, trainings, or safety fairs.

9.8.5.2 PARTNERSHIP HISTORY

In 2024, SDGE's funding of $50,000 specifically supported the Tribal Preparedness and Resilience program at Regional Coordination meetings by including a partnership with the Climate Science Alliance's Collaboration of Native Nations for Climate Transformation. ITLTRF added the topic of establishing a pipeline of cultural burn technicians and practitioners. The goal is to fund Tribal cadres who would be available to help Tribal communities use cultural burning techniques for preparedness and mitigation of wildfire risk.

9.8.5.3 FUTURE PROJECTS

Specific future projects have not been identified. SDG&E will continue to collaborate with ITLTRF and focus on preparedness and resiliency for Tribal community members.

9.8.6 SAN DIEGO COUNTY FIRE

9.8.6.1 OVERVIEW

This is an ongoing relationship with no plans for work in the 2026 to 2028 WMP cycle. The goal of the project is to reduce roadside ignitions where electric facilities are present, which pose an ignition risk and/or threat of damage from a wildland fire. Funding was awarded based on an agreed upon SOW. Work (projects) focused on spraying a long-term retardant along roadways that had been identified to have a high incident of roadside ignitions. All roadways were within the HFTD and had adjacent electric infrastructure.

9.8.6.2 PARTNERSHIP HISTORY

SDGE Table 9-4 details the history of the relationship with San Diego County Fire. Projects include the purchase of fire retardant. The poles/towers are the electric infrastructure included in the projects, and the miles are the length of roadway treated with retardant.

SDGE Table 9-4: San Diego County Fire Project History

Year	Amount	Projects	Miles	Poles/Towers
2019	$50K	1	3.5	47
2021	$50K	1	23.4	270
2022	$80K	1	3.5	47
2023	$60K	1	3.5	47
2024	$0	0	0	0
2025	$0	0	0	0

9.8.6.3 FUTURE PROJECTS

This is an ongoing partnership with no current projects but with the potential for future collaboration.

9.9 ACTIVITIES BASED ON WEATHER CONDITIONS

9.9.1 OVERVIEW

Vegetation Management internal staff and contractors receive daily weather reports including a weather forecast, current FPI rating, and other related information. This information is used to inform which activities are allowed to continue in the near term. For example, if a RFW, conditions warranting a PSPS de-energization, or extreme FPI is forecasted, Vegetation Management will cease most tree pruning and removal and pole clearing activities in the affected area(s). Inspection activities generally continue under these conditions as they do not carry the same risk and provide greater situational awareness and the ability to observe conditions that may warrant priority or emergency remediation. During Emergency Operations, Vegetation Management participates in contractor resource coordination, strategic staging of crews, and support of restoration activities.

9.9.2 PROCEDURES

- ESP 113.1 (SDG&E Operations & Maintenance Wildland Fire Prevention Plan); Version June 21, 2024

9.9.3 SCHEDULING

Planned, scheduled Vegetation Management activities generally cease during a RFW or other forecasted weather conditions that indicate an elevated fire risk. Work is scheduled based on allowable activities referenced in Electric Standard Practice (ESP) 113.1.

As a forecasted RFW or PSPS de-energization approaches, contracted tree crew resources may be proactively staged for dispatch at one or more of SDG&E's Construction & Operation Centers (Districts) for storm response and restoration activities. Where emergency tree pruning is required during elevated wildfire conditions, additional fire suppression resources may be utilized to provide support per ESP 113.1.

9.9.4 UPDATES

No changes were made to activities based on weather conditions since the 2023-2025 Base WMP.

9.10 POST-FIRE SERVICE RESTORATION

9.10.1 OVERVIEW

After a wildfire event, Vegetation Management conducts a hazard tree assessment within the fire perimeter where overhead electrical infrastructure is located to identify dead, damaged, and structurally defective trees that may pose a future threat to overhead conductors, or that may be required to facilitate restoration activities. The scope of such patrols includes a visual inspection of trees within the utility strike zone in the fire perimeter. Abatement activities may include topping dead or damaged trees that could strike the lines or felling a tree completely if necessary for worker safety, facility protection, or environmental protection. All Vegetation Management activities are generally halted within and adjacent to the perimeter of a wildfire for worker and public safety.

9.10.2 PROCEDURES

- Program Overview Guide; Version 0; 11/1/2024

9.10.3 SCHEDULING

Scheduling of post-fire vegetation management patrols is determined by the location, duration, and size of a wildfire and whether it impacted electrical infrastructure. If it is determined that a fire has burned an area that includes overhead electrical facilities and is populated with trees, a post-fire inspection may be scheduled as soon as practicable and safe to perform. The post-fire inspection is conducted to determine whether any trees adjacent to the lines have been structurally damaged by the fire and may require remediation. Post-fire inspections are scheduled the same for Tier 2 and Tier 3 in the HFTD.

9.10.4 UPDATES

In 2025 a new geographic information system (GIS) layer was added to the field application tool (Epoch) that provides a visualization of the perimeter of an active wildfire. This new map layer provides inspectors in the field the ability to see the extent of a wildfire and its superimposition relative to overhead electrical facilities.

9.11 QUALITY ASSURANCE AND QUALITY CONTROL OF VEGETATION MANAGEMENT (WMP.505)

9.11.1 OVERVIEW, OBJECTIVES, AND TARGETS

Quality assurance audits of vegetation management activities are performed to measure work quality, contractual adherence, compliance with regulations and standards, and data accuracy. A third-party contractor performs the quality assurance audits of vegetation management activities.

QA/QC of Vegetation Management audits, Detailed Inspections, Pruning and Removal, Pole Clearing activities. Each audit activity evaluates individual units respective to their activity. Detailed Inspection audits assess individual tree units (1 tree equals 1.0 unit) to ensure inspectors followed procedures and compliance requirements for Detailed Inspections. Pole clearing audits are based on individual pole units (1 Pole equals 1.0 unit) to ensure tree contractors followed contractual requirements, procedures, and pole clearing standards for safety, compliance, and reliability. Similarly, pruning and removal audits evaluate individual tree units (1 tree equals 1.0 unit) to ensure tree contractors followed contractual requirements, procedures, and pruning standards for safety, compliance, and reliability.

The QA/QC audit activity is scheduled to begin after the conclusion of the vegetation management work activity within the VMA following the annual Master Schedule.

OEIS Table 9-5: Vegetation Management QA and QC Program Objectives

Initiative/Activity Being Audited	Tracking ID	Quality Program Type	Objective of the Quality Program
Detailed Inspections, Prune and Removal (Clearance), and Pole Clearing	WMP.494 WMP.501 WMP.512	QA/QC	Ensure contractors are following SDG&E contractual requirements, procedures, and standards for safety, compliance, and reliability.

OEIS Table 9-6: Vegetation Management QA and QC Activity Targets

QA/QC Activity Name*	Initiative/ Activity Being Audited	Population / Sample Unit	2026: Population Size	2026: Sample Size	2026: % of Sample in HFTD	2027: Population Size	2027: Sample Size	2027: % of Sample in HFTD	2028: Population Size	2028: Sample Size	2028: % of Sample in HFTD	Confidence level / MOE	2026 : Pass Rate Target	2027 : Pass Rate Target	2028 : Pass Rate Target
Quality assurance/quality control of Vegetation Management (WMP.505)	Detailed Inspections (WMP.494) Prune and Removal (Clearance) (WMP.501) Pole Clearing (WMP.512)	Inspections	277,000**	15%	100%	277,000**	15%	100%	277,000**	15%	100%	99%/3.0%	90%	90%	90%

**This column was added by SDG&E and is not in the OEIS WMP Guidelines*

*** Prune and Removal activities are also subject to QA/QC; however, population size is determined upon completion of inspections*

9.11.2 QA/QC PROCEDURES

- Program Overview Guide; Version 0; 11/1/2024
- Audit Activity, Version 0; 11/1/2024

9.11.3 SAMPLE SIZES

A randomized, representative sample of all completed vegetation management work is used for the purposes of auditing. Audit activities generally sample 12 to 15 percent of completed vegetation management activities. Randomization of post-prune audit samples include representation of multiple tree crews.

9.11.4 PASS RATE CALCULATION

The audit sample unit for Detailed Inspections is the individual asset (tree) inspected, the audit sample unit for Pole Clearing is the individual pole cleared, and the audit sample unit for Tree Pruning and Removal is the individual tree pruned or removed. The passing criteria is defined as an audit that does not have findings and does not require corrective actions and the failing criteria is defined as audits that have findings and require corrective actions.

QA/QC pass rates are calculated using the following calculations:

- Detailed Inspections QA/QC = (Pre-Inspection units audited with no findings ÷ Pre-Inspection total units audited) × 100
- Pole Clearing QA/QC = (Pole Clearing units audited with no findings ÷ Pole Clearing total units audited) × 100
- Tree Pruning and Removal QA/QC = (Pruning and Removal units audited with no findings ÷ Pruning and Removal total units audited) × 100

The following criteria are evaluated to determine whether an individual sample unit (Pre-Inspection, Tree Pruning and Removal, or Pole Brush) is passed or failed. There is no weighting of these criteria. A failure of one criterion results in the failure of the audit sample unit.

Pre-Inspection

- Missed Tree; Non Inventory
- Missed Tree; Pre-Inspected and Clear (PIC) to Pre-Inspected and Requires Pruning (PIP)
- Missed Tree; Memo
- Incorrect Species
- Incorrect Height
- Incorrect DBH
- Incorrect Growth Rate
- Incorrect Number of Units
- Incorrect Status of PIP
- Incorrect Clearance
- Incorrect Access
- Incorrect Voltage
- Incorrect Tree Notes

- Incorrect Address
- Incorrect City
- Incorrect Property Ownership
- Incorrect Pole Numbers
- Incorrect Location Notes
- Incorrect Customer Information
- Incorrect Status of Reliability (Hazard)

Tree Pruning and Removal

- No Trim
- Insufficient Clearance
- Overhangs
- Poor Pruning
- Poor Cleanup
- Documentation
- Removal Complete

Pole Clearing

- Pole Not Brushed
- Partial Brush Fail
- Debris Left In Radius
- Debris Piled on Perimeter
- Radius Not Cleared to 8' Height
- Dead/Dying Limbs Not Cleared
- Clearance Radius < 10'
- Unauthorized Vegetation In Radius
- Chem-Treated Pole-Did Not Hold Warranty
- Chemical Pole-Not Tagged
- Non-Chem Pole-Tag not Removed

9.11.5 OTHER METRICS

The QA/QC Program uses the pass rate to evaluate the effectiveness of inspection activities. It does not use other metrics to evaluate effectiveness.

9.11.6 DOCUMENTATION OF FINDINGS

Audit activities are generated and submitted as work orders within the PowerWorkz work management system. Audit findings are recorded and documented electronically within the individual asset (tree or pole) records in the Epoch system. Findings and observations are provided to SDG&E and the respective contractors which are reviewed for status, trends, and follow-up action. Audit failures are generally associated with work quality, compliance, and/or data entry. Examples include incorrect condition code (work type), incorrect tree attributes (tree height, DBH, species), insufficient clearance obtained, improper pruning techniques, and poor cleanup practices. Audit fails for tree pruning or pole clearing activities are issued back to the contractor for follow-up and corrective action.

9.11.7 CHANGES TO QA/QC SINCE LAST WMP AND PLANNED IMPROVEMENTS

No significant changes were made to this program since the 2023-2025 Base WMP.

9.12 WORK ORDERS

9.12.1 PRIORITY ASSIGNMENT

Electronic work orders assigned to contractors are used to track and document completed field work within the PowerWorkz work management system. An SWO is created annually for each activity within each VMA. The assigned contractor creates one or multiple “child” DWOs to distribute to the field worker(s). Once field work is completed, the contractor electronically completes the associated asset records within the assigned DWO. Once records within a DWO are complete, the DWO status is completed. When DWOs within the “parent” SWO are completed, the SWO status is completed.

Vegetation Management activities follow an annual Master Schedule. Each VMA is assigned a monthly date when activities occur. In general, the annual inspections for a given VMA are scheduled to occur within its assigned monthly timeframe. Routine Tree Pruning and Removal Activities generally occur 60 to 120 days following inspections within a given VMA.

Priority tree pruning may be processed using a “Memo” work order. A Memo is an asset (tree or pole) that is either in a non-compliant condition or that otherwise requires priority action to mitigate the condition. Memo work orders are ad-hoc and separate from a routinely created DWO. Memo work orders may be assigned to the tree pruning contractor to be completed the same day the condition is observed, the next day, or within 30 days based on the condition and priority.

9.12.2 BACKLOG ELIMINATION

The PowerWorkz work management system allows tracking and reporting of the status of all open, pending, and completed SWOs, DWOs, and Memo work orders. Additionally, it can track and report the condition code activity status at the asset level for all inventory tree and pole clearance records. SDG&E is creating dashboards that can display work order status and backlog to enhance transparency and inform decisions.

9.12.3 TRENDS

Work orders are tracked as a function of activity completion and schedule. Some types of work orders such as SWOs must be completed in the PowerWorkz work management system before the contractor can perform electronic invoicing. Contractors update the status of DWOs and SWOs as an administrative function. As an ad-hoc creation, Memo (priority) work orders do not have the system requirement to complete before the contractor can invoice. However, the contractors must condition code an individual asset record as complete before the work can be invoiced.

A percentage of HFTD trees issued within open work orders remain open at the end of each year. This is driven by the annual activity schedule and timing of the work when inspections take place towards the end of the year and the associated pruning is scheduled to be completed within the first quarter of the following year. Forecasts for future open work orders are expected to remain consistent with the historical 5-year average.

OEIS Table 9-7 and OEIS Table 9-8 show the total number of tree units within the HFTD that were past due at the end of 2024. Work order scheduling is dependent on the condition code of the tree. Routine work is generally scheduled to be completed within 120 days of inspection, whereas priority work is generally scheduled to be completed within 30 days of inspection. Various factors including access restrictions, customer refusals, permitting delays, environmental review or restrictions, and agency restrictions may impact the scheduled work.

OEIS Table 9-7: Number of Past Due Vegetation Management Work Orders Categorized by Age and HFTD Tier

HTFD Area	0-30 Days	31-90 Days	91-180 Days	181+ Days
HFTD Tier 2	2,514	3,601	53	70
HFTD Tier 3	790	2,475	411	2

OEIS Table 9-8: Number of Past Due Vegetation Management Work Orders Categorized by Age and Priority Levels

Priority Level	0-30 Days	31-90 Days	91-180 Days	181+ Days
Low Priority	3,220	6,039	463	69
High Priority	84	37	1	3

Note: Table based on HFTD operations/units

9.13 WORKFORCE PLANNING (WMP.506)

OEIS Table 9-9: Vegetation Management Qualifications and Training

Worker Title	Minimum Qualifications for Target Role	Applicable Certifications	# of Electrical Corporation Employees with Min Quals	# of Electrical Corporation Employees with Special Certifications	# of Contracted Employees with Min Quals	# of Contractor Employees with Applicable Certifications	Total # of Employees	Reference to Electrical Corporation Training/Qualification Programs
Vegetation Management Compliance Manager	Bachelor's Degree in Forestry, Biology, or Horticulture and/or equivalent training/experience. 7 years' experience in Utility Vegetation Management.	International Society of Arboriculture (ISA) Certified Arborist ISA Utility Specialist	1	1	n/a	n/a	1	International Society of Arboriculture Certified Arborist Program
Vegetation Management WMP Manager	Bachelor's Degree in Forestry, Biology, or Horticulture and/or equivalent training/experience.	International Society of Arboriculture (ISA) Certified Arborist ISA Utility Specialist	1	1	n/a	n/a	1	International Society of Arboriculture Certified Arborist Program
Vegetation Management Operational Manager	Bachelor's Degree in Forestry, Biology, or Horticulture and/or equivalent training/experience 7 years' experience in Utility Vegetation Management, including 3 years in contractor management	International Society of Arboriculture (ISA) Certified Arborist ISA Utility Specialist	1	1	n/a	n/a	1	International Society of Arboriculture Certified Arborist Program
Vegetation Management Business Advisor	Bachelor's degree in Finance, Accounting, Data Analytics, Business Administration, or related	No special certification required	1	n/a	n/a	n/a	1	n/a
Vegetation Management Senior Data Analyst	Bachelor's degree in Engineering, Economics, Finance, Data Analytics, or related	No special certification required	2	n/a	n/a	n/a	2	n/a
Area Forester/ Contract Administrator	3 years' utility vegetation management experience. Bachelor's degree in Forestry, Biology, Horticulture, or related field (preferred).	International Society of Arboriculture (ISA) Certified Arborist	8	8	n/a	n/a	8	International Society of Arboriculture Certified Arborist Program

Worker Title	Minimum Qualifications for Target Role	Applicable Certifications	# of Electrical Corporation Employees with Min Quals	# of Electrical Corporation Employees with Special Certifications	# of Contracted Employees with Min Quals	# of Contractor Employees with Applicable Certifications	Total # of Employees	Reference to Electrical Corporation Training/Qualification Programs
Vegetation Management Lead Forester	Bachelor's degree in Forestry, Biology, Horticulture, or related field (preferred). 3-5 years' experience administering vegetation management programs. Supervisory experience working with external contractors.	International Society of Arboriculture (ISA) Certified Arborist	1	1	n/a	n/a	1	International Society of Arboriculture Certified Arborist Program
Forester Patrol Person	3 years' utility vegetation management experience. Bachelor's degree in Forestry, Biology, Environmental Science, Horticulture, or related field (preferred).	International Society of Arboriculture (ISA) Certified Arborist	4	4	n/a	n/a	4	International Society of Arboriculture Certified Arborist Program
Resource Coordinator (Customer Help Desk)	High school diploma, college courses (preferred). 3 years' customer service experience. Microsoft Office proficiency. Strong technical writing skills (preferred). Working knowledge of Mainframe, GIS, SAP and Distribution Planning Scheduling applications (preferred).	No special certification required	3	n/a	n/a	n/a	3	n/a
Auditor	Bachelor's degree in Forestry, Biology, Environmental Science, Horticulture, or related field (preferred); Current Class C Driver's License with clean driver safety record	International Society of Arboriculture (ISA) Certified Arborist	n/a	n/a	29	16	29	International Society of Arboriculture Certified Arborist Program
Pre-Inspector	Bachelor's degree in Forestry, Biology, Environmental Science, Horticulture, or related field (preferred). Current Class C driver's license with clean driver safety record.	International Society of Arboriculture (ISA) Certified Arborist	n/a	n/a	47	53	62	International Society of Arboriculture Certified Arborist Program
Tree Trim General Foreperson/ Supervisor	5 years' line clearance tree pruning experience as a Foreman. Current California driver's license (Class B endorsement). General computer knowledge. Strong leadership qualities.	International Society of Arboriculture (ISA) Certified Arborist	n/a	n/a	7	7	12	International Society of Arboriculture Certified Arborist Program

Worker Title	Minimum Qualifications for Target Role	Applicable Certifications	# of Electrical Corporation Employees with Min Quals	# of Electrical Corporation Employees with Special Certifications	# of Contracted Employees with Min Quals	# of Contractor Employees with Applicable Certifications	Total # of Employees	Reference to Electrical Corporation Training/Qualification Programs
Tree Trimmer	Current California driver's license (Class B endorsement). General computer skills.	Line-Clearance Qualified Arborist (or Trainee)	n/a	n/a	133	148	148	United States Department of Labor Standard OSHA 1910.269; ANSI Z133 Safety Standards
Pole Brush General Foreman / Supervisor	5 years' line clearance tree pruning experience as a Foreman. Current California driver's license (Class C endorsement). General computer knowledge.	Qualified Applicator Certification	n/a	n/a	5	3	5	California Department of Pesticide Regulation Licensing Program
Pole Brusher	Current California driver's license (Class C endorsement). General computer skills.	No special certification required	27	n/a	n/a	n/a	27	n/a

Vegetation Management's workforce is comprised of contractor personnel and includes over 300 individuals. The internal workforce includes approximately 20 personnel including Managers, Area Foresters, Contract Administrators, Patrollers, Business Advisors, Data Specialists, and Administrative. See Table 9-9 for vegetation management and inspections personnel details.

9.13.1 RECRUITMENT

SDG&E contractors are directly responsible for the recruitment and hiring of vegetation management and inspection personnel. Examples of outreach that contractors employ for recruiting qualified candidates include:

- Professional websites (e.g., Indeed, LinkedIn, Jobvite)
- Employment Development Department
- Utility Vegetation Management conferences and trade shows
- Educational (High School, Community Colleges, Technical Colleges) Job Fairs
- Community Events (e.g., Arbor Day, Earth Day, Wildfire Safety Fairs)
- "Word of Mouth" (e.g., Davey Resource Group "Refer-A-Friend" Program)

SDG&E and contractors have collaborated with colleges and universities through the San Diego College of Continuing Education (SDCCE). Vegetation Management sponsors and collaborates with the SDCCE on the Utility Line Clearance Arborist Training Program, a 5-week course that provides individuals in-depth classroom and field training to gain skills to become a professional tree worker. Upon completion of the course, graduates attend a job fair with participation from SDG&E and its vegetation management contractors.

9.13.2 TRAINING AND RETENTION

Vegetation Management contractors are directly responsible for initial training, refresher training, and continuing education of their vegetation management and inspection personnel. Initial training subject matter and content varies depending on the specific services the contractor performs; however, training typically includes electrical safety, driver safety, utility standards, utility line clearance regulations, customer engagement, tree identification, hazard tree assessment, equipment operations, fire preparedness, utility hardware identification, and activity-specific work processes and procedures. Contractors are additionally required to provide annual refresher training on fire preparedness, environmental protection, hazard tree assessment, and customer engagement. Vegetation Management provides initial training for contractors on its work management system including hardware and software applications and data entry.

Contractors additionally provide employees refresher education training on safety, ANSI and Occupational Safety and Health Administration (OSHA) standard updates, customer engagement, technical skills, career development opportunities, ISA certification training, leadership development, and updates to utility operating procedures. Ongoing engagement helps provide workers career pathways and promotional opportunities through advanced training to foster long-term employment growth.

Vegetation Management provides initial and refresher training for its internal full-time employees on environmental regulations, fire preparedness, and vehicle driver safety. Additionally, SDG&E employees are required to complete annual, online refresher training on environmental, safety, compliance, and fire preparedness.

Wildfire Safety | SDGE™

2026-2028 Wildfire Mitigation Base Plan

Situational awareness and forecasting

10 SITUATIONAL AWARENESS AND FORECASTING

The Fire Science and Climate Adaptation (FSCA) business unit was established in 2018 and is comprised of meteorologists, climate adaptation advisors, and fire coordinators. Its purpose is responding to and strategizing for wildfire preparedness activities and climate resilience-related deliverables. The WCRC, which opened in 2024, has brought together leading thinkers and problem solvers in academia, government, and the community to create forward-looking solutions to help prevent ignitions, mitigate the impacts of fires, and ultimately help build a more resilient region.

Situational awareness consists of many tools and technologies. The Weather Station Network increases situational awareness and obtains foundational data for operational and mission critical activities. It provides information on the location and severity of weather events that may impact the system. In addition, the Air Quality Management Program utilizes sensors throughout the service territory to monitor hazardous levels of particulate matter, often found in wildfire smoke. Geostationary Operational Environmental Satellites (GOES)-18/-17 along with the Advanced Baseline Imager (ABI), are utilized to operationalize fire detection and characterization. High-performance computing clusters generate high-quality weather data that is incorporated directly into operations.

The FPI model calculates the wildfire potential on any given day, assisting in safe and reliable operations. It establishes daily operating conditions (i.e., Normal, Elevated, Extreme) that inform operational decisions such as recloser settings, restrictions on the type of work being performed in high-risk locations, and the use of CFRs. It is also used as an input for PSPS decision making.

10.1 TARGETS

10.1.1 QUALITATIVE TARGETS

10.1.2 QUANTITATIVE TARGETS

OEIS Table 10-1: Situational Awareness Targets by Year

Initiative	Quantitative or Qualitative Target	Activity (Tracking ID #)	Previous Tracking ID, if applicable	Target Unit	2026 End of Year Total/Completion Date	% Risk Reduction for 2026	2027 Total/Status	% Risk Reduction for 2027	2028 Total/Status	% Risk Reduction for 2028	3- year Total	Section; Page number
Environmental Monitoring Systems	Quantitative	Air Quality Station Maintenance (WMP. 1431)	n/a	Sensor Maintenance	192	n/a	192	n/a	192	n/a	576	10.2; p. 237
Environmental Monitoring Systems	Qualitative	Weather Station Data - Update 95th, 99th and max wind gust annually utilizing prior years weather station data. (WMP.1461)	n/a	n/a	By 12/31/2026, complete annual adjustments to max wind gust thresholds	n/a	By 12/31/2027, complete annual adjustments to max wind gust thresholds	n/a	By 12/31/2028, complete annual adjustments to max wind gust thresholds	n/a	n/a	10.2; p. 237
Grid Monitoring Systems	Qualitative	Grid Monitoring Systems Data Integration-Integrate power quality, fault data, and smoke detection to enhance situational awareness and support grid reliability. (WMP.1444)	n/a	n/a	By 12/31/2026, begin integration of power quality, fault data, and smoke detection data into a central monitoring system to enhance real-time monitoring, response, and prevention	n/a	By 12/31/2027, continue integration of power quality, fault data, and smoke detection data into a central monitoring system to enhance real-time monitoring, response, and prevention	n/a	By 12/31/2028, continue integration of power quality, fault data, and smoke detection data into a central monitoring system to enhance real-time monitoring, response, and prevention	n/a	n/a	10.3; p. 239
Grid Monitoring Systems	Quantitative	Early Fault Detection (WMP.1195)	n/a	nodes	60	15.43%	60	15.40%	60	15.74%	n/a	10.3; p. 239
Ignition Detection Systems	Qualitative	Ignition Detection Systems - Cameras - Ongoing review to identify camera communication network single points of failure to avoid interruption of camera imagery. (WMP.1343)	n/a	n/a	By 12/31/2026, complete annual monitoring of network	n/a	By 12/31/2027, complete annual monitoring of network	n/a	By 12/31/2028, complete annual monitoring of network	n/a	n/a	10.4; p. 243

Initiative	Quantitative or Qualitative Target	Activity (Tracking ID #)	Previous Tracking ID, if applicable	Target Unit	2026 End of Year Total/Completion Date	% Risk Reduction for 2026	2027 Total/Status	% Risk Reduction for 2027	2028 Total/Status	% Risk Reduction for 2028	3- year Total	Section; Page number
Ignition Detection Systems	Quantitative	Quarterly validation of weekly uptime for Ignition Detection Cameras (WMP.1467) **	n/a	Quarterly validations	4	n/a	4	n/a	4	n/a	4	10.4; p. 243
Weather Forecasting	Qualitative	See Fire Potential Index (WMP.450) in OEIS Table 10-1	n/a	n/a	See Fire Potential Index (WMP.450) in OEIS Table 10-1	n/a	See Fire Potential Index (WMP.450) in OEIS Table 10-1	n/a	See Fire Potential Index (WMP.450) in OEIS Table 10-1	n/a	See Fire Potential Index (WMP.450) in OEIS Table 10-1	10.5; p. 247
Weather Forecasting	Quantitative	Post-processing success rate - WRF simulations (WMP.1465)	n/a	Success rate	97%	n/a	97%	n/a	97%	n/a	97%	10.5; p. 247
Weather Station Maintenance and Calibration	Qualitative	Communication success rate of weather stations (WMP.1466)	n/a	n/a	By 12/31/2026, complete monitoring of communication success rate of weather stations	n/a	By 12/31/2027, complete monitoring of communication success rate of weather stations	n/a	By 12/31/2028, complete monitoring of communication success rate of weather stations	n/a	n/a	10.5.5; p. 252
Weather Station Maintenance and Calibration	Quantitative	Weather Station Maintenance and Calibration* (WMP. 1430)	n/a	Station maintenance	217	n/a	217	n/a	217	n/a	651	10.5.5; p. 252
Fire Potential Index (FPI)	Qualitative	Fire Potential Index - Ongoing analysis of FPI predictions versus observations to potentially improve FPI. (WMP.450)	n/a	n/a	By 12/31/2026, complete annual analysis	n/a	By 12/31/2027, complete annual analysis	n/a	By 12/31/2028, complete annual analysis	n/a	n/a	10.6; p. 252

**The weather station network consists of 223 weather stations throughout the service territory. Six of these stations are owned by SDG&E but are maintained by AEM (https://aem.eco/). SDG&E is responsible for maintenance and calibration of the other 217 weather stations.*

*** The Alert California Cameras are built on the High-Performance Wireless Research and Education Network (HPWREN) in partnership with UC San Diego and local fire departments. SDG&E does not have control of the uptime, but will report any downtime to the vendor.*

10.2 ENVIRONMENTAL MONITORING SYSTEMS

10.2.1 EXISTING SYSTEMS, TECHNOLOGIES, AND PROCEDURES

OEIS Table 10-2: Environmental Monitoring Systems

System	Measurement/ Observation	Frequency	Purpose and Integration
Weather Stations	Wind speed, wind direction, wind gusts, temperature, and humidity	6 measurements per hour	Increases situational awareness and obtains foundational data for operational and mission critical activities.
Air Quality Sensors	Concentration of $PM_{2.5}$	6 measurements per hour	Converts concentrations to an index (AQI) and quickly notifies employees when air quality is unhealthy.
Fuel Moisture & NDVI Cameras	Fuel moisture values	Daily values of 10-hour fuels and grass health respectively	Provide accurate reflection of the state of fuels, which is important for understanding fire potential.

10.2.1.1 WEATHER STATIONS

The Weather Station Network consists of 223 strategically placed weather stations across the service territory. Each station transmits data on wind speed, gusts, direction, temperature, and humidity every 10 minutes using cellular and spread spectrum communications. Data is transmitted to SDG&E's publicly available website Weather Awareness System (https://weather.sdgeweather.com/). Furthermore, 217 of the 223 weather stations (approximately 97 percent) can be remotely enabled to report data every 30 seconds during critical fire weather conditions. Over the past decade, this data has been used to analyze weather patterns within the service territory and to generate statistics such as the 95th percentile, 99th percentile, and maximum values for wind gusts, which are essential for informed decision-making during extreme weather events. These statistics are updated annually to maintain accuracy and relevance.

10.2.1.2 AIR QUALITY STATIONS

Particulates in wildfire smoke are hazardous to employees and the public. The Division of Occupational Safety and Health, Protection from Wildfire Smoke standard (Title 8 CCR Section 5141.1) requires employers to notify employees and implement control measures when the Air Quality Index (AQI) for Particulate Matter 2.5 microns or smaller in diameter ($PM_{2.5}$) exceeds 150 or exceeds 500 during wildfires.

The Air Quality Management system is comprised of 16 particulate sensors and a partially automatic notification system that reports the AQI for $PM_{2.5}$ at each sensor location. The AQI is a tool developed by the EPA to communicate air quality. While the EPA monitors and reports on multiple air pollutants, the Air Quality Management system focuses on $PM_{2.5}$. Causes of high levels of $PM_{2.5}$ include vehicle exhaust, sources such as power plants, and the burning of fuels such as wood, coal, or heating oil. In addition, the concentration of $PM_{2.5}$ can increase significantly during a wildfire. Particulate sensors measure the levels of $PM_{2.5}$ and when thresholds are exceeded, Safety is automatically notified. If the particulate source is confirmed to be a wildfire, notifications with AQI information are sent to supervisors via text and email.

The Air Quality Station Maintenance Program targets maintenance and calibration of the particulate sensors. Maintenance of the particulate sensors includes a scheduled monthly, quarterly, and annual inspection. Each visit provides rigorous preventative maintenance to ensure accurate functioning of the sensors and includes cleaning cyclone traps, replacing pumps, purging filters, and factory service for the inlet heater, pump, and optical module as needed.

10.2.1.3 FUEL MOISTURE (WMP.1334)

Meteorology manages a robust network of dead fuel sensors in the HFTD. Eight 10-hour-dead-fuel moisture sensors have been installed along with nine Normalized Difference Vegetation Index (NDVI) cameras in strategic locations, providing daily values for 10-hour fuels and grass health, respectively. Additionally, Meteorology receives weekly NDVI values from low earth orbiting satellites that scan 20 areas of interest within the service territory that are representative of grasslands. Finally, LFM values are received from the U.S. Forest service for two areas in the service territory monthly and then every 2 weeks during times when fuel moisture values are critical. Fuels sampling provides inputs to the FPI, which informs company operations of the fire potential for the coming week.

10.2.2 EVALUATION AND SELECTION OF NEW SYSTEMS

SDG&E evaluates new technologies to reduce the risk of wildfire ignitions by periodically gathering subject matter experts to discuss opportunities that focus on prevention, detection, mitigation, and operational improvement. The financial viability of deploying new technologies at scale is evaluated, along with the potential for risk reduction against costs, regulatory requirements, and available funding. Operational costs and long-term maintenance of the technology may also be evaluated. Once proven effective, technologies are integrated into the broader wildfire mitigation efforts. This could involve new operational procedures, updated safety protocols, and enhanced training for utility personnel. Performance of the new technology is then monitored and adjusted as needed. Feedback from ongoing extreme weather conditions, updated risk assessments, and technological advancements help fine-tune the strategies.

At the beginning of every calendar year, wildfire mitigation and planning conferences are strategically mapped out with the intent of sharing and learning best practices with other utilities, industry experts, and academia. Meteorology participates in panels, round table discussions, and presentations with the intent to constantly improve and refine wildfire mitigation protocols. Additionally, Meteorology participates in the annual Utility Wildfire, Weather & Analytics Summit, which is a gathering of meteorologists and data scientists from all western utilities and includes presentations from industry experts and academic research. This annual event is critical toward maintaining and sharing expertise across participating utilities concerning all wildfire mitigation best practices.

10.2.3 PLANNED IMPROVEMENTS

Planned improvements to Environmental Monitoring Systems include utilizing prior years' weather station observation data (WMP.1461) to perform annual updates to relevant wind gust percentile values to support situational awareness decision-making.

For a list of planned improvements, refer to the qualitative and quantitative targets in OEIS Table 10-1.

10.2.4 EVALUATING ACTIVITIES

The Weather Station and Maintenance Program calibrates weather station instruments annually in alignment with National Weather Service (NWS) procedures and internal procedures. The weather station status is also continuously updated on an internal dashboard. If erroneous data is found, it is flagged for further evaluation and crews are dispatched to correct any misreporting weather station. NDVI data is also consistently evaluated for accuracy and compared to in situ observations performed by Meteorology.

The Air Quality Station Maintenance Program targets the maintenance and calibration of particulate sensors. It includes a scheduled monthly, quarterly, and annual inspection. Each visit includes preventative maintenance to ensure accurate functioning of the sensors. In addition, output data is compared to county data.

Utilizing Google Earth and resident knowledge of the service territory, Meteorology has co-located eight DFM sensors within the service territory that accurately reflect the state of dead fuels critical to fire potential understanding. These strategically placed sensors augment the existing Remote Automated Weather Station (RAWS) DFM sensors throughout the county. They are evaluated weekly and compared to existing sensors to verify the accuracy of reporting.

10.3 GRID MONITORING SYSTEMS

10.3.1 EXISTING SYSTEMS, TECHNOLOGIES, AND PROCEDURES

OEIS Table 10-3: Grid Operation Monitoring Systems

System	Measurement/Observation	Frequency	Purpose and Integration
Advanced Radio Frequency Sensors	Radio Frequency signals	Real-time	Used to correlate trends and determine failing equipment and the location of the failing equipment.
Power Quality Meters	Event based voltage and current waveforms (greater than 128 samples per cycle)	Event based	Waveform data is consumed by a platform that uses AI and machine learning algorithms to determine failing equipment and the location of the failing equipment.
SCADA	Telemetered points in RTUs provide status and analog data based on sensor type. Field devices are on both 12 kV and 4 kV circuits.	Varies by sensor type	Used by DSOs to monitor and control field equipment. Monitors telemetered points and alarms and operates field RTUs giving DSOs real-time situational awareness.
Data Historian	Collects and tracks data such as electricity usage, energy consumption, and other data points such as megawatts, mega volt amps, and reactive power breaker status.	Real time (60 seconds or less), varies by sensor type	Captures, stores, and provides access to real-time and historical data from sensors, devices, and systems. Used to monitor and optimize energy consumption, identify problems and inefficiencies, and perform data analysis and reporting.

System	Measurement/Observation	Frequency	Purpose and Integration
OMS	Locations and duration of outages (SCADA is source of data).	Continuous (24 hours a day, 7 days a week, 365 days)	Hub for distribution operations regarding outage and distribution planning management. Integrated with a variety of systems to identify and restore outages.
LPCN OTV	Monitors field devices, such as WFIs and federal aviation (FAA) lights, that are connected through the Low Power Communications Network (LPCN).	1 measurement per hour for each WFI (2,900 total WFIs) and 3 measurements per hour for each FAA light.	See Measurement/Observation
Synchrophasors/ Phasor Measurement Units (PMU)	Displays measured electrical quantities such as phase voltage magnitude, phase current magnitude, phase angle, and frequency of electrical signals in the grid (e.g., MW, MVAR, Phase Angle, Frequency, Phase Magnitude).	Real time; 30 samples per second per PMU sensor location	Used to display and measure electrical characteristics of the electric power system. Data is transmitted to a central monitoring system where it can be used for data analysis, reporting, and control purposes.
Smart Meter	Collects meter data such as measured intervals and register consumption data for billing customers as well as other meter information such as voltage, events, and alarms. Openway is used for pinging / load-side voltage checks for groups of meters to verify outage conditions.	Voltage Data is collected once per day. Alarm data is transmitted real-time. All other data is retrieved once per day.	Smart Meter Openway is integrated to OMS, for pinging / load-side voltage checks. OSIPi is subscribed to receive voltage information from a subset of pre-designated meters.

The EFD Program (WMP.1195) utilizes various technologies to detect what are known as incipient faults on the system with enough time to locate and potentially fix or replace equipment prior to it permanently failing. These incipient faults occur on failing pieces of equipment long before they fail violently and cause damage to the surrounding area. Technologies implemented by the EFD Program include Advanced Radio Frequency Sensors (ARFS) and PQ Meters.

ARFS use radio frequency monitoring of partial discharges from primary conductors to find, replace, and/or repair damaged components before they fail. Sensors are installed for each phase at 4-kilometer intervals along a circuit extending from just outside the substation to the end of its furthest branches. Data is collected every second and backhauled on commercial cell communication networks to web servers. Software analysis eliminates spurious signals and isolates signals which are generated by the electrical facilities. Comparing the timing of the arrival of the signals at two adjacent installations (nodes) allows the location of the equipment generating the signal to be determined within 10 meters on the path between the nodes. The developer analyzes the data and provides monthly reports showing low-, medium-, or high-risk ratings for each structure on the path, allowing targeted inspections of the facilities to find the damaged equipment generating the signal.

PQ meters can remotely monitor, capture, and transmit high-resolution electric system data, supporting electric transmission, distribution, and substation asset management, operations, power quality investigations, distributed energy integration, reliability improvement, fire risk reduction, fault location, and predictive fault analytics.

The PQ monitoring system provides the following benefits:

- Provide health information for distribution, transmission, and substation systems (e.g. RMS voltage, transient events, harmonics, power flow, power factor, flicker)
- Logging and notifying events on transmission, distribution, and customer systems Advanced analytics for fault detection and locating Advanced analytics processes, including incipient fault detection (aka, fault anticipation or predictive fault analysis) and advanced fault locating
- A data source with analytics for historical events and steady state trends

The data collected is regularly used by various groups, such as Commercial and Industrial Services, Electric Transmission, and Distribution Engineering and Planning.

SCADA devices monitor telemetered points and alarms and operate field RTUs, providing real-time situational awareness. There are over 900 SCADA sites in substations and field devices located in the HFTD. The system triggers data collection through solicited polling to bring in status and analog changes. SCADA front end processors provide quality codes that identify bad data, and remote terminal units have internal diagnostic points that indicate bad data. SCADA alarms record these diagnostic events. Calculated quantities vary by sensor type (e.g., analog min/max/average is calculated by the system, trending allows for customized min/max/average calculations).

Data Historian captures, stores, and provides access to real-time and historical data from SCADA sensors, devices, and systems and is located on servers at SDG&E. Data Historian provides analytical calculations based on raw data received from SCADA sites. SCADA provides quality code data points that identify bad data.

Outage Management System (OMS) is the hub for distribution operations regarding outage and distribution planning management and is located on servers at SDG&E. Data is collected from customer notifications, meter data (loss of power), and SCADA devices. Distribution System Operators verify outage via electric troubleshooters. Calculations from OMS data provide SAIDI and SAIFI metrics.

Low Power Communications Network (LPCN) Onramp Total View (OTV) monitors field devices connected through the LPCN. Device type examples would be Wireless Fault Indicators and Federal Aviation Lights.

Synchrophasors/PMUs are installed at key points in the grid to provide a comprehensive view of the grid's performance. In the HFTD, there are over 400 Transmission PMUs from transmission substations and over 200 Distribution PMUs from distribution substations and field devices. Data is constantly streamed at 30 samples per second from each PMU sensor location. Measured quantities are verified by system operators and compared against SCADA/EMS data. Measured electrical quantities are analog values and breaker statuses are digital values.

Wireless Fault Indicator (WFI) devices are used to monitor electricity distribution lines and locate faults more efficiently and accurately using LPCN communication to alert distribution system operators where a fault on a line or circuit has occurred. WFIs can detect faults without having a minimum continuous current on the line and therefore can be used at remote locations that have very little load. Distribution operators can then dispatch electric troubleshooters close to the exact fault location to identify and isolate the fault and begin service restoration quickly. Due to manufacturer upgrades that resulted in incompatibility with current communications (see the 2025 WMP Update for details), the WFI program is being discontinued. Installed WFIs will continue to be utilized for situational awareness. See Table 13-2 for details on discontinued programs.

Smart Meter is a suite of applications that are part of the meter-to-cash flow. The OpenWay Collection System application communicates with the SDG&E Smart Meter mesh network to return the measured intervals/register consumption data for customer billing. It also gathers other meter information such as voltage, events, and alarms. Voltage information is forwarded to OSIPi as a subscribed service. The Meter Data Management System is the SDG&E application responsible for requesting and storing measurement data from Smart Meters deployed in the service territory. Each day, new consumption data is exported to the Customer Information System (CIS) system to support billing, MyAccount, Data Warehouse, and third-party systems.

10.3.2 EVALUATION AND SELECTION OF NEW SYSTEMS

New ideas and initiatives are obtained through collaborating with regulators and other utilities, evaluating the performance of existing systems, and reviewing emerging technology. Proposed modifications or additions are reviewed for feasibility and the associated potential costs and benefits before being approved and implemented. When a new technology is developed, the methodology for evaluating its efficacy is also determined with input from internal subject matter experts, industry experts, and academia.

10.3.3 PLANNED IMPROVEMENTS

Planned improvements to Grid Monitoring Systems include integrating power quality, fault data, and smoke detection to enhance situational awareness and support grid reliability.

For a list of planned improvements, refer to the qualitative and quantitative targets in OEIS Table 10-1.

10.3.4 EVALUATING ACTIVITIES

Evaluation of the efficacy of grid operation monitoring programs is performed for each system as follows:

- EFD: Provides system incipient faults for evaluation of potential system equipment issues.
- SCADA: front end processor provides quality codes that identify bad data. RTUs have internal diagnostic points that indicate bad data. SCADA alarms record these diagnostic events.
- Data Historian: SCADA provides quality code data points that identify bad data.
- OMS: Distribution System Operators verify outage via trouble shooters.
- LPCN OTV: Assists in Detecting Distribution Faults. Fault notifications are manually checked for accuracy and data quality verification is performed.
- Synchrophasors: Measured quantities are verified by system operators and compared against SCADA / EMS data in parallel.
- Smart Meter: Openway provides meter/load-side voltage confirmation when requested. No verification of results is performed.

10.4 IGNITION DETECTION SYSTEMS

10.4.1 EXISTING IGNITION DETECTION SENSORS AND SYSTEMS

The overall responsibility for monitoring and effectively communicating information about emerging incidents is assigned to the Fire Science and Coordination team, comprised of former firefighters who bring experience in emergency response and developing relationships with first responders. The team also staffs a 24/7/365 On Duty Fire Coordinator responsible for monitoring radio traffic and coordinating with local agencies to receive dispatch notifications, coordinating with internal and external resources to respond to requests from first responder agencies, and responding to the scene of an incident when necessary to serve as the single point of contact from the utility to the Incident Commander.

OEIS Table 10-4: Ignition Detection Systems Currently Deployed

Detection System	Capabilities	Companion Technologies	Contribution to Fire Detection and Confirmation
Satellite Based Remote Sensing	Ignition detection from geostationary satellite	Used with camera imagery to verify fire detection	Provide confirmation of wildfires and help operators assess the scope of resource response needed.
Cameras	Smoke detection	Used with satellite ignition detection to verify fire	Corroborate the initial hot spot detections from space.

10.4.1.1 SATELLITE BASED REMOTE SENSING (WMP.971)

In collaboration with the Space Science and Engineering Center (SSEC), GOES 18/-17 and the ABI are utilized to operationalize fire detection and characterization at a spatial resolution of 2 kilometer and a temporal resolution of 5 minutes and in some circumstances 1 minute or faster. Fire Detection and Characterization is accomplished with the Wildfire Automated Biomass Burning Algorithm (WFABBA) adopted for ABI-class sensors. Hotspots are rated in six fire categories based on confidence in the Fire Radiative Power, size, and temperature estimates.

Space-based fire alerts are sent to the San Diego Supercomputer Center (SDSC) in real time where they are archived and processed for relevance within established boundary conditions and filtered for false positives. The ignition data is then sent to SDG&E as an email with a link to a web-based map of the area that includes camera images auto triangulated on the fire.

The GOES system is in geo-stationary orbit and continuously images the western United States. It is expected to be operational until 2033. The sensor pathways are government controlled and thus the resiliency is unknown but assumed to be durable and redundant. Ignition detections that have been characterized as legitimate fires on the landscape are promulgated to appropriate users within the organization. False positive filtering is ongoing and recurring indicators such as industrial solar farms are routinely filtered from the terrestrial scan. Typically, the time between detection and confirmation is less than 5 minutes. The information obtained from the GOES system is securely processed within the WFABBA algorithm and sent to the SDSC for post processing.

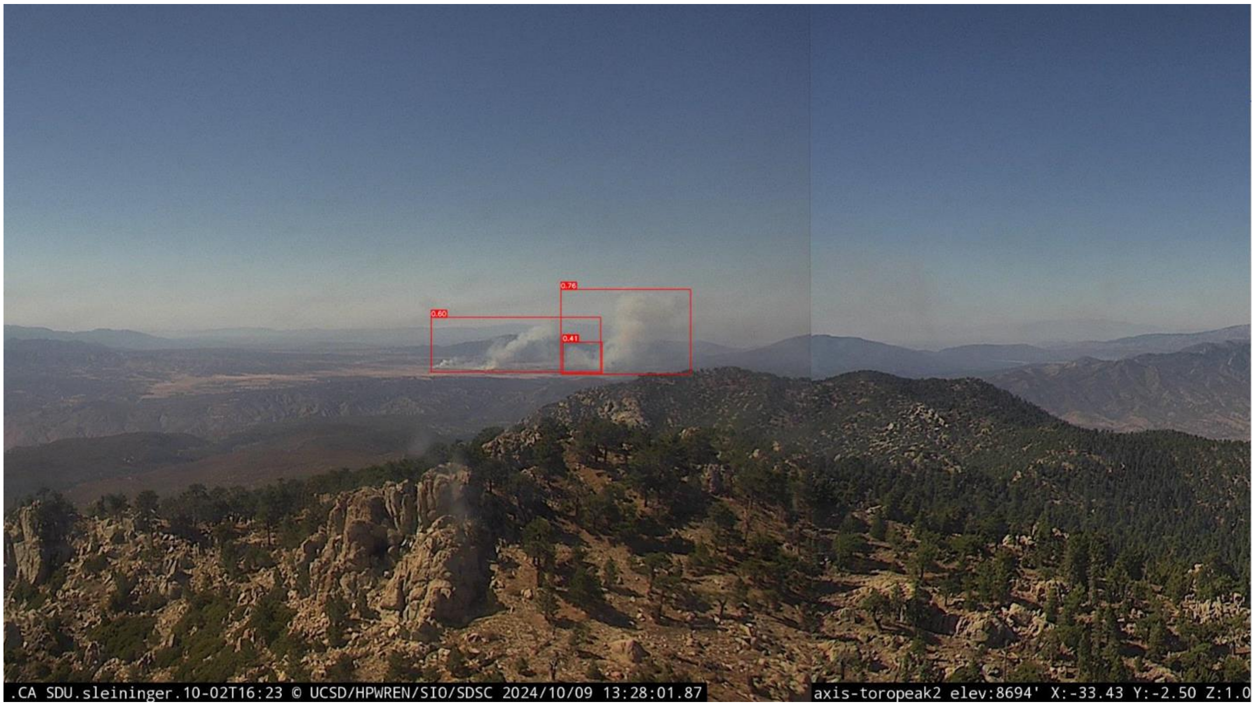
10.4.1.2 CAMERAS (WMP.1343)

The robust camera network of over 140 mountain-top cameras captures smoke plumes, which are associated with fire ignitions, in near real-time throughout the service territory. This network of cameras is built on the High-Performance Wireless Research and Education Network (HPWREN) in partnership with UC San Diego and local fire departments. The network consists of a combination of fixed view cameras and Pan-Tilt-Zoom cameras with remote access for limited SDG&E personnel and local fire agency personnel to aid in the triangulation of ignitions or areas of interest. Images are relayed through Federal Communications Commission (FCC)-licensed radio spectrum to the ALERTCalifornia website (https://alertcalifornia.org/), a publicly available web-based platform.

Cameras are strategically located on mountain tops with optimal viewsheds of mountainous areas of dense brush and chaparral, providing vantage points for not only the HFTD but for some WUI areas and urban areas. Cameras provide visual confirmation of reported ignitions or areas of concern. Camera feeds do not provide positive or negative imagery but rather a constant image feed. Recent AI advancements provide registered users access to AI smoke detection information, further enhancing the speed and accuracy needed to maintain critical situational awareness. This new feature is significant to emergency responders and their ability to quickly assess a reported situation. SDG&E does not filter false positives from AI smoke detection information, rather CAL FIRE employees who are alerted of a possible smoke plume are responsible for confirming if it is valid or not.

The security of the camera network is managed by the UC San Diego supercomputing center and is independent of any internal systems. SDG&E does not own the cameras but provides funding to the HPWREN user group for camera maintenance and installation. The maintenance funding provides redundant feeds for all cameras such that if a feed is lost through the ALERTCalifornia website, backup imagery is available through the HPWREN-dedicated website. In addition, backend communication pathways are comprised of a multi-point radio system thereby providing redundant pathways for relaying camera imagery.

Figure 10-1: Smoke Detection Image Identified by AI Smoke Detection Algorithm



10.4.1.3 FIRE GROWTH POTENTIAL SOFTWARE

The WRF model is a numerical weather prediction system developed by the National Center for Atmospheric Research (NCAR) and designed for both atmospheric research and operational forecasting applications. NCAR was established by the National Science Foundation in 1960 and is managed by the nonprofit University Corporation for Atmospheric Research (UCAR). The WRF is an open-source model available at https://www.mmm.ucar.edu/models/wrf/support.

Technosylva's Wildfire Analyst-Enterprise (WFA-E) product is used along with the WRF to conduct fire modeling, deliver modeling outputs, and monitor and visualize results with software applications. Wildfire behavior modeling and risk analysis is applied to address two scenarios.

First, the modeling is used with historical re-analysis WRF weather data to support the mitigation planning process. WFA-E FireSight™ is used to quantify risk metrics from millions of wildfire simulations using numerous WRF weather scenarios. These simulations are based on the 125 most severe historical fire weather days recorded between 2013 and 2021 within the service territory. FireSight™ model outputs of acres burned, buildings destroyed, and population impacted estimates are used to assess the potential wildfire consequences of unsuppressed ignitions originating from SDG&E asset locations and lasting 8 and 24 hours. This wildfire consequence data is then combined with probability of failure and probability of ignition analysis developed internally to define composite risk values that support prioritization of asset hardening and related mitigation. As a result of extreme fire weather conditions experienced in December 2024 and January 2025, representative fire weather days for the FireSight™ model will be updated.

Second, the WFA-E FireRisk™ is used with daily WRF-based weather forecast data to calculate consequence-based risk metrics for all assets as possible ignition sources. Other key input datasets such as surface and canopy fuels, and LFM and DFM, are developed daily using machine learning models to calculate the wildfire behavior outputs as part of the risk analysis model. Wildfire risk forecasts are derived daily, with a multi-day outlook on an hourly basis. This information is used as an input to key decision making related to operational requirements, such as PSPS de-energizations, resource allocation and deployment, and field operations.

10.4.2 EVALUATION AND SELECTION OF NEW DETECTION SYSTEMS

Ignition detection technology is unique relative to the service territory and requires flexibility in determining how best to evaluate. Through testing and deployment of the two existing ignition detection systems, cameras and satellite based remote sensing, SDG&E concluded that these two technologies proved most effective and therefore, SDG&E's ignition detection capabilities are fully mature. When or if a new technology is developed, the methodology for evaluating its efficacy is determined with input from internal subject matter experts, industry experts, and academia. FSCA leverages relationships with industry experts in the public and private sector such as Western Weather and the University of Wisconsin to benchmark state-of-the-art technologies, as needed. In addition to determining the efficacy of new technologies, Safety staff attend conferences where exhibitors demonstrate emerging technologies to assist with hazard recognition and controls. The appropriate business unit will evaluate the technology for applicability and develop a proposal for deployment, including cost projections. Costs are reviewed by leadership within the business unit proposing the project.

10.4.3 PLANNED INTEGRATION OF NEW IGNITION DETECTION TECHNOLOGIES

A formal process for the planned integration of new ignition detection technologies does not exist because each technology is unique and requires a unique integration process. When a new technology is developed or implemented, the methodology for physical integration, system integration into existing data analysis, and budget and staffing support are determined for that technology.

10.4.4 EVALUATING ACTIVITIES

For satellite-based remote sensing, the efficacy of the fire detection system from the GOES satellite is evaluated each time there is a fire detection from space. The ignition detection is compared to mountain-top camera feeds at the same location and corroborated with radio indication from CAL FIRE received by the FSCA. Camera effectiveness is measured by uptime and availability to both SDG&E and first responders.

The SDG&E Risk Analytics team, in collaboration with Meteorology and Fire Coordination teams, utilizes a comprehensive set of scripts and validation processes for the FireSight™ model. Additionally, SDG&E collaborates with Technosylva to ensure that model enhancements and outputs undergo rigorous testing and validation. Technosylva also works directly with CAL FIRE to validate the model's performance and identify opportunities for improvement. This collaborative approach between teams helps maintain the integrity and effectiveness of the models used in SDG&E's decision-making process.

10.5 WEATHER FORECASTING

10.5.1 EXISTING MODELING APPROACH

Meteorology owns and operates three supercomputers running 10 ensembles of the WRF Model at 0.6, 1.5, 2, 2.5, and 6-kilometer horizontal resolution, generating over 170 gigabytes of data daily. Forecast simulations are displayed in visualization portals to help with analysis and preparation of accurate weather forecasts, which are reviewed by meteorologists prior to publishing. In addition to 16 weather parameters and 10 fire parameters that are modeled and visualized, post processed models and indices provide additional situational awareness:

- The Machine Learning Wind Gust model for the HFTD (217 out of 223 weather stations) provides situational awareness 72 hours prior to a dangerous fire weather event. The circuit forecast is generated twice daily with the latest weather model forecasts and the output is a 3-day forecast for each circuit associated weather station, delineating max wind gust and time for each day.
- The FPI is a 7-day forecast that classifies fire potential based on weather and fuels condition in eight districts. It is used daily by employees and supervisors for crew deployment and resourcing decisions and is shared with local fire agencies, emergency responders, and the NWA.
- The Santa Ana Wind Threat Index (SAWTI) was developed to rate Santa Ana wind events and is issued daily by the U.S. Forest Service.

Weather data and forecast modeling is integrated into fire behavior and fire potential tools, contributing to ignition probability and estimated wildfire consequence. Fuel moisture data available from the RAWS and fire agencies is closely monitored, including the Energy Release Components, LFM Percentages through the National Fuels Database, and the number of grams of water that are measured in the 1-, 10-, 100-, and 1000-hour fuels across the region. LFM values are considered extreme when the reading falls below 60 percent.

The AI forecasting system has been integrated across 217 weather stations, providing the latest available forecasting technology to help serve communities in the highest risk fire areas. The ability to implement this technology stems from recording weather observations every 10 minutes for over 15 years, collecting almost one billion observations that are available to be used in training artificial intelligence (AI). As more data is collected each year, more data can be integrated back into the forecasting system to improve the model, increasing the accuracy of weather forecasts, which are shared with the public and fire agencies.

High-performance computing clusters generate high-quality weather data that is incorporated directly into operations. Collectively, nearly 2,000 compute core hours of high-performance computing are used per day to generate operational products, including the SAWTI, FPI, and WFA-E. The forecast data generated by these supercomputers is shared with researchers and various stakeholders and Application Programming Interfaces (APIs) enable public access to WMP-related datasets by authorized users for use in fire modeling.[53]

[53] WIFIRE List of SDG&E Datasets; https://wifire-data.sdsc.edu/organization/sdge

10.5.1.1 WEATHER RESEARCH AND FORECASTING (WMP.541)

WRF is a state-of-the-art mesoscale numerical weather prediction system designed for both atmospheric research and operational forecasting applications. It features two dynamical cores, a data assimilation system and a software architecture, that support parallel computation and system extensibility. The model serves a wide range of meteorological applications across scales from tens of meters to thousands of kilometers. In 2023 a new operational WRF model was established with a resolution of 1.5 km, which improved the weather and dead fuels moisture components. In addition, SDG&E transitioned to a 3.7-meter resolution NDVI as an input to the FPI. This improved the measures of grass health in the service territory. For researchers, WRF can produce simulations based on actual atmospheric conditions (i.e., from observations and analyses) or idealized conditions. WRF offers operational forecasting a flexible and computationally efficient platform while reflecting recent advances in physics, numeric, and data assimilation contributed by developers from the research community. WRF is currently in operational use at National Centers for Environmental Prediction (NCEP) and other national meteorological centers as well as in real-time forecasting configurations at laboratories, universities, and companies.

WRF has a large worldwide community of registered users (a cumulative total of over 57,800 in over 160 countries as of 2021), and NCAR provides regular workshops and tutorials.

10.5.1.2 SAWTI (WMP.540)

The SAWTI calculates the potential for large wildfire activity based on the strength, extent, and duration of the wind, dryness of the air, dryness of the vegetation, and greenness of the grasses. Similar to the hurricane-rating system, the SAWTI compares current environmental data to climatological data and correlates it with historical wildfires to rate a Santa Ana wind event using four threat levels that range from "marginal" to "extreme."

For details on the SAWTI, refer to Appendix B and the Santa Ana Wildfire Threat Index: Methodology and Operational Implementation.[54]

10.5.2 KNOWN LIMITATIONS OF EXISTING APPROACH

As with any computational weather model, there are temporal and spatial limitations to the parameters that are being modeled into the future. Specifically, WRF spatial resolution is on a 1.5-kilometer grid, which may not resolve micro scale weather phenomenon induced by diverse terrain. Additionally, running a numerical weather model at a high resolution has a temporal limitation of less than 5 days.

All components of the SAWTI are modeled and thus there are inherent limitations to each. In addition, several major assumptions are made when calculating the SAWTI. See The Santa Ana Wildfire Threat Index: Methodology and Operational Implementation for details.

10.5.3 PLANNED IMPROVEMENTS

Planned improvements to Weather Forecasting Systems include leveraging current and forecasted weather conditions to support the annual analysis of FPI predictions.

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54 Rolinski, T., S. B. Capps, R. G. Fovell, Y. Cao, B. J. D'Agostino, and S. Vanderburg. 2016. The Santa Ana Wildfire Threat Index: Methodology and Operational Implementation. Wea. Forecasting, 31, 1881–1897. https://doi.org/10.1175/WAF-D-15-0141.1

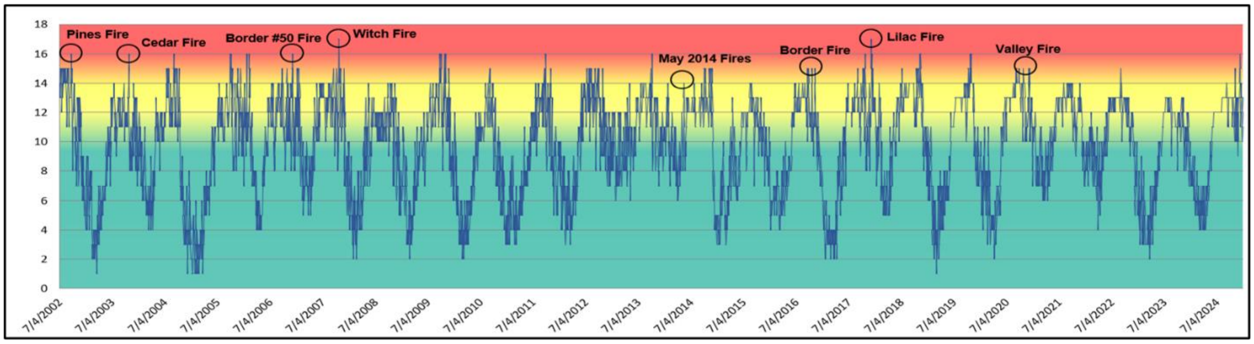
Other planned improvements include developing a large (at least 80 members) ensemble-based 7-day weather forecast system that will run daily and developing additional weather forecast simulations with a horizontal grid spacing of 600 meters.

For a list of planned improvements, refer to the qualitative and quantitative targets in OEIS Table 10-1.

10.5.4 EVALUATING ACTIVITIES

The FPI calculation is continually evaluated using historical weather and fuels data and then compared to historical fires in the service territory. This evaluation shows that as the FPI value increases, so does the occurrence and severity of large fires. Figure 10-2 shows the calculated FPI rating and major wildfires that occurred from 2002 to 2021. Large, destructive fires occurred at FPI values of 14 and above.

Figure 10-2: Historical Major Wildfire Correlation to FPI

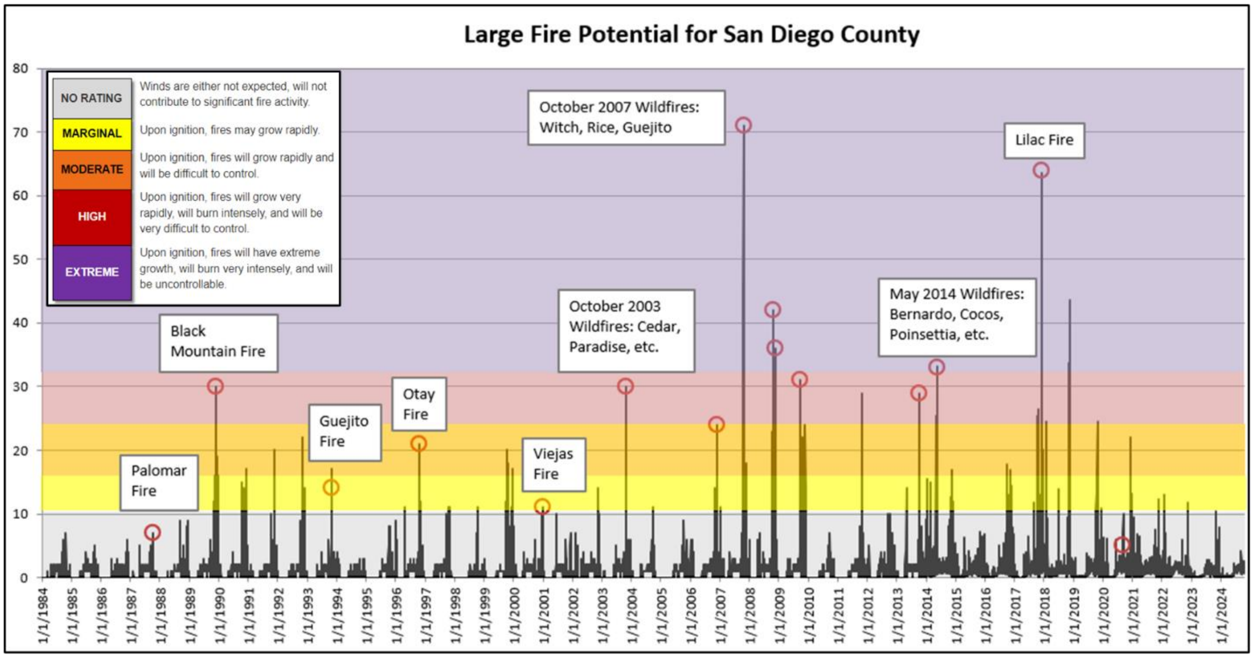


The FPI is also validated daily using representative weather stations for wind speed, dewpoint depression, and DFM observations. Satellite data of NDVI is used to validate the greenness of the grass, and local LFM measurements are used to validate LFM. The actual (validated) FPI is recorded daily and can be used to compare to the predicted FPI.

The SAWTI was calculated from 1984 through 2021 and compared to the occurrence of large fires in Southern California during Santa Ana winds. Figure 10-3 shows that the majority of large wildfires occurred during periods of High or Extreme SAWTI ratings, demonstrating the SAWTI as a reliable tool for assessing the fire environment. Refer to The Santa Ana Wildfire Threat Index: Methodology and Operational Implementation Section 3d-Validation for details on efforts undertaken to verify and validate model performance.[55]

55 Rolinski, T., S. B. Capps, R. G. Fovell, Y. Cao, B. J. D'Agostino, and S. Vanderburg. 2016. The Santa Ana Wildfire Threat Index: Methodology and Operational Implementation. Wea. Forecasting, 31, 1881–1897; https://doi.org/10.1175/WAF-D-15-0141.1

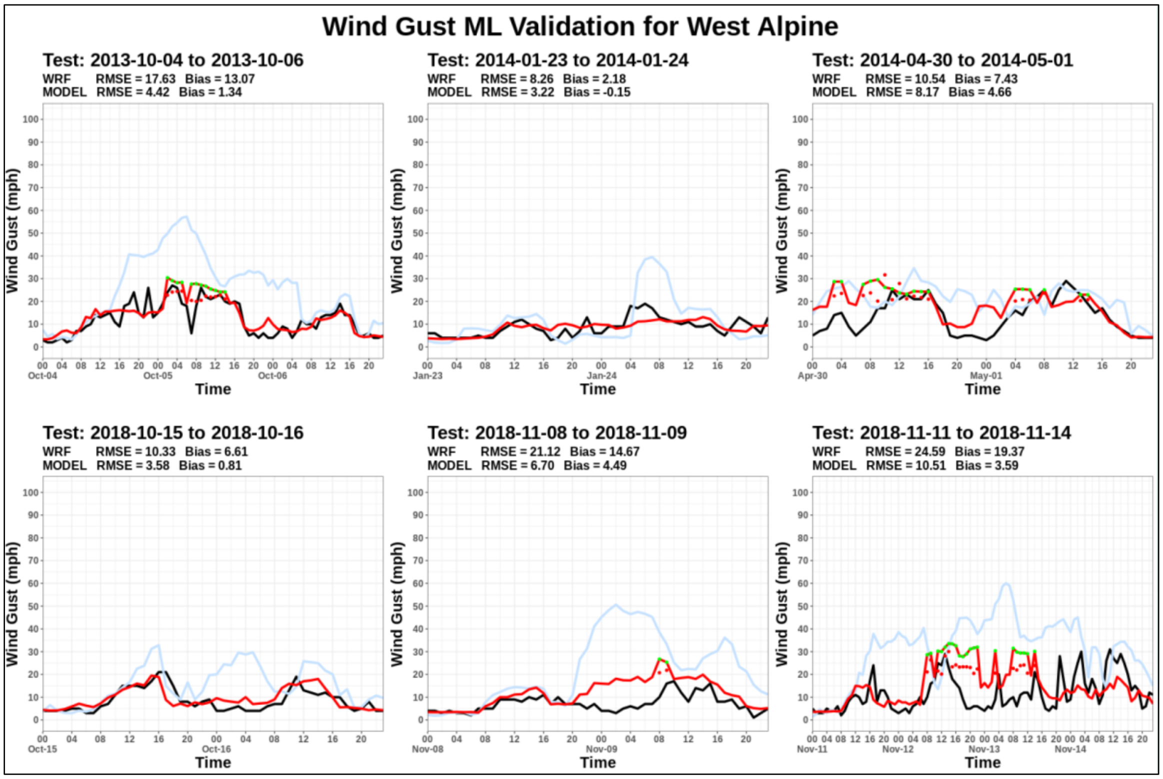
Figure 10-3: SAWTI Across Time and Incidences of Major Wildfires



The machine learning wind gust forecast model was trained using the Random Forest algorithm with available observations collected from the surface weather network. This model also uses the XGBoost (eXtreme Gradient Boosting) algorithm to better capture high wind days.

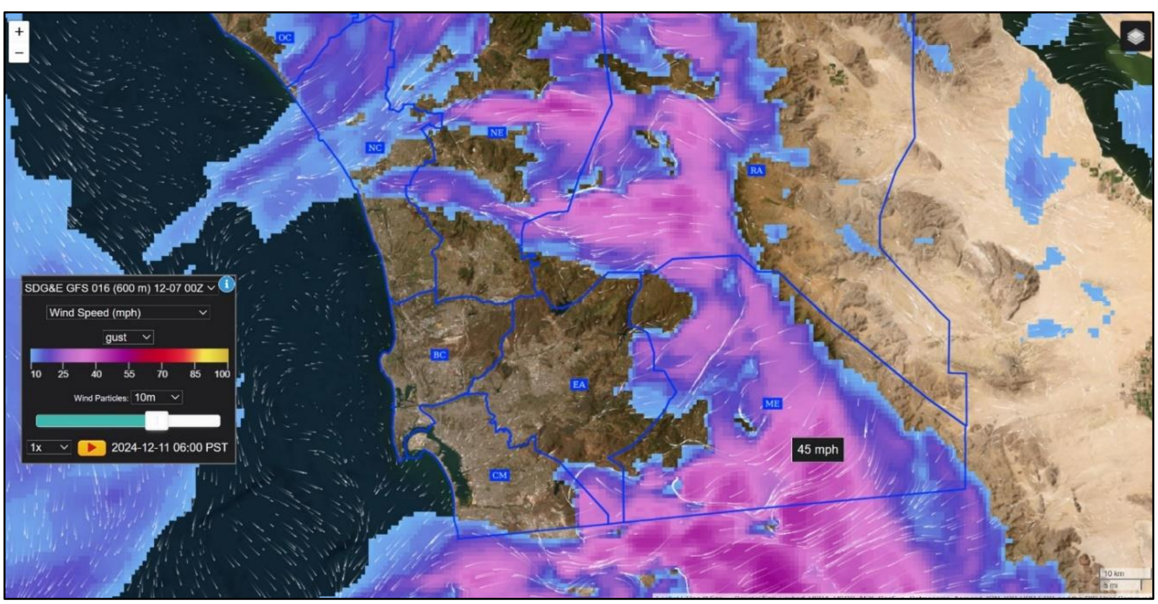
Validation showed the model's success at adding accuracy when applied to a sample of 15 weather stations for 22 RFW and/or Extreme FPI dates. An example of the validation, shown in Figure 10-4, shows the observed observations (black), the WRF gust forecast (light blue) and the machine learning gust forecast model (red and green) for the West Alpine weather station. Each of the six boxes represents peak winds during a representative RFW and/or Extreme FPI date. The WRF model clearly over forecasts the wind gusts in all six scenarios and the machine learning gust.

Figure 10-4: Wind Gust Machine Learning Validation for West Alpine



The Machine Learning Gust Forecast model is an integral tool for understanding and forecasting small-scale, complex terrain-induced wind flow and for identifying areas where wind can reach critical and impactful magnitudes when numerous forcing scenarios are implemented. Figure 10-5 is a high-resolution Machine Learning Gust Forecast model output that highlights areas of critical wind flow based on specific forcing.

Figure 10-5: Example of Machine Learning Gust Forecast Model Output



10.5.5 WEATHER STATION MAINTENANCE AND CALIBRATION

The Weather Station Maintenance and Calibration (WMP.1430) Program is dedicated to the maintenance and calibration of weather stations.

The Weather Station Network strategically positions weather stations to transmit data on sustained wind speed, wind gust, wind direction, temperature, and humidity every 10 minutes using cellular and spread spectrum communications. Although SDG&E does not have a set acceptable outage percentage, the stations have consistently maintained a 99 percent communication rate (data on weather station communication rates is reported in Table 3 of the QDR table 3).

Reduced coverage does not increase risk due to the dense network of multiple stations on HFTD circuits and the presence of field observers in extreme circumstances.

SDG&E's challenging terrain can hinder maintenance visits and access to certain sites. In 2024, two stations were inaccessible for maintenance and calibration.

The network is essentially complete, representing every circuit within HFTD Tier 2-3. A few circuits in urban or coastal areas do not have weather stations due to a lack of practical need.

10.6 FIRE POTENTIAL INDEX (WMP.450)

10.6.1 EXISTING CALCULATION APPROACH AND USE

The FPI was developed to communicate the wildfire potential on any given day to promote safe and reliable operations. This 7-day forecast product, produced daily, classifies the fire potential based on weather and fuels conditions and historical fire occurrences.

The FPI reflects key variables such as the state of native grasses across the service territory ("green-up"), fuels (ratio of DFM component to LFM component), and weather (sustained wind speed and dew point depression). Each of these variables is assigned a numeric value and those individual numeric values are summed to generate a Fire Potential value from 0 to 17 that expresses the degree of fire threat expected for each of the 7 days included in the forecast. The numeric values are grouped into "Normal", "Elevated", and "Extreme".

The FPI first assumes that an ignition takes place and attempts to predict the susceptibility of the environment to support fire growth from that presumed ignition. There is a necessary assumption that the weather and fuels forecast will be accurate and that the fuel types and terrain characteristics are homogeneous. The result is a blanket FPI applied over a spatially diverse district.

Extreme FPI ratings are associated with an increase in the probability of the environment supporting large wildfires. To mitigate this risk, standard operating procedures may be modified or even cancelled during days with Elevated or Extreme FPI ratings.

FPI improvements have been realized with the recent implementation of a 1.5-kilometer WRF model, which is a significant improvement from the previous 2-kilometer gridded solution. This improvement resulted in a higher resolution of model inputs such as wind speeds, dryness of the air and the condition of grasses, dead fuels and live fuels.

For details on the existing calculation approach, assumptions, and operational use, see Appendix B.

OEIS Table 10-5: Fire Potential Features

Feature Group	Feature	Altitude	Description	Source	Update Cadence	Spatial Granularity	Temporal Granularity
Weather	Temperature	Surface	Temperature at the surface in Fahrenheit	Weather model	6 per day	1 km	Hourly
Fuel Moisture	Dead Fuel Moisture	Surface	Fuel moisture content	Weather model and third-party dataset	Daily	2 km	Daily
Fuel Moisture	Dead Fuel	Ground	10-hour fuels are 0.25 inch to 1 inch in diameter	Remote Automatic Weather Stations (RAWS)	Hourly	1.5 km grid	Hourly
Fuel Moisture	Live Fuel	Ground	Moisture content within living vegetation	U.S. Forest Service	Bi-Monthly	National Forests	Bi-Monthly
Fuel Moisture	Grass	Space	Normalized Difference Vegetation Index (NDVI)	Planet Labs	Weekly	3.7 m	Daily

Efficacy Study - Determination of Average Distribution Ignition Percentages by Location and Operating Risk Condition

An efficacy study was performed to determine the average distribution ignition percentages by location (e.g., non-HFTD, Tier 2 of the HFTD, or Tier 3 of the HFTD) and by operating risk condition (e.g., FPI rating of Normal, Elevated, or Extreme). The risk of ignition is greater in the HFTD and in elevated and extreme operating conditions. By comparing risk events to ignitions sorted by location and operating condition, the difference in risk in terms of ignition probability was quantified. Additionally, ignition percentage values could be provided for the purposes of improved RSE calculations and improved risk modeling.

The results of this study validate certain assumptions about the PoI (see SDGE Table 10-1). Over the last 5 years:

- A fault in the HFTD was more likely to cause an ignition than a fault in the non-HFTD.
- A fault in the HFTD during a day with an FPI rating of Extreme was more likely to cause an ignition than on a day with an FPI of Normal.

While ignition probability has historically been higher in Tier 2 than Tier 3, this does not take into account the risk of an ignition developing into a fire of consequence. Even though the ignition probability is shown to be higher in Tier 2, the risk of wildfire is higher in Tier 3 due to the impact of the risk equation.

SDGE Table 10-1: Five-Year Average Ignition Rate (2019-2023)

Location	Normal FPI	Elevated FPI	Extreme FPI	All FPI
Non-HFTD	0.66%	2.16%	0.00%	0.92%
Tier 2	2.26%	3.35%	22.22%	2.82%
Tier 3	1.38%	5.38%	11.11%	3.06%
System	1.06%	3.45%	10.00%	1.73%
HFTD (Tier 2 and Tier 3)	1.86%	4.33%	16.67%	2.93%

10.6.2 KNOWN LIMITATIONS OF EXISTING APPROACH

While the FPI has undergone verification and validation studies, there is some uncertainty regarding the specific weight of the FPI components within the formula. The projected FPI is based on a forecast model, which inherently produces uncertainty.

There are several limitations to this approach:

- The NDVI is measured from space.
- DFM is measured by 6 RAWS that are representative 8 operating districts.
- LFM is measured by the U.S. Forest Service at two locations that represent service territory.
- Modeling the fuels information into the future is at a 1.5-kilometer grid spacing.

Reference Appendix B for additional information.

10.6.3 PLANNED IMPROVEMENTS

Planned improvements to the FPI include ongoing analysis of FPI predictions versus observations to potentially improve the FPI predictions.

From the daily verification process of FPI forecast against observations, potential areas of improvement will be identified. Exploratory data analysis will also be performed to identify potential adjustments to the FPI formulation, which includes examining new input variables such as soil moisture.

For a list of planned improvements, refer to the qualitative and quantitative targets in OEIS Table 10-1.

Wildfire Safety | SDGE

2026-2028 Wildfire Mitigation Base Plan

Emergency preparedness, collaboration and community outreach

11 EMERGENCY PREPAREDNESS, COLLABORATION, AND COMMUNITY OUTREACH

SDG&E's Emergency and Disaster Preparedness Plan (the Company Emergency and Disaster Preparedness Plan or CEADPP) was developed in compliance with PUC§768.6(a) as a guide to govern emergency response efforts, including wildfire and PSPS emergency preparedness. This plan supports and is part of the overall emergency response plan framework.

The Wildfire Safety/PSPS Community Awareness campaign educates customers and the general public about the risk of wildfires and PSPS de-energizations through online webinars, Wildfire Safety Fairs, and outreach advisors who work with local CBOs to amplify messaging. The Tribal Relations team implements culturally appropriate communications and outreach based on feedback from Tribes via listening sessions, online surveys, and focus groups. During PSPS activations, customer notifications, media updates, in-community signage, and situational awareness postings are used across social media, including social media toolkits that are shared with community partners to reach a broad audience. Assistance and resource access is provided to those who are directly impacted by wildfires and/or PSPS activations. Emergency residential and non-residential customer protections are provided for wildfire victims, as ordered by the CPUC.[56]

SDG&E regularly engages with local governments at various levels. The Regional Public Affairs team engages senior and elected officials while the Emergency Management team works with first responders and other emergency management agencies. SDG&E participates in a series of weekly and monthly meetings with other California IOUs to strategize and align where possible on wildfire and PSPS mitigations. Additionally, the Company has a membership with Chartwell, Inc., a national membership group for gas and electric utilities, that collaborates on problem-solving opportunities and events to help utilities improve customer experience and operational efficiency.

56 SDG&E filed Advice Letter 3177-E/2645-G on January 26, 2018, in compliance with Resolution M-4835 dated January 11, 2018, which was approved on February 21, 2018, and made effective December 7, 2018. See also CPUC Decisions D.19-05-039 and D.19-07-015.

11.1 TARGETS

11.1.1 QUALITATIVE TARGETS

OEIS Table 11-1: Emergency Preparedness and Community Outreach Targets by Year

Initiative	Activity (Tracking ID #)	Previous Tracking ID, if applicable	2026 End of Year Total/Completion Date	2027 Status	2028 Status	Section; Page number
Emergency Preparedness and Recovery Plan	Augment the CEADPP by incorporating detailed plans, concepts of operations, and annexes tailored to specific identified risks. (WMP.1008)	n/a	By 12/31/2026 the CEADPP will be updated to incorporate applicable lessons learned from 2025 and include additional requirements as they are identified	By 12/31/2027 the CEADPP will be updated to incorporate applicable lessons learned from 2026 and include additional requirements as they are identified	By 12/31/2028 the CEADPP will be updated to incorporate applicable lessons learned from 2027 and include additional requirements as they are identified	Section 11.2; p. 258
External Collaboration and Coordination	Enhance current collaborations and establish new ones with CBOs, public safety agencies, and government entities that deliver emergency preparedness education, response, and support services. (WMP.1454)	n/a	By 12/13/2026, expand the CBO network to approximately 55 CBOs. Additional CBOs will target circuit segments in the HFTD that have a high number of individuals with AFN.	By 12/31/2027, expand the CBO network to approximately 60 CBOs. Additional CBOs will target circuit segments in the HFTD that have a high number of individuals with AFN.	By 12/31/2028, expand the CBO network to approximately 65 CBOs. Additional CBOs will target circuit segments in the HFTD that have a high number of individuals with AFN.	Section 11.3; p. 264
Public Communication, Outreach, and Education Awareness	Focus on creating more meaningful and interactive engagements including proactive preparedness through community collaboration, Tribal feedback sessions, and a combination of Outreach and AFN engagement. Organize a series of Wildfire Safety Fairs and mini-Wildfire Safety Fairs aimed at educating, engaging, and preparing customers in rural communities for wildfires. Implement Wildfire/PSPS Public Education campaign leading up to the	n/a	By 12/31/2026 the Wildfire, PSPS and AFN Public Education campaigns will have concluded. Customer feedback will be gathered and used to improve communications for 2027. Host Tribal Nation learning sessions post PSPS activations to acquire level of satisfaction with communication and resiliency. Incorporate feedback where applicable.	By 12/31/2027 the Wildfire, PSPS and AFN Public Education campaigns will have concluded. Customer feedback will be gathered and used to improve communications for 2028. Host Tribal Nation learning sessions post PSPS activations to acquire level of satisfaction with communication and resiliency. Incorporate	By 12/31/2028 the Wildfire, PSPS and AFN Public Education campaigns will have concluded. Customer feedback will be gathered and used to improve communications for 2029. Host Tribal Nation learning sessions post PSPS activations to acquire level of satisfaction with communication and	Section 11.4; p. 270

Initiative	Activity (Tracking ID #)	Previous Tracking ID, if applicable	2026 End of Year Total/Completion Date	2027 Status	2028 Status	Section; Page number
	Santa Ana wind season. Solicit customer feedback on communications and messaging and use results to improve communications and notifications for the following year. (WMP.527)		Continue partnerships with CBOs and AFN collaborative council for amplification of preparedness information by end of year. Host Wildfire Safety Fairs and mini-Wildfire Safety Fairs in key communities of concern.	feedback where applicable. Continue partnerships with CBO's and AFN collaborative council for amplification of preparedness information by end of year. Host Wildfire Safety Fairs and mini-Wildfire Safety Fairs in key communities of concern.	resiliency. Incorporate feedback where applicable. Continue partnerships with CBO's and AFN collaborative council for amplification of preparedness information by end of year. Host Wildfire Safety Fairs and mini-Wildfire Safety Fairs in key communities of concern.	
Customer Support in Wildfire and PSPS Emergencies	Enhance support and resources provided to impacted customers at CRCs. (WMP.1455)	n/a	By 12/31/2026 incorporate applicable lessons learned and feedback received for CRCs.	By 12/31/2027 incorporate applicable lessons learned and feedback received for CRCs.	By 12/31/2028 incorporate applicable lessons learned and feedback received for CRCs.	Section 11.5; p. 279

11.2 EMERGENCY PREPAREDNESS AND RECOVERY PLAN

The CEADPP (WMP.1008) was established to provide an all-hazards strategic framework that SDG&E personnel may rely on to respond effectively using the Incident Command System (ICS) and National Incident Management System (NIMS) (ICS-NIMS) required by federal and state mandates.

This plan is developed, updated, and maintained in compliance with GO 166[57] as modified by D.98-07-097,[58] D.00-05-022,[59] D.12-01-032,[60] D.14-05-020,[61] and D.21-05-019.[62]

- The CEADPP, Fifth Edition, dated 04/23/2024

11.2.1 OVERVIEW OF WILDFIRE AND PSPS EMERGENCY PREPAREDNESS AND SERVICE RESTORATION

11.2.1.1 OVERVIEW OF WILDFIRE AND PSPS PROTOCOLS, POLICIES, AND PROCEDURES

The response to a wildfire or PSPS de-energization can vary significantly. It may involve a straightforward executive notification that is typically managed by field crews within a few days, or escalate to a Level 1 EOC activation, requiring external mutual assistance and potentially taking months to fully restore services. EOC activation levels are determined by the authority, skill-level, and company resources required to effectively manage incidents or events and determine how the crisis management leadership group and its staff will expand to meet the response situation. EOC activation levels are summarized below and in Figure 11-1.

- Level 5 (Green): Executive Notification, EOC not activated
- Level 4 (Blue): Active Monitoring, EOC activated with minimal targeted responders
- Level 3 (Yellow): Serious, partial or full EOC activation
- Level 2 (Orange): Severe, Full EOC Activation including the Executive Management Team
- Level 1 (Red): Catastrophic, Full EOC activation and Sempra Headquarters Incident Center

The EOC moves between Preparedness, Monitoring, Activation, Incident Response, and Recovery phases before, during, and after an event. Figure 11-2 outlines the EOC activation levels for each phase and high-level actions taken.

The incident management structure is designed to expand or contract to a given level as required by the emergency response and recovery. Each event is assessed to determine the extent of its disruptive impact on the Company's ability to safely deliver services to its customers, maintain a proper workforce environment, help ensure infrastructure and resource availability, and fulfill regulatory obligations.

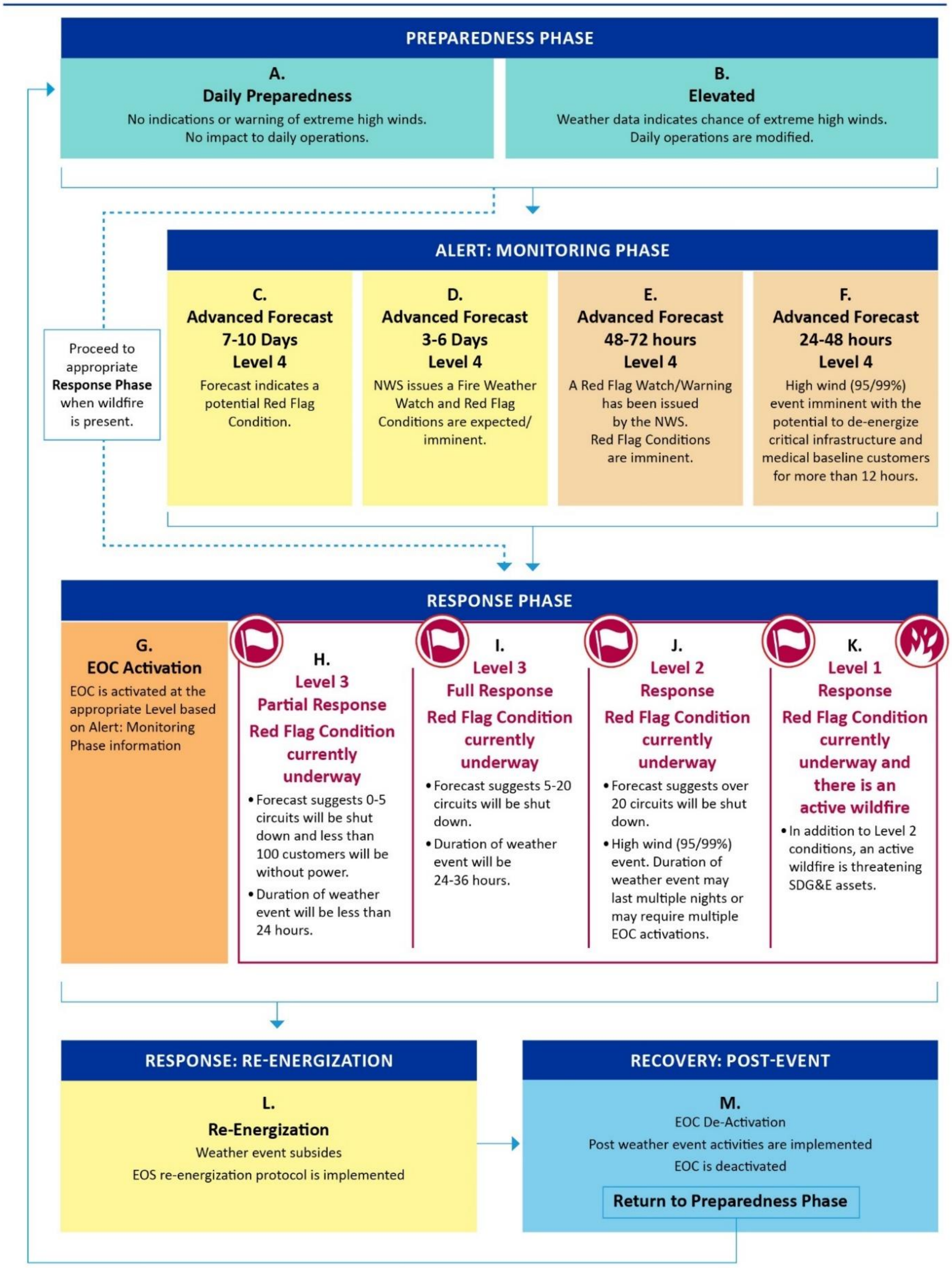
EOC personnel are activated based on event needs and requirements. Personnel can be deactivated on the authority of the Officer in Charge (OIC) once the threat and activation criteria has subsided. This

[57] GO 166; https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/safety-policy-division/reports/general-order-no-166.pdf
[58] D.98-07-097; https://docs.cpuc.ca.gov/PUBLISHED/Graphics/1290.PDF
[59] D.00-05-022; https://ia.cpuc.ca.gov/gos/resmajor/DesNo00-05-022/DesNo00-05-022.htm
[60] D.12-01-032; https://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/157605.PDF
[61] D.14-05-020; https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M091/K543/91543083.PDF
[62] D.21-05-019; https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M385/K377/385377826.PDF

assessment is based on the level of threat of SDG&E's commodity assets, which could affect public safety or result in property damage that could require sufficient repair of the assets to provide restoration of services to the public.

Figure 11-1: EOC Activation Levels

Figure 11-2: Wildfire and PSPS Emergency Response Phases



11.2.1.2 KEY PERSONNEL, QUALIFICATIONS, AND TRAINING

SDG&E has a comprehensive training program to support outage restoration, patrols, inspections, and maintenance as part of the CMP and QC programs to reduce system impacts, promote public safety, and reduce the risk of utility-related wildfires. The Department Operations Center integrates various levels of ICS training in support of storm response and PSPS de-energization response into aspects of Electric Operations, including Management and Supervisor ranks, line assistant curriculum, lineman apprentice program, Electric Troubleshooters, and Fault Finder training.

Implementation of ICS is a programmatic element designed to sustain a fully ready emergency workforce. In Electric Operations, personnel are assigned an Emergency Role and routinely participate in training, exercises, and ongoing mentorship to sustain foundational knowledge. This continued effort is led by the Department Operations Center-Electric (DOC-E) Emergency Response Practices Team in collaboration with the Emergency Management Team who lead EOC responders.

Multiple Homeland Security Exercise and Evaluation Program (HSEEP) guided exercises of both discussion and operations-based categories are conducted throughout the year to exercise current response plans and standard operating procedures. Each year, specific capabilities are selected for strengthening and training, and exercises are designed to measure understanding and performance. Following each exercise, stakeholder employees are invited to participate in feedback sessions and give written feedback for lessons learned and suggestions for changes following best practices for After Action Reports (AARs), Hotwashes, and written feedback solicitation.

AARs are completed after each emergency activation and reviewed to ensure emergency response training curriculums are adequate. Where there are areas for improvement, curriculums are updated accordingly. SDG&E's Skills Training Center also proactively looks for opportunities to improve trainings utilizing technology, such as virtual reality.

Emergency Management personnel are assigned EOC and Emergency On-Duty (EOD) Officer roles and responsibilities that expand according to the fixed activation level functions in the EOC (see Figure 11-1). These are pre-assigned and are activated according to the defined scope and magnitude of the incident. There are additional pre-assigned support functions that are operated by other business units as the magnitude of an event expands. In addition, a significant number of trained employees have been assigned response roles that are under the supervision of Emergency Management supervision and/or the EOC or utility OIC.

EOC personnel are selected based on their qualifications and experience in their relevant business unit. Selected personnel complete an onboarding process that includes confirmation of completed training. Emergency Management maintains ICS and California Specialized Training Institute (CSTI) training of the responders designated to support EOC activations. EOC responders, prior to being active members of the EOC roster, must take the following courses: Federal Emergency Management Agency (FEMA) IS-100, FEMA IS-200, FEMA IS-700 and CSTI SEMS G606. In addition, active EOC responders attend Summer Readiness training, which provides annual updates on projected weather and curtailment conditions, as well as changes to response procedures or systems. EOC leadership positions (Command and General Staff) also receive additional training towards achieving the California Specialized Training Institute's Utility Representative EOC position credential.

SDG&E also provides the following courses internally to ensure a readiness state for the storm and wildfire workforce, and all personnel are required to take courses annually as a refresher. Additionally, in years where there are multiple real-world activations, the annual capture of lessons learned assists with the review of Standard Operating Procedures (SOPs) and affiliated toolkits for analyzing outcomes.

Training for employees and contractors (based on assigned emergency role):

- ESCGO100 – Beginner/New Employee for Emergency Readiness
- ESCGO101 - Intermediate for Emergency Readiness includes Intro to PSPS
- ESCPS100 - Introduction to PSPS and Wildland Fire
- ESCPS101 - Introduction to PSPS and Wildland Fire includes PSPS Overview and Damage Specific Infrastructure/System Elements
- ESCPS102 - Intro to PSPS for VCM/Contractors
- ESCICS100 - IS-100/200 for Utilities (Certification Outcome)
- ESCICS300 - 16 hours – Intermediate ICS (Certification Outcome)

Training for Relief Electric Troubleshooters:

- Task #14 STUEM300 CMP Line Patrol Inspections
- Task #15 Fire Calls
- Task #046 Wildland Fire Prevention
- Task #047 Public Safety Power Shutoff
- SFUGN1O3 Wildland Fire Prevention & Safety

Training for Electric Troubleshooters:

- STUEM300 CMP Line Patrol Inspections
- ESCPS205 PSPS Patroller (VR)
- ESCPS100 PSPS / Fire Training
- SFUGN1O3 Wildland Fire Prevention & Safety

Training for Relief Fault Finders:

- ESCPS100 PSPS / Fire Training
- SFUGN1O3 Wildland Fire Prevention & Safety
- ESP 113.1 reviewed and discussed in class

Attendance Tracking is conducted across multiple programmatic areas including the Learning Management System (Cornerstone); Training Sign-In Sheets (5300s); and through Check-In/Out systems during real world activations.

11.2.1.3 MEMORANDUM OF AGREEMENTS

MOU agreements exist for aerial support services, fire support services, and fuels management project support on Tribal lands.

The aerial support services MOU between SDG&E and the County of San Diego addresses the helicopters that are leased and/or owned by SDG&E and how they are utilized within the service territory and San Diego County. The primary purpose of these helicopters is to ensure, regardless of how a fire is started, that there are aerial firefighting assets available in the service territory. Since the 2023-2025 Base WMP, the MOU timeline has been extended and vendors are generic should any leases change. The scope of the MOU does not include coordination with public safety partners or notifications to customers.

The fire support services MOU between SDG&E and the County of San Diego addresses foam firefighting trailers that may be dispatched in support of incident response throughout the service territory. The primary purpose of these trailers is to address the unique hazards presented by large volumes of combustible liquids that may be present in substations or at other incidents throughout the region. SDG&E also provides training for the safe and effective use of the foam firefighting trailers. The scope of the MOU does not include notifications to customers.

The fuels management project supports MOUs between SDG&E and three Independent Tribal Nations (Campo, Viejas, Pala) that address fuels management projects performed on Tribal land or in partnership with Tribal governments. The primary purpose of these MOUs is to guide mitigation activities on Tribal land and strengthen the relationships between SDG&E and the Tribal Nations in the service territory. The scope of the MOUs does not include notifications to customers.

OEIS Table 11-2: Key Gaps and Limitations in Integrating Wildfire- and PSPS-Specific Strategies into Emergency Plan

Gap or Limitation Subject	Brief Description of Gap or Limitation	Remedial Action Plan
Changing regulatory requirements	Constant changes in regulatory requirements make integrating wildfire- and PSPS-specific strategies into the CEADPP difficult. New regulations require additional planning and stakeholder engagement, which takes time and effort.	Assign regulatory oversight to personnel in order to maintain continuous awareness of changing regulations and ensure incorporation into the CEADPP.

11.2.2 PLANNING AND ALLOCATION OF RESOURCES

Prior to the start of a potential PSPS de-energization, Meteorology studies areas that are forecasted to experience weather that may trigger a PSPS de-energization. Identified sites are aggregated into a list that is shared with operational leadership and field QEWs are assigned to observe locations within each of the impacted zones. The observer looks for unsafe conditions that may trigger the need to de-energize lines for safety, such as wind conditions that could cause debris or vegetation to fly into lines or extreme conductor movement that may lead to wires contacting each other. If multiple electrical circuits are located within proximity to each other in a zone, a single observer may be assigned to observe those multiple circuits but would be initially stationed in the windiest location within that zone.

Each circuit segment that may be impacted by a PSPS de-energization has a pre-defined recommended resource allocation needed to perform patrols on that overhead line section. These resource requirements are documented in a field patrol guide. The guide also identifies if the line could be patrolled on the ground or if aviation support is required. If there are enough resources to patrol each affected line segment, then patrol resources are largely allocated by the expected timeframes that safe patrols will be allowed. If there is a shortage of patrol resources, then restorations are prioritized by critical infrastructure affected and the number of customers impacted to restore power to as many customers as possible.

Restoration Priorities and Resource plans are approved by the Utility OIC. Additionally, each individual authorization to patrol and authorization to re-energize is issued by the Utility OIC after consulting with Meteorology about the weather conditions for that specific site.

Once a circuit is released for ground patrol, the resources allocated to perform those patrols are assigned to a circuit patrol coordinator. That coordinator accepts authorizations to patrol, reports the status of patrols, and helps ensure section patrols have been completed prior to asking for permission to re-energize that portion of a circuit. CFRs are also assigned to each location during restorations to coordinate quick fire suppression response should an ignition occur during restoration.

11.3 EXTERNAL COLLABORATION AND COORDINATION

11.3.1 COMMUNICATION STRATEGY WITH PUBLIC SAFETY PARTNERS

SDG&E's public safety partner portal allows for more effective communication with Public Safety Partners, including first responders, jurisdictions, Tribal governments, water and telecommunications providers, CalOES, and County OES. This portal streamlines information sent to Public Safety Partners during a PSPS de-energization so they can access the most up-to-date information. Outreach and education on the public safety partner portal is conducted in Public Safety Partner training sessions. A tutorial video is also available on the PSPS portal.

As outlined in the CEADPP, a notification group comprised of the Public Information Officer, Government Liaison, Customer Care, and Planning Section Chief coordinates messaging, timing, and stages of notifications to customers, Public Safety Partners, jurisdictions, elected officials, and critical infrastructure agencies. Notifications to customers may be sent as phone calls, SMS texts, or emails. Notifications to external stakeholders are typically via email.

The Crisis Communications Plan, which is part of the CEADPP, focuses on communications with external partners and the public. It is intended to coordinate internal resources and the Notification Group to help ensure the "one voice" communication tone is consistent between external stakeholders, customers, elected leaders, regulatory, and Public Safety Partners. This plan is managed by the Brand, Marketing & Communications department.

The WCRC serves as both the hub for operational communications during an event as well as a valuable training and outreach resource for SDG&E responders and public safety partners. During an incident, the WCRC houses the EOC. As a venue for tours, meetings, and other collaboration opportunities, the WCRC helps foster a strong relationship with stakeholders by allowing engagement, collaboration, training, and exercise with Public Safety Partners on an ongoing basis.

OEIS Table 11-3: High-Level Communication Protocols, Procedures, and Systems with Public Safety Partners

Public Safety Partner Group	Name of Entity	Key Protocols	Frequency of Prearranged Communication Review and Update
Emergency Response	2-1-1 Orange County	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	2-1-1 San Diego	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Alvarado Hospital	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	American Red Cross of Orange County	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	American Red Cross San Diego Region	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Communication Service Providers	AT&T	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Barona Band of Mission Indians	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
CAL FIRE	Cal Fire	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
CalOES	Cal OES	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
CalOES	Cal OES Office of Tribal Affairs	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	California Highway Patrol	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Caltrans	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Campo Band of Kumeyaay Indians	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Carlsbad Fire Department	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly

Note: Full table is provided in Appendix F

OEIS Table 11-4: Gaps and Limitations in Communication Coordination with Public Safety Partners

Gap or Limitation Subject	Brief Description of Gap or Limitation	Remedial Action Plan
Engagement overload	Partners not providing as much engagement or feedback due to increased requests.	Leverage the partner focus group to determine strategies to increase engagement and feedback
Quarterly Update of Public Safety Partner Contact Information	Current updates require SDG&E staff to proactively reach out to update Public Safety Partner contact information at a regularly scheduled interval. This does not capture dynamic changes outside of that schedule.	Add contact information self-service functionality in the Public Safety Partner Portal so that partners can update their information in real time.

11.3.2 COLLABORATION ON LOCAL AND REGIONAL WILDFIRE MITIGATION PLANNING

Local and regional collaboration for wildfire mitigation includes SDG&E's quarterly Regional PSPS Working Group, which brings together small multi-jurisdictional electric utilities, community choice aggregators, publicly owned utilities, communication and water service providers, local government entities, Tribal and public safety partners, and agencies that serve community members with disabilities, aging, and AFN populations. During the Q3 session, attendees are updated on wildfire mitigations, grid hardening enhancements, and vegetation management activities that reduce the risk of wildfires and the frequency and duration of a PSPS de-energization.

SDG&E's Energy Solutions Partner Network consists of more than 200 CBOs. These organizations are considered trusted partners in the communities they serve and are leveraged to help prepare customers, with a focus on individuals with AFN, for wildfires and other emergency situations through presentations, community resource fairs, and sharing safety and emergency preparedness messaging on their respective social media channels. In addition, SDG&E currently has a network of roughly 50 CBOs who serve customers in the HFTD by providing supplemental PSPS notification support and promoting awareness of support services.

PSPS Preparedness & Wildfire Safety Workshops are hosted for Public Safety Partners where four business units, Meteorology, Emergency Management, Wildfire Mitigation, and AFN, provided updates on key initiatives. Similar annual workshops are planned for the 2026 to 2028 WMP cycle.

Since 2018 SDG&E has been a key supporter of the Cal Poly San Luis Obispo Wildland Urban Interface Fire Institute (Cal Poly WUI),[63] whose mission is to help create the most fire resilient communities in the world. The mutual goal of Cal Poly and the IOUs is to develop a model institute that mitigates the WUI Fire problem in California. From 2021 to 2023, the IOUs (SDG&E, SCE and PG&E) provided funding to hire a full-time director committed to connecting stakeholders for impactful WUI Fire research, the teaching and learning experience, and interdisciplinary innovation. In addition, the IOUs each have a representative on the Cal Poly WUI External Advisory Council to assist in guiding and ensuring the successful establishment of the Cal Poly WUI.

[63] Cal Poly WUI: https://fire.calpoly.edu/

OEIS Table 11-5: Collaboration in Local and Regional Wildfire Mitigation Planning

Name of County, City, or Tribal Agency or Civil Society Organization (e.g., nongovernmental organization, fire safe council)	Program, Plan, or Document	Last Version of Collaboration	Level of Collaboration
2-1-1 San Diego	CEADPP	2024 version (April 2024)	Wildfire/PSPS protocols feedback and review
2-1-1 Orange County	CEADPP	2024 version (April 2024)	Wildfire/PSPS protocols feedback and review
CAL FIRE	CEADPP	2024 version (April 2024)	Wildfire/PSPS protocols feedback and review
County OES	CEADPP	2024 version (April 2024)	Wildfire/PSPS protocols feedback and review
Cal OES	CEADPP	2024 version (April 2024)	Wildfire/PSPS protocols feedback and review
San Diego County	CEADPP	2024 version (April 2024)	Wildfire/PSPS protocols feedback and review
American Red Cross	CEADPP	2024 version (April 2024)	Wildfire/PSPS protocols feedback and review
211 San Diego	Wildfire Preparedness	2024 version (June 2024)	Wildfire Preparedness and Resiliency Workshop
Cal OES Office of Tribal Coordination	Wildfire Preparedness	2024 version (June 2024)	Wildfire Preparedness and Resiliency Workshop
CAL FIRE	Wildfire Preparedness	2024 version (June 2024)	Wildfire Preparedness and Resiliency Workshop
California Governor's Office of Emergency Services	Wildfire Preparedness	2024 version (June 2024)	Wildfire Preparedness and Resiliency Workshop
California Public Utilities Commission	Wildfire Preparedness	2024 version (June 2024)	Wildfire Preparedness and Resiliency Workshop

Note: full table is in Appendix F

OEIS Table 11-6: Key Gaps and Limitations in Collaborating on Local and Regional Wildfire Mitigation Planning

Subject of Gap or Limitation	Brief Description of Gap or Limitation	Strategy for Improvement
No current gaps or limitations noted in collaboration efforts with local and regional partners on local wildfire planning efforts.	n/a	n/a

11.3.3 COLLABORATION WITH TRIBAL GOVERNMENTS

Tribal fire and law enforcement departments provide trusted on-the-ground support because they provide wellness checks for Tribal governments. Focus group discussions with Tribal governments occur on a yearly basis to enhance strategy and communication. Based on Tribal council recommendations, Tribal fire and law enforcement departments may receive resiliency grants, emergency backpacks, collateral, and/or other resources to address any gaps due to limited broadband, remoteness, technology limitations, and lack of trust for outsiders (including SDG&E). A dedicated Senior Tribal Affairs Manager works with Tribal Governments to protect and preserve cultural resources, enhance wildfire safety and prevention measures, support vital infrastructure, and develop clean energy solutions.

OEIS Table 11-7: Collaboration with Tribal Agencies

Name of County, City, or Tribal Agency or Civil Society Organization (e.g., nongovernmental organization, fire safe council)	Program, Plan, or Document	Last Version of Collaboration	Level of Collaboration
Mesa Grande	Wildfire Preparedness and Resiliency	Tribal Events – 3/2024; 7/2024; 11/2024	Held listening sessions on Tribal priorities, provided overview of undergrounding project on Circuit 222, received feedback on CAVA, held low-income workshops, and held a Customer Resiliency Solutions townhall.
Iipay Nation of Santa Ysabel -	Wildfire Preparedness and Resiliency	Tribal Events - 01/2024; 2/2024;4/2024; 6/2024;9/2024; 11/2024	Held listening sessions on Tribal priorities, provided overview of undergrounding project on Circuit 220, received feedback on CAVA, discussed undergrounding colocation with Caltrans, discussed Department of Energy resiliency grant, and participated in Earth Day Fair, co-sponsored Safety Fair.
Jamul Indian Village	Emergency Preparedness	Tribal Events – 03/2024; 5/2024	Held listening session on Tribal priorities, reviewed Tribal Emergency Response, provided customer resiliency collateral, and participated in Earth Day Fair.
La Posta	Wildfire Preparedness and Resiliency	Tribal Events – 02/2024; 3/2024;5/2024; 10/2024	Held listening session on Tribal priorities, participated in Earth Day Fair, provided update of undergrounding project on Circuit 1215, and reviewed feedback on PSPS activation.

Name of County, City, or Tribal Agency or Civil Society Organization (e.g., nongovernmental organization, fire safe council)	Program, Plan, or Document	Last Version of Collaboration	Level of Collaboration
Pala	Wildfire Resiliency	Tribal Events – 04/2024; 7/2024; 8/2024; 11/2024	Held meet and greet listening session on Tribal priorities and received feedback on CAVA.
Rincon	Community Outreach	Tribal Events – 01/2024; 2/2024; 3/2024; 4/2024; 5/2024; 6/2024; 7/2024; 8/2024; 10/2024; 11/2024; 12/2024	Provided overview of undergrounding project on Circuit 990, discussed interconnection projects, delivered microgrid incentive program information, reviewed feedback on PSPS activation, and participated in career fair.
San Pasqual	Wildfire Resiliency	Tribal Events – 05/2024; 6/2024; 8/2024; 10/2024	Provided overview of undergrounding project on Circuit 1030, discussed undergrounding colocation with ATT, and addressed cultural resources and access protocols issues.
Campo	Wildfire Preparedness and Resiliency	Tribal Events – 01/2024; 2/2024; 3/2024; 4/2024; 5/2024; 6/2024; 7/2024; 8/2024; 9/2024; 10/2024; 11/2024	Participated in Campo Earth Day, delivered microgrid incentive program information, discussed undergrounding colocation, provided overview of undergrounding project circuit 1215, and participated in Healthy Families and Community Fair.
Ewiiaaiipyaap	Wildfire Resiliency	Tribal Events - 01/2024	Provided overview of undergrounding project on Circuit 358.
Pauma	Wildfire Preparedness and Resiliency	Tribal Events - 01/2024; 4/2024; 7/2024; 8/2024	Participated in Community Police Night Out Event, addressed cultural and access protocols, provided a grant to the fire department, and delivered customer resiliency informational items.
La Jolla	Wildfire Preparedness and Resiliency	Tribal Events - 01/2024; 5/2024; 7/2024	Delivered microgrid incentive program information, held a listening session, participated in community event, and participated in Earth Day Fair.
Los Coyotes	Wildfire Preparedness and Resiliency	Tribal Events - 3/2024; 5/2024; 11/2024	Held education session on vegetation management access protocols, sponsored tree planting event, and provided overview of undergrounding project on Circuit 210.
Barona	Wildfire Resiliency	Tribal Events - 3/2024; 7/2024	Participated in Healthy Families event and other listening sessions.
Viejas	Wildfire Preparedness and Resiliency	Tribal Events - 5/2024	Participated in Earth Day Fair and provided update of undergrounding project on Circuit 358.
Manzanita	Wildfire Preparedness and Resiliency	Tribal Events - 01/2024; 2/2024; 3/2024; 8/2024; 12/2024	Provided update of undergrounding project on Circuit 215 update, addressed cultural and access protocols, participated in Healthy Family Events, and participated in Earth Day Fair.
Southern California Tribes	Wildfire Preparedness	Tribal Events – 3/2024; 5/2024;	Participated quarterly in Southern California Tribal Emergency Managers Meeting and participated and

Name of County, City, or Tribal Agency or Civil Society Organization (e.g., nongovernmental organization, fire safe council)	Program, Plan, or Document	Last Version of Collaboration	Level of Collaboration
		6/2024; 7/2024; 9/2024; 11/2024; 12/2024	facilitated focus group sessions with Inter-Tribal Long-Term Recovery foundation Resiliency Breakfast and SDG&E Workshop.

OEIS Table 11-8: Key Gaps and Limitations in Collaborating with Tribal Agencies

Subject of Gap or Limitation	Brief Description of Gap or Limitation	Strategy for Improvement
Trust of outside entities	There is little to no trust for SDG&E	Strategy: Provide cultural competency training and stress reciprocity to internal business. Target timeline: Execute first training by Q3 of 2026.
Limited participation from Tribes on wildfire and PSPS plans and support services	Low Tribal participation in annual workshops and tours	Strategy: Continue to offer in person and virtual workshops and continue to conduct annual survey. Participate in planned Tribal events and offer mini grants. Target timeline: Annual survey was implemented in 2025. Begin participation in Tribal events in 2026.
Limited funding for Tribal projects	Because Tribes are often dependent on grant funding, Tribes with fewer resources struggle to provide basic needs to their members.	Strategy: Fund partial time for an SDG&E liaison position within Tribal governments of under resourced Tribes. Target timeline: Next GRC cycle.

11.4 PUBLIC COMMUNICATION, OUTREACH, AND EDUCATION AWARENESS

During outages due to wildfires and/or PSPS de-energizations, notifications, website updates, media updates, in-community signage, and situational awareness postings on social media are created or made available to inform customers about real-time conditions. Social media toolkits are also developed and shared with community partners to help amplify messaging. Communications are aimed at providing affected customers and the general public with the latest real-time system condition updates. Direct customer notifications are made available in the region's 22 prevalent languages, including American Sign Language.

In addition to the mass media listed above, communications are also leveraged to target individuals who may not be SDG&E account holders (e.g., travelers, visitors, mobile home park residents, caretakers, etc.). This is accomplished through channels like SDG&E's mobile application called Alerts by SDG&E,

roadside electronic message signs placed in strategic highly traveled locations, Tribal casino marquees, and flyers posted throughout impacted communities.

PSPS notifications are sent to all impacted individuals as soon as possible through the Customer Notification System (CNS) (recorded voice message, email, and text message). All notifications for outages due to wildfires or PSPS de-energizations are also available in American Sign Language video, audio read-out, and written transcript. Address-level alerts are also enabled for customers and the general public through the Alerts by SDG&E Application.

Additionally, SDG&E has a network of approximately 50 CBOs that amplify PSPS safety and emergency notifications through their respective social media channels.

11.4.1 PROTOCOLS FOR EMERGENCY COMMUNICATIONS

The Wildfire Safety Public Education and Outreach plan increases community resiliency to wildfires and mitigates the impact of PSPS de-energizations. The plan is divided into three phases: prior to, during, and following a wildfire or PSPS de-energization.

Prior to an anticipated PSPS de-energization, mass communication efforts focus on educating customers and the public. During a wildfire or PSPS activation, notifications, media updates, in-community signage, and situational awareness postings are used across social media and SDG&E's external-facing blog to provide the latest real-time updates to customers and the general public. Social media toolkits are also developed and shared with community partners to help amplify and reach a broader audience. Key communications are available in 22 prevalent languages. Notifications are amplified by SDG&E's expansive AFN CBO partner coalition, made up of trusted agencies within the AFN community, including, Residencial Care Facilities, Social Service agencies, and AFN and medical support organizations.

Communications with local water districts, telecommunications infrastructure providers, the San Diego County Office of Education, the San Diego County Office of Emergency Services, and the American Red Cross are ongoing through the duration of an event and through customer restoration. Community flyers are posted throughout affected communities and communications are posted on school and casino marquees on portable roadside signage strategically placed at major thoroughfares and principal egress and regress points in affected communities. Additionally, Public Safety Partner priority notifications are delivered to government agencies, Tribes, emergency management organizations, AFN support partners, and others before, during and after a PSPS de-energization. Public safety partners also have access to SDG&E's Public Safety Partner Portal for up-to-date information. CFI customers and Public Safety Partners are granted additional support and communication directly from their assigned Account Executive.

In addition to direct customer notifications, SDG&E provides 24/7 real-time situation updates through the Alerts by SDG&E Application, its website, and partnerships with local media. These updates are also posted on their external-facing blog, SDGEtoday.com, which, along with the SDG&E website, offers event-specific information about impacted areas. Social media platforms are also utilized to broadcast updates and safety information across the region.

After a wildfire or PSPS de-energization, communications to customers and the general public are reviewed and evaluated for future improvements. An engagement survey is sent to all public safety partners to solicit feedback on SDG&E's level of engagement with organizations and what can be done to improve their experience. The survey also seeks feedback on its Public Safety Partner Portal and provides an opportunity to update contact information. Feedback is then used to improve customer and public communications and outreach efforts for the following year.

OEIS Table 11-9: Protocols for Emergency Communication to Stakeholder Groups

Stakeholder Group/ Target Community	Event Type	Method(s) for Communicating	Means to Verify Message Receipt	Interests or Concerns Before, During, and After Wildfire and PSPS events
General public	Wildfire	CNS system (text, voice message, and email), website updates, PSPS app, SDG&E Today	CNS message confirmation tracking, web traffic tracking, and app downloads/ performance.	Awareness of a current wildfire, scope of impacted communities, current status and areas threatened, available resources, and ongoing updates until wildfire is contained.
General public	Wildfire-related outage	CNS system (text, voice message, and email), website updates, PSPS app, SDG&E Today	CNS message confirmation tracking, web traffic tracking, and app downloads/ performance.	Awareness of a current wildfire, scope of impacted communities, current status and areas threatened, available resources, and ongoing updates until wildfire is contained.
General public	PSPS-related de-energization	CNS system (text, voice message, and email), website updates, PSPS app, SDG&E Today	CNS message confirmation tracking, web traffic tracking, and app downloads/ performance.	Awareness of a current wildfire, scope of impacted communities, current status and areas threatened, available resources, and ongoing updates until wildfire is contained.
General public	Restoration of service	CNS system (text, voice message, and email), website updates, PSPS app, SDG&E Today	CNS message confirmation tracking, web traffic tracking, and app downloads/ performance.	Awareness of a current wildfire, scope of impacted communities, current status and areas threatened, available resources, and ongoing updates until wildfire is contained.
Priority essential services	Wildfire	Emails, plus access to website updates, PSPS app, PSP app, and SDG&E NewsCenter	Email delivery confirmations, updating for any that come back unsent.	Awareness of a current wildfire, scope of impacted communities, current status and areas threatened, available resources, and ongoing updates until wildfire is contained.
Priority essential services	Wildfire-related outage	Emails, plus access to website updates, PSPS app, PSP app, and SDG&E NewsCenter	Email delivery confirmations, updating for any that come back unsent.	Awareness of a current wildfire, scope of impacted communities, current status and areas threatened, available resources, and ongoing updates until wildfire is contained.
Priority essential services	PSPS-related de-energization	Emails, plus access to website updates, PSPS app, PSP app, and SDG&E NewsCenter	Email delivery confirmations, updating for any that come back unsent.	Awareness of a current wildfire, scope of impacted communities, current status and areas threatened, available resources, and ongoing updates until wildfire is contained.
Priority essential services	Restoration of service	Emails, plus access to website updates, PSPS app, PSP app, and SDG&E NewsCenter	Email delivery confirmations, updating for any that come back unsent.	Awareness of a current wildfire, scope of impacted communities, current status and areas threatened, available resources, and ongoing updates until wildfire is contained.

Stakeholder Group/ Target Community	Event Type	Method(s) for Communicating	Means to Verify Message Receipt	Interests or Concerns Before, During, and After Wildfire and PSPS events
AFN populations	Wildfire, wildfire-related outage, PSPS-related de-energization, restoration of service	CNS system (text, voice message, and email), website updates, PSPS app, SDG&E Today	CNS message confirmation tracking, web traffic tracking, and app downloads/performance. If no reply is given, house visits could be performed.	Awareness of a current wildfire, scope of impacted communities, current status and areas threatened, available resources, and ongoing updates until wildfire is contained.
Non-English speakers	Wildfire, wildfire-related outage, PSPS-related de-energization, restoration of service	CNS system (text, voice message, and email), website updates, PSPS app, SDG&E Today	CNS message confirmation tracking, web traffic tracking, and app downloads/performance.	Awareness of a current wildfire, scope of impacted communities, current status and areas threatened, available resources, and ongoing updates until wildfire is contained.
Tribes	Wildfire, wildfire-related outage, PSPS-related de-energization, restoration of service	CNS system (text, voice message, and email), website updates, PSPS app, SDG&E Today	CNS message confirmation tracking, web traffic tracking, and app downloads/performance.	Awareness of a current wildfire, scope of impacted communities, current status and areas threatened, available resources, and ongoing updates until wildfire is contained.

11.4.2 MESSAGING

To develop effective messaging, tone and language are examined and tested annually. Communications are crafted to be easy to understand, concise, clear, consistent, and informative. All messaging is aligned across communication channels, including direct customer notifications, SDG&E Today stories, social media, and website updates. This messaging is also shared with external partners. Additionally, websites and mobile applications are developed to meet ADA and Web Content Accessibility Guidelines (WCAG) global web standards for accessibility.

During outages due to wildfires or PSPS de-energizations, the CNS notification system provides affected customers with the latest updates on system conditions. Key communications are available in 22 prevalent languages. Customer and public notifications are sent in the following intervals:

- 48 hours before power is turned off
- 24 hours before power is turned off
- 12 hours before power is turned off
- 1 to 4 hours before power is turned off
- At the start of the de-energization
- If any CRCs are opened

- When filed inspections begin
- When electric power is restored

Messaging content contains real-time awareness information about the situation and where to find additional updates. Local media and community partners are also provided with similar messaging for amplification. These communications include information about the high-fire risk weather conditions as well as communities at risk for potential outages. Customers and the public are directed to the SDG&E website[64] for further updates.

Annual customer research is conducted to measure retention and comprehension of the public education communications and messaging. The research results are used to make improvements to future communications and marketing campaigns. In addition, communication with Tribal fire departments is utilized to increase resources to community members living on reservations. During a PSPS de-energization, Tribal first responders are responsible for making wellness checks.

11.4.3 OUTREACH AND EDUCATION AWARENESS ACTIVITIES

Implementation of outreach and awareness programs is done through approximately 50 CBOs from the Energy Solutions Partner Network that are either located in or serving customers in the HFTD. These CBOs are leveraged to provide notification support before, during, and after an event. SDG&E also partners with several CBOs to jointly host a series of Wildfire Safety Fairs and Mini Wildfire Safety Fairs, which target both HFTD communities and hard-to-reach customers in the HFTD. These events are held in partnership with local organizations and internal departments and share key information about how to prepare for a wildfire, PSPS de-energization, or other potential emergencies. Feedback is also solicited from event attendees and responses are used to improve future outreach efforts.

Every year, SDG&E tests communication tactics and messaging, and feedback is also solicited from customers and stakeholders. This information is used to refine and improve communications for the following year.

OEIS Table 11-10: List of Target Communities

Target Community	Interests or Concerns Before, During, and After Wildfire and PSPS events
Non-English speakers	Limited access to understand electrical corporation wildfire hazards and risks, specific actions that can be taken to reduce risk, and awareness of emergency services and resources.
People in remote or isolated areas	Limited access to resources such as transportation and/or the ability to receive emergency notifications, specific actions that can be taken to reduce risk, and awareness of emergency services and resources.
Elderly (Seniors 62+)	Impaired physical mobility, diminished sensory awareness, chronic health conditions, and/or social and economic limitations that interfere with the ability to prepare for, react to, and recover from a wildfire or a PSPS activation.
People with limited technology	Limited and/or no access to emergency notifications and limited understanding of electrical corporation wildfire hazards and risks, specific actions that can be taken to reduce risk, and awareness of emergency services and resources.

[64] PSPS Dashboard Landing Page; www.sdge.com/ready or https://www.sdge.com/psps-dashboard

Target Community	Interests or Concerns Before, During, and After Wildfire and PSPS events
Customers enrolled in utility program: CARE, FERA, MBL, including Life Support (Critical Care)	Accuracy of self-certification status renewal to support accurate and timely emergency notifications are received.
Customer with disabilities	Providing education on resources available to further support customers who have mobility, hearing, learning, or seeing disabilities these customers during an emergency.
Customers who receive their bill in an alternate format (e.g., Braille, large print)	Limited ability to digest educational material, collateral, and emergency notifications if not presented in an alternate format.
Customers who self-identify as AFN or an individual with AFN in the household	Limited ability to understand the requirements and limited knowledge of the self-identification process.
Tribal members	Difficult to reach due to diversity – some live on reservations, some off, some are a part of federally recognized tribes and others are not. Increased risk due to their location in remote and/or HFTD areas with limited access to broadband, limited technology, health disparities, and impacted by socioeconomic factors.
Website information	Maintaining current information on the website to serve as a repository for wildfire safety resources for customers. It also provides information on PSPS activations, wildfire safety projects, emergency preparedness, Community Resource Centers (CRCs) and more.
PSPS Mobile App	Providing real -time alerts and updates in English and Spanish on a PSPS activation for up to five addresses. Information includes customized notifications, CRC information with GPS directions, and other real-time updates and safety information related to PSPS activities.
Public Safety Partner Mobile App	Updating regional public safety partners via the Public Safety Partner mobile app to allow them to access the Public Safety Portal from the field on their mobile devices. Features include real-time map information linked to a secure GIS portal, the ability for partners to follow the PSPS activation status of one or more jurisdictions of their choice, customized push notifications, sectionalizing devices listed by community, and a resource page that includes a social media tool kit, point of contact information, and community flyers.
SDG&E Alexa Skill	Providing real-time updates and information via Alexa skill on weather forecasts, RFWs, the FPI, air quality, the potential for a PSPS activation, and where to find resources about a PSPS activation, as well as flex alerts.
Media Engagement	Establishing partnerships with local broadcast and print media continue to inform customers of proactive safety and preparedness outreach prior to, during, and after a PSPS activation or wildfire. Local broadcast and print media, including designated emergency broadcast radio, amplify messaging during a wildfire or PSPS activation. Press updates are also posted to SDGENews.com and on social media channels.
PSPS Paid Campaign	Informing customers via the PSPS Paid Campaign of the latest technology advancements to further refine the decision-making required when activating a PSPS protocols. Providing tips and available resources during a PSPS activation on what to expect during a PSPS activation, and where to go to receive support services is available. Sharing communication tools including social media, local community social media pages, print, digital and outdoor advertising, wildfire Safety Fairs, in-Community events, in-Community newsletters, newspapers; community bulletins/ posters, community stores, supermarkets, laundromats, barber shops, airport, train and bus depot video monitor messaging, athletic event/stadium ads, local broadcast media and journalist education, message amplification by CBOs, and power outage and preparedness videos.

11.4.4 ENGAGEMENT WITH ACCESS AND FUNCTIONAL NEEDS POPULATIONS

SDG&E conducts a dedicated campaign focused on communicating with customers who have Access and Functional Needs. The AFN campaign promotes available resources and services during a PSPS de-energization through its robust support model and partnerships with entities such as 211, Facilitating Access to Coordinated Transportation (FACT), and the Salvation Army. Additionally, the campaign promotes collaboration with local CBOs across the service territory, including organizations within SDG&E's Energy Solutions Partner Network.

A centralized resource hub is offered for individuals with AFN through partnerships with 211 San Diego and 211 Orange County (Orange County United Way), and 211 staff help direct constituents to resources such as food delivery, transportation, hotel stays, CRCs and an extensive list of other available services. Additionally, accessible transportation is provided through a partnership with FACT and no-cost hotel stays are provided through a partnership with the Salvation Army. Food and other as needed services (e.g. restrooms, laundry) can also be dispatched to severely impacted areas as needed.

The Energy Solutions Partner Network also leverages partnerships with approximately 50 CBOs to provide general education and awareness on available resources for individuals with an AFN before, during and after a PSPS de-energization. The majority of these CBOs are small, grassroots agencies serving individuals with AFN, including those that are multicultural, multilingual, low income, seniors, and LEP audiences in communities of concern, who help amplify messaging and emergency notifications to customers located in the HFTD.

A public education campaign deploys mass-communications similar to the wildfire and PSPS campaigns and includes the same expansive set of tactics targeted towards vulnerable and hard-to-reach populations, with the intent of sharing resource information to individuals with AFN. Additionally, a dedicated AFN landing page, sdge.com/AFN, includes links to available solutions and an AFN self-identification webform.

Campaign tactics include digital banners, social media, TV and radio advertising, outdoor advertising, and print advertising. Print advertising, particularly local in-language newspapers and magazine publications, is especially helpful in reaching affected communities as well as individuals with AFN and hard-to-reach audiences. Event-specific community flyers are also posted in community centers and high traffic areas in affected communities to reach audiences that may not have readily available internet or cable access.

Along with the public education campaign, PSPS messaging and creative assets are provided for 211 websites and social media platforms. Digital versions of collateral, such as the HFTD Newsletter and the PSPS Resource Fact Sheet, are provided to 211 San Diego and 211 Orange County (Orange County United Way) for inclusion on their websites.

11.4.4.1 SUMMARY OF KEY AFN DEMOGRAPHICS

There are approximately 404,000 customer accounts that have been identified as AFN, of which approximately 45,000 are located in the HFTD (a further breakdown of the AFN population can be found in the AFN Plan (see Appendix H). While the primary methodology for identifying AFN populations is through SDG&E's databases, customers can also self-identify through the Customer Contact Center, SDG&E's AFN self-identification webform, and various marketing campaigns. Additionally, individuals with AFN may be reached through local community partners who represent or provide services to these constituencies (e.g., 211 San Diego). Customers in the following categories are also considered to be AFN:

- Customers enrolled in CARE, FERA, Medical Baseline (MBL), or Temperature Sensitive programs
- Customers who receive their utility bill in an alternate format: Braille, Large Font Bill
- Customers whose preferred language is a language other than English
- Seniors (over age 62)
- Customers who self-identfy to receive an in-person visit prior to disconnection for non-payment or self-identfy as having a person with a disability in the household: disable deaf/hearing impaired, disabled blind/vision impaired, disability – not defined
- Customers who have self-identified as having an AFN

11.4.4.2 EVALUATION OF CHALLENGES AND NEEDS DURING A WILDFIRE OR PSPS EVENT

SDG&E works closely with an AFN Collaborative Council, AFN Core Planning team, Regional PSPS Working Group, local governments, and Tribal communities to address the challenges of supporting individuals with AFN during a wildfire or PSPS de-energization, as outlined in the AFN Plan (see Appendix H). Where possible, SDG&E uses the best available information to evaluate the challenges and needs of individuals with AFN during a wildfire or PSPS de-energization. Sources include surveys, social media, commentary, customer inquiries, community forums, townhalls, and wildfire safety fairs.

In 2023, SDG&E launched a PSPS Customer Impact study to increase understanding of customer impacts during a PSPS de-energization, with a focus on individuals with AFN. This study utilized a comprehensive approach to gather factual data, including key findings from existing relevant studies and direct survey feedback from customers and employees, to inform how customers are targeted, supported, and communicated with before, during and after a PSPS de-energization. Throughout 2024, the study findings were shared with key internal and external stakeholders.

11.4.4.3 PLANS TO ADDRESS NEEDS OF THE AFN CUSTOMER BASE

SDG&E works closely with other IOUs and collaboratively with a statewide AFN Core Planning team to develop a Joint IOU Statewide strategy to meet the diverse needs of individuals with AFN before, during and after a wildfire or PSPS de-energization. On January 31, 2025, the utilities filed their respective 2025 AFN Plans regarding efforts to address populations with AFN during a wildfire or PSPS de-energization. The AFN Plan includes information related to notifications before, during, and after a de-energization event; support services and tools available to customers with AFN; identification of all customers with AFN; collaboration with working groups, advisory councils, CBOs, and AFN support groups; and available customer programs and resources. A full version of the AFN Plan can be found in Appendix H.

11.4.5 ENGAGEMENT WITH TRIBAL NATIONS

A dedicated Senior Tribal Affairs Manager in the Operations Support business unit supports 17 Tribal Nations, all in the HFTD. The population of the Tribal Nations ranges from about 45 to 3,000; however, not all Tribal members choose to live on reservations. The Senior Tribal Affairs Manager implements culturally appropriate communications and outreach based on feedback from Tribal elected leaders, staff and community leaders via listening sessions, online surveys and focus groups. See Section 9.8 Partnerships for additional partnerships with Tribal Nations.

In addition to individual meetings with Tribal governments throughout the year, the Southern California Tribal Chairmen's Association, Intertribal Long Term Recovery Foundation, Indian Health Council, and Southern Indian Health Council are utilized to amplify messaging and additional avenues to support Tribal communities during PSPS activations. All Tribes are provided information and offered training on the Public Safety Partner portal.

Challenges during wildfires and PSPS de-energizations include increased impacts to elders and vulnerable community members, lack of connection to generators and batteries, impacts to food and water sources, the relatively long length of PSPS de-energizations due to remoteness, and the lack of integrating indigenous conversations around climate adaptation and ancestral wisdom. In addition, Tribes have expressed that their elected leadership and staff have limited resources and cannot always provide feedback.

In response, SDG&E established support systems with Indian Health Councils to provide generators, resiliency items, information, and resources as well as support emergency food distribution during a PSPS de-energization. Additionally, SDG&E executive leadership participates in Tribal events to provide one-on-one feedback and shares data that will inform Tribal climate adaptation plans. In 2024, focus shifted to include smaller community events within areas where there are higher low-income populations.

Building on feedback from Tribal leaders and first responders, Tribal fire departments and law enforcement, which are highly trusted in the community and already conducting wellness checks to the most vulnerable Tribal members living on reservations, now provide resiliency items, generators, and information to reach more Tribal members. Several grants were given to Tribal fire departments to provide more resources to reach vulnerable Tribal customers that may not trust outside organizations such as SDG&E.

11.4.6 CURRENT GAPS AND LIMITATIONS

OEIS Table 11-11: Key Gaps and Limitations in Public Emergency Communication Strategy

Gap or Limitation Subject	Brief Description of Gap or Limitation	Remedial Action Plan
Customer/Public Wildfire/PSPS Notifications/Communications Comprehension	Improving our customers retention and comprehension of communications and messaging during a PSPS activation or related emergency event.	Strategy: Continue to conduct annual surveys as required and use feedback to improve communications and messaging for the following year. This includes Public Education efforts, customer notification content and customer/public messaging during PSPS activations. Target timeline: Annually
Customer understanding of support services during PSPS de-energizations vs. planned outages	Customers sometimes contact PSPS AFN support partners looking for assistance during a planned outage, especially if it occurs near a PSPS activation.	Strategy: Continue to provide education on what support services are offered for PSPS de-energizations and notify the customer contact center when a customer is inaccurately referred to an AFN Support Partner. Target timeline: Ongoing

Gap or Limitation Subject	Brief Description of Gap or Limitation	Remedial Action Plan
Updating current customer contact information	This is a constant effort to retain updated contact information for customers.	Strategy: SDG&E will continue to utilize the call to action of updating contact information, signing up for PSPS notifications and downloading the Alerts by SDG&E app to receive notifications and updates about PSPS de-energizations. Additionally, the company will explore additional opportunities to solicit and retain updated customer contact information. Target timeline: Ongoing

11.5 CUSTOMER SUPPORT IN WILDFIRE AND PSPS EMERGENCIES

11.5.1 OUTAGE REPORTING

During potential or actual PSPS de-energizations, broadcast media (radio and TV), SDG&E's external-facing blog (SDGEtoday.com)[65], a dedicated PSPS landing page[66], the SDG&E outage map[67], and social media are utilized for real-time situational awareness. The CNS also provides notifications and updates directly to affected customers and community members who have signed up to receive PSPS activity alerts.

11.5.2 SUPPORT FOR LOW-INCOME CUSTOMERS

The following actions are taken for all low-income customers in wildfire-impacted areas to align with the CARE and Energy Savings Assistance (ESA) programs:

- Freeze all standard and high-usage reviews for CARE program eligibility standards and high-usage post enrollment verification requests for all customers in the impacted areas within the service territory
- Partner with the United Way, the administrator of the Neighbor-to-Neighbor program that provides emergency bill assistance, to increase the bill assistance cap amount for impacted customers from $200 to $400
- Modify the ESA program by allowing impacted customers to self-certify if: 1) the customer states they lost documentation necessary for income verification of a wildfire, or 2) if the customer states that individuals displaced by the wildfires reside in the household

Immediately following a wildfire, outreach representatives are deployed to support American Red Cross and County of San Diego assistance centers. These outreach representatives help customers download the mobile outage map to stay up to date on estimated restoration times, help customers enroll in

[65] SDG&E Today; https://www.sdgetoday.com/pressroom/newscenter
[66] PSPS Dashboard Landing Page; www.sdge.com/ready or https://www.sdge.com/psps-dashboard
[67] SDG&E Outage map; https://www.sdge.com/residential/customer-service/outage-center/outage-map (also available on the SDG&E App)

programs like CARE and ESA, and connect customers to the vast array of services provided by San Diego emergency services.

Local CBOs are also utilized to help connect customers with emergency-related information, outage information, and program information. These CBOs also help to refer customers in need to San Diego emergency services for further information and assistance.

11.5.3 BILLING ADJUSTMENTS

When a wildfire has destroyed a customer's residential structure, closing bills are waived, including charges from the previous regular read date up until the dates the wildfire occurred and charges from the prior month of billing. For non-residential customers whose structures have been destroyed, closing bill amounts from the previous regular read date up to the dates on which the wildfire occurred are waived. Non-residential customers are still held responsible for charges billed for any months prior to the wildfire. Estimated energy usage for billing purposes is stopped when a home/unit is unoccupied due to a wildfire.

11.5.4 DEPOSIT WAIVERS

Deposit requirements are waived for impacted customers seeking to re-establish service at either the same location or a new location.

11.5.5 EXTENDED PAYMENT PLANS

For impacted customers, including customers whose employment was impacted by wildfires, payment arrangements are extended with a 0-percent down payment and a repayment period of 12 months.

11.5.6 SUSPENSION OF DISCONNECTION AND NONPAYMENT FEES

For customers impacted by wildfires, including customers whose employment was affected by wildfires, disconnection for non-payment and associated fees is suspended, deposit and late fee requirements are waived for affected customers who pay their utility bills late, and late payments by customers who are eligible for these protections are not reported to credit reporting agencies or to other such services.

The premises of customers impacted by wildfires that are not capable of receiving utility services are identified and billing is discontinued for these premises. Currently there is no disconnect charge. Additionally, there is no reconnection charge for customers impacted by wildfires.

11.5.7 REPAIR PROCESSING AND TIMING

Move-ins and move-outs are expedited to support customers impacted by wildfires returning to their homes. If a customer communicates that they are relocating to another location as a result of damage to their home due to a wildfire, every attempt is made to have service available to the customer on the requested day. Additionally, the time from when the service is requested to the time it is completed is tracked.

11.5.8 COMMUNITY ASSISTANCE LOCATIONS AND SERVICES

SDGE Table 11-1 shows the locations and services of the CRCs

SDGE Table 11-1: CRC Locations and Services

Community Resource Center	Area Served	Facility Name	Location	Site Description	Services Offered
Boulevard CRC	Boulevard	Boulevard Community Center	39919 Ribbonwood Rd Boulevard, CA 91916	Brick & Mortar	Water, WiFi, Medical Device Charging, Snacks, Phone Charging, Ice, Water for livestock, Car Power Inverter, Battery Bank, and Up-to-Date Outage Information
Descanso CRC	Descanso	Descanso County Library	9545 River Dr Descanso, CA 91916	Brick & Mortar	Water, WiFi, Medical Device Charging, Snacks, Phone Charging, Ice, Water for livestock, Car Power Inverter, Battery Bank, and Up-to-Date Outage Information
Dulzura CRC	Dulzura	Dulzura Community Development Center	1136 Community Building Rd Dulzura, CA 91917	Brick & Mortar	Water, WiFi, Medical Device Charging, Snacks, Phone Charging, Ice, Water for livestock, Car Power Inverter, Battery Bank, and Up-to-Date Outage Information
Fallbrook CRC	Fallbrook	Fallbrook Branch Library	124 S Mission Rd Fallbrook, CA 92028	Brick & Mortar	Water, WiFi, Medical Device Charging, Snacks, Phone Charging, Ice, Water for livestock, Car Power Inverter, Battery Bank, and Up-to-Date Outage Information
Julian CRC	Julian	Whispering Winds Catholic Camp	17606 Harrison Park Rd Julian, CA 92036	Brick & Mortar	Water, WiFi, Medical Device Charging, Snacks, Phone Charging, Ice, Water for livestock, Car Power Inverter, Battery Bank, and Up-to-Date Outage Information
Lake Morena CRC	Lake Morena	Lake Morena Community Church	29765 Oak Dr Campo, CA 91906	Brick & Mortar	Water, WiFi, Medical Device Charging, Snacks, Phone Charging, Ice, Water for livestock, Car Power Inverter, Battery Bank, and Up-to-Date Outage Information
Pine Valley CRC	Pine Valley	Pine Valley Improvement Club	28890 Old Hwy 80 Pine Valley, CA 91962	Brick & Mortar	Water, WiFi, Medical Device Charging, Snacks, Phone Charging, Ice, Water for livestock, Car Power Inverter, Battery Bank, and Up-to-Date Outage Information
Potrero CRC	Potrero	Potrero Community Center	24550 Highway 94 Potrero, CA 91963	Brick & Mortar	Water, WiFi, Medical Device Charging, Snacks, Phone Charging, Ice, Water for livestock, Car Power Inverter, Battery Bank, and Up-to-Date Outage Information

Community Resource Center	Area Served	Facility Name	Location	Site Description	Services Offered
Ramona CRC	Ramona	Ramona Branch Library	1275 Main Street Ramona, CA 92065	Brick & Mortar	Water, WiFi, Medical Device Charging, Snacks, Phone Charging, Ice, Water for livestock, Car Power Inverter, Battery Bank, and Up-to-Date Outage Information
Valley Center CRC	Valley Center	Valley Center Branch Library	29200 Cole Grade Rd Valley Center, CA 92082	Brick & Mortar	Water, WiFi, Medical Device Charging, Snacks, Phone Charging, Ice, Water for livestock, Car Power Inverter, Battery Bank, and Up-to-Date Outage Information
Warner Springs CRC	Warner Springs	Warner Springs Community Resource Center	30950 Highway 79 Warner Springs, CA 92086	Brick & Mortar	Water, WiFi, Medical Device Charging, Snacks, Phone Charging, Ice, Water for livestock, Car Power Inverter, Battery Bank, and Up-to-Date Outage Information

11.5.9 MEDICAL BASELINE SUPPORT SERVICES

To support Medical Baseline Allowance Program participants, SDG&E offers support before an outage and during an outage. To prepare for an outage, customers are encouraged to sign up for customized resiliency recommendations, outage notifications, and back-up battery programs and to make an emergency kit and plan. During a PSPS de-energization, there are a number of resources available to support the customer including hotel stays, accessible transportation, food support, emergency kit items, wellness checks, back-up power, and access to CRCs.

11.5.10 ACCESS TO ELECTRICAL CORPORATION REPRESENTATIVES

Customers and stakeholders have a variety of representatives available to communicate information and communicate concerns. These include representatives in SDG&E's Call Centers, Regional Public Affairs, Business Services, and Fire Coordination.

- Resource levels accordingly to support events.
- Regional Public Affairs: SDG&E representatives are assigned to develop and maintain relationships with local elected officials. As a wildfire event approaches, the representative will establish and maintain contact with their key stakeholder. The representative provides answers to questions and addresses concerns.
- Business Services: Key and critical accounts are identified and assigned an SDG&E representative to establish and maintain contact during a wildfire or PSPS de-energization. The representative reaches out to the customer as the event develops and maintains contact until the event is over.

- Fire Coordination: The Fire Coordinators are experienced in fire behavior, fire prevention, and firefighting techniques. They serve as the direct link to emergency-response agencies. They also serve as the single point of contact for the fire agency ICS, provide periodic updates to fire emergency personnel and SDG&E personnel, establish radio and communication assignments, assist in the coordination of activities related to de-energizing and reenergizing power lines, and update on-scene personnel, control centers, service dispatch, and the SDG&E regional operations centers as to the status of each incident.

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Enterprise systems

12 ENTERPRISE SYSTEMS

12.1 TARGETS

12.1.1 QUALITATIVE TARGETS

OEIS Table 12-1: Enterprise Systems Targets

Initiative	Qualitative or Quantitative Target	Activity (Tracking ID #)	Previous Tracking ID (if applicable)	2026 End of Year Total/Completion Date	2027 Total/Status	2028 Total/Status	Section; Page Number
Asset Management and Inspection Enterprise System	Qualitative	Asset Management and Inspection Enterprise System-Utilize advanced technology and analytics - including integrating Asset 360 and IIP data - to develop, enhance, expand risk-informed strategies, and enhance transparency for asset management (WMP.1457)	n/a	By 12/31/2026, integrate advanced technology and analytics, including Asset 360 and IIP data, to develop risk-informed strategies for asset management.	By 12/31/2027, continue enhancing and expanding these risk-informed strategies to improve transparency and efficiency in asset management.	By 12/31/2028, continue enhancing and expanding these risk-informed strategies to improve transparency and efficiency in asset management.	Section 8.3; p. 150
Vegetation Management Enterprise System	Qualitative	Vegetation Management Enterprise System-Enhance asset tracking, data analytics, and scheduling capabilities to more effectively manage and support Vegetation Management activities. (WMP.511)	n/a	By mid-2026: Integrate historical meteorology data (e.g., wind gust) into PowerWorkz field application ("Epoch") as a GIS visualization tool for improved field situational awareness and decision-making. By 12/31/26: Complete update of new version of Powerworkz desktop work management application ("Cityworks") to enhance work order management and vegetation management activity scheduling.	By mid-2027: Complete migration of all vegetation management data into AWS and the Cloud. By 12/31/27: Replace all current SSRS reporting with AWS-reporting capabilities and dashboarding to track, manage, and report on all vegetation management activity status.	By mid-2028: Move from a Mobile Data Platform hardware tool used for data collection to a newer and more functional tool such as I-Pad to improve efficiency, functionality, and worker safety. By 12/31/28: Integrate data modeling and predictive analytics to improve vegetation management activity scheduling, risk management, project scoping, etc.	Section 9; p. 206
Vegetation Management Enterprise System-Advanced Analytics	Qualitative	Vegetation Management Enterprise System-Advanced Analytics-Advanced analytics for proactive vegetation inspection (WMP.1464)	n/a	By mid-2026: Complete and test v.2.0 of the Probability of Vegetation Contact model. Focus on model tuning and testing – including field-validation surveys with vegetation management subject matter experts. By 12/31/2026: Test v.1.0 of the Probability of Hazard model. Focus on model tuning and testing – including	By early 2027: Begin AWS data-product developments (phase II) to streamline operational analytics, reporting, and future model developments. By mid-2027: Begin design and exploratory data analysis for a Vegetation Growth model.	By early 2028: Complete v.1.0 of data-product developments and integrate with existing models and reporting systems where applicable. By 12/31/2028: Where applicable, continue investigating and/or begin implementing remote sensing technologies identified during proof-of-concept study(ies) in 2027.	Section 9; p. 206

Initiative	Qualitative or Quantitative Target	Activity (Tracking ID #)	Previous Tracking ID (if applicable)	2026 End of Year Total/Completion Date	2027 Total/Status	2028 Total/Status	Section; Page Number
				field-validation surveys with vegetation management subject matter experts. By 12/31/2026: Complete phase I of Vegetation Management data migration from PowerWorkz-Oracle to AWS.	By 12/31/2027: Conduct proof-of-concept study(ies) with applicable vendor(s) to better understand the efficacy of remote sensing technologies for identifying non-compliant vegetation.	By 12/31/2028: Test/utilize risk models to develop indices for prioritizing and conducting targeted Off-Cycle HFTD inspections.	
Enterprise Data Foundation	Qualitative	Enterprise Data Foundation-Migrate data from on-premise to the AWS Cloud (WMP.519)	n/a	By 12/31/2026: Establish data migration patterns, successfully migrate data sets including grid hardening, assets, and PSPS/risk events, and implement data validation, integrity, and governance processes to ensure quality and integrity throughout the migration journey.	By 12/31/2027: Execute data integration from the upgraded SAP S/4 HANA platform for ERP, transitioning from the legacy SAP ECC system. Additionally, implement data ingestion processes for the new Transmission SAP S/4 HANA system while maintaining enterprise data quality standards.	By 12/31/2028: Integrate and ingest critical data from all newly implemented systems across the organization. This initiative will include establishing data pipelines, security protocols, and ETL processes. The integration will prioritize data quality and system compatibility while maintaining compliance standards.	Section 12; p. 284
Risk Methodology and Assessment	Qualitative	Risk Assessment Systems - Enhance WiNGS Visualization Platform (WMP.442)	n/a	By 12/31/2026: Continue enhancing the visualization platform to facilitate quick and easy access to reliable data to inform de-energization and mitigation investment planning decisions, faster initial loads and overall stability of the platform. Identify potential enhancements for existing features to elevate user experience and facilitate efficient risk information transfer.	By 12/31/2027: Continue to integrate and deploy additional enhancements, bug fixes and features. Explore and expand additional use cases for risk modeling and visualization platform.	By 12/31/2028: Continue regular meetings with internal subject matter experts, visualization developers, and platform users to ensure the precision of displayed data and effective visualizations as well as pinpoint areas for improvement. Explore and expand additional use cases for risk modeling and visualization platform.	Section 5.7; p. 76
Weather Forecasting	Qualitative	See FPI (WMP.450)	n/a	See OEIS Table 10-1	See OEIS Table 10-1	See OEIS Table 10-1	Section 10.5 ; p. 235
Grid Monitoring	Qualitative	Data Integration (WMP.1444)	n/a	See OEIS Table 10-1	See OEIS Table 10-1	See OEIS Table 10-1	Section 10.1; p. 235
Ignition Detection	Qualitative	Ignition Detection Systems – Cameras (WMP.1343)	n/a	See OEIS Table 10-1	See OEIS Table 10-1	See OEIS Table 10-1	Section 10.1; p. 235

12.2 SUMMARY OF ENTERPRISE SYSTEMS

Database(s) used for Data Storage

Databases used vary by enterprise system and include Oracle, Oracle RDS, SAP Hana, SQL, AWS, Azure, Time Series, CKAN, Postgres, and some proprietary databases.

Procedures for Updating the Enterprise System

Updates to enterprise systems are managed using an Information Technology Change Management methodology in partnership with an IT Agile team, with changes documented as user stories and prioritized and completed utilizing Agile methodologies. A Change Advisory Board (CAB) reviews proposed changes each week.

The enterprise system for Risk Assessment makes use of Azure DevOps (ADO) for Python code version control and project management. ADO incorporates documented enhancements attached to repository branches for logical and traceable model updates.

Asset Identification Process

A GIS mapping system is used to capture, edit, analyze, manage, and display spatial and geographic data. The scope of asset information documented in GIS includes distribution, transmission, substation, telecommunication, and land assets. The system tracks equipment location, unique equipment attributes, and circuit information. Equipment assets are identified and updated manually from design orders, outage reports, as-built true ups, and field inspections.

Systems Applications and Processes Plant Maintenance (SAP PM) stores distribution master asset records, including inspection and maintenance records for the CMP. GeoCall is used to collect detailed CMP inspection data from the field. SAP PM is integrated with the GIS system.

Transmission Construction and Maintenance (TCM) Data is used to track inspection findings and record maintenance work completed as a result of inspections. Epoch Mobile on Mobile Data Terminals (MDTs) is used to collect field inspection data. TCM is integrated with the GIS system.

The Substation Maintenance Management System, known as Cascade, is the system of record for substation asset master records and is used for work management of assets inside the substation including asset attributes, maintenance triggers, history of maintenance completed, and equipment failures.

QA/QC processes, along with other system checks, are performed on design packages before they are posted to GIS. Accuracy and metrics reports are integrated with GIS, SAP PM, and CPM data to assess production and quality. Automated data quality processes to measure completeness have been implemented for critical source systems like GIS. Also, Sempra Internal Audit audits asset data periodically.

Process for Data Integrity, Accessibility, and Retention

The Data Governance Framework, based in data governance standards and practices, defines how data should be managed throughout its lifecycle and includes the core pillars of ownership, accessibility, security, quality, and knowledge. Operationally, a variety of data management processes have been implemented to verify data integrity, accessibility, and retention. Access to the data is controlled via application access management and database administration access management processes and controls.

Data is retained according to the Information Management Policy and Records Retention Schedules.

Quality Assurance/Quality Control

As a core component of the Data Governance Framework, data quality metrics include dimensions of accuracy, completeness, consistency, timeliness, uniqueness, and validity. To date, automated processes to measure completeness have been implemented for critical source systems like GIS.

Data consumed by the WiNGS-Planning and WiNGS-Ops models is checked for completeness to facilitate results representing the most accurate, up-to-date information. As a part of model operations, model input data is manually analyzed and automatically aggregated and visualized in a data quality dashboard to surface potential issues.

Quality assurance audits of vegetation management activities include field work review as well as a data accuracy review.

Data Governance Plan

The Enterprise Data Governance Office provides strategies to promote clean, organized, and easily accessible data. Data governance processes and controls are documented for the enterprise systems leveraged in the WMP Data Platform. The Enterprise Data Catalog is comprised of two main components, SAP Hana and AWS. Collibra, DataZone, and Glue are used for creating data asset inventories, data stewardship, metadata capture, and governance.

WMP Initiative Tracking

WMP initiatives reported in the QDR are tracked in SAP Hana. Monitoring of the initiatives is done through Business Intelligence Dashboards.

Employee/Contractor Internet Access

Access to the WMP enterprise systems is managed according to the Sempra Information Security and Acceptable Use Policy, Electric GIS Policy, and the SAP Access Request System User Guide.

Incorporation of Work Order and Asset Management Systems into Risk Analysis and Interim Mitigations

Asset Management systems feed into centralized databases using Application Programming Interfaces (APIs), AWS S3 synchronization processes, and File Transfer Protocols (FTP), which are then used in the WiNGS-Planning and WiNGS-Ops models.

In the days preceding a PSPS de-energization, engineering, construction, and compliance teams centralize the most recent data on situational risk in the service territory, including locations of temporary construction or compliance concerns that could increase the potential risk of an ignition. As part of this process, engineering teams provide feedback regarding certain wind speed thresholds to inform the PSPS decision-making process and include a complete understanding of how different risks may or may not be the reason for a reduced weather threshold.

Changes to Enterprise Systems since Last WMP Submission

Changes to the risk management systems in the 2023 to 2025 WMP cycle included WiNGS-Planning model enhancements such as automating the calculation process for wind speed thresholds, refactoring aggregation functions, and enhancing Pytest report to capture model deviations. Additionally, WiNGS-Ops model enhancements included migrating historical weather data to AWS, retraining of the vehicle model, and improvements to model pipeline architecture.

Changes to the vegetation management systems included the addition of new Genus and species attribute fields, new map layers and updated photo imagery, new SWOs specific to the Off-Cycle Patrol activity, new mapping capabilities to inspection progression, new data fields to electronically record customer refusals and other deferred work, and creation of a refusal/deferred work dashboard to track and manage time-sensitive tree work.

Changes for grid monitoring systems included transitioning SCADA communications for field devices internet protocols on the existing radio frequency 4RF network.

Changes to ignition detection systems included transitioning from an SDG&E funded, vendor based Alert Wildfire camera video AI monitoring service to a fully integrated AI video monitoring within ALERTCalifornia (https://ops.alertcalifornia.org/). The addition of AI to AlertCalifornia allows for continuous monitoring of ignition detection by CAL FIRE.

Changes to the weather forecasting systems included the addition of two weather stations to meet an existing PSPS requirement and to provide real time wind information for an alternate helicopter landing base. Additionally, one weather station was removed due to a request from the property owner.

Changes to the asset management systems included a new field service delivery system called Geocall for CMP inspections and follow-up corrective work. Inspectors have enhanced visibility using a streamlined, consolidated view of critical job information, previous photos of assets, GIS maps, safety/hazard information and integrated routing tools to work more efficiently. Other asset management systems were also updated for routine maintenance and upgrades.

In 2024, a CNS was implemented providing enhanced visibility and consistency in notifications. The customer notifications platform was transitioned to AWS, utilizing Pinpoint for email and SMS, and Connect for voice applications. In addition, a new user interface was developed to manage customer notifications with real-time reporting to help the business understand which customers are in scope for an event and track the status of notifications being sent.

For a list of planned future improvements to the program and a timeline for 2026 to 2028 WMP cycle, refer to the targets in OEIS Table 12-1.

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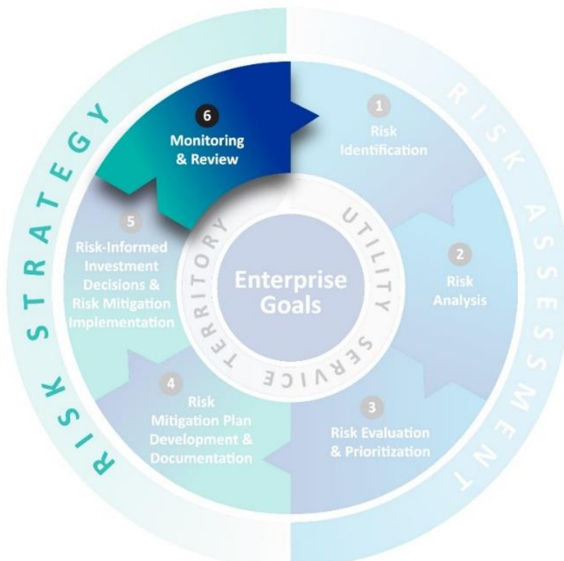
Lessons learned

13 LESSONS LEARNED

The last step of the Enterprise Risk Management Framework is Monitoring & Review (see Figure 13-1). This includes tracking risk mitigation implementation and progress (see QDR), the incorporation of lessons learned, corrective actions, and review and correction of any Notifications of Violation and Defect.

Figure 13-1: Monitoring & Review Step of the Enterprise Risk Management Framework



OEIS Table 13-1: Lessons Learned

ID #	Year of Lesson Learned	Subject	Category and Source of Lesson Learned	Description of Lesson Learned	Proposed WMP Improvement	Timeline for Implementation	Reference
1	2024	Double Down Initiative PSPS	Outcome From Previous WMP Cycles PSPS	Proactive, risk-informed corrective maintenance can potentially reduce scope of PSPS activations.	Risk-informed prioritization of CMP corrective work prior to San Diego's Santa Ana wind season. Implement prioritization for pole loading calculation related findings (utilization & clearance infractions) with Electric Distribution Engineering	2025-2028	n/a
2	2024	Double Down Initiative	Outcome From Previous WMP Cycles	Notify field users and corporate security of potential hazards and customer warnings before approaching private property.	Enable GeoCall to allow field users to enter data on customer and property restrictions and identify on GIS/maps in real time.	2025-2028	n/a
3	2024	Double Down Initiative	Outcome From Previous WMP Cycles	Establish a process to identify, review, and maintain distribution access roads that need maintenance.	Prioritize access roads to devices on circuits that are frequently de-energized for PSPS to help reduce the time it takes to patrol and develop dashboard for districts to submit and review status of projects.	2025-2028	n/a
4	2024	PSPS	Nov 6-8, 2024, PSPS Activation	Data refresh rates between GIS and the Customer Notification System resulted in inconsistent customer data	A focus team has been created to resolve the issue.	2025-2027	PSPS Post-Event Report - Nov 6-8, 2024
5	2024	PSPS	PSPS After Action Report (AAR)	Identified areas of improvement for the Customer Notification System, which includes ability to create customer lists based on switching plans and other real-time changes to support re-energization.	Identify requirements for improvements and execute projects based on priority, difficulty, and budget.	2025-2027	n/a
6	2024	Risk Methodology and Assessment	Dec 2024/Jan 2025 PSPS Activations ACIs	As more end users gain access and are using the WiNGS visualization tools, there is an opportunity to improve user experience as well as the timeliness and consistency of the data refresh.	Provide easy and quick access to reliable data and provide an optimized user interface to inform decision making.	Ongoing	OEIS Table 5-6 ACI SDGE-25U-03
7	2022-2024	Wildfire Mitigation Strategy	Areas for Continuous Improvement	Continue journey of more risk-informed and data-driven decision making.	Incorporate lifecycle cost analysis to explore combined mitigation effectiveness to inform mitigation selection and prioritization.	2024-2028	WMP 2026-2028, Section 6

ID #	Year of Lesson Learned	Subject	Category and Source of Lesson Learned	Description of Lesson Learned	Proposed WMP Improvement	Timeline for Implementation	Reference
							ACI SDGE-23-06
8	2022	Vegetation management and inspections	Collaboration with other IOUs ACIs	Continue analysis of enhanced clearance research to inform updated forecasts and program scope.	Refine scope of enhanced clearances.	2023-2028	Section 9.2 ACI SDGE-25U-09
9	2024	Land Rights and Permits	Feedback from Government Agencies	Agency approval is needed before advancing to design phase for agency projects.	Process was updated to hold projects at 60 percent design, instead of advancing to 100 percent of the design through the QA and approval process. By holding the project at the 60 percent design milestone, a higher level of engagement can be achieved during any design revisions.	Ongoing	n/a
10	2024	Land Rights and Permits	Feedback from Government Agencies	Certain agencies have complex or restrictive design criteria. Incorporating agency approval criteria into internal design guidelines will streamline the approval process.	Agency approval criteria should be identified and included in the Design Preference Guideline (DPG).	Ongoing	n/a
11	2024	Land Rights and Permits	Feedback from Government Agencies	Stronger relationships with agency representatives may help mitigate some rejections and re-submittals.	Develop relationships with agency staff. Increasing time and effort up front to create these relationships allows for a greater depth of communication. Instead of rejecting a submittal, which would lead to revisions and re-submittal, agency staff can call or send messages with questions that can be answered in a timely manner.	Ongoing	n/a
12	2024	Undergrounding	Grid Hardening Working Group	Cultural, Tribal Nation and Environmental Considerations: Early on, the program didn't realize the challenge and demand required to understand Tribal Nation sensitivities, regulatory requirements, and the need for thorough engagement, which often requires multiple meetings and extended timelines. Without understanding Tribal Nation sensitivities, regulatory requirements, and	SDG&E collaborates with multiple government agencies such as the County of San Diego, Department of the Interior, Bureau of Indian Affairs, Caltrans, and the U.S. Forest Service, to ensure proper land rights and permits are obtained.	Ongoing	n/a

ID #	Year of Lesson Learned	Subject	Category and Source of Lesson Learned	Description of Lesson Learned	Proposed WMP Improvement	Timeline for Implementation	Reference
				need for thorough engagement, it's difficult to complete a 30% design review.			
13	2024	Undergrounding	Grid Hardening Working Group	Data-Management and Technology Integration: Emphasis on systemizing data collection and processing at all levels, including subs and liaisons, to prevent process inefficiencies. Early data collection enables better project management and problem resolution.	Continue to collaborate with Grid Hardening Working Group and our own impact departments to create and implement solutions.	Ongoing	n/a
14	2024	Undergrounding	Grid Hardening Working Group	Feedback and Continuous Improvement: Silos within the program hinder collaboration, as not all teams are aware of each other's work. A shared platform for visibility into all ongoing work would enhance communication and coordination. Programs with funding obligations often require detailed reporting, which could be formalized into a monthly program report for better program wide visibility and documentation.	Continue to collaborate with Grid Hardening Working Group and our own impact departments to create and implement solutions.	Ongoing	n/a
15	2024	Undergrounding	Grid Hardening Working Group	Financial Management and Budgeting: A budget funding calculator was introduced to help price projects and assist requestors in understanding costs. The Last Planner System, including planning and scheduling, was used to track survey progress and efficiency. Monthly reports were sent to the team for feedback and improvements.	Continue to collaborate with Grid Hardening Working Group and our own impact departments to create and implement solutions.	Ongoing	n/a
16	2024	Undergrounding	Grid Hardening Working Group	Process Improvement and Efficiency: Initially the program was managed as a collection of individual projects, leading to inefficiencies. Each group reviewed and developed deliverables at every stage gate, creating bottlenecks and a lack of collective project tracking. The program transitioned to a streamlined approach by consolidating all disciplines' deliverables into a single file, improving efficiency.	Continue to collaborate with Grid Hardening Working Group and our own impact departments to create and implement solutions.	Ongoing	n/a

ID #	Year of Lesson Learned	Subject	Category and Source of Lesson Learned	Description of Lesson Learned	Proposed WMP Improvement	Timeline for Implementation	Reference
17	2024	Undergrounding	Grid Hardening Working Group	Program Governance and Leadership: In person governance workshops brought SDG&E executives and AECOM together, highlighting different ideas and understanding of AECOM global program management and energy utility approaches. These workshops emphasized the importance of governance, planning and alignment. SDGE leadership, demonstrated strong commitment from day one, signaling their intent to do things differently by bringing in AECOM. Their sponsorship and alignment with functional leads were key to program success. Leadership events, such as roundtables, were valuable for fostering alignment and inclusion early in the program. Expanding these roundtables beyond leadership to the entire program team could enhance inclusivity and engagement.	Continue to collaborate with Grid Hardening Working Group and our own impact departments to create and implement solutions.	Ongoing	n/a
18	2024	Undergrounding	Grid Hardening Working Group	Risk Management and Planning - Granular Analysis and Root Cause Identification: Analyzing delays at a granular level helps identify patterns (e.g., common owners or encroachments) and predict future risks. Root cause analysis identifies driving factors of risks/delays and informs mitigation plans.	Continue to collaborate with Grid Hardening Working Group and our own impact departments to create and implement solutions.	Ongoing	n/a
19	2024	Undergrounding	Grid Hardening Working Group	Safety and Field Operations: The safety team built strong personal relationships with field team members and the construction safety services team by actively engaging in the field. They provided hands-on coaching to promote safer practices and reinforce safe behaviors, fostering a shared understanding of safety expectations. By placing Field Safety Officers on-site, they established a culture of trust, making it clear that the goal was not to catch mistakes but to support contractors in working safely. Additionally, the safety team exceeded	Continue to collaborate with Grid Hardening Working Group and our own impact departments to create and implement solutions.	Ongoing	n/a

ID #	Year of Lesson Learned	Subject	Category and Source of Lesson Learned	Description of Lesson Learned	Proposed WMP Improvement	Timeline for Implementation	Reference
				SDG&E's written reporting protocols by following up with team members after reports by phone call, further strengthening relationships and reinforcing their commitment to safety.			
20	2024	Undergrounding	Grid Hardening Working Group	Stakeholder Engagement and Management - Focus Group Meetings: To address challenges with private property owners hesitant to sign easements, focus group meetings were implemented. These meetings included regular participation from program and project management, legal counsel, lands, and land service representatives, and communications to align on and resolve issues that historically caused delays. By bringing the right decision-makers together every two weeks, the team could address new challenges, make decisions in real-time, and avoid delays caused by email bottlenecks.	Continue to collaborate with Grid Hardening Working Group and our own impact departments to create and implement solutions.	Ongoing	n/a
21	2024	Undergrounding	Grid Hardening Working Group	Team Collaboration and Communication: Establishing a partnership with SDG&E involved working alongside them rather than merely beside them, fostering sponsorship and collaborative relationships. Contractor partnerships, such as with NV5, were critical. Building trust and including contractors in conversations led to significant cost savings and strengthened relationships.	Continue to collaborate with Grid Hardening Working Group and our own impact departments to create and implement solutions.	Ongoing	n/a

13.1 DESCRIPTION AND SUMMARY OF LESSONS LEARNED

13.1.1 FEEDBACK FROM GOVERNMENT AGENCIES AND STAKEHOLDERS

SDG&E collaborates with multiple government agencies such as the County of San Diego, Department of the Interior, Bureau of Indian Affairs, Caltrans, and the U.S. Forest Service, to ensure proper land rights and permits are obtained.

Established in 2019, the SDG&E Wildfire Safety Community Advisory Council (WSCAC) provides direct constructive input, feedback, recommendations, and support from community leaders to SDG&E senior management and the Safety Committee of SDG&E's Board of Directors on how SDG&E can continue to help protect the region from wildfires. Membership includes, City and County of San Diego Emergency Operations Services, the San Diego County Water Authority District, CAL FIRE, Tribal representation, the U.S. Forest Service, the Cleveland National Forest, local community-based organizations, the San Diego County Office of Education, the San Diego Fire Chiefs Association, AT&T, Cox Communications, Caltrans, and other key stakeholders.

See OEIS Table 13-1 for lessons learned regarding feedback from government agencies and stakeholders.

13.1.2 COLLABORATION WITH OTHER ELECTRICAL CORPORATIONS AND INDUSTRY EXPERTS

During the 2023 to 2025 WMP cycle, monthly collaborations with other utilities expanded to include PG&E, SCE, Bear Valley Electric, PacifiCorp, Hawaiian Electric, and Liberty Utilities (see ACI SDGE-25U-04 in Appendix D). Lessons learned are centered around sharing experiences, similarities and differences in mitigation approaches, best practices, and metrics. This serves as baseline understanding of challenges while offering diversity of thought and interpretation. For example, having a shared understanding around regulatory requirements and conducting discussions around new technologies and mitigations deployed by other utilities is beneficial.

13.1.3 PSPS OR OUTAGE EVENTS

In December 2024, SDG&E experienced one of its most wide-spread PSPS activations in its history, impacting over 51,000 customers with de-energizations that included distribution and transmission lines. The anticipated rapid onset of high winds across the service territory led SDG&E to develop a proactive plan to de-energize distribution lines slightly in advance of peak wind gusts to avoid numerous concurrent de-energizations. While it is less common to de-energize transmission lines, SDG&E made the decision during this weather event to de-energize transmission lines based on a risk assessment. These de-energizations of transmission lines included those that fed substations where all distribution circuits out of the substation were proactively de-energized. While infrequent, transmission lines may require de-energization in the future based on risk assessments. Lessons learned from this event will inform future events similar in nature with rapid, wide-spread impacts.

Lessons learned during the late-2024, early-2025 PSPS activations are listed in OEIS Table 13-1.

13.1.4 OUTCOMES FROM PREVIOUS WMP CYCLES

The Double Down Initiative continues to be an opportunity to reflect on lessons learned and share ideas for continuous improvement. For example, Wildfire Mitigation staff participate in district safety meetings and stand-downs, building upon multiple years of Safety Culture Assessment results. The commitment to "Double Down" on existing practices will continue with frontline workers to solicit new ideas and communicate enhancements to wildfire safety and preparedness. Lessons learned from the Double Down Initiative are listed in OEIS Table 13-1.

13.1.5 AREAS FOR CONTINUED IMPROVEMENT

SDG&E continues to track and provide updates on the 12 ACIs outlined in Energy Safety's Decision on SDG&E's 2023-2025 Base WMP and SDG&E's 2025 WMP Update.[68] Detailed information respective to each unique ACI is presented in Appendix D and lessons learned can be found in OEIS Table 13-1.

13.2 WORKING GROUP MEETINGS

13.2.1 PSPS WORKING GROUP

SDG&E continues to participate in the CPUC directed joint IOU PSPS Working Group. This working group continues the open collaboration and communication between California's IOUs to discuss best practices for implementing PSPS de-energizations, benchmark against each other, and share lessons learned.

13.2.2 RISK MODELING WORKING GROUP

SDG&E actively participates in the Energy Safety-led Risk Modeling Working Group, where discussions focus on refining risk assessment methodologies and improving wildfire mitigation strategies. Topics covered in these sessions include utility-specific approaches to identifying the likelihood of risk events and ignitions, assessing fire consequences based on meteorological, environmental, and fuel data, and modeling the probability and impact of PSPS de-energizations.

Through these discussions, SDG&E has gained valuable insights into industry best practices, particularly in leveraging advanced analytics and machine learning for enhanced weather and fire behavior modeling Lessons learned from the Risk Modeling Working Group are listed in OEIS Table 13-1.

13.2.3 GRID HARDENING WORKING GROUPS

Undergrounding

The Joint IOU Undergrounding Working Group focuses on 10 overarching themes: Cultural, Tribal and Environmental Considerations, Data Management and Technology Integration, Feedback and Continuous Improvement, Financial Management and Budgeting, Process Improvement and Efficiency, Program Governance and Leadership, Risk Management and Planning, Safety and Field Operations,

[68] OEIS. October 2023. Decision on 2023-2025 Wildfire Mitigation Plan San Diego Gas & Electric Company, Section 11. Available at https://energysafety.ca.gov/what-we-do/electrical-infrastructure-safety/wildfire-mitigation-and-safety/wildfire-mitigation-plans/2023-wildfire-mitigation-plans/

Stakeholder Engagement and Management, and Team Collaboration and Communication. Lessons learned from this working group are listed in OEIS Table 13-1.

System Protection

In May 2020, SDG&E, SCE, and PG&E initiated monthly meetings to collaboratively enhance system protection strategies aimed at reducing wildfire risk. These meetings serve as a platform for sharing progress and insights, with a focus on six key areas: fast trip settings, sensitive ground fault detection, blocking reclosing, resonant grounding/Swedish Neutral systems, electrical sensor-based methods, and open phase detection methods.

As a result of these joint meetings, the utilities have been able to collaboratively share the latest advancements in existing technologies and discuss new technologies under consideration or research. In 2024, this platform facilitated discussions on how Advanced Metering Infrastructure (AMI 2.0) could be utilized as an electrical sensor to support wildfire mitigation efforts. Additionally, SDG&E has implemented ARFS on its 12 kV distribution system and has benefited from SCE's insights on the effectiveness of ARFS on their transmission-level deployments. This group has also continued to share information on new equipment that could be used for patrolling lines and identifying equipment in the early stages of failure.

Combined Mitigation Effectiveness

In late 2024, SDG&E initiated a joint IOU group dedicated to efficacy studies. This group discusses methodologies and address challenges related to various mitigation effectiveness studies. The primary focus of the group is to achieve alignment across IOUs, ensuring consistent methodologies for quantifying mitigation effectiveness.

Because the working group is relatively new, there is not enough information to develop any lessons learned. However, this continued effort in 2025 is expected to bring valuable insight and result in utility alignment on mitigation effectiveness and methodologies.

13.2.4 ENHANCED VEGETATION MANAGEMENT WORKING GROUP

SDG&E leads the Energy Safety-required Enhanced Vegetation Management Working Group, bringing together a joint IOU team to enhance wildfire mitigation strategies. Throughout the year, the team has collaborated to share data, exchange independent studies, and assess the effectiveness of enhanced clearances in preventing vegetation-related outages. As part of this assessment, the joint IOUs performed a study that focused on quantifying whether enhanced radial clearances are associated with lower probability of vegetation contact. See ACI 23-B-17 in Appendix D for details.

Through this collaborative work, several key insights have emerged from this collaborative work:

- The use of independent studies across multiple service territories has provided a more comprehensive understanding of clearance effectiveness in different environmental conditions.
- A study by the Electric Power Research Institute (EPRI) evaluated the effectiveness of pruning clearances. It standardized data from three IOUs and compared the average time from inspection or pruning to the time of outage, based on the range of clearances. The results

showed that this average time to outage is significantly higher when the clearances are greater, indicating the benefit of greater clearance.

- Three IOUs' white paper focuses on quantifying whether enhanced radial clearances are associated with a lower probability of vegetation contact. The result indicates enhanced clearances reduced approximately 20 percent of vegetation-caused outages. However, clearance alone has limited impact on risk reduction, especially during windy and winter storm conditions, which affect Northern and Southern California differently.
- Effective risk management requires acknowledging differences in utilities' landscapes and land cover. Utilities with more vegetated land face different challenges than those with smaller, less diverse territories. Collaboration has shown that regional differences in climate, topography, and vegetation types require customized clearance approaches rather than a one-size-fits-all solution. To complement clearance, controlling other factors like fuel conditions is recommended.
- The white paper recommends utilities determine areas where historically higher wind gusts and drier fuel conditions may necessitate prioritization and frequency of inspection and tree pruning activities. Additional mitigation methods should be considered particularly in forest and shrubland areas. Such a strategy should consider location-specific treatments or enhanced clearance practices. And these combined mitigations require time to collect the data to further analyze its effectiveness.
- The white paper also acknowledges the benefit of record keeping practices that connect tree related outage and ignition data to the work activity records to gain greater insight into clearance and trends in tree failure. Frequent monitoring of vegetation conditions using remote sensing technologies can help utilities identify patterns and adjust clearance practices. Data collection is crucial for learning and improvement. The evolution of vegetation management relies on data analytics for a more targeted and proactive strategy.

13.3 DISCONTINUED ACTIVITIES

SDG&E completed six initiatives in the 2023 to 2025 WMP cycle and is discontinuing four initiative activities beginning in 2026. Completed activities are listed below. OEIS Table 13-2 summarizes the discontinued activities and provides lessons learned.

- Capacitor Maintenance and Replacement Program (SCADA) (WMP.453)
- Expulsion Fuse Replacement Program (WMP.459)
- Maintenance, Repair, and Replacement of Connectors, Including Hotline Clamps (WMP.464)
- Lightning Arrester Removal and Replacement (WMP.550)
- Avian Protection Program (WMP.972)
- Air Quality Index (WMP.970)

OEIS Table 13-2: Lessons Learned from Discontinued Activities

Discontinued Initiative Activity (Tracking ID)	Rationale for Discontinuation	Lessons Learned	Replacement Activities (include page # where discussed)
Wireless Fault Indicators (WMP.449)	The current wireless fault indicators were discontinued by the manufacturer. These units communicate into On-Ramp, but do not communicate with SCADA, which makes it obsolete as a wireless indicator. Therefore, they are used manually by field personnel as a fault indicator.	SDG&E is exploring alternative technologies and will continue to utilize existing fault indicators to achieve risk reduction.	n/a
Generator Grant Program (WMP.466)	Changes in the product technology and market availability of viable options has changed since the launch of this program, and the same type of customers will be served with resiliency assessments and resources based on evolving technology and availability.	Customers across the high fire threat district have varying degrees of resiliency for potential power outages, and an offering that assesses customer awareness and resource preparedness can better align the appropriate support.	Customized Resiliency Assessments (WMP.1432); Section 8.2.11.3; p. 147
Distribution infrared inspections (WMP.481)	The inspection program yielded an extremely low find rate. See ACI SDGE-25U-08 (Appendix D) for more information.	As discussed in ACI SDGE-25U-08 (Appendix D), alternative technologies and inspections can be used to identify the findings that were historically identified through this program.	Distribution Inspections (WMP.478, WMP.488, WMP.552); Section 8.3.1; p. 153; Section 8.3.7; p. 166; Section 8.3.6; p. 162 EFD (WMP.1195); Section 10.3.1; p. 239 APP (WMP.463); Section 8.2.8.1; p. 141 Protective Equipment and Device Settings (WMP.991); Section 8.7.1; p.194
Transmission 69 kV Tier 3 Visual Inspections (WMP.555)	The inspection program yielded an extremely low find rate. See Section 8.3.10.2 for more information.	The supplemental program is ineffective, and issues can be identified through other inspection programs.	Transmission Inspections (WMP.479, WMP.482, WMP.489); Section 8.3.2; p. 155; Section 8.3.3; p. 157; Section 8.3.8; p. 167 SDG&E continues to perform inspections in advance of PSPS de-energizations and restoration.
Distribution Communications Reliability Improvements (WMP.549)	Due to budget reductions in the GRC, SDG&E has focused its budget on projects that have the greatest impact on risk reduction in the HFTD. The DCRI project, while providing communication for these projects, has a lower impact on risk reduction than other programs.	Through the process of providing Private LTE services, a standard has been developed for Transmission/Distribution sites as well as stand-alone Telecom sites which will allow SDG&E to effectively address these type of telecommunication installations in the future.	Communication needs for the projects funded by WMP will be addressed as those projects are built out, instead of proactively. There is currently no identified replacement for this program to serve these projects.

Appendix A: Definitions

APPENDIX A: GLOSSARY

2026-2028 Base WMP

Table of Contents

1 TERMS DEFINED IN OTHER CODES

Where terms are not defined in this Appendix and are defined in the Government Code, Public Utilities Code, or Public Resources Code, such terms have the meanings ascribed to them in those codes.

2 TERMS NOT DEFINED

Where terms are not defined through the methods authorized by this section, such terms have ordinarily accepted meanings such as the context implies.

3 DEFINITION OF TERMS

Term	Source	Definition
Access and functional needs population (AFN)	OEIS 2026-2028 WMP Technical Guidelines	Individuals, including, but not limited to, those who have developmental or intellectual disabilities, physical disabilities, chronic conditions, or injuries; who have limited English proficiency or are non-English speaking; who are older adults, children, or people living in institutionalized settings; or who are low income, homeless, or transportation disadvantaged, including, but not limited to, those who are dependent on public transit or are pregnant. (Gov. Code, § 8593.3(f)(1).)
Asset (utility)	OEIS 2026-2028 WMP Technical Guidelines	Electric lines, equipment, or supporting hardware.
Benchmarking	OEIS 2026-2028 WMP Technical Guidelines	A comparison between one electrical corporation's protocols, technologies used, or mitigations implemented, and other electrical corporations' similar endeavors.
Burn Likelihood	OEIS 2026-2028 WMP Technical Guidelines	The likelihood that a wildfire with an ignition point will burn at a specific location within the service territory based on a probabilistic set of weather profiles, vegetation, and topography.
Catastrophic wildfire	OEIS 2026-2028 WMP Technical Guidelines	A fire that caused at least one death, damaged over 500 structures, or burned over 5,000 acres.
Circuit miles	OEIS 2026-2028 WMP Technical Guidelines	The total length in miles of separate transmission and/or distribution circuits, regardless of the number of conductors used per circuit (i.e., different phases).
Circuit Segment	OEIS 2026-2028 WMP Technical Guidelines	A specific portion of an electrical circuit that can be separated or disconnected from the rest of the system without affecting the operation of other parts of the network. This isolation is typically achieved using switches, circuit breakers, or other control mechanisms.
Consequence	OEIS 2026-2028 WMP Technical Guidelines	The adverse effects from an event, considering the hazard intensity, community exposure, and local vulnerability.
Contact from object ignition likelihood	OEIS 2026-2028 WMP Technical Guidelines	The likelihood that a non-vegetative object (such as a balloon or vehicle) will contact utility-owned equipment and result in an ignition.
Contact from vegetation likelihood of ignition	OEIS 2026-2028 WMP Technical Guidelines	The likelihood that vegetation will contact utility-owned equipment and result in an ignition.

Term	Source	Definition
Contractor	OEIS 2026-2028 WMP Technical Guidelines	Any individual in the temporary and/or indirect employ of the electrical corporation whose limited hours and/or time-bound term of employment are not considered “full-time” for tax and/or any other purposes.
Critical facilities and infrastructure	OEIS 2026-2028 WMP Technical Guidelines	Facilities and infrastructure that are essential to public safety and that require additional assistance and advance planning to ensure resiliency during PSPS events. These include the following: Emergency services sector: • Police stations • Fire stations • Emergency operations centers • Public safety answering points (e.g., 9-1-1 emergency services) Government facilities sector: • Schools • Jails and prisons Health care and public health sector: • Public health departments • Medical facilities, including hospitals, skilled nursing facilities, nursing homes, blood banks, health care facilities, dialysis centers, and hospice facilities (excluding doctors' offices and other non-essential medical facilities) Energy sector: • Public and private utility facilities vital to maintaining or restoring normal service, including, but not limited to, interconnected publicly owned electrical corporations and electric cooperatives Water and wastewater systems sector: • Facilities associated with provision of drinking water or processing of wastewater, including facilities that pump, divert, transport, store, treat, and deliver water or wastewater Communications sector: • Communication carrier infrastructure, including selective routers, central offices, head ends, cellular switches, remote terminals, and cellular sites Chemical sector: • Facilities associated with manufacturing, maintaining, or distributing hazardous materials and chemicals (including Category N-Customers as defined in D.01-06-085) Transportation sector: • Facilities associated with transportation for civilian and military purposes: automotive, rail, aviation, maritime, or major public transportation (D.19-05-042 and D.20-05-051)
Customer hours	OEIS 2026-2028 WMP Technical Guidelines	Total number of customers, multiplied by average number of hours (e.g., of power outage).
Dead fuel moisture content	OEIS 2026-2028 WMP Technical Guidelines	The moisture content of dead organic fuels, expressed as a percentage of the oven dry weight of the sample, that is controlled entirely by exposure to environmental conditions.

Term	Source	Definition
Detailed inspection	OEIS 2026-2028 WMP Technical Guidelines	In accordance with General Order (GO) 165, an inspection where individual pieces of equipment and structures are carefully examined, visually and through routine diagnostic testing, as appropriate, and (if practical and if useful information can be so gathered) opened, and the condition of each is rated and recorded.
Disaster	OEIS 2026-2028 WMP Technical Guidelines	A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability, and capacity, leading to one or more of the following: human, material, economic, and environmental losses and impacts. The effect of the disaster can be immediate and localized but is often widespread and could last a long time. The effect may test or exceed the capacity of a community or society to cope using its own resources. Therefore, it may require assistance from external sources, which could include neighboring jurisdictions or those at the national or international levels. (United Nations Office for Disaster Risk Reduction [UNDRR].)
Discussion-based exercise	OEIS 2026-2028 WMP Technical Guidelines	Exercise used to familiarize participants with current plans, policies, agreements, and procedures or to develop new plans, policies, agreements, and procedures. Often includes seminars, workshops, tabletop exercises, and games.
Electrical corporation	OEIS 2026-2028 WMP Technical Guidelines	Every corporation or person owning, controlling, operating, or managing any electric plant for compensation within California, except where the producer generates electricity on or distributes it through private property solely for its own use or the use of its tenants and not for sale or transmission to others.
Emergency	OEIS 2026-2028 WMP Technical Guidelines	Any incident, whether natural, technological, or human caused, that requires responsive action to protect life or property but does not result in serious disruption of the functioning of a community or society. (FEMA/UNDRR.)
Enhanced inspection	OEIS 2026-2028 WMP Technical Guidelines	Inspection whose frequency and thoroughness exceed the requirements of a detailed inspection, particularly if driven by risk calculations.
Enterprise Risk Registry (ERR)	CPUC	An inventory of enterprise risks at a snapshot in time that summarizes (for a utility's management and/or stakeholders such as the CPUC) risks that a utility may face. The ERR must be refreshed on a regular basis and can reflect the changing nature of a risk; for example, risks that were consolidated together may be separated, new risks may be added, and the level of risks may change over time.
Equipment ignition likelihood	OEIS 2026-2028 WMP Technical Guidelines	The likelihood that utility-owned equipment will cause an ignition through either normal operation (such as arcing) or failure.
Exercise	OEIS 2026-2028 WMP Technical Guidelines	An instrument to train for, assess, practice, and improve performance in prevention, protection, response, and recovery capabilities in a risk-free environment. (FEMA.)
Exposure	OEIS 2026-2028 WMP Technical Guidelines	The presence of people, infrastructure, livelihoods, environmental services and resources, and other high-value assets in places that could be adversely affected by a hazard.
Failure Rate	SDG&E	Failed equipment resulting in faults.
Fire Hazard Index	OEIS 2026-2028 WMP Technical Guidelines	A numerical rating for specific fuel types, indicating the relative probability of fires starting and spreading, and the probable degree of

Term	Source	Definition
		resistance to control; similar to burning index, but without effects of wind speed.[1]
Fire Potential Index (FPI)	OEIS 2026-2028 WMP Technical Guidelines	Landscape scale index used as a proxy for assessing real-time risk of a wildfire under current and forecasted weather conditions.
FPI – Normal	SDG&E	An FPI value of 11 or less represents a normal fire potential based upon combined green-up, fuels, and weather measurements.
FPI – Elevated	SDG&E	An FPI value of 12 to 14 represents an elevated risk of fire potential based upon combined green-up, fuels, and weather measurements.
FPI – Extreme	SDG&E	An FPI value of 15 or greater represents an extreme risk of fire potential based upon combined green-up, fuels, and weather measurements.
Fire season	OEIS 2026-2028 WMP Technical Guidelines	The time of year when wildfires are most likely for a given geographic region due to historical weather conditions, vegetative characteristics, and impacts of climate change. Each electrical corporation defines the fire season(s) across its service territory based on a recognized fire agency definition for the specific region(s) in California.
Fireline intensity	OEIS 2026-2028 WMP Technical Guidelines	The rate of heat release per unit time per unit length of fire front. Numerically, it is the product of the heat yield, the quantity of fuel consumed in the fire front, and the rate of spread. [2]
Frequency	OEIS 2026-2028 WMP Technical Guidelines	The anticipated number of occurrences of an event or hazard over time.
Frequent PSPS events	OEIS 2026-2028 WMP Technical Guidelines	Three or more PSPS events per calendar year per line circuit.
Fuel Continuity	OEIS 2026-2028 WMP Technical Guidelines	The degree or extent of continuous or uninterrupted distribution of fuel particles in a fuel bed thus affecting a fire's ability to sustain combustion and spread. This applies to aerial fuels as well as surface fuels. [3]
Fuel density	OEIS 2026-2028 WMP Technical Guidelines	Mass of fuel (vegetation) per area that could combust in a wildfire.
Fuel management	OEIS 2026-2028 WMP Technical Guidelines	Act or practice of controlling flammability and reducing resistance to control of wildland fuels through mechanical, chemical, biological, or manual means, or by fire, in support of land management objectives. [4]
Fuel moisture content	OEIS 2026-2028 WMP Technical Guidelines	Amount of moisture in a given mass of fuel (vegetation), measured as a percentage of its dry weight.
Full-time employee (FTE)	OEIS 2026-2028 WMP Technical Guidelines	Any individual in the ongoing and/or direct employ of the electrical corporation whose hours and/or term of employment are considered "full-time" for tax and/or any other purposes.
GO 95 nonconformance	OEIS 2026-2028 WMP Technical Guidelines	Condition of a utility asset that does not meet standards established by GO 95.
GO 95 Priority Level 1	CPUC	Immediate safety and/or reliability risk with high probability for significant impact.
GO 95 Priority Level 2	CPUC	Variable (non-immediate high to low) safety and/or reliability risk.

[1] National Wildfire Coordinating Group. Accessed May 9, 2024. https://www.nwcg.gov/node/393188
[2] National Wildfire Coordinating Group. Accessed May 9, 2024. https://www.nwcg.gov/node/447140
[3] National Wildfire Coordinating Group. Accessed May 9, 2024. https://www.nwcg.gov/node/444281
[4] National Wildfire Coordinating Group. Accessed May 9, 2024. https://www.nwcg.gov/node/386549

Term	Source	Definition
GO 95 Priority Level 3	CPUC	Acceptable safety and/or reliability risk.
Grid hardening	OEIS 2026-2028 WMP Technical Guidelines	Actions (such as equipment upgrades, maintenance, and planning for more resilient infrastructure) taken in response to the risk of undesirable events (such as outages) or undesirable conditions of the electrical system to reduce or mitigate those events and conditions, informed by an assessment of the relevant risk drivers or factors.
Grid topology	OEIS 2026-2028 WMP Technical Guidelines	General design of an electric grid, whether looped or radial, with consequences for reliability and ability to support PSPS (e.g., ability to deliver electricity from an additional source).
Ground Inspection	SDG&E	Foot patrol assessment of trees adjacent to overhead electrical facilities
Hazard	OEIS 2026-2028 WMP Technical Guidelines	A condition, situation, or behavior that presents the potential for harm or damage to people, property, the environment, or other valued resources.
Hazard tree	OEIS 2026-2028 WMP Technical Guidelines	A tree that is, or has portions that are, dead, dying, rotten, diseased, or otherwise has a structural defect that may fail in whole or in part and damage utility facilities should it fail.
Helicopter Inspection	SDG&E	Aerial inspection of vegetation adjacent to overhead electrical facilities.
High Fire Threat District (HFTD)	OEIS 2026-2028 WMP Technical Guidelines	Areas of the state designated by the CPUC as having elevated wildfire risk, where each utility must take additional action (per GO 95, GO 165, and GO 166) to mitigate wildfire risk. (D.17-01-009.)
HFTD Tier 2	CPUC	Tier 2 fire-threat areas depict areas where there is an elevated risk (including likelihood and potential impacts on people and property) from utility associated wildfires.
HFTD Tier 3	CPUC	Tier 3 fire-threat areas depict areas where there is an extreme risk (including likelihood and potential impacts on people and property) from utility associated wildfires.
High Fire Risk Area (HFRA)	OEIS 2026-2028 WMP Technical Guidelines	Areas that the electrical corporation has deemed at high risk from wildfire, independent of HFTD designation.
High FPI day	SDG&E	Days with an FPI rating of elevated or extreme
Highly rural region	OEIS 2026-2028 WMP Technical Guidelines	Area with a population of less than seven persons per square mile, as determined by the United States Bureau of the Census. For purposes of the WMP, “area” must be defined as a census tract.
High-risk species	OEIS 2026-2028 WMP Technical Guidelines	Species of vegetation that (1) have a higher risk of either coming into contact with powerlines or causing an outage or ignition, or (2) are easily ignitable and within close proximity to potential arcing, sparks, and/or other utility equipment thermal failures. The status of species as “high-risk” must be a function of species-specific characteristics, including growth rate; failure rates of limbs, trunk, and/or roots (as compared to other species); height at maturity; flammability; and vulnerability to disease or insects.
High Wind Warning (HWW)	OEIS 2026-2028 WMP Technical Guidelines	Level of wind risk from weather conditions, as declared by the National Weather Service (NWS). For historical NWS data, refer to the Iowa State University archive of NWS watches/warnings.[5]

[5] https://mesonet.agron.iastate.edu/request/gis/watchwarn.phtml

Term	Source	Definition
HWW overhead (OH) circuit mile day	OEIS 2026-2028 WMP Technical Guidelines	Sum of OH circuit miles of utility grid subject to a HWW each day within a given time period, calculated as the number of OH circuit miles under a HWW multiplied by the number of days those miles are under said HWW. For example, if 100 OH circuit miles are under a HWW for one day, and 10 of those miles are under the HWW for an additional day, then the total HWW OH circuit mile days would be 110
Ignition	CPUC	CPUC reportable ignitions (as defined by D.14-02-015)
Ignition likelihood	OEIS 2026-2028 WMP Technical Guidelines	The total anticipated annualized number of ignitions resulting from electrical corporation-owned assets at each location in the electrical corporation's service territory. This considers probabilistic weather conditions, type and age of equipment, and potential contact of vegetation and other objects with electrical corporation assets. This should include the use of any method used to reduce the likelihood of ignition. For example, the use of protective equipment and device settings (PEDS) to reduce the likelihood of an ignition upon an initiating event.
Ignition rate	SDG&E	Total ignitions caused by actual failures that lead to faults.
Incident command system (ICS)	OEIS 2026-2028 WMP Technical Guidelines	A standardized on-scene emergency management concept specifically designed to allow its user(s) to adopt an integrated organizational structure equal to the complexity and demands of single or multiple incidents, without being hindered by jurisdictional boundaries.
Initiative activity	OEIS 2026-2028 WMP Technical Guidelines	See Mitigation Activity.
Initiative construction standards	OEIS 2026-2028 WMP Technical Guidelines	The standard specifications, special provisions, standards of practice, standard material and construction specifications, construction protocols, and construction methods that an electrical corporation applies to activities undertaken by the electrical corporation pursuant to a WMP initiative in a given compliance period.
Inventory Tree	SDG&E	Any tree identified as having the potential to impact the lines from encroachment by growth or branch or trunk failure within three (3) years of inspection
Level 1 finding	OEIS 2026-2028 WMP Technical Guidelines	In accordance with GO 95, an immediate safety and/or reliability risk with high probability for significant impact.
Level 1 Inspection	SDG&E	A cursory assessment of trees within the right-of-way to determine which require pruning for the annual cycle based on tree growth and/or to abate a hazardous condition.
Level 2 finding	OEIS 2026-2028 WMP Technical Guidelines	In accordance with GO 95, a variable safety and/or reliability risk (non-immediate and with high to low probability for significant impact).
Level 2 Inspection	SDG&E	A 360-degree visual assessment of a tree where the crown, trunk, canopy, and above-ground roots are evaluated for specific hazards to the electric infrastructure. This may also involve simple tools such as a mallet to sound the tree trunk
Level 3 finding	OEIS 2026-2028 WMP Technical Guidelines	In accordance with GO 95, an acceptable safety and/or reliability risk.
Limited English proficiency (LEP) population	OEIS 2026-2028 WMP Technical Guidelines	Population with limited English working proficiency based on the International Language Roundtable scale.

Term	Source	Definition
Line miles	OEIS 2026-2028 WMP Technical Guidelines	The number of miles of transmission and/or distribution conductors, including the length of each phase and parallel conductor segment.
Live fuel moisture content	OEIS 2026-2028 WMP Technical Guidelines	Moisture content within living vegetation, which can retain water longer than dead fuel.
Locally relevant	OEIS 2026-2028 WMP Technical Guidelines	In disaster risk management, generally understood as the scope at which disaster risk strategies and initiatives are considered the most effective at achieving desired outcomes. This tends to be the level closest to impacting residents and communities, reducing existing risks, and building capacity, knowledge, and normative support. Locally relevant scales, conditions, and perspectives depend on the context of application.
Match-drop simulation	OEIS 2026-2028 WMP Technical Guidelines	Wildfire simulation method forecasting propagation and consequence/impact based on an arbitrary ignition.
Memo Tree	SDG&E	A tree identified to be pruned on a priority basis based on its proximity to the power lines and/or if the tree exhibits a hazardous condition that requires a priority response
Memorandum of Agreement (MOA)	OEIS 2026-2028 WMP Technical Guidelines	A document of agreement between two or more agencies establishing reciprocal assistance to be provided upon request (and if available from the supplying agency) and laying out the guidelines under which this assistance will operate. It can also be a cooperative document in which parties agree to work together on an agreed-upon project or meet an agreed objective.
Mitigation	OEIS 2026-2028 WMP Technical Guidelines	Undertakings to reduce the loss of life and property from natural and/or human-caused disasters by avoiding or lessening the impact of a disaster and providing value to the public by creating safer communities. Encompasses mitigation categories, mitigation initiatives, and mitigation activities within the WMP.
Mitigation activity	OEIS 2026-2028 WMP Technical Guidelines	A measure that contributes to or accomplishes a mitigation initiative designed to reduce the consequences and/or probability of wildfire or outage event. For example, covered conductor installation is a mitigation activity under the mitigation initiative of Grid Design and System Hardening.
Mitigation category	OEIS 2026-2028 WMP Technical Guidelines	The highest subset in the WMP mitigation hierarchy. There are five Mitigation Categories in total: Grid Design, Operations, and Maintenance; Vegetation Management and Inspections; Situational Awareness and Forecasting; Emergency Preparedness; and Enterprise Systems. Contains mitigation initiatives and any subsequent mitigation activities.
Mitigation initiative	OEIS 2026-2028 WMP Technical Guidelines	Efforts within a mitigation category either proposed or in process, designed to reduce the consequences and/or probability of wildfire or outage event. For example, Asset Inspection is a mitigation initiative under the mitigation category of Grid Design, Operations, and Maintenance.
Model uncertainty	OEIS 2026-2028 WMP Technical Guidelines	The amount by which a calculated value might differ from the true value when the input parameters are known (i.e., limitation of the model itself based on assumptions).[6]

[6] Adapted from SFPE, 2010, "Substantiating a Fire Model for a Given Application," Society of Fire Protection Engineers Engineering Guides.

Term	Source	Definition
Mutual aid	OEIS 2026-2028 WMP Technical Guidelines	Voluntary aid and assistance by the provision of services and facilities, including but not limited to electrical corporations, communication, and transportation. Mutual aid is intended to provide adequate resources, facilities, and other support to electrical corporations whenever their own resources prove inadequate to cope with a given situation.
National Incident Management System (NIMS)	OEIS 2026-2028 WMP Technical Guidelines	A systematic, proactive approach to guide all levels of government, nongovernment organizations, and the private sector to work together to prevent, protect against, mitigate, respond to, and recover from the effects of incidents. NIMS provides stakeholders across the whole community with the shared vocabulary, systems, and processes to successfully deliver the capabilities described in the National Preparedness System. NIMS provides a consistent foundation for dealing with all incidents, ranging from daily occurrences to incidents requiring a coordinated federal response.
Operations-based exercise	OEIS 2026-2028 WMP Technical Guidelines	Type of exercise that validates plans, policies, agreements, and procedures; clarifies roles and responsibilities; and identifies resource gaps in an operational environment. Often includes drills, functional exercises (FEs), and full-scale exercises (FSEs).
Outage program risk	OEIS 2026-2028 WMP Technical Guidelines	The measure of reliability impacts from wildfire mitigation related outages at a given location.
Overall utility risk	OEIS 2026-2028 WMP Technical Guidelines	The comprehensive risk due to both wildfire and PSPS incidents across a utility's territory; the aggregate potential of adverse impacts to people, property, critical infrastructure, or other valued assets in society.
Overall utility risk, PSPS risk	OEIS 2026-2028 WMP Technical Guidelines	See Outage program risk.
Parameter uncertainty	OEIS 2026-2028 WMP Technical Guidelines	The amount by which a calculated value might differ from the true value based on unknown input parameters. (Adapted from Society of Fire Protection Engineers [SFPE] guidance.)
Patrol inspection	OEIS 2026-2028 WMP Technical Guidelines	In accordance with GO 165, a simple visual inspection of applicable utility equipment and structures designed to identify obvious structural problems and hazards. Patrol inspections may be carried out in the course of other company business.
Performance metric	OEIS 2026-2028 WMP Technical Guidelines	A quantifiable measurement that is used by an electrical corporation to indicate the extent to which its WMP is driving performance outcomes.
Population density	OEIS 2026-2028 WMP Technical Guidelines	Population density is calculated using the American Community Survey (ACS) one-year estimate for the corresponding year or, for years with no such ACS estimate available, the estimate for the immediately preceding year.
Preparedness	OEIS 2026-2028 WMP Technical Guidelines	A continuous cycle of planning, organizing, training, equipping, exercising, evaluating, and taking corrective action in an effort to ensure effective coordination during incident response. Within the NIMS, preparedness focuses on planning, procedures and protocols, training and exercises, personnel qualification and certification, and equipment certification.
Priority essential services	OEIS 2026-2028 WMP Technical Guidelines	Critical first responders, public safety partners, critical facilities and infrastructure, operators of telecommunications infrastructure, and water electrical corporations/agencies.

Term	Source	Definition
Property	OEIS 2026-2028 WMP Technical Guidelines	Private and public property, buildings and structures, infrastructure, and other items of value that may be destroyed by wildfire, including both third-party property and utility assets.
Protective equipment and device settings (PEDS)	OEIS 2026-2028 WMP Technical Guidelines	The electrical corporation's procedures for adjusting the sensitivity of grid elements to reduce wildfire risk, other than automatic reclosers (such as circuit breakers, switches, etc.). For example, PG&E's "Enhanced Powerline Safety Settings" (EPSS).
PEDS outage consequence	OEIS 2026-2028 WMP Technical Guidelines	The total anticipated adverse effects from an outage occurring while increased sensitivity settings on a protective device are enabled at a specific location, including reliability and associated safety impacts.
PEDS outage exposure potential	OEIS 2026-2028 WMP Technical Guidelines	The potential physical, social, or economic impact of an outage occurring when PEDS are enabled on people, property, critical infrastructure, livelihoods, health, local economies, and other high-value assets.
PEDS outage likelihood	OEIS 2026-2028 WMP Technical Guidelines	The likelihood of an outage occurring while increased sensitivity settings on a protective device are enabled at a specific location given a probabilistic set of environmental conditions.
PEDS outage risk	OEIS 2026-2028 WMP Technical Guidelines	The total expected annualized impacts from PEDS enablement at a specific location.
PEDS outage vulnerability	OEIS 2026-2028 WMP Technical Guidelines	The susceptibility of people or a community to adverse effects of an outage occurring when PEDS are enabled, including all characteristics that influence their capacity to anticipate, cope with, resist, and recover from the related adverse effects (e.g., high AFN population, poor energy resiliency, low socioeconomics).
PSPS consequence	OEIS 2026-2028 WMP Technical Guidelines	The total anticipated adverse effects of a PSPS for a community. This considers the PSPS exposure potential and inherent PSPS vulnerabilities of communities at risk.
PSPS event	OEIS 2026-2028 WMP Technical Guidelines	The period from notification of the first public safety partner of a planned public safety PSPS to re-energization of the final customer.
PSPS exposure potential	OEIS 2026-2028 WMP Technical Guidelines	The potential physical, social, or economic impact of a PSPS event on people, property, critical infrastructure, livelihoods, health, local economies, and other high-value assets.
PSPS likelihood	OEIS 2026-2028 WMP Technical Guidelines	The likelihood of a PSPS being required by a utility given a probabilistic set of environmental conditions.
PSPS risk	OEIS 2026-2028 WMP Technical Guidelines	The total expected annualized impacts from PSPS at a specific location. This considers two factors: (1) the likelihood a PSPS will be required due to environmental conditions exceeding design conditions, and (2) the potential consequences of the PSPS for each affected community, considering exposure potential and vulnerability.
PSPS Vulnerability	OEIS 2026-2028 WMP Technical Guidelines	The susceptibility of people or a community to adverse effects of a PSPS event, including all characteristics that influence their capacity to anticipate, cope with, resist, and recover from the adverse effects of a PSPS event (e.g., high AFN population, poor energy resiliency, low socioeconomics).
Public safety partners	OEIS 2026-2028 WMP Technical Guidelines	First/emergency responders at the local, state, and federal levels; water, wastewater, and communication service providers; community choice aggregators (CCAs); affected publicly owned electrical corporations/electrical cooperatives; tribal governments; Energy

Term	Source	Definition
		Safety; the Commission; the California Office of Emergency Services; and CAL FIRE.
Qualitative Target	OEIS 2026-2028 WMP Technical Guidelines	Specific, measurable, achievable, realistic, and timely outcomes for the overall WMP strategy, or mitigation initiatives and activities that a utility can implement to satisfy the primary goals and subgoals of the WMP program.
Quantitative Target	OEIS 2026-2028 WMP Technical Guidelines	A forward-looking, quantifiable measurement of work to which an electrical corporation commits to in its WMP. Electrical corporations will show progress toward completing targets in subsequent reports, including data submissions and WMP Updates.
Red Flag Warning (RFW)	National Weather Service	Level of wildfire risk from weather conditions, as declared by the NWS. For historical NWS data, refer to the Iowa State University archive of NWS watches/warnings.[7]
RFW OH circuit mile day	OEIS 2026-2028 WMP Technical Guidelines	Sum of OH circuit miles of utility grid subject to RFW each day within a given time period, calculated as the number of OH circuit miles under RFW multiplied by the number of days those miles are under said RFW. For example, if 100 OH circuit miles are under RFW for one day, and 10 of those miles are under RFW for an additional day, then the total RFW OH circuit mile days would be 110.
Risk	OEIS 2026-2028 WMP Technical Guidelines	A measure of the anticipated adverse effects from a hazard considering the consequences and frequency of the hazard occurring.[8]
Risk Bow Tie	CPUC	A tool that consists of a Risk Event in the center, a listing of drivers on the left side that potentially lead to the Risk Event occurring, and a listing of Consequences on the right side that show the potential outcomes if the Risk Event occurs.[9]
Risk component	OEIS 2026-2028 WMP Technical Guidelines	A part of an electric corporation's risk analysis framework used to determine overall utility risk.
Risk evaluation	OEIS 2026-2028 WMP Technical Guidelines	The process of comparing the results of a risk analysis with risk criteria to determine whether the risk and/or its magnitude is acceptable or tolerable. (ISO 31000:2009.)
Risk event	OEIS 2026-2028 WMP Technical Guidelines	An event with probability of ignition, such as wire down, contact with objects, line slap, event with evidence of heat generation, or other event that causes sparking or has the potential to cause ignition. The following all qualify as risk events: • Ignitions • Outages not caused by vegetation • Outages caused by vegetation • Wire-down events • Faults • Other events with potential to cause ignition
Risk management	OEIS 2026-2028 WMP Technical Guidelines	Systematic application of management policies, procedures, and practices to the tasks of communication, consultation, establishment

[7] https://mesonet.agron.iastate.edu/request/gis/watchwarn.phtml
[8] Adapted from D. Coppola, 2020, "Risk and Vulnerability," Introduction to International Disaster Management, 4th ed.
[9] D.18-12-014 at 16.

Term	Source	Definition
		of context, and identification, analysis, evaluation, treatment, monitoring, and review of risk. (ISO 31000.)
Rule	OEIS 2026-2028 WMP Technical Guidelines	Section of Public Utilities Code requiring a particular activity or establishing a particular threshold.
Rural region	OEIS 2026-2028 WMP Technical Guidelines	In accordance with GO 165, area with a population of less than 1,000 persons per square mile, as determined by the U.S. Bureau of the Census. For purposes of the WMP, "area" must be defined as a census tract.
Safety Management System (SMS)	SDG&E	A Safety Management System, or SMS, establishes the systematic enterprise-wide framework to collectively manage safety programs, reduce risks and hazards, and enable continuous improvement in safety performance through deliberate, integrated, documented processes.
Seminar	OEIS 2026-2028 WMP Technical Guidelines	An informal discussion, designed to orient participants to new or updated plans, policies, or procedures (e.g., to review a new external communications standard operating procedure).
Sensitivity analysis	OEIS 2026-2028 WMP Technical Guidelines	Process used to determine the relationships between the uncertainty in the independent variables ("input") used in an analysis and the uncertainty in the resultant dependent variables ("output"). (SFPE guidance.)
Situational Awareness	OEIS 2026-2028 WMP Technical Guidelines	An on-going process of gathering information by observation and by communication with others. This information is integrated to create an individual's perception of a given situation.[10]
Slash	OEIS 2026-2028 WMP Technical Guidelines	Branches or limbs less than four inches in diameter, and bark and split products debris left on the ground as a result of utility vegetation management.[11]
Span	OEIS 2026-2028 WMP Technical Guidelines	The space between adjacent supporting poles or structures on a circuit consisting of electric lines and equipment. "Span level" refers to asset-scale granularity.
Tabletop exercise (TTX)	OEIS 2026-2028 WMP Technical Guidelines	A discussion-based exercise intended to stimulate discussion of various issues regarding a hypothetical situation. Tabletop exercises can be used to assess plans, policies, and procedures or to assess types of systems needed to guide the prevention of, response to, or recovery from a defined incident.
Trees with strike potential	OEIS 2026-2028 WMP Technical Guidelines	Trees that could either, in whole or in part, "fall in" to a power line or have portions detach and "fly in" to contact a power line in high-wind conditions.
Uncertainty	OEIS 2026-2028 WMP Technical Guidelines	The amount by which an observed or calculated value might differ from the true value. For an observed value, the difference is "experimental uncertainty"; for a calculated value, it is "model" or "parameter uncertainty." (Adapted from SFPE guidance.)
Urban region	OEIS 2026-2028 WMP Technical Guidelines	In accordance with GO 165, area with a population of more than 1,000 persons per square mile, as determined by the U.S. Bureau of the Census. For purposes of the WMP, "area" must be defined as a census tract.

[10] https://www.nwcg.gov/node/439827 (assessed May 13, 2024).
[11] California Public Resources Code section 4525.7.

Term	Source	Definition
Utility-related ignition	OEIS 2026-2028 WMP Technical Guidelines	An event that meets the criteria for a reportable event subject to fire-related reporting requirements.[12]
Validation	OEIS 2026-2028 WMP Technical Guidelines	Process of determining the degree to which a calculation method accurately represents the real world from the perspective of the intended uses of the calculation method without modifying input parameters based on observations in a specific scenario. (Adapted from ASTM E 1355.)
Vegetation management (VM)	OEIS 2026-2028 WMP Technical Guidelines	The assessment, intervention, and management of vegetation, including pruning and removal of trees and other vegetation around electrical infrastructure for safety, reliability, and risk reduction.
Vegetation management area (VMA	SDG&E	A discrete geographical polygon that represents a portion of the service territory. Vegetation Management assets (trees and poles) are distributed within the VMAs for the purpose of scheduling activities.
Verification	OEIS 2026-2028 WMP Technical Guidelines	Process to ensure that a model is working as designed, that is, that the equations are being properly solved. Verification is essentially a check of the mathematics. (SFPE guidance.)
Vulnerability	OEIS 2026-2028 WMP Technical Guidelines	The propensity or predisposition of a community to be adversely affected by a hazard, including the characteristics of a person, group, or service and their situation that influences their capacity to anticipate, cope with, resist, and recover from the adverse effects of a hazard.
Wildfire consequence	OEIS 2026-2028 WMP Technical Guidelines	The total anticipated adverse effects from a wildfire on a community that is reached. This considers the wildfire hazard intensity, the wildfire exposure potential, and the inherent wildfire vulnerabilities of communities at risk.
Wildfire exposure potential	OEIS 2026-2028 WMP Technical Guidelines	The potential physical, social, or economic impact of wildfire on people, property, critical infrastructure, livelihoods, health, environmental services, local economies, cultural/historical resources, and other high-value assets. This may include direct or indirect impacts, as well as short- and long-term impacts.
Wildfire hazard intensity	OEIS 2026-2028 WMP Technical Guidelines	The potential intensity of a wildfire at a specific location within the service territory given a probabilistic set of weather profiles, vegetation, and topography.
Wildfire Likelihood	OEIS 2026-2028 WMP Technical Guidelines	The total anticipated annualized number of fires reaching each spatial location resulting from utility-related ignitions at each location in the electrical corporation service territory. This considers the ignition likelihood and the likelihood that an ignition will transition into a wildfire based on the probabilistic weather conditions in the area.
Wildfire mitigation strategy	OEIS 2026-2028 WMP Technical Guidelines	Overview of the key mitigation initiatives at enterprise level and component level across the electrical corporation's service territory, including interim strategies where long-term mitigation initiatives have long implementation timelines. This includes a description of the enterprise-level monitoring and evaluation strategy for assessing overall effectiveness of the WMP.
Wildfire risk	OEIS 2026-2028 WMP Technical Guidelines	The total expected annualized impacts from ignitions at a specific location. This considers the likelihood that an ignition will occur, the likelihood the ignition will transition into a wildfire, and the potential

[12] CPUC Decision 14-02-015, Appendix C, p. C-3:
https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M087/K892/87892306.PDF

Term	Source	Definition
		consequences—considering hazard intensity, exposure potential, and vulnerability—the wildfire will have for each community it reaches.
Wildfire spread likelihood	OEIS 2026-2028 WMP Technical Guidelines	The likelihood that a fire with a nearby but unknown ignition point will transition into a wildfire and will spread to a location in the service territory based on a probabilistic set of weather profiles, vegetation, and topography.
Wildfire Vulnerability	OEIS 2026-2028 WMP Technical Guidelines	The susceptibility of people or a community to adverse effects of a wildfire, including all characteristics that influence their capacity to anticipate, cope with, resist, and recover from the adverse effects of a wildfire (e.g., AFN customers, Social Vulnerability Index, age of structures, firefighting capacities).
Wildland-urban interface (WUI)	OEIS 2026-2028 WMP Technical Guidelines	The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetation fuels (National Wildfire Coordinating Group).
Wind Load Condition 3 – Extreme	SDG&E	Historical max wind gusts at each weather station during Santa Ana Conditions
Wire down	OEIS 2026-2028 WMP Technical Guidelines	Instance where an electric transmission or distribution conductor is broken and falls from its intended position to rest on the ground or a foreign object.
Work order	OEIS 2026-2028 WMP Technical Guidelines	A prescription for asset or vegetation management activities resulting from asset or vegetation management inspection findings.
Workshop	OEIS 2026-2028 WMP Technical Guidelines	Discussion that resembles a seminar but is employed to build specific products, such as a draft plan or policy (e.g., a multiyear training and exercise plan).

4 DEFINITIONS OF INITIATIVES BY CATEGORY

Category	Section	Initiative	Definition
Risk Methodology and Assessment	5	Risk Methodology and Assessment	Development and use of tools and processes to assess the risk of wildfire and PSPS across an electrical corporation's service territory.
Wildfire Mitigation Strategy	6	Wildfire Mitigation Strategy Development	Development and use of processes for deciding on a portfolio of mitigation initiatives to achieve maximum feasible risk reduction and that meet the goals of the WMP.
Grid Design, Operations, and Maintenance	8.2.	Grid Design and System Hardening	Strengthening of distribution, transmission, and substation infrastructure to reduce the risk of utility-related ignitions resulting in catastrophic wildfires.
Grid Design, Operations, and Maintenance	8.3	Asset Inspections	Inspections of overhead electric transmission lines, equipment, and right-of-way.
Grid Design, Operations, and Maintenance	8.4	Equipment Maintenance and Repair	Remediation, adjustments, or installations of new equipment to improve or replace existing connector equipment such as hotline clamps.
Grid Design, Operations, and Maintenance	8.5	Quality assurance / quality control	Establishment and function of audit process to manage and confirm work completed by employees or contractors, including

Category	Section	Initiative	Definition
			packaging QA/QC information for input to decision-making and related integrated workforce management processes.
Grid Design, Operations, and Maintenance	8.6	Work orders	Actions taken to manage the electrical corporation's open work orders resulting from inspections that prescribe asset management activities.
Grid Design, Operations, and Maintenance	8.7	Grid Operations and Procedures	Operations and procedures to reduce across the electrical corporation's system to reduce wildfire risk.
Grid Design, Operations, and Maintenance	8.8	Workforce Planning	Programs to ensure that the electrical corporation has qualified asset personnel and to ensure that both employees and contractors tasked with asset management responsibilities are adequately trained to perform relevant work.
Vegetation Management and Inspections	9.2	Vegetation management inspections	Inspections of vegetation around and adjacent to electrical facilities and equipment that may be hazardous by growing, blowing, or falling into electrical facilities or equipment.
Vegetation Management and Inspections	9.3	Pruning and Removal	Pruning, removal, and other vegetation management activities that are performed as a result of inspections.
Vegetation Management and Inspections	9.4	Pole clearing	Plan and execution of vegetation removal around poles per Public Resources Code section 4292 and outside the requirements of Public Resources Code section 4292 (e.g., pole clearing performed outside of the State Responsibility Area).
Vegetation Management and Inspections	9.5	Wood and slash management	Actions taken to manage all downed wood and "slash" generated from vegetation management activities.
Vegetation Management and Inspections	9.6	Defensible space	Actions taken to reduce ignition probability and wildfire consequence due to contact with substation equipment.
Vegetation Management and Inspections	9.7	Integrated vegetation management	Actions taken in accordance with Integrated Vegetation Management principles that are not covered by another initiative.
Vegetation Management and Inspections	9.8	Partnerships	Collaboration of resources, expertise, and efforts to accomplish agreed upon objectives related to wildfire risk reduction achieved through vegetation management.
Vegetation Management and Inspections	9.9	Activities based on weather conditions	Actions taken in accordance with weather condition forecasts that indicate an elevated fire threat in terms of ignition probability and wildfire potential.
Vegetation Management and Inspections	9.10	Post-fire service restoration	Actions taken during post-fire restoration to restore power while active fire suppression is ongoing and actions that occur following active fire suppression during the post-fire suppression repair and rehabilitation phases of fire protection operations.
Vegetation Management and Inspections	9.11	Quality assurance / quality control	Establishment and function of audit process to manage and confirm work completed by employees or contractors, including packaging QA/QC information for input to decision-making and related integrated workforce management processes.
Vegetation Management and Inspection	9.12	Work orders	Actions taken to manage the electrical corporation's open work orders resulting from inspections that prescribe vegetation management activities.

Category	Section	Initiative	Definition
Vegetation Management and Inspection	9.13	Workforce planning	Programs to ensure that the electrical corporation has qualified personnel and to ensure that both employees and contractors tasked with vegetation management responsibilities are adequately trained to perform relevant work.
Situational Awareness and Forecasting	10.2	Environmental monitoring systems	Development and deployment of systems which measure environmental characteristics, such as fuel moisture, air temperature, and velocity.
Situational Awareness and Forecasting	10.3	Grid monitoring systems	Development and deployment of systems that checks the operational conditions of electrical facilities and equipment and detects such things as faults, failures, and recloser operations.
Situational Awareness and Forecasting	10.4	Ignition detection systems	Development and deployment of systems which discover or identify the presence or existence of an ignition, such as cameras.
Situational Awareness and Forecasting	10.5	Weather forecasting	Development methodology for forecast of weather conditions relevant to electrical corporation operations, forecasting weather conditions and conducting analysis to incorporate into utility decision-making, learning and updates to reduce false positives and false negatives of forecast PSPS conditions.
Situational Awareness and Forecasting	10.6	Fire potential index	Calculation and application of a landscape scale index used as a proxy for assessing real-time risk of a wildfire under current and forecasted weather conditions.
Emergency Preparedness, Collaboration, and Public Awareness	11.2	Emergency preparedness and recovery plan	Development and integration of wildfire- and PSPS-specific emergency strategies, practices, policies, and procedures into the electrical corporation's overall emergency plan based on the minimum standards described in GO 166.
Emergency Preparedness, Collaboration, and Public Awareness	11.3	External collaboration and coordination	• Actions taken to coordinate wildfire and PSPS emergency preparedness with relevant public safety partners including the state, cities, counties, and tribes. • Development and integration of plans, programs, and/or policies for collaborating with communities on local wildfire mitigation planning, such as wildfire safety elements in general plans, community wildfire protection plans, and local multi-hazard mitigation plans.
Emergency Preparedness, Collaboration, and Public Awareness	11.4	Public communication, outreach, and education	• Development and integration of a comprehensive communication strategy to inform essential customers and other stakeholder groups of wildfires, outages due to wildfires, and PSPS and service restoration, as required by Public Utilities Code section 768.6. • Development and deployment of public outreach and education awareness program(s) for wildfires; outages due to wildfires, PSPS events, and protective equipment and device settings; service restoration before, during, and after the incidents and vegetation management. • Actions taken understand, evaluate, design, and implement wildfire and PSPS risk mitigation strategies, policies, and procedures specific to access and functional needs customers.
Emergency Preparedness, Collaboration, and Public Awareness	11.5	Customer support in wildfire and PSPS emergencies	Development and deployment of programs, systems, and protocols to support residential and nonresidential customers in wildfire emergencies and PSPS events.

Category	Section	Initiative	Definition
Enterprise Systems	12	Enterprise Systems Development	Structures and methods that allow the electrical corporation and its employees and/or contractors to accept, store, retrieve, and update data for the production, management, and scheduling of related work.

5 DEFINITIONS OF ACTIVITIES BY INITIATIVE

Initiative	Section #	Activity	Definition
Grid Design and System Hardening	8.2.1	Covered conductor installation	Installation of covered or insulated conductors to replace standard bare or unprotected conductors (defined in accordance with GO 95 as supply conductors, including but not limited to lead wires, not enclosed in a grounded metal pole or not covered by: a "suitable protective covering" (in accordance with Rule 22.8), grounded metal conduit, or grounded metal sheath or shield). In accordance with GO 95, conductor is defined as a material suitable for: (1) carrying electric current, usually in the form of a wire, cable or bus bar, or (2) transmitting light in the case of fiber optics; insulated conductors as those which are surrounded by an insulating material (in accordance with Rule 21.6), the dielectric strength of which is sufficient to withstand the maximum difference of potential at normal operating voltages of the circuit without breakdown or puncture; and suitable protective covering as a covering of wood or other non-conductive material having the electrical insulating efficiency (12kV/in. dry) and impact strength (20ft.-lbs) of 1.5 inches of redwood or other material meeting the requirements of Rule 22.8-A, 22.8-B, 22.8-C or 22.8-D.
System Hardening	8.2.2	Undergrounding of electric lines and/or equipment	Actions taken to convert overhead electric lines and/or equipment to underground electric lines and/or equipment (i.e., located underground and in accordance with GO 128).
Grid Design and System Hardening	8.2.3	Distribution pole replacements and reinforcements	Remediation, adjustments, or installations of new equipment to improve or replace existing distribution poles (i.e., those supporting lines under 65kV), including with equipment such as composite poles manufactured with materials reduce ignition probability by increasing pole lifespan and resilience against failure from object contact and other events.
Grid Design and System Hardening	8.2.4	Transmission pole/tower replacements and reinforcements	Remediation, adjustments, or installations of new equipment to improve or replace existing transmission towers (e.g., structures such as lattice steel towers or tubular steel poles that support lines at or above 65kV).
Grid Design and System Hardening	8.2.5	Traditional overhead hardening	Maintenance, repair, and replacement of capacitors, circuit breakers, cross-arms, transformers, fuses, and connectors (e.g., hot line clamps) with the intention of minimizing the risk of ignition.
Grid Design and System Hardening	8.2.6	Emerging grid hardening technology installations and pilots	Development, deployment, and piloting of novel grid hardening technology.

Initiative	Section #	Activity	Definition
Grid Design and System Hardening	8.2.7	Microgrids	Development and deployment of microgrids that may reduce the risk of ignition, risk from PSPS, and wildfire consequence. “Microgrid” is defined by Public Utilities Code section 8370(d).
Grid Design and System Hardening	8.2.8	Installation of system automation equipment	Installation of electric equipment that increases the ability of the electrical corporation to automate system operation and monitoring, including equipment that can be adjusted remotely such as automatic reclosers (switching devices designed to detect and interrupt momentary faults that can reclose automatically and detect if a fault remains, remaining open if so).
Grid Design and System Hardening	8.2.9	Line removals (in HFTD)	Removal of overhead lines to minimize the risk of ignition due to the design, location, or configuration of electric equipment in HFTDs.
Grid Design and System Hardening	8.2.10	Other grid topology improvements to minimize risk of ignitions	Actions taken to minimize the risk of ignition due to the design, location, or configuration of electric equipment in HFTDs not covered by another initiative.
Grid Design and System Hardening	8.2.11	Other grid topology improvements to mitigate or reduce PSPS events	Actions taken to mitigate or reduce PSPS events in terms of geographic scope and number of customers affected not covered by another initiative.
Grid Design and System Hardening	8.2.12	Other technologies and systems not listed above	Other grid design and system hardening actions which the electrical corporation takes to reduce its ignition and PSPS risk not otherwise covered by other initiatives in this section.
Grid Operations and Procedures	8.7.1	Equipment Settings to Reduce Wildfire Risk	The electrical corporation’s procedures for adjusting the sensitivity of grid elements to reduce wildfire risk.
Grid Operations and Procedures	8.7.2	Grid Response Procedures and Notifications	The electrical corporation’s procedures it uses to respond to faults, ignitions, or other issues detected on its grid that may result in a wildfire.
Grid Operations and Procedures	8.7.3	Personnel Work Procedures and Training in Conditions of Elevated Fire Risk	Work activity guidelines that designate what type of work can be performed during operating conditions of different levels of wildfire risk. Training for personnel on these guidelines and the procedures they prescribe, from normal operating procedures to increased mitigation measures to constraints on work performed.

Appendix B: Supporting Documentation for Risk Methodology and Assessment

APPENDIX B: SUPPORTING DOCUMENTATION FOR RISK METHODOLGY AND ASSESMENT

2026-2028 Base WMP

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List of Abbreviations

Abbreviation	**Name**
EOC	Emergency Operations Center
HFTD	High Fire Threat District
PEDS	Protective Equipment Device Settings
PoF	Probability of Failure
PoI	Probability of Ignition
PSPS	Public Safety Power Shutoff
WiNGS	Wildfire Next Generation System for Investment
WMP	Wildfire Mitigation Plan

1 MODEL INVENTORY

Model Name	Model Description
WiNGS-Planning	This model evaluates risk event impacts at a conductor span granularity in order to inform and prioritize grid-hardening investment decisions. Prioritization is driven by determining which combinations of initiatives deployed in what portions of the grid would yield the greatest benefit per dollar spent. The risk metrics evaluated for the model include wildfire, Public Safety Power Shutoff (PSPS), and Protective Equipment Device Settings (PEDS).
WiNGS-Ops	This model assesses whether the advantages of proactive de-energization outweigh the potential safety risks to the public during extreme fire weather conditions. These opposing scenarios are quantified following the enterprise risk quantification framework based on 3-day weather forecasts ingested daily.
Conductor PoF	This is a statistical model (log-log regression) that estimates the likelihood and frequency of a conductor failure (i.e. wire down) at every span in the service territory. This model incorporates historical weather conditions, with an emphasis on wind gusts, and correlates these conditions with site-specific factors and asset attributes. This model is designed to support scenario analysis in Wildfire Next Generation System for Investment (WiNGS)-Planning by predicting historical conductor outages through the input of past weather conditions (backcasting). It is also used in WiNGS-Ops to forecast future conductor outages by simulating weather conditions over a 3-day period.
Vegetation PoF	This is a statistical model (log-log regression) that estimates the likelihood and frequency of a vegetation failure (i.e. tree strike causing a wire down) at every span in the service territory. This model incorporates historical weather conditions, with an emphasis on wind gusts, and correlates these conditions with site-specific factors, asset attributes, and tree inventory data. This model is designed to support scenario analysis in WiNGS-Planning by predicting historical vegetation outages through the input of past weather conditions (backcasting). It is also used in WiNGS-Ops to forecast future vegetation outages by simulating weather conditions over a 3-day period.
Vehicle Contact PoF	This is a machine Learning model (XGBoost) that estimates the likelihood of a vehicle contact at the asset location.
Other Equipment & Foreign Object PoF	This is a deterministic model that is used to account for the number of historical outages that do not show a correlation with wind gust conditions or exhibit significant seasonality. This model captures outages resulting from equipment failures that are not related to wind events, such as fuse damages, recloser malfunctions, and transformer issues. It also accounts for outages caused by external forces, including animal interference, balloons, and contact by employees or members of the public. The model also includes random outages due to vandalism, theft, and other unforeseen incidents.
Pole/Span Conditional PoI	This model is the annual ignition rate in the High Fire Threat District (HFTD) adjusted to account for wind speed, historical tree strikes, vegetation density, asset hardening, and asset health.
Wildfire Likelihood	This model simulates the annual frequency of ignition event occurrences leading to potential wildfires by leveraging probabilistic Probability of Ignition (PoI) values and simulated wind speeds. It is used to help aid in estimating the impact of wildfire risk with the integration with the Wildfire Consequence model.
Wildfire Consequence	This model estimates the expected wildfire consequence impacts if a wildfire event were to occur in a specific location of the grid.
PSPS Likelihood	This model estimates the probability that a given feeder-segment would be proactively de-energized due to PSPS on a given high-fire day by leveraging historical wind speeds measured at all upstream weather stations and taking into account the grid-hardening state of the full upstream trace from the given feeder-segment. It also forecasts the number of PSPS de-energizations and leverages the PSPS Consequence attributes to estimate the magnitude of forecasted PSPS de-energizations, including the

Model Name	Model Description
	number of customers de-energized per event. For WiNGS-Ops, a PSPS likelihood value of 1 is assumed.
PSPS Consequence	This model estimates the expected PSPS consequence impacts if a PSPS de-energization event were to occur in a specific location of the grid.
PEDS Likelihood	This model simulates the annual frequency of PEDS outage event impact occurrences in a specific location of the grid. For WiNGS-Ops, a PEDS outage is not taken into account as a proactive de-energization.
PEDS Consequence	This model estimates expected PEDS consequence impacts if a PEDS outage event were to occur in a specific location of the grid.
Lifecycle Cost	This model estimates the asset maintenance cost of sections of the grid to help inform and optimize cost-effective grid hardening prioritization strategies

Note: For inputs and outputs, refer to Figure 1.

2 SUMMARY DOCUMENTATION

2.1 WINGS-PLANNING

2.1.1 PURPOSE

The Wildfire Next Generation System for Investment (WiNGS) Planning model was developed to evaluate risk event impacts at a conductor span granularity in order to inform and prioritize grid-hardening investment decisions. It serves to prioritize grid-hardening investment decisions by identifying which combinations of initiatives, deployed in specific portions of the grid would yield the greatest benefit per dollar spent. The model assesses three key event risk metrics: wildfire, Public Safety Power Shutoff (PSPS), and Protective Equipment Device Settings (PEDS) outages. Annual projections of these risk metrics and simulated scenarios of residual risks associated with each grid-hardening initiative guide the long-term investment decisions that help support long-term risk reduction goals.

2.1.2 ASSUMPTIONS AND LIMITATIONS

The WiNGS Planning model is one element in the wildfire mitigation decision process for long-term grid hardening projects. Mitigations proposed by the model must undergo subject matter expertise review. This is accomplished via the desktop feasibility analysis that includes geography, loading, specific standards, environmental, and other projects. These qualitative factors are not able to be assessed within the model and are instead considered qualitatively by scoping engineers after the model output is produced.

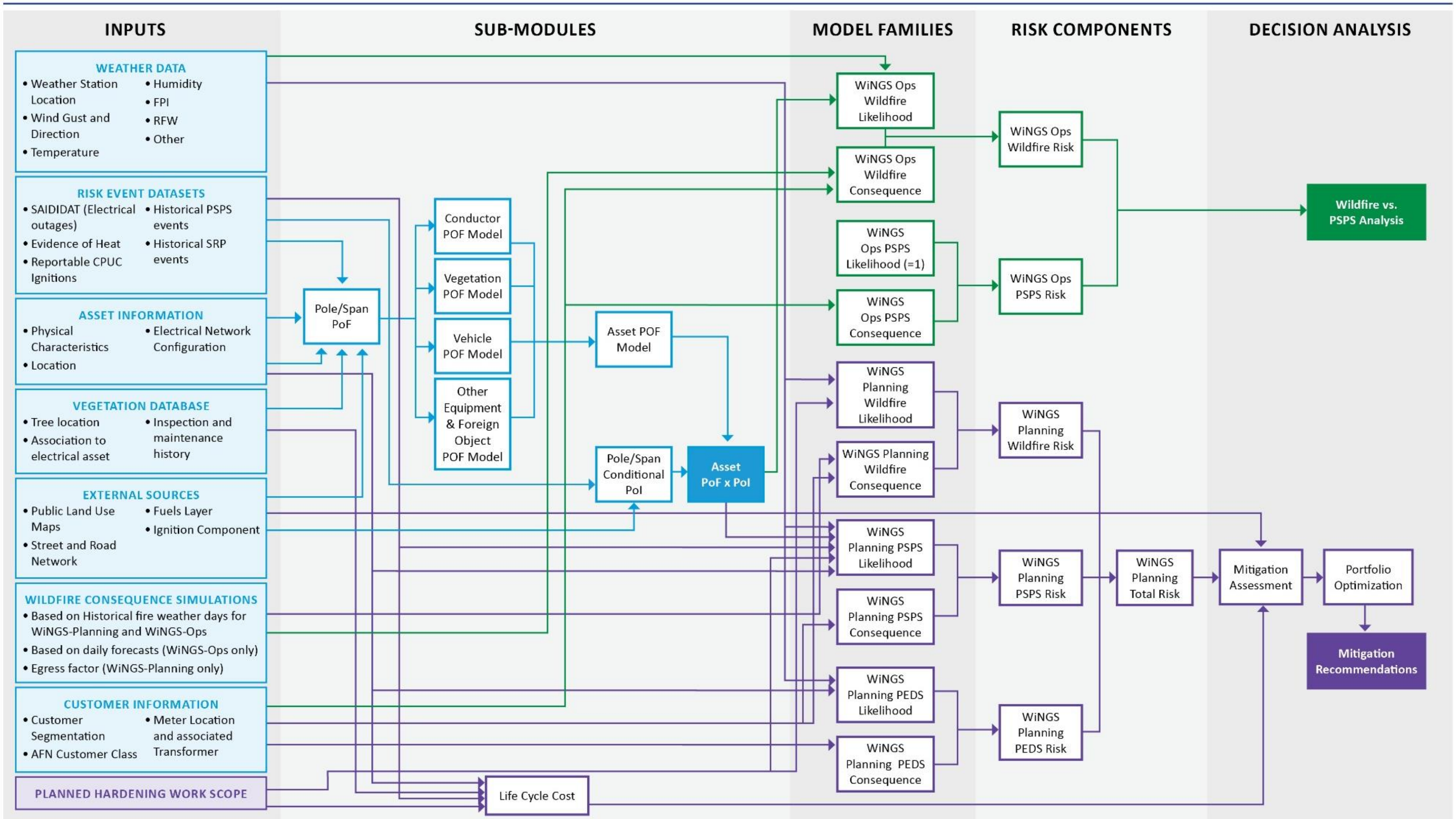
Additionally, risk projections made with considerations of in-scope planned grid-hardening projects are assuming a completion of that work as currently scoped by engineering and project planning teams. Due to various feasibility factors that are inherent in the design and planning phase, planned work scope may be forced to be delayed or reconsidered.

For additional assumptions and limitations, refer to Section 5.2.3 of the 2026-2028 Base Wildfire Mitigation Plan (WMP).

2.1.3 CALCULATION PROCEDURE

The WiNGS-Planning model takes input data from a variety of internal and external data sources. Its machine learning Probability of Ignition (PoI)/ Probability of Failure (PoF) sub-models serve as the base framework, along with the WiNGS-Ops model, that are used to calculate wildfire risk. Inputs for the PoI/PoF sub-models are determined by a feature selection methodology. A general model process flow diagram depicting the model elements, process steps, and their interactions is shown in Figure 2Figure 1, detailing the inputs, outputs, and interdependencies of the data. The specific implementations and calculations for each risk component are depicted in the flow diagram, which consist of calculation steps necessary to compute wildfire, PSPS, and PEDS risk as a cost-benefit value, built up from the component Likelihood and Consequence model families. The calculation involves Monte Carlo risk event simulations for each risk metric to compute an annual risk event cost for each grid unit. A mitigation assessment scenario analysis is then performed to recommend the optimal grid-hardening portfolio for the list of circuit-segments considered for grid-hardening.

Figure 1: WiNGS-Planning and WiNGS-Ops Calculation Schematic

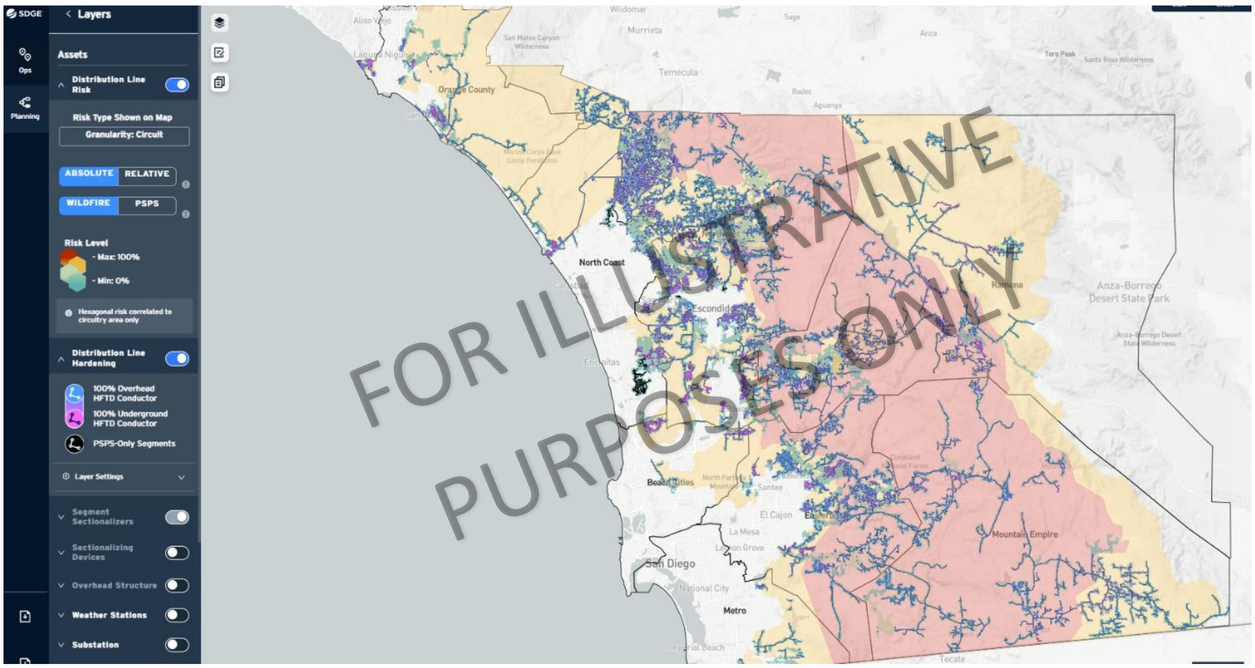


LEGEND: **Purple:** WiNGS Planning related only **Green:** WiNGS Ops related only **Blue:** Related to both WiNGS Ops & Planning

2.1.4 CHARACTERIZATION AND PRESENTATION OF OUTPUTS

The WiNGS Visualization Platform is used to display and disseminate the output of the WiNGS models to various user groups from top level executives to scoping analysts to Emergency Operations Center (EOC) decision makers and other stakeholders. The application consists of dashboards with dynamic web maps linked to informative widgets designed for investment planning. Within the platform application, users will be able to view circuit and segment-level risk in the context of wildfires and PSPS de-energizations. Users will also be able to run the WiNGS-Planning model with a variety of design-level scenarios to help analyze and guide optimal investment decisions.

Figure 2: WiNGS Visualization Platform



Source: Image extracted from WiNGS-Planning Visualization Application (in development)

2.1.5 PLANNED CHANGES

For planned changes, see Section 5.7 of the 2026-2028 Base WMP.

2.2 WINGS-OPS

2.2.1 PURPOSE

WiNGS-Ops assesses whether the advantages of proactive de-energization outweigh the potential safety risks to the public during extreme fire weather conditions. WiNGS-Ops quantifies these two opposing scenarios following the enterprise risk quantification framework based on 3-day weather forecasts ingested daily. The WiNGS-Ops application is an interactive, real-time tool that employs in-depth and dynamic risk modeling at the feeder-segment level. The primary purpose of the model is to help inform real-time decisions about the risks of wildfire and PSPS de-energizations, which guides risk-based de-energization decisions during risk events.

2.2.2 ASSUMPTIONS AND LIMITATIONS

With respect to its theoretical foundation, model outputs are heavily dependent on weather forecast estimates from each weather station. This reliance introduces potential variability and uncertainty into the predictions, as the accuracy of the model is directly tied to the precision of the weather forecasts. Additionally, PSPS risk is evaluated as a function of the de-energization duration, with models considering 24, 28, 72, and 96-hour periods. The risk of wildfire versus PSPS de-energization is assessed within these predefined durations.

From a mathematical perspective, the machine learning sub-models are limited by the characteristics of the training data on historical outages and reportable ignitions. There are also limitations around the normalization to annual historical events and customers impacted by PSPS de-energizations. The model also relies on weather forecast accuracy and subject matter expert assumptions.

For additional assumptions and limitations, see Section 5.2.3 of the 2026-2028 Base WMP.

2.2.3 CALCULATION PROCEDURE

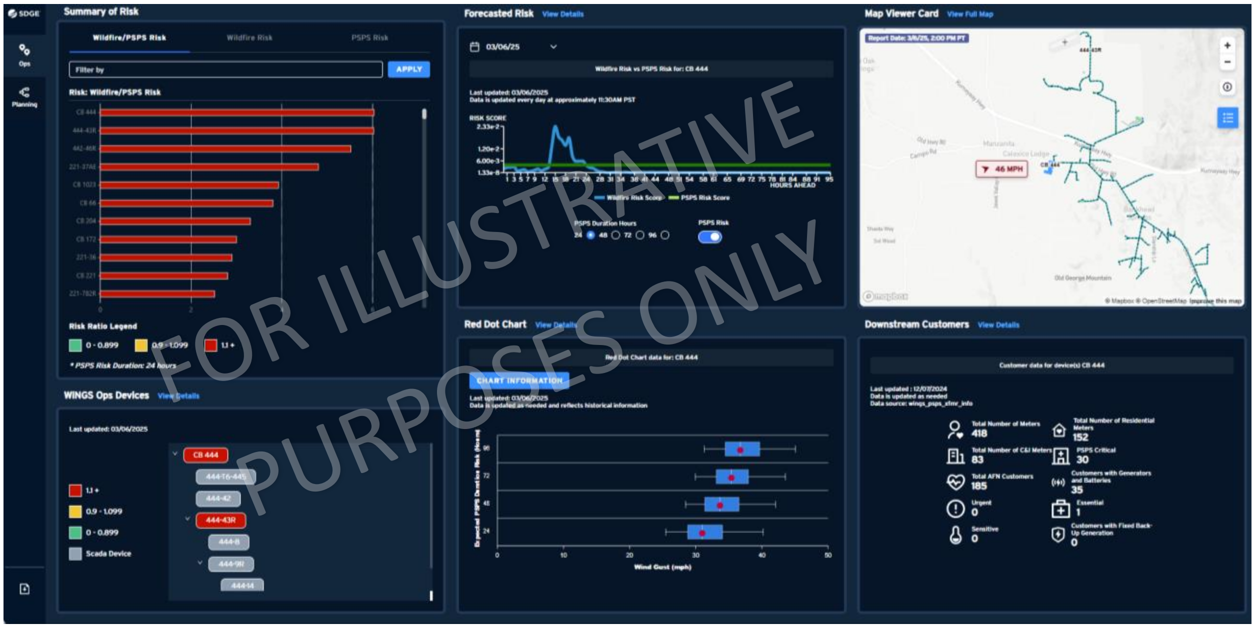
The WiNGS-Ops model takes input data from a variety of internal and external data sources. Wind gust thresholds where PSPS de-energization decision should be considered are calculated based on risk model outputs. For machine learning models, the inputs are determined by the feature selection methodology. Figure 1 details the inputs, outputs, and interdependencies of the data flowing through the model.

2.2.4 CHARACTERIZATION AND PRESENTATION OF OUTPUTS

The WiNGS Visualization platform is used to visually display and to disseminate the output of the WiNGS models to various user groups from top level executives to scoping analysts to EOC decision makers, and other stakeholders. The application consists of dashboards for WiNGS-Ops with dynamic web maps linked to informative widgets designed for PSPS decision making. Within the Visualization applications, users are able to view circuit and segment-level risk in the context of wildfire and PSPS de-energizations. The WiNGS-Ops application is a real-time, interactive application that utilizes comprehensive and dynamic risk modeling at the segment level based on forecasted fire conditions. The primary function of WiNGS-Ops is to provide the ability to weigh the quantified risks of a binary choice of actions: to de-energization or not. This machine plus human experience strengthens the PSPS decision-making confidence by enabling a more targeted approach to asset-level reporting and real time weather updates. For more information regarding the insights that WiNGS-Ops provides during PSPS de-energization events, see Utility PSPS Post-Event Reports.[1]

[1] https://www.cpuc.ca.gov/consumer-support/psps/utility-company-psps-reports-post-event-and-post-season

Figure 3: WiNGS Visualization Platform



2.2.5 PLANNED CHANGES

For planned changes, see Section 5.7 of the 2026-2028 Base WMP.

Appendix C: Additional Maps

APPENDIX C: ADDITIONAL MAPS

2026-2028 Base WMP

All maps required in the 2026-2028 Wildfire Mitigation Plan were of sufficient detail; no additional maps are provided in this Appendix.

Appendix D: Areas for Continued Improvement

APPENDIX D: AREAS FOR CONTINUED IMPROVEMENT

2026-2028 Base WMP

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List of Abbreviations

Abbreviation	Name
ACI	Areas for Continued Improvement
APP	Advanced Protection Program
ARFS	Advanced Radio Frequency Sensors
AWS	Amazon Web Services
CHI	Conductor Health Index
CoF	consequence of failure
CPUC	California Public Utilities Commission
DCRI	Distribution Communications Reliability Improvements
EFD	Early Fault Detector
FPI	Fire Potential Index
GO	General Order
GRC	General Rate Case
HFTD	High Fire Threat District
HRFA	High Risk Fire Area
IIP	Intelligent Image Processing
IOU	Investor-Owned Utilities
kV	kilovolt
LiDAR	Light detection and ranging
OII	Order Instituting Investigations
PEDS	protective equipment and device settings
PoF	probability of failure
PoH	Probability of Hazard
PoI	probability of ignition
PoVC	Probability of Vegetation Contact
PQ	Power Quality
PSPS	Public Safety Power Shutoff
QA/QC	Quality Assurance/Quality Control
RIDI	Risk-Informed Drone Inspections
SDG&E	San Diego Gas & Electric
SRP	Sensitive Relay Profile
TCC	Temporary Construction and Compliance
VMA	Vegetation Management Area
VRI	Vegetation Risk Index
WiNGS	Wildfire Next Generation System
WMP	Wildfire Mitigation Plan
WRF	Weather Research Forecast

1 SDGE-25U-01. CALCULATING RISK SCORES USING MAXIMUM CONSEQUENCE VALUES

1.1 DESCRIPTION

In Energy Safety's decision on San Diego Gas & Electric's (SDG&E's) 2023-2025 Base Wildfire Mitigation Plan (WMP), Energy Safety determined that SDG&E's use of maximum consequence values, as opposed to probability distributions, to aggregate risk scores was not aligned with fundamental mathematical standards and could lead to suboptimal mitigation prioritization decisions. SDG&E's progress on making this transition, as reported in its 2025 WMP Update, is adequate, but SDG&E must continue reporting on its further progress.

Discussed in Section 6 "Risk Methodology and Assessment."

1.2 REQUIRED PROGRESS

In its 2026-2028 Base WMP, SDG&E must continue to report on its progress transitioning to using probability distributions, as outlined in its 2025 WMP Update. This must include:

- An overarching roadmap of its wildfire risk planning model updates, including where SDG&E is planning on trialing and implementing probability distributions.
- Any changes to the transition plan.
  - The reasoning behind these changes.
- Any updates on target implementation dates, including completed ones

1.3 SECTION AND PAGE NUMBER OF ANY IMPROVEMENTS

See Section 5.2.2, p. 34 of the 2026-2028 Base WMP.

1.4 SDG&E RESPONSE

As of Q3 2024, SDG&E began developing a framework to create risk event probability distributions for its Wildfire Next Generation System (WiNGS)-Planning model outputs. The risk unit for the modeling now leverages cost-benefit units (dollar amounts). In Q1 2025, a Monte Carlo simulation-based risk event framework was completed for the three risk event metrics in the model: wildfire, Public Safety Power Shutoff (PSPS), and protective equipment and device settings (PEDS) risks. The Monte Carlo modeling runs for millions of simulated years, accounting for variations in conditions at a conductor-span granularity level in the grid, including wind, conductor attributes, Fire Potential Index (FPI) values, and ignition simulation outcomes. This leverages a stochastic approach of selecting ignition fire simulation attributes that are used for wildfire consequence risk event estimations. It also involves the annual aggregation of Probability of Ignition (PoI) values across multiple years of historical weather conditions experienced in the service territory. This means that both the consequence and the likelihood components of wildfire cost estimates are evaluated for the full spectrum of expected scenarios within the service territory.

Moving forward, the new risk event probability distribution outputs, along with statistical distribution metrics such as mean and various percentiles, will be used to inform future optimal mitigation prioritization decisions.

As part of SDG&E's commitment to continuous improvement, the wildfire risk modeling approach will continue to be updated. In addition, assumptions and inputs used in the models will be continuously reviewed and enhanced.

2 SDGE-23B-04. INCORPORATION OF EXTREME WEATHER SCENARIOS INTO PLANNING MODELS

2.1 DESCRIPTION

In Energy Safety's decision on SDG&E's 2023-2025 WMP Base Plan, Energy Safety determined that SDG&E relied on wind conditions data representing the past 13 years that do not consider rare but foreseeable and significant risks. SDG&E does not evaluate the risk of extreme wind events in its service territory to prioritize its wildfire mitigations using WiNGS-Planning.

Discussed in Section 6 "Risk Methodology and Assessment" of Energy Safety's Decision on SDG&E's 2023-2025 Base WMP[1]."

2.2 REQUIRED PROGRESS

In its 2026-2028 Base WMP, SDG&E must report on its progress developing statistical estimates of potential wind events over at least the maximum asset life for its system and evaluate results from incorporating these into WiNGS-Planning when developing its mitigation initiative portfolio or explain why the approach would not serve as an improvement to its mitigation strategy.

2.3 SECTION AND PAGE NUMBER OF ANY IMPROVEMENTS

See Section 5.2.2, p. 34 of the 2026-2028 Base WMP.

2.4 SDG&E RESPONSE

By the end of 2024, the WiNGS-Planning model methodology was updated to incorporate the WiNGS-Ops probabilistic framework[2] and currently utilizes statistical and machine learning models developed using historical electrical outage data and ignitions and correlated with historical asset characteristics, vegetation, site-specific conditions, and weather conditions in order to capture the influence of wind gust and wind direction variables at the time of the outage and ignition. By analyzing these correlations, insights into the probability of failure and ignition across various wind gust scenarios can be determined.

Fire behavior scenarios are evaluated for a selection of 125 days spanning from 2013 to 2021 that represent the worst fire weather days in the service territory. These days are selected based on historical data analysis, weather conditions, asset and site-specific conditions, and metrics like the FPI.

The model's risk event probability distributions developed from a Monte Carlo-based framework not only allow SDG&E to generate statistical estimates of potential wind events over the maximum asset life of its system but also allow for the simulation of various scenarios of grid hardening initiatives to assess the expected risk reduction of simulated catastrophic wildfires within the service territory.

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[1] Decision on SDG&E 2023-2025 Wildfire Mitigation Plan (Oct. 13, 2023) pp. 26-27; https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=55782&shareable=true, accessed May 31, 2024

[2] SDG&E 2023-2025 WMP Update Section 5.2; https://www.sdge.com/sites/default/files/regulatory/2025-04-02_SDGE_2025_WMP-Update_R0_0.pdf

By estimating both the expected risk and the upper tail risk, which includes rare and extreme scenarios, the model enhances SDG&E's ability to understand and mitigate a wide range of potential outcomes posed by diverse weather conditions. This modeling approach enables SDG&E to shape its grid hardening initiatives to improve the safety and resilience of the infrastructure and the community against wildfire risk events.

The model methodology, inputs, assumptions, and technical solutions, including cloud computing and front-end visualizations, are continuously refined and optimized, ensuring that the model remains a robust tool for grid-hardening decision-making. In addition, SDG&E regularly collaborates with industry experts, academia, other California IOUs, government agencies, and various stakeholders to better understand and quantify the impact of catastrophic wildfires. These collaborations may lead to updates and enhancements in the model, ensuring it remains effective in supporting risk-based decision-making.

3 SDGE-25U-02 CROSS-UTILITY COLLABORATION ON BEST PRACTICES FOR INCLUSION OF CLIMATE CHANGE FORECASTS IN CONSEQUENCE MODELING, INCLUSION OF COMMUNITY VULNERABILITY IN CONSEQUENCE MODELING, AND UTILITY VEGETATION MANAGEMENT FOR WILDFIRE SAFETY

3.1 DESCRIPTION

SDG&E, PG&E, and SCE participated in past Energy Safety sponsored scoping meetings on these topics and began collaborating on other WMP-related topics. SDG&E, PG&E, and SCE have not made sufficient efforts to include Bear Valley, Liberty Utilities, and PacifiCorp in these efforts.

Discussed in Section 7 "Wildfire Mitigation Strategy Development."

3.2 REQUIRED PROGRESS

In its 2026-2028 Base WMP, SDG&E must continue its collaboration efforts and demonstrate that it has made efforts to include Bear Valley, Liberty Utilities, and PacifiCorp in these efforts, where appropriate and relevant to each IOU's interests.

SDG&E must also continue to participate in all Energy Safety Safety-organized activities related to best practices for:

- Inclusion of climate change forecasts in consequence modeling.
- Inclusion of community vulnerability in consequence modeling.
- Utility vegetation management for wildfire safety.

3.3 SECTION AND PAGE NUMBER OF ANY IMPROVEMENTS

See Section 13.1.2, p. 295 and 13.2, p. 296 of the 2026-2028 Base WMP.

3.4 SDG&E RESPONSE

In the 2023 to 2025 WMP cycle, SDG&E continued its cross-utility collaboration through monthly meetings focused on Energy Safety activities and other WMP-related topics. Beginning in 2024, Bear Valley, Liberty Utilities, PacifiCorp, and Hawaii Electric were included in these meetings. Additionally, these utilities participate in various industry events throughout the year to share best practices and expand collective knowledge.

During the 2023 to 2025 WMP cycle, SDG&E hosted two in-person meetings in May and November 2024, bringing together SCE, PG&E, Bear Valley, Liberty Utilities, PacifiCorp, and Hawaii Electric to discuss key topics, including:

- Wildfire Mitigation Plan Progress
- Idle Facilities
- Technosylva Models
- SMU Fuses
- Safety Culture Assessment
- Vegetation Management
- Advanced Meter Initiative and Wildfire Mitigation Requirements

These monthly meetings will continue through the 2026 to 2028 WMP cycle and will continue to include Bear Valley, Liberty Utilities, PacifiCorp, and Hawaii Electric.

In the 2026 to 2028 WMP cycle, SDG&E will also continue to participate in all Energy Safety-organized activities related to best practices for inclusion of climate change forecasts in consequence modeling, inclusion of community vulnerability in consequence modeling, and utility vegetation management for wildfire safety.

4 SDGE-25U-03. THIRD-PARTY RECOMMENDATIONS FOR MODEL IMPROVEMENTS

4.1 DESCRIPTION

In its 2025 WMP Update, SDG&E provided a plan to implement improvements identified for its risk modeling from its third-party consultant as required in Energy Safety's Decision on SDG&E's 2023-2025 Base WMP. However, it deferred implementation of many recommendations to 2024 and 2025. Due to these deferrals, SDG&E must continue to report on status updates for its implementation of the consultant's recommendations in its 2026-2028 Base WMP.

Discussed in Section 7 "Wildfire Mitigation Strategy Development."

4.2 REQUIRED PROGRESS

In its 2026-2028 Base WMP, SDG&E must provide an update on its implementation of the following recommended improvements:

- Inclusion of its Vegetation Risk Index and/or other measurement of vegetation-related risk and how this index informs vegetation management decisions
- Use of its risk model to inform mitigation work outside of grid hardening.
- Sensitivity analysis for risk buy-down, mitigations, and PSPS models.
- Elimination of double-counting of conductor age and circuit health index within models.
- SDG&E must also provide a list of recommendations from the Table of Recommendations in its consultant's May 2023 report that it is adopting with the timeline for each recommendation's implementation and a list of recommendations it is not adopting, if any, with an explanation on why SDG&E is not adopting a recommendation.

4.3 SECTION AND PAGE NUMBER OF ANY IMPROVEMENTS

See Section 5.2.2, p. 34, 7.2, p. 119 and Section 13, p. 289 of the 2026-2028 Base WMP.

4.4 SDG&E RESPONSE

Implementation priorities for the WiNGS-Planning and WiNGS-Ops models are continually reevaluated to address the most important items in a timely manner. Many of the recommendations from third-party reviews that were conducted in 2023 have been evaluated, prioritized, and/or completed. The remaining recommendations are currently being re-evaluated and prioritized. Business values for model initiatives are classified based on a combination of regulatory requirements, stakeholder/leadership satisfaction, improvements to input/output quality, and improvements to process efficiency. Due to many proposed model improvements and third-party review recommendations, the business value score is used to prioritize the highest-value initiatives.

4.4.1 INCLUSION OF VEGETATION RISK INDEX AND/OR OTHER RISK MEASUREMENT

From 2023 to 2025, Vegetation Management has implemented a risk-informed, non-routine inspection schedule. A machine learning model, based on hazardous tree conditions, generates the Probability of Hazard (PoH) condition, indicating the likelihood of needing immediate pruning or removal after an inspection cycle. The annual non-routine inspection schedule for Vegetation Management Areas (VMAs) is updated in the beginning of a calendar year based on these aggregated probability predictions.

In 2025, the PoH model will undergo a second iteration of enhancements. The vegetation analytics team is testing a span-level PoH model while also exploring the Probability of Vegetation Contact (PoVC) and condition-based tree growth models. These risk indicators will be tested as components of a priority ranking system to optimize the current inspection schedule.

The Vegetation Risk Index (VRI) is designed for use in the PSPS decision-making processes. It covers a subset of VMAs and is implemented as a map layer in the vegetation operation system. Unlike the PoH and PoVC models, which utilize tree pruning and removal records, topographical, and climatological variables from every VMA to predict probability of an event, VRI does not include these variables nor does it have a predictive nature. Therefore, Vegetation Management uses this VRI map layer solely for situational awareness.

4.4.2 USE OF RISK MODEL TO INFORM MITIGATION OTHER THAN GRID HARDENING

WiNGS-Planning and WiNGS-Ops modeling outputs are currently being explored to inform mitigation work scope beyond the Strategic Undergrounding and Combined Covered Conductor programs. For example:

- PSPS Backup Power Program: This project would identify and prioritize customers who would benefit most from backup power options offered through customer programs, such as portable and permanent solutions. Analysis would consider projected work scope to estimate the full lifecycle benefits for customers and prevent redundancy with other planned grid hardening efforts (e.g., undergrounding). This approach would help maximize customer savings from expected PSPS and PEDS de-energizations.

- Temporary Construction and Compliance (TCC) Poles: As part of the WiNGS-Ops model ecosystem, an interactive dashboard has been developed to easily identify assets with open work orders that lower the de-energization wind gust thresholds. By addressing poles with open work orders, this approach could prevent the de-energization of hundreds of customers, enhancing the reliability and resilience of assets during extreme fire weather conditions. In 2025, open work orders will begin to be assessed using a risk-informed approach based on model insights. This approach will be used to assist in the prioritization of work orders to reduce ignition risk and minimize impacts of PSPS de-energizations.

- Risk Informed Drone Inspection Program: The Risk-Informed Drone Inspections (RIDI) Program involves flight planning, drone flight and image capture, field observations, image assessment, determination of issues, and repair. Imagery collected by drones improves traditional ground inspections by providing inspectors with a "birds eye view" of overhead facilities, as well as high resolution imagery of overhead equipment and components. The use of drones to collect imagery enhances an inspector's ability to identify potential fire hazards related to certain types of issues or where conditions such as terrain and vegetation density make full detailed inspections challenging. Images and inspection findings have also been used to build asset identification and damage detection models that allow Intelligent Image Processing (IIP) technology to process imagery data, improve the quality of RIDI assessments, and enhance the Inspection Prioritization Model. IIP models enhance the ability to process large amounts of data quickly with less dependency on human resources. Structures selected for RIDI inspection are identified using a semi-automated Inspection Prioritization Model that combines time-based inspection schedules, probability of failure (PoF) and consequence of failure (CoF) to determine structure risk and account for navigation efficiency. The Inspection Prioritization Model aligns with existing methods that quantify risk and is easily modified to account for new attributes or changes in scope.

4.4.3 SENSITIVITY ANALYSIS

Ongoing sensitivity analysis is conducted during the development and fine-tuning of risk models for both WiNGS-Planning and WiNGS-Ops. This includes ad-hoc and formalized analyses to improve model calculations and guide data-driven decisions. For example, WiNGS-Planning now uses a stochastic approach with Monte Carlo-based risk event simulations, producing probability distributions for risk metrics such as wildfire, PSPS, and PEDS. These distributions are continuously analyzed to understand the sensitivity of various input parameters, contributing risk drivers, model calculation steps, and underlying assumptions. By conducting these sensitivity analyses, SDG&E can pinpoint the factors that most significantly impact the model's outputs, supporting the development of risk-based grid-hardening strategic decisions.

4.4.4 DOUBLE COUNTING ELIMINATION

As of Q1 2025, WiNGS-Planning has addressed the issue of double-counting conductor age and circuit health index within its models. The wildfire likelihood model was upgraded to incorporate the same advanced statistical and machine learning models used by WiNGS-Ops. These models assess the probability of failure and probability of ignition based on detailed asset attributes at the conductor span level while also taking into account historical weather conditions.

Each conductor span's attributes are included in the training set and utilized as features for model inference, allowing for precise assessment of event probabilities. This enhancement means that the wildfire likelihood sub-model now directly infers ignition probabilities from these asset attributes, eliminating the need for the aging Conductor Health Index (CHI) and the additional adjustment steps previously required to account for conductor and pole attributes.

The shift to a probabilistic framework, which eliminates double counting and other redundancies, has led to more accurate and reliable predictions. This enhances the overall effectiveness of the model in quantifying and mitigating wildfire risks. By streamlining the modeling process and improving the precision of wildfire likelihood assessments, it provides a more robust tool for managing and reducing wildfire hazards.

4.4.5 THIRD PARTY RECOMMENDATIONS

Table 4-1: WiNGS-Planning Risk Modeling Updates-

ID	Recommendation Name	Description	Severity Level and Impact	Target Deadline (EOY)	Status
R1.1	Data Ownership	Ensure that there is an integrated function, such that communication from specific data owners is cohesive and timely. This would ensure the communication of definitions, use, bounds for validity, and decisions on changes. Data owners would also be responsible for ensuring that the data is up to date and accessible.	Severity Level: Medium – lack of communication from data owners may result in unexpected changes and diminished data integrity. The data owner is accountable for the use, quality and protection of a dataset.	2026	In progress
R1.2	Calculation Ownership	Assign owners of specific constants (e.g., PSPS risks) and calculation methodologies such that their definitions and approaches are agreed, documented and uniform across the business. This is to ensure that any colloquial terms used for aggregated data assets are consistent such that an output like "miles of span in HFTD" in one group's calculation is the same as another's.	Severity Level: Low – a calculation owner will be accountable for ensuring calculation methodologies are clearly defined and are used appropriately and consistently.	2026	In progress
R1.3	Model Ownership	Broaden model ownership in the form of a board or group with regular meeting cadence to agree to higher-level changes and adjustments, reviewing output of sensitivity analysis and changes prior to implementation. This would ensure that the responsibility for driving the direction of overall model enhancements is agreed upon amongst the Developers, Wildfire Mitigation team, and the Business users.	Severity Level: Low – without regular communication between all stakeholders, the direction and prioritization of model development and improvements can be missed.	2023	Complete
R1.4	Develop New Vegetation Risk Model	Development of a new Vegetation Risk Model, replacing the GIS Surveyors, Inc. (GSI) Tree Strike input, which is based on 2018 data. A sensitivity analysis should be performed to capture any changes.	Severity Level: Medium – development of a new vegetation risk model has the potential to change the ignition rate vegetation adjustment step, which will change the risk scores and may alter the mitigation rankings.	2023	Complete
R1.5	Refresh CHI	Replace/refresh the CHI input to incorporate updated data and ensure data components are not utilized more than once in the same calculations. A sensitivity	Severity Level: Medium – updating the CHI values will likely result in minor changes to the ignition rate asset health adjustment	2025	Complete

ID	Recommendation Name	Description	Severity Level and Impact	Target Deadline (EOY)	Status
		analysis should be performed to capture any changes.	step which will change the risk scores slightly and may impact the mitigation rankings.		
R1.6	Update Data Input Check	Review the models and components utilized in WiNGS-Ops to validate whether an updated data input is available. This must be done while ensuring that the purpose and definition of the data is fully understood so any data assets or model inputs from WiNGS-Ops are complimentary to the existing WiNGS-Planning model.	Severity Level: Medium – updating constants will alter the final risk score results; however, the mitigation rankings may not change or may only change slightly.	2024	Complete
R2.1	Model Value	In order to quantify the value, the model brings to the business, define a measurable metric that clearly shows what benefit the model is providing in order to evaluate if the value offsets the costs. A potential metric could be tracking the percent Electric System Hardening (ESH) deviates from the model recommendations.	Severity Level: Low – while not directly affecting the model output, it is best practice to regularly evaluate the value a model brings to a business to determine future growth and investment.	2026	Not Started
R2.2	Initiation Stage Documentation	Document the initiation stage in order to capture critical elements of the initial planning stage. This includes defining what problem this model will solve, what is the feasibility of the model, who are the end users and how do they want to ingest the model outputs, who are the subject matter experts and what is their ability to participate in the model development, who will be the business owner of the model, what are the initial assumptions and how were they determined, and confirmation that all relevant business areas have taken full sponsorship of the project. Additional details on why certain decisions were made with respect to model generation are also critical to document in the initiation process.	Severity Level: Medium – due to the lack of documentation from the initiation of the WiNGS-Planning model, there are several assumptions and decisions that were made that cannot be explained now that the original stakeholders are no longer with the company.	2026	In progress
R3.1	Data Documentation and Dictionaries	Document for all input data, which should include the data owner, the context of the data, data collection methodology, structure and organization of the data, data validation and quality assurance	Severity Level: Low – not having documentation or data dictionaries do not prevent the model from running, however, there is a risk of misunderstanding	2026	In progress

ID	Recommendation Name	Description	Severity Level and Impact	Target Deadline (EOY)	Status
		steps, data manipulations from raw data, and data confidentiality, access and use conditions. If applicable, it should also include any calculations used to derive any of the fields, data dictionary of input data into those calculations, assumptions, references to methodologies or assumptions, and any limitations of the data. This will ensure a detailed understanding of the data that can be referenced as needed. Additionally, develop data dictionaries for all input data, which should list all the data fields. Each data field listing should include a description, data type, acceptable numerical ranges or classification values if applicable, units, if mandatory, null or missing value definition, effective date, and update information (including date of update, by who, what was updated, and why). This will ensure a thorough understanding of each data field, as well as a reference for data validation steps.	the data, or if there is turnover on the data science team, new team members will have a more challenging time referencing and understand the data inputs.		
R3.2	Data Input Validation	Implement an automated data validation check for every data input to look for outliers, errors, text control, contradictions, etc. Each of these validation checks should have associated documentation that includes what to do when data is missing or anomalous. Examples of how outliers, errors, contradictions, etc. are detected and how corrections are performed in a demonstratable way should be provided if necessary.	Severity Level: Medium – there is currently a lot of reliance on source data owners to validate their data, which can lead to errors and reduce data quality.	2026	In progress
R3.3	Constants	Store constants used in the model calculations somewhere other than code itself. This will allow for better documentation of the assumptions that go into the constants decisions and will result in ease of readability for review.	Severity Level: Low – this recommendation will not change any of the model outputs, however there is room to improve how to view the values, include all the proper documentation (see recommendation R2.1) and track changes (When it was changed, from what value, by who, and full reasoning for the change).	2023	Complete

ID	Recommendation Name	Description	Severity Level and Impact	Target Deadline (EOY)	Status
R3.4	LiDAR Tree Data	Update tree locations based on available LiDAR data to present a more accurate count of strikes per mile input for the circuit segments.	Severity Level: Medium – updating tree locations will likely change the tree strike potentials for circuit segments.	2026	Not Started
R3.5	Shorter Than Conductor Height Trees Strike Buffer	Consider updating the tree strike model to address short trees that cannot hit the conductors based on the actual conductor height.	Severity Level: Medium – accounting for shorter trees that are not likely to fall into conductors may be over-represented in the risks currently captured.	2024	Complete
R3.6	CHI Update	Refresh or update the CHI input data, which was last refreshed in 2020, so it contains the most relevant data to provide the latest contribution to the modelling output.	Severity Level: Medium – updating the CHI values, will likely result in minor changes to the ignition rate asset health adjustment step and will probably have minimal impact on mitigation rankings.	2025	Not Applicabl e
R4.1	Derived Field Data Dictionaries	Add more detailed documentation to data dictionaries for each derived field that includes the calculation, data validation and quality assurance steps, data manipulations, null or missing value definition and/or handling, acceptable numerical ranges if applicable, effective date, and update information (including date of update, by who, what was updated, and why).	Severity Level: Low – Detailed documentation and data dictionaries are critical for ensuring an understanding of the generated data. Without them, there is a risk of misunderstanding the data or how to validate the results, particularly if there is turnover on the data science team. Having	2023	Complete
R4.2	Derived Data Validation	In line with recommendation R3.2, incorporate data validation steps when new fields are derived to ensure the generated data is explainable, and include documentation that explains the validation steps taken and what to do when data is missing or anomalous. Provide examples of how flagged data is detected and how corrections are performed in a demonstratable way if necessary.	Severity Level: Medium – validating derived data is an important step for ensuring the most accurate model outputs. Some values are valid on their own which allows them to make it through the initial data ingest validation step, but when put in context with another value, it may indicate the data is an outlier.	2026	In progress
R4.3	Ignition Rate Veg Adjustment 0.001 Adder	Perform a detailed analysis of this step to confirm it is unnecessary, which will reduce the technical debt as well as reduce the amount of unnecessary documentation, especially when there is no explanation for this step.	Severity Level: Low – this step performs no function and therefore will not have any effect on the model results.	2023	Complete

ID	Recommendation Name	Description	Severity Level and Impact	Target Deadline (EOY)	Status
R4.4	Mean Value Assessment	Conduct a detailed assessment of the instances where mean values are utilized in the calculations in order to determine if the approach would correctly account for outliers, potentially presenting a less risky situation than is accurate.	Severity Level: Medium – if it is determined that using mean values does not correctly account for outliers and a decision to use something other than mean values is made, then the data will change, which will result in a change to the risk score.	2025	Not Applicabl e
R5.1	Stakeholder Involved Sensitivity Analysis	Conduct a more robust sensitivity analysis at a regular cadence (as outlined in ASTM E 1355 Section 10). Business stakeholders should be made aware of this sensitivity analysis and should be invited to participate in choosing the variables and their value ranges. The business users should then be involved in all output reviews and have the suggested changes/ remediation actions presented to them, such that the impacts may be fully understood and agreed with.	Severity Level: Medium – a sensitivity analysis will provide the end users a better understanding of how different values affect the model as well as help identify which values are influencing the model the most. This will allow the end users to make more informed decisions when determining if they need to deviate from the model results.	2026	In progress
R5.2	Customer Type Multiplier Sensitivity Analysis	Perform a sensitivity analysis on the results of the customer type weight multipliers to evaluate if any unintended bias has resulted by adding weights to certain types of customers. This could include understanding the distribution of medical baseline and urgent customers relative to certain areas that may result in a decreased hardening priority.	Severity Level: Medium – if the results of the study indicate that the different customer type multipliers have the potential to adversely impact certain communities or demographics and the multiplier values are adjusted, that will result in changes to the CoRE model outputs and may change the mitigation rank for certain segments.	2026	Not Started
R5.3	Formalize Model Validation Process	Devise and document formal process for validating the overall model outputs. This can be completed by comparing the run’s results with previous iterations' outputs as well as identifying outputs that appear erroneous. It is also recommended to engage the end users to incorporate any additional thoughts or checks they have into the validation process.	Severity Level: Low – a formalized model validation process will instill greater trust by end users by knowing how the model results are validated prior to receiving the outputs and can reference any generated validation reports.	2026	In progress
R5.4	Formalize External Feedback Management Process	Create formalized demand management process for external parties to provide feedback and request adjustments to the	Severity Level: Low – this will not directly affect the model outputs; however, this is an important	2026	Not Started

ID	Recommendation Name	Description	Severity Level and Impact	Target Deadline (EOY)	Status
		models. This will ensure that as the team, model, and user base continue to grow, there is a robust mechanism through which updates may be requested, tracked, and implemented in the Cloud environment.	validation step between model developers and end users to continue to facilitate model development, accuracy, and value to the business.		
R6.1	Standardize Model Notifications	Create a standardized approach for how model update notifications are delivered and work with end users to capture the correct granularity and details that they would need to understand the changes.	Severity Level: Low – this recommendation will not have any effect on the model output but ensures that the appropriate level of communication is delivered between the development team and the end users.	2026	In progress
R6.2	Docstring Best Practice	Ensure all python functions have docstrings, as older functions have not been updated. This will ensure that all functions are correctly documented, and definitions, descriptions, and decision point reasoning are captured. Docstring best practice for a function includes a brief description of what the function is and what it is used for, any arguments that are passed, labeling what is required and what is optional, any restrictions on when the function can be called, and/or any exceptions that are raised.	Severity Level: Low – this recommendation will not affect the model outputs but is a best practice to follow when writing code.	2023	Complete
R6.3	Profiler	Run a profiler to identify any unused code that is taking up unnecessary technical debt.	Severity Level: Low – this recommendation does not affect the model output but may improve the runtime performance of the model.	2026	In progress
R6.4	Unit Testing	Incorporate unit testing to ensure all functions are performing as expected.	Severity Level: Low – this recommendation will only affect the model if any functions are not performing as they should.	2026	In progress
R7.1	End User Data Consumption	Work with end user to see how they would like to consume the data, then develop and implement a standard way of delivering data.	Severity Level: Low – this recommendation has no effect on the model output results, but it is important to establish the most efficient way to deliver the output results to the end users.	2026	In progress
R7.2	Aws Billing Limits	Introduce billing limits for certain sandbox/development activities such that there is not a risk of an	Severity Level: Low – this recommendation is to ensure that model costs are	2025	Complete

ID	Recommendation Name	Description	Severity Level and Impact	Target Deadline (EOY)	Status
		unintended spike in cloud costs for a development error.	monitored and meet the set budget.		
R7.3	Aws Access Control	Review access control principles, focused on two areas: • Review the default access periods, so access is revoked if someone doesn't access for a given period of time. • Consider enabling row or column-level security to ensure users only access certain subsets of data most relevant and appropriate to them. This will become more needed in the WiNGS-Planning visualization tool.	Severity Level: Low – following the security pillar from the 6 pillars of the AWS Well-Architected Framework will ensure the confidentiality and integrity of the data and prevent unauthorized access and changes to the model and systems.	2028	Not Started
R7.4	Single Cloud Vendor Consolidation	In the future, consolidate services under one cloud provider for ease of use, integration, and billing. This can ensure that future updates to any of the cloud services are always made in a way to keep compatibility and seamless integration with the other developed components.	Severity Level: Low – this recommendation has no impact on the output of the WiNGS-Planning model but would allow for greater efficiency in use of cloud services.	2028	Not Started
R7.5	AWS Athena Consolidation	With improved Governance of the data, create only one instance of AWS Athena, with the GIS and Flat File data combined into the Data Mesh layer. With the data available in the Data Mesh, appropriate ownership and controls must be established such that any shared data is used within the bounds of its intended purpose.	Severity Level: Low – reducing from multiple instances of AWS Athena down to one would ensure efficiency of use and a lower overhead to manage, monitor, and maintain.	2028	In progress
R7.6	Go / No-Go	Engage with business users for a release of a new model version in the form of a Go/No-Go meeting such that the end users are engaged in the decision to approve a release and are made aware of any projected impact or change.	Severity Level: Medium – by performing a Go/No-Go meeting, there is assurance that the end-users understand and approve the newest model version. Without this assurance, the end users may not fully understand the latest model outputs, which could result in a misinterpretation of the model outputs.	2025	Complete
R7.7	Separate Access On AWS	Create separation in the access to Cloud workspaces as the products mature.	Severity Level: Low – this would allow more control over access control, budget planning, and spend tracking for the separate groups.	2028	Not Started

Table 4-2: WiNGS-Ops Risk Modeling Updates

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
R1.1	Model Approach Standardization	Expand standardization to all aspects of model development so that all models are tested and validated to the same specification. As most of the model build is independent, there is a potential lack of standardization for the development, training, testing and validations of models.	Severity Level: Low – without a standardized approach, each model may not hold the same level of credibility given varying levels of testing and validation. Standardization would improve consistency of model outputs.	2023	Complete
R1.2	Internal Model Review Process	Implement a level of peer-review to validate the scripts that are developed and operated. Creation of a more formalized internal model review process would provide a forum through which ideas may be discussed and considered before implementation, and through which a robust and consistent approach to model review may be performed.	Severity Level: Medium – this would enable potential improvements or ideas to be highlighted and discussed, leading to more effective and efficient models.	2023	Complete
R1.3	Model Documentation	Ensure documentation is complete for each of the latest model versions to be released for fire season 2023. As the team has been operating in a reactive state to changes in the WMP guidelines and recommendations, full documentation of each of the models is not complete and there is heavy reliance on the experience and knowledge of the individual team members.	Severity Level: Low – without robust model documentation, there is a reliance on the experience and memory of team members to explain the reasoning behind model decisions and changes.	2023	Complete
R1.4	Team Enhancements	Enhance the team with the addition of 1) a scrum master who can help generate and manage a backlog of tasks and activities such that activities may be prioritized, and a demand management process may be created and 2) a data analyst who could assist with external regulatory data requests, alleviating some of the time demands of the WiNGS-Ops Data Science team. The team consistently faces capacity constraints due to the ever-changing landscape of the WMP guidelines and recommendations, coupled with continued regulatory requests for data and information. As such, the team operates reactively to requests and priorities, without a true backlog of tasks captured and delivered against.	Severity Level: Medium – without changes to the team size and team roles, the full potential of members of the team may not be realized. Improved team size, capability, and demand management would allow for a more optimal environment, within which the greatest value may be generated.	2023	Complete
R1.5	Data Owner Communication	Ensure that there is an integrated function, such that communication from	Severity Level: Medium – lack of communication	2026	In Progress

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
		specific data owners is cohesive and timely. This would ensure the communication of definitions, use, bounds for validity, and decisions on potential changes. Data owners would also be responsible for ensuring that the data is up to date and accessible.	from data owners may result in unexpected changes and diminished data integrity.		
R1.6	Calculation Ownership	Assign owners of specific constants (e.g., PSPS risks) and calculation methodologies such that their definitions and approaches are agreed, documented and uniform across the business. This is to ensure that any colloquial terms used for aggregated data assets are consistent such that an output like "miles of span in HFTD in one group's calculation is the same as another's.	Severity Level: Low – a calculation owner will be accountable for ensuring calculation methodologies are clearly defined and are used appropriately and consistently.	2026	In Progress
R1.7	Model Ownership	Implement broader model ownership in the form of a board/ group with regular meeting cadence to agree to higher-level changes and adjustments, reviewing output of sensitivity analysis and changes prior to implementation. This would ensure that the direction of overall model enhancements and improvements is agreed amongst the Developers, Wildfire Mitigation team, and the Business users.	Severity Level: Low – without regular communication between all stakeholders, the direction and prioritization of model development and improvements can be missed.	2026	In Progress
R1.8	EAMP Data Experts	Onboard an internal team to share subject matter expertise responsibility for EAMP/Asset 360. EAMP/Asset 360 provides a rich asset data source used in modeling. The data itself is a clean and curated version of GIS and Asset Management data. Currently, the program is operated by external contractors who also remain as the data source subject matter experts. The source, including all dictionaries and implemented manipulations, should also be fully documented such that any new user may easily gain a complete understanding of the data and its use.	Severity Level: Medium – with a continued reliance on external parties for this critical data source, the team will not gain full ownership, understanding, and control over the underlying data. Internal subject matter expertise in the data source will ensure a robust and future-proof mechanism for data understanding, questions, and data updates.	2028	In Progress
R1.9	External Inference Team	Integrate more SDG&E resources into the inference team so that knowledge and experience is internalized and reliance on external contractors is reduced. Currently, the development team responsible for the inference aspects of WiNGS-Ops are a group of external contractors. The team is effective in the conversion of models from training and	Severity Level: Low – as the WiNGS-Ops model continues to mature and gain complexity, the technical debt on external development members of the Advanced Analytics team	2028	In Progress

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
		test phase to inference phase but do not look to challenge the training team to improve the models.	will grow, increasing this reliance.		
R2.1	OIR Requirements	Build and maintain a formalized report that tracks OIR requirements and how they were carried out in order to ensure that all Order Instituting Rulemaking (OIR) requirements are met and prevent possible violations. Having this existing documentation will not only confirm what the requirements are and if and how they were completed but will also be ready to pass along to the OIR as appropriate.	Severity Level: Low – this will help prevent potential violations from the OIR by tracking all the requirements and how they were completed.	2028	In Progress
R2.2	Model Change Documentation	Create a formal process through which requirements for model changes are captured, tracked, and completed against. This will ensure that changes are understood and captured correctly and will allow success criteria to be defined and assessed against by the end users in their approval of model changes.	Severity Level: Low – without a documented process, requirements and requested changes may be incorrectly implemented or the end users may not have an easy mechanism for change approval.	2025	Complete
R2.3	Model Value	Establish metric(s) to gauge the effectiveness of the model, which will help determine the value the model is bringing to the business. This will ensure that the impact of model improvements and developments over time are quantified and tracked.	Severity Level: Low – this recommendation will increase end user buy in and understanding of the changes that are enacted in the model.	2023	Complete
R2.4	Initiation Stage Documentation	Document the initiation stage in order to capture critical elements of the initial planning stage. This includes defining what problem this model will solve, what is the feasibility of the model, who are the end users and how do they want to ingest the model outputs, who are the subject matter experts and what is their ability to participate in the model development, who will be the business owner of the model, what are the initial assumptions and how were they determined, and confirmation that all relevant business areas have taken full sponsorship of the project. Additional details on why certain decisions were made with respect to model generation are also critical to document in the initiation process.	Severity Level: Low – without this documentation in place, future developers and end users may have a more difficult time understanding the decisions and assumptions that were made, which subject matter experts to turn to for input, how the model will be measured for success, or the original problem and objectives.	2026	In Progress
R3.1	Data Input Validation	Implement an automated data validation check for every data input to look for outliers, errors, text control,	Severity Level: Medium – there is currently a lot of reliance on source data	2026	In Progress

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
		contradictions, etc. Each of these validation checks should have associated documentation that includes what to do when data is missing or anomalous. This should be implemented in the inference pipeline and should be consistent with data validation performed by the WiNGS-Ops data science team during their exploratory data analysis process.	owners to validate their data, which can lead to errors and reduce data quality.		
R3.2	Pole and Span Imputation	In collaboration with the GIS team, develop a logic-based solution for imputing pole location information using other fields when historical pole locations are missing. This may include utilizing an existing GIS redlining process for resolving these gaps.	Severity Level: Low – this would ensure that the data used in modeling is most representative of the network. It may also help reduce the number of minority class records that are dropped due to missing data.	2028	In Progress
R3.3	Network As Switched Limitation	Note this as a limitation of the model and prior to PSPS activations that the systems are restored to the as-designed states wherever possible. In addition, contact Operations personnel to confirm the correct owner of the network as-operated electrical connectivity data since this data is a critical component of the WiNGS-Ops model. Seeking out information on the root data source, how it is validated, and the existing assumptions are critical for ensuring a complete understanding of the data and its correct use.	Severity Level: Low – without knowing the correct data owner or who to reach out to with concerns or data issues, there will be continued uncertainty of the data and of the stewardship and accountability surrounding that data.	2023	Complete
R3.4	Data Object Governance	Increase governance and controls for each of the data objects utilized by WiNGS-Ops such that none of the data created for and used in the models is inadvertently used for a different purpose, generating alternative and incorrect views of the landscape.	Severity Level: Low – although this may not directly impact the output of the WiNGS-Ops model, it may affect the credibility of the data sources used if the source is used incorrectly elsewhere.	2026	In Progress
R3.5	SAIDIDAT Data Ingestion	Perform a direct query of SAIDIDAT data from its source database. This eliminates the reliance on individuals and prevents potential human error.	Severity Level: Low – manual data request and transfers are reliant on the requestor to ask for the information. Automating the request process may be a better way to obtain updated outage history data on a scheduled basis rather	2026	In Progress

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
			than on an as-requested basis.		
R4.1	Feature Removal	For the models that do not have auto regularization, remove the less relevant features as measured by the feature importance function outputs. Removing less relevant features will help with the stability of the model, avoid overfitting, and reduce computation cost.	Severity Level: Medium – it is unclear at this stage the impact that inclusion of these unimportant features has on the outputs. Removing them has the potential to skew results which may have a large impact, so has been rated as such.	2026	In Progress
R4.2	Alternative Land Use Data Source	Work closely with the SANGIS team to incorporate service territory areas currently not covered in their existing coverage data, as well as request more frequent than annual data updates. This would ensure the models have access to the same information as the rest of San Diego County and are up to date during a red flag warning event.	Severity Level: Low – models run on data which has not been recently refreshed or on imputed data based on mean values may provide inaccurate outputs. This may cause a model to under-represent the potential consequence of an ignition due to a missing at-risk land use.	2028	Not Started
R4.3	Model Improvement Limitations	Do not develop or incorporate additional features to the models. Due to the time pressures and resource constraints, the team does not have the capacity to further improve models in this manner.	Severity Level: Low – impact would be minimal due to the models' existing satisfactory performance but might represent a missed opportunity for continued model improvements and enhancement.	2028	In Progress
R4.4	Safety Weights Documentation	Create a documented framework to define the safety weights used in the PSPS model such that there is an explainable process through which they may be assessed and updated based on additional subject matter expertise. These weights must also be integrated into version control, so that changes are managed and easily tracked, model version to model version. This documentation would help future model developers and users better understand why certain values were used and what the historical justifications and rationale were.	Severity Level: Low – without a clearly documented process for suggesting changes to the weights and version control to track those changes, it may be difficult to provide explanatory evidence in support of decisions driven by this model.	2026	Not Started
R5.1	Class Imbalance Approaches	Test other approaches to handling class imbalanced data, including up-sampling,	Severity Level: Medium – down-sampling excludes	2026	In Progress

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
		SMOTE, and ADASYN, in order to determine the most applicable method for each model.	significant amounts of data which may result in an unrepresentative data sample being used for training and testing the model.		
R5.2	Algorithm Testing	Test other algorithms to ensure that the most suitable algorithm is used to solve the problem, balancing complexity of understanding and training with accuracy of modeling outputs.	Severity Level: Low – without validating that there isn't a more suitable algorithm for the model, the team cannot be certain that they have built the most suitable model for the specific application.	2028	In Progress
R5.3	Collaborative Model Development and Release	Implement a more collaborative approach towards model development and release. A peer-reviewed approval process (similar to the one used by WiNGS-Planning) can ensure consistency between sub-models and that best practices are followed.	Severity Level: Medium – individual working may lead to inconsistencies between models, resulting in deployment of models with differing levels of robustness.	2026	In Progress
R5.4	Conductor Model Retrain	Retrain the conductor model based on data from 2015 to present, utilizing the 2022 data for testing and validation. This will ensure the most representative data is utilized in construction and training to create the most accurate and useful modeling outputs.	Severity Level: Medium – based on the most recent data used for validation, the model under-represented the potential risk due to conductor failure. Re-training this model would generate a more representative output.	2025	Complete
R5.5	Same Data Sources	Train the models on the same data sources that would be utilized for inference in production such that the resulting outputs are most relevant and applicable.	Severity Level: Medium – as the models were trained on different source data, the learned data relationships may not be representative of what would be seen in the EOC. As a result, outputs of the models may not be as accurate as if the data used for training was the same source as used in inference.	2026	In Progress
R5.6	GIS Cleaning	Consider a larger program of GIS data cleaning, validating, and improvement and investigate if existing GIS red lining processes can be leveraged to ensure the GIS system of record for assets represents the most accurate view of	Severity Level: Low – it is critical that decisions in the EOC are made based upon the most accurate representation of the assets in the field.	2028	In progress

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
		assets in the service territory. This would ensure that any modeling application or activation event would consider that most accurate understanding when making data-driven decisions.			
R5.7	Hyper-parameter Tuning	Implement the approach used for tuning hyper-parameters in the foreign object model, GridSearchCV, for tuning hyper-parameters in the vehicle contact model.	Severity Level: Low – consistent use of techniques across models ensures that the quality and robustness of each model is uniform and contributes to an optimal output.	2026	Not Started
R5.8	SHAP	Incorporate Shapley Additive Explanations (SHAP) to help explain model outputs through calculating the contribution of each feature to the model output. These values can be used to understand the importance of each feature and to explain the results of the model.	Severity Level: Low – without a full understanding of the importance and contribution of the features in a model, the driving factors of the model's outputs are less explainable.	2023	Complete
R6.1	Brier Score	Use the full Brier score such that the outputs are unaffected by population size. This will enable Brier scores to be compared across different versions of a model to allow model improvements to be validated.	Severity Level: Low – a modified Brier score might be inadvertently used to compare models with different sample sizes. This would give an inaccurate view of the performance comparison and could result in an incorrect modeling decision.	2026	Not Started
R6.2	Class Imbalance Validation Methodology	For the vehicle contact model, incorporate a nested cross validation where one fold is an out-of-period imbalanced data split for the final validation and the other fold is split for training and testing on balanced sampled data set. This would provide an additional method for validating the accuracy of the model. Ensure the right metric is used for the evaluation, as some metrics are better for evaluation when there is class balance (ROC AUC) and others are better for when there is class imbalance (Precision-Recall AUC).	Severity Level: Medium – validating imbalanced data with this approach checks performance of the model against real class distribution.	2026	Not Started
R6.3	Uniform Model Testing	Establish a consistent and agreed approach for model testing across the team such that each member may be sure of the optimal model and be in agreement when training is complete.	Severity Level: Low – models may have differing levels of robustness without a uniform, defined, and	2026	In Progress

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
		This will ensure consistency across models and build credibility with the end users.	agreed upon approach to testing.		
R6.4	Data Documentation	Provide detailed documentation for all data that is ingested into the models The documentation is the responsibility of the data owners and should contain pertinent information such as the data owner, data collection methodology, data dictionary, structure of the data, data validation and quality assurance steps taken, data manipulations from the raw data, and confidentiality, access and use conditions. This will ensure a detailed understanding of the data that can be reference as needed, critical for ground truth data.	Severity Level: Low – without detailed documentation, there is a risk the data can be misinterpreted, or if there is turnover or new hires on the WiNGS-Ops Data Science or Advanced Analytics teams, they may have a more challenging time referencing and understanding the data inputs.	2026	In Progress
R7.1	Back-casting Model Validation Process	Create a more holistic and reliable model validation process to allow automated back-casting for each model change. This would allow for greater confidence in the updated version of each model. Given the snapshots of data are now maintained in the cloud, this ensures that this process would be simpler to perform.	Severity Level: Low – without an automated and uniform approach to model output validation, validating each new model release will be a time-consuming and inconsistent process.	2026	In Progress
R7.2	Back-casting Data Capture	Ensure that all necessary data and calculation components are captured, including the network configuration, at the time of a PSPS activation to help streamline future back-casting exercises.	Severity Level: Low – implementing this would allow for the automated and uniform approach mentioned in R7.1 and could be enacted for model back-casting.	2028	In Progress
R7.3	End User Formalized Validation Process	Establish a formalized validation process by the end users that will establish consistency in the validation approach and also build credibility with OEIS by demonstrating the results are reviewed in a specific and systematic way.	Severity Level: Low – without a formalized validation process, there is the potential for end users to validate the model differently every time a new model version is released. This may result in missing an important check, or reviewing an output that differs from a previous model version.	2026	In Progress
R8.1	Centralize Models	Migrate the conductor training model and PSPS model scripts to Azure DevOps Repos. This will ensure development on local machines are version controlled, tracked appropriately, and accessible by the team. This will also allow models to leverage cloud compute capabilities,	Severity Level: Medium – current processes limiting version control and access could introduce errors and confusion in the correct version that should be	2026	In Progress

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
		meaning that more advanced models may be produced. Additionally, the PSPS model should be passed to the inference team such that the entire WiNGS-Ops model can be executed through the inference pipeline.	run in production. Full cloud migration would limit the risk of this issue.		
R8.2	Model Training Process Explanation	The model training team should provide a more thorough explanation of the model training process and decisions which would enable the Advanced Analytics team to have a better grounding for implementing the code. As well as education sessions, thorough documentation would enable any new team members to be onboarded swiftly.	Severity Level: Low – without full understanding and knowledge of the model training process, the Advanced Analytics team may not be able to add as much value in critiquing and improving the models.	2023	Complete
R8.3	Combine Pole and Span Ignition Models	Combine the pole and span ignition models to remove any overlaps which might exist.	Severity Level: Medium – currently the models are not fully independent, which may skew the results. This should be rectified such that an accurate representation of risk may be generated.	2025	Complete
R8.4	Profiler	Run a profiler to help understand the resource consumption of the various operations in the model. This can potentially resolve performance bottlenecks and help the model execute faster.	Severity Level: Low – this recommendation does not affect the model output but may improve the runtime performance of the model.	2026	In Progress
R8.5	Unit Testing	Incorporate unit testing to ensure all functions are performing as intended and errors are more easily isolated when they occur. Unit tests also check that the code still functions as expected after making changes, which builds code stability.	Severity Level: Medium – Without unit testing, there is no assurance that the code will function correctly and that there are no undiscovered bugs. This can lead to poor quality modeling results and wasted time and resources spent debugging.	2026	In Progress
R8.6	Integration Testing	Incorporate integration testing to ensure all functions and scripts are working together as intended and there are no conflicts or errors between different code units.	Severity Level: Medium – without integration testing, there is no assurance that all functions and scripts are working together correctly. In addition, the team will be less efficient	2023	Complete

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
			at debugging and will spend time and resources fixing errors.		
R8.7	Docstrings	Ensure all python functions have docstrings, which will ensure that all functions are correctly documented and definitions, descriptions, and decision point reasoning are captured. Docstring best practice for a function includes a brief description of what the function is and what it is used for, any arguments that are passed, labeling what is required and what is optional, and determining any restrictions on when the function can be called or any exceptions that are raised.	Severity Level: Low – this recommendation will not affect the model outputs but is a best practice to follow when writing code.	2028	In Progress
R9.1	Internal Resources Embedded into Each Team	Ensure there is a skilled and knowledgeable base of internal resources involved in each aspect of the WiNGS-Ops modeling process such that reliance on external parties is reduced.	Severity Level: Low – the Advanced Analytics team is skilled and knowledgeable so there is minimal risk to the model outputs at this stage.	2026	In Progress
R9.2	Cloud Consolidation	Consolidate services under one cloud provider for ease of use, integration, and billing. This can ensure that future updates to any of the cloud services are always made in a way to keep compatibility and seamless integration with the other developed components.	Severity Level: Low – this recommendation has no impact on the output of the WiNGS-Ops model but would allow for greater efficiency in use of cloud services. Although cloud services may work together across different vendors, they are optimized to work most effectively when combined with services belonging to one single cloud provider.	2028	Not Started
R9.3	Pipeline Deployment Documentation	Create robust and granular documentation of the deployment pipeline, which would ensure a lower reliance on the experience of resources.	Severity Level: Medium – without this documentation, a continued reliance on external resources would be mandatory as there would be no straightforward mechanism through which internal resources could inform themselves on the finer details of the inference pipeline.	2026	In Progress

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
R9.4	Modeling Key Drivers	Expose key drivers of the modeling output to the users, such that they may gain a greater understanding of the outputs and some indication on how an output should be viewed and utilized.	Severity Level: Low – this detail may allow for greater understanding and trust in the WiNGS-Ops output.	2026	In Progress
R9.5	Limitations Documentations	Document the limitations of the models that underpin the WiNGS-Ops outputs and ensure that these are fully understood by the business users. This will ensure that any decisions made based on the result of the WiNGS-Ops model are made from the most informed position.	Severity Level: Medium – without understanding the limitations of the model, sub-optimal decisions may be made due to a misinterpretation of the results.	2026	In Progress
R9.6	Full Model Lifecycle Documentation	Document the full lifecycle of each model in training and in inference such that the knowledge, skills and experience of the team is captured for future use. This would also enable training and onboarding of new resources to be more straightforward and regulatory filings to be completed more swiftly. Example pieces to include in this documentation are the problem formulation process, all decision points and reasonings, and future plans and intentions.	Severity Level: Low – the team is knowledgeable in the models they have constructed so any risk is reduced. In most cases there is only one team member with discrete knowledge of the specific model.	2026	In Progress
R9.7	Weather Sanitization Ownership Update	Update the technical ownership of the weather sanitization repository and any other repositories that may have changed ownership.	Severity Level: Medium – the script is well understood by multiple parties, however there is no single owner to drive decisions or improvements.	2025	Complete
R9.8	Weather Station Imputation Mapping	On the inference side, implement the device to weather station associations that the Meteorology team determined based on topographical features into the weather station mapping. This will ensure the most suitable weather station data is used for each segment.	Severity Level: Medium – there is the potential to produce skewed results if there is a significant topographical impact on certain spans.	2026	In Progress
R9.9	Missing Data Outputs	Correct data issues such that all segments have an outputted value from the WiNGS-Ops model. Failing that, provide full communication and explanation to the end users for those segments where a WiNGS-Ops output was unable to be generated. This would ensure that awareness of these missing values is gained and decisions are not based on the omission of those segments in the model outputs.	Severity Level: Medium – while the PSPS de-energization decision takes other inputs aside from WiNGS-Ops, without a complete model output for every segment, it is conceivable that the decision maker will lose trust with WiNGS-Ops model if a PSPS de-energization decision	2026	In Progress

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
			would need to be made for a segment that has no WiNGS-Ops output.		
R9.10	Cold Storage	Consider the use of cold storage for long-term storage of snapshots or model runs which do not need to be accessed regularly. This would reduce the overall costs of the cloud infrastructure, which will become more important as the models and data sets mature and grow in size.	Severity Level: Low – as the size of files being stored currently is not large, use of cold storage would have a minimal effect on the cost of cloud services, though remains a best practice recommendation.	2028	Not Started
R9.11	Error Monitoring Dashboard	Develop a monitoring dashboard that provides real-time error monitoring and a view of the model runs such that issues may be highlighted and resolved in a timely manner.	Severity Level: Low – existing monitoring allow for errors to be identified; however, advanced monitoring would allow a more streamlined process for error identification and remediation.	2025	Complete
R9.12	Global ID Cleaning	Clean the data such that all Global IDs are valid and the amount of feeders without output results due to invalid global IDs decreases. This will prevent situations where the WiNGS-Ops model is unable to produce risk scores.	Severity Level: Medium – having up to 10% of feeders without risk scores could cause a loss of credibility within the organization when the model is needed to provide data driven insights for PSPS de-energization decision making.	2025	Complete
R9.13	WiNGS-Ops Support Position	Create a new role in the EOC to provide WiNGS-Ops model support. This person would be knowledgeable about all aspects of the model, outputs, limitations, and the impact on other components utilized in EOC decision-making.	Severity Level: Low – without this role in the EOC, the model may not be fully understood so model outputs may be interpreted incorrectly. This could lead to sub-optimal decisions being made.	2023	Complete
R10.1	Issue Reporting Process	Create a formalized process for issue reporting from the end users to the development teams. This should be simple and streamlined such that any issues may be raised, quantified, and remediated quickly.	Severity Level: Low – currently there is no prescribed process, which could lead to confusion as to the point of escalation for issues. This may result in a delay to any remediation activity and impact the quality of outputs.	2024	Complete

ID	Recommendation Name	Description	Severity Level	Target Deadline (EOY)	Status
R10.2	Action & Tasks Log	Document meetings and create a backlog for actions/tasks so they can be prioritized, tracked, and completed against. This will ensure that all tasks are captured and implemented as intended and miscommunication is avoided.	Severity Level: Low – without a formalized process of documentation and action tracking, there may be more instances of misunderstanding of intention between teams, which might result in a sub-optimal outcome or re-work in remediating the concern.	2025	Complete
R10.3	Questions and Model Changes Tracking	Create a formalized process for questions and model changes ahead of each activation event. In addition, track changes to model code and outputs through formal version control. This will mean that the decision points and actions taken are formally documented and easily explainable if a reference is required, which may aid answering regulatory questions or post-event report preparation.	Severity Level: Low – the current process will result in a more time-consuming post-activation event reporting process. This may mean a period of potential re-work to establish the reasoning behind certain tweaks and decisions taken in the model pre-event.	2025	Complete
R10.4	WiNGS-Ops Overall Versioning Process	Create an overall WiNGS-Ops model versioning process such that changes or updates to any component of WiNGS-Ops results in a version iteration. This ensures that users have a clear indication of when a model methodology has changed. This may help the users understand which models may be easily compared.	Severity Level: Low – the current versioning methodology may result in inaccurate comparisons being made by end users across models.	2025	Complete

5 SDGE-25U-04. CONTINUATION OF GRID HARDENING JOINT STUDIES

5.1 DESCRIPTION

As directed in the 2023-2025 WMP Decisions, the IOUs have made progress on the areas for continued improvement (SDGE-22-11 and SDGE-22- 13) relating to the continued joint IOU grid hardening working group efforts. Energy Safety expects the IOUs to continue these efforts and meet the requirements of this ongoing area for continued improvement.

Discussed in Section 8.1.1 "Grid Design and System Hardening."

5.2 REQUIRED PROGRESS

Required Progress: In its 2026-2028 Base WMP, SDG&E must continue to collaborate with the other IOUs to evaluate various aspects of grid hardening and provide an updated Joint IOU Grid Hardening Working Group Report. This report must include continued analysis for the following:

- The IOUs' joint evaluation of the effectiveness of undergrounding. This evaluation must account for any remaining risk from secondary or service lines, analysis of in-field observations from potential failure points of underground equipment, and ignition risk as well as PSPS risk.
- The IOUs' joint evaluation of lessons learned on undergrounding applications. These lessons learned must include use of resources (including labor and materials) to accommodate undergrounding programs, any new technologies being applied to undergrounding, and cost and associated cost effectiveness efforts for deployment.
- The IOUs' joint evaluation of various approaches to implementation of protective equipment and device settings. This evaluation must include an analysis of the effectiveness of various settings, lessons learned on how to minimize reliability impacts and safety impacts (including use of downed conductor detection and partial voltage detection devices), variations on settings used by IOUs including thresholds of enablement, and equipment types in which such settings are being adjusted.
- The IOUs' continued efforts to evaluate new technologies being researched, piloted, and deployed by IOUs. These efforts must include, but not be limited to: REFCL, EFD, DFA, falling conductor protection, use of smart meter data, open phase detection, remote grids, and microgrids.
- The IOUs' joint evaluation of the effectiveness of mitigations in combination with one another, including, but not limited to overhead system hardening, maintenance and replacement, and situational awareness mitigations. This must also include analysis of in-field observed effectiveness, as well as effectiveness for both wildfire and PSPS risk.
- Additionally, SDG&E must report on all lessons learned SDG&E has applied or expects to apply to its WMP, including a list of applicable changes and a timeline for expected implementation as applicable.

5.3 SECTION AND PAGE NUMBER OF ANY IMPROVEMENTS

See Section 13.1.2, p. 295 of the 2026-2028 Base WMP.

5.4 SDG&E RESPONSE

In response to this Area for Continued Improvement (ACI), collaboration with the other Investor-Owned Utilities (IOUs) continued in order to evaluate various aspects of grid hardening. The resulting report, Continuation of Grid Hardening Joint Studies, can be found in Attachment A.

6 SDGE-25U-05. EARLY FAULT DETECTION IMPLEMENTATION

6.1 DESCRIPTION

As directed in its 2023-2025 WMP decision, SDG&E provided in its 2025 WMP Update an update on the status of its EFD deployment, including the number of incipient faults identified by EFD technology. However, SDG&E misinterpreted the accuracy of EFD technology, and plans to continue further development of EFD technology.

Discussed in Section 8.1.1 "Grid Design and System Hardening."

6.2 REQUIRED PROGRESS

In its 2026-2028 Base WMP, SDG&E must analyze the accuracy of its EFD sensors in identifying issues and incipient faults. This must include evaluating the number of correctly identified issues, the number of false positives, and the number of missed issues.

- As part of the ongoing collaboration efforts in SDGE-25U-04, "Continuation of Grid Hardening Joint Studies," SDG&E must report on its progress for implementing EFD technologies, including evaluation of effectiveness.

6.3 SECTION AND PAGE NUMBER OF ANY IMPROVEMENTS

See Section 6.1.3.3.5, p. 104 and Section 10.3.1, p. 239 of the 2026-2028 Base WMP.

6.4 SDG&E RESPONSE

SDG&E began implementing Early Fault Detectors (EFDs) in 2020 to enhance the system's reliability and operational efficiency. EFDs are designed to proactively identify and mitigate equipment faults, reducing unplanned outages and improving asset health. During the phase 1 pilot implementation, circuit level EFDs were installed across five circuits. Since the end of the phase 1 pilot in June of 2022, substation level EFDs were installed across six substations and circuit level EFDs were installed across 68 additional circuits, for a total of 73 circuits. A third party was engaged to evaluate their effectiveness and based on their analysis, several changes were implemented to accommodate system tracing and ensure the exact coverage of the installed devices for accuracy.

The EFD system was evaluated using the following key metrics:

- Fault Detection Accuracy
- False Positive/Negative Rate
- Location of the EFD device on a given circuit

Using these key metrics and the following calculation, it was determined that the effectiveness of EFD on equipment failures is 52 percent, and the effectiveness of EFD on all risk events is 16 percent (EFD only detects equipment-related faults). The evaluation found that the initial settings of EFD detected many underground faults that were excluded from the effectiveness analysis.

$$Effectiveneess = \frac{Prior\ probability\ of\ outages - Posterior\ probability\ of\ outages}{Prior\ probability\ of\ outages}$$

Key Results (2021 to 2024):

- Number of correctly identified faults (True Positive): 20
- Number of False Positives: 0
- Number of Missed Issues (False Negatives):10

Starting in 2025, the Power Quality (PQ) EFD machine learning algorithms will be fine-tuned with recent vegetation contacts and other utility data to further focus on the detection of overhead incipient faults. An evaluation of a smaller EFD and a more efficient method of installation to increase overall coverage of the EFD system will be completed. An annual evaluation of the effectiveness of EFD will be completed.

7 SDGE-25U-06. DISTRIBUTION COMMUNICATION RELIABILITY IMPROVEMENT

7.1 DESCRIPTION

In its 2025 WMP Update, SDG&E provided a decrease to its 2025 target for its Distribution Communications Reliability Improvements initiative from 90 to 42 base stations, citing technical and workflow process constraints and delays in the development of pole specifications. This target reduction may reduce the effectiveness of some of SDG&E's mitigation technologies, such as falling conductor protection and early fault detection, which require reliable communication to effectively mitigate risk.

Discussed in Section 8.1.1 "Grid Design and System Hardening."

7.2 REQUIRED PROGRESS

In its 2026-2028 Base WMP, SDG&E must:

- Discuss the delays related to electrical engineering, civil engineering, work methods, telecommunications, and pole specification development.
- Identify specific constraints in each area and outline its plan to address each constraint including any lessons learned.

7.3 SECTION AND PAGE NUMBER OF ANY IMPROVEMENTS

See Section 13.3, p. 298 of the 2026-2028 Base WMP.

7.4 SDG&E RESPONSE

Due to the final decision in SDG&E's General Rate Case (GRC) issued by the California Public Utilities Commission (CPUC) that significantly reduced wildfire mitigation costs, SDG&E filed a 2025 WMP Change Order Request on January 27, 2025, that reduced the scope of the Distribution Communications Reliability Improvements (DCRI) program.[3]

During the 2023 to 2025 WMP cycle, there were delays in DCRI projects due to site types that were rebuilding or inter-setting a new distribution pole. Initially, sites were stand-alone poles (i.e., only SDG&E-owned telecommunication equipment attached to the pole) or existing telecommunication facilities that needed retrofitting. Distribution pole sites are a different type of construction that requires several technical disciplines (i.e., Distribution Engineering, Telecommunication Engineering, and Civil Engineering) to develop a construction standard and work methods. For example, both Distribution Engineering and Telecommunication Engineering were required to design and engineer the structures so work methods were accommodated and standard practices were followed in order to meet proper clearances between the communication equipment and 12 kilovolt (kV), secondary, and any other third-

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[3] *San Diego Gas & Electric 2025 Change Order Report* (January 27, 2025). Energy Safety rejected this Change Order Request and ordered SDG&E to submit a Petition to Amend consistent with the 2026-2028 WMP Guidelines. SDG&E will submit the Petition to Amend in accordance with Energy Safety's direction no later than April 10, 2025.

party communication attachments. The mapping team was also needed to ensure the sites could be properly digitized in GIS prior to construction.

Currently, the standard for distribution poles has been finalized and new mapping standards and processes have been developed. The first planned site installation in 2025 will test these new construction and mapping standards. In addition, obtaining final land rights should provide a blueprint for future distribution sites.

The slower pace of DCRI installations has affected communications capabilities in the High Fire Threat District (HFTD) for various WMP funded projects. The Strategic Undergrounding, Falling Conductor Protection and EFD teams are currently working to address these communications issues. DCRI is used where available, and where not available, the team is working to find either an alternative communication capability and/or change prioritization of sites to enable communications through DCRI.

8 SDGE-25U-07. PROGRESS ON INSPECTION QA/QC PROGRAM CHANGE

8.1 DESCRIPTION

In its 2025 WMP Update, SDG&E stated that it plans on modifying its QA/QC program to occur within one month (instead of within three months), track pass/fail audit results, and monitor trends and modify training accordingly. The planned improvements are in response to SDGE-23-13 and indicate significant changes in SDG&E's QA/QC process, and as such Energy Safety must evaluate the improvements as part of SDG&E's 2026-2028 Base WMP.

Discussed in Section 8.1.2 "Asset Inspections."

8.2 REQUIRED PROGRESS

In its 2026-2028 Base WMP, SDG&E must provide the following:

- Any modifications made to its QA/QC procedures to properly capture findings, including changes made to how SDG&E defines pass/fail criteria.
- Descriptions of how SDG&E is tracking its pass/fail rates, including pass/fail rates for its QA/QC inspections in 2024.
- Any observed trends from QA/QC audits performed in 2024, including a description of findings and associated modifications to procedures or trainings to address trends.

8.3 SECTION AND PAGE NUMBER OF ANY IMPROVEMENTS

See Section 8.5.7.2, p. 188 of the 2026-2028 Base WMP.

8.4 SDG&E RESPONSE

8.4.1 MODIFICATIONS TO QA/QC PROCEDURES

Prior to 2025, the Quality Assurance/Quality Control (QA/QC) audit program for overhead distribution detailed inspections consisted of District Supervisors performing an audit of 1.5 percent of the total distribution overhead visual inspections completed in the prior quarter. This included inspections that occurred in HFTD and non-HFTD areas. Therefore, the percentage of audits that occurred within the HFTD was less than 1.5 percent on a quarterly basis. Starting in 2025 and in response to ACI SDGE-23-13, two new audit processes will be implemented, one to reduce the timeframe between the inspection and the audit, and one to increase the percentage of audits performed and track the pass/fail results of the audits. No changes to the definition of pass-fail criteria are planned.

Beginning in 2025, the following two QA/QC audit processes for overhead distribution detailed inspections will be implemented:

- An audit of 50 percent of potential safety and fire hazard issues identified during inspection will be performed by a District Supervisor via a field visit or a desktop review of images collected during the inspection within 1 month following the end of the month the inspection was completed.

- A random sampling of 5 percent of inspections performed within the HFTD with no findings will be audited by a quality assurance advisor via a field visit or a desktop review of images collected during the inspection within 1 month following the end of the month the inspection was completed.

8.4.2 PASS/FAIL RATE TRACKING

SDG&E did not track pass/fail of inspections in 2024 due to the time between the initial inspection and the secondary assessment (QA/QC) activity, which was between 3 and 6 months. The QA/QC is not determinative of whether an inspector passed or failed the initial inspection as conditions found during the secondary assessment may not have been present at the time of initial inspection. The planned modifications for 2025 will allow SDG&E to correlate audit results to a pass/fail status, include this rate in reports, and track trends.

8.4.3 OBSERVED TRENDS

Because only two audit findings were found in the first three quarters of 2024, there was not enough data to perform a trend analysis. However, the audit program has been modified starting in 2025 to track and identify trends in audit findings.

9 SDGE-25U-08. DISTRIBUTION INFRARED INSPECTIONS

9.1 DESCRIPTION

In its 2025 WMP Update, SDG&E provided a decreased to its 2025 target for its Distribution Infrared Inspections initiative from 9,532 to 300 structures, a decrease of 97 percent. SDG&E stated that it is modifying this program to focus on circuits with larger loads during peak season due to the low historical find rate of distribution infrared inspections. SDG&E did not commit to analyzing the find rate of the new inspection regime or reevaluating the distribution infrared inspection target on this basis.

Discussed in Section 8.1.2 “Asset Inspections.”

9.2 REQUIRED PROGRESS

In its 2026-2028 Base WMP, SDG&E must provide:

- The find rate and number of findings of level 1, level 2 and level 3 conditions identified by the new inspection methodology.
- The date of each infrared inspection resulting in a level 1 or 2 finding, and the date of the most recently completed detailed ground and aerial inspection prior to the infrared inspection for each infrared level 1 or 2 finding.
- The percentage of level 1 and 2 infrared inspection findings SDG&E anticipates it likely would have identified by other inspection initiatives prior to failure.
    - Provide supporting documentation such as photographs and/or data analysis.
- A discussion of any further changes to the initiative methodology or targets, including the basis for any changes

9.3 SECTION AND PAGE NUMBER OF ANY IMPROVEMENTS

See Section 8.3.10.1, p. 171 and Section 13.3, p. 298 of the 2026-2028 Base WMP.

9.4 SDG&E RESPONSE

As of December 31, 2024, 6,656 overhead distribution structures were inspected under the infrared inspection program. These inspections resulted in the following findings:

- Level 1 find rate = 0.045 percent (3 findings)
- Level 2 find rate = 0.916 percent (61 findings)

Refer to Table 9-1 for the infrared inspection dates resulting in a level 1 or 2 finding.

In 2024, thermographers performing infrared inspections identified potential infractions on less than 1 percent of the total poles inspected. As shown in Table 9-1, approximately 52 percent of findings were identified through visual observations. These findings would have been found with other inspection initiatives such as patrols, detailed overhead visual inspections, or drone inspections. For example, Structure P831017 identified a damaged crossarm through a detailed overhead visual inspection.

It is estimated that the remaining 48 percent of 2024 infrared findings could have been found through other real-time monitoring programs. Continuous monitoring with advanced protection (e.g., EFD, Advanced Protection Program [APP], Sensitive Relay Profile [SRP]) is better positioned to identify anomalies on distribution infrastructure that require further investigation. EFD, Advanced Radio Frequency Sensors (ARFS) and PQ EFD provide the ability to identify incipient faults. This technology acts as a near real time health monitor on the circuit or section of circuit it is monitoring, providing notifications of equipment that could be classified as a level 1 or 2 finding. These indicators are then used to initiate a more targeted patrol/inspection using infrared technology when needed.

Continuous monitoring programs deployed in higher risk areas are anticipated to result in improved mitigation of the potential issues identified by thermographers versus continuing routine infrared inspections that result in extremely low find rates (less than 1 percent).

In 2025, 300 infrared inspections will be targeted as approved in the 2025 WMP Update. However, due to a historically low find rate, Distribution Infrared Inspections (WMP.481) will be discontinued in 2026 (refer to Section 8.3.10 of the 2026-2028 Base WMP).

SDG&E will continue utilizing infrared technology as an essential tool to augment routine and responsive patrols and inspections. For instance, infrared technology can be used to identify specific equipment requiring maintenance when there is an undetermined fault or outage. Additionally, infrared devices are used for underground inspections when vaults or transformers are opened. During patrol inspections, infrared tools help identify issues, allowing SDG&E to mitigate conditions before a fault, outage, or other safety issue occurs.

Table 9-1: Infrared Inspection Findings

IR Inspection Date	IR Finding Level	Structure ID	Findings Identified Through Alternative Initiative	Type of Finding	Prior Detailed Inspection Date
7/1/2024	Level 2	P831017	Detailed Inspection	Visual	5/19/2023
7/1/2024	Level 1	P192125		Thermography	7/13/2020
6/24/2024	Level 2	P737700		Visual	7/13/2020
7/1/2024	Level 2	P192125		Thermography	7/13/2020
7/1/2024	Level 2	P737707		Thermography	7/13/2020
7/1/2024	Level 2	P838742	Drone Inspection	Visual	7/6/2020
7/1/2024	Level 2	P192259		Thermography	7/13/2020
7/1/2024	Level 2	P729957		Visual	6/28/2023
7/1/2024	Level 2	P834374		Visual	5/19/2023
7/18/2024	Level 2	P479712		Thermography	8/30/2019
7/1/2024	Level 2	P192259		Thermography	7/13/2020
7/1/2024	Level 2	P192287		Thermography	7/6/2020

IR Inspection Date	IR Finding Level	Structure ID	Findings Identified Through Alternative Initiative	Type of Finding	Prior Detailed Inspection Date
7/23/2024	Level 2	P163469		Visual	9/13/2020
7/23/2024	Level 2	P831688		Visual	9/13/2020
7/30/2024	Level 2	P570385		Thermography	8/26/2020
7/1/2024	Level 2	P192287		Thermography	7/6/2020
7/30/2024	Level 2	P11850		Thermography	6/8/2021
7/1/2024	Level 2	P192306		Thermography	7/6/2020
8/5/2024	Level 2	P103863		Visual	7/14/2023
8/7/2024	Level 2	P474064		Thermography	8/7/2019
8/23/2024	Level 2	P201281		Thermography	8/16/2024
8/21/2024	Level 2	P279981		Thermography	7/3/2024
8/21/2024	Level 2	P379031		Thermography	9/18/2023
7/17/2024	Level 2	Z245659		Thermography	1/9/2024
9/11/2024	Level 1	Z282843		Visual	5/1/2023
9/13/2024	Level 2	Z731331		Thermography	5/5/2020
9/19/2024	Level 2	P227944		Thermography	1/5/2024
9/20/2024	Level 2	Z118778		Thermography	3/21/2022
9/20/2024	Level 2	Z473088		Thermography	3/28/2022
9/30/2024	Level 2	Z229374		Thermography	9/23/2024
10/15/2024	Level 2	P839538		Thermography	6/7/2024
10/15/2024	Level 2	P734600		Thermography	6/9/2021
10/15/2024	Level 2	P62585		Visual	5/17/2022
10/15/2024	Level 2	P61972		Visual	5/17/2022
10/15/2024	Level 2	P734427		Visual	4/14/2022
10/15/2024	Level 2	P62636		Visual	6/7/2022
10/11/2024	Level 2	P833320	Drone Inspection	Visual	6/9/2021
10/15/2024	Level 2	P62579		Visual	5/17/2022
9/5/2024	Level 2	Z731101		Visual	5/18/2020
10/29/2024	Level 2	P933220		Thermography	5/5/2021
11/1/2024	Level 2	P738074	Drone Inspection	Visual	5/13/2020
11/1/2024	Level 2	P734275	Drone Inspection	Visual	5/8/2020
11/1/2024	Level 2	P734276	Drone Inspection	Visual	5/12/2020
11/5/2024	Level 2	P839002	Detailed Inspection	Visual	2/20/2020
11/5/2024	Level 2	P2135672414		Thermography	2/12/2020

IR Inspection Date	IR Finding Level	Structure ID	Findings Identified Through Alternative Initiative	Type of Finding	Prior Detailed Inspection Date
11/7/2024	Level 2	P472873		Visual	7/15/2024
11/7/2024	Level 2	P279793		Visual	8/14/2024
11/4/2024	Level 2	P313295		Thermography	10/21/2020
11/5/2024	Level 2	P2157171985		Thermography	2/5/2020
11/5/2024	Level 2	P232868	Detailed Inspection	Visual	2/20/2020
7/1/2024	Level 2	P192306		Thermography	7/6/2020
7/30/2024	Level 2	P195779		Thermography	6/11/2021
7/30/2024	Level 2	P195779		Visual	6/11/2021
7/18/2024	Level 2	P479891		Visual	8/16/2019
12/16/2024	Level 1	P174771		Thermography	4/4/2022
11/13/2024	Level 2	P2200071097		Visual	3/28/2024
11/13/2024	Level 2	P37348		Visual	6/1/2020
11/18/2024	Level 2	P836905		Visual	1/10/2022
12/16/2024	Level 2	P514611		Visual	1/3/2022
12/16/2024	Level 2	P112350		Visual	10/21/2021
12/20/2024	Level 2	P103816		Visual	6/3/2024
7/18/2024	Level 2	P479891		Thermography	8/16/2019
8/5/2024	Level 2	P831174	Drone Inspection	Visual	9/15/2023
8/5/2024	Level 2	P831174		Visual	9/15/2023

10 SDGE-23B-16. UPDATES ON IDENTIFYING ADDITIONAL, PROACTIVE HFTD INSPECTIONS

10.1 DESCRIPTION

In Energy Safety's decision on SDG&E's 2023-2025 WMP Base Plan, Energy Safety determined that SDG&E was developing additional, proactive inspections within the HFTD. As SDG&E's proactive HFTD inspections program matures, it will be necessary for SDG&E to provide sufficient information for Energy Safety to assess the quality of the program.

Discussed in Section 8.2 "Vegetation Management and Inspections" of Energy Safety's Decision on SDG&E's 2023-2025 Base WMP.

10.2 REQUIRED PROGRESS

SDG&E must provide Energy Safety and WMP stakeholders updates on efforts to foster collaborative learning and improvement across the industry. In its 2026-2028 Base WMP, SDG&E must report on:

- Any efforts to identify new opportunities for vegetation inspections or new inspection techniques.
- The effectiveness of newly identified inspection opportunities.
- Whether SDG&E plans to implement these inspections on a permanent basis and the justification if they are made permanent.[4]

10.3 SECTION AND PAGE NUMBER OF ANY IMPROVEMENTS

See Section 9.2.2.6, p. 211 of the 2026-2028 Base WMP.

10.4 SDG&E RESPONSE

10.4.1 BACKGROUND

Tier 2 and Tier 3 of the HFTD encompasses approximately 60 percent of the service territory and includes a wide variety of terrain such as portions of coastal canyons, foothills and mesas, forested land, and desert. Within these areas are a rich biodiversity of vegetation including native chapparal, riparian species, grasslands, oak woodlands, forested lands, and desert. Approximately 55 percent of the inventory tree population managed by Vegetation Management is located within the HFTD. Included in this population are species that require diligent management to maintain required clearances from power lines because of their fast or unpredictable growth rate and/or failure characteristics. Examples of these include eucalyptus, palm, pine, sycamore, oak, bamboo, and Century plant.

[4] These remedies are adapted from comments on SDG&E's 2023-2025 Base WMP from the Public Advocates Office at the California Public Utilities Commission (Cal Advocates) in "Comments of the Public Advocates Office on the 2023 to 2025 Wildfire Mitigation Plans of the Large Investor-Owned Utilities," dated May 26, 2023, p. 76; https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53966&shareable=true, accessed June 5, 2024

Vegetation Management divides the service territory into 133 distinct VMAs, 106 of which are located partially or completely in the HFTD. The Master Schedule allows for the annual inspection of all VMAs, which includes Detailed Inspections of all trees adjacent to overhead power lines. During Detailed Inspections, data for all inventory trees are recorded electronically within the Vegetation Management System (PowerWorkz) through the mobile field data collection application (Epoch). Information updated within inventory tree records includes location, tree species, tree condition, diameter, height, clearance, work prescription, customer information, work activity, and history.

Beginning in 2009 shortly after the CPUC Order Instituting Investigations (OII) following the 2007 wildfires in San Diego County, Vegetation Management expanded its tree inspection activities to include the Off-Cycle Patrol, a second annual activity within the High Risk Fire Area (HRFA). Off-Cycle Patrols were continued after the adoption of the HFTD by the Wildfire Safety Division beginning in 2018 and remain part of annual Vegetation Management inspections.

The increased inspection frequency provided by Off-Cycle Patrols identifies conditions that may not be observable through a single annual inspection activity due to the unpredictable nature of trees and ever-changing environmental factors across the landscape such as wind, moisture, fire, and tree mortality. In addition, “targeted species patrols” for fast growing trees such as bamboo and Century plant are performed at strategic times throughout the annual cycle to intercept vegetation growth that could otherwise conflict with the power lines had only one annual inspection activity occurred.

The Off-Cycle Patrol includes a Level 2 inspection of trees located within the HFTD that have the potential to encroach or fall within the minimum clearance required by law. The assessments are made visually and include a 360-degree inspection of the tree from the base to the crown to identify any hazards or defects which could cause an impact to the lines.

Because every VMA has its own assigned month of activities (Pre-Inspection, Tree Pruning, and Auditing) within the annual cycle, conducting inspection activities such as Off-Cycle Patrols and targeted species patrols may cause scheduling conflicts. Off-Cycle Patrols are scheduled to occur in the months prior to the onset of Santa Ana wind season which typically peaks in the fall. Beginning in 2023, SDG&E began using risk metrics to rank VMAs in the HFTD based on frequency of reliability (hazard) pruning, priority (memo) work, and outages.

10.4.2 UPDATES ON IDENTIFICATION OF NEW OPPORTUNITIES FOR VEGETATION INSPECTIONS OR NEW INSPECTION TECHNIQUES

Historically, Off-Cycle Patrols have involved comprehensive, periodic inspections performed on an annual basis to ensure safety and compliance. However, with advanced analytics, predictive modeling, and ancillary data integrations, Vegetation Management will aim to identify risk-based proactive inspections in the HFTD and explore transitioning from schedule-based to condition-based non-routine inspection cycle.

Several options are being considered to develop a more condition based and targeted approach to vegetation management inspections. The initiative "Advanced Analytics for Proactive Vegetation Inspection" is currently exploring three risk indicator models to support this proactive HFTD inspection approach: the Probability of Vegetation Contact, the Probability of Hazard Tree conditions, and the

Predictive Growth Rate. Figure 10-1 demonstrates the effort to explore future capabilities of the risk-driven proactive inspection approach. This effort is also in collaboration with enterprise risk modeling to leverage Probability of Ignitions outcomes. SDG&E will continue to share the results of this approach with other IOUs.

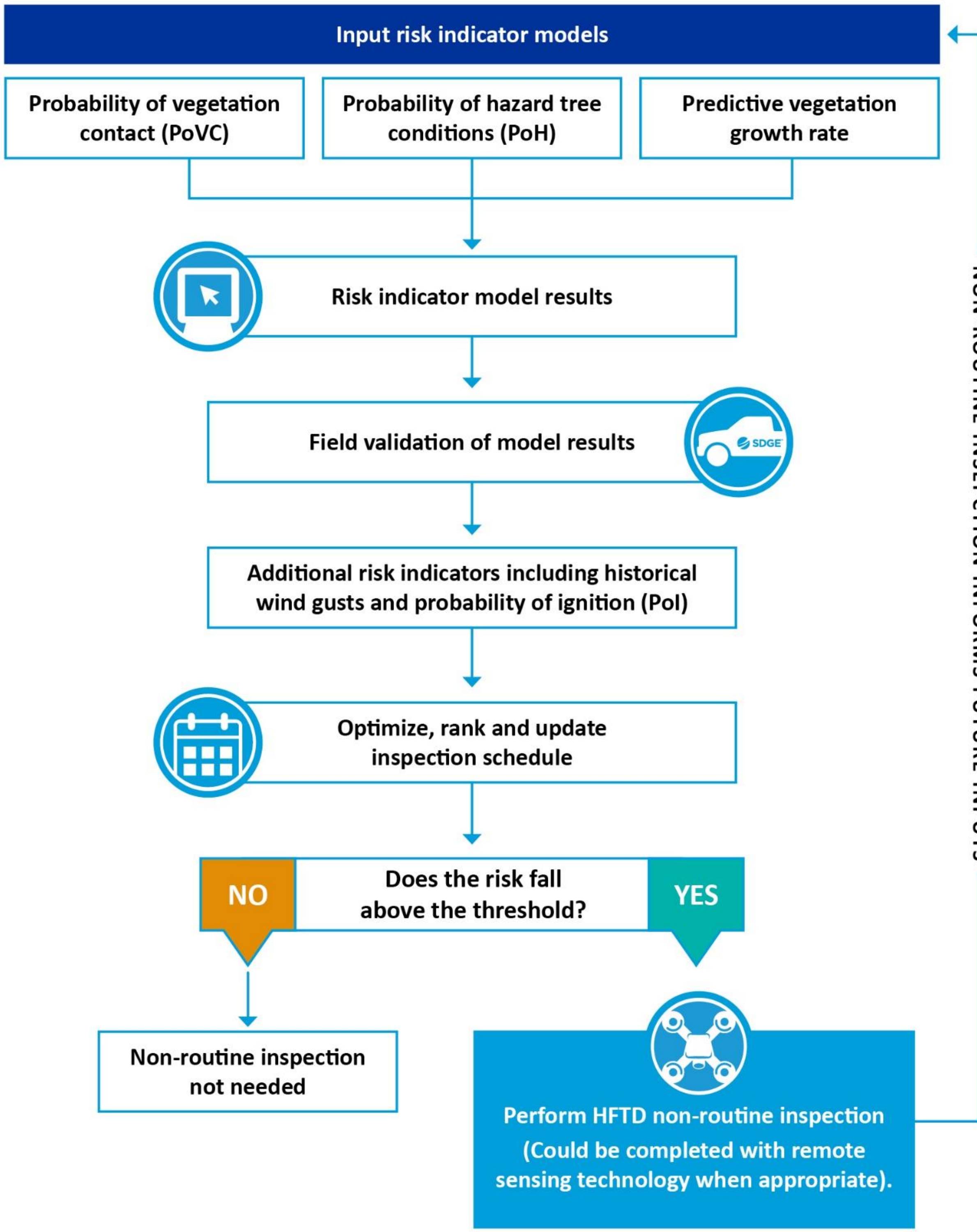
In addition to developing the risk-indicator models in 2026, outputs from various risk models could be evaluated to more accurately identify regions of higher relative risk that may require additional non-routine inspections. This process would involve ad-hoc analytics and field visits to document the limitations and successes of models to ensure they can be effectively used as targeting tools for non-routine inspection activities. A “vegetation growth” model could also be explored, which would assist with predicting the growth characteristics of disparate vegetation species to more effectively target non-routine inspections.

The capabilities of private and publicly available remote sensing technologies (e.g., Light detection and ranging [LiDAR] or satellite imagery) may be tested for use in conjunction with risk indicators to create risk-ranking and prioritization tools for non-routine inspection activities. This could include proof-of-concept studies with external agencies or vendors to identify where remote sensing technologies best meet targeted non-routine inspection goals.

Other climatology related risk factors are considered for integration into the Vegetation Management System software (Epoch) for use by field personnel. This integration includes aggregating historical strong wind gust at the spans level from Weather Research Forecast (WRF) data to facilitate inspection and tree pruning activities. Additionally, the application of live fuel moisture content products could be explored to more accurately and precisely identify regions of higher wildfire risk that may require additional non-routine inspection activities and/or greater clearance.

To improve operational integration, Vegetation Management may employ the use of Amazon Web Services (AWS) cloud architecture and tools for more robust analytics and modeling. This would include migrating data from the current Vegetation Management source system to a dedicated AWS Vegetation Management account. In addition, integration of existing IT systems disparate models and data products to assist with generated schedule and dispatch workorders for non-routine inspection activities could be explored.

Figure 10-1: Proof of Concept to Explore Risk-Indicator Driven Inspection Technology



Once risk-indicator model results are available, field validations would be conducted to evaluate the effectiveness and accuracy of the results, which could optimize inspection operation. Once field validations are completed, a risk index that ranks the overall risk at the span level would be created and used to update the inspection schedule. This risk index would also be leveraged to conduct a second round of inspections in the HFTD, potentially using drones or other remote sensing supported inspection.

The effectiveness would be studied to justify the financial and operational feasibility for future implementation.

Implementation of any new inspection method on a permanent basis would be determined based on analysis, including case studies. Additional time may be required to ensure that new inspection practices comply with regulatory requirements and industry standards.

11 SDGE-23B-17. CONTINUATION OF EFFECTIVENESS OF ENHANCED CLEARANCES JOINT STUDY

11.1 DESCRIPTION

In Energy Safety's decision on SDG&E's 2023-2025 WMP Base Plan, Energy Safety determined that SDG&E was developing additional, proactive inspections within the HFTD. As SDG&E's proactive HFTD inspections program matures, it will be necessary for SDG&E to provide sufficient information for Energy Safety to assess the quality of the program.[5]

Discussed in Section 8.2 "Vegetation Management and Inspections" of Energy Safety's Decision on SDG&E's 2023-2025 Base WMP.

11.2 REQUIRED PROGRESS[6]

With its 2026-2028 Base WMP, SDG&E, along with PG&E and SCE, must attach a white paper that discusses:

- The large IOUs' joint evaluation of the effectiveness of enhanced clearances including, but not limited to, the effectiveness of enhanced clearances in reducing tree-caused outages and ignitions.
- The large IOUs' joint recommendations for updates and changes to utility vegetation management operations and best management practices for wildfire safety based on this study. This may include the IOUs' recommendations for updates to regulations related to clearance distances.

Furthermore, SDG&E must, as a result of this study and white paper:

- Assess the effectiveness of enhanced clearances combined with other mitigations including, but not limited to, covered conductor and protective equipment and device settings (e.g., EPSS, FastCurve).
- Provide a plan for implementing the results and recommendations of the third-party contractor analysis and the white paper.
    - This plan must include trackable milestones and timelines for implementation.
    - SDG&E must also provide a list of recommendations it is not implementing and why it is not selecting them for implementation.

[5] For the definition of the objectives for the Enhanced Clearances Joint Study see Energy Safety Action Statement on SDG&E 2021 WMP Update (July 20, 2021) SDGE-21-04, pp. 8-9 and pp. 53-54; https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51674&shareable=true, accessed June 5, 2024

[6] In Energy Safety's Decision on SDG&E 2023-2025 Base WMP, SDGE-23-17 included requirements for progress reporting in SDG&E's 2025 WMP Update; this language has been removed from this Decision as it does not apply toward the required progress for the 2026-2028 Base WMP.

11.3 SECTION AND PAGE NUMBER OF ANY IMPROVEMENTS

See Section 13.2.4 p. 297 of the 2026-2028 Base WMP.

11.4 SDG&E RESPONSE

In response to this ACI, a joint study was conducted to quantify the benefits of proactive pruning that meets or exceeds the General Order (GO) 95 recommendation of 12 feet of clearance on distribution lines for three utility companies: SDG&E, PG&E, and SCE. See the Investor-Owned Utility Effectiveness of Enhanced Clearances White Paper in Attachment B.

SDG&E's data sample, used in this study, does not holistically represent the effectiveness of combined mitigations. SDG&E incorporates lifecycle cost of overhead mitigations into its mitigation selection process. As an outcome, one of the main alternative mitigations to undergrounding is the use of covered conductor. The use of covered conductor is selected for circuit segments with fewer trees since the cost of maintaining such overhead assets are lower. Since covered conductor has been a recent engineering mitigation measure deployed by IOUs, additional time will be required to collect data samples and further analyze the effectiveness of combined mitigations. The IOUs will also conduct further studies to investigate alternative mitigations that involve enhanced vegetation pruning and its lifecycle cost.

The recommendations from the third-party analysis and the white paper are detailed in the Table 11-1.

Table 11-1: Implementation Plan from Third-Party (TP) and White Paper (WP) Results

	Recommendations	Milestones	Timeline
TP01	Standardizing vegetation management data (e.g., inspection and trim records) would provide additional information about the clearances that are achieved more broadly for primary overhead circuits and would allow for more robust analyses of clearance effectiveness.	Fully integrate LiDAR strike tree data into Epoch field data collection software. Update existing inspection and outage investigation data collection process in Vegetation Management System including additional outage codes to specify tree failure causes.	End 2025 End 2026
TP02	Outage investigation reports did not include an estimate of radial clearance at the time of the outage for two of the three IOUs. Adding this estimate to the outage investigation report for all IOUs would provide valuable information to future analyses of clearance effectiveness.	SDG&E is currently tracking this data. No additional implementations are needed.	n/a
TP03	Implement a time-series, grid-type analysis. This analysis will leverage weather and landcover data, dividing utility service territories into grid cells for detailed evaluation over time.	A time-series analysis at a granular asset level can be used for different purposes. This technique has been utilized by SDG&E to quantify the annual outage rate, probability and tree population with enhanced clearance. SDG&E could explore this method to evaluate the outage and growth rate, and minimal clearance at segments or spans level.	End 2027
WP01	It is recommended that each IOU make efforts to implement within their data records the ability to associate outage and ignition investigation information as part of their work activity history.	SDG&E is currently tracking this data. No additional implementations are needed.	n/a
WP02	Utilities may also additionally benefit from the monitoring of vegetation conditions and clearance by leveraging remote sensing technologies, especially those with larger service territories. By collecting higher frequency data over time utilities may identify patterns in vegetation growth and tree health and measure the minimal clearance based on outage and ignition rates associated with specific circuits or segments to enhance situational awareness. This will allow utilities to modify their clearance practices accordingly. Without data collection, opportunities for learning and improvement are reduced.	SDG&E records conditions and clearances on each inventory tree annually during each inspection and pruning activity. SDG&E will explore the following PoC projects to assess additional data analytical capability of remote sensing: Tree health QA/QC audit/ clearance validation	End 2027
WP03	This study recommends identifying locations with historically higher wind gusts and drier fuel conditions to inform of the risk and prioritization of inspection and clearance activities. The strategy should consider location-specific treatments or enhanced clearance practices. Additional mitigation methods should be	Integrate historical wind data into the Epoch field data collection software as a GIS layer. Conduct field surveys to evaluate the hazard tree condition, vegetation contacts, and tree growth models.	Mid 2026 Mid 2026

	Recommendations	Milestones	Timeline
	considered particularly in forest and shrubland areas. Additionally, the establishment of radial clearance at time of pruning should consider multiple factors such as species, growth rate, hazard abatement, industry standards, and tree health.	Explore the application of live fuel moisture content products to more accurately and precisely identify regions of higher relative risk that may require additional non-routine inspection activities. Complete the third-party study with Cal Poly WUI to determine the efficacy of the current fuels management program and scope in mitigating ignitions associated with electrical hardware.	End 2028

12 SDGE-25U-09. THIRD-PARTY CONTRACTOR'S ASSESSMENT OF THE EFFECTIVENESS OF ENHANCED CLEARANCES

12.1 DESCRIPTION

SDG&E and the other large IOUs did not provide their third-party contractor's assessment of the effectiveness of enhanced clearances as required by SDGE-23B-17 (formerly SDGE-23-17). SDG&E stated that an assessment of the effectiveness of enhanced clearances had not been finalized at the time of its 2025 WMP filing.[7]

Discussed in Section 8.2 "Vegetation Management and Inspections" of Energy Safety's Decision on SDG&E's 2023-2025 Base WMP.

12.2 REQUIRED PROGRESS

No later than the submission of SDG&E's 2026-2028 Base WMP, SDG&E must provide[8] the third-party contractor's assessment of the effectiveness of enhanced clearances including, but not limited to, the effectiveness of enhanced clearances in reducing tree-caused outages and ignitions.

12.3 SECTION AND PAGE NUMBER OF ANY IMPROVEMENTS

See Section 13.2.4, p. 297 of the 2026-2028 Base WMP.

12.4 SDG&E RESPONSE

SDG&E's third-party contractor's assessment, the Joint IOU Study on the Effectiveness of Enhanced Vegetation Clearances for Wildfire Management, is provided in Attachment C.

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[7] SDG&E 2025 WMP Update (R2) (clean version, July 5, 2024), p. 104; https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=56955&shareable=true, accessed July 15, 2024

[8] If the third-party contractor's assessment of the effectiveness of enhanced clearances is finalized before the submission of SDG&E's 2026-2028 Base WMP, email safetypolicy@energysafety.ca.gov for direction on submission including the appropriate Energy Safety docket.

Attachment A: Joint IOU Grid Hardening Working Group Report: Update for 2026-2028 Wildfire Mitigation Plan

Joint IOU Grid Hardening Working Group Report:

Update for 2026-2028 Wildfire Mitigation Plan

[3/19/2025]
Submitted on behalf of the following:

Southern California Edison Company (SCE)
San Diego Gas & Electric Company (SDG&E)
Pacific Gas and Electric Company (PG&E)

Introduction

In the final decisions for 2025 Wildfire Mitigation Plan (WMP) Updates for the Joint Investor-Owned Utilities (IOUs), the Office of Energy Infrastructure Safety (Energy Safety) issued an Area for Continuing Improvement (ACI) requiring the continuation of joint grid hardening studies from the 2023-2025 Base WMP. The ACI was identified as follows in the decisions for each utility:

- SCE-25U-03
- SDGE-25U-04
- PG&E-25U-03

This report serves as the Joint Utility response to the ACI. The language from the ACI is presented in italics, with the Joint Utility response presented in non-italics.

In many sections of this report, the Joint Utilities have presented a unified response to provide Energy Safety and other stakeholders with a combined narrative. The Joint Utilities note that each utility's individual practices may vary, both in the present day and in the future. As such, statements in this report about how the Joint Utilities approach specific issues or situations should be taken with the understanding that variations at each utility may exist.

ACI Description

Continuation of Grid Hardening Joint Studies

As directed in the 2023-2025 WMP Decisions, the IOUs have made progress on the areas for continued improvement related to the continued joint IOU grid hardening working group efforts. Energy Safety expects the IOUs to continue these efforts and meet the requirements of this ongoing area for continued improvement.

ACI Required Progress

In its 2026-2028 Base WMP, [each utility] must continue to collaborate with the other IOUs to evaluate various aspects of grid hardening and provide an updated Joint IOU Grid Hardening Working Group Report. This report must include continued analysis for the following:

(continued on following page)

Topic #1: Covered Conductor

1.1 The IOUs' continued joint evaluation of the effectiveness of CC for reducing ignition risk, PSPS risk, and outage risk associated with protective equipment and device settings. This evaluation must include analysis of risk reduction observed in-field as well as research on CC degradation over time and its associated lifetime risk mitigation effectiveness.

The Joint Utilities conduct a California Utility Wildfire Risk Reduction meeting on a monthly basis. Covered conductor (CC) is discussed as part of this meeting. This section details the evaluation of CC for reducing risks associated with protective equipment and device settings.

1.1.1 Ignition risk

SCE

As outlined in earlier WMPs, each utility's CC program varies due to factors such as location, terrain, and existing overhead facilities. Additionally, each utility has unique ignition frequencies, risk drivers, and deployment volumes. These characteristics, among others, lead to variations in data, calculations, and methods for estimating effectiveness. At SCE, CC is the primary mitigation implemented for Overhead Hardening, except in cases in which the level of risk is sufficiently high to merit undergrounding the lines (please see SCE's Integrated Wildfire Mitigation Strategy as described in its WMP Section 5).

SCE's mitigation effectiveness for its Wildfire Covered Conductor Program (WCCP) program is estimated to be 60 percent (see discussion in SCE's 2026-2028 WMP, Chapter 5). This value is based on testing, ignition data, experience, benchmarking, and Subject Matter Expert (SME) judgement. SCE completed extensive third-party CC testing in 2022, as provided in the 2023-2025 Joint IOU Covered Conductor Working Group report.

PG&E

PG&E's overhead hardening program consists of primary and secondary CC replacement along with pole replacements, replacement of non-exempt equipment, replacement of overhead distribution line transformers, framing and animal protection upgrades, and vegetation clearing. Although the focus of this request is CC, PG&E's efforts to estimate effectiveness include all elements of our Overhead Hardening program, which is more complete than CC alone.

As detailed in Section 8.2.1 of PG&E's 2026-2028 WMP, based on historical analysis of ignitions, PG&E estimates the effectiveness of CC at reducing ignition risk in the PG&E service territory to be 67 percent. When combined with Enhanced Power Line Safety Settings (EPSS) and Downed Conductor Detection (DCD), PG&E estimates the ignition risk reduction effectiveness increases to 79 percent.

SDG&E

In 2025, SDG&E calculated CC effectiveness using ignitions and evidence of heat data from 2019 to 2024. Outputs of CC testing and benchmarking with the Joint Utilities were also utilized to update the effectiveness of CC at preventing ignitions from risk drivers. The effectiveness of CC varies based on the wildfire risk driver. When combined with other mitigations such as falling conductor protection and early fault detection, overall ignition reduction for all risk drivers is 56.7 percent. By applying these findings to actual ignition counts, SDG&E estimates that the use of covered conductors is 44 percent effective at reducing wildfire risk.

1.1.2 PSPS risk

Due to CC's ability to reduce the risk of contact from foreign objects, wind speed de-energization thresholds on fully covered circuit segments can be raised from National Service Wind Advisory levels (31 mph sustained wind speed and 46 mph gust wind speed) to National Weather Service High Wind Warning levels (40 mph sustained wind speed and 58 mph gust wind speed). However, wind speed thresholds for de-energization of covered conductor segments vary due to each utility's risk tolerance and the unique circumstances impacting each PSPS event.

As part of their processes, the Joint Utilities analyze circuits impacted by PSPS. If the analysis shows that future de-energizations can be mitigated by CC, then CC will be considered. Additionally, analysis is now proactively performed on circuits that are at risk for PSPS but have not yet been impacted. CC will be considered for deployment on these circuits as necessary pending the results of the analysis.

1.1.3 Outage risk associated with protective equipment and device settings

The Joint Utilities deploy protective equipment and device settings in conjunction with CC, such as EPSS for PG&E, fast curve for SCE, or Sensitive Relay Profiles (SRP) for SDG&E.

CC may not have a direct impact on the outage risk associated with protective equipment and device settings. For example, even though CC may decrease the likelihood of transient level faults experienced by the utility, it could also increase the likelihood of a downed wire that would not be de-energized by standard device setting practices. Therefore, the utilities are continuing to develop and implement new devices and methodologies for clearing what would be experienced as open-wire scenarios.

PG&E

See Sections 5.1.1 and 8.7.1.1 of PG&E's 2026-2028 WMP for discussion of outage risk and protective equipment.

SDG&E

See Section 4.1.2 and 4.1.4 for SDG&E's utilization of protective equipment and section 5.1 for analysis on mitigations deployed in combination with CC.

SCE

See Section 8.2.8, 8.7.1, 8.7.2, and 10.3.1. for SCE's discussion of sectionalizing and protection devices and settings.

1.1.4 *Risk reduction observed in-field*

The Joint Utilities have continued to refine their data and methods to measure the effectiveness of CC in the field. Factors such as outage data, scored by SMEs and based on qualitative criteria (e.g. Equipment Type, Basic Cause, Outage Driver, etc.), are used to measure the effectiveness of CC in the field. Promising studies are underway with major California universities to monitor and produce meaningful observed effectiveness results, including the use of Bayesian inferences; however, data availability is a constraint given the relative novelty of CC installation programs. Ideally, SME-based assessment of effectiveness will not be relied on long term, but limited real-world observations of CC will support the assumptions used. For example, PG&E has experienced two ignitions involving CC. Both incidents experienced large vegetation failures that broke through the CC, resulting in wire down incidents that ignited ground fuels. Although both incidents occurred in locations where CC was installed, the vegetation failures were so large that the hardened circuit was not able to withstand the contact. These events reinforce PG&E's methodology of "medium" effectiveness for tree fall-in associated with wire on object and wire on ground ignitions.

PG&E

PG&E's overhead hardening program consists of primary and secondary CC replacement along with pole replacements, replacement of non-exempt equipment, replacement of overhead distribution line transformers, framing and animal protection upgrades, and vegetation clearing. Although the focus of this request is CC, PG&E's efforts to estimate effectiveness include all elements of our Overhead Hardening program, which is more complete than CC alone.

Determining whether a specific event could result in an ignition depends upon a wide variety of factors, including the nature of the event itself and prevailing environmental conditions (e.g., weather, ground moisture level, time of year). As PG&E does not have complete information to make this determination for each event, estimating overhead hardening effectiveness relies upon several assumptions. Most distribution outages (momentary and sustained) typically involve a fault condition. Thus, for purposes of estimating overhead hardening effectiveness, it is assumed that all distribution outages could potentially result in an ignition, regardless of other prevailing conditions. This approach aligns with what has been previously stated in PG&E's 2023 WMP and 2024 RAMP filing.

In 2023, PG&E re-evaluated the SME effectiveness designations and adjusted the estimated ignition effectiveness of CC in a few key areas based on an assessment of the Joint IOU grid hardening testing results. While this is expected to be an ongoing process, effectiveness values have been refreshed based on updated designations and the data as follows:

- Tree fall-in associated with wire on object and wire on ground changed from “none” (not effective) to “medium” (some effectiveness). While other IOUs considered a higher effectiveness than PG&E, as discussed above, there are trees in our service territory large enough to damage CC and as such, CC does not have as substantial an increase in effectiveness.

- Contact from Object Vehicle changed from “none” (not effective) to “medium” (some effectiveness). PG&E agrees with other IOUs that CC has some limited benefit. Given that PG&E is installing larger poles to support CCs, the larger poles have the potential to sustain more impact from vehicle than existing infrastructure.

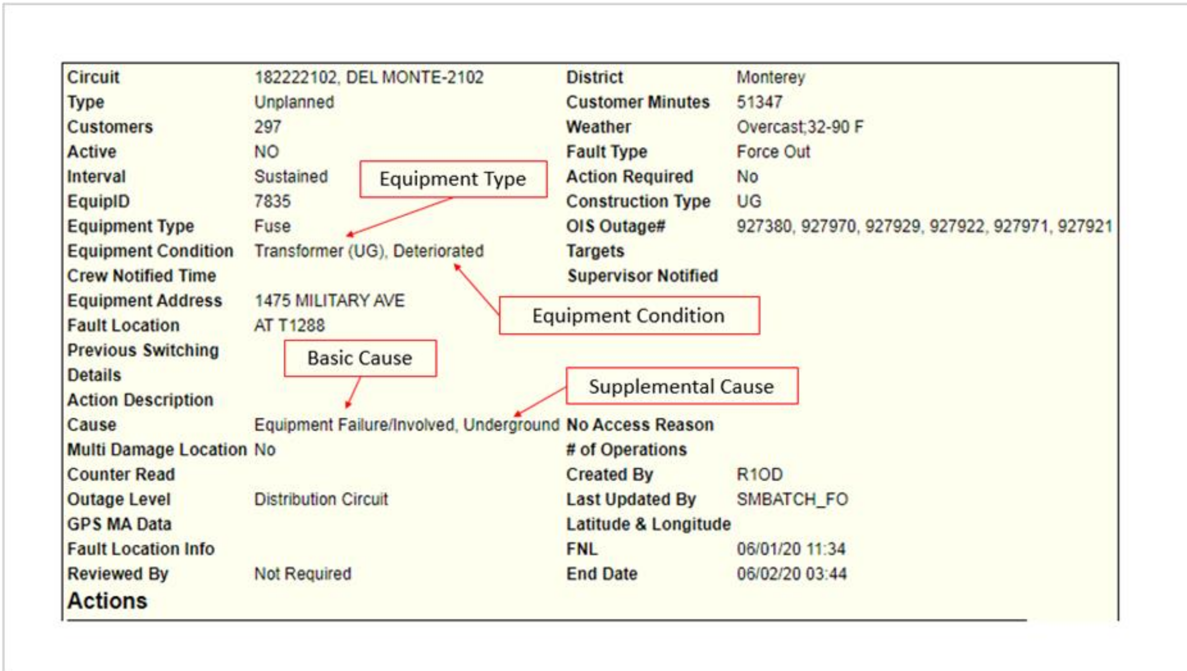
- Animal caused outages associated with conductor contact changed from “none” (not effective) to “All” (very high effectiveness). Testing on the covering material of CCs showed a high resiliency to damage. Also, PG&E found that the insulating properties of the covering did not diminish significantly when damaged. Therefore, PG&E has increased CC effectiveness for mitigating damage caused by animals such as squirrels and birds.

In the 2024 update, the analysis was updated to be more granular, and additional mitigation alternatives, including undergrounding, were added as a consideration. Given the many combinations of outage types seen on PG&E’s system, SMEs highlighted the need to differentiate effectiveness in a more granular level for some of the outage conditions. Therefore, qualitative categorization levels used in the analysis were increased from five (All, High, Medium, Low, None) to seven (All, Very High, High, Medium High, Medium, Low, None).

PG&E’s approach to calculating estimated effectiveness of CC is detailed below:

1. SMEs identified approximately 100,000 distinct outages between 2015 and 2024 by using all known combinations of basic cause, supplemental cause, equipment type, and equipment condition from the distribution outage database, shown in Figure 1. Whenever an outage is reported, an operator enters the required information about the outage. Through SME evaluation, it was decided that a combination of the four aforementioned combination fields provide an appropriate distinction of different outage types.

FIGURE 1: PG&E DISTRIBUTION OUTAGE DATABASE RECORD



Circuit	182222102, DEL MONTE-2102	District	Monterey
Type	Unplanned	Customer Minutes	51347
Customers	297	Weather	Overcast;32-90 F
Active	NO	Fault Type	Force Out
Interval	Sustained	Action Required	No
EquipID	7835	Construction Type	UG
Equipment Type	Fuse	OIS Outage#	927380, 927970, 927929, 927922, 927971, 927921
Equipment Condition	Transformer (UG), Deteriorated	Targets	
Crew Notified Time		Supervisor Notified	
Equipment Address	1475 MILITARY AVE		
Fault Location	AT T1288		
Previous Switching Details			
Action Description			
Cause	Equipment Failure/Involved, Underground	No Access Reason	
Multi Damage Location	No	# of Operations	
Counter Read		Created By	R1OD
Outage Level	Distribution Circuit	Last Updated By	SMBATCH_FO
GPS MA Data		Latitude & Longitude	
Fault Location Info		FNL	06/01/20 11:34
Reviewed By	Not Required	End Date	06/02/20 03:44

Actions

2. SMEs identified whether the presence of CC would eliminate or reduce the potential of an ignition from each outage combination based on the qualitative categorizations below:
    - **All** = Eliminates the likelihood of ignition from a certain type of outage
    - **Very High** = Addresses most outage concerns, but OH construction still has the potential for outage events resulting in an ignition
    - **High** = Significant outage reduction, however still chance that contact failure would result in an ignition
    - **Medium High**= Better than average likelihood of reducing ignitions from a certain type of outage
    - **Medium =** Moderately reduces the likelihood of a certain type of outage occurring resulting in an ignition
    - **Low** = Minimally reduces the likelihood of a certain type of outage occurring resulting in an ignition
    - **None** = Will not affect the likelihood of ignition from a certain type of outage
3. Each qualitative category was assigned a quantitative value, which measured the likelihood of outage reduction:
    - All = 100 percent
    - Very High = 90 percent
    - High = 70 percent
    - Medium High = 60 percent
    - Medium = 40 percent

- Low = 20 percent
- None = 0 percent

4. The above criteria were applied to historical outages, which resulted in the likelihood of outage reduction for each outage.
5. Outages were classified by drivers in alignment with PG&E's current Wildfire Distribution Risk Model (WDRM v4). The outage drivers identified are:
   - Animal (Bird)
   - Animal (other)
   - Animal (Squirrel)
   - Equipment (Capacitor)
   - Equipment (DPD)
   - Equipment (Fuse)
   - Equipment (other)
   - Equipment (Support Structure)
   - Equipment (Switch)
   - Equipment (Transformer)
   - Equipment (Voltage Control)
   - Primary Conductor - Line Slap
   - Primary Conductor - Other
   - Primary Conductor - Wire Down
   - Secondary Conductor
   - Third Party (Balloon)
   - Third Party (other)
   - Third Party (Vehicle)
   - Vegetation (Branch)
   - Vegetation (other)
   - Vegetation (Trunk)

   One additional "Company Initiated" driver was created, but outages associated with this driver are excluded from results of the analysis. This category includes outages such as PSPS events.

6. A Pivot table was then created to aggregate outages in the HFTD. The aggregation was done at the outage driver level and the results are shown in Table 1.

TABLE 1: PG&E COVERED CONDUCTOR MITIGATION EFFECTIVENESS ESTIMATE

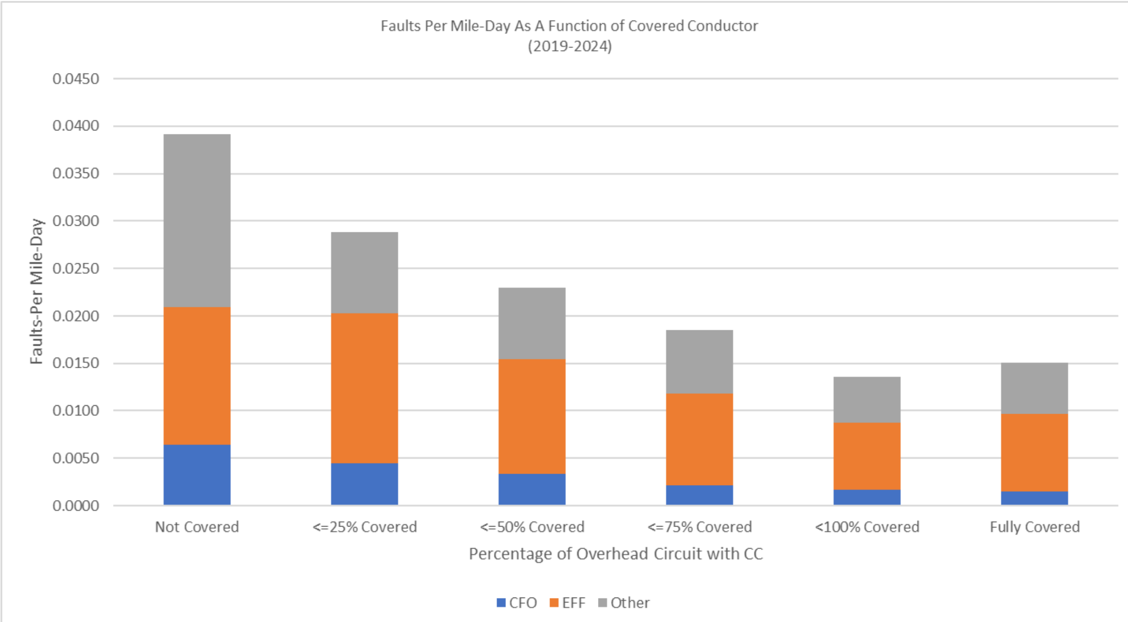
WDRM V4 Driver	Overhead Hardening	UG Primary and OH Secondary	UG Primary and UG Secondary
Vegetation (Branch)	76%	98%	100%
Vegetation (Trunk)	58%	98%	100%
Vegetation (other)	83%	97%	100%

WDRM V4 Driver	Overhead Hardening	UG Primary and OH Secondary	UG Primary and UG Secondary
Animal (Bird)	79%	100%	100%
Animal (Squirrel)	74%	100%	100%
Animal (other)	78%	99%	100%
Third Party (Balloon)	88%	100%	100%
Third Party (Vehicle)	64%	99%	100%
Third Party (other)	52%	71%	73%
Primary Conductor - Line Slap	85%	99%	99%
Primary Conductor - Wire Down	47%	100%	100%
Primary Conductor - Other	74%	100%	100%
Secondary Conductor	50%	50%	99%
Equipment (Support Structure)	73%	100%	100%
Equipment (Transformer)	70%	100%	100%
Equipment (Voltage Control)	32%	96%	98%
Equipment (other)	76%	94%	94%
Equipment (Capacitor)	41%	91%	91%
Equipment (DPD)	40%	97%	98%
Equipment (Fuse)	73%	100%	100%
Equipment (Switch)	81%	99%	99%
Grand Total	67%	98%	99%

SCE

SCE tracks fault rates on overhead distribution circuits with 100 percent CC installed, circuits that are partially covered, and circuits with no CC installed (bare wire). The data can be broken down by fault sub-drivers such as Contact from Object, Equipment/Facility Failure, and Other. The data is based on all circuits that traverse the HFTD and includes a breakdown of how many miles there are in the fully covered, partially covered, and not covered categories. Because it is difficult to determine if faults on partially covered circuits occurred on the covered or bare portion, SCE further delineated this data into the following partially covered groups: less than 25, 25 to 49, 50 to 74, 75 percent, and less than 100 percent. Furthermore, SCE is now using a faults-per-mile-per-day method that factors in how long the circuit was fully or partially covered. Faults-per-mile-per-day data from 2019 to 2024 are shown in Figure 2.

FIGURE 2: FAULTS PER MILE PER DAY AS A FUNCTION OF CC



There are currently no changes to the near-term approach for evaluating effectiveness. SCE will continue to track and analyze ignition events and may leverage this data to refine current assumptions for estimated effectiveness.

1.1.5 Research on CC degradation over time and its associated lifetime risk mitigation effectiveness

Over the last few years, the Joint Utilities have conducted extensive testing on CC. These tests included third-party testing in 2022, which included contact-from-obvious testing, wire down, flammability, and water ingress. In addition, the Joint Utilities require manufacturers to perform ultraviolet resistance and track resistance testing (to prevent covering degradation caused by electrical charges on the outer portion of the CC covering).

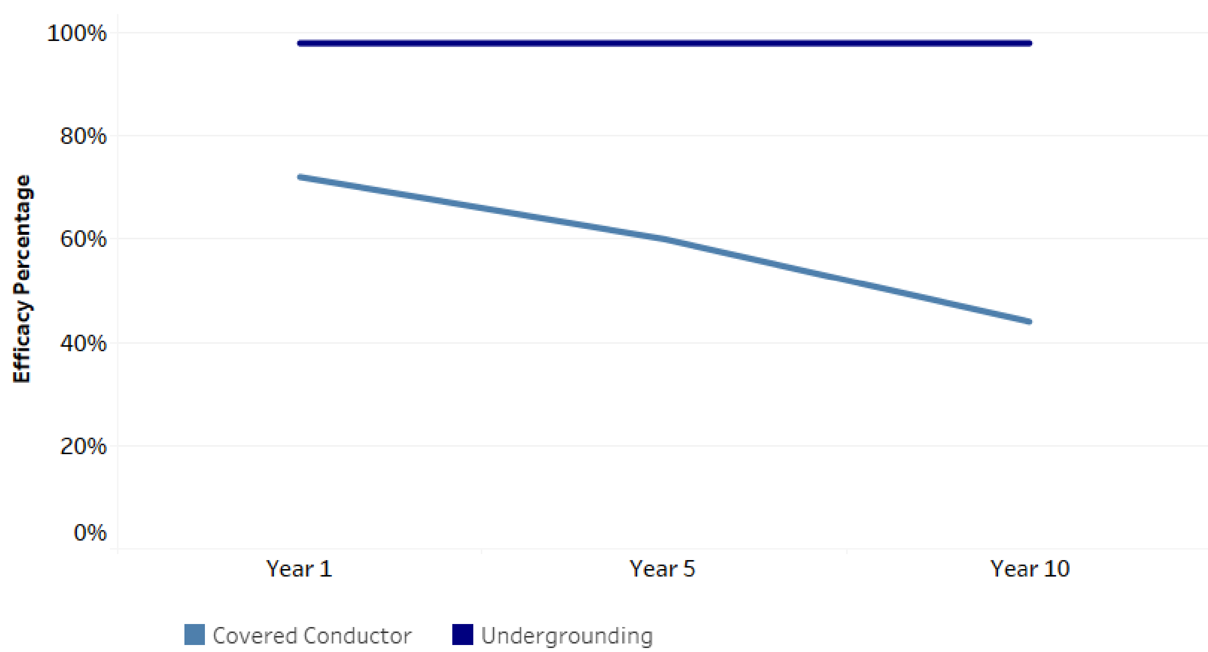
Based on tests, benchmarking information, and manufacturer feedback, SCE estimates the useful life of CC to be 45 years. SCE does not expect a reduction of mitigation effectiveness for CC within these 45 years.

PG&E utilizes 48 years as the estimated service life for CC, which aligns with industry information citing an expected service life in the range of 30 to 50 years. PG&E has a large service territory with varying environmental conditions that impact equipment aging and degradation in different ways. For example, testing results indicate that equipment degradation can be increased in damp locations, such as the coast where fog is more common. Therefore, PG&E does not have an estimated service life for CC. However, 30-50 years is the expected service life according to industry information.

SDG&E

The effectiveness of CC against various equipment failure risk drivers was reduced in 2025 for several reasons. Originally, the estimated effectiveness was derived using a year-over-year approach. Effectiveness was defined as the immediate protection gained from performing the CC installation, which replaces aging or damaged equipment with new equipment. However, because these effectiveness numbers are being utilized for long-term investment planning, it is more appropriate to utilize a long-term effectiveness number for risk drivers. While CC installation replaces aging equipment, covered conductors will also age and degrade, reducing the effectiveness of the original installation over time. To address this issue, previous studies on the effectiveness of traditional (bare conductor) hardening were used to estimate the effectiveness of CC on equipment failure risk drivers over time. As shown in Figure 3, traditional hardening had an estimated effectiveness of approximately 65 percent in the first year that decreased over the course of 10 years to 39 percent. Because of the similarities in equipment being replaced during covered conductor and traditional hardening initiatives, the 10-year recorded effectiveness of 39 percent for traditional hardening effectiveness against equipment failure risk events was also used to calculate CC effectiveness for the same equipment failure risk drivers, resulting in a decrease in covered conductor efficacy from 72 percent in the first year to 44 percent after 10 years.

FIGURE 3: HARDENING EFFICACY OVER TIME



Combined Mitigation Effectiveness Updated CC effectiveness values were utilized to study the combined effectiveness of CC with the Advanced Protection initiatives of FCP and EFD. Much like CC installations, FCP installations are new and therefore no recorded data is available for calculating effectiveness. Therefore, subject matter expertise from the System Protection and Controls Engineering (SPACE) team was utilized to estimate their effectiveness. EFD was calculated using data as described in ACI-SDGE-25–

05 (see SDG&E's 2026-2028 Wildfire Mitigation Plan, Appendix D). When combining mitigations, the following formula was used (in collaboration with the Joint Utilities):

$$Combined\ Effectiveness = 1 - [(1 - CC\ Efficacy) \times (1 - FCP\ Efficacy) \times (1 - EFD\ Efficacy)]$$

$$1 - [(1 - 44\%)] \times (1 - 8\%) \times (1 - 16\%) = 56.7\%$$

The overall efficacy of CC conductors is estimated to be 44 percent and the overall efficacy of CC combined with FCP and EFD is estimated to be 56.7 percent.

Topic #2: Undergrounding

2.1 The IOUs' joint evaluation of the effectiveness of undergrounding for reducing ignition risk, PSPS risk, and outage risk associated with protective equipment and device settings. This evaluation must account for any remaining risk from secondary or service lines and analysis of in-field observations from potential failure points of underground equipment.

The Joint Utilities continued to meet quarterly in 2023 and 2024 to share information and lessons learned regarding undergrounding within California and to participate in efforts to share and learn from utilities implementing underground programs outside California. In August 2023, PG&E and SDG&E participated in an Electric Power Resource Institute (EPRI)-sponsored 2-day in-person session with utilities from across the country to discuss topics such as undergrounding program motivations, operations, challenges, and efficiencies. In April 2024, PG&E published an undergrounding benchmarking report that discussed program approaches and trends for 11 electric utilities, including all three California IOUs. See Section 2.2 for details on this report.

Because every utility considers unique factors for selecting undergrounding, as well as environmental factors contributing to the feasibility and effectiveness of undergrounding, data and lessons learned from one utility are not always applicable to other utilities. However, the California utilities intend to continue meeting regularly to ensure communication and sharing of information and will apply lessons learned whenever applicable and participate in national undergrounding-related information-sharing opportunities.

2.1.1 Joint Evaluation of effectiveness of undergrounding for reducing Ignition risk:

Among the Joint Utilities, the estimated effectiveness of undergrounding at reducing ignition risk in a given location ranges from 94 to 99 percent. While the joint utilities' effectiveness rates are highly aligned and indicate that undergrounding is very effective in reducing ignition risk, the exact figures vary slightly due to differences in assumptions and methodologies used to calculate effectiveness values, differences in territory topography and weather, and differences in data, such as outage type and frequency, for past outages and ignitions.

PG&E estimates the ignition mitigation effectiveness of undergrounding primary powerlines to be approximately 98 percent and approximately 99 percent if both the primary and secondary services are undergrounded. Effectiveness is derived by using outages as a proxy for ignitions as well as subject matter expertise. PG&E provides additional information on calculating mitigation effectiveness in its 2026-2028 WMP, Section 8.2.1.

2.1.2 Joint Evaluation of effectiveness of undergrounding for reducing PSPS risk

PG&E

Beyond PG&E's projects targeted to reduce PSPS, lines that are undergrounded may be exempt from PSPS activity as the underground lines themselves do not pose an ignition risk during the extreme weather conditions that drive PSPS events. However, it is challenging for PG&E to provide a PSPS risk effectiveness value for undergrounding because the PSPS effectiveness of undergrounding in any particular location depends on whether, and how much of the upstream and downstream line sections have been undergrounded. For example, undergrounding may not eliminate PSPS risk for customers directly connected to an underground section of a circuit if the undergrounded section remains connected to an overhead line (either upstream or downstream) in a High Fire Risk Area (HFRA) that is subject to PSPS. While overhead hardening does not automatically exempt a location from a PSPS event, the hardened status of a line, and of any overhead upstream and downstream lines, is considered in the analysis that determines which lines are scoped into a PSPS event. As PG&E completes additional undergrounding and underground sections are connected, more PSPS risk will be mitigated.

SCE

SCE has not quantified the effectiveness of Targeted Undergrounding (TUG) on PSPS risk. However, SCE would no longer have PSPS as the line is now underground, but someone on a UG circuit could potentially be subject to PSPS if they are downstream of a segment that is de-energized and SCE can’t otherwise section them off.

SDG&E

SDG&E subject matter experts from Meteorology, Fire Science, Engineering, and Risk Analytics groups are currently assessing the effectiveness of existing underground infrastructure considering the most recent fire weather conditions experienced in SDG&E's service territory from November 2024 to January 2025. This evaluation aims to determine the frequency and duration of SDG&E’s most recent PSPS de-energizations on underground segments and identify any necessary improvements to SDG&E’s risk models.

In addition, subject matter experts are evaluating the criteria for selecting future undergrounding projects based on the hardening status of upstream and downstream feeder segments. With this new approach, SDG&E aims to maximize PSPS risk reduction while balancing ignition risk reduction in the most cost-effective manner.

2.1.3 Joint Evaluation of effectiveness of undergrounding for reducing outage risk associated with protective equipment and device settings

PG&E analyzed the reliability performance of circuit sections where System Hardening Undergrounding work was performed in 2022 and 2023 to quantify overall improvements to service reliability. The analysis included approximately 750 outages between 2021 and 2024 and showed an approximate 90 percent reduction in faults that resulted in sustained outages.

2.1.4 How the effectiveness evaluation accounts for remaining risk from secondary or service lines

SDG&E

SDG&E’s undergrounding program is inclusive of primary, secondary and service lines, thus limiting risk from secondary or service lines remaining overhead.

PG&E

While PG&E’s distribution undergrounding program currently includes primary powerlines and secondary lines that run parallel to the primaries, PG&E expects that when the undergrounding program is transitioned to the EUP it will include some secondary and service lines in addition to primary lines in the HFTD. PG&E provides mitigation effectiveness values for Undergrounding All, which includes primary distribution lines, secondary lines, and services in PG&E’s 2026-2028 Base WMP, Table PG&E 8.2.1-3, Section 8.2.1.

SCE

SCE’s program currently focuses on undergrounding primary conductor and does not underground lateral secondary lines and service conductors. As such, SCE has not developed effectiveness values for secondary/service risk. For SCE’s TUG program, secondaries will be included as part of the scope when possible and services are not part of the TUG scope.

2.1.5 How the effectiveness evaluation accounts for in-field observations from potential failure points of underground equipment

PG&E tracks data from ignition events and other failures by underground distribution infrastructure equipment. Data is analyzed and used to make updates to equipment and process standards. If relevant to wildfire mitigation effectiveness, updated standards may be leveraged to refine assumptions for estimated effectiveness of undergrounding in preventing wildfire ignitions. However, this data does not directly impact effectiveness values because failure modes of underground equipment are not typically affected by factors that are associated with wildfire risk. For example, extreme high wind conditions, which can be associated with higher ignition risk, do not trigger failures in underground lines because the lines are underground and thus not impacted by wind.

2.2 The IOUs’ joint evaluation of lessons learned on undergrounding applications. These lessons learned must include use of resources (including labor and materials) to accommodate undergrounding programs, any new technologies being applied to undergrounding, and cost and associated cost effectiveness efforts for deployment.

Lessons learned regarding undergrounding have been discussed among the Joint Utilities during quarterly meetings held throughout 2024. The following lessons learned were noted in those discussions:

1. Managing resources requires a clear understanding of the scope of work and overall workplan to ensure the appropriate allocation of internal resources versus contractors. Ensuring the right resource balance between the two can optimize cost and efficiency.

2. Continuing to test and deploy new technologies is an effective way to improve productivity and reduce unit costs, particularly when paired with innovative construction approaches.
3. Proactive planning was identified as important, particularly in identifying potential challenges, such as encountering hard rock, that can significantly impede construction progress and contribute to cost overruns.

Each of these lessons learned could lead to revised practices that will minimize delays, cost overruns, and resource inefficiencies. To reinforce the need to improve upon these areas, the Joint Utilities continue to discuss these topics regularly.

In late 2023, PG&E and SDG&E participated in a 2-day EPRI workshop with over 10 utilities from across the United States to discuss electrical undergrounding programs and lessons learned. The workshop covered key challenges as well as solutions and best practices on a variety of undergrounding topics. Key challenges identified by workshop participants included:

- Obtaining easements and permits
- Geological challenges, such as granite and sand hills
- Paving requirements and coordination with local governments
- Material supply chain delays
- Managing project cost

Workshop participants explored solutions and lessons learned, including:

- Less invasive trenching (including shallow trenching and micro-trenching)
- Comprehensive contract bidding
- Best practice collaboration and communication with local government and permitting agencies
- Standardizing material components to simplify design, purchasing and installation

In April 2024, PG&E published its benchmarking study that evaluated 11 electric utility strategic undergrounding programs[1]. Strategic undergrounding programs are defined as those in which the utility chooses electric assets to underground with a goal of mitigating safety, reliability, or other risks. The participating utilities represent geographic regions across the United States and have strategic undergrounding programs in various stages of development. Collectively, these utilities serve more than 60 million customers.

[1] The 11 participants include PG&E and two other California electric utilities.

The purpose of this undergrounding benchmarking study was to learn how different utilities across the United States are approaching strategic undergrounding in their service areas and to identify trends and lessons learned. Overhead system hardening programs were not addressed in the study. Participating utilities responded to an online survey and participated in follow-up phone interviews. The study focused on the following issues: (1) the scale and scope of undergrounding; (2) utilities' motivation to underground and site selection approach; (3) costs and cost containment; (4) customer engagement; and (5) technical standards and operations.

Key takeaways and lessons learned included

- Scale and scope of undergrounding programs
    - Participating utilities' programs vary in scale, from established programs that have converted more than 1,500 overhead miles to underground to small pilots
    - Most utilities are undergrounding primary distribution lines, secondary distribution lines, and service lines, although some are pursuing alternative strategies such as installing more resilient poles and equipment, vegetation management, and operational mitigations, including power shutoffs.
- Motivation and site selection
    - Utilities in the South and Midwest cited reliability and/or resilience to weather events as their main motivations for strategic undergrounding. Utilities in the West primarily use their undergrounding programs to reduce wildfire risk.
    - Utilities selected sites based on metrics related to their motivation for pursuing strategic undergrounding: reliability metrics in the South and Midwest and wildfire risk in the West.
- Cost and cost containment
    - Unit costs are highly variable and are affected by factors such as terrain and population density. On the whole, Southern and Midwestern utilities see lower costs than Western utilities.
    - Several utilities noted negative impacts resulting from a constrained supply of pad mount transformers in the second half of 2023.
    - Utilities noted that economies of scale (e.g., contracting, design, and workforce considerations) have helped contain costs.
- Customer engagement
    - Utilities noted that obtaining easements can be challenging, but customer outreach and education can help.
- Technical standards and operations
  - Depth and method of cover above the undergrounded lines were fairly standard across utilities surveyed, at 30 to 36 inches, and most utilities pull cable through conduit rather than direct burying electric cables.

The report is publicly available here: https://www.pge.com/assets/pge/docs/outages-and-safety/safety/undergrounding-benchmarking-report.pdf

Use of resources (including labor and materials) to accommodate undergrounding programs

Materials supply chain issues were identified as key challenges by a number of the utilities in the PG&E's benchmarking study. Limits on the availability of key materials can stop or slow construction work and delays can increase project costs. For example, three utilities with established strategic undergrounding programs commented that a limited supply of pad mount transformers presented challenges and/or caused delays in their undergrounding programs during the second half of 2023; two of those utilities highlighted supply chain issues as the top challenge facing their programs. In addition, two utilities with undergrounding programs in the pilot stage reported that supply chain issues challenged their programs.

Effective management of labor resourcing has been a topic discussed in quarterly meetings. Utilities have shared lessons learned regarding how unproductive time can create cost challenges for a program and how schedule management and use of labor resources can help alleviate this issue. For example, utilities discussed the importance of managing contract resources to align with the timing and scale of planned work and to be able to offboard contract labor when scheduled work is decreased or delayed due to weather or other conditions.

2.3 New technologies being applied to undergrounding

The Joint Utilities are evaluating Ground Level Distribution Systems (GLDS), which may provide an alternative to traditional underground systems. This technology involves installing facilities at the ground level, removing the need to bury the cable in areas where difficult terrain that makes traditional undergrounding infeasible.

PG&E's Undergrounding Innovation team identifies new undergrounding technologies to understand their potential effectiveness and value to the program. Examples of new technologies PG&E is applying to its undergrounding program include:

- **Fluid Free Boring Technologies**: While horizontal directional drilling (HDD) is a valuable installation method, disposal of the resulting large quantities of mud presents cost and logistical challenges in remote areas. PG&E is pursuing multiple technologies that reduce or eliminate the production of mud as a result of drilling.

- **Automated Utility Design**: New smart design tools can be used to calculate characteristics such as voltage drop, cost, and parts needed on the fly as a design is created. By using this software to calculate these characteristics, cycle times and errors that would require design rework can be reduced.

- **Spider Plow**: This installation method for rough terrain can install multiple conduits without the need for an excavated trench, even when an area can only be accessed by bulldozer. Spider plow can efficiently install reels of conduit in terrain that would be high cost for conventional means of construction.
- **Augmented Reality (AR) Tools**: These tools can create more transparency with customers by providing three-dimensional visuals of work that will take place on a customer's property. This transparency provides greater understanding of the undergrounding work and the end result, improving the customer experience and reducing the need for redesigns.

SDG&E

SDG&E is evaluating various technologies to enhance the efficiency of wildfire mitigation. These technologies aim to strengthen fire prevention efforts, improve situational awareness, and enhance response capabilities in high-risk areas. For example:

1. GLDS: SDG&E is exploring the use of GLDS, ideal for areas where underground conversions are difficult, such as rocky terrains, environmentally sensitive regions, or challenging field conditions. This technology features durable above-ground trays that hold distribution conductors and are then encased in epoxy resin concrete for added resilience. To evaluate the effectiveness of GLDS in various scenarios, SDG&E plans to construct a test setup and conduct a pilot project. SDG&E is partnering with the Electric Power Research Institute (EPRI) to further test this technology.
2. Mobile application for improved communications with property owners: SDG&E is exploring the use of mobile applications to enhance communication with property owners. Through the use of artificial intelligence and machine learning, property owners can view an augmented reality visual representation of how their property will look after the installation of electric equipment such as transformers or junction boxes. This technology will give property owners a better understanding of the impact of installed equipment during an underground conversion project, helping them make more informed decisions about granting easements to the utility.
3. Improved process for handhole installation in high altitude areas: When above surface land rights and/or geography limits the ability to install padmounted structures, sub surface handholes are installed. To prevent collisions between handhole covers and snowplowing vehicles in high-altitude areas, particularly on unpaved county roads, SDG&E has successfully implemented a new handhole installation method utilizing soil stabilization materials. This approach enhances the durability of handholes while protecting both the covers and snowplowing equipment.

4. Microgrids: SDG&E is evaluating microgrid solutions as an alternative to overhead power lines, particularly for circuits that serve minimal loads like well pumps or antennae. If a load analysis confirms that the microgrid can reliably support these applications, SDG&E considers removing the overhead lines, reducing wildfire risk and infrastructure maintenance needs.

For SCE, refer to the ground level duct system, referenced in Chapter 8 of the 2026-2028 Base WMP.

2.3.3 Cost and associated cost effectiveness efforts for deployment

A key finding from the PG&E benchmarking study was that unit costs are highly variable and are affected by factors such as terrain and population density. Unit cost information shared by seven utilities with established strategic undergrounding programs was analyzed. [2]Multiple utilities reported that undergrounding costs can vary widely from project to project, and ranges given for a "typical" project may not capture the full variability. The seven utilities reported typical undergrounding unit costs that varied from approximately $300,000 to more than $3 million per overhead mile removed (all costs are presented in 2023 USD). Costs may have limited comparability across and even within utilities because indirect costs may be allocated differently by different utilities, costs differ by the type of asset being undergrounded[3] and method of construction,[4] and smaller, more nascent programs may face higher costs than larger, more established programs.[5] Other themes that drive cost variation include:

- **Terrain**. Four utilities noted that terrain features including hard rock, flood plains, water crossings, or soil type can affect ease and cost of construction. One utility noted that encountering unanticipated hard rock can increase costs because the project cannot be executed as originally designed. When asked to rank the top challenges facing their strategic undergrounding programs, five[6,7] utilities ranked physical topography among the top two.

- **Population density and customer load base**. Two utilities noted that undergrounding costs are higher in more densely populated areas, and a third noted higher costs in areas where customer load base is higher. A fourth utility noted that the need to obtain more easements can drive project costs up and that the use of existing easements where possible can help contain costs.

[2] Because smaller or pilot programs unit cost estimates are based on at most a few completed miles, they were not included in this analysis. In addition, one utility with an established program declined to share unit cost estimates.
[3] For example, one utility noted that the cost of undergrounding a single-phase line was approximately 40 percent lower than that of undergrounding a 3-phase line, and that a 3-phase, large conductor line cost approximately 30 percent more to underground than a standard 3-phase line.
[4] For example, as noted by one utility, directional boring had higher costs than trenching.
[5] Programs in the pilot phase are excluded from this analysis due to the potential for higher costs than established programs.
[6] The utility that did not report its unit costs is included in this analysis.
[7] Including PG&E.

- **Region**. Typical undergrounding unit costs varied between $300,000 to less to $1.7 million per overhead mile removed among Southern and Midwestern utilities. Western utilities[8] reported costs to date generally varied from $2.0 to $3.7 million per overhead mile removed, but one projected that future costs could rise to as much as $4.6 million per overhead mile removed.

The eight utilities with established strategic undergrounding programs[9] were asked about strategies they have used to contain costs. Common themes included:

- ***Building economies of scale.*** Three utilities[10] noted that they achieved cost efficiencies by undergrounding adjacent or nearby segments simultaneously or in sequence. They also discussed finding cost efficiencies through larger-scale purchases or longer-term contracts or providing contractors with a consistent level of work to enable them to maintain a steady workforce level.

- ***Unit pricing and other contract considerations.*** Five utilities described contracting approaches that have helped contain costs. Two reported signing turnkey, unit-priced contracts with vendors. A third reported it is moving toward fixed pricing and currently limits change orders. A fourth noted that it is negotiating construction allowance agreements to limit unanticipated costs. A fifth noted that competitive bidding has generally helped drive undergrounding costs down. One utility further noted that it tracks contractor performance metrics such as on-time completion of work.

- ***Design considerations.*** Six utilities[11] noted that efficient or careful system design, exploring alternative design options, and ensuring design-build alignment can help contain costs.

- ***Depth of cover and method of trenching.*** Two utilities noted that they have reduced depth of cover (also referred to as trench depth) where possible as a cost containment strategy; another noted that shallower trenches could work in some locations and was in the process of piloting this strategy.[12] A fourth utility reported that its use of directional boring, rather than trenching, may increase costs.

[8] Including PG&E.
[9] Utilities included were those with large or moderately-sized programs, including the utility that did not share unit costs.
[10] Including PG&E.
[11] Including PG&E.
[12] While data on depth of cover was collected from the majority of participating utilities, due to small sample size and the number of other factors that vary between utilities, a clear pattern relating cost and depth of cover did not emerge across participants.

- ***Workforce.*** Two utilities noted the importance of maintaining a qualified skilled workforce to contain costs. Two utilities reported using a project management office to oversee the end-to-end undergrounding process and to identify process efficiencies.

Topic #3: Protective Equipment and Device Settings

3.1 The IOUs' joint evaluation of various approaches to implementation of protective equipment and device settings. This evaluation must include an analysis of the effectiveness of various settings, lessons learned on how to minimize reliability impacts and safety impacts (including use of downed conductor detection and partial voltage detection devices), variations on settings used by IOUs including thresholds of enablement, and equipment types in which such settings are being adjusted.

Beginning in 2019, the Joint Utilities met regularly to discuss various electrical protection and sensor-based methods to mitigate wildfire ignition risk and to exchange lessons learned. Topics of discussion included various protective equipment and device settings deployed by the Joint Utilities. The initial participants were PG&E, SCE, and SDG&E. Meetings have since expanded to include Liberty Utilities, and most recently, PacifiCorp.

The following sections provide a comparison of the various protective equipment and device settings the Joint Utilities have implemented to reduce the risk of wildfire ignitions from utility equipment and mitigate reliability impacts.

3.1.1 Effectiveness of various settings

PG&E

EPSS program effectiveness for the years 2021 to 2023 was calculated by comparing the reduction in ignitions when EPSS is enabled to a baseline timeframe before the Dixie Fire (2021) when EPSS would have been enabled in the same conditions.

Based on this analysis, PG&E found an ignition reduction effectiveness of 74.1 percent in 2021, 68.8 percent in 2022, and 72.7 percent in 2023. In 2024, PG&E adopted a Stratified Effectiveness methodology to understand EPSS effectiveness in reducing the rate of overall ignitions. The current calculated effectiveness based on the new FPI-stratified effectiveness formula is 65.2 percent.

This analysis is explained in greater detail in Section 8.7.1.1 of PG&E's 2026-2028 WMP.

SCE

SCE began using Fast Curve Settings (FCS) in 2018. In June 2022, SCE refined its FCS setting program for application to new and existing installations. FCS is applied in conjunction with recloser relay blocking, which prevents the automatic closing of circuit breakers and remote automatic reclosers following a relay/trip operation. The combined effectiveness of FCS and recloser relay blocking for the years 2021 to

2023 was estimated comparing ignition event frequencies of SCE circuits. Please see Sections 8.2.8 and 8.7.1 of SCE's 2026-2028 for information on setting effectiveness.

SDG&E

SDG&E completed a study to determine the impact of sensitive relay settings at reducing ignitions from risk events downstream of SRP enabled devices. SRP device enable history was examined against the risk events and ignition data from 2015 to 2024, and found zero ignitions by primary faults downstream of devices with sensitive relay settings enabled. This study was detailed in SDGE's 2020-2022 WMP and is updated on an annual basis.

3.1.2 Lessons learned on how to minimize reliability impacts and safety impacts (including use of downed conductor detection and partial voltage detection devices)

Downed Conductor Detection (DCD)

PG&E

DCD technology could improve the ability to detect and isolate high impedance faults before an ignition can occur. PG&E first deployed DCD in 2022 as a pilot that provided an additional protection element to address fault types not yet fully mitigated through the EPSS program. This additional protection is achieved by enhancing the ability to quickly detect and de-energize low and very low initial current (high-impedance) line-to-ground faults before an ignition can occur, which is the primary existing gap in EPSS protection on primary overhead distribution conductors.

During EPSS, DCD is enabled if the device is DCD capable. This feature is highly sensitive, which allows the detection of high-impedance ground faults. However, due to its sensitivity it cannot be coordinated between devices in series. In response to unintended false positive trips with DCD settings, PG&E upgraded the firmware on existing DCD devices to improve the high-impedance fault detection accuracy, which reduced nuisance outage frequency. By the end of 2024, over 500 devices have received updated firmware to improve performance. PG&E will continue to upgrade firmware on remaining DCD devices during the 2026-2028 WMP cycle.

SCE

SCE is refining the fast curve settings but generally is seeing this in a steady-state without major changes since the settings update around 2022-2023 time period.

SDG&E

As discussed in ACI SDGE-25U-05, SDG&E performed an efficacy study on EFD devices, which found that the initial settings of EFD detected many underground faults. Moving forward, EFD algorithms will be fine-tuned to further focus on the detection of overhead incipient faults. See SDG&E's 2026-2028 Base WMP Appendix D for details on ACE SDGE-25U-05.

Partial Voltage Detection Devices

PG&E

To support PG&E's identification and response to high-impedance faults, new data-driven capabilities leveraging the SmartMeter™ network have been implemented. Partial Voltage (PV) Alerts target the 3-wire distribution system with Line-to-Line connected transformers and indicate low SmartMeter Voltage (25 to 75 percent of nominal 240 V).

If partial voltage conditions are detected, Control Center Operators can force out, remotely or locally manually opening a switch or protective device to de-energize the line downstream, an upstream Supervisory Control and Data Acquisition (SCADA) device at the location where multiple partial voltage alarms are received. When a partial voltage alarm indicates low SmartMeter™ voltage on two or more SmartMeter™ devices at the fuse level, the Distribution Control Center Operator can open the next upstream 3-pole gang-operated SCADA device and dispatch response teams to the area of the alarm.

This technology helps PG&E detect and locate a downed wire within minutes, instead of relying on an employee assessment or customer alert. This can reduce the amount of time a downed line is energized, reducing the possibility of an ignition. If an ignition does occur, first responders are able to locate and extinguish it more quickly. A total of 86 partial voltage force outs occurred from 2022 to 2024. These were largely triggered by vegetation or animal contact, which are common fault types that trigger ignitions.

SCE

SCE uses its smart meter voltage alerts and other data sources to identify abnormal circuit conditions and acts to either de-energize circuitry or dispatch crews for further investigation. Meter Alarming for Downed Energized Conductors (MADEC) is a machine learning algorithm utilizing smart meter data to detect a subset of energized wire-downs and other high impedance faults/hazards and generates an alarm that allows an operator to act quickly and de-energize the circuit. MADEC is currently being used throughout SCE's service area. The MADEC system works for both bare wire and CC applications. The MADEC system can limit the total time a downed conductor stays energized after falling, providing potential reduction of ignition risk and public safety benefits.

SCE additionally applies algorithms using voltage data from smart meters can detect small voltage rises associated with shorted turns in the transformer. These algorithms can identify early signs of transformer degradation, to allow proactive equipment replacement prior to complete failure.

Smart meter voltage alarms are also used to dispatch SCE crews to investigate causes of abnormal conditions often helping improve response times to circuit events that may impact customer reliability.

Examples of these conditions are transformer or branch line fuse operations that create customer electric service interruptions.

SDG&E

To support the identification of high impedance faults not tripped by other protective devices, SDG&E has developed a partial voltage detection platform that uses AMI 1.0 voltage readings to determine if there is an active downed wire within minutes. The tool is currently being evaluated by the engineering group for correctness and adjustment to the algorithms. Upon operationalization, this tool will act as a last line of defense to reduce the amount of time a downed line is energized, which will reduce the safety risk to the public and reduce the possibility of the downed conductor causing an ignition. If an ignition does occur, the location will be easily identifiable, allowing first responders to extinguish it more quickly.

3.1.3 Variations on settings used by IOUs including thresholds of enablement and equipment types in which such settings are being adjusted

	PG&E	**SCE**	**SDG&E**
Settings Program Name	Enhanced Powerline Safety Settings (EPSS)	Fast Curve (FCS) Settings	Sensitive Relay Profile (SRP) and Sensitive Ground Fault (SGF)
First Deployed	2021	2018	2011
Scope	HFTD, HFRA, and non-HFTD Buffer Zones	HFRA	HFTD and non-HFTD
Equipment Types in Which Such Settings are Being Adjusted	Circuit breakers Line Reclosers Interrupters Fuse Savers	Distribution circuit breakers Remote controlled automatic reclosers	Some feeder circuit breakers starting in 2025 Line reclosers
Enablement Criteria	In the HFTD and HFRA EPSS is always enabled during peak season on days with a rating of R2 and above, and under certain R1 and R2 conditions during Non-Peak Season: During Peak Season: *R1*: EPSS is enabled if wind speed is >19 mph, relative humidity is <75%, and dead fuel moisture is <9%	FCS are enabled in conjunction with automatic recloser relay blocking. FCS are enabled by using EMS and DMS group controls during the following conditions: • Red Flag Warning issued by the National Weather Service	SRP and SGF are enabled when extreme fire weather conditions or PSPS de-energizations are forecasted.

	PG&E	SCE	SDG&E
	During Winter Posture (Non-Peak Season): *R1*: EPSS is enabled if wind speed is >25 mph, relative humidity is <20%, and dead fuel moisture is <9% *R2*: EPSS is enabled if wind speed is >22+ mph, relative humidity is <25%, and dead fuel moisture is <9% In EPSS Buffer Zones: EPSS enabled during FFW/RFW / mFPC / PSPS adjacent conditions	• Fire Weather Threat declaration made by SCE Weather Service • Fire Climate Zone declaration made by SCE Weather Service • Thunderstorm Threat declaration made by SCE Weather Service	
Note: RFW = Red Flag Warning, FWW = Fire Weather Watch, mFPC = Minimum Fire Potential Conditions			

Topic #4: New Technologies

4.1 The IOUs' continued efforts to evaluate new technologies being researched, piloted, and deployed by IOUs. These efforts must include, but not be limited to: REFCL, EFD, distribution fault anticipation (DFA), falling conductor protection, use of smart meter data, open phase detection, remote grids, and microgrids.

4.1.1 REFCL

The Joint Utilities evaluated the distribution network for applications of REFCL technology to aid with wildfire mitigation efforts.

SCE

See the main discussion on REFCL in chapter 8 of SCE's 2026-2028 WMP.

PG&E

PG&E continues to evaluate performance of REFCL as implemented at the Calistoga substation. In 2025, PG&E will be assessing an additional site for potential REFCL installation that is aligned with the broader underground and overhead hardening strategy for substations located in the HFRA.

SDG&E

SDG&E does not employ REFCL. SDG&E performed a REFCL study from 2020 to 2021. The purpose of the study was to identify the requirements, costs, and benefits of implementing a REFCL scheme at a single transmission-distribution substation feeding 3 distribution circuits in Tier 3. Results of the study showed that the cost to implement REFCL was too significant considering the need for distribution circuit and substation rebuilds. See SDG&E's 2022 WMP Update, Section 4.4.2.10 for details on the full study.

4.1.2 EFD

SDG&E

SDG&E's Early Fault Detection (EFD) Program utilizes two independent technologies to detect incipient faults on the system, with the goal of providing sufficient time to locate and potentially fix or replace equipment prior to it permanently failing. Incipient faults occur on aging and failing pieces of equipment typically long before they fail, sometimes violently, potentially causing damage to the surrounding area.

In 2024, the EFD program focused efforts on developing and optimizing processes and procedures to enable repeatable results and increase production capacity. Key milestones included:

- Revising and publishing overhead construction standard (OHCS) 743. This standard was also converted to a 3D model, allowing users to fully visualize installation best practices.
- Drafting construction standard (UG 7665), which is expected to be published in 2025. Design of ARFS on pad mounted transformers was paused until the standard is fully published.
- Developing a solar assembly for ARFS, enabling installation of sensors at locations where potential transformers did not already exist, and installation of new transformers would be too difficult or cost prohibitive.

In 2025 SDG&E will test a smaller and more cost effective ARFS solution that does not require a full engineering design cycle, rarely requires pole replacements, and is connected directly to the low voltage side of existing transformers using insulation penetrating connectors (IPC). If successful, the program has the potential to quickly increase sensor density and speed of deployment. Additional PQ meters will also be installed on distribution assets, which will increase incipient fault awareness.

PG&E

PG&E has installed EFD sensors on eight distribution circuits (203 locations) in Tier 2 and Tier 3 of the HFRA that are being used to proactively detect incipient equipment conditions. EFD uses the capture of partial discharge events (micro arcing) to detect and isolate early-stage equipment failures, including degrading/damaged conductor, cracked/damage/loose insulators, failing splices, and vegetation encroachment. PG&E is planning on installing approximately 180 sensor locations per year in the 2026-2028 WMP cycle.

4.1.3 DFA

SCE

Between 2019 and 2021, SCE installed 215 DFA units for monitoring HFRA circuits. DFA is a standalone device that is intended to anticipate system failures, although the use of data from other systems can help diagnose or locate some of the alerts from the system. These other systems include Advance Metering Infrastructure (AMI) and Intelligent Electronic Device (IED). Early identification of pre-fault or pre-failure electrical signatures can allow maintenance to be conducted prior to a larger electric system event, helping to reduce ignition or other risks. SCE applied a product from Texas A&M for its DFA applications, however other types of fault recorders or power quality meters could potentially be configured to provide similar capabilities. This technology is presently using traditional voltage and current transformers for collecting measurements. In many cases existing voltage and current transformers at the substation can be configured to these data acquisition systems, helping limit total installation cost.

PG&E

PG&E installed DFA sensors at substations on 96 circuits in Tier 2 and Tier 3 of the HFRA. DFA sensors in combination with Line Sensors, Line Reclosers, SmartMeters, and an in-house Foundry based analytical platform are being used to preemptively detect and isolate latent sources of unknown caused outages to remove the risk of outage recurrence during high wildfire risk periods. PG&E is planning on installing 15 additional circuits each year in the 2026-2028 WMP cycle.

4.1.4 Falling conductor protection

PG&E

As discussed in ACI PG&E-23-07 in PG&E's 2025 WMP Update, falling conductor protection (FCP) is defined as a protective scheme that attempts to de-energize a broken wire before it contacts the ground (or shortly thereafter) to prevent an ignition. This scheme requires sensing devices and communication links, which can be difficult to implement at scale on a distribution system in highly forested terrain. Additionally, to be effective circuit-wide, every lateral branch of the circuit would need a sensing device at the end of the line to be able to detect broken wires before or shortly after they contact the ground, which would be cost prohibitive. Finally, the majority of CPUC-reportable ignitions within HFRA portions of PG&E's service territory occur because of vegetation contact or other external contact, which FCP cannot always mitigate.

However, in certain strategic and high-risk locations, it may be possible to implement a FCP scheme to provide coverage for a targeted section of distribution overhead circuitry. PG&E is currently in the early stages of a pilot initiative to attempt to provide FCP online reclosers over existing cellular connectivity to determine the overall feasibility of this type of solution. Lessons learned, such as cellular connectivity latency, device compatibility, and ignition mitigation effectiveness, will be evaluated as part of this effort.

In the meantime, PG&E will continue to leverage and expand the EPSS program to mitigate distribution falling conductor related ignitions. This program also includes an algorithmic based high impedance ground fault DCD capability and SmartMeter partial voltage detection to mitigate distribution wire down-related ignitions.

SDG&E

SDG&E's Advanced Protection Program (APP) develops and implements advanced protection technologies within electric substations and on the electric distribution system. The program aims to prevent and mitigate the risks of fire incidents, provide better distribution sectionalization, create higher visibility and situational awareness in fire-prone areas, and allow for the implementation of new relay and automation standards in locations where protection coordination is difficult due to lower fault currents attributed to high impedance faults.

The program upgrades and installs protection equipment and devices capable of supporting FCP technology, which trips one or more zones of protection on overhead distribution circuits before broken energized conductors can reach the ground. When an energized conductor fails due to normal aging, over-stressed conditions, or other reasons, the conductor may continue to be energized as it falls and when it reaches the ground. If the conductor makes physical contact with other objects as it falls, arcing may occur, which could result in sparks or embers being distributed across the adjacent area. If the conductor is energized when it reaches the ground, the same type of arcing and subsequent ignition may occur. The risk of falling CCs, while minimized by the insulation surrounding the length of the cable, may result in a high impedance fault at the failure point that could go undetected by protection equipment, creating a potential for ignition. FCP is compatible with traditional open and CC cable and provides the same risk mitigation benefits to both.

SDG&E implements FCP by using a combination of substation protective relays, distribution reclosers, and line monitoring equipment that are in constant communication via high-speed wireless data connections. All devices send readings at 30 samples per second to a centralized real-time automation controller (RTAC) located in the substation. The RTAC consolidates the data and uses multiple algorithms to determine whether a falling conductor condition exists, where it is located, and what section(s) of the circuit must be deenergized. A typical conductor takes approximately 1.4 seconds to reach the ground when it falls; the system is capable of detecting, reacting, and deenergizing a conductor in less than 700 milliseconds (0.7 seconds).

Cost of FCP deployments varies due to multiple factors. Substation circuit breakers, relays, and remote terminal units may require replacement to support FCP. Expulsion fuses may need to be replaced with reclosers, and line monitoring equipment must be installed at the end of each protected branch. High speed data communications must exist or be installed, and poles may need replacement to support the additional weight of reclosers and line monitor equipment. To reduce the total cost of construction, SDG&E is exploring emerging single-ended FCP detection technology, which may reduce the required number of devices. EFD ARFS coverage will also be included on circuits targeted for FCP to determine which technology provides the best risk reduction. FCP will typically cover the main feeder and branches of the circuit and EFD will typically cover remote branch sections too cost prohibitive to deploy FCP.

4.1.5 Smart meter data

SCE

Smart meters provide large quantities of data, and when coupled with other data can help alert SCE of inspection needs or other actions. Smart meter data is coupled with GIS system data and historical event data to help detect possible wire down situations where the conductor may remain energized. SCE calls this Meter Alarming for Downed Energized Conductor (MADEC). When a MADEC alarm is identified, SCE manually de-energizes the line to help reduce ignition and other public safety risks. SCE also uses smart meter data to help detect defects that lead to failures in distribution transformers. Winding shorts, partially turn-to-turn shorts, create small increases in voltage on a transformer secondary that can be detected by smart meters. By aggregating and comparing voltage data of surrounding transformers, SCE can create replacement maintenance actions for some transformers prior to failure. This helps reduce ignition risks due to equipment failure and also helps limit the effects of electric service outages to customers. SCE continues to explore other possibilities for the use of meter data to help manage operation and maintenance of the distribution electric system.

PG&E

Similar to SCE's MADEC, PG&E uses SmartMeter partial voltage detection alerts to inform operators of possible down conductor conditions. PG&E also uses SmartMeter interval voltage data and machine learning algorithms (IONA) to detect secondary and transformer high risk conditions including service transformer windings failures, overloaded transformer, and secondary service connection issues. Additionally, next generation SmartMeters are currently being piloted to see if high resolution edge computing sensor devices improve visibility and alerting of secondary voltage conductor conditions issues including, splice/connection issues, conductor insulation deterioration, vegetation contact, and transformer early-stage failures.

4.1.6 Open Phase Detection

SCE

Open phase detection/protection (OPD), sometimes referred to as falling conductor and broken conductor detection/protection, focuses on de-energizing powerlines when a separation is detected with sufficient speed to de-energize the line before it makes contact with the ground. Transmission and Distribution system topologies and relaying strategies have led to differences in how open phase detection can be applied.

Downed powerlines that remain energized create a risk of ignition when arcing proximate to fuels. Various conditions, such as car collisions with poles, falling vegetation, mechanical impacts, failure of conductor supports, and arcing associated with electrical faults can create open phases. Additionally, a conductor may remain intact in some situations but can still fall to the earth, for example when a car hits a pole, or a large tree and damages crossarms and/or poles without causing a wire separation.

Distribution systems schemes rely heavily on voltage measurements to determine the normal and operational conditions. Radio communication, which requires remote measurements at the end of the protection zone, is the preferred choice for voltage monitoring. Operating times of approximately one second are needed to sufficiently detect an open phase event and de-energize a line section. The demands for speed and bandwidth of the radio system are within present technology capabilities. Current common practice is to have 900 Megahertz (MhZ) radio networks to support traditional distribution automation schemes, which may not have the needed speed or bandwidth to reliably apply an OPD scheme.

SCE's mainline distribution OPD will typically focus on larger conductor sizes and can encompass multiple miles of conductor. The costs for monitor voltage at one end point compared to total conductor length will generally be lower than multiple voltage measurement points needed to monitor tapline locations. While it is generally expected that a smaller conductor is more prone to experiencing a downed wire event, both large and small conductors can experience separation or failure.

For transmission systems, OPD schemes have focused on current measurement quantities rather than voltage. Transmission systems may have more than one voltage source that can operate islanded, which traditional radial distribution systems usually do not do. The additional voltage source as well as lack of distributed loads allow current and changes in current to be integrated into protective relays.

PG&E

PG&E leverages SmartMeter Partial Voltage Detection as part of EPSS to mitigate some wire down incidents due to high impedance faults associated with broken conductors. This is not a "falling conductor" scheme in traditionally sense but does provide some level of open phase detection capability to force out a line after some time when the condition occurs. See Section 4.1.4 for more information on Falling Conductor Protection.

4.1.7 Remote Grids

The Joint Utilities continue to use Remote Grid Applications as they help to limit ignition risk exposure for some circuitry or costly upgrades by serving customer loads from a dedicated source rather than the grid. Remote grids must be capable of providing sufficient and reliable power for the customer load that would be islanded with the dedicated generation. In general, these customer loads are relatively small and are in areas where a distribution line may extend a substantial distance as this helps to limit the cost of remote generation grid facilities and helps with reasonability of the comparative risk of traditional electric system upgrades, such as CC or undergrounding of overhead lines.

4.1.8 Microgrids

The Joint Utilities design and build permanent and temporary microgrids that can be electrically isolated during a PSPS event, thereby maintaining electric service to customers within the microgrid boundary. While alternative hardening solutions, such as undergrounding electric lines, may be better at simultaneously mitigating wildfire risk, those options are not always technically feasible or cost-effective.

A combination of data including the risk of wildfire from overhead infrastructure, feasibility of traditional overhead hardening solutions, alternative solutions such as undergrounding distribution infrastructure, and historical PSPS impact data is used to guide the installation of microgrids.

This mitigation focuses on reducing electric service interruptions for customers who would otherwise be affected during PSPS events. The operation of microgrids complements the reduction risk of ignitions caused by electric service lines that are de-energized during PSPS events.

4.1.9 Other-All

SCE

Radio Frequency Defect Detection System (RFDDS) equipment, also called Early Fault Detection (EFD), is applied on SCE’s network. SCE has applied sensors to its distribution and sub-transmission networks up to 115 kV. These systems attempt to both detect and provide a location of a defect or undesirable condition on the network. SCE’s findings include failing insulators, vegetation contact, broken conductor strands, poor connections, and damaged bond wires. Locating and repairing these types of issues prior to failure can help avoid potential ignition events and improve the integrity of the electric system.

Distribution Waveform Analysis (DWA) equipment, also referred to as Distribution Fault Anticipation (DFA), is applied on SCE’s distribution system. SCE applies DFA to distribution circuits to monitor performance of the system to better understand the technology functionality and requirements on the SCE workforce to utilize the technology. The alerts from DFA have helped locate faults, particularly for phase-to-phase conductor contact faults. These types of faults can repeat over time and identifying the location and making remediations to the line, like insulated line spacers, can help avoid future outages or ignition events. As part of SCE’s trial, SCE also learned about the ability for DFA to help detect failing underground connections or components among other detection conditions. SCE continues to monitor alerts from the existing DFA system and work with the DFA supplier to better understand where DFA can supplement other monitoring systems such as smart meters or RFDDS.

Topic #5: Overall Effectiveness of Mitigation

5.1 The IOUs' joint evaluation of the overall effectiveness of mitigations in combination with one another, including, but not limited to overhead system hardening, maintenance and replacement, and situational awareness mitigations. This must also include analysis of in-field observed effectiveness, interim risk exposure during implementation, and how those impact effectiveness for ignition risk, PSPS risk, and outage risk associated with protective equipment and device settings.

Each utility implements the wildfire mitigations and combinations of mitigations that are most suited to that utility's territory and risk factors. The Joint Utilities do not have a single joint evaluation of mitigation effectiveness. However, they meet regularly to benchmark mitigation efforts. Each utility implements the mitigations and combinations of mitigations that are most effective in its own service territory, which can have different effectiveness values depending on the service territory (fuels, topography, weather, etc.) and methodologies used. Each utility describes its mitigation combinations and available mitigation data and effectiveness values in their WMP.

5.1.1 Overall effectiveness of mitigations <u>in combination with one another</u>, including, but not limited to overhead system hardening, maintenance and replacement, and situational awareness mitigations

The Joint Utilities measure the overall results of wildfire mitigation efforts through a combination of evaluation, measurement, and verification practices. For overhead system hardening, the Joint Utilities track the completion of hardening projects, such as replacing wooden poles with steel ones, installation of CC, and undergrounding power lines.

The Joint Utilities track and collect ignition outage and equipment failure data and outage data. Combining system hardening with regular maintenance and timely replacement of aging or damaged equipment is crucial for preventing failures that could spark wildfires. The Joint Utilities maintain detailed records of inspection and maintenance activities and equipment replacements. Assets are evaluated for effectiveness by analyzing the frequency and severity of equipment-related incidents or by observing equipment damage during regularly scheduled inspection activities. The Joint Utilities continue to measure the collective effectiveness of these mitigations by monitoring the number of incidents and risk event data. Finally, each Joint Utility employs risk modeling to monitor how risk changes with different combination of mitigations.

SDG&E partnered with a third-party to validate individual mitigation effectiveness values and methodologies and explore the impact of combined mitigation strategies, which will help identify the most cost-effective and impactful mitigation approaches. The study's findings indicate that undergrounding of electric lines is the most effective mitigation measure, surpassing other combinations, including CC, FCP, and EFD. SDG&E is currently reviewing the methodology, assumptions, and results of this analysis. This evaluation will help determine whether an update to the existing methodology is necessary.

5.1.2 In-field observed effectiveness

Field crews conduct routine diagnostic testing, as appropriate, and perform regular visual ground inspections and manned and unmanned aerial inspections of power lines, poles, and other infrastructure to identify potential hazards such as damaged equipment, vegetation encroachment, and other risk factors. These inspections help the utilities assess the condition of assets and the effectiveness of maintenance and hardening efforts. The utilities also install monitoring devices such as weather stations, high-definition cameras, and remote sensing technology on electric infrastructure. These devices provide real-time data on environmental conditions, equipment performance, and potential ignition sources. By analyzing this data, the utilities can evaluate the effectiveness of technologies and make informed decisions about necessary interventions. In addition, the utilities regularly gather feedback from field crews who are directly involved in implementing and observing mitigation measures. This feedback helps identify practical strategies to improve mitigation efforts and areas for improvement.

5.1.3 Interim risk exposure during implementation

The Joint Utilities deploy a variety of interim mitigations to reduce system risk until more permanent, long-term mitigations can be fully deployed. The Joint Utilities perform vegetation management throughout their service territories by trimming and removing vegetation around power lines and equipment to help prevent contact that could cause an ignition event. This includes creating defensible spaces (pole clearing). The Joint Utilities proactively utilize PSPS during extreme weather conditions to prevent electrical equipment from igniting wildfires. This measure is used as a last resort when the risk of wildfire is exceptionally high. In addition, the Joint Utilities adjust protective equipment and device settings to reduce the risk for a potential ignition event.

5.1.4 How [in-field observed effectiveness and interim risk exposure during implementation] impact effectiveness for ignition risk, PSPS risk, and outage risk associated with protective equipment and device settings

In-field observed effectiveness and interim risk exposure data is analyzed on a regular basis through various methods, such as modeling and trend analysis, and reevaluated on a regular basis through quarterly and annual updates to each Joint Utility’s WMP.

Based on the results of the analyses, modifications are implemented to each Joint Utility’s WMP and combinations of mitigations.

More details regarding the results of the analysis and mitigation strategy changes are discussed in each Joint Utility’s WMP.

Topic #6: Applications in the WMP

6.1 Additionally, PG&E must report on all lessons learned PG&E has applied or expects to apply to its WMP, including a list of applicable changes and a timeline for expected implementation as applicable.

Utility	Lessons Learned	Changes in the Utility's WMP
PGE	Topic 1: CC	Reference Section 8.2.1 in PG&E's 2026-2028 WMP
PGE	Topic 2: Undergrounding	Reference Section 8.2.2 in PG&E's 2026-2028 WMP
PGE	Topic 3: Protective Equipment and Device Settings	Reference Section 8.7.1.1 in PG&E's 2026-2028 WMP
PGE	Topic 4: New Technologies	Reference the following Sections in PG&E's 2026-2028 WMP: REFCL–8.7.1.3.1 DFA/EFD–10.3 FCP/SmartMeter Data/ OPD–8.7.1.1 Remote Grids–8.2.7.1 Microgrids–8.2.7
PGE	Topic 5: Overall Effectiveness of Mitigations	Reference Section 5 and Section 6 in PG&E's 2026-2028 WMP
SCE	Topic 1: CC	Reference Sections 5.2.1.2 and 8.2.1 in SCE's 2026-2028 WMP
SCE	Topic 2: Undergrounding	Reference Sections 5.2.1.2 and 8.2.2 in SCE's 2026-2028 WMP
SCE	Topic 3: Protective Equipment and Device Settings	Reference Sections 8.2.8, 8.7, and 10.3.1.5 in SCE's 2026-2028 WMP
SCE	Topic 4: New Technologies	**For REFCL, r**eference Sections 8.2.6.1 and 10.3.1.8 and Table 8-1 Targets in SCE's 2026-2028 WMP **For EFD,** reference Section 10.3.1.1 and Table 10-1 Target in SCE's 2026-2028 WMP **For MADEC,** reference Section 10.3.1.6 in SCE's 2026-2028 WMP **For DOPD/TOPD, r**eference section 10.3.1.2 and 10.3.1.3 in SCE's 2026-2028 WMP **For Microgrids,** reference Section 8.2.7 in SCE's 2026-2028 WMP **For Remote Grids,** reference Section 8.2.9 in SCE's 2026-2028 WMP
SCE	Topic 5: Overall Effectiveness of Mitigations	Reference Section 6.1.3 Table SCE 6-01 and Section 6.2.1 Table 6-3 in SCE's 2026-2028 WMP

Utility	Lessons Learned	Changes in the Utility's WMP
SDGE	Topic 1: CC	Lessons learned include the importance of capturing complete lifecycle costs for CC. See Section 6.1.3 of the 2026-2028 Base WMP
SDGE	Topic 2: Undergrounding	Lessons learned from the grid hardening working group are included in Table 13-1 of the 2026-2028 Base WMP
SDGE	Topic 3: Protective Equipment and Device Settings	Lessons learned include an efficacy study that showed sensitive relay settings eliminate the occurrence of ignitions in the event of a fault on electric lines. See the efficacy study in Section 8.7.1.1 of the 2026-2028 Base WMP
SDGE	Topic 4: New Technologies	For EFD lessons learned, see ACI SDGE-25U-05 in Appendix D of the 2026-2028 Base WMP
SDGE	Topic 5: Overall Effectiveness of Mitigations	SDG&E partnered with a third-party to validate individual mitigation effectiveness values and methodologies while also exploring the impact of combined mitigation strategies. See Section 6.1.3.3.5 of the 2026-2028 Base WMP for lessons learned.

Attachment B: Investor-Owned Utility Effectiveness of Enhanced Clearances White Paper

INVESTOR-OWNED UTILITY EFFECTIVENESS OF ENHANCED CLEARANCES

March 20, 2025

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1 EXECUTIVE SUMMARY

Vegetation management is essential for maintaining the safety and reliability of electric power lines, particularly in wildfire-prone areas. By regularly clearing trees, shrubs, and other vegetation around power lines, utilities can reduce the probability of vegetation contact-caused outages (“outages”), consequently resulting in fewer ignitions.

California Public Utilities Commission (CPUC) General Order (GO) 95, Rule 35 mandates a minimum radial clearance of bare line conductors from vegetation, based on conductor voltage and whether facilities are located within the High Fire Threat District (HFTD). Rule 35, Appendix E recommends utilities establish greater clearances at time of pruning to ensure compliance with minimum clearances until the next scheduled maintenance. To reduce the risk of vegetation contact, utility tree pruning practices may exceed the recommended clearances at time of pruning, depending upon location, species, growth rate, tree health, and other site- and tree-specific conditions. To ensure the effectiveness of vegetation management activities in support of wildfire mitigation solutions, three electric investor-owned utilities (IOUs) in California: San Diego Gas & Electric Company (SDG&E), Pacific Gas and Electric Company (PG&E), and Southern California Edison Company (SCE) (collectively the “IOUs”), leverage both quantitative studies and expertise derived from field observations to better understand and improve vegetation management practices.

A study conducted by the third-party company, Electric Power Research Institute (EPRI),[1] evaluated the effectiveness of the clearance at the time of the pruning. This study standardized data from the three IOUs and compared the average duration from the time of inspection or pruning activity to the time of outage, based on the range of clearances at the time of inspection or pruning.

This white paper focuses on quantifying whether enhanced radial clearances are associated with a lower probability of vegetation contact. A machine learning technique, logistic regression model, was used to perform a sensitivity analysis comparing the differences in outage probabilities before and after modifying the targeted enhanced clearance levels. The result indicates enhanced clearances reduced approximately 20% of vegetation-caused outages. This white paper also addresses other factors, beyond radial clearances, that impact outage probabilities. Exploratory data analysis was also employed to identify the unique characteristics of three IOUs’ land cover types, assess the impacts of weather conditions during and throughout the year, compare performance outcomes in the HFTD with other regions. Historical radial clearances of trees sampled from SDG&E were also analyzed to quantify the differences in the average outage rates for trees with enhanced clearances.

These different methods have shown that enhanced clearances reduce the probability of vegetation-caused outages by a measurable amount. This reduction in outage frequency can subsequently result in a lower incidence of ignitions in regions characterized by fire-prone vegetation.

However, the effectiveness of enhanced radial clearances in reducing the likelihood of ignitions is limited. Weather conditions can be a direct contributing factor to the probability of ignitions. For example, data has shown that the effectiveness of enhanced clearance diminishes during and after windy weather conditions. Additionally, the alteration of fuel loading along overhead conductors can

[1] This third-party study can be found in SDG&E’s 2026-2028 Base WMP Appendix D.

provide additional risk-reduction benefits. Therefore, these may be considered as complementary risk control mechanisms.

2 INTRODUCTION

GO 95, Rule 35 mandates that "Where overhead conductors traverse trees and vegetation, safety and reliability of service demand that certain vegetation management activities be performed in order to establish necessary and reasonable clearances, the minimum clearances set forth in Table 1, Cases 13 and 14, measured between line conductors and vegetation under normal conditions shall be maintained." For conductors operating at 2,400 to 72,000 volts, GO 95, Rule 35, Appendix E recommends a minimum of 12 feet of clearance at time of pruning for facilities located in the HFTD and a minimum of 4 feet of clearance at time of trimming for facilities located outside of the HFTD.

The IOUs minimize vegetation contact risk through proactive vegetation management activities that catalog, audit, and prune or remove trees near electrical facilities. The terminology "enhanced clearance" has been misunderstood as a pruning practice that only takes the radial distance of vegetation from electric lines into consideration. In actuality, the three utilities follow a more balanced approach, considering what is necessary for safety, compliance, and reliability. In addition to the required minimum clearance, this balanced approach considers tree species, growth rate, site conditions, and tree health to determine the proper radial clearance for a tree. Additionally, industry pruning standards such as the American National Standards Institute (ANSI A300) guidelines factor into the determination of appropriate radial clearances.

This study focuses on quantifying the benefits of proactive pruning to 12 feet of clearance or greater at the time of pruning for primary distribution facilities. For the purposes of this study, clearances of 12 feet and above are defined as the “enhanced clearance”. Factors other than clearance can also contribute to the likelihood of vegetation contact-caused outages (“outages”), such as inspection frequency. However, these factors are not captured quantitatively in the data set nor considered in this study.

2.1 COMMONALITIES OF VEGETATION MANAGEMENT PRACTICES ACROSS UTILITIES

The IOUs’ vegetation management practices may differ based on the unique aspects of their respective service territories. However, there are practices that are common across the IOUs. First, the IOUs generally perform tree inspections twice per year in the HFTD portions of their respective service territory and at least once per year within the non-HFTD. Second, the primary inspection method is foot patrol. Third, a clearance of 12 feet or greater at time of pruning is defined as the threshold when quantifying whether an IOU has obtained enhanced clearance. In addition, each utility uses professional judgement based on training and arboricultural knowledge to make case-by-case determinations of which trees are appropriate candidates to receive expanded clearances. That is, the determination of how much clearance is obtained at time of pruning is not made arbitrarily. The goal of establishing proper clearance is predicated on ensuring safety and compliance for at least the annual pruning cycle. Indeed, in some instances the health of a tree may be adversely affected by expanded clearances.

3 DATA AND METHODS

3.1 DATA SAMPLE AND DATA VARIABLES

Vegetation-caused outage data from the three IOUs were collected from year 2015 to 2022 based on the Quarterly Data Reporting (QDR) files. To accurately reflect annual outage frequency in comparison to the outage data filtered in the third-party's assessment, this time period was used to conduct the exploratory analysis. Additional asset data, such as primary distribution overhead circuit miles, were sourced from the Q1 2024 Quarterly Data Report[2].

A table of data variables is available in Appendix A.

3.2 EXPLORATORY DATA ANALYSIS

3.2.1 BACKGROUND FOR DATA INTERPRETATION:

Public Safety Power Shutoffs (PSPSs) are the proactive de-energization of power lines during severe weather to reduce the likelihood of power lines causing an ignition. During elevated or severe weather conditions warranting a PSPS event, especially Red Flag Warnings (RFW)[3], vegetation-caused outages are not recorded on de-energized circuits. Therefore, weather conditions associated with vegetation outages used in this study (also reported as "risk-events" in the Wildfire Mitigation Plan (WMP) QDR) do not include this type of dry windy conditions. This indicates that the conclusions on the effectiveness of the enhanced clearance drawn from this analysis are not relevant to weather conditions that meet PSPS protocol.

Unless otherwise specified, outages mentioned in this white paper refer to vegetation-caused outages.

3.2.2 COMPARISON OF OVERHEAD CIRCUIT MILES AND LAND COVER ACROSS UTILITY SERVICE TERRITORIES

A comparison of the land cover[4] across California is informative when evaluating the effectiveness of vegetation-related mitigation methods and developing a utility-specific strategy.

California's land cover is highly diverse, reflecting its varied geography. Northern California features dense forests, fertile valleys like the Central Valley, and mountainous areas like the Sierra Nevada range. This region receives more rainfall, contributing to its lush vegetation. In contrast, Southern California is characterized by arid deserts, coastal plains, and extensive urban development. The landscape here includes chaparral, coastal sage scrub, and palm trees, with a generally warmer and drier climate. These

[2] The % of total primary distribution overhead circuit miles that were added or removed is relatively small. To simplify the calculation, the circuit miles data from 2024 Q1 QDR in a utility company are used for all the years.
[3] RFW stands for Red Flag Warning issued by National Weather Service to alert areas of critical fire weather conditions, such as strong winds and low humidity, which could lead to extreme fire behavior.
[4] In the context of the National Land Cover Database (NLCD), land cover refers to the physical material at the surface of the earth. The NLCD provides detailed land cover data at a 30-meter spatial resolution, which is used for various environmental, land management, and modeling applications.

differences create distinct ecological zones and contribute to the unique identities of Northern and Southern California.

Figure 1 presents a land cover classification map of California, derived from the 2023 National Land Cover Database (NLCD). The map's land cover groups are categorized into stratified class bins based on the Anderson Level II Land Cover Classification System (Anderson, 1976).

Figure 1: California NLCD Land Cover map

Source: NLCD 2023 version. The grouping of the land cover types is included in Appendix A.

Table 1: Overheard Circuit Miles and Vegetation Outage Statistics by Land Cover

Utility Name and Sample Size	Metrics	Developed	Forest	Shrub	Wetland	Working	Low Veg Cover
PG&E HFTD miles = 25,293 non-HFTD miles = 54,485 HFTD outages = 16,245 non-HFTD outages = 13,183	Circuit miles % (HFTD)	42.0%	23.3%	18.6%	0.7%	15.2%	0.2%
	Circuit miles % (non-HFTD)	60.4%	0.5%	1.2%	0.8%	36.8%	0.3%
	Outages % (HFTD)	37.7%	49.0%	6.5%	0.6%	3.5%	0.3%
	Outage % in Non-HFTD	71.0%	10.4%	3.0%	1.1%	12.8%	0.3%
	Outages per mile (HFTD)	0.58	1.35	0.23	0.54	0.15	1.12
	Outages per mile (non-HFTD)	0.28	4.89	0.62	0.35	0.08	0.27
SCE HFTD miles = 13,743 non-HFTD miles = 36,787 HFTD outages = 987 non-HFTD outages = 2,354	Circuit miles % (HFTD)	46.4%	3.4%	34.5%	0.9%	14.6%	0.1%
	Circuit miles % (non-HFTD)	71.9%	0.02%	17.9%	0.2%	8.4%	1.6%
	Outages % (HFTD)	73.8%	12.7%	9.6%	0.5%	3.3%	0.1%
	Outage % in Non-HFTD	96.1%	0.1%	0.6%	0.0%	2.6%	0.6%
	Outages per mile (HFTD)	0.11	0.27	0.02	0.04	0.02	0.05
	Outages per mile (non-HFTD)	0.09	0.23	0.002	0	0.02	0.02
SDG&E HFTD miles = 3,378 non-HFTD miles = 2,950 HFTD outages = 134 non-HFTD outages = 341	Circuit miles % (HFTD)	39.6%	2.1%	47.6%	1.8%	8.8%	0.1%
	Circuit miles % (non-HFTD)	94.9%	0.05%	3.9%	0.3%	0.7%	0.2%
	Outages % (HFTD)	67.9%	4.5%	22.4%	3.7%	1.5%	n/a
	Outage % in Non-HFTD	99.7%	0.3%	0.0%	0.0%	0.0%	0.0%
	Outages per mile (HFTD)	0.07	0.08	0.02	0.08	0.01	n/a
	Outages per mile (non-HFTD)	0.12	0.72	0	0	0	0

** Outage data was collected from 2015 to 2022. A small portion of PG&E outage records (2.31%) are not spatially recorded; therefore, this table is a subset of all outages reported in the QDR.*

As shown in Table 1, PG&E has the highest proportion of service territory classified as "Forest" among the three utilities, with 23 percent of its overhead primary circuits (5,905 miles) located in forested areas. Consequently, nearly 50 percent of vegetation-caused outages in the HFTD portion of PG&E's service territory are associated with forests, which also have the highest outage rate per mile. In comparison, SCE and SDG&E have 3.4 percent and 2.1 percent of their service territories classified as

“Forest”, respectively. Despite these differences, forests exhibit the highest outage rate among all three IOUs. The ratio of forest outage percentage in HFTD to forest circuit miles percentage in HFTD is greater than 2 to 1 for all IOUs, indicating that outages are proportionally more likely to occur in forested areas.

SDG&E has the smallest service territory of the three utilities. In the HFTD portion of SDG&E's service territory, the largest land cover type is "Shrub," accounting for 47.6 percent, followed by "Developed," accounting for 39.6 percent. However, nearly 68 percent of vegetation-caused outages occur in developed regions, while 22.4 percent occur in shrub land areas. Similar patterns are observed for SCE’s HFTD territory, where “Developed” and “Shrub” land cover account for 46.4 percent and 34.5 percent of the circuit miles in HFTD respectively. These land covers are responsible for 73.8% and 9.6% of the outages in the HFTD."

Fuel types associated with forest and shrub land cover in California are generally easier to burn compared to developed and other land cover types. Forests and shrublands contain a significant amount of vegetation, including grasses, shrubs, and trees, which can serve as fuel for wildfires. These areas often have a high density of fine fuels, such as leaves, needles, and small branches, which can ignite easily and burn rapidly. Therefore, the ignition risks associated with “Forest” and “Shrub” are generally higher than with other land cover. From a vegetation management perspective, shrub lands are generally easier to manage than forests. Shrub lands typically have less biomass and a simpler structure compared to forests, making them more accessible for management activities such as controlled burns, mechanical removal, and herbicide application. Additionally, shrubs often grow in more open areas, which can facilitate easier access for equipment and personnel.

Forests, on the other hand, have a more complex structure with multiple layers of vegetation, including understory, midstory, and canopy layers. In addition to vegetation structure, forests are subject to stringent permitting requirements guiding vegetation management activities. This complexity can make management activities more challenging and labor-intensive. Forest management often requires more specialized techniques and equipment to address issues like tree thinning, invasive species control, and maintaining biodiversity. The forests in PG&E’s service territory are challenging to manage, which contributes to the high outage rate discussed in Section 3.2.3.

“Forest” and “Shrub” lands combined in HFTD account for 41.9 percent of PG&E’s primary overhead circuit miles, 49.7 percent of SDG&E’s circuit miles, and 37.9 percent of SCE’s circuit miles. Outage rate per circuit mile across three IOUs are not comparable given the variation in land cover, however, outage rate per circuit mile between HFTD and non-HFTD within one IOU offers insights on the outcome of vegetation management activities. The outage rate per circuit mile within the HFTD forest land cover is significantly lower than in non-HFTD areas in PG&E’s territory. For instance, PG&E's outage rate is 1.35 outages per circuit mile in the HFTD compared to 4.89 outages per circuit mile in the non-HFTD. A similar pattern is observed in shrubland. This lower outage rate highlights the results of PGE’s comprehensive mitigation effort in the HFTD, partially attributed to enhanced clearances. SCE and SDG&E have a relatively small percentage of overhead circuit miles in the non-HFTD forest areas, therefore a similar comparison between HFTD and non-HFTD is not meaningful in this case.

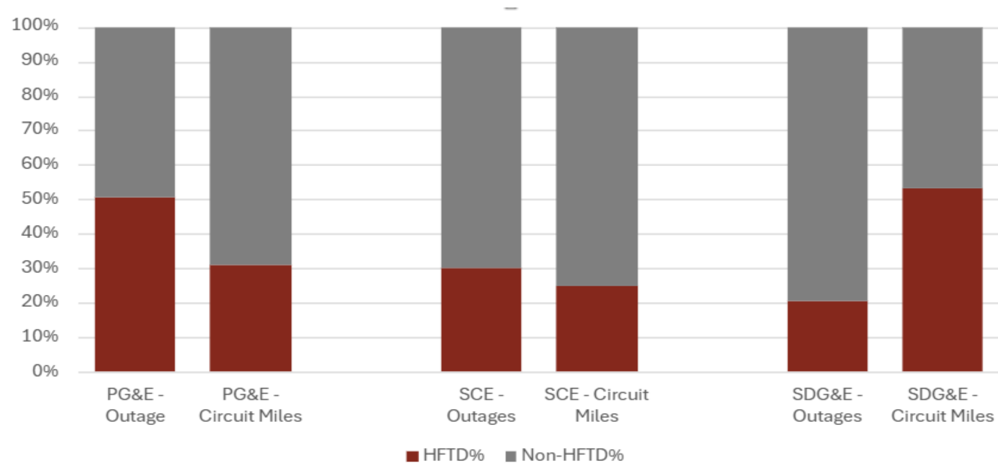
In conclusion, understanding the land cover types and their associated outage frequency and rate identifies factors beyond the radial clearance that impact the likelihood of vegetation-caused outages. This information can also guide utilities in researching and evaluating the minimum clearances based on land cover and in strategizing best practices.

3.2.3 STATISTICS ON VEGETATION CAUSED OUTAGES AND IGNITIONS

3.2.3.1 OUTAGE STATISTICS OUTSIDE OF RFW AND HWW[5] CONDITIONS

Figure 2 and Table 2 compare vegetation-caused outages in HFTD and non-HFTD portions of the service territories of each utility excluding RFW or HWW days. The comparison is shown by outage as well as by circuit miles.

Figure 2: Comparison of Vegetation Caused Outages Excluding RFW or HWW Days



Source: 2015-2022 WMP QDR

Table 2: Comparison of Vegetation Caused Outages Excluding RFW or HWW Days

Outages Outside of RFW or HWW Days	PG&E (n=39,851)	SCE (n=2,737)	SDG&E (n=276)
Annual actual frequency range (territory)	3,210 - 7,292	218 - 508	21 - 48
Percent of avg. outages in the HFTD	51%	30%	21%
Percent of circuit miles in the HFTD	31%	25%	53%
Range of annual percentage against all vegetation-related outages in HFTD	85.6% to 99.1%	65.3% to 91.3%	41.7% to 100%
Range of annualized frequency per 1000 miles in the HFTD**	51.1 - 174.0	6.6 - 17.8	0.9 - 4.5
Mean of annualized frequency per 1000 miles in HFTD*	101.0	10.8	2.1
Mean of annualized frequency per 1000 miles in non-HFTD*	45.0	8.4	7.5

Source: 2015-2022 WMP QDR Table 2 and Table 7

** Weather conditions vary greatly in each year; therefore the goal is to assess the outcome when such conditions do occur. Therefore, years when observations were 0 are not included when the mean is calculated.*

*** Circuit miles in HFTD are based on metrics in the Q1 2024 QDR.*

[5] HWW stands for high wind warning condition issued by the National Weather Service. A High Wind Warning is issued when sustained winds of 40 mph or higher are expected for at least an hour, or wind gusts of 58 mph or more are anticipated. "HWW" used in this paper are HWW conditions associated with winter storms and precipitation, without overlapped RFW conditions.

Over half (53 percent) of the primary overhead circuit miles in SDG&E's service territory are in the HFTD versus 31 percent in PG&E's service territory and 25 percent in SCE's service territory. This demonstrates the unique terrain of each utility's service territory.

When comparing the proportion of outages that occur outside of RFW or HWW days to the proportion of overhead circuit miles in the HFTD, the data shows utilities have distinctive results. For PG&E, outages in the HFTD are proportionally higher than the circuit miles percentage. SCE's percentage of outages in the HFTD is very close to its circuit miles proportion. SDG&E's percentage of outages in the HFTD is much less than the proportion of overhead circuit miles in the HFTD.

The percentage of forest land in the HFTD can be used to indicate the density of vegetation along overhead circuits. As shown in Table 1, the outage rate among land cover types varies significantly. PGE's higher annualized outage frequency in HFTD could be partially explained by much higher percentage of forest in the HFTD compared to other utilities.

In contrast, SDG&E's outage proportion in the HFTD is much lower than the circuit mile proportion, and annualized outage frequency is more than three times (2.1/7.5) lower in the HFTD compared to the non-HFTD. However, this observation is associated with very low forest land cover (2.14 percent, 76 miles). SCE has a similar outage rate in both the HFTD and the non-HFTD, which might be due to the smaller percentage of its territory in the HFTD.

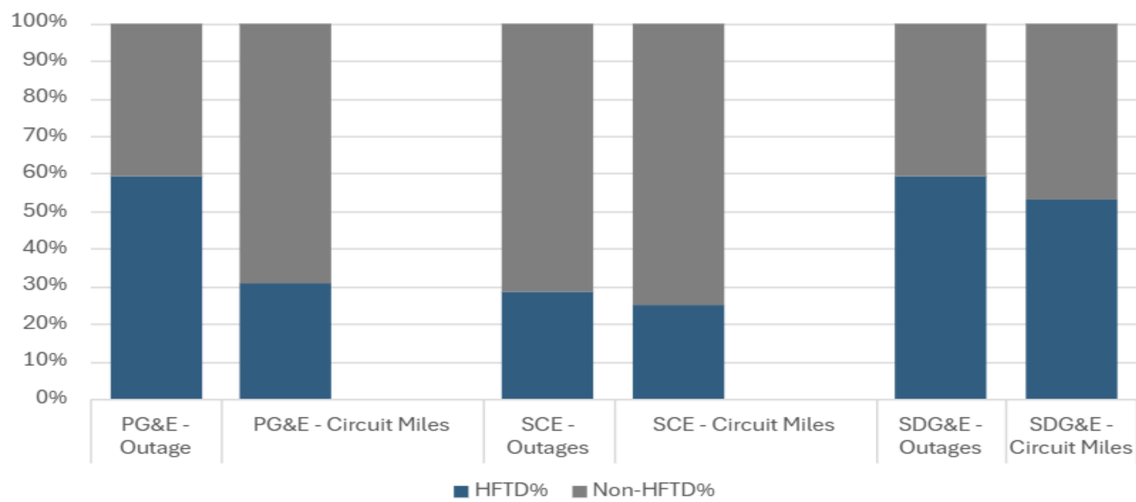
The effectiveness of enhanced clearances should be measured independently during wind events and non-wind events. The Annual Actual Outage Frequency range in Table 2 indicates that most vegetation contacts occurred outside of RFW and HWW conditions. While overall outage rates are higher in the HFTD compared to the non-HFTD for PG&E and SCE, Table 1 shows that the primary driver is likely due to the higher outage frequency in forest and shrubland compared to other land types. However, enhanced radial clearances in PG&E's HFTD forestland are associated with lower outage rates when compared to non-HFTD forestland. PG&E's outage rate in the forestland overall is still much higher than the rate in other land types. Therefore, further research is needed to determine the effective radial clearances required to reduce outage rates in forest and shrub regions to levels comparable to other land types.

3.2.3.2 OUTAGE STATISTICS DURING RFW CONDITIONS THAT DON'T TRIGGER PSPS PROTOCOLS

The impact of RFW and HWW weather conditions varies from event to event and across each service territory, and the pattern of these weather conditions is largely unpredictable. Understanding the influence of these weather conditions on vegetation-caused outages is crucial for evaluating the diminishing effectiveness of enhanced clearances. This also justifies the need for additional mitigation methods beyond enhanced clearances, thereby informing comprehensive mitigation strategies.

A small percentage of outages are observed during RFW weather conditions. The included RFW days do not meet the criteria to initiate PSPS protocols, possibly due to the moisture content of the fuel. RFW conditions vary from event to event, making comparison impossible due to spatial and temporal variations in weather factors. However, to compare outcomes across the utilities' service territories, overhead circuit mile days as a standardization method is used to generate the outage rate per 1,000 overhead circuit mile (OCM) days[6]. Additionally, the data sample used in this analysis does not include the RFW conditions that warrant PSPS protocols.

Figure 3: Comparison of Vegetation Caused Outages During RFW Conditions that do not Trigger PSPS Protocols



Source: 2015-2022 WMP Quarterly Data Report (QDR) Table 2 and Table 7

Table 33: Comparison of Vegetation Caused Outages during RFW Conditions that do not Trigger PSPS Protocols

Outages During RFW Days	PG&E (n=1,167)	SCE (n=381)	SDG&E (n=23)
Annual actual frequency range (territory)	2 - 297	0 - 117	0 - 12
Avg. outages % in HFTD*	59%	28%	59%
Circuit miles % in HFTD	31%	25%	53%
Range of annual percentage against all vegetation-related outages in HFTD	0.04% - 6.24%	0% - 26%	0% - 58.3%
Range of outage rate per 1000 OCM days (territory)	0.01 - 0.52	0 - 0.39	0 - 0.1
Mean of outage rate per 1000 OCM days (territory) **	0.27	0.22	0.05

Source: 2015-2022 WMP Quarterly Data Report (QDR)
** SCE's vegetation management mitigation scope also includes State Responsibility Area (SRA) in addition to HFTD. SRA is not used in the white paper. The statistical impact is negligible.*
*** Weather conditions vary greatly in each year, the goal is to assess the outcome when such conditions do occur. Therefore, years when observations were 0 are not included when the average is calculated. The outage rate is annualized*

Figure 3 indicates that the proportion of outages during RFW conditions closely matches the proportion of circuit miles in the HFTD. This impact is particularly evident in SDG&E's service territory, where the percentage of outage events in the HFTD during this type of RFW condition reaches 59 percent, a significant increase from 21 percent during no windy weather conditions. PG&E has a small increase,

[6] Overhead Circuit Mile (OCM) days is a metric collected in QDR Table 4. It measures the exposure of the overhead asset to a certain weather condition by using the product of time duration and circuit mile length. This can be used to understand some of the weather factors and general differences between each event or year.

from 51 to 59 percent; whereas outages percentage in the HFTD portion of SCE's service territory does not have a significant difference.

This difference highlights the vulnerability to windy conditions and the reduced effectiveness of enhanced vegetation pruning in the HFTD. The differences of the outage rate per 1,000 OCM days are smaller across the three utilities during such RFW conditions when compared to the outage rate outside of RFW or HWW conditions. SDG&E's sample size is relatively smaller, making it less comparable to the other two utilities.

3.2.3.3 OUTAGE STATISTICS DURING HWW ONLY CONDITIONS

The impact is even more pronounced during HWW conditions, as shown in Table 4. Although these wet, windy conditions differ significantly from dry, windy conditions like Santa Ana winds, HWW conditions can still serve as a stress test to evaluate the effectiveness of greater clearance during strong winds. Since wet, windy conditions do not pose an elevated wildfire risk, utilities typically do not need to de-energize the lines as they do during conditions that present a higher fire risk, such as RFW. Therefore, outage observations are available for comparison.

Table 4 presents statistics for observations during HWW conditions. PG&E experienced up to 54.49 outages per 1,000 OCM days annually during HWW conditions. To demonstrate the wind impact on vegetation-caused outages, the outage rate outside of RFW and HWW was standardized using OCM days and then compared to the rate during HWW. Since PG&E has a larger outage data sample size, its mean annualized outage rate of 45.0 from Table 2 was used as an example to extrapolate the outage rate per OCM days. Assuming 45.0 outages per 1,000 miles occurred in the non-HFTD for 365 days, this rate is normalized as follows:

$$
\begin{aligned}
x(\text{OCM days}) &= \frac{\text{number of outages}}{\text{OCM} \times 365 \text{ days}} \times 1000 \\
&= \frac{\text{number of outages}}{\text{OCM}} \times 1000 \times \frac{1}{365} \\
&= \text{number of outages per 1000 miles} \times \frac{1}{365} \\
&= 45 \times \frac{1}{365} \\
&= 0.12 \text{ per 1,000 OCM days per year}
\end{aligned}
$$

After the above conversion, 45.0 outages per 1,000 miles per year would be equivalent to 0.12 per 1,000 OCM days on average per year, whereas the outage rate during HWW condition is 54.49 per 1,000 OCM days per year in PG&E's service territory. This large difference highlights the magnitude of the weather impact.

This type of windy condition can also contribute to a significant portion of outages, as evidenced by the 51.7 percent recorded in 2022 for SDG&E's service territory. This indicates the reduced effectiveness of enhanced clearance, similar to RFW conditions. Additional findings regarding HWW are explained in Section 3.2.3.2.

Table 44: Comparison of Vegetation Caused Outages Observed during HWW conditions that do not Trigger PSPS Protocols

Outages Within Only HWW Days	PG&E (n=2,019)	SCE (n=265)	SDG&E (n=66)
Annual actual frequency range (territory)	3 to 647	6 to 97	0 to 35
Avg. outages % in HFTD	61%	31%	24%
Circuit miles % in HFTD	31%	25%	53%
Range of annual percentage against all vegetation-related outages in HFTD	0% to 12%	3% to 19%	0% to 51.7%
Range of outage rate per 1000 OCM days (territory)**	0.62 to 54.49	0.05 to 0.67	0 to 0.9
Mean of outage rate per 1000 OCM days (territory) *	11.1	0.3	0.3

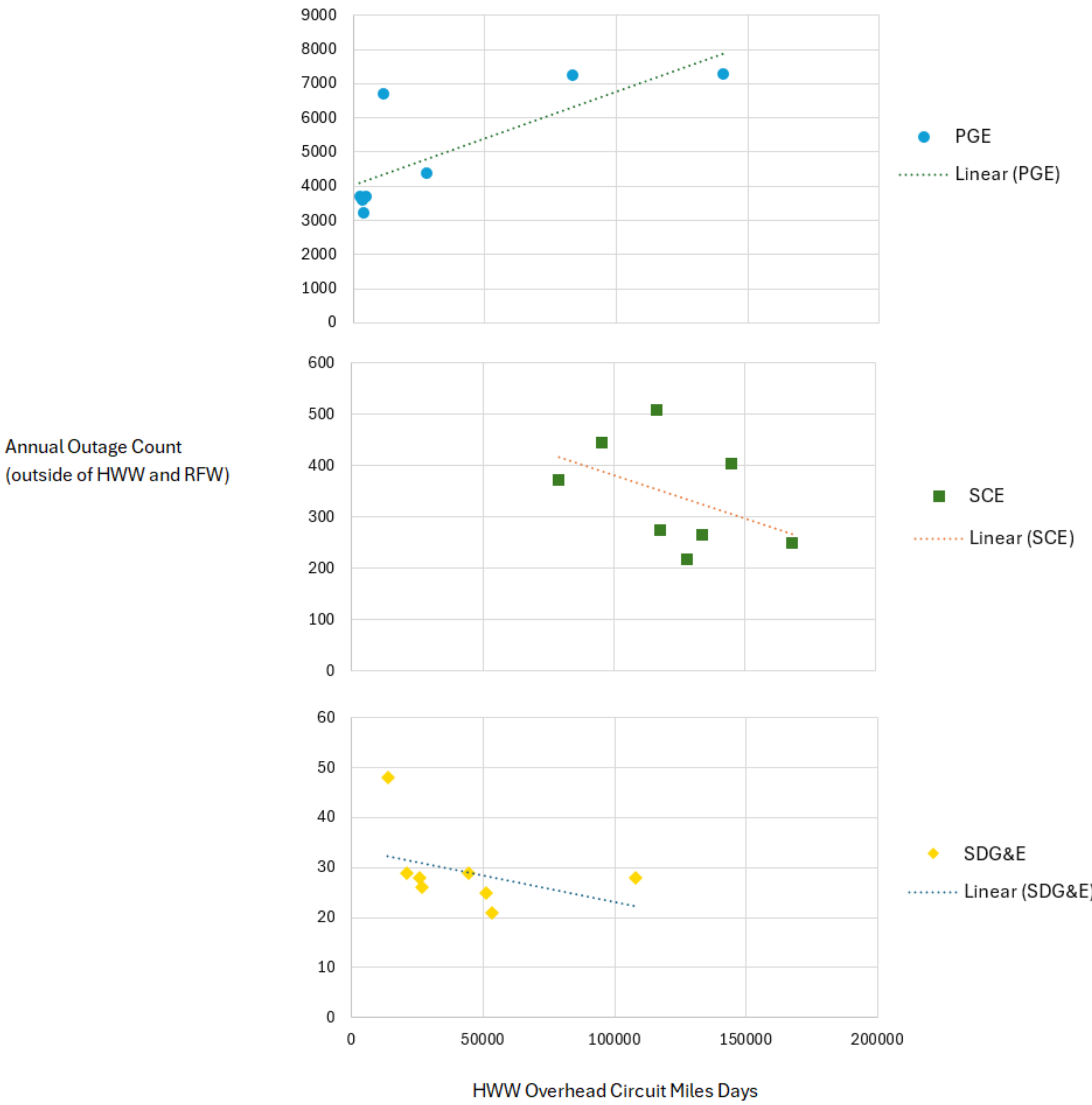
Source: 2015-2022 WMP QDR

** Weather conditions vary greatly in each year; the goal is to assess the outcome when such conditions do occur. Therefore, years when observations were 0 are not included when the average is calculated. The outage rate is annualized.*

*** OCM days is Overhead Circuit Mile days metric.*

3.2.3.4 THE IMPACT OF HWW WEATHER CONDITION ON THE OUTAGE FREQUENCY

Figure 4: Correlation between Outage Count Excluding HWW and RFW Conditions and Annual HWW Overhead Circuit Mile Days[7]



	PG&E	SCE	SDG&E
Pearson Correlation Coefficient	0.78	-0.45	-0.40

Source: QDR Table 2 and Table 4QDR

[7] HWW circuit mile days include some events that overlap with RFW conditions.

HWW conditions in Northern California are often associated with winter storms and atmospheric river events. These conditions typically occur during the winter months and bring strong winds, heavy rain, and sometimes snow to the region. In Southern California, HWW conditions are also common during winter storms.

As most HWW conditions bring rain to California during the winter season, they influence the annual outage frequency, not only during the HWW days but also for the rest of the year. However, this impact varies significantly between Northern and Southern California.

Figure 4 provides a compelling observation that a strong positive correlation (0.78) is evident for the year when PG&E's service territory experienced a higher frequency of HWW conditions. In contrast, moderate negative correlations (-0.45 and -0.4) were observed for the years when SCE's and SDG&E's service territories experienced more HWW conditions.

These observations may be attributed to the differences in vegetation type between Northern and Southern California. For Northern California, the data indicates that during years when greater HWW winter storms occur, higher outage frequency was observed.

This insight can inform utility strategies for effective vegetation management practices, particularly in regions where outages are more likely to occur following HWW days. Additionally, this correlation between HWW and outage frequency also highlights the cause of the variation in the effectiveness of enhanced clearances year over year.

3.2.3.5 VEGETATION CAUSED IGNITION FREQUENCY AND IGNITION PER OUTAGE

Ignition probability is directly influenced by factors such as fuel type, fuel moisture, wind, and heat sources. A heat source is derived from sparks generated when vegetation contacts bare conductors or when a tree strikes a covered conductor with enough force to break parts of the joints and other electrical devices. This can happen at a location with dry fuels or a location without any fuels. Therefore, not every vegetation contact (outage) has the same probability of causing an ignition.

Radial clearance as a treatment can reduce the probability of vegetation contact (outages) to a certain degree, as shown in Section 3.2.3 and Section 3.4. However, radial clearance on vegetation does not directly impact the probability of ignition. Statistically, assuming that ignition can happen randomly, reducing the probability of vegetation contacts through greater clearance logically leads to a reduction in the probability of vegetation contacts that result in ignitions.

The statistical relationship between clearance and ignition is that radial clearance can reduce the probability of vegetation contact with conductors, thereby reducing the overall number of outages. Radial clearance does not directly impact the probability of ignition once a contact occurs. The reduction in vegetation contacts indirectly reduces the number of potential ignition events.

Given that environmental factors vary greatly among utilities, ignitions per outage rate are not comparable among these regions. However, the differences between non-HFTD and HFTD areas within the same utility's service territory can offer some insights.

Table 5 shows that the average ignition frequency per 1,000 miles is higher in the HFTD than in the non-HFTD across all utilities, however, SDG&E has the smallest difference. Similarly, the ignition rate per outage in HFTD regions are higher than in non-HFTD regions, however, PG&E has the smallest difference.

Using SCE's rate as an example, the mean value in the HFTD is 0.0512, compared to 0.0321 in the non-HFTD. This means that on average, 100 outages would likely lead to 5 ignitions in the HFTD and 3 ignitions in the non-HFTD. In SDG&E's territory, the ignition rate is 2.8 times higher in the HFTD, but the outage rate in the HFTD is one third of the rate in the non-HFTD (see Table 2).

The higher rate in the HFTD might be attributed to more rural regions, such as the Wildland-Urban Interface (WUI), where fuel conditions are more prone to fire. This also indicates that enhanced clearance as a mitigation treatment alone is less likely to reduce ignitions if fuel conditions around the overhead assets remain unchanged.

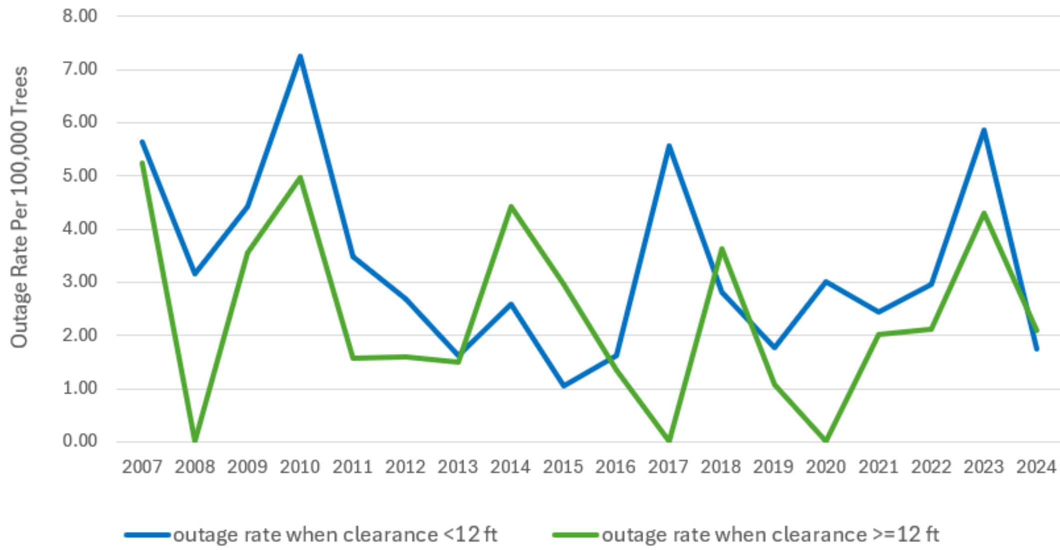
Table 5: Vegetation Caused Reportable Ignitions and Statistics (Annualized)

Mean ± Standard Deviation (μ±σ)	**PG&E (n=1025)**	**SCE (n=114)**	**SDG&E (n=18)**
Ignition per 1000 miles – HFTD	2.678 ± 0.658	0.570 ± 0.187	0.654 ± 0.501
Ignition per 1000 miles – non-HFTD	1.122 ± 0.234	0.313 ± 0.066	0.593 ± 0.382
Ignition rate per outage – HFTD	0.027 ± 0.013	0.051 ± 0.032	0.229 ± 0.206
Ignition rate per outage – non-HFTD	0.026 ± 0.008	0.032 ± 0.011	0.059 ± 0.045

Source: 2015-2022 WMP QDR

3.2.3.6 OUTAGE RATE COMPARISON BY CLEARANCE RANGE

Figure 5: Outage Rate per 100,000 Trees in the HFTD Portion of SDG&E's Service Territory from 2007 to 2024



	<12 ft	>=12 ft
average percentage of all trees inspected in HFTD (2007-2017)	73.3%	26.7%
average percentage of all trees inspected in HFTD (2018-2024)	64.6%	35.4%
outage sample	102	31
average outage rate (2007-2024)	3.3	2.4

Note: To evaluate the effectiveness of clearance, outages captured in this data sample only include trees that have been inspected and maintained prior to the outage events. The outage sample size is 133.

To effectively quantify the outage rate for trees that are either maintained[8] or pruned to an enhanced clearance, data collection must include the radial clearance at the time of inspection and pruning, as well as the estimated clearance when outages occurred. SDG&E has been collecting such data for over two decades; therefore, outage data were sampled from SDG&E's service territory to conduct this analysis.

As observed in Figure 5, in 16 out of the 18 years the outage rate for trees with enhanced clearances (>=12 ft) was lower than the trees with less clearances. This finding indicates that when vegetation clearance is maintained or pruned to enhanced clearances, it reduces the outage frequency by 27 percent on average (difference between 3.3 and 2.4).

[8] SDG&E tracks and records the radial clearance on every inventory tree at the time of routine inspections. When a tree does not require pruning in the annual inspection cycle, it means its radial clearance is maintained at a targeted sufficient distance. When a tree does require pruning after inspection, the radial clearance is pruned to a targeted sufficient distance for at least one annual cycle.

3.3 STATISTICAL ANALYSIS ON THE EFFECTIVENESS OF VEGETATION CLEARANCE

3.3.1 METHOD AND MACHINE LEARNING MODEL SELECTION FOR STATISTICAL INFERENCE

3.3.1.1 THE PURPOSE OF STATISTICAL INFERENCE AND LOGISTIC REGRESSION

The goal of this analysis is to quantify the probability of a vegetation caused outage event that could happen given the input variables, such as species or clearance and specifically how one input variable, clearance, impacts the probability of vegetation outages when holding other input variables consistent.

Logistic regression models the probability that a given input belongs to a particular class. It uses the logistic function (also known as the sigmoid function) to map predicted values to probabilities between 0 and 1. One of the strengths of logistic regression is its interpretability. The coefficients (weights) can be interpreted as the log odds of the outcome, making it easier to understand the influence of each feature (input variables).

Therefore, logistic regression was selected to quantify the influence of clearance on the probability of vegetation outages. Additionally, to understand the level of impact that clearance has on the probability of outages, a sensitivity analysis is used to answer the 'what if' question, namely, "if no trees were maintained with enhanced clearance, how many vegetation outages would have occurred?".

A modified version of the test dataset was created by adjusting records with clearance values greater than 12 feet to have values of 11 feet. This modified test dataset was then used to generate new probabilities of vegetation related outages. Differences were then compared between the probability of outage based on the actual clearance and the probability of outage when enhanced clearances (values greater than 12 feet) are modified to 11 feet.

3.3.1.2 DATA SAMPLES AND DATA FRAME USED FOR MODELING

The data sample used for this statistical inference consisted of records captured throughout the SDG&E service territory. SDG&E is the first utility in California to track and record vegetation activities and tree-related variables at the tree level. This precise data collection enables advanced statistical inference by providing detailed information on tree features. Consequently, this data sample was selected for the analysis. Data recorded from 2006 to 2022 was used to train the logistic regression model, and data recorded from 2023 to 2024 was used to conduct the sensitivity analysis.

3.3.1.3 DATA VARIABLES

The response variable positive and negative observation were encoded for each Tree ID in each calendar year. If a Tree ID had an outage, then the output was classified as 1, otherwise, the output was classified as 0. Figure 6 shows the predictive variables that are important in this model. A logistic regression model was trained to predict the probability of a tree causing an outage. This step establishes a statistical algorithm using logistic regression, which can be used to conduct the sensitivity analysis.

Figure 6: Predictive Variables used in the Final Machine Learning model

	0	Coefs
0	species_grp_Ash	-0.986696
1	species_grp_Avocado	-1.058510
2	species_grp_Brush 5X5 Bamboo	-0.041978
3	species_grp_Century Plant	0.444559
4	species_grp_Cottonwood	-0.565706
5	species_grp_Eucalyptus	-0.123354
6	species_grp_Oak	-1.021837
7	species_grp_Other	-1.343835
8	species_grp_Palm-Date	-0.060114
9	species_grp_Palm-Fan	0.821419
10	species_grp_Palm-Feather	-0.426131
11	species_grp_Pepper (California)	-0.917737
12	species_grp_Pine	-0.111842
13	species_grp_Silk Oak	-0.174798
14	species_grp_Sycamore	-0.276343
15	species_grp_Willow	-0.932854
16	vma_grp_200	-0.663902
17	vma_grp_300	-1.894322
18	vma_grp_400	-1.443127
19	vma_grp_500	-0.608306
20	vma_grp_600	-1.319338
21	vma_grp_700	-0.846762
22	growthrate_FAST	-1.448301
23	growthrate_MED	-1.833513
24	growthrate_NR	-0.133987
25	growthrate_SLOW	-1.922541
26	growthrate_VFST	-1.437415
27	LINECLR_MID_scale	-2.277939
28	DBH_MID_scale	1.670327
29	TREEHEIGHT_MID_scale	3.663053
30	enhanced_clear_yes	-0.630047

3.3.2 MODEL OUTPUT AND INTERPRETATION

Table 6 presents the results from a model trained on data from 2006 to 2022 and tested on data from 2023 and 2024. Due to the significantly lower number of positive observations compared to negative ones, the model is imbalanced. However, the primary objective of this regression is to perform a sensitivity analysis, focusing on the predicted true positive outcomes.

More details on model performance can be found in Appendix B.

Table 66: Model Output with Actual Clearance Values (unit=outages in 2023 and 2024)

Confusion Matrix Using True Clearance Values		**Actual**		
		Outage	**No Outage**	**Total**
Predicted	Outage	47	162,971	163,018
	No Outage	15	610,267	610, 282
	Total	62	773,238	773,300

According to the model output shown in Table 6, 62 actual outages were observed from 2023 to 2024 and the model correctly predicted 47 out of 62. Based on the true positive and false positive ratio derived from this true test data, these ratios are then used to split the calculated true outages and calculated false outages in Table 7.

Table 77: Model Output after Altering Clearance Values (unit=outages in 2023 and 2024)

Confusion Matrix Using Altered Clearance Values		**Calculated (used as actual)**		
		Outage	**No Outage**	**Total From Model**
Predicted	Outage	62.8	217,955.2	218,018
	No Outage	13.9	555,237.1	555,251
	Total	76.7	773,192.3	773,300

The actual values for the variable "clearance" were adjusted to 11 if they exceed 11. After modifying the clearance values, the same algorithm was rerun to generate the performance output shown in Table 7. As a result, the calculated actual outage count increased from 62 to 76.7. The following formula illustrates the difference in outage counts between scenarios where some trees have enhanced clearances and where no trees have enhanced clearances. This method indicates that enhanced clearances reduced approximately 20% of vegetation-caused contacts.

$$(76.7 \times Sensitivity\ Analysis\ Outage\ Count) - (62 \times Actual\ Outage\ Count) \\ = Approximately\ 15\ Potential\ Mitigated\ Outage$$

3.3.3 CONCLUSION OF THE STATISTICAL INFERENCE

This sensitivity analysis provides further evidence that greater clearance reduces the probability of vegetation-caused outages, thereby resulting in fewer ignitions. This method helps quantify the impact by modifying one variable while holding other variables constant. However, it does not directly specify the clearance that should be adopted.

3.4 LIMITATION OF THE STATISTICAL INFERENCE

3.4.1 DATA VARIABLES NOT INCLUDED IN THE STATISTICAL INFERENCE.

The variation in the tree canopy is not considered in the model. Based on variables used in the third-party's analysis, the average of "Tree Canopy Cover" in PG&E's service territory is close to three times the average tree canopy cover in SCE's and SDG&E's service territories.

Additionally, variation in land cover is not captured in the regression model. The land cover identified at locations where outages are observed differs between Northern and Southern California.

Wind gust is not included as a variable. This model is not designed to make real-time predictions.

4 COMMENTS ON THE THIRD-PARTY MEMO REGARDING THE EFFECTIVENESS OF ENHANCED CLEARANCE

4.1 INTERPRETATION ON THE SAMPLE SIZE OF RESPONSE VARIABLE "TIME-TO-OUTAGE"

Time-to-Outage in the third-party analysis is defined as the days between the time when a tree received a pruning or inspection that recorded a clearance and the time when a tree caused an outage. This variable is used to measure the difference in duration among clearance categories to evaluate whether greater clearance is associated with longer duration.

Table 8 is interpreted as the sample size of the response variable "time-to-outage" collected from each utility and grouped by different radial clearance category. The sample size might not represent the ratio of the outage tree population for each clearance category.

For PG&E, it should be noted that there is not a direct connection between the outage records and the vegetation management database (inspection/tree work records). The data used in Table 8 was derived by geo-referencing location of outage tree and vegetation management records and filtering results based on multiple factors described in the third-party report. Because of the high variability in factors that influence this data, no direct conclusions should be drawn from PG&E data in Table 8.

Table 88: Response variable "Time-to-Outage" by clearance and its sample size

	"Time-to-Outage" Variable Sample Size (n=1,345)			Summary Stats			
Radial Clearance Category	**PG&E**	**SCE**	**SDG&E**	**Overall Mean (time-to-outage)**	**Median (time-to-outage)**	**Standard Error (time-to-outage)**	**Standard Deviation (time-to-outage)**
0-4 ft	8	13	6	287 days	121	85.5	444
4-12 ft	268	102	139	425 days	201	25.2	569
>12 ft	760	22	27	619 days	336	21.8	619

4.2 INTERPRETATION AND COMMENTS ON "OUTAGE VARIATIONS BETWEEN WORKED AND NON-WORKED TREES"

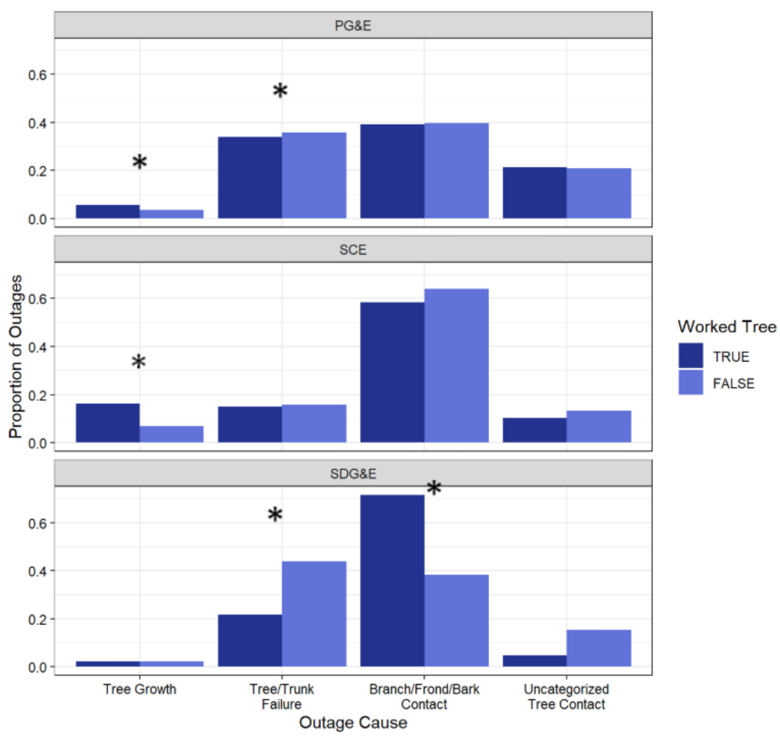
The third-party analysis stated that "IOUs differed in the proportion of outages caused by worked trees. Approximately two-thirds of SDG&E outages in the analysis subset were caused by worked trees (67.7 percent), whereas PG&E had 25.1 percent of outages caused by work trees, and SCE only had 5.0 percent of outages caused by worked trees". This information indicates the proportion of trees that caused outages were previously recorded and maintained. The word "worked trees" is used to describe such observations.

However, the third-party analysis overlooks the differences in data collection practices across the three utilities when making related statements, meaning these percentages do not reflect the true ratio. For instance, PG&E does not record data when a tree is inspected but does not require follow-up, whereas SDG&E collects data on every tree at the time of its annual inspection, regardless of whether follow-up work is needed. This explains SDG&E's 67.7 percent figure. The correct interpretation of this number is that 67.7 percent of outages are caused by trees that have records and were inspected each year. This statement does not apply to PG&E, as not every tree inspection is recorded. Similarly, SCE did not historically collect data from every inspected tree, making the linkage between inspection activities and outages unclear. Therefore, no conclusions should be based on such data.

Additionally, this information has little relevance to the effectiveness of radial clearance. Based on data collected by SDG&E, when trees were not tracked and inspected prior to an outage event, their locations were much further from the conductors and thus not recorded. When evaluating the effectiveness of radial clearance, SDG&E excludes these tree records.

Work order data records are used to determine the date of previous inspection or tree pruning activities, allowing the duration between the previous clearance and the outage to be quantified. Figure 7 from third-party report is misleading given the flaws in data records.

Figure 4: EPRI assessment Figure 3-9

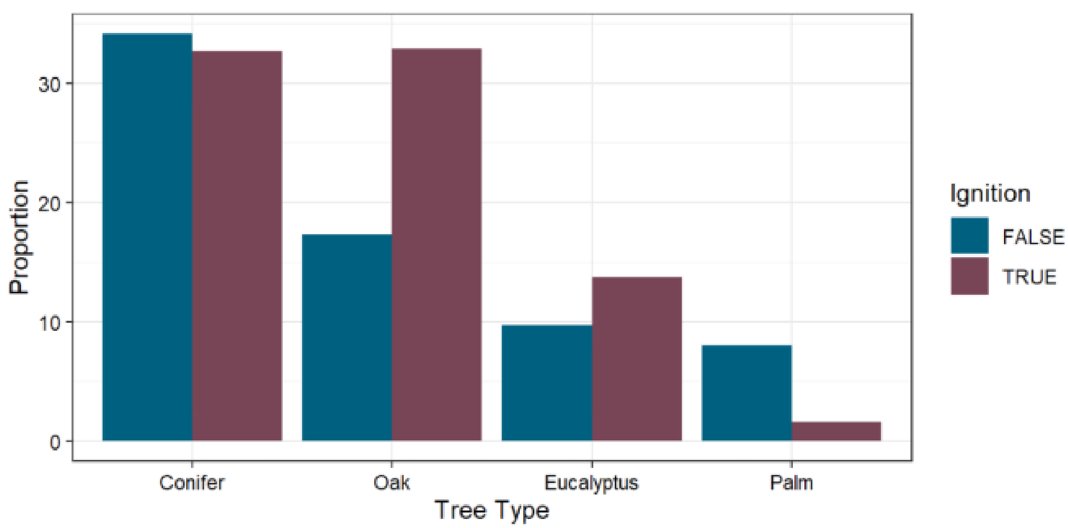


Source: Third-Party Report, Figure 3-9 The proportion of outages in each utility and outage cause based on work status (i.e., whether the tree was trimmed prior to an outage). When Worked Tree is TRUE, then the outage tree had been trimmed prior to causing an outage. Stars (*) indicate significant 2-sample proportion tests (p < 0.05) between worked-tree outages and non-worked-tree outages.

4.3 IGNITION SPECIES

The third-party analysis uses information in Figure 8 to suggest an association between tree species and ignitions. However, this graph is misleading as it may imply a direct causal relationship between species and ignition. The reality is that the likelihood of a tree species catching fire is not inherent to the species itself, but rather related to the type of fuels typically found in their vicinity. Therefore, it is the surrounding fuel types, not the tree species, that directly impact the probability of ignitions.

Figure 8: Variation in the Proportion of Outages without Ignitions and Outages Associated with Ignitions for the Top Genera Contributed to Outages.



Source: Third-Party Report, Figure 3-8 Variation in the proportion of outages without ignitions and outages associated with ignitions for the top genera contributing to outages. Conifers include Pinus spp., Sequoia spp., and Pseudotsuga spp. Oaks include Quercus spp. Eucalyptus includes Eucalyptus spp. Palms include Washingtonia spp. and unknown palms.

5 CONCLUSIONS AND RECOMMENDATIONS BASED ON ENHANCED CLEARANCE STUDY

As shown in this study, different methods have been used by the utilities and third parties to evaluate the effectiveness of enhanced clearance. Results demonstrate that greater clearance reduces the probability of outages by a measurable amount. A reduction in outage frequency can subsequently result in a lower incidence of ignitions in regions characterized by fire-prone vegetation.

However, the effectiveness of enhanced radial clearances alone in reducing the likelihood of ignitions is limited. Weather conditions can be a direct contributing factor to the probability of ignitions. For example, data has shown that the effectiveness of enhanced clearance diminishes during and after windy weather conditions. Additionally, the alteration of fuel loading under and adjacent to overhead conductors can provide additional risk-reduction benefits. Therefore, these may be considered as complementary risk control mechanisms.

Importantly, recognizing the differences between utility landscapes and land cover is crucial for effective risk management. As shown by the outage and ignition rates in this study, each utility has its own unique challenges related to risk due to differences in land cover. Utilities with significantly larger amounts of forested land face different and unique challenges compared to those with smaller service territories and less diverse land cover types. This study recommends utilities determine areas where historically higher wind gusts and drier fuel conditions may necessitate prioritization and frequency of inspection and tree pruning activities. Additional mitigation methods should be considered particularly in forest and shrubland areas. Such a strategy should consider location-specific treatments or enhanced clearance practices.

Establishing proper radial clearances at time of pruning is imperative to maintaining safety, compliance and reliability. The determination of proper clearance should take into account multiple factors including among others: species, growth rate, minimum clearance requirement, hazard abatement, line and tree movement, industry pruning standards, and tree health. There is a logical inference that increased clearances would result in reduced outages and, by association, ignitions. Indeed, recommendations set forth in General Order 95, Rule 35 state that radial clearances of 12 feet in the HFTD:

> *...are recommended minimum clearances that should be established, at time of trimming, between the vegetation and the energized conductors and associated live parts where practicable. Reasonable vegetation management practices may make it advantageous for the purposes of public safety or service reliability to obtain greater clearances than those listed below to ensure compliance until the next scheduled maintenance. Each utility may determine and apply additional appropriate clearances beyond clearances listed below, which take into consideration various factors, including: line operating voltage, length of span, line sag, planned maintenance cycles, location of vegetation within the span, species type, experience with particular species, vegetation growth rate and characteristics, vegetation management standards and best practices, local climate, elevation, fire risk, and vegetation trimming requirements that are applicable to State Responsibility Area lands pursuant to Public Resource Code Sections 4102 and 4293*.

The CPUC recommendation recognizes the establishment of enhanced clearances as a prudent method of preventing outages and ignitions that considers multiple and interrelated factors, and that this decision is made by professionals who understand and apply sound arboricultural practices. However, utility practices do not simply employ a radial clearance at time of pruning that is arbitrary or pre-determined. Rather, site-specific and tree-specific conditions should be considered to implement the most appropriate clearance to ensure compliance for the annual cycle.

This study also acknowledges the benefit of record keeping practices that connect tree related outage and ignition data to the work activity records to gain greater insight into clearance and trends in tree failure. By collecting higher frequency data over time utilities may identify patterns in vegetation growth and tree health. This will allow utilities to modify their clearance practices accordingly. Without sufficient data collection, opportunities for learning and improvement are reduced. It is recommended that each IOU make efforts to implement within their data records the ability to associate outage and ignition investigation information as part of their work activity history.

Finally, utilities, especially those with a large service territory, may benefit by leveraging remote sensing technologies such as LiDAR and satellite imagery to monitor clearance and tree health conditions. The evolution of vegetation management hinges on the development and effective use of data analytics, enabling a shift towards a more targeted and proactive vegetation mitigation strategy.

6 DISCUSSION ON COMBINED MITIGATIONS AND IMPLEMENTATIONS

The three IOUs' data sample, used in this study, does not holistically represent the effectiveness of combined mitigations. One of the main alternative mitigations is the use of covered conductor, which is used as an alternative to undergrounding and for the purpose of preventing ignitions caused by tree and power line contacts. Since covered conductor is a relatively recent engineering mitigation measure deployed by the IOUs, additional time will be required to further analyze its effectiveness combined with other mitigation measures.

Such mitigation strategies cannot be evaluated solely based on the cost-effectiveness of risk reduction. A key criterion is whether the combined mitigation can reduce the use of PSPS, enhance safety and reliability, and minimize impact to customers. Wildfires are one of the top risks facing Californians. However, a sustainable and reliable energy infrastructure is crucial for the future of electrification, social stability, economic growth, and long-term prosperity of the region.

The IOUs will explore further studies on alternative mitigations that involve enhanced tree pruning and associated lifecycle cost. The future implementation and milestones will depend on the effectiveness of this combined mitigation approach.

Appendix A: Supporting Data

Data Variables

Variable	Description
ANSI	American National Standards Institute
avg. ignition per 1000 miles	Total number of ignitions that occur over a given length of infrastructure and dividing it by the total miles of that infrastructure, multiplied by 1000.
avg. ignition rate per outage	Total number of ignitions divided by the total number of outages.
avg. outage rate per 1000 miles	Total number of outages that occur over a given length of infrastructure and dividing it by the total miles of that infrastructure, multiplied by 1000.
CPUC	California Public Utilities Commission
enhanced clearance	clearances of 12 feet and above
EPRI	Electric Power Research Institute
GO	General Order
HFTD	High Fire Threat District
HWW	high wind warning condition issued by the National Weather Service. A High Wind Warning is issued when sustained winds of 40 mph or higher are expected for at least an hour, or wind gusts of 58 mph or more are anticipated. "HWW" used in this paper are HWW conditions associated with winter storms and precipitation, without overlapped RFW conditions.
IOUs	investor-owned utilities: San Diego Gas & Electric Company (SDG&E), Pacific Gas and Electric Company (PG&E), and Southern California Edison Company (SCE)
land cover	In the context of the National Land Cover Database (NLCD), land cover refers to the physical material at the surface of the earth. The NLCD provides detailed land cover data at a 30-meter spatial resolution, which is used for various environmental, land management, and modeling applications.
NLCD	National Land Cover Database
Overhead Circuit Miles (OCM)	Overhead Circuit Mile (OCM) days is a metric collected in QDR Table 4. It measures the exposure of the overhead asset to a certain weather condition by using the product of time duration and circuit mile length. This can be used to understand some of the weather factors and general differences between each event or year.
PSPSs	Public Safety Power Shutoffs
QDR	Quarterly Data Reporting
RFW	Red Flag Warning issued by National Weather Service to alert areas of critical fire weather conditions, such as strong winds and low humidity, which could lead to extreme fire behavior.
SRA	State Responsibility Area
WUI	Wildland-Urban Interface

Supporting Data for Figure 1 and Table 1

Utility Name	Circuit Miles within the Service Territory	Developed	Forest	Shrub	Wetland	Working	Low Veg Cover	Unknown	Totals
PG&E	Circuit Miles (HFTD)	10,621	5,905	4,697	181	3,845	44		25,293
PG&E	Circuit Miles (non-HFTD)	32,911	279	649	411	20,069	166		54,485
Utility Name	**Outages (IOUs)**	**Developed**	**Forest**	**Shrub**	**Wetland**	**Working**	**Low Veg Cover**	**Unknown**	**Totals**
PG&E	Counts (HFTD)	6,128	7,968	1,064	97	563	49	376	16,245

PG&E	Counts (non-HFTD)	9,358	1,367	402	144	1,683	45	184	13,183
Utility Name	**Circuit Miles within the Service Territory**	**Developed**	**Forest**	**Shrub**	**Wetland**	**Working**	**Low Veg Cover**	**Unknown**	**Totals**
SCE	Circuit Miles (HFTD)	6,381	466	4,743	127	2,007	18		13,743
SCE	Circuit Miles (non-HFTD)	26,443	9	6,601	56	3,105	573		36,787
Utility Name	Outages (IOUs)	Developed	Forest	Shrub	Wetland	Working	Low Veg Cover	Unknown	total
SCE	Counts (HFTD)	728	125	95	5	33	1		987
SCE	Counts (non-HFTD)	2,262	2	14	0	62	14		2,354
Utility Name	**Circuit Miles within the Service Territory**	**Developed**	**Forest**	**Shrub**	**Wetland**	**Working**	**Low Veg Cover**	**Unknown**	**Totals**
SDG&E	Circuit Miles (HFTD)	1,338	72	1,607	61	296	3		3,378
SDG&E	Circuit Miles (non-HFTD)	2,799	1	115	9	22	5		2,950
Utility Name	**Outages (IOUs)**	**Developed**	**Forest**	**Shrub**	**Wetland**	**Working**	**Low Veg Cover**	**Unknown**	**Totals**
SDG&E	Counts (HFTD)	91	6	30	5	2	0		134
SDG&E	Counts (non-HFTD)	340	1	0	0	0	0		341

Supporting Data for Figure 2

Circuit Miles as of 2024Q1

SDG&E	HFTD	3,363
SDG&E	Non-HFTD	2,951
PG&E	HFTD	24,694
PG&E	Non-HFTD	55,243
SCE	HFTD	9,439
SCE	Non-HFTD	28,381

Distribution – No RFW or HWW

Outages	Tier	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Sum
SDG&E	HFTD	7	15	11	5	6	4	6	3	0	0	57
SDG&E	Non-HFTD	18	33	17	16	20	24	23	68	51	0	219
PG&E	HFTD	2005	2310	3752	1714	4304	2134	2503	1263	2086		19985
PG&E	Non-HFTD	1695	2059	3540	1496	2954	1577	4221	2324	7548		19866
SCE	HFTD	85	153	127	84	168	66	74	63	112		820
SCE	Non-HFTD	287	355	277	182	276	152	201	187	0	240	1917

Distribution – No RFW or HWW

Outages	Tier	HFTD%	Non-HFTD%	Average	Annualized HFTD%	Annualized non-HFTD%
SDG&E	HFTD	0.21		7	0.21	
SDG&E	Non-HFTD		0.79	27		0.79
PG&E	HFTD	0.50		2498	0.50	
PG&E	Non-HFTD		0.50	2483		0.50
SCE	HFTD	0.30		103	0.30	
SCE	Non-HFTD		0.70	240		0.70

Supporting Data for Figure 3

Distribution – RFW Days

Outages	Tier	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Sum
SDG&E	HFTD	0	0	4	7	0	1	0	0	0		12
SDG&E	Non-HFTD	0	0	3	5	2	1	0	0	0	0	11
PG&E	HFTD	4	1	118	51	21	142	64	4	2		405
PG&E	Non-HFTD	5	1	123	26	254	155	163	35	0	0	762
SCE	HFTD	0	5	50	19	9	16	9	0	2		108
SCE	Non-HFTD	0	14	67	92	35	41	24	0	3	0	273

Distribution – RFW Days

Outages	Tier	HFTD%	Non-HFTD%	Average if not 0	HFTD%	Non-HFTD%
SDG&E	HFTD	0.52		4	0.59	
SDG&E	Non-HFTD		0.48	3		0.41
PG&E	HFTD	0.35		51	0.35	
PG&E	Non-HFTD		0.65	95		0.65
SCE	HFTD	0.28		18	0.28	
SCE	Non-HFTD		0.72	46		0.72

Distribution – HWW Only Days

Outages	Tier	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Sum
SDG&E	HFTD	1	2	7	0	0	1	1	4			16
SDG&E	Non-HFTD	1	11	28	2	0	0	7	1			50

Outages	Tier	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Sum
PG&E	HFTD	22	37	402	1	341	0	358	7	0	167	1168
PG&E	Non-HFTD	13	23	245	2	291	3	267	7	0	106	851
SCE	HFTD	11	14	17	3	10	19	3	6			83
SCE	Non-HFTD	18	16	80	31	20	12	3	2			182

Distribution – HWW Only Days

Outages	Tier	HFTD%	Non-HFTD%	Average if not 0	HFTD%	Non-HFTD%
SDG&E	HFTD			3	0.24	
SDG&E	Non-HFTD			8		0.76
PG&E	HFTD	0.58		167	0.61	
PG&E	Non-HFTD		0.42	106		0.39
SCE	HFTD	0.31		10	0.31	
SCE	Non-HFTD		0.69	23		0.69

Supporting Data for Figure 4

Utility	Year	Outages – no HWW or RFW	Outages – HWW Only	HWW OCM Days
PG&E	2015	3700	35	2394
PG&E	2016	4369	60	28023
PG&E	2017	7292	647	140758
PG&E	2018	3210	3	3997
PG&E	2019	7258	632	83182
PG&E	2020	3711	3	4862
PG&E	2021	6724	625	11470
PG&E	2022	3587	14	3235
SCE	2015	372	29	78965
SCE	2016	508	30	116378
SCE	2017	404	97	144820
SCE	2018	266	34	133880
SCE	2019	444	30	95208
SCE	2020	218	31	127914
SCE	2021	275	6	117529
SCE	2022	250	8	168192
SDG&E	2015	25	2	51232
SDG&E	2016	48	13	13752
SDG&E	2017	28	35	107922
SDG&E	2018	21	2	53298

Utility	Year	Outages – no HWW or RFW	Outages – HWW Only	HWW OCM Days
SDG&E	2019	26	0	26852
SDG&E	2020	28	1	25667
SDG&E	2021	29	8	44509
SDG&E	2022	29	5	20708

Source: WMP QDR 2022 Q3 and Q4 Table 6 - High wind warning overhead circuit mile days

Supporting Data for Table 5

Utility			2015	2016	2017	2018	2019	2020	2021	2022
PG&E	Ignitions	Ignitions - HFTD	62	63	101	68	62	65	66	42
		Ignitions - non- HFTD	45	45	76	57	76	63	75	59
		avg. ignition per 1000 miles - HFTD	2.51	2.55	4.09	2.75	2.51	2.63	2.67	1.70
		avg. ignition per 1000 miles - non- HFTD	0.81	0.81	1.38	1.03	1.38	1.14	1.36	1.07
	Ignition rate per outage	avg. ignition rate per outage- HFTD	0.03	0.03	0.02	0.04	0.01	0.03	0.02	0.03
		avg. ignition per outage - non- hftd	0.03	0.02	0.02	0.04	0.02	0.04	0.02	0.02
SCE	Ignitions	Ignitions – HFTD	6	5	6	5	3	3	8	7
		Ignitions - non- HFTD	7	7	10	10	10	8	12	7
		avg. ignition per 1000 miles - HFTD	0.63	0.53	0.63	0.53	0.32	0.32	0.84	0.74
		avg. ignition per 1000 miles - non- HFTD	0.25	0.25	0.35	0.35	0.35	0.28	0.42	0.25
	Ignition rate per outage	avg. ignition rate per outage- HFTD	0.06	0.03	0.03	0.05	0.02	0.03	0.09	0.10
		avg. ignition per outage - non- HFTD	0.02	0.02	0.02	0.03	0.03	0.04	0.05	0.04
SDG&E	Ignitions	Ignitions - HFTD	5	2	2	0	1	0	0	1
		Ignitions - non- HFTD	0	2	1	3	0	1	0	0
		avg. ignition per 1000 miles - HFTD	1.49	0.59	0.59	0.00	0.30	0.00	0.00	0.30
		avg. ignition per 1000 miles - non- HFTD	0.00	0.68	0.34	1.02	0.00	0.34	0.00	0.00
	Ignition rate per outage	avg. ignition rate per outage- HFTD	0.63	0.12	0.09	0.00	0.17	0.00	0.00	0.14
		avg. ignition per outage - non- HFTD	0.00	0.05	0.02	0.13	0.00	0.04	0.00	0.00

Supporting Data for Figure 5

Year	Outage Rate* when Clearance is Less Than12 ft	Outage Rate* when Clearance is Greater Than or Equal to 12 ft
2007	5.63	5.25
2008	3.15	0
2009	4.43	3.56
2010	7.25	4.97
2011	3.48	1.56
2012	2.69	1.59
2013	1.62	1.49
2014	2.59	4.41
2015	1.04	2.95
2016	1.62	1.35
2017	5.55	0
2018	2.81	3.64
2019	1.78	1.07
2020	3.02	0
2021	2.43	2.02
2022	2.96	2.12
2023	5.87	4.29
2024	1.75	2.1

**Outages Rate per 100,000 trees*

Appendix B: Model Output and Interpretation

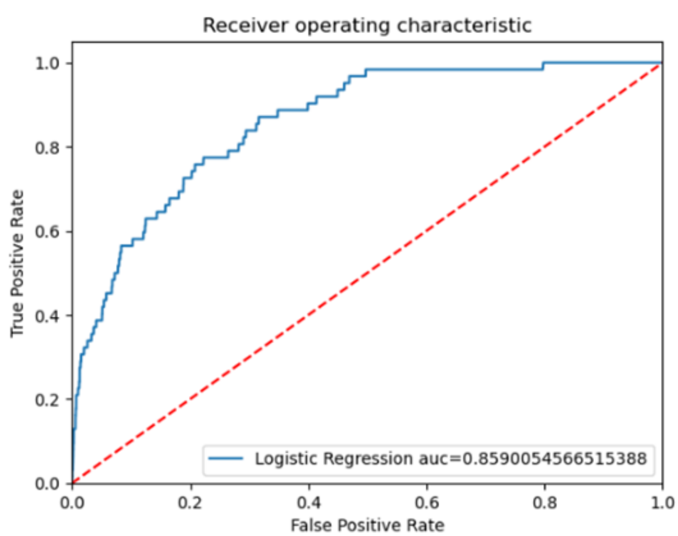
Sensitivity Analysis for Enhanced Clearance

The Vegetation Management Analytics repository contains three scripts essential for completing the dataset for sensitivity analysis. The first script retrieves and cleans vegetation management data from 2006 onwards, writing the output to S3. The second script separates outage data from other activities, linking outages to previous activities to analyze their impact on outage probability, and writes the processed data to S3. The third script prepares this data for modeling by correcting values, reducing features, and encoding variables, then generates a classification model to predict outcomes based on adjusted line clearance distances. The analysis uses Logistic Regression from scikit-learn package 1.2.0, considering factors like target species, vegetation management area, tree growth rate, Last Line Clearance Distance, Tree Diameter at Breast Height, Tree Height, Enhanced Clearance (Yes/No above 11 ft).

The sensitivity analysis examines the impact of changing line clearance distances for the test set (2023 & 2024). If the line clearance distance for a FacilityId was greater than 11 feet, it was reduced to 11 feet. The same threshold value was used to identify predicted outages versus no outages. The confusion matrix distribution from the actual test set was used to estimate potential mitigated vegetation-related outages.

Model Performance

AUC Curve



Threshold value was selected based on maximizing True Positives while also minimizing the False Positive rate (.0000700986). Used the Model that was generated from the Training dataset and Test performance on years not used for training (2023 & 2024).

2023 & 2024 Test

	Outage	No Outage	Total
Predicted Outage	47	162,971	163,018

	Outage	No Outage	Total
Predicted No Outage	15	610,267	610, 282
Total	62	773,238	773,300

Accuracy: 78.9%

Recall: 75.8%

Total Observations returned with positive prediction: 21.1%

Although this model is not perfect, it does appear it is capturing risk for the trees that did experience vegetation related outage in the following year. We can change underlying data values to understand the impact a variable may have on a FacilityId's risk probability. As data is changed, for this analysis it was assumed that the distribution of Outage and No Outage across Predicted Outage and Predicted Outage would be the same.

2023 & 2024 Distribution	Outage	No Outage	Total
Predicted Outage	0.000288	.999712	163,018
Predicted No Outage	0.000025	.999975	610,282

Sensitivity Analysis

The Sensitivity Analysis was done to understand Line Clearance distance's impact on a trees risk probability score. Line Clearance Distance was changed for the Test set (2023 & 2024). If FacilityId Line Clearance >11 (enhanced clearance) then it was reduced to 11. The same threshold value (0.0000700986) was used to identify if a FacilityId in the Test Set (changed data) was Predicted Outage vs Predicted No Outage. The Confusion matrix distribution from the actual test set was used to estimate potential mitigated Vegetation related outages.

Below is the estimated impact on outages by bringing observations with enhanced clearances down to 11 feet.

2023 & 2024 Changed Data	Outage	No Outage	Total
Predicted Outage	62.8 (calculated)	217,955.2 (calculated)	218,018 (from model)
Predicted No Outage	13.9 (calculated)	555,237.1 (calculated)	555,251 (from model)
Total	76.7	733,192.3	773,300

Difference in Outages: 76.7 (Sensitivity Analysis Outage count) - 62 (Actual Outage count) = ~15 (14.7) potential mitigated outages

The same analysis was done but separately by years of data as there was significant outage differences from 2023 to 2024.

2023 & 2024 Test Performance by Year

2023 Test Performance	Outage	No Outage	Total
Predicted Outage	35	78,263	78,298
Predicted No Outage	10	308,065	308,075
Total	45	386,328	386,373

2024 Test Performance	Outage	No Outage	Total
Predicted Outage	12	84,708	84,720
Predicted No Outage	5	302,202	302,207
Total	17	386,910	386,927

Below is the percentage distribution for each group calculated from performance of the machine learning model.

2023 % Distribution	Outage	No Outage	Total
Predicted Outage	0.0004470	.999553	78,298
Predicted No Outage	0.0000326	.999968	308,075

2024 % Distribution	Outage	No Outage	Total
Predicted Outage	0.0001416	.999858	84,720
Predicted No Outage	0.0000165	.999983	302,207

Same assumed performance distribution is used to understand potential mitigated outages.

2023 Changed Data	Outage	No Outage	Total
Predicted Outage	47.5	106,271.5	106,319
Predicted No Outage	9.1	280,044.9	280,054
Total	56.6	386,316.4	386,373

2024 Changed Data	Outage	No Outage	Total
Predicted Outage	15.8	111,714.2	111,730
Predicted No Outage	4.6	275,192.4	275,197
Total	20.4	386,906.6	38,6927

By year total Predicted outage = 77, actual outage count for the same period is 62, looking at it by year this analysis shows that potential outages mitigated by enhanced clearance over two years is 15. By year this would be a difference of 11.6 outages in 2023 and 3.4 outages in 2024.

Attachment C: Joint Investor-Owned Utility (IOU) Study on the Effectiveness of Enhanced Vegetation Clearances for Wildfire Management

2024 TECHNICAL UPDATE

Joint Investor-Owned Utility (IOU) Study on the Effectiveness of Enhanced Vegetation Clearances for Wildfire Management

Draft Report for San Diego Gas & Electric, Southern California Edison, and Pacific Gas & Electric

Joint Investor-Owned Utility (IOU) Study on the Effectiveness of Enhanced Vegetation Clearances for Wildfire Management

Draft Report for San Diego Gas & Electric, Southern California Edison, and Pacific Gas & Electric

SUBMITTED ON DECEMBER 19, 2024. REVISED ON FEBRUARY 11, 2025.

EFFECTIVENESS OF ENHANCED VEGETATION CLEARANCES FOR WILDFIRE MANAGEMENT

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ABSTRACT

The three California investor-owned utilities (IOUs) are interested in examining whether enhanced vegetation clearances lead to an effect on outages and ignitions. To explore this question, EPRI created a joint database of information from the IOUs, which included 33 categories of variables. This database was curated to include variables that were expected to affect outages and ignitions. The database was used to examine enhanced vegetation and outage cause, outages in high fire threat districts, outages leading to reportable ignitions, outages on trees with recent trimming, and the effect of radial clearance. In this study, EPRI presents how the database was created, the methodology used for analysis, results, discussion, and potential next steps for the utilities. The outcomes presented here can be used to consider how enhanced vegetation management can be tailored or targeted.

Keywords

Enhanced clearances; high fire threat districts; outage; ignition; land cover; weather; radial clearance; database

EXECUTIVE SUMMARY

Product Title: Joint Investor-Owned Utility (IOU) Study on the Effectiveness of Enhanced Vegetation Clearances for Wildfire Management: Draft Report for San Diego Gas & Electric, Southern California Edison, and Pacific Gas & Electric

Primary Audience: Utility professionals with expertise in risk management, statistics, operations, and regulatory affairs who are exploring the effectiveness of managing wildfire risk (in terms of outages and ignitions) through vegetation management.

Secondary Audience: Utility professionals in general who are interested in managing wildfire risk in their service territories and regions.

KEY RESEARCH QUESTIONS

1. Can we collect data from all three California investor-owned utilities (IOUs), share curated data with all parties in a secure environment, and share results of data analysis on enhanced vegetation management?

2. Does enhanced vegetation management lead to reduced outages and reduced ignitions in the service territories of San Diego Gas & Electric, Southern California Edison, and Pacific Gas & Electric Company?

3. What is the role of weather and abiotic factors on outages and ignitions?

RESEARCH OVERVIEW

To answer the research question, a joint database was created, using data from San Diego Gas & Electric, Southern California Edison, and Pacific Gas & Electric. This study provides an overview of the creation of a joint IOU database, filtering the common database for analysis, statistical methods used, and the results of the analysis. The results are divided into variation in the outage subset, outages in high fire threat districts, outages leading to reportable ignitions, outage variation between worked and non-worked trees, and the effect of radial clearance. This exploration was designed to provide insight to help utilities understand how to target and focus their vegetation management actions.

KEY FINDINGS

- Outage Variation
    - The number of outages varied annually and seasonally. Winter months (December – February) tended to have the largest peaks in outage counts, which could be explained by weather variables. These peaks co-occurred with low temperatures and high wind speeds.

- Outage Cause
  - A low proportion of total outages for each utility are caused by vegetation growing into the lines, showing evidence of a direct benefit from vegetation management.
  - The greatest proportion of outages from each utility was caused by a part of a tree (e.g., branch, bark, frond) contacting the line.
- Outages in High Fire Threat District
  - PG&E and SCE had a greater proportion of outages in HFTD than expected when compared to the proportion of primary overhead distribution circuit miles in HFTD. However, SDG&E had a lower proportion of HFTD outages than expected.
  - Variation in land cover and tree canopy cover among utility service territories may help explain differences in the proportion of outages that occur within high fire threat districts.
- Outages Leading to Reportable Ignition
  - Combining all utilities, approximately 2% of analyzed outages resulted in an ignition.
  - Most of these outage-ignitions occurred in developed areas for SCE and SDG&E; however, PG&E had more variation in land cover. PG&E was the only utility with these outage ignitions occurring in forested areas, which had the highest percentage among PG&E outage-ignitions.
  - A greater proportion of outages were related to an ignition in the summer months. Weather conditions during summer months indicated that outage-ignitions occurred more in hotter, drier conditions, on average.
- Worked Trees
  - A greater proportion of outages caused by worked trees were categorized as vegetation growth-caused outages than outages by trees that had not been worked (i.e., previously trimmed) for PG&E and SCE.
  - Similarly, SDG&E had a greater proportion of outages caused by worked trees were categorized as branch/frond/bark-caused outages than outages by trees that had not been worked (i.e., previously trimmed).
  - SDG&E had a smaller proportion of outages caused by worked trees were categorized as tree/trunk failure-caused outages than outages by trees that had not been worked (i.e., previously trimmed).
  - Each utility had evidence that outage trees that had been previously trimmed were closer to the line than outage trees that had not been previously trimmed.
  - These differences suggest that vegetation trimming can help reduce the occurrence of grow-in and blow-in outage causes, specifically, by managing trees that are closer to the line. However, fall-in outage causes may be influenced more by a hazard tree management program.

- Effect of Radial Clearance
    - Utilities experienced a reduced proportion of outages caused by vegetation growth as radial clearance increased. PG&E also experienced a reduced proportion of branch/frond/bark-caused outages as radial clearance increased. These results support the outage cause results for worked trees and provide further evidence that enhanced clearance distances can provide greater benefits.
    - Using time-to-outage as a response variable to test the effectiveness of radial clearance, we found that enhanced clearance distances led to longer time elapsed between management and a subsequent outage. Considering that lines are inspected on a regular basis, this increase in time-to-outage implies that maintaining radial clearance at an increased distance will reduce the likelihood that an outage will occur before the lines are inspected again.
    - In a modeling framework alongside other variables, increasing radial clearance was still significant and provided benefits for time-to-outage; however, other variables explained more variation in the outage data. The utility, year, distance to the line, temperature and wind direction were also important in explaining variation.

WHY THIS MATTERS

The value of this research is to provide the results of an initial exploration of data from three California IOUs. It represents the first effort in the United States to collect, curate, and compile data from three organizations to provide a database which can be analyzed to address important issues of wildfire management. The analysis presented in this report goes into detail on vegetation management, outages, and ignitions and their links. Additionally, the database can be used to answer many different questions beyond the key questions described here, and some options are presented at the end of the study.

HOW TO APPLY RESULTS

Reviewing the results of this study might provide insights to California IOU wildfire mitigation planners, vegetation experts, and operations experts regarding the implementation of enhanced vegetation clearances. The key findings of the study (above) suggest areas for consideration in terms of management of trees. Utility subject matter experts at the California IOUs can work together with these results to discuss how to best translate these statistical findings into management actions.

LEARNING AND ENGAGEMENT OPPORTUNITIES

Distribution Grid Resiliency: Vegetation Management (EPRI Report 3002006781). The report provides the results an industry survey and interview, as well as suggestions of gathering of specific types of data in the future to prioritize vegetation management resiliency improvements.

SCE Fuel Removal Assessment for Wildfire Mitigation (EPRI Report 3002023370). In 2019-2022, the team developed a report titled to document current fuel removal practices across the company's rights of way located within US Forest Service (USFS) land and explore data driven decisions for moving forward.

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1 INTRODUCTION

Wildfires have a wide-reaching effect on the environment, utility assets, and surrounding communities. The implications from wildfire can range from service disruptions to damaged assets and legal liability, which can translate to infrastructure and financial losses for utilities and additional financial and societal losses. California utilities must meet regulatory requirements related to wildfire risk, which includes compliance with California Public Utility Commission (CPUC) General Orders and statutory obligations concerning vegetation management, development of Wildfire Mitigation Plans (WMPs), master special use permits, laws and regulations with the U.S. Forest Service, and additional requirements regarding rights of way (ROW) vegetation management.

One key area of practical research is vegetation management and how it may affect outages. There are many different options for vegetation management, depending on regulations, ecosystem aspects, precipitation, fire regimes, abiotic factors, proximity to communities, and other factors. An important type of more aggressive vegetation management is enhanced vegetation clearances, which is the subject of this study.

The research question for this study centers around the effectiveness of enhanced vegetation clearing and its potential effects on ignition risk and outages. The three investor-owned utilities (IOUs) in California were interested in a joint study to examine the effectiveness of enhanced clearances across their diverse territories. EPRI responded to a Request for Proposals (RFP) from San Diego Gas & Electric to address this issue.

In this study, EPRI had three distinct phases: Database Evaluation; Database Development; and Data Analysis. During the Database Evaluation, the team investigated each utility's data individually then examined the lessons learned to assess the broader applicability. During Database Development, EPRI initiated the development of a cross utility database and designed the criteria around how the common database was populated. In the Data Analysis phase, EPRI examinee a selection of key variables used in the joint IOU common database. This technical update describes a two-year effort to create a joint database across the three utilities focused on tree-caused risk events. The Data Analysis considers variety of vegetation, outage, ignition, biotic, and abiotic factors. This study presents an initial exploration of the joint IOU database and has the potential to address short and long-term research needs in California, where wildfire risk is not expected to decrease in the coming decades.

2 METHODS

Common Database Creation

Overview

EPRI examined various aligned datasets related to vegetation risk events from the three utilities participating in the Joint IOU Enhanced Vegetation Clearance Project. Variables were aggregated into an SQL database built from the individual utility datasets provided in the project. The SQL database, referred to as the Joint Utility Vegetation Management database, includes data from the following datasets from at least one of the utilities: vegetation management (inspection and trim records), tree records for maintained trees, vegetation-caused outage reports, and fire ignition related to vegetation-caused outages. EPRI also integrated a few external datasets into the SQL database, which provided additional biotic and abiotic data for analysis that were consistent among utilities. External datasets included ERA5 (Hersbach et al. 2020) and ERA5-Land (Muñoz-Sabater et al. 2021) climate variables, National Land Cover Database (NLCD) land cover classification types (USGS 2024), and U.S. Forest Service NLCD tree canopy cover (USFS 2023). Raw datasets were in the following file formats: Microsoft Excel, Microsoft Excel CSV, KMZ, and various GIS vector- and raster-based file formats.

EPRI collected and standardized utility and external data into the joint database to facilitate common analyses of vegetation-caused distribution outages among utilities. The database includes data stored in multiple tables (Table 2-1), which contain all the data used in the project for the EPRI analysis. Additionally, the tables are made available to utility members of the project via the EPRI Data Science Platform (DSP) in two forms: a SQL database and through a collection of .csv files that contain the same information.

Table 2-1 Tables in the Joint Utility Vegetation Management Database

Table Name	Table Description
Outage	Standardized outage variables derived from utility data
ERA5_Weather	Weather variables for each outage derived from ERA5 and ERA5-Land climate reanalysis data
LandCover	Land cover and tree canopy cover variables for each outage derived from NLCD data
IOU_Circuit	Circuit mile information for IOU overhead primary lines derived from IOU spatial files of assets
Utility	Lookup table for UtilityID from the Outage table
OutageCause	Lookup table for OutageCauseID from the Outage table
RadialClearanceCategory	Lookup table for RadialClearanceCategoryID from the Outage table
DBHCategory	Lookup table for DBHCategoryID from the Outage table
TreeCondition	Lookup table for TreeConditionID from the Outage table
TreeHeightCategory	Lookup table for TreeHeightCategoryID from the Outage table
TreeGrowthRate	Lookup table for TreeGrowthRate from the Outage table
NLCD	Lookup table for NLCD land cover classification from LandCover table

The EPRI SQL database for the project contains all the datasets provided. The common data from all three utilities were placed in the Joint Utility Vegetation Management database. Both databases reside in EPRI DSP, a secure platform on EPRI-owned and -managed servers. The EPRI DSP provides a path for both EPRI and designated analysts from each utility to access the data via a virtual machine using the Citrix Work as shown in Figure 2-1. As depicted in the graphic, EPRI loaded the data from each utility into the Intake folder designated by utility – datasets 6XX, 6YY, and 6ZZ. Once in the DSP, data was moved to the Raw Folder. The raw folder contains all the original datasets supplied by the utilities. Data in this folder and all other project folders have an EPRI-restricted classification. This is the highest data classification and limits data access to a subgroup of EPRI staff working on the project. The SQL database built to hold all project data is shown as the DSP "Master" Database. The EPRI Dataset 6TT contains the Work and Final folders that contain results and working files associated with the project. EPRI has access to all datasets in both the "Master" database and the Joint Utility Vegetation

Management database, as well as the Individual Utility Datasets (8XX, 8YY, and 8ZZ) folders through its virtual machine.

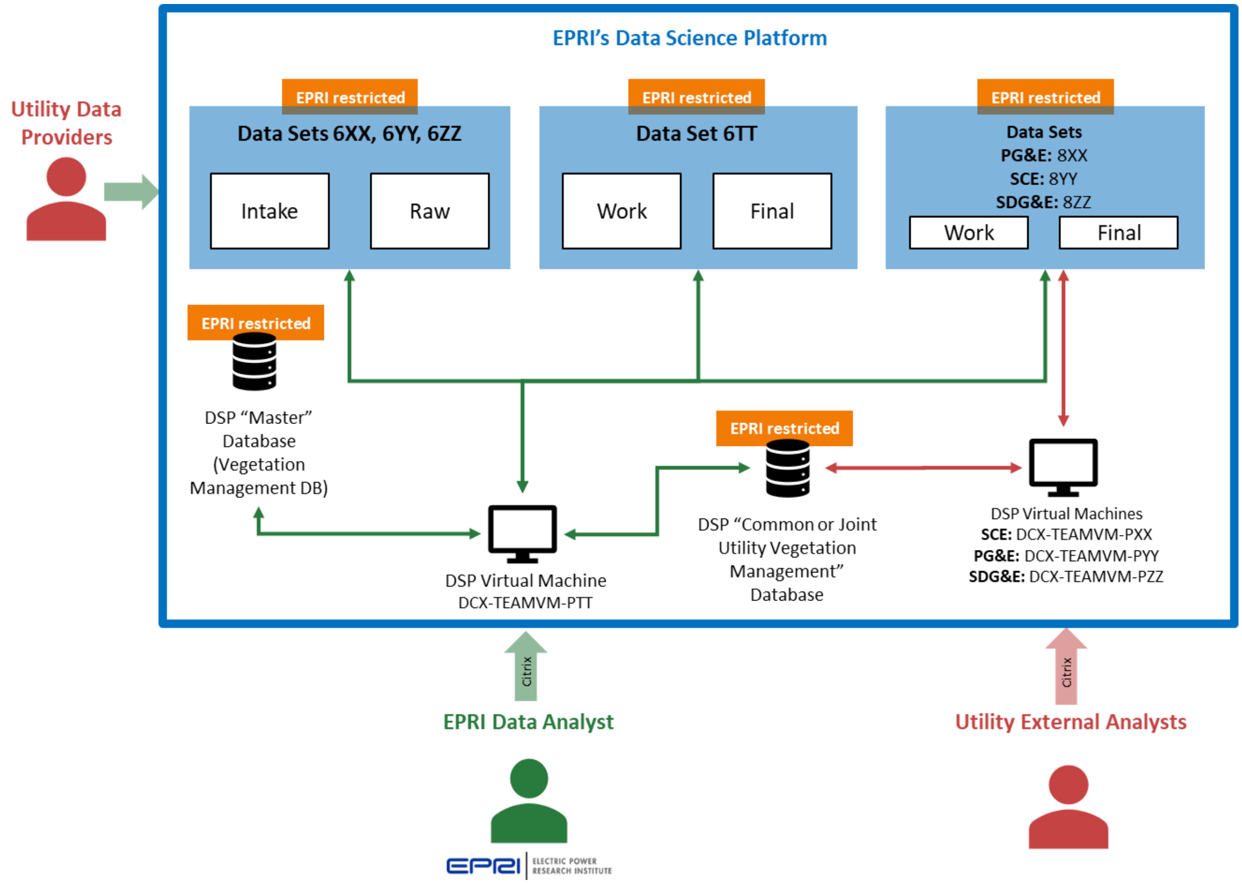

Figure 2-1 Setup of the Data Science Platform for the Project

Utility access to the Joint Utility Vegetation Management SQL database and the equivalent .csv files occurs via a dedicated utility virtual machine, as denoted in Figure 2-1. The dedicated utility virtual machine is loaded with applications, such as Python and R, for the utility to analyze the data. Also, the virtual machine has applications, such as SQL Management Studio and Visual Studio Code, that helps the utility analyst access the data more easily. Only the persons designated by the utility have access to the utility specific virtual machines. The utility users share a designated virtual machine and thus have access to the uploaded files by EPRI, derivative files, and analysis results saved to the Work and Final folders. Note that EPRI will include a read.me file containing information about the data in the database and the .csv files that mirror the tables in the database. Each user has read/write permissions.

Data with Joint Utility Vegetation Management Database

The assembly of the Joint Utility Vegetation Management database had many identified challenges. The project team, EPRI and the three utilities, spent most of a year discussing and working through challenges to assemble over a decade of data into a common database. The following is a list of challenges in creating the common database:

- **Non-standard data representation:** There is no standard information model for vegetation management, as there is for utility infrastructure, which is the Common Information Model. Each utility has its schema for collecting, formatting, and storing data. Each data model for a given utility evolved over time. This evolution meant that each utility had non-standard ways of representing the data collected.
- **Siloed data:** Vegetation management data, outage data, biotic and abiotic data, and other miscellaneous data were in different databases and generally had different data owners. Some data, such as the weather and tree cover data, were acquired from external sources.
- **Obtaining the data:** Each company had to work with various internal groups to obtain the agreed-upon data variables. At times, there were multiple attempts to compile and share the data due to data extraction errors, missing data, and different file formats.
- **Sharing of data:** Each company has its own data-sharing method. Most data-sharing methods were geared towards contractors working with data, not an external research institute. As a result, adaptations were made to share data EPRI via a secure file transfer method.
- **Merging of the data:** Some nominal, ordinal, and interval variables selected for the common database had unique categories at each utility. Discussions were required to determine the best categories for each variable across all three utilities.
- **Missing data for important variables:** EPRI worked with utilities to determine ways to merge data to obtain a measurement or indication for variables they may not have collected during vegetation management work or other inspections. In some cases, there were no variables to link the databases. As a result, geospatial coordinates were used to link datasets, such as the outage and the vegetation management datasets, to create data for a variable not collected by the utility. Appendix A contains descriptions of how EPRI joined datasets using spatial location to derive values for certain variables in the database.
- **Triangulating:** Determining the vegetation management parameters during an outage is difficult. Generally, there is data from the last vegetation trim cycle or inspection. This data collection may be days, weeks, or months before the outage. Thus, the analyst must infer the parameters during the outage. This could be as simple as using the last observations, whether from an inspection or data collected at the time of vegetation management.

The challenges associated with merging data from three utilities were overcome to create a unique database to analyze vegetation management practices across California. This database will serve as a foundation for future research and is set up to add additional data to advance learning associated with vegetation management.

The primary data table with the Joint Utility Vegetation Management database is the Outage Table. It contains 33 variables that are common across all three utilities. Table 2-2 shows the variables, the description of the variable, and values associated with the variables in the Outage Table.

Table 2-2 Outage Table in the Joint Utility Vegetation Management Database

Variable	Description	Values
UtilityID	Identifies utility without providing name	1-3
OutageID	Unique identifier for each outage (from utility outage data)	
DateTreeCausedOutage	Date and time of outage	YYYY:MM:DD hh:mm:ss
LastVegManDate	Date of last vegetation management (for inventory trees)	YYYY:MM:DD
LastInspectionDate	Date of last vegetation inspection (for inventory trees)	YYYY:MM:DD
Circuit	Circuit name or number where the outage occurred (given by utility)	
DistributionSystem	Whether an outage occurred on the primary distribution	0 (False), 1 (True)
OutageCauseID	Cause of outage given in common scale	1-13
TreeID	Identifier for tree causing the outage (given by utility)	
TreeInInventory	Where tree causing the outage was managed before the outage (i.e., inspected and possibly trimmed)	0 (False), 1 (True)
ForesterInspectionComments	Comments from outage inspection	
IgnitionRelatedToOutage	Whether the outage resulted in an ignition	0 (False), 1 (True)
ESA	Whether an outage occurred in an environmentally sensitive area	0 (False), 1 (True)
LatDamage	Latitude of outage (decimal degrees)	
LonDamage	Longitude of outage (decimal degrees)	
RadialClearanceCategoryID	Radial clearance at the time of last management (inspection or trim) given in common scale	1-3
Distance Tree causing Outage	Horizontal distance from the tree causing outage to line (ft)	
HighFireThreatDistrict	Whether the outage occurred in a high fire threat district (tier 2 or tier 3)	0 (False), 1 (True)
HighFireRiskAreaCombined	Whether an outage occurred in high fire risk area	0 (False), 1 (True)
CPUCTier	Identified high-fire threat district tier	Non-HFTD, Tier 1, Tier 2, Tier 3
DBHCategoryID	Diameter at breast height given in common scale	1-11

Variable	Description	Values
DeadDyingTreeBranch	Whether the tree/tree part causing the outage was dead or dying	0 (False), 1 (True)
TreeConditionID	Condition of the tree causing outage given in the common scale	1-4
TreeHeightCategoryID	Height of tree causing outage given in common scale	1-9
TreeGrowthRateID	Growth rate of the tree causing outage given in the common scale	1-4
CommonName	Common name of outage tree species	
Genus	Genus of outage tree species	
ScientificName	Scientific name of outage tree species	

Appendix B contains information on the mapping of individual utility variables to the Outage dataset variables in the Joint Utility Vegetation Management database.

Additional tables within the Joint Utility Vegetation Management database containing variables for the analysis are as follows:

- ERA5_Weather Table (Table 2-3)
- LandCover Table (Table 2-4)
- IOU_Circuit Table (Table 2-5)

The ERA5_Weather Table (Table 2-3) contains geospatial weather variables for each outage (i.e., OutageID) in the Joint Utility Vegetation Management Database. The ERA5-Land gridded dataset was used to populate temperature and precipitation variables and has 0.1° (~9 km) spacing. The ERA5 gridded data has 0.25° (~30 km) spacing and was used to populate wind variables. ERA5 had the benefit of supplying wind measurements at 10 m and 100 m heights. From each dataset, weather variables were selected from the data point that was closest to the outage coordinates. The weather variables should be considered averages within their grid spacing that may not capture local extremes that utilities may have experienced at exact outage locations. Therefore, analyses with weather variables should be interpreted more in terms of correlation than magnitude.

Table 2-3 ERA5_Weather Table in the Joint Utility Vegetation Management Database

Variable	Data Source	Description
Precip_1day	ERA5-Land	Total precipitation (in) on the date of the outage
Precip_2day	ERA5-Land	Total precipitation (in) from 1 day before the outage through the date of outage (e.g., an outage occurring on 6/10/2018 would have the total precipitation from 6/9/2018 – 6/10/2018)
Precip_3day	ERA5-Land	Total precipitation (in) from 2 days before an outage through the date of outage (e.g., an outage occurring on 6/10/2018 would have the total precipitation from 6/8/2018 – 6/10/2018)
TempAvg_1day	ERA5-Land	Mean temperature (°F) on the date of outage
TempMax_1day	ERA5-Land	Maximum temperature (°F) on the date of outage
TempMin_1day	ERA5-Land	Minimum temperature (°F) on the date of outage
WS10mMean_1day	ERA5	Mean sustained wind speed (m/s) at 10 m height on date of outage
WS10mMax_1day	ERA5	Maximum sustained wind speed (m/s) at 10 m height on date of outage
WS10mMin_1day	ERA5	Minimum sustained wind speed (m/s) at 10 m height on date of outage
Wdir10mMean_1day	ERA5	Mean wind direction (degrees) at 10 m height on the date of outage
WS100mMean_1day	ERA5	Mean sustained wind speed (m/s) at 100 m height on date of outage
WS100mMax_1day	ERA5	Maximum sustained wind speed (m/s) at 100 m height on date of outage
WS100mMin_1day	ERA5	Minimum sustained wind speed (m/s) at 100 m height on date of outage
Wdir100mMean_1day	ERA5	Mean wind direction (degrees) at 100 m height on the date of outage
gust10mMean_1day	ERA5	Mean wind gust (m/s) at 10 m height on date of outage
gust10mMax_1day	ERA5	Maximum wind gust (m/s) at 10 m height on date of outage
gust10mMin_1day	ERA5	Minimum wind gust (m/s) at 10 m height on date of outage

The LandCover Table (Table 2-4), shows two types of land cover data available for analysis. The tree canopy cover (TCC) dataset and the National Land Cover Database (NLCD) are raster datasets that have 30m resolution (pixels are 30m x 30m). The TCC dataset is Landsat and Sentinel-2 based. The data represents the percent of the pixel that has tree cover (Ruefenacht 2022). The TCC data can be used as a proxy for tree density, in which greater percent TCC generally relates to greater tree density. The National Land Cover Database (NLCD) Land Cover is Landsat based and “depicts the predominant thematic land cover class within the mapping year with respect to broad categories of artificial or natural surface cover” (USGS 2024).

Table 2-4 LandCover Table in the Joint Utility Vegetation Management Database

Variable	Data Source	Description
TCC	NLCD, USFS	Percent tree canopy cover (0-100, NA)
NLCD	NLCD	Land cover classification (lookup table for NLCD values also provided in database – following two slides)

The IOU_Circuit Table (Table 2-5) provides information about the total length of primary overhead distribution circuit miles for each circuit. The circuit miles were calculated from GIS spatial files obtained by each utility. Any circuits containing entirely undergrounded lines were excluded. The primary overhead distribution circuit miles were further separated with respect to their location within high fire threat districts. We note that the circuit miles present in the table may include a combination of bare wires and covered conductors, and that multiple mitigation techniques are utilized where lines have covered conductors.

At this time, only SCE and SDG&E circuit miles are populated in the IOU-circuit table. Circuit mile totals for each utility (i.e., not separated by circuit) were calculated from this table for SCE and SDG&E. PG&E will be providing supplemental data to populate the table. Ate that time, the database will be updated with accurate data for PG&E.

Table 2-5 IOU_Circuit Table in the Joint Utility Vegetation Management Database

Variable	Description	Values
UtilityID	Identifies utility without providing name	2-3
Circuit	Circuit name or number where the outage occurred	
NonHFTD_mi	Primary overhead circuit miles in non-HFTD by circuit	
HFTD_mi	Primary overhead circuit miles in HFTD by circuit	
Total_mi	Total primary overhead circuit miles by circuit	

Additionally, EPRI generated several lookup tables to provide utilities with meaningful descriptions of EPRI-standardized values present in the Joint Utility Vegetation Management Database. These tables are included in Appendix C.

- NLCD
- Utility
- OutageCause
- RadialClearanceCategory
- DBHCategory
- TreeCondition
- TreeHeightCategory
- TreeGrowthRate

Filtering the Common Database for Analysis

Filtering The Common Database for Analysis

The outage records in the common database varied among IOUs in date range, system description, and completeness of data fields in the utility's outage investigation report. For example, PG&E provided outage records from the longest date range (2009-01-01 to 2023-10-16), followed by SDG&E (2010-12-19 to 2023-05-04) and SCE (2014-07-01 to 2023-07-13). To account for the inherent variation of outage records in the common database, we filtered the outage records to a subset that met the following selection criteria:

- The outage occurred on overhead primary distribution, removing any transmission or secondary distribution outages,
- The outage date occurred between 2015-2022, representing the full years of data for which all three IOUs provided data,
- The outage had a known High Fire Threat District classification, removing any outages without valid latitude/longitude positional information that could not be categorized,
- The outage had a vegetation growth or contact outage cause, removing any outages that were caused by human error, Public Safety Power Shutoffs and other safety shutoffs, and unknown causes, and

These selection criteria resulted in an outage subset containing 27,944 outage records across the three IOUs that was focused on the outages of interest for the research question (Table 2-6). A closer look at the number of outage records that meet individual selection criteria are available in Supplemental Table E-1. An additional filter for radial clearance was applied to this analysis subset for the radial clearance analysis and is described in the Radial Clearance Analysis subsection.

Table 2-6. The number of outage records in common database and the number of outages meeting filter criteria for analysis

Outage Dataset	PG&E	SCE	SDG&E	Total
All vegetation-caused outage records	57,684	3,893	533	62,110
Outage records used in the following analysis	24,765	2,916	263	27,944

Aggregating Outage Cause

In the joint database, outage cause has 13 unique categories, nine of which are considered vegetation causes for the purpose of the analysis (Supplemental Table C-2). The nine vegetation-cause categories were aggregated for better representation among utilities and to address utility concerns regarding the reliance on forester comments to categorize the outage cause (Table 2-7). The outage cause “Branch/Frond/Bark Contact” also includes OutageCauseID 8 (close contact), because utilities did not always specify whether tree parts were detached when they contacted the line.

Table 2-7. Aggregation of outage cause for purposes of the analysis.

<table>
<tr><th>OutageCauseID (Description)</th><th>Aggregated Outage Cause</th><th>Description</th></tr>
<tr><td>1 (vegetation growth)</td><td>Tree Growth</td><td>Outage cause refers to vegetation encroachment.</td></tr>
<tr><td>2 (whole tree failed)</td><td rowspan="2">Tree/Trunk Failure</td><td rowspan="2">Outage cause refers to a tree falling on the line, either due to uprooting or breaking along the trunk.</td></tr>
<tr><td>3 (tree failed at trunk)</td></tr>
<tr><td>4 (branch on the line)</td><td rowspan="5">Branch/Frond/Bark Contact</td><td rowspan="5">Outage cause refers to a tree part contacting the line. Contact is mostly, but not always, from detached vegetation.</td></tr>
<tr><td>5 (frond on the line)</td></tr>
<tr><td>6 (bamboo on the line)</td></tr>
<tr><td>7 (bark on the line)</td></tr>
<tr><td>8 (close contact)</td></tr>
<tr><td>9 (uncategorized vegetation contact)</td><td>Uncategorized Contact</td><td>Utility outage cause codes indicate that vegetation made contact; however, there was not enough additional details to further categorize that contact.</td></tr>
</table>

Aggregating Land Cover

In the joint database, the NLCD land cover classification is provided for each outage location. To facilitate drawing comparisons in predominant land cover among utilities, we aggregated the values into fewer, broader categories of land cover. Additional NLCD definitions for each value are provided in Supplemental Table C-8.

Table 2-8. Aggregation of National Land Cover Database (NLCD) land cover classifications for the purpose of analysis.

NLCD value	Aggregated land cover value	Description
21, 22, 23, 24	Developed	Land cover that has been developed (open space, low intensity, medium intensity, high intensity)
41, 42, 43	Forest	Land cover dominated by forest (evergreen, deciduous, mixed)
52	Shrub	Land cover dominated by shrub/scrub
71, 81, 82	Working	Land cover dominated by working lands (cultivated crops, pasture/hay, grassland/herbaceous)
90, 95	Wetland	Land cover dominated by wetlands (woody, emergent)
11, 12, 31	Low Vegetation Cover	Land cover with little/no vegetation (open water, perennial ice/snow, barred land)

Weather Variable Subset

We included multiple variables (e.g., mean, minimum, maximum) for each weather variable type (i.e., precipitation, temperature, sustained wind speed, wind gust, and wind direction) in the Joint Utility Vegetation Management Database (Table 2-3). In most cases, these variables describe the weather conditions on the day that the outage occurred. They often correlated with each other (Figure 2-2) and should not all be used in analysis at the same time.

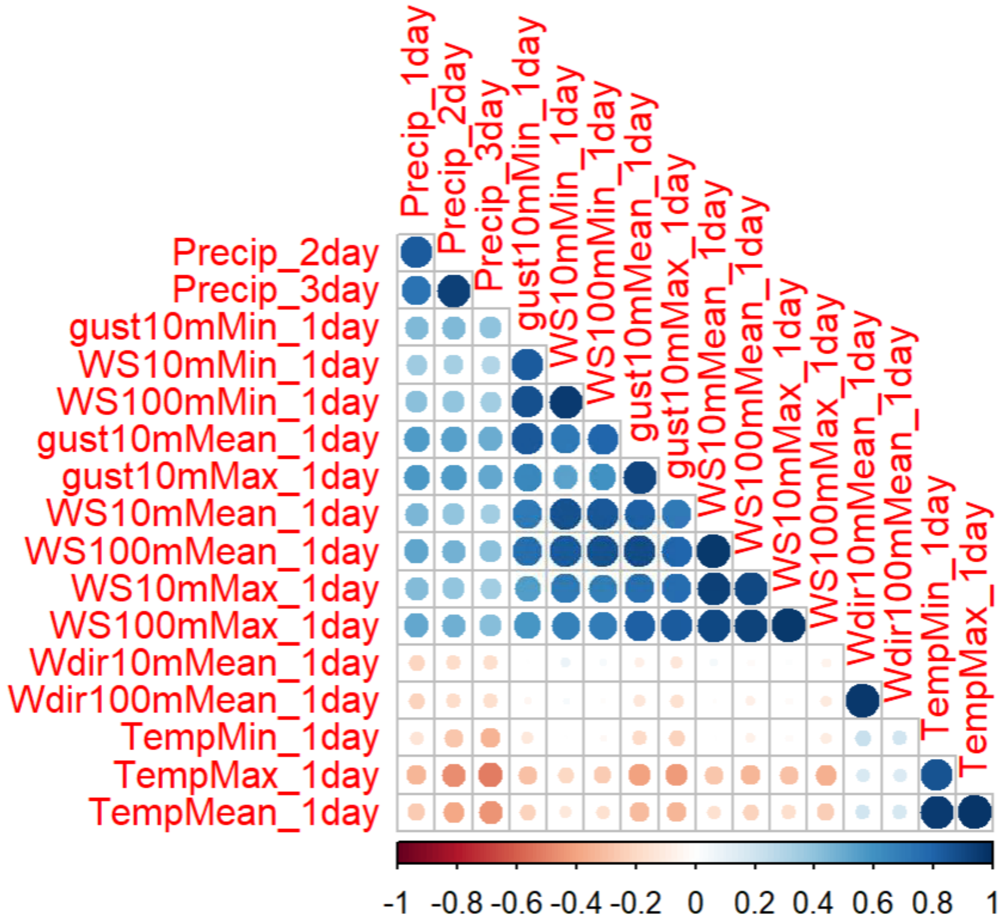

Figure 2-2. Correlation plot for all weather variables present in the common database depicting Pearson's correlation coefficients between each weather variable pair. Blue indicates a positive correlation, red indicates a negative correlation, and the size and saturation of the circle represents the strength of the correlation. Outage records with complete weather information (n = 26,566) were used to create the plot. All weather variables are defined in the common database documentation.

Thus, we selected one variable from each weather variable type to include in the analysis:

- Precip_3day: the total precipitation (inches) starting two days prior to the outage through the day of the outage
- TempMean_1day: the mean temperature (°F) on the day of the outage
- WS10mMean_1day: the mean sustained wind speed (m/s) on the day of the outage, recorded at a height of 10 m
- Gust10mMax_1day: the maximum wind gust speed (m/s) on the day of the outage, recorded at a height of 10 m
- Wdir10mMean_1day: mean wind direction (degrees) on the day of the outage, recorded at a height of 10 m

Descriptive statistics are provided for these weather variables in Table 2-9.

Table 2-9. Descriptive statistics for weather variables used in analysis. Mean ± standard error and range are displayed. Populated weather variables the following utility sample sizes: PGE (n = 23,697), SCE (n = 2,619), and SDG&E (n = 250).

Weather Variable	PG&E	SCE	SDG&E
3-Day Total Precipitation (inches)	0.453 ± 0.004 0 - 4.23	0.137 ± 0.006 0 - 3.07	0.224 ± 0.022 0 - 1.59
Mean temperature (°F)	53.1 ± 0.1 15.4 - 99.2	57.4 ± 0.2 14.1 - 101.0	59.1 ± 0.7 33.7 - 89.3
Mean sustained wind speed (m/s) on day of outage	3.90 ± 0.01 0.50 – 13.7	2.66 ± 0.03 0.66 – 8.79	4.05 ± 0.14 1.15 - 10.3
Maximum wind gust (m/s) on day of outage	9.66 ± 0.03 1.87 - 25.1	7.79 ± 0.06 2.59 - 21.5	8.91 ± 0.26 3.37- 20.1
Mean wind direction (degrees) on day of outage	199 ± 0.41 14.6 - 354	171 ± 1.41 14.8 - 344	206 ± 3.87 44.3 - 319

Statistical Methods

We completed all statistical analyses using R 4.2.1 (R Core Team 2022). We provide the R functions and associated R packages, were applicable, alongside the description of the analysis.

Outages in High Fire Threat Districts

HFTD areas are maintained with larger clearance distances, so we explored whether more aggressive vegetation management translated into a reduction of vegetation caused outages. Using GIS shapefiles from SCE and SDG&E, we calculated the number and proportion of primary overhead circuit miles that were found in high fire threat districts (HFTD). We used the proportion of HFTD circuit miles as the expected proportion for outages also occurring in HFTD. For each utility, we used 1-sample proportion tests (*prop.test* function in R) to compare the proportion of outages occurring in HFTD with the calculated proportion of circuit miles in HFTD to determine if outages occurred more or less than expected in HFTD. Once the data from PG&E is obtained, EPRI will update the database as well as the report with up-to-date results from the analysis.

Outages Leading to A Reportable Ignition

The analysis subset included some outages for each utility that were related to a CPUC reportable ignition. Because this analysis used a subset of all vegetation-caused outages, it is important to note that the number of outages with related ignitions analyzed here is not intended to represent all vegetation-related ignitions that the utilities have previously reported to CPUC. Additionally, SCE outages related to ignitions may be underestimated because the joint database variable for ignition relied on matching the selection criteria between the SCE outage report and the CPUC ignition report. PG&E and SDG&E provided additional ignition datasets that enabled more complete matching to outages.

Using information available in the analysis subset, we calculated the proportion of outages for each utility and all utilities combined that resulted in a reportable ignition as well as the proportion of outages associated with ignitions that occurred in HFTD. We considered land cover as one explanation for the variation in the number of outages with ignitions in HFTD among utilities and summarize these outages by the aggregated land cover variable.

We also assessed monthly variation in the outages associated with ignitions for all utilities combined. We considered differences in weather conditions and plant genera to help explain monthly variation in outages with ignitions. Most methods were descriptive in nature; however, we used 2-sample proportion tests (*prop.test* function in R) to assess whether the top genera causing outages showed significant differences in their contribution to outages associated with an ignition and outages not associated with an ignition.

Outage Variation Between Worked and Non-Worked Trees

Outage trees that were inspected prior to the outage were considered inventory trees. Some of these trees also had prior trim records. Outage trees with a previous inspection date were categorized as inventory trees, whereas outage trees with a previous trim date were categorized as worked trees. Each utility differed in how vegetation management actions were recorded; thus, methods assessing variation with respect to inventory status or prior trimming of outage trees included utility. We provide the proportion of outages from the analysis subset caused by worked trees for each utility.

For each utility, only a portion of the total outages are caused by trees with known prior trimming. Since these trees are being actively managed, prior trimming can be used to begin describing the influence of vegetation management on vegetation-caused outages. Outage causes may not be equally influenced by vegetation management; thus, we aimed to identify any outage causes that differed with respect to work status. We visualized the proportion of outages for each outage cause (i.e., tree growth, tree/trunk failure, branch/frond/bark contact, uncategorized contact) for worked and non-worked trees separately for each utility. Then, we tested whether the proportion of outages for a specific outage cause differed statistically between worked outage trees and non-worked outage trees using 2-sample proportion tests (*prop.test* function in R). We also assessed differences in the linear distance (ft) between the outage tree and the utility asset with respect to work status using t-tests for each utility to explore whether variation in distance corroborated outage cause findings.

Effect of Radial Clearance

The radial clearance variable present in the common database groups radial clearance into three categories: 0 – 4 ft, 4 – 12 ft, and > 12 ft. The radial clearance category variable in the common database refers to a recorded clearance at the time of last management. For SCE and SDG&E, last management could refer to the last inspection or the last trim, whichever was more recent. For PG&E, last management refers to last trim and has the assumption that the prescribed clearance recorded at the time of the last inspection was achieved at trimming. These conditions limited our ability to populate the radial clearance category variable broadly among outage records but still allowed for representation from each utility for each radial clearance category (Table 2-10).

Table 2-10. Outage records present in the joint database analysis subset with radial clearance information for the outage tree. Radial clearance categories are populated from the utility's vegetation management records and refer to the clearance recorded at the time of last management prior to the outage.

Radial Clearance Category	Number of Outages with Radial Clearance Analyzed			Summary Stats [Average time in days between the last management event (inspection/trim) and the subsequent outage for each radial clearance category]			
	PG&E	**SCE**	**SDG&E**	**Overall Mean** (all samples)	**Median** (all samples)	**Standard Deviation** (all samples)	**Standard Error** (all samples)
0 – 4 ft	8	13	6	287	121	444	85.5
4 – 12 ft	268	102	139	425	201	569	25.2
>12 ft	760	22	27	619	336	619	21.8

Outage causes may not be equally influenced by enhanced clearance distances; therefore, we aimed to identify any differences in outage cause by radial clearance category. We visualized the proportion of outages for each aggregated outage cause and utility with respect to radial clearance category. Then, we tested whether the proportion of outages for a specific outage cause statistically differed between pairs of radial clearance categories: 0 – 4 ft vs. 4 – 12 ft; 0 – 4 ft vs. >12 ft; and 4 – 12 ft vs. >12 ft.

The radial clearance category variable is not intended to represent radial clearance at the time of the outage. Moreover, as the time elapsed between the recorded clearance and the outage date gets larger, we expect this clearance measurement to become less reflective of the radial clearance present at the time of the outage. However, we can use the time elapsed (days) between the last management and the subsequent outage to determine whether increasing the radial clearance distance influences outage occurrence. If increasing the radial clearance distance reduces the likelihood of an outage, this would result in greater time elapsed between management and an outage.

We calculated the response variable (hereafter, time-to-outage) as the number of days between the last inspection date or the last trim date, whichever was more recent. We tested the effect of radial clearance categories on the time to outage in isolation using analysis of variance (ANOVA). If the ANOVA returned a significant result, indicating that the radial clearance categories differed in time-to-outage, we performed multiple comparisons using Tukey's Honest Significant Difference test (Tukey HSD) to identify which categories differed significantly. We performed the ANOVA twice:

- First, we tested all outages in the clearance subset and log-transforming time-to-outage to approach a normal distribution, and
- Second, we tested outages within the clearance subset that occurred on days with daily maximum wind gust (Gust10mMax_1day) < 15 m/s. This second ANOVA attempts to remove outages that occurred during extreme weather conditions.

Given that the primary focus is on the management action (i.e., trimming), we also provide results for similar tests using only the outages in which trimming was the last management event, and thus, radial clearance refers to clearance achieved at the last trim (see Appendix D).

We further explored the effect of radial clearance on outages using a generalized linear modeling (GLM) framework, which allows for the specification of alternate distributions when the response variable is not normally distributed. We specified a gamma distribution for the response variable (time-to-outage), which was positive and right skewed. We included additional predictor variables besides radial clearance that were thought to explain variation in time-to-outage (Table 2-11). We did not include predictor variables from the common database that had poor representation in the data (i.e., many null values) or categorical variables with many values. We fit models using the *glm* function in the *lme4* package (Bates et al. 2015).

Table 2-11. Predictor variables used in the model set testing the effectiveness of radial clearance on the number of days that elapse between last management and the outage (i.e., time-to-outage), as well as the values present for the outages analyzed in the clearance subset.

Predictor	Values
RadialClearanceCategoryID	1 (0 – 4 ft), 2 (4 – 12 ft), 3 (>12 ft)
Utility	1 (PG&E), 2 (SCE), 3 (SDG&E)
Year (centered on 2015)	0 – 7
TreeCanopyCover (%)	0 – 88
HighFireThreatDistrict	TRUE, FALSE
OutageCauseID	growth, tree_trunk_fail, branch_frond_bark, uncategorized
DistanceTreeCausingOutage (ft)	0 - 100
Precip_3day (inches)	0 – 3.8
TempMean_1day (°F)	16.5 – 97.8
WS10mMean_1day (m/s)	0.8 – 13.2
Gust10mMax_1day (m/s)	3.8 – 34.2
Wdir10mMean_1day (degrees)	19.6 – 345.0

We specified models using a forward selection approach, starting with models containing each variable independently, then adding models with combinations of predictors to the model set that increased the amount of variation in time-to-outage explained by the data. We ranked models using Akaike's Information Criterion (AIC) using the *model.sel* function in the *MuMIn* R package (Bartón 2024). When models are ranked by AIC, the top model has the lowest AIC and represents the model with the most support in the data (Burnham and Anderson 2002). We considered models with a difference in AIC ≤2 as competing models that could be used for inference.

GLMs do not provide a traditional R-squared value, which identifies the amount of variation in the data that is explained by a model. Thus, we calculated McFadden's R-squared (McFadden 1974) as an approximate R-squared measurement. This calculation compares the model of interest to a null model (i.e., a model without any predictors) to determine if the model of interest has a better fit to the data.

3 RESULTS

Frequency of Outages by Circuit

Most of the outages present in the analysis subset matched to overhead circuit information from recent spatial files obtained from each utility (n = 27,207; 97.4%). By utility, 24,089 (97.3%) of PG&E outages, 2,863 (99.2%) of SCE outages, and 255 (97.0%) of SDG&E outages in the analysis subset matched to overhead circuit information. Circuits listed for outages that did not return a match in utility spatial files may have had an invalid circuit name or number entered (e.g., NA, NONE, blank, data entry error), multiple circuits entered, or a valid circuit name that was undergrounded between the time of the outage and the utility spatial data extract.

Outages with matching circuit information provided some insight into the proportion of overhead primary distribution circuits that had experienced a vegetation-caused outage, as well as the rate of outages per circuit mile. PG&E had the largest proportion of circuits experiencing at least one vegetation-caused outage (1,847 of 3,069 circuits, 60.2%), followed by SCE (1,389 of 3,936 circuits; 35.3%) then SDG&E (168 of 766 circuits; 21.9%). Data for the number of outages per circuit and per circuit mile were right-skewed, with the majority of circuits experiencing a low number of outages or outages per circuit mile (Table 3-1; Figure 3-1).

Table 3-1. Summary of the number of outages present in the analysis subset with matching circuit information by circuit. Rates are provided as raw counts (Outages/circuit) and standardized by the availability of overhead primary distribution circuit miles for each circuit (Outages/circuit mile). Note: calculations focused on the outage analysis subset, and thus, do not incorporate circuits in which no vegetation-caused outages occurred.

Description	PG&E	SCE	SDG&E
Number of Outages per Circuit	Mean ± SE: 13.0 ± 0.71 Median: 4 Range: 1 – 401	Mean ± SE: 2.1 ± 0.05 Median: 1 Range: 1 – 13	Mean ± SE: 1.5 ± 0.07 Median: 1 Range: 1 – 7
Number of Outages per Circuit Mile	Mean ± SE: 1.8 ± 0.43 Median: 0.25 Range: 0.006 – 352	Mean: 1.6 ± 0.76 Median: 0.20 Range: 0.007 – 823	Mean: 0.3 ± 0.1 Median: 0.13 Range: 0.009 – 16.9

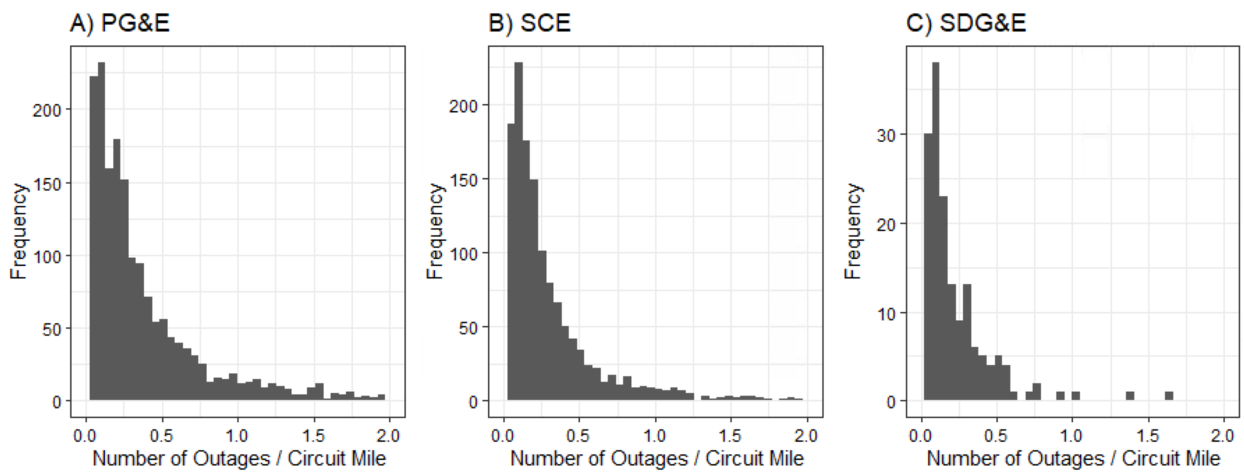

Figure 3-1. Histogram depicting the frequency of outages per circuit mile. Truncating the x-axis to 2 outages/circuit mile removed 71 PG&E circuits, 38 SCE circuits, and 1 SDG&E circuit.

Variation in the Outage Subset

Summarizing variation in outages among utilities helps to provide context for the analysis. Although there are some similarities among utilities, we can begin to identify differences among utilities that may have implications for the effectiveness of enhanced clearances in vegetation management. Variation in several variables that were used in the analysis are provided in Table 3-2. We found that *Quercus*, *Pinus*, and *Eucalyptus* were among the top five tree genera causing outages for each utility. However, the order of these top genera reflects differences in the vegetation present in utility service territories. PG&E experienced more outages by deciduous and coniferous trees, whereas SCE and SDG&E experienced more outages from palms and *Eucalyptus*. For all utilities, most outages occurred in developed space of some type, where we expect to see more overhead assets present. However, PG&E had a greater proportion of outages that occurred in forested area (evergreen forest in particular), which also explains the greater average tree canopy cover for PG&E outages. The greatest percentages of outages were caused by contact with a tree part, such as a branch, frond, or bark. The average linear distance between the asset and the outage tree was within 30 ft.

Table 3-2. Summary of several common database variables, showing both variation and similarities in vegetation-caused outages among utilities. Percentages were calculated separately for each utility. Aggregated land cover and outage cause variables are defined in the Methods.

Variable	PG&E	SCE	SDG&E
Top 5 genera causing outages	*Quercus* (18.9%) *Pinus* (17.7%) *Sequoia* (10.8%) *Eucalyptus* (9.2%) *Pseudotsuga* (8.6%)	Unknown Palm (38.1%) *Eucalyptus* (12.4%) *Pinus* (10.8%) *Quercus* (7.3%) *Washingtonia* (4.7%)	*Eucalyptus* (34.2%) *Washingtonia* (19.0%) *Pinus* (12.2%) *Quercus* (7.2%) *Corymbia* (4.2%)
Top land cover classes at outage locations (from National Land Cover Database)	Developed (50.1%) Forest (34.9%) Working (8.3%) Shrub (5.0%)	Developed (87.9%) Forest (4.1%) Working (3.2%) Shrub (3.1%)	Developed (90.5%) Shrub (6.5%) Forest (1.9%) Working (0%)
Tree Canopy Cover (%) mean ± se, range	34.9 ± 0.2 0 - 89	11.0 ± 0.3 0 - 73	13.0 ± 0.8 0 - 61
Outage Cause	Branch-frond-bark (39.7%) Tree-trunk-fail (35.3%) Uncategorized contact (20.9%) Growth (4.2%)	Branch-frond-bark (63.7%) Tree-trunk-fail (15.8%) Uncategorized contact (13.6%) Growth (7.3%)	Branch-frond-bark (60.1%) Tree-trunk-fail (29.3%) Uncategorized contact (8.4%) Growth (2.3%)
Distance between outage tree and line (ft)	23.1 ± 0.12 0 - 750	18.6 ± 0.6 0 - 300	30.4 ± 1.4 1 - 100

Variable	PG&E	SCE	SDG&E
mean ± se, range			

There is also variation in the frequency of outages over time, as depicted by the monthly outage totals from the outage analysis subset (Figure 3-2). Years with a larger number of vegetation-caused outages are driven by outages occurring in the winter months (December – February) and represent times with more hazardous weather conditions. Visualizing the variation in the monthly number of outages by weather variables (Figure 3-3 and Figure 3-4), we see a trend in the number of monthly outages with respect to temperature vs wind gust and relative humidity vs wind gust as well as a trend between the weather variables.

Additional figures depicting the number of monthly outages for individual weather variables are provided in Appendix F. In those figures, we also see some evidence that specific trends may not be linear, but rather indicate a threshold above which the outage count increases more rapidly. For instance, the data from PG&E and SDG&E suggest that winter monthly outage counts stay relatively low until maximum wind gust speed reaches approximately 15 m/s (Supplemental Figure F-1). This hazardous wind gust (>15 m/s) represents the gust condition for 12.8% of PG&E outages in the analysis subset and 6.8% of SDG&E outages. For comparison, SCE data did not show a clear simple relationship between monthly outage counts and wind gust speed, and only 1.9% of outages occurred on days with maximum wind gust >15 m/s.

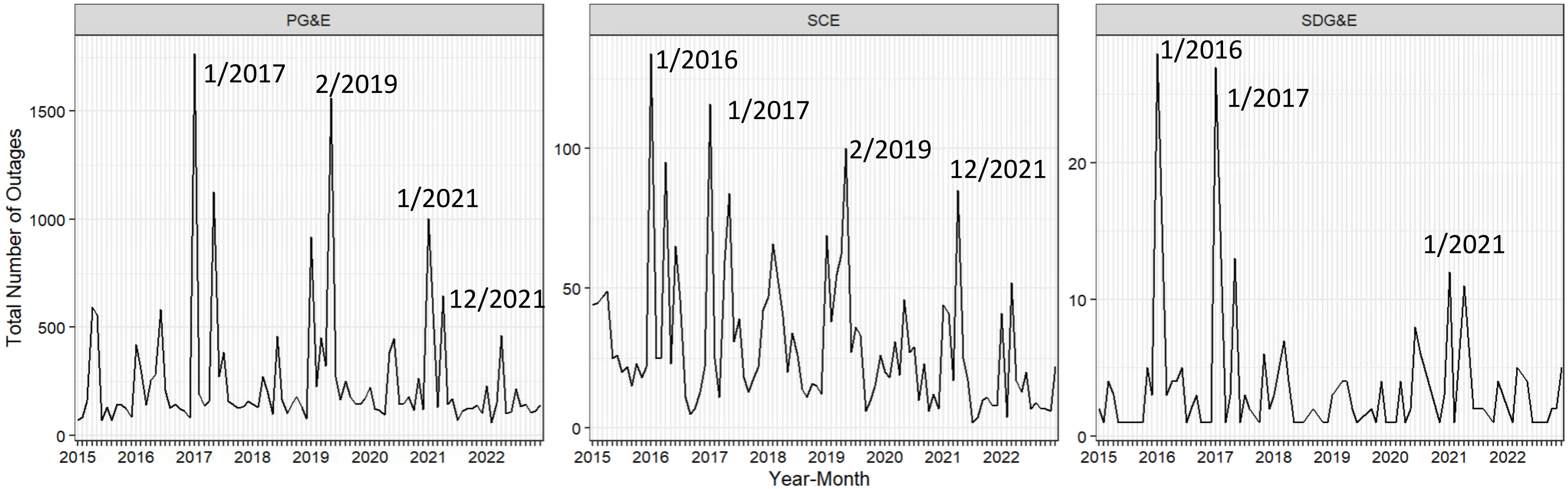

Figure 3-2. Monthly outage counts from January 2015 – December 2022 for each utility. Peaks in monthly outage counts correspond to winter months and represent times with more hazardous weather conditions.

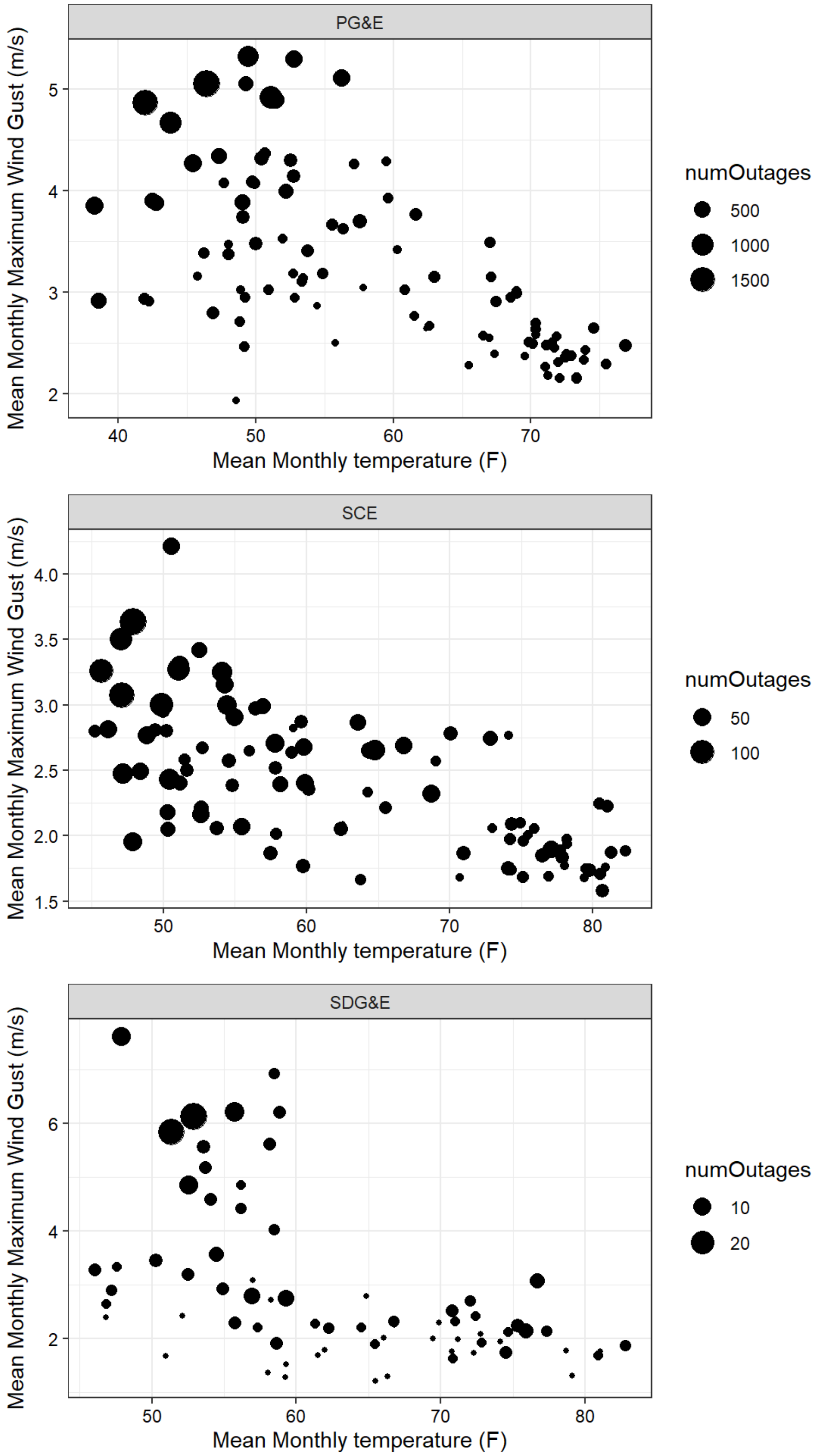

Figure 3-3. The relationship between weather variables (temperature and wind gust) and the monthly vegetation-caused outage total for each utility. Size of the circle represents the monthly number of outages.

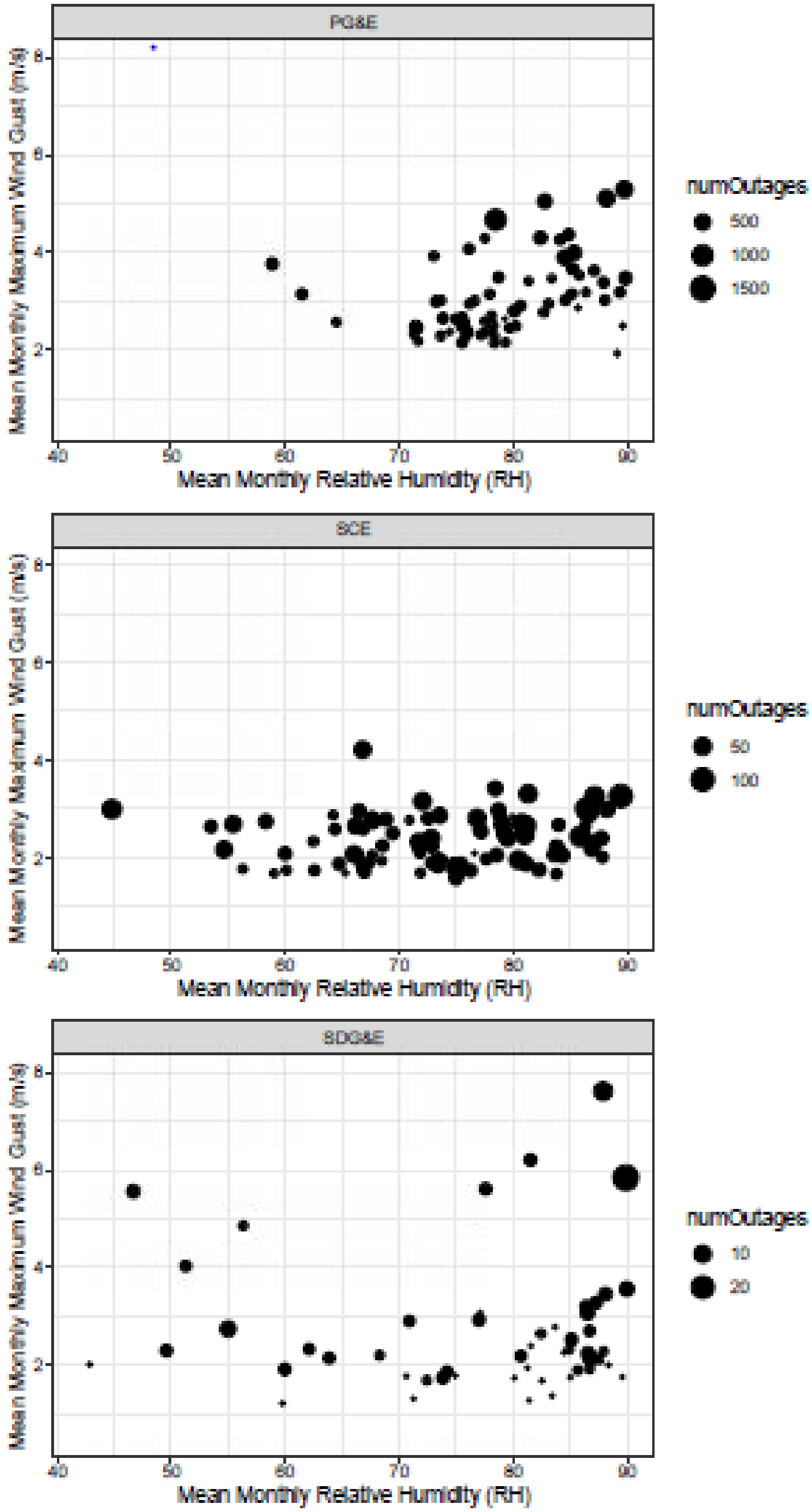

Figure 3-4. The relationship between weather variables (relative humidity and wind gust) and the monthly vegetation-caused outage total for each utility. Size of the circle represents the monthly number of outages.

Outages in High Fire Threat Districts

Utilities varied in the proportion of primary overhead distribution lines that were in a high fire threat district (HFTD) area (Figure 3-5). SCE had the lowest proportion of circuit miles in HFTD (23.9%), followed by PG&E (32.0%). SDG&E had the largest proportion of circuit miles in HFTD (53.2%). Using these utility-specific proportions of HFTD lines as the expected proportion of outages in HFTD, we found that the proportion of outages occurring in HFTD areas differed from the expectation. For PG&E and SCE, a greater proportion of outages occurred in HFTD (59.7% and 27.7%, respectively) than expected from the proportion of HFTD lines (χ^2_1 = 8756.20, $p < 0.00001$ and χ^2_1 = 23.263, $p < 0.00001$, respectively). SDG&E experienced a lower proportion of outages in HFTD (28.1%) than expected from the proportion of HFTD lines (χ^2_1 = 66.354, $p < 0.00001$).

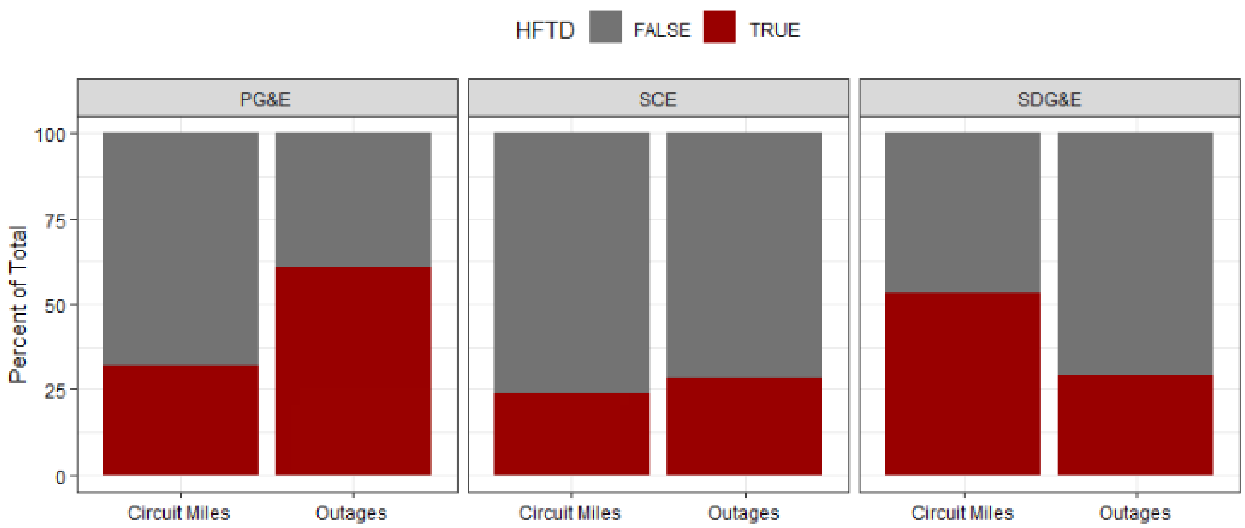

Figure 3-5. Comparison of the proportion of outages from the analysis subset observed in high fire threat district (HFTD) and the proportion of primary overhead circuit miles found in HFTD for each utility.

It is important to note that these totals are derived from recent snapshots of primary overhead distribution lines and may not reflect the changes that have occurred over the study period (2015 – 2022). For instance, strategic undergrounding of distribution lines may target HFTD lines and over time may have reduced the mileage of primary overhead lines. Differences among utilities may also reflect variation in land cover within their service territories. For example, we mentioned previously that PG&E experienced more outages in forested areas with greater tree canopy cover.

Outages Leading to A Reportable Ignition

For the ignition information included in the analysis subset, we found that 2.0% of vegetation-caused outages resulted in a reportable ignition for all utilities combined (Table 3-3). This percentage varied slightly among utilities and was lowest for SCE. Utilities varied in the percent of analyzed outages with associated ignitions that occurred in HFTD.

Table 3-3. The number and percent of outages in the analysis subset that were associated with a reportable ignition as well as the proportion of those outage ignitions that occurred in a high fire threat district (HFTD).

Utility	Number (Percent) of outages in analysis associated with an ignition	Number (Percent) of outages associated with an ignition that occurred in HFTD
PG&E	548 (2.2%)	351 (64.1%)
SCE	18 (0.6%)	3 (16.7%)
SDG&E	5 (1.9%)	2 (40%)
Total	571 (2.0%)	356 (62.3%)

This variation may, in part, be explained by utility differences in land cover (Figure 3-6). Whereas the majority of analyzed outages associated with ignitions occurred in developed areas for SCE and SDG&E (94.4% and 80%, respectively), PG&E experienced more diversity in the land cover types where outages were associated with ignition. PG&E was the only utility with these outage ignitions occurring in forested areas, which had the highest percentage among PG&E outage ignitions (36.7%).

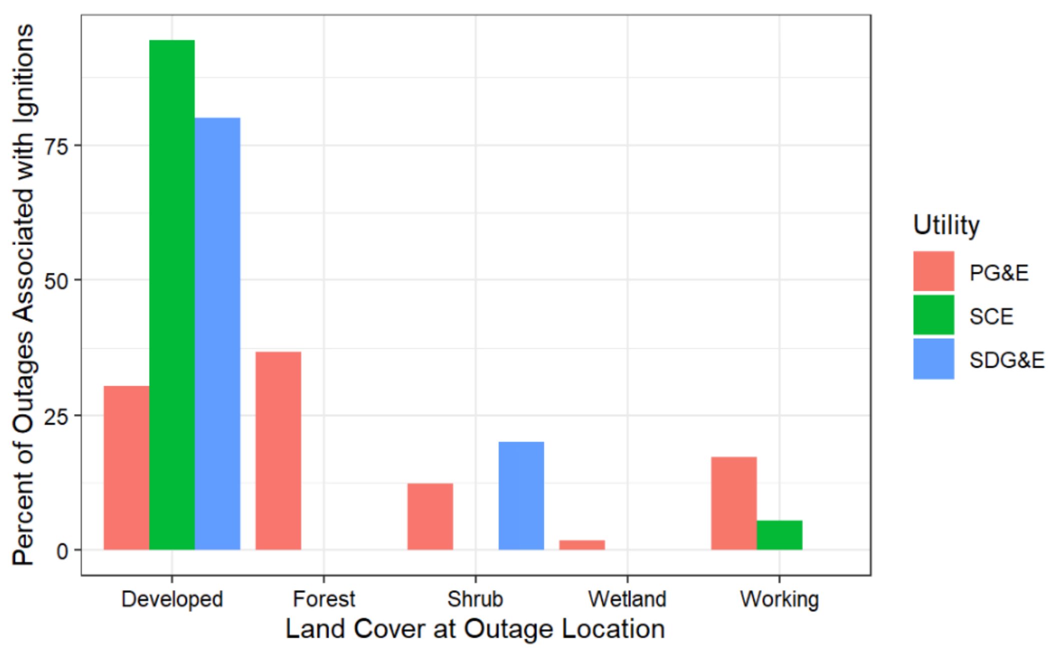

Figure 3-6. The variation in land cover types among utilities at outage locations in which outages were associated with a reportable ignition. Only outages included in our analysis subset are included in these calculations.

We also found that the occurrence of outages associated with ignitions was related to weather. Unlike the relationship between outage count and weather, which has a greater proportion of the annual outages occurring in the winter, the proportion of annual outage ignitions was greatest during the summer months (Figure 3-7), suggesting that, in general, different weather conditions contribute to ignition risk. It is important to note that PG&E comprised 96% of the ignition data; therefore, this relationship may be more reflective of PG&E than SCE or SDG&E (see Supplemental Figure F-5 for monthly variation in outage count by utility for outages associated with an ignition).

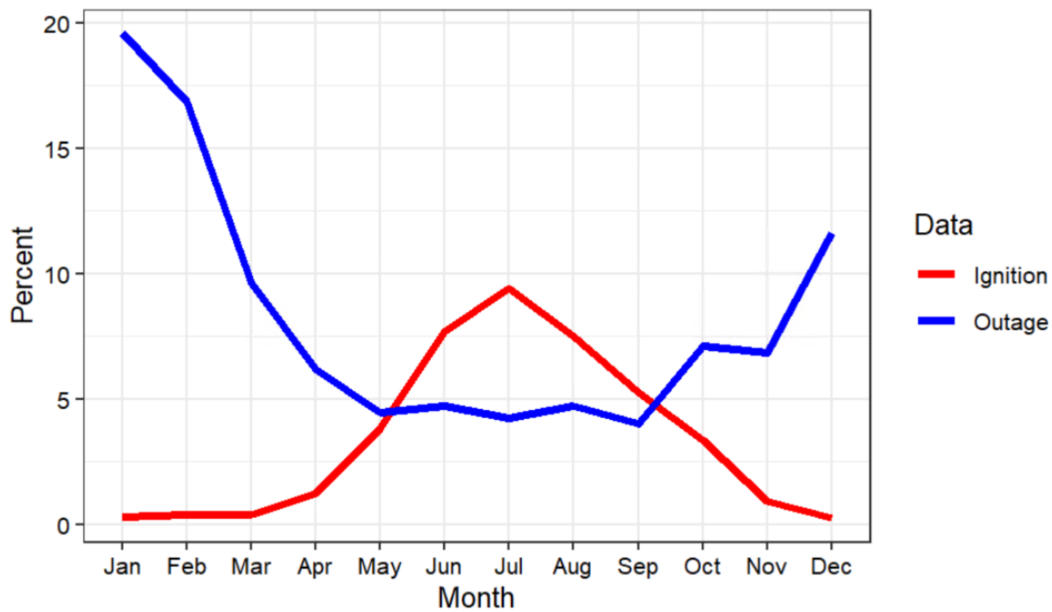

Figure 3-7. The percent of annual total outages and annual outages associated with an ignition that occur during each month of the year.

Focusing on outages that occurred from May – September, we found that outages associated with ignitions occurred on days with greater mean temperatures and lower total precipitation within 3 days of the outage (Figure 3-8). Thus, hotter and drier conditions were characteristic of summer outages that were associated with an ignition. Additional variation in variables between summer outages that were associated with an outage versus those that were not associated with an ignition are provided in Supplemental Table E-2.

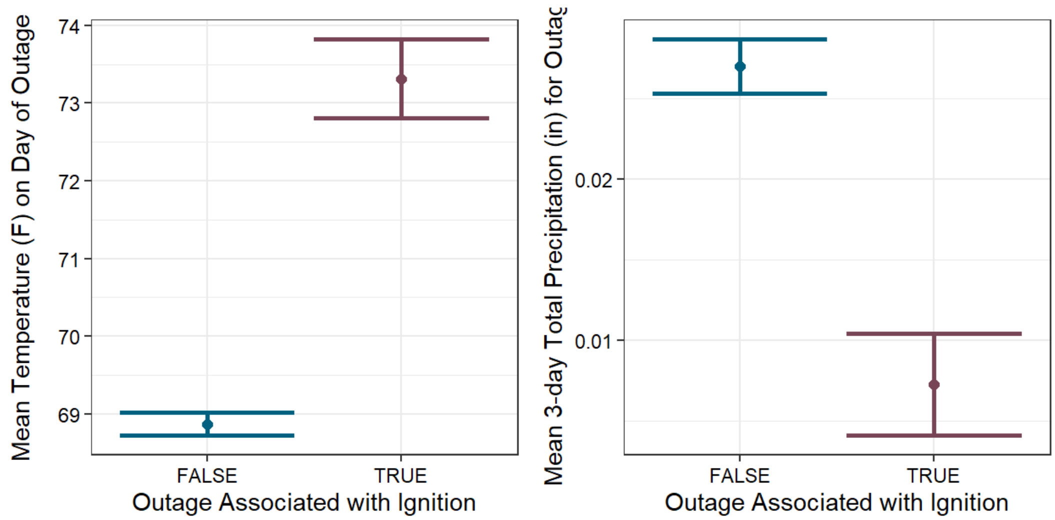

Figure 3-8. Differences in temperature and precipitation (mean ± standard error) between summer outages that were associated with an ignition and outages that were not associated with an ignition.

Considering the top genera causing outages for any of the three utilities (see Table 3-1), we found some differences in the proportion of outages that were associated with an ignition and outages that were not associated with an ignition (Figure 3-9). Oaks (*Quercus* spp.) comprised a greater proportion of outages associated with ignitions (32.9%) than outages without ignitions (17.3%; and χ^2_1 = 94.462, p < 0.00001). Similarly, *Eucalyptus* spp. comprised a greater proportion of outages associated with ignitions (13.7%) than to outages without ignitions (9.7%; and χ^2_1 = 9.84, p = 0.0008). However, palms comprised a greater proportion of outages without ignitions (8.0%) than outages associated with an ignition (1.6%; χ^2_1 = 32.00, p < 0.00001). Additionally, we found similar seasonal effects with oaks and *Eucalyptus* spp., in which the winter months comprised more of the outages without ignitions from these species, but the summer months comprised more outages associated with ignitions (Supplemental Figure F-6).

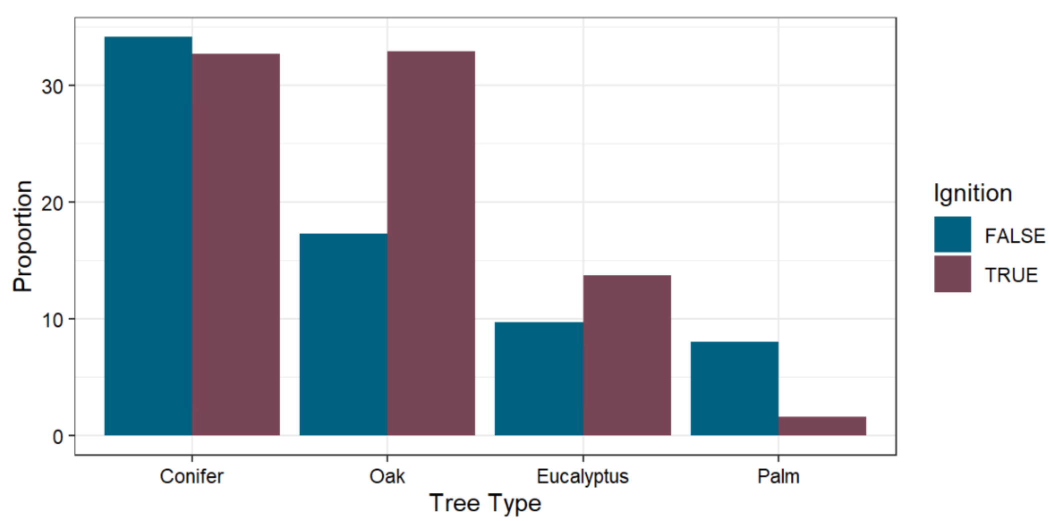

Figure 3-9. Variation in the proportion of outages without ignitions and outages associated with ignitions for the top genera contributing to outages. Conifers include *Pinus* spp., *Sequoia* spp., and *Pseudotsuga* spp. Oaks include

Quercus spp. Eucalyptus includes *Eucalyptus* spp. Palms include *Washingtonia* spp. and unknown palms.

Outage Variation Between Worked and Non-worked Trees

IOUs differed in the proportion of outages caused by worked trees. Approximately two-thirds of SDG&E outages in the analysis subset were caused by worked trees (67.7%), whereas PG&E had 25.1% of outages caused by work trees, and SCE only had 5.0% of outages caused by worked trees. These differences could be related to variation in the quantity of trees surrounding power lines in each service territory, as shown by difference in tree canopy cover among utilities (Table 3-1). The lower proportion of outages from inventory trees from PG&E and SCE could also be due to differences in record keeping. The trim dataset for SCE began mid-2019, before which we relied on a notation in the outage investigation report indicating that the tree was regularly trimmed. For PG&E, the identification of trees that had been previously worked relied on the matching criteria between the outage investigation and the work records (see Appendix A for details).

Understanding the types of outages caused more by inventory trees than non-inventory trees based on utility data can help to identify the types of outage causes than can potentially be reduced with tree trimming. When comparing the proportions of vegetation outage causes, we see some differences based on inventory status, although these differences are not consistent among utilities (Figure 3-10). Tree growth comprised a greater proportion of worked-tree outages than non-worked-tree outages for PG&E ($\chi^2_1 = 43.34$, $p < 0.00001$) and SCE ($\chi^2_1 = 18.39$, $p < 0.00001$). Tree/trunk failures comprised a greater proportion of non-worked-tree outages than worked-tree outages from PG&E ($\chi^2_1 = 7.54$, $p = 0.003$) and SDG&E ($\chi^2_1 = 14.48$, $p = 0.00007$). Branch/frond/bark contact comprised a greater proportion of inventory-tree outages from SDG&E ($\chi^2_1 = 27.10$, $p < 0.00001$).

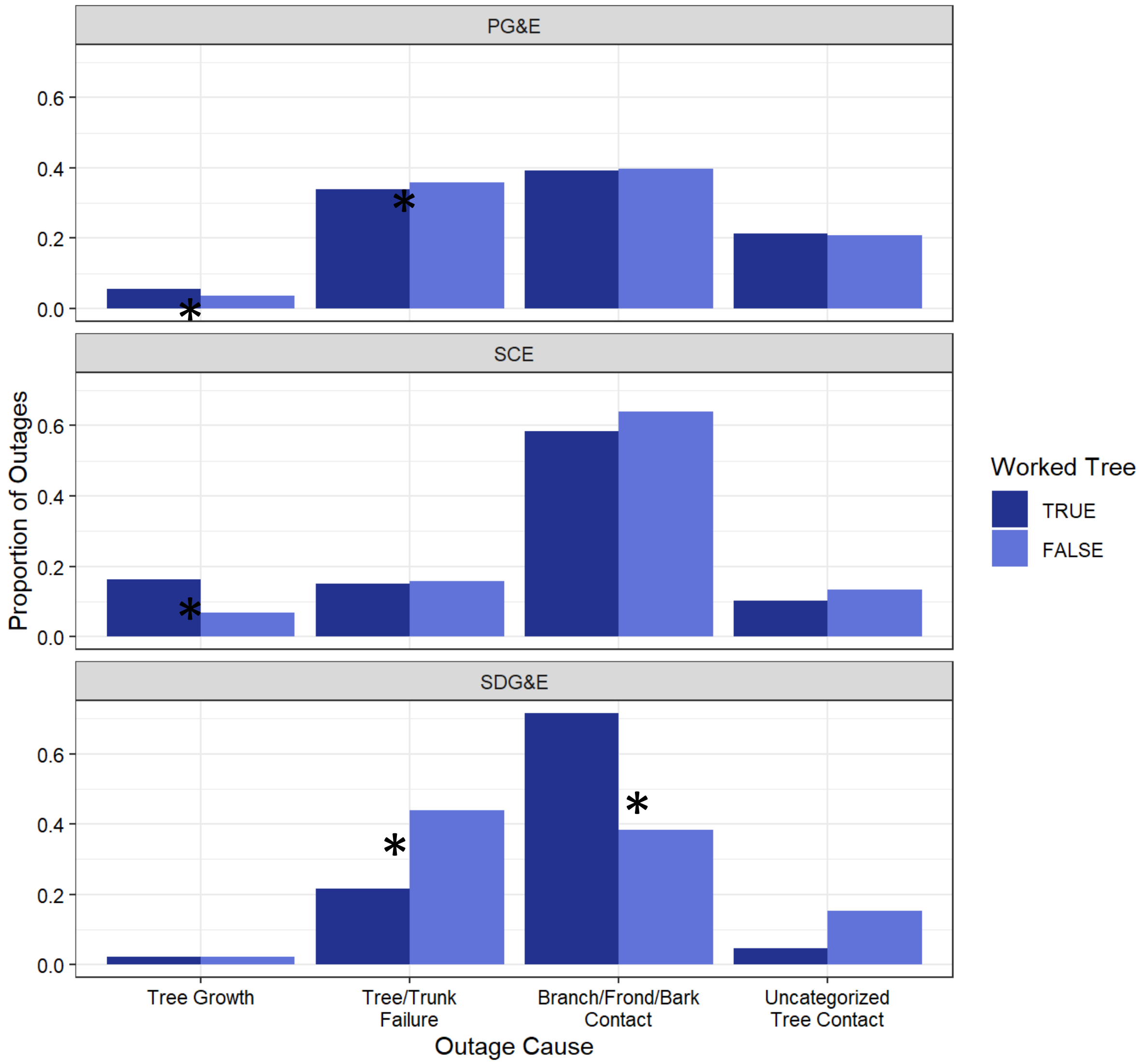

Figure 3-10. The proportion of outages in each utility and outage cause based on work status (i.e., whether the tree was trimmed prior to an outage). When Worked Tree is TRUE, then the outage tree had been trimmed prior to causing an outage. Stars (*) indicate significant 2-sample proportion tests ($p < 0.05$) between worked-tree outages and non-worked-tree outages.

The difference in outage causes between worked and non-worked trees was supported by concurrent differences in the linear distance (ft) between the outage tree and the utility asset. For each utility, worked outage trees were statistically closer on average to the asset than non-inventory outage trees (Figure 3-11). The greatest difference was seen for SDG&E ($t_{104.54} = 8.41$, $p < 0.00001$; worked: 21.5 ± 0.9 ft [mean ± se], not worked: 47.5 ± 3.0 ft), followed by SCE ($t_{390.38} = 10.73$, $p < 0.00001$; worked: 10.1 ± 0.6 ft, not worked: 19.7 ± 0.6 ft). PG&E had the least discrepancy between distances for worked trees and not worked trees, although the difference was still significant ($t_{13054} = 15.37$, $p < 0.00001$; worked: 20.3 ± 0.2 ft, not worked: 24.0 ± 0.1 ft).

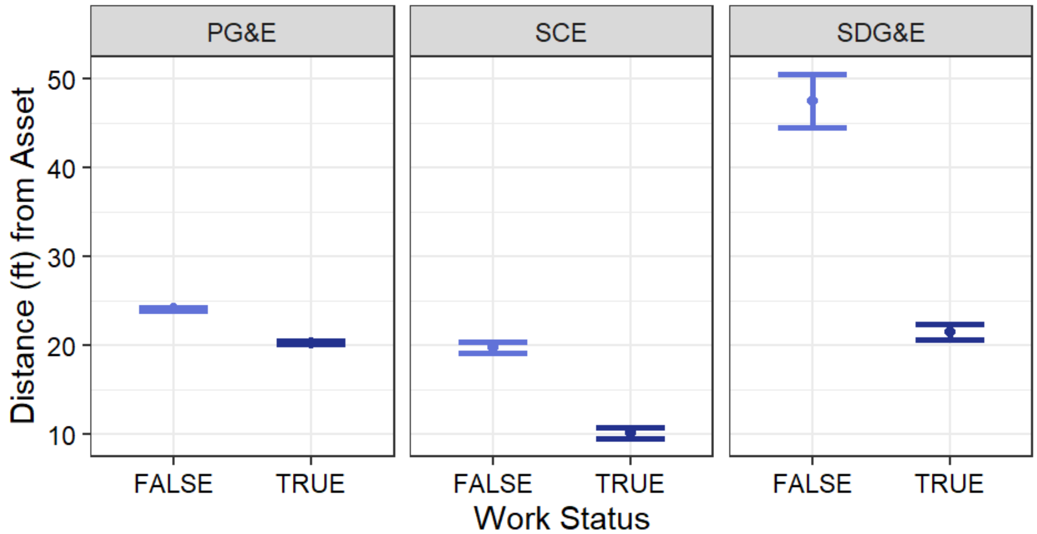

Figure 3-11. Average linear distance (ft) (mean ± standard error) between outage trees and assets differed between worked and non-worked trees.

Effect of Radial Clearance

We identified several cases in which the evidence suggested that increased clearance distance reduced the occurrence of certain types of outages (Figure 3-12). For example, SCE experienced fewer tree growth outages for trees last recorded as 4 – 12 ft clearance than as 0 – 4 ft ($p = 0.02$), as proportions of all outages in those radial clearance categories. PG&E and SDG&E also experienced a downward trend of tree growth outages with increased radial clearance; however, sample sizes precluded statistically significant results. PG&E also experienced fewer branch/frond/bark contact outages for trees last recorded as >12 ft clearance than as 4 – 12 ft clearances ($p = 0.001$), as proportions of all outages in those radial clearance categories. We did not see a similar trend for SCE and SDG&E for branch/frond/bark contact outages, which can be explained by the different species causing outages and the mode of vegetation contact among utilities. For instance, outage investigation comments show that anecdotally, SCE and SDG&E experienced a greater occurrence of outages from detached palm fronds that blew into the lines, whereas PG&E experienced more outages from attached branches “bending” into lines due to snow loading or high heat.

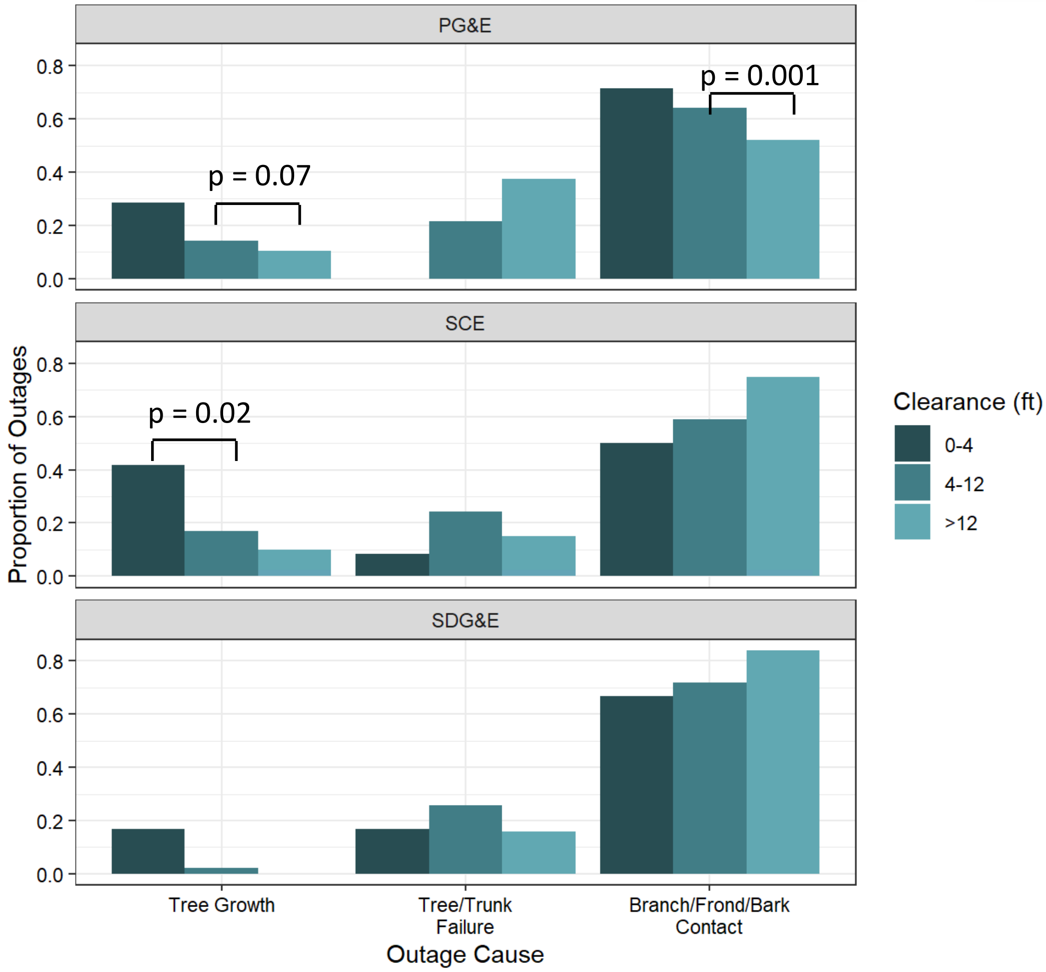

Figure 3-12. Proportions of outage causes for inventory trees with radial clearance information from last management (inspection or trim), with evidence from 2-sample proportion tests were radial clearance categories differed in the proportion of outages categorized as a specific outage cause. Proportions are calculated by utility and radial clearance category for known vegetation contact outage causes.

The first analysis assessing the effect of radial clearance on the time-to-outage (d) considered radial clearance as an isolated treatment without incorporating other variables that may also explain variation in outage occurrence. Using all outages in the analysis subset with radial clearance (n = 1,345), we found that time-to-outage differed among radial clearance categories ($F_{(2,1342)} = 33.41$, $p < 0.00001$). Multiple comparisons using Tukey HSD identified that the enhanced clearance category (>12 ft) had significantly greater time-to-outage than either the 0 – 4 ft category ($p = 0.005$) or the 4 – 12 ft category ($p < 0.00001$; Figure 3-13A). Average time-to-outage by radial clearance category is provided in Table 3-3.

Confining the outages to those occurring on days with a maximum wind gust <15 m/s to remove extreme conditions (n = 836), we found similar results regarding the effect of radial clearance on time-to-outage. Specifically, time-to-outage differed among radial clearance categories ($F_{(2,833)} = 22.06$, $p < 0.00001$). Multiple comparisons using Tukey HSD identified that the enhanced clearance category (>12 ft) had significantly greater time-to-outage than either the 0 – 4 ft category (p = 0.01) or the 4 – 12 ft category (p < 0.00001; Figure 3-13B). Average time-to-outage by radial clearance category is provided in Table 3-4.

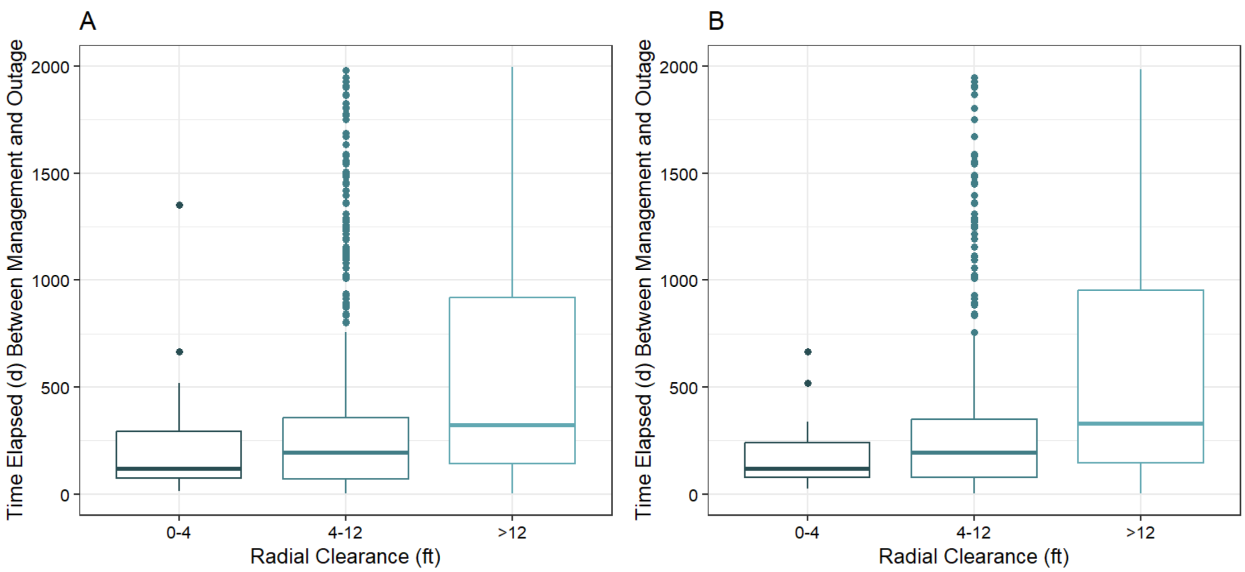

Figure 3-13. Box plots showing the distribution of time-to-outage (d) for each radial clearance category. A) All outages in the analysis subset that contain radial clearance information (n = 1,345), but 48 outages with time-to-outage >2000 d are not depicted. B) Outages that occurred on days with a maximum wind gust <15 m/s to remove extreme conditions (n = 836).

Table 3-4. Variation in the average time (mean ± standard error) between the last management event (inspection or trim) and the subsequent outage for outages (i.e., time-to-outage) for each radial clearance category.

Radial Clearance Category	ANOVA 1: All outages in analysis subset with radial clearance information		ANOVA 2: Outages occurring within 2 years of last management event and without extreme wind conditions	
	Sample Size	Time-To-Outage (d) (mean ± se)	Sample Size	Time-To-Outage (d) (mean ± se)
0 – 4 ft	27	287 ± 85.5	21	269 ± 95.4
4 – 12 ft	509	425 ± 25.2	314	426 ± 32.5
>12 ft	809	619 ± 21.8	501	638 ± 28.2

The second analysis assessing the effect of radial clearance on the time-to-outage (d) considered radial clearance in combination with other variables hypothesized to influence the time-to-outage using a GLM framework. The most supported model contained radial clearance, as well as distance between the outage tree and asset, year, utility, mean temperature, and mean wind direction (Table 3-5). McFadden's R-squared value for this model was 0.26. There were X other models with a ΔAIC ≤2 (Table 3-6). A nested model with the same predictors as the top model except radial clearance could also be used for inference, as it explains a similar amount of variation in the data. However, we chose the more complex model with radial clearance included due to the significance of the radial clearance variable. High Fire Threat District and tree canopy cover also appeared in completing models; however, neither of these variables were significant.

Table 3-5. Output for top model explaining variation in the time elapsed between last management event and a subsequent outage (time-to-outage)

Predictor	Estimate	Standard Error	t-value	p-value
(Intercept)	4.698	0.273	17.206	<0.00001
Radial Clearance Category (4 – 12 ft)	0.470	0.222	2.123	0.03
Radial Clearance Category (>12 ft)	0.497	0.223	2.213	0.03
Year	0.223	0.015	14.910	<0.00001
Utility (SCE)	-1.787	0.116	-15.407	<0.00001
Utility (SDG&E)	-1.085	0.093	-11.669	<0.00001
Distance	0.005	0.002	2.126	0.03
Mean temperature	0.002	0.002	1.099	0.3
Mean wind direction	0.0004	0.0004	0.943	0.3

Table 3-6. Models with ΔAIC ≤2 in GLM model set explaining variation in time-to-outage, ranked according to AIC.

Model	Log-likelihood	AIC	ΔAIC	weight
Radial Clearance + Year + Utility + Distance + Temperature + Wind direction	-8973.17	17966.3	0	0.24
Year + Utility + Distance + Temperature + Wind direction	-8975.34	17966.7	0.33	0.20
Radial Clearance + Tree Canopy Cover + Year + Utility + Distance + Temperature + Wind direction	-8972.65	17967.3	0.95	0.15
Radial Clearance + HFTD + Year + Utility + Distance + Temperature + Wind direction	-8972.75	17967.5	1.17	0.13
Tree Canopy Cover + Year + Utility + Distance + Temperature + Wind direction	-8974.89	17967.8	1.45	0.12
HFTD + Year + Utility + Distance + Temperature + Wind direction	-8975.13	17968.3	1.92	0.09

4 DISCUSSION

In this study, EPRI explored the question of whether enhanced vegetation affects outages and ignitions. To address this question, EPRI collected and standardized utility and external data into the joint database to facilitate common analyses of vegetation-caused distribution outages among utilities. The question focused on outages, including their cause, occurrence in high fire threat districts, leading to reportable ignitions, variation between worked and non-worked trees, and the effect of radial clearance.

For **Outage Variation**, the number of outages varied annually and seasonally. Winter months (December – February) tended to have the largest peaks in outage counts, which could be explained by weather variables. These peaks co-occurred with low temperatures and high wind speeds.

In terms of **Outage Cause**, analysis found that a low proportion of total outages for each utility are caused by vegetation growing into the lines. This finding might point towards evidence of a direct benefit from vegetation management. The type of tree genera were similar for all the utilities but the order of the genera in terms of causing outages varied among the utilities. The greatest proportion of outages from each utility was caused by a part of a tree (e.g., branch, bark, frond) contacting the line. Looking at monthly outage totals from the outage analysis subset, trends in vegetation-caused outages can be observed. Wind gust and other individual weather variables show (non-linear) trends that might merit further investigation. Overall, from the analysis, management options might consider type of tree genera and weather in planning enhanced vegetation activities.

For **Outages in High Fire Threat Districts**, utilities varied in the proportion of distribution lines that were in a HFTD. Analysis showed that PG&E and SCE had a greater proportion of outages in HFTD than expected when compared to the proportion of primary overhead distribution circuit miles in HFTD. However, SDG&E had a lower proportion of HFTD outages than expected. Variation in land cover and tree canopy cover among utility service territories may help explain differences in the proportion of outages that occur within HFTD. Further investigation into these trends should include exploring a longer time period as well as land cover variation.

Considering **Outages Leading to Reportable Ignition**, and combining all utilities, approximately 2% of analyzed outages resulted in an ignition. Most of these outage-ignitions occurred in developed areas for SCE and SDG&E; however, PG&E had more variation in land cover. PG&E was the only utility with these outage ignitions occurring in forested areas, which had the highest percentage among PG&E outage-ignitions. A greater proportion of outages were related to an ignition in the summer months. Weather conditions during summer months indicated that outage-ignitions occurred more in hotter, drier conditions, on average. Further consideration of seasonal weather patterns might lead to insights that help utilities target timing and location of enhanced vegetation management.

For the analysis of **Worked and Non-Worked Trees**, a greater proportion of outages caused by worked trees were categorized as vegetation growth-caused outages than outages by trees that had not been worked (i.e., previously trimmed) for PG&E and SCE. Similarly, SDG&E had a greater proportion of outages caused by worked trees were categorized as branch/frond/bark-caused outages than outages by trees that had not been worked (i.e., previously trimmed). SDG&E had a smaller proportion of outages caused by worked trees were categorized as tree/trunk failure-caused outages than outages by trees that had not been worked (i.e., previously trimmed). Each utility had evidence that outage trees that had been previously trimmed were closer to the line than outage trees that had not been previously trimmed. These differences suggest that vegetation trimming can help reduce the occurrence of grow-in and blow-in outage causes, specifically, by managing trees that are closer to the line. However, fall-in outage causes may be influenced more by a hazard tree management program.

Finally, with respect to the **Effect of Radial Clearance**, utilities experienced a reduced proportion of outages caused by vegetation growth as radial clearance increased. PG&E also experienced a reduced proportion of branch/frond/bark-caused outages as radial clearance increased. These results support the outage cause results for worked trees and provide further evidence that enhanced clearance distances can provide greater benefits. Using time-to-outage as a response variable to test the effectiveness of radial clearance, we found that enhanced clearance distances led to longer time elapsed between management and a subsequent outage. Considering that lines are inspected on a regular basis, this increase in time-to-outage implies that maintaining radial clearance at an increased distance will reduce the likelihood that an outage will occur before the lines are inspected again. In a modeling framework alongside other variables, increasing radial clearance was still significant and provided benefits for time-to-outage; however, other variables explained more variation in the outage data. The utility, year, distance to the line, temperature and wind direction were also important in explaining variation.

It is important to note **Assumptions and Limitations** in a study of this scale. First, primary overhead line circuit miles contain bare wires and covered conductors, and thus, includes areas in which additional mitigation measures are in place besides vegetation management. These mitigations measures were not included in the study. Secondly, HFTD circuit miles are from a recent snapshot of utility lines and do not consider the number of HFTD circuit miles that have been undergrounded during the timeframe of the study.

Recommendations and Future Work

EPRI with the help of the IOUs created a joint database and then performed analysis to answer the key research question regarding the connection between enhanced vegetation clearances and the effect on outages and ignitions. This database can be used to explore other research questions that the joint IOUs have, or that one IOU would like to explore in more detail for their service territory. A selection of potential next steps include the following ideas:

- Outage investigation reports did not include an estimate of radial clearance at the time of the outage for two of the three IOUs. Adding this estimate to the outage investigation report for all IOUs would provide valuable information to future analyses of clearance effectiveness.

- In this project scope, the focus of the combined utility data was vegetation-caused outages, which led to limited information about radial clearance and did not incorporate areas where trees were trimmed and have not caused an outage. Standardizing vegetation management data (e.g., inspection and trim records) would provide additional information about the clearances that are achieved more broadly for primary overhead circuit and would allow for more robust analyses of clearance effectiveness.
- A time-series, grid-type analysis could provide additional insights into the effectiveness of clearance distances. Weather and landcover data were populated in the common database from datasets that use a grid approach to report variables. For example, in the ERA5-Land dataset, the grid cells are approximately 9x9 km (0.1° by 0.1°). Utilities' service territories could also be divided into grid cells, allowing for the analysis of vegetation and outage information for individual grid cells over time. This type of analysis could help investigate whether the probability of a vegetation-caused outage is correlated with the management of vegetation in each grid cell.
- Various mitigating practices (e.g., vegetation management, covered conductor, undergrounding) are used to reduce vegetation-caused outages and ignitions. Whereas the scope of this project focused solely on vegetation management, future analyses should be inclusive of all mitigating practices, which would enable a better understanding of the conditions where each practice may be most effective.
- Additional analytical methods, commonly used in utility reliability analyses, could be explored to understand and potentially quantify the impact of vegetation management changes on outage performance. This type of analysis would require additional information from the utilities to separate the impact of various changes implemented over time. For this analysis, increasing vegetation clearance distance would be one of the changes considered.

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6 APPENDICES

The included appendices aim to provide additional documentation on the creation of the Joint Utility Vegetation Management Database and supplemental analyses requested by the utilities.

A COMMON DATABASE DOCUMENTATION

PG&E Table Documentation

Dataset subsets were created for any tables that required joining based on spatial location. The resulting data was transferred to the tables making up the Joint Utility Vegetation Management database. Note that these tables containing the subsets of data are only in the "Master Database." Only EPRI has access to this database. EPRI includes this content to illustrate how we joined data based on spatial location.

PGE_Outage_subset

This table filters vegetation-caused outages obtained from PG&E (*PG_E_VMDR-2267 Follow-Up – Outage*) to records where an outage investigation occurred, and the tree causing the outage was identified. This subset contains all PG&E vegetation-caused outages made available in the common IOU database. The table includes only the fields necessary for the data join to other PG&E datasets. Additionally, the table defines field data types, creates a primary key, creates a geography field for point location, and creates a spatial index for the geometry.

PGE_VMD_subset

This table filters PG&E's vegetation management dataset (*PG_E_VMD*) to facilitate joining to the outage data. The table includes only the fields necessary for the data join or used to populate the common database variables downstream and excludes records with missing data in fields used for join conditions. Additionally, the table defines field data types, creates a primary key, creates a geography field for point location, and creates a spatial index for the geometry.

PGE_EVM_subset

This table filters PG&E's enhanced vegetation management dataset (*PG_E_EVM_VMDR_EPRI_Data*) to facilitate joining to the outage data. The table includes only the fields necessary for the data join or used to populate the common database variables downstream and excludes records with missing data in fields used for join conditions. Additionally, the table defines field data types, creates a primary key, creates a geography field for point location, and creates a spatial index for the geometry.

PGE_Ignitions_subset

This table filters PG&E's ignitions dataset (*PG_E_Ignitions*) to facilitate joining to the outage data. The table includes only the fields necessary for the data join or used to populate the common database variables downstream and excludes records with missing data in fields used for join conditions. Additionally, the table defines field data types, creates a primary key, creates a geography field for point location, and creates a spatial index for the geometry.

PGE_Outage_VMD_join

This table joins *PGE_VMD_subset* and *PGE_Outage_subset* to identify any potential trees assessed and trimmed during annual vegetation management cycles that subsequently caused an outage.

This join selects VMD records to Outage records in which trees were the same species, had a DBH within 12 in, had a height (ft) within a 30% variance, were inspected before the outage, and were located within a pre-defined distance (m) from the outage coordinates based on available VMD coordinates.

Outage coordinates were always recorded at the outage tree, whereas VMD contained two coordinate possibilities: tree locations and work segment locations. We reasoned that VMD tree locations should generally be the same as outage locations (within 40 ft). In contrast, VMD work segment locations could be up to an average span length away (200 ft) from the outage location. VMD tree locations were given preference when they were available. No VMD tree locations >40 ft (12.192 m) from the outage point or work segment locations >200 ft (60.96 m) from the outage point were considered possible matches.

With these join conditions, matching multiple VMD records to an outage record was possible. Additional logic used to select a single record from the possible matches is outlined in creating *PGE_clean*.

PGE_Outage_EVM_join

This table joins *PGE_EVM_subset* and *PGE_Outage_subset* to identify any potential trees assessed within the EVM scope that subsequently caused an outage.

This join selects EVM records to Outage records in which trees were the same species, had a DBH within 6 in variance, had a height (ft) within a 30% variance, were assessed before the outage, and were located within 40 ft (12.192 m) from the outage coordinates.

Outage coordinates were recorded at the outage tree, and EVM coordinates were recorded at the assessed tree. We reasoned that EVM tree locations should generally be the same as outage locations. No EVM trees >40 ft away from the outage point were considered possible matches.

With these join conditions, matching multiple EVM records to an outage record was possible. Additional logic used to select a single record from the possible matches is outlined in creating *PGE_clean*.

PGE_Outage_Ignition_join

This table joins *PGE_Ignitions_subset* and *PGE_Outage_subset* to determine where vegetation-caused outages also resulted in a CPUC reportable ignition.

This join selects ignition records with a matching integrated logging information number (ilis) number.

With these join conditions, it was possible to match multiple ignition records to an outage record in cases where multiple ignition records were created for an ignition event. Additional logic used to select a single record from the possible matches is outlined in creating *PGE_clean*.

PGE_clean

This table joins *PGE_Outage_VMD_join*, *PGE_Outage_EVM_join*, and *PGE_Outage_Ignition_join* with the outage dataset supplied by PG&E (*PG_E_VMDR-2267 Follow-Up – Outage*), also filtered to records where an outage investigation occurred and the tree causing the outage was identified. The table has the same number of rows (i.e., vegetation-caused outages) as the filtered outage dataset but now includes additional columns from PG&E's VMD, EVM, and Ignitions datasets, where applicable. where multiple records from VMD, EVM, or Ignitions are matched to an outage record, this table also selects a single most likely record. The table was used to populate the common IOU database.

Information from VMD and EVM were combined to populate the last inspection date, the last management date, and radial clearance. From possible matches identified in *PGE_Outage_VMD_join* or *PGE_Outage_EVM_join*, we selected the record from either dataset with the closest distance to the outage location. If multiple records were equally close, we selected the tree with the closest DBH, the closest height, and finally, the latest inspection date before the outage. Trees with work codes indicating they were removed were excluded from consideration as they could not have caused an outage. If no records were selected, we determined that the tree causing the outage had not been managed in the VMD or EVM scope.

From PGE_Outage_Ignition_join, we selected the record with the latest create date and time. If no ignition records were selected, we determined that the vegetation-caused outage did not result in a CPUC reportable ignition.

SCE Table Documentation

Data subset tables were created for any datasets that required joining based on spatial location. Otherwise, dataset joins were performed while making the *SCE_clean* table, which is used to populate the common database.

SCE_TCCI_subset

This table filters vegetation-caused outage records obtained from SCE (*SCE_TCCI*) to facilitate the join to the SCE strike trees dataset and contains the fields necessary for this join.

Additionally, the table defines variable classes, creates a primary key, creates a geography field for point location, and creates a spatial index for the geography.

SCE_Heavytrees_subset

This table filters SCE's strike tree dataset (*SCE_Heavytrees*) to facilitate joining to the outage data. The table includes only the fields necessary for the data join or used to populate the common database variables downstream and excludes records with missing data in fields used for join conditions. Additionally, the table defines field data types, creates a primary key, creates a geography field for point location, and creates a spatial index for the geometry.

SCE_TCCI_Heavytrees_join

This table joins *SCE_TCCI_Heavytrees_subset* to *SCE_TCCI_subset* to determine if any trees managed as potential strike hazards subsequently caused an outage.

This join selects Heavytree records in which trees were the same species, were assessed before the outage, and had a distance to the outage location that was within 40 ft (12.192 m) of the specified distance between the outage tree and the line from the outage record.

The outage location coordinates were recorded at the outage structure/asset, whereas the Heavytree location coordinates were recorded at the tree. Thus, our buffered location match attempts to match heavy trees that were the same distance from the line as outage trees. No trees >40 ft from the known distance of the outage tree to the line were considered possible matches. Outage records missing distance from the line could not be matched to heavy trees.

With these join conditions, matching multiple Heavytree records to an outage record was possible. Additional logic used to select a single record from the possible matches is outlined in the creation of *SCE_clean*.

SCE_clean

This table joins *SCE_trees*, *SCE_treeinspection*, *SCE_workpoint*, *SCE_TCCI_heavytrees_join*, and *SCE_CPUC_ignitions* to *SCE_TCCI*. The table has the same number of rows (i.e., vegetation-caused outages) as *SCE_TCCI*, but now includes additional columns from other SCE datasets, where applicable. This table also selects a single most-likely vegetation record for an outage where multiple records from treeinspection, workpoint, heavytrees, or ignitions matched to an outage record based on the join conditions. This table was used to populate the common IOU database.

SCE_trees was used to connect *SCE_TCCI* to *SCE_treeinspection* and *SCE_workpoint* through common tree IDs. From *SCE_inspection*, we selected the record with a matching tree ID with the latest inspection date before the outage date. From *SCE_workpoint*, we selected the record with a matching tree ID with the latest work date before the outage date.

From *SCE_TCCI_heavytrees_join*, we selected the record where the distance from the heavy tree to the outage location was most similar to the distance from the line recorded in the outage record.

From *SCE_CPUC_ignitions*, we selected the record with the same date and line device.

Information from the tree program (inspection and workpoint) and the heavy tree program were combined to populate the last inspection date and the last management date. If an outage joined both *SCE_trees* and *SCE_heavytrees,* then data from *SCE_trees* was used to populate *SCE_clean.*

SDG&E Table Documentation

All SDG&E utility datasets could be joined using outage ID or tree ID information. Since no spatial joins were required, SDG&E datasets could be used to directly insert variables into the common database. The following SDG&E datasets were used in the common database insert:

- SDGE_vegoutages2011onwards
- SDGE_veg_outage_attributes_07_18_2024
- SDGE_vtree_allrecords_with_latlon
- SDGE_Ignitions

B OUTAGE DATASET VARIABLE MAPPING

The following contains the mapping of utility variables to the common database variables.

Table B-1. Variables from PG&E data files used to determine mapping to Joint Utility Vegetation Management Database variables

Common Database Variable	VMDR-2267 Follow-Up - Outage	VMD	EVM_VMDR-2267_EPRI_Data_202300830	Ignitions	Other/Notes
UtilityID					Assigned to utility by EPRI
OutageID	cRptNumber, nILIS_ID, ID				
DateTreeCausedOutage	dOutageDate				
LastVegManDate		dtTrimPriorLast, dtWorkDate	TW_WORK_DATE		
LastInspectionDate		TreeLoc_dInspDate	CALC_FIRST_PI_DATE		
Circuit	cCircuit				
DistributionSystem	cILIS_Outage_Level				
OutageCauseID	cDOLIP_Cause, bDOLIP_Cause_Correct, cReason				
TreeID		iTreeRecsID	AUTO_ID		
TreeInInventory		TreeLoc_dInspDate	CALC_FIRST_PI_DATE		
ForesterInspectionComments	cReason				
IgnitionRelatedToOutage	nILIS_ID			Ilis_number	
ESA			ENVIRONMENTAL_CONCERN		
LatDamage	nLat				
LonDamage	nLon				

Common Database Variable	VMDR-2267 Follow-Up - Outage	VMD	EVM_VMDR-2267_EPRI_Data_202300830	Ignitions	Other/Notes
RadialClearanceCategoryID		nClearance	CALC_VP_WORKVERIFICATION_PASS		
DistanceTreeCausingOutage	nDistance				
HighFireThreatDistrict					lat/lon spatially joined to HFTD map
HighFireRiskAreaCombined					lat/lon spatially joined to HFRA map
CPUCTier					lat/lon spatially joined to HFTD map
DBHCategoryID	nDBH				
DeadDyingTreeBranch	bTreeDead				
TreeConditionID	bTreeDead, cTreeHealth				
TreeHeightCategoryID	nHeight				
TreeGrowthRateID					Not populated
CommonName	Generated from cSpecies				
Genus	Generated from cSpecies				
ScientificName	Generated from cSpecies				

Table B-2. Variables from SCE data files used to determine mapping to Joint Utility Vegetation Management Database variables

Common Database Variable	TCCI	sce-heavy-trees-all-data-2023-08-09T182423Z	Work_Point	Tree_Pt_Inspection	tblSpeciesGrowthRate	Other/ Notes
UtilityID						Assigned to utility by EPRI
OutageID	_record_id					
DateTreeCausedOutage	start_date					
LastVegManDate		work_completed_date	COMPETEDATETIME			
LastInspectionDate		risk_assessment_date		INSPECTIONDATE		
Circuit	circuit_name					
DistributionSystem						All outage records are distribution
OutageCauseID	tcci_category, description, action_and_remarks					
TreeID		_record_id		_record_id		
TreeInInventory	Normally_trimmed, hazard_tree_inventory					Also true if matching heavy tree or inspection
ForesterInspectionComments	action_and_remarks					
IgnitionRelatedToOutage						Outage date and line device match to CPUC ignition record
ESA	esa					
LatDamage	_latitude					

Common Database Variable	TCCI	sce-heavy-trees-all-data-2023-08-09T182423Z	Work_Point	Tree_Pt_Inspection	tblSpeciesGrowthRate	Other/ Notes
LonDamage	_longitude					
RadialClearanceCategoryID			CLEARANCE_W	CLEARANCE		
DistanceTreeCausingOutage	distance_from_line					
HighFireThreatDistrict						lat/lon spatially joined to HFTD map
HighFireRiskAreaCombined	hfra					
CPUCTier						lat/lon spatially joined to HFTD map
DBHCategoryID	DBH					
DeadDyingTreeBranch	tree_condition					
TreeConditionID	tree_condition					
TreeHeightCategoryID	tree_height					
TreeGrowthRateID					GrowthRate	
CommonName	Generated from tree_type					
Genus	Generated from tree_type					
ScientificName	Generated from tree_type					

Table B-3. Variables from SDG&E data files used to determine mapping to Joint Utility Vegetation Management Database variables

Common Database Variable	Vegoutages2011onwards	vtree_allrecords_with_latlon	SDGE_veg_outage_attributes_07_18_2024	Ignitions	Other/ Notes
UtilityID					Assigned to utility by EPRI
OutageID	OTGID				
DateTreeCausedOutage	OTGDATE				
LastVegManDate			LastTrimDate		
LastInspectionDate			LastInspectionDate		
Circuit	CIRCUITNUMBER				
DistributionSystem			If_primary		
OutageCauseID	OTGCAUSECODE, FORCAUSECODE, OTGCAUSECOMMENT				
TreeID	FACILITYID				
TreeInInventory			If_inventory		
ForesterInspectionComments	OTGCAUSECOMMENT				
IgnitionRelatedToOutage				OutageID_Associated	
ESA		ESA			
LatDamage		CC_LAT_wgs84			
LonDamage		CC_LONG_WGS84			
RadialClearanceCategoryID			LastTrim_RadialCLEARANCE, LastInsp_RadialCLEARANCE		
DistanceTreeCausingOutage	OTGTREEBASELINEDIST				

Common Database Variable	Vegoutages2011onwards	vtree_allrecords_with_latlon	SDGE_veg_outage_attributes_07_18_2024	Ignitions	Other/ Notes
HighFireThreatDistrict	TIER				
HighFireRiskAreaCombined	HFRA				
CPUCTier	TIER				
DBHCategoryID	DBH				
DeadDyingTreeBranch	OTGTREECONDITION				
TreeConditionID	OTGTREECONDITION				
TreeHeightCategoryID	TREEHEIGHT				
TreeGrowthRateID		GROWTHRATE			
CommonName	Generated from SPECIES				
Genus	Generated from SPECIES				
ScientificName	Generated from SPECIES				

Table B-4. Standardizing utility data values into Joint Utility Vegetation Management Database variables: TreeConditionID

Level	EPRI	PG&E	SCE	SDG&E
Dataset	Joint Database	VMD	Work_point	Vegoutages2011onwards
Variable	TreeConditionID	BTREEDEAD & cTREEHealth	tree_condition	OTGTREECONDITION
Values	1 – Green, Live	N & None, Slight, ‘ ’	Green, Leaning, Overhang, Unstable	LIVE
	2 – Decline	N & Moderate, Severe	Decline, Beetle Infested, Damaged, Deteriorated	DCLN
	3 – Dead	Y & (any cTreeHealth value)	Dead	DEAD
	4 – Unknown		Unknown	
	NULL	NULL	‘ ’	NULL

Table B-5. Standardizing utility data values into Joint Utility Vegetation Management Database variables: DeadDyingTreeBranch

Level	EPRI	PG&E	SCE	SDG&E
Dataset	CommonDatabase	OutageReport	TCCI	vegoutages2011onwards
Variable	DeadDyingTreeBranch	BTREEDEAD	tree_condition	OTGTREECONDITION
Values	0 – no	N	Green, Leaning, Overhang, Unstable	LIVE
	1 – yes	Y	Decline, Beetle Infested, Damaged, Deteriorated, Dead	DEAD, DCLN
	Unknown		Unknown	
	NULL	NULL	‘ ‘	NULL

Table B-6. Standardizing utility data values into Joint Utility Vegetation Management Database variables: RadialClearanceCategoryID

Level	EPRI	PG&E	SCE	SDG&E
Dataset	CommonDatabase	VMD or EVM	Work_point or Tree_Pt_Inspection	veg_outage_attributes_07_18_2024
Variable	RadialClearanceCategoryID	nClearance or CALC_VP_WORKVERIFICATION_PASS	CLEARANCE_W or CLEARANCE	LastTrim_RadialCLEARANCE or LastInsp_RadialCLEARANCE
Values	1 – 0-4 ft	0 < clearance value ≤ 4	RCD (0-4 ft)	1 (0-2 ft), 2 (2.1-4 ft)
	2 – 4-12 ft	4 < clearance value < 12	CCD (4-6 ft), TCD (6-9 ft), GRCD (9-12 ft)	3 (4.1-5.9 ft), 4 (6.0-7.9 ft), 5 (8.0-9.9 ft), 6 (10-11.9 ft)
	3 – 12+ ft	clearance value ≥ 12	>GRCD (>12 ft)	7 (12.0-14.9 ft), 8 (15.0-19.9 ft), 9 (20.0-30 ft), 10 (30.1-40 ft), 11 (40.1-50 ft), 12 (50.1-60 ft), 13 (60.1-80 ft), 14 (80.1-100 ft), 15 (100.1+ ft)
	NULL	0 99	NULL	16 (Unable to verify) NR (No Record)

Table B-7. Standardizing utility data values into Joint Utility Vegetation Management Database variables: HighFireThreatDistrict

Level	EPRI	PG&E	SCE	SDG&E
Dataset	CommonDatabase	HFTD shapefile	HFTD shapefile	vegoutages2011onwards
Variable	HighFireThreatDistrict			TIER
Values	0 – no	Outage lat/lon position falls outside of HFTD polygon	Outage lat/lon position falls outside of HFTD polygon	Non-HFTD
	1 – yes	Outage lat/lon position falls inside of HFTD polygon	Outage lat/lon position falls inside of HFTD polygon	Tier-2, Tier-3
	NULL	Outage does not have lat/lon position recorded		

Table B-8. Standardizing utility data values into Joint Utility Vegetation Management Database variables: HighFireRiskAreaCombined

Level	EPRI	PG&E	SCE	SDG&E
Dataset	CommonDatabase	HFRA shapefile	TCCI	vegoutages2011onwards
Variable	HighFireRiskAreaCombined		hfra	HFRA
Values	0 – no	Outage lat/lon position falls outside of HFRA polygon	No	N
	1 – yes	Outage lat/lon position falls inside of HFRA polygon	EXTREME, ELEVATED, HHZ, SRA	Y
	NULL	Outage does not have lat/lon position recorded	NULL	NULL

Table B-9. Standardizing utility data values into Joint Utility Vegetation Management Database variables: ESA (environmentally sensitive area)

Level	EPRI	PG&E	SCE	SDG&E
Dataset	CommonDatabase	EVM	TCCI	SDGE_vtree_allrecords_with_latlon
Variable	ESA	ENVIRONMENTAL_CONCERN	esa	ESA
Values	0 – no		no	N
	1 – yes	all other values	yes	Y
	NULL	NULL, None Observed, ‘ ’	NULL	NULL

Table B-10. Standardizing utility data values into Joint Utility Vegetation Management Database variables: TreeInInventory

Level	EPRI	PG&E	SCE	SDG&E
Dataset	CommonDatabase	VMD & EVM for matching tree records	TCCI (Tree_Pt_Inspection & sce-heavy-trees-all-data-2023-08-09T182423Z for matching tree records)	SDGE_veg_outage_attributes _07_18_2024
Variable	TreeInInventory	iTreeRecsID & AUTO_ID	normally_trimmed & hazard_tree_inventory	If_inventory
Values	0 – no	no matching tree record	normally_trimmed = no & hazard_tree_inventory = no & no matching tree record	no
	1 – yes	matching tree record	Normally_trimmed = yes OR hazard_tree_inventory = yes OR matching tree record	yes

Table B-11. Standardizing utility data values into Joint Utility Vegetation Management Database variables: TreeGrowthRateID

Level	EPRI	PG&E	SCE	SDG&E
Dataset	CommonDatabase		SpeciesGrowthRate	SDGE_vtree_allrecords_with_latlon
Variable	TreeGrowthRateID		GrowthRate	GROWTHRATE
Values	1 – SLOW		Slow	SLOW
	2 – MED		Medium	MED
	3 – FAST		FAST	FAST
	4 – VFST		VFST	VFST
	NULL	All records	NULL	NULL

Table B-12. Standardizing utility data values into Joint Utility Vegetation Management Database variables: DBHCategoryID

Level	EPRI	PG&E	SCE	SDG&E
Dataset	CommonDatabase	PG_E_VMDR-2267 Follow-Up - Outage	TCCI	Vegoutages2011onwards
Variable	DBHCategoryID	nDBH	DBH	DBH
Values	1 – (0-3 in)	DBH < 3	DBH < 3	0.0-2.9 in
	2 – (3-8 in)	3 ≤ DBH < 8	3 ≤ DBH < 8	3.0-7.9 in
	3 – (8-13 in)	8 ≤ DBH < 13	8 ≤ DBH < 13	8.0-12.9 in
	4 – (13-18 in)	13 ≤ DBH < 18	13 ≤ DBH < 18	13.0-17.9 in
	5 – (18-24 in)	18 ≤ DBH < 24	18 ≤ DBH < 24	18.0-23.9 in
	6 – (24-36 in)	24 ≤ DBH < 36	24 ≤ DBH < 36	24.0-35.9 in
	7 – (36-42 in)	36 ≤ DBH < 42	36 ≤ DBH < 42	36.0-41.9 in
	8 – (42-48 in)	42 ≤ DBH < 48	42 ≤ DBH < 48	42.0-47.9 in
	9 – (48-54 in)	48 ≤ DBH < 54	48 ≤ DBH < 54	48.0-53.9 in
	10 – (54-60 in)	54 ≤ DBH < 60	54 ≤ DBH < 60	54.0-59.9 in
	11 – (60-80 in)	60 ≤ DBH < 80	60 ≤ DBH < 80	60.0-79.9 in
	12 – (80+ in)	DBH ≥ 80	DBH ≥ 80	
	NULL	NULL	NULL	NR (No Record)

Table B-13. Standardizing utility data values into Joint Utility Vegetation Management Database variables: TreeHeightCategoryID

Level	EPRI	PG&E	SCE	SDG&E
Dataset	CommonDatabase	PG_E_VMDR-2267 Follow-Up - Outage	TCCI	outage
Variable	TreeHeightCategoryID	nHeight	tree_height	TREEHEIGHT
Values	1 – (0-5 ft)	Height ≤ 5	Height ≤ 5	1 (0.0-5.0 ft)
	2 – (5-15 ft)	5 < Height ≤ 15	5 < Height ≤ 15	2 (5.1-15.0 ft)
	3 – (15-20 ft)	15 < Height ≤ 20	15 < Height ≤ 20	3 (15.1-20.0 ft)
	4 – (20-30 ft)	20 < Height ≤ 30	20 < Height ≤ 30	4 (20.1-30.0 ft)
	5 – (30-40 ft)	30 < Height ≤ 40	30 < Height ≤ 40	5 (30.1-40.0 ft)
	6 – (40-50 ft)	40 < Height ≤ 50	40 < Height ≤ 50	6 (40.1-50.0 ft)
	7 – (50-60 ft)	50 < Height ≤ 60	50 < Height ≤ 60	7 (50.1-60.0 ft)
	8 – (60-80 ft)	60 < Height ≤ 80	60 < Height ≤ 80	8 (60.1-80.0 ft)
	9 – (80-200 ft)	80 < Height ≤ 200	80 < Height ≤ 200	9 (80.1-200 ft)
	10 – (200+ ft)	Height > 200		
	NULL	NULL	NULL	13, NR

Table B-14. Standardizing utility data values into Joint Utility Vegetation Management Database variables: DistributionSystem

Level	EPRI	PG&E	SCE	SDG&E
Dataset	CommonDatabase	PG_E_VMDR-2267 Follow-Up - Outage	TCCI	SDGE_veg_outage_attributes_07_18_2024
Variable	DistributionSystem	cILIS_Outage_Level		If_primary
Values	0 – no	G, S, T, TS, TX		A (Standalone Transmission), C (SSC Secondary), S (Open-wire Secondary), T (Transmission)
	1 – yes	D	All records	P (Primary Distribution)
	NULL	NULL, ‘ ‘		

Table B-15. Standardizing utility data values into Joint Utility Vegetation Management Database variables: IgnitionRelatedToOutage

Level	EPRI	PG&E	SCE	SDG&E
Dataset	CommonDatabase	PG_E_VMDR-2267 Follow-Up – Outage & Ignitions	TCCI & CPUC ignition reports	veg_ignitions2014onwards
Variable	IgnitionRelatedToOutage	nILIS_ID & Ilis_number		OutageID_Associated
Values	0 – no	Ilis number is not found in Ignition dataset	Outage record info does not match CPUC ignition record	Outage ID is not found in ignition dataset
	1 – yes	Ilis number is found in ignition dataset	Outage record info matches CPUC ignition record	Outage ID is found in ignition dataset

Table B-16. Standardizing utility data values into Joint Utility Vegetation Management Database variables: OutageCauseID

Level	EPRI	PG&E	SCE	SDG&E
Dataset	CommonDatabase	PG_E_VMDR-2267 Follow-Up – Outage	TCCI	vegoutages2011onwards
Variable	OutageCauseID	cDOLIP_Cause	cause_category	OTGCAUSECODE & FORCAUSECODE
Values	1 (Tree or vegetation growth)	Tree – grew into line	Grow In	318 – Tree contact due to growth/encroachment
	2 – 9 (Tree or tree part contact)	Tree – bark fell into line, Tree – branch fell into line, Tree – fell into line, Tree – palm frond fell into line	Blow In, Fall In	322 – Detached tree branch contact, 324 – Palm tree contact, 326 – Detached palm frond contact, 420 – Tree contact (weather related), 426 – Detached tree branch contact (weather related), 428 – Palm tree contact (weather related), 430 – Detached palm frond contact (weather related)
	10 (Company/ contractor/ private tree trimming cause)	Tree – cutting	Human Caused	606 – SDG&E crew line fault/tree trimming, 626 – SDG&E contractor line fault/tree trimming, 704 – Line fault/tree trimming
	11 (Miscellaneous, Unknown)	Other ground vegetation, NULL	No Cause/Not Tree Related, Uncategorized, NULL	NULL

Level	EPRI	PG&E	SCE	SDG&E
	12 (PSPS)	Public Safety Power Shut-off		215 – Public Safety Power Shutoff (PSPS)
	13 (Safety-related)	CWSP – Vegetation Removal, Planned		214 – Deenergized for safety, 320 – Deenergized for safety - tree trimming, 424 – Deenergized for safety

Table B-17. Standardizing utility data values into Joint Utility Vegetation Management Database variables: comments used to further refine tree or tree part contact (OutageCauseID 2 – 9). Note that misspellings in the table are intentional; because comments are free-form, misspellings are present and were accounted for in the script to create OutageCauseID.

Level	EPRI	PG&E	SCE	SDG&E
Dataset	CommonDatabase	PG_E_VMDR-2267 Follow-Up – Outage	TCCI	vegoutages2011onwards
Variable	OutageCauseID	cReason, only used when bDOLIP_Cause_Correct = Y	Fall_in_type, Tree_type, Description, Action_and_remarks	OTGCAUSECOMMENT
Values	2 (Whole tree failed)	cDOLIP_Cause = 'Tree – fell into line' cReason = uproot, uroot, up-rooted, up rooted, up rotted, up root, uprooted, uprroted, uproorting, upooted, uprotted, fail & roots, tree fell over, failed at base, tree blew over, fallen tree, down tree, broke at ground level, broke off at ground, broke off at base, at base broke, saturated soil, saturated ground, soil saturation, soft soil, decay in root, blew down, blown over, mudslide, land slide, slide, domino, species down, OAKL down, feel into line, feel into the power lines, collasped, root plate failure, root plate failure, root rot, base rot, came down	Fall_in_type = root Description = root, tree came down Action_and_remarks = root, uproted, tree fell, tree fell over, tree blew over, fallen tree, tree failed, down tree, failed at the base, oak fell, euc failed, oak & failed	OTGCAUSECOMMENT = uproot, failed & base, failed & roots, failed at ground level, pushed over, toppled, felled, Eucalyptus & fell
	3 (Tree failed at trunk)	cDOLIP_Cause = 'Tree – fell into line' cReason = Top broke, top split, broke the top, tree broke, top &	Fall_in_type = trunk Action_and_remarks = top broke, broke the top, tree broke, broke tree, top brought	OTGCAUSECOMMENT = snapped at trunk, broke off the main trunk, trunk snap, top snap, top broke, top blown, broke out at 3ft, failed at the codom, trunk &

Level	EPRI	PG&E	SCE	SDG&E
		blew out, snap, top brought down, top fail, trunk fail, failed & trunk, broke & toppled, broke at co-dominant top, broke off & above ground, boke 16ft from ground, broke out, broke & fell, tree & break & fall, stem, split, fresh cut, cracked at the base	down, top of Cedar broke, broken tree, tree & breaking out, top & broke out, broke out, broke off & top, broke near base of trunk, leader broke, codominant stem snap, split in half, tree cracked and fell, snapped at base	split out, failed at the co-dominant trunk union, top portion, trunk fail, fail & trunk, leader & break, split & fell, top & broke, large leader fail, snapped in half, leader & broke out
	4 (Branch on the line)	cDOLIP_Cause = 'Tree - branch fell into line'	Fall_in_type = branch Decription = branch, limb Action_and_remarks = branch, limb	OTGCAUSECOMMENT = branch, limb, twig, liomb, flyer, bark detached
	5 (Frond on the line)	cDOLIP_Cause = 'Tree - palm frond fell into line'	Fall_in_type = branch Tree_type = palm Description = frond Action_and_remarks = frond, palm fromd, palm frown, palm friond	OTGCAUSECOMMENT = frond, deed pod, seed stalk, flower stalk
	6 (Bamboo on the line)		Description = bamboo Action_and_remarks = bamboo	
	7 (Bark on the line)	cDOLIP_Cause = 'Tree - bark fell into line'		
	8 (Close contact)	cDOLIP_Cause = 'Tree – fell into line'		OTGCAUSECOMMENT = grew, made contact, blew into conductors, blown into

Level	EPRI	PG&E	SCE	SDG&E
		cReason = Caused arcing, bent, lean over, lean, made contact with line, oak contacting lines, bow, weeped, drooped over, wilted into primary lines, snowloaded over and into lines, snow loaded and into lines, snow & dip into the lines, snowloaded into powerlines, snow loaded and make contact, snow loaded & line to line fault		conductors, blew into primary, blown into primary, contacted primary, phased pushed together
	9 (Uncategorized tree contact)	Remaining outages where cDOLIP_Cause = 'Tree – fell into line', but comments were insufficient to separate further	Remaining outages where tcci_category = Blow In or Fall In, but comments were insufficient to separate further	Remaining outages where FORCAUSECODE or OTGCAUSECODE = 322, 324, 326, 420, 426, 428, 430, but comments were insufficient to separate further

C JOINT DATABASE LOOKUP TABLES

The following are lookup tables included in the database. The lookup tables contain the categories determined by the utilities so that nominal variables can have the same values across all three utilities.

Table C-1 Utility Table

Utility ID	Utility
1	PG&E
2	SCE
3	SDG&E

Table C-2 Outage Cause Table

OutageCauseID	Description
1	Tree or vegetation growth
2	Whole tree failed
3	Tree failed at the trunk
4	Branch on line
5	Frond on line
6	Bamboo on line
7	Bark on line
8	Close contact
9	Uncategorized vegetation contact

OutageCauseID	Description
10	Company/contractor/private tree trimming cause
11	MISC / unknown cause
12	PSPS
13	Safety-related outages

Table C-3 Radial Clearance Category Table

RadialClearanceCategoryID	Description
1	0-4 ft
2	4-12 ft
3	12+ ft

Table C-4 DBH Category Table

DBHCategoryID	Description
1	0.0-2.9 in
2	3.0-7.9 in
3	8.0-12.9 in
4	13.0-17.9 in
5	18.0-23.9 in

DBHCategoryID	Description
6	24.0-35.9 in
7	36.0-41.9 in
8	42.0-47.9 in
9	48.0-53.9 in
10	54.0-59.9 in
11	60.0-79.9 in
Null	null

Table C-5 Tree Condition Table

TreeConditionID	Description
1	Green, Live
2	Decline
3	Dead
4	Unknown

Table C-5 Tree Height Category Lookup Table

TreeHeightCategory	Description
1	0.0-5.0 ft
2	5.1-15.0 ft
3	15.1-20.0 ft
4	20.1-30.0 ft
5	30.1-40.0 ft
6	40.1-50.0 ft
7	50.1-60.0 ft
8	60.1-80.0 ft
9	80.1-200 ft

Table C-6 Tree Growth Rate Lookup Table

TreeGrowthRate	Description
1	Slow
2	Medium
3	Fast
4	Very Fast

Table C-7 National Land Cover Database (NLCD) Lookup Table

NLCD_Value	NLCD_Name	NLCD_Description
11	Open Water	All areas of open water, generally with less than 25% cover or vegetation or soil.
12	Perennial Ice/Snow	All areas characterized by a perennial cover of ice and/or snow, generally greater than 25% of total cover.
21	Developed, Open Space	Includes areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20 percent of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.
22	Developed, Low Intensity	Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20-49 percent of total cover. These areas most commonly include single-family housing units.
23	Developed, Medium Intensity	Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50-79 percent of the total cover. These areas most commonly include single-family housing units.
24	Developed, High Intensity	Includes highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80 to 100 percent of the total cover.
31	Barren Land (Rock/Sand/Clay)	Barren areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.
41	Deciduous Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75 percent of the tree species shed foliage simultaneously in response to seasonal change.
42	Evergreen Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75 percent of the tree species maintain their leaves all year. Canopy is never without green foliage.

NLCD_Value	NLCD_Name	NLCD_Description
43	Mixed Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75 percent of total tree cover.
52	Shrub/Scrub	Areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.
71	Grassland/Herbaceous	Areas dominated by graminoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling but can be utilized for grazing.
81	Pasture/Hay	Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20 percent of total vegetation.
82	Cultivated Crops	Areas used to produce annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20 percent of total vegetation. This class also includes all land being actively tilled.
90	Woody Wetlands	Areas where forest or shrub land vegetation accounts for greater than 20 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
95	Emergent Herbaceous Wetlands	Areas where perennial herbaceous vegetation accounts for greater than 80 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
250	No Data	No Data
NA	No Data	No Data

D SUPPLEMENTAL RADIAL CLEARANCE ANALYSIS

Given that the primary focus is on the management action (i.e., trimming), we conducted a similar test using only the outages in which trimming was the last management event, and thus, radial clearance refers to clearance achieved at the last trim.

We assessed the effect of radial clearance on the time-to-outage (d) considered radial clearance as an isolated treatment without incorporating other variables that may also explain variation in outage occurrence. Using outages in the analysis subset with radial clearance and trim as the last management event (n = 1,124), we found that time-to-outage differed among radial clearance categories ($F_{(2,1121)} = 6.37$, $p = 0.002$). Multiple comparisons using Tukey HSD identified that the enhanced clearance category (>12 ft) had significantly greater time-to-outage than the 4 – 12 ft category ($p = 0.002$; Figure E-1A). Average time-to-outage by radial clearance category is provided in Table E-1.

Confining the outages further to those occurring on days with maximum wind gust <15 m/s to remove extreme conditions (n = 686), there was some evidence of differences in time-to-outage among radial clearance categories ($F_{(2,683)} = 2.95$, $p = 0.05$; Figure E-1B). Although not statistically significant, the >12 ft category had greater time-to-outage than the 4 – 12 ft category ($p = 0.06$). Average time-to-outage by radial clearance category is provided in Table E-1.

In this supplemental analysis, we are further filtering the limited number of outages with radial clearance, and any interpretation of results should be made with caution. Given the differences in the underlying utility data, filtering outages to those in which trim was the last management event did not filter data from the three IOUs equally. Specifically, outages from SCE and SDG&E but not from PG&E were filtered out. Moreover, a greater number of outages from the 0 – 4 ft and 4 – 12 ft radial clearance categories were filtered out, which could have precluded our ability to detect a significant difference in the second ANOVA (Table E-2).

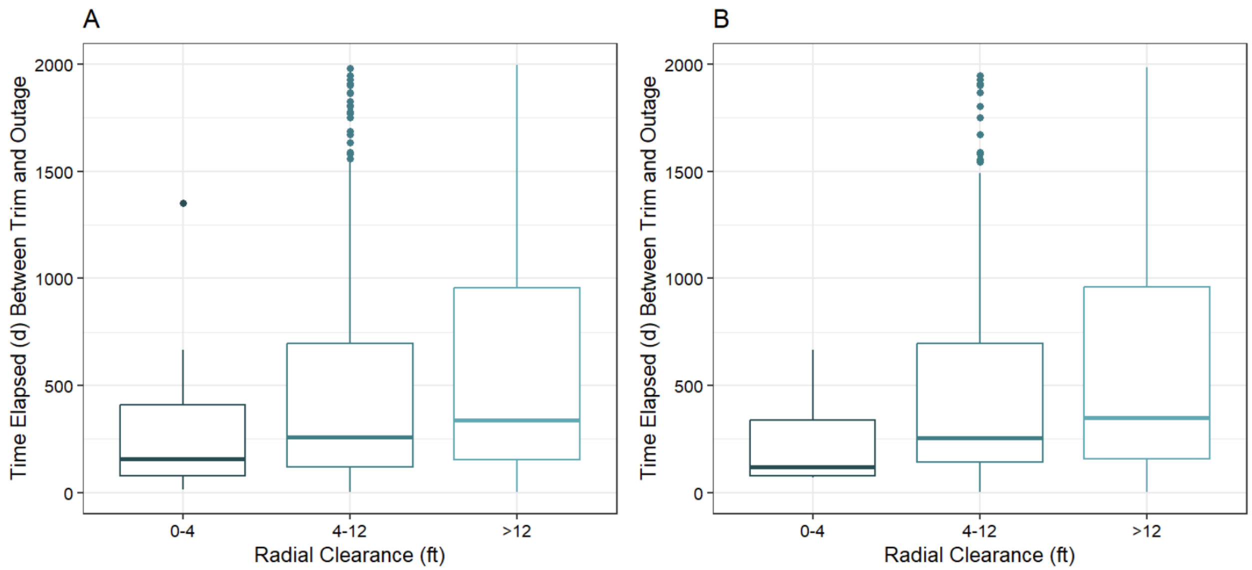

Figure D-1. Box plots showing the distribution of time-to-outage (d) for each radial clearance category in which the last management event was trimming. A) All outages in the analysis subset that contain radial clearance information (n = 1,124), but 46 outages with time-to-outage >2000 d are not depicted. B) Outages that occurred on days with maximum wind gust <15 m/s to remove extreme conditions (n = 686), but 31 outages with time-to-outage >2000 d are not depicted.

Table D-1. Variation in the average time (mean ± standard error) between the last trim and the subsequent outage for outages (i.e., time-to-outage) for each radial clearance category.

Radial Clearance Category	ANOVA 1: Outages in analysis subset with radial clearance information		ANOVA 2: Outages occurring on days without extreme wind conditions	
	Sample Size	Time-To-Outage (d) (mean ± se)	Sample Size	Time-To-Outage (d) (mean ± se)
0 – 4 ft	12	472 ± 179	8	465 ± 238
4 – 12 ft	346	555 ± 33.6	203	572 ± 44.4
>12 ft	766	641 ± 22.1	475	656 ± 28.3

Table D-2. Number of outages from each utility contributing to each radial clearance category in the supplemental analysis using only outages in which the last management action was trimming.

Radial Clearance Category	PG&E	SCE	SDG&E
0 – 4 ft	8	1	3
4 – 12 ft	268	27	51
>12 ft	760	3	3

E SUPPLEMENTAL TABLES

This appendix provides supplemental tables to aid in understanding and transparency.

Table E-1. The number of outage records from each utility that would meet selection criteria when criteria are considered separately. Outage records are filtered from the Outage dataset in the Joint Utility Vegetation Management Database.

Utility	All records in Outage dataset	Outages in primary distribution	Outages occurring in years 2015-2022	HFTD variable is populated	Outage Cause is vegetation growth or contact	All selection criteria – results in analysis subset
PG&E	57,684	51,362	30,735	53,602	54,832	24,765
SCE	3,893	3,893	3,376	3,893	3,339	2,916
SDG&E	533	484	328	533	458	263
All Utilities	62,110	55,739	34,439	58,028	58,629	27,944

Table E-2. Summary of weather conditions (mean ± standard error, range) for outages in the summer months (May – September) that were or were not associated with an ignition. Sample sizes indicate outages for which weather variables were populated.

Variable	Outages without an associated ignition (n = 5533)	Outages with an associated ignition (n = 394)
Mean Temperature (°F)	68.9 ± 0.15 18.3 – 101.0	73.3 ± 0.50 43.6 – 93.7
3-day Precipitation Total	0.027 ± 0.002 0 – 1.47	0.007 ± 0.003 0 – 0.85
Mean Wind Speed (m/s)	2.70 ± 0.02 0.66 – 12.0	2.46 ± 0.07 0.96 – 10.1
Mean Wind Gust (m/s)	10.3 ± 0.04 3.51 – 28.2	10.3 ± 0.15 4.73 – 22.4
Mean Wind Direction (degrees)	234 ± 0.77 31 – 353	220 ± 3.10 32.7 – 349

F SUPPLEMENTAL FIGURES

This appendix provides supplemental figures to aid in understanding and transparency.

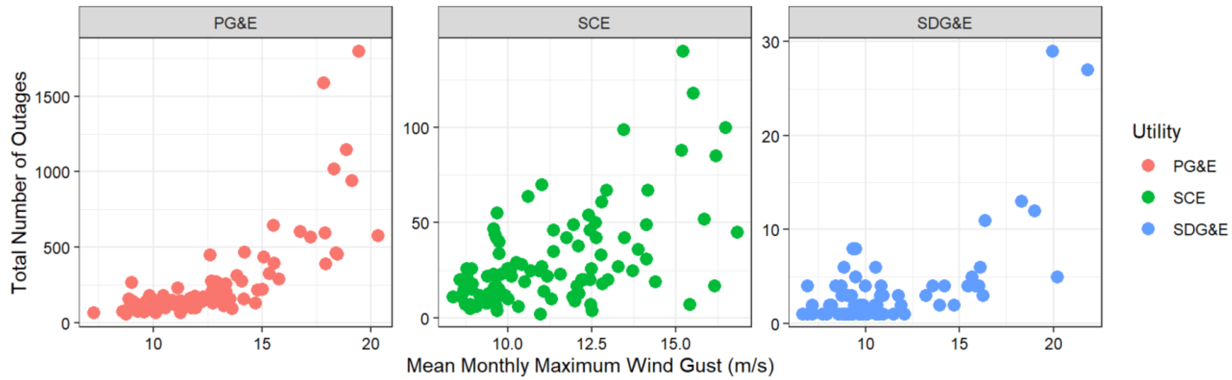

Figure F-1. Relationship between monthly outage counts and maximum wind gust speed (m/s) for each utility.

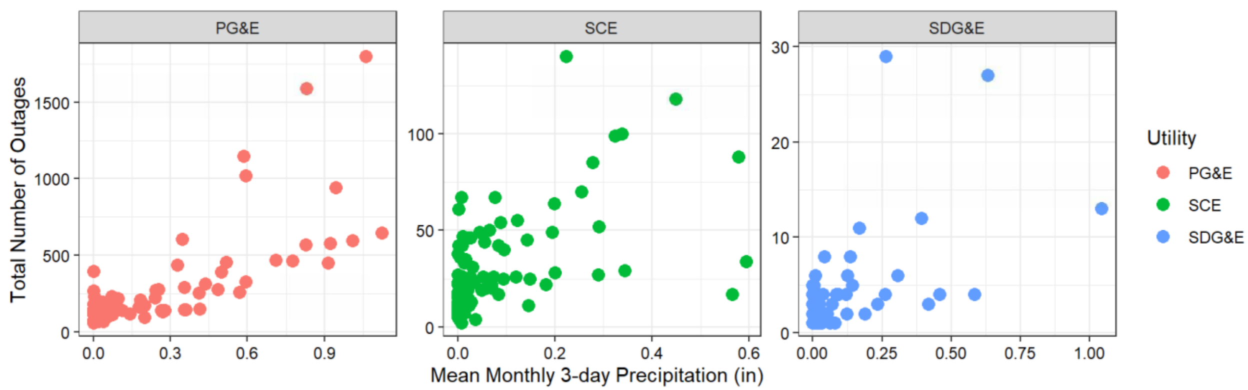

Figure F-2. Relationship between monthly outage counts and the total precipitation (in) for two days prior through the day of the outage for each utility.

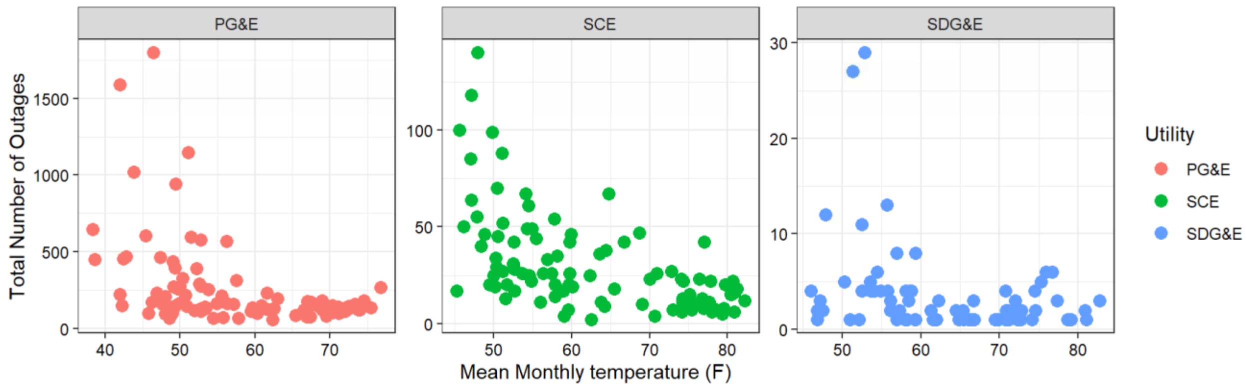

Figure F-3. Relationship between monthly outage counts and the mean daily temperature (°F) for each utility.

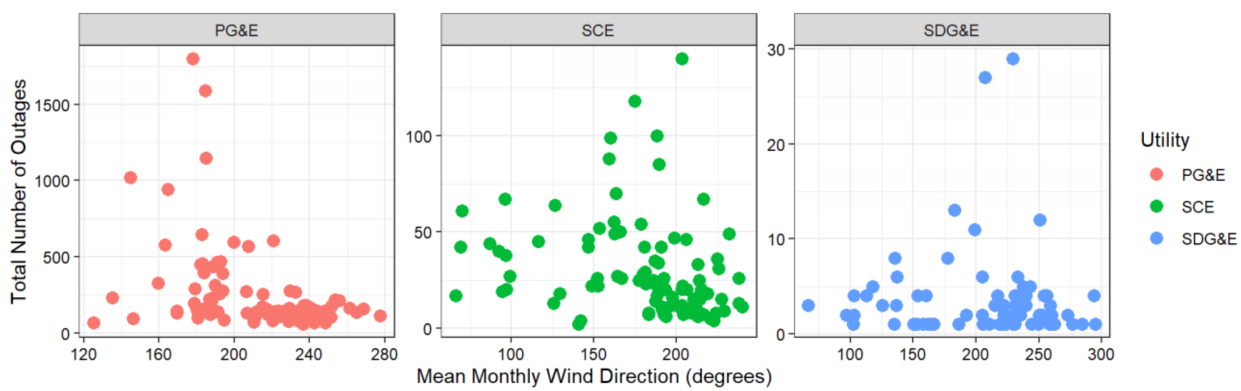

Figure F-4. Relationship between monthly outage counts and the mean wind direction (degrees) for each utility.

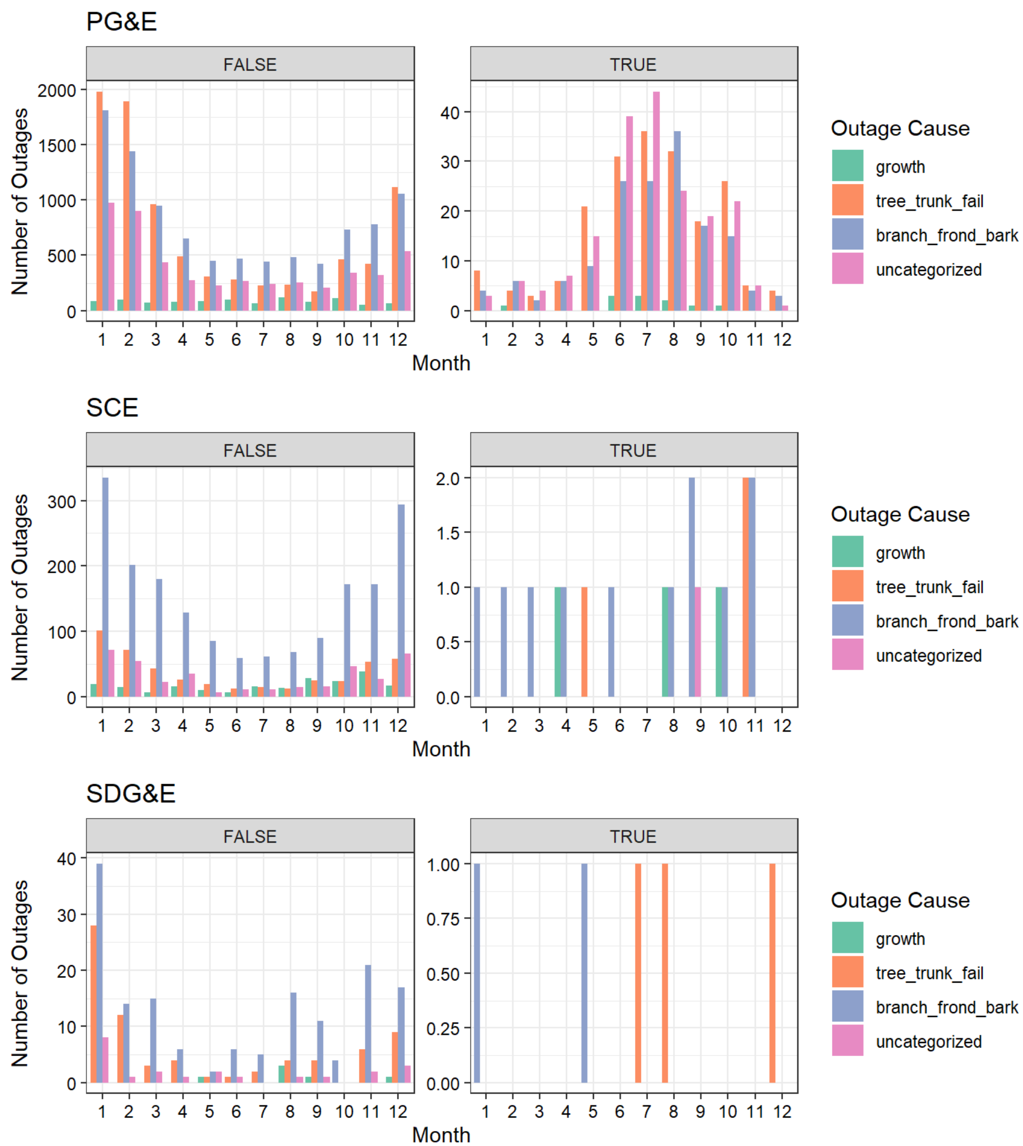

Figure F-5. Variation in the number of outages each month by outage cause. Plots are separated by utility as well as whether the outage was associated with an ignition (TRUE) or not (FALSE).

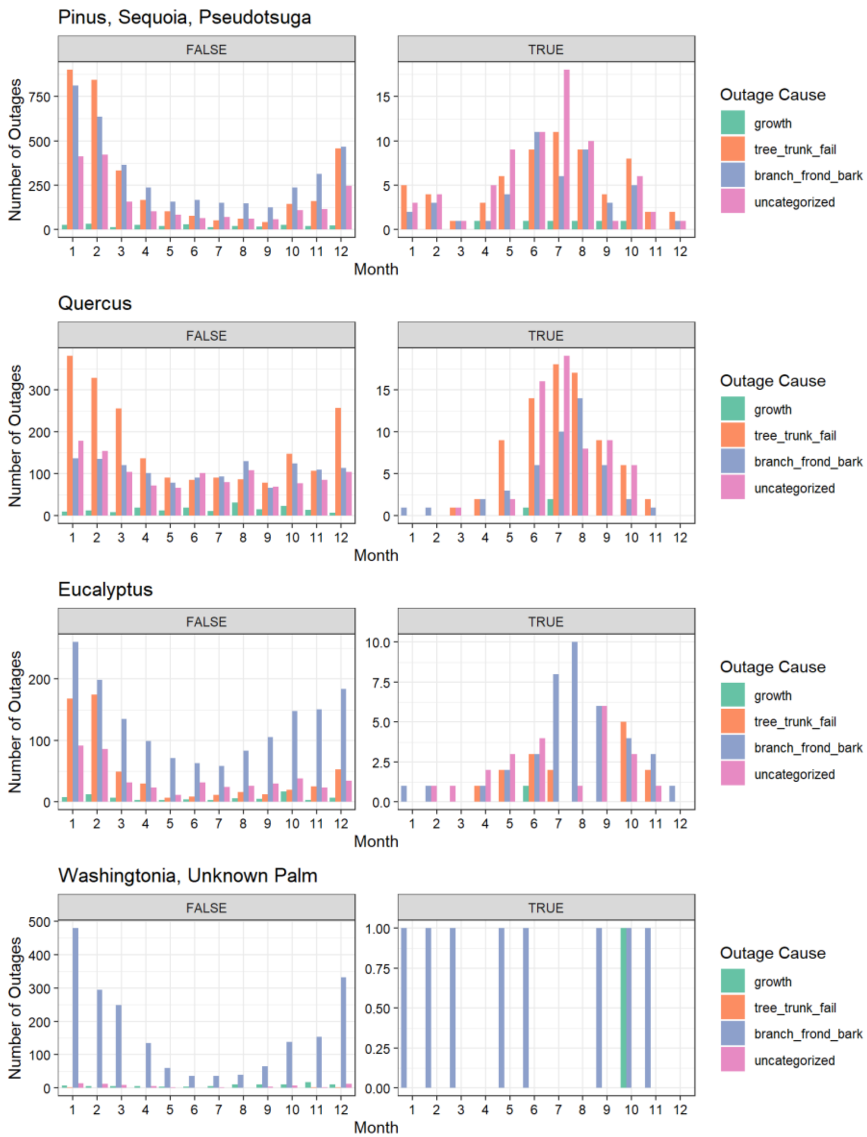

Figure F-6. Monthly variation in outage count and outage cause for top genera causing outages for any of the three utilities. Outages are also separated by with respect to their association with an ignition (TRUE or FALSE).

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Appendix E: Referenced Regulations, Codes, and Standards

APPENDIX E: REFERENCED REGULATIONS, CODES, AND STANDARDS

2026-2028 Base WMP

Name of Regulation, Code, or Standard	Brief Description
D.98-07-097	CPUC Decision Adopting Rules to Govern the Electric Utilities' Planning for and Responses to Emergencies and Major Power Outages.
D.00-05-022	CPUC Decision Adopting of Restoration Criteria and Call Center Standards to Responses to Major Weather-related Outages.
D.12-01-032	CPUC Decision Adopting Regulations to Reduce Fire Hazards Associated with Overhead Power Lines and Communication Facilities.
D.14-05-020	CPUC Decision Adopting Modifications to the Fire-Prevention Plans
D.16-08-018	CPUC Interim Decision Adopting the Multi-Attribute Approach (or Utility Equivalent Features) and Directing Utilities to Take Steps Toward a More Uniform Risk Management Framework
D.17-01-009	CPUC Decision Adopting the Development and Adoption of a Statewide Fire-Threat Map Known as Fire Map 2.
D.18-12-014	CPUC Phase 2 Decision Adopting Safety Model Assessment Proceeding Settlement Agreement with Modifications
D.19-05-039	CPUC Decision on SDG&E's 2019 WMP Pursuant to Senate Bill 901
D.19-07-015	CPUC Decision Adopting an Emergency Disaster Relief Program for Electric, Natural Gas, Water, and Sewer Utility Customers
D.22-12-027	CPUC Phase II Decision Adopting Modifications to the Risk-Based Decision-Making Framework Adopted in D.18-12-014 and Directing Environmental and Social Justice Pilots
D.24-05-064	CPUC Phase II Decision Resolving Phase 3 Issues: evaluation of post-test years; uncertainty-transparency pilot; tail risk-consequence modeling; climate change; risk scaling; discount rates; Risk Assessment and Mitigation Phase (RAMP) reporting templates; and tranches.
General Order 95	Overhead electric line design, construction, and maintenance requirements in order to ensure adequacy of service and safety; covers topics such as proper grounding, clearances, strength requirements, and tree trimming
General Order 165	Inspection requirements for transmission and distribution facilities in order to ensure safety and high-quality electrical service; sets maximum allowable inspection cycle lengths, scheduling and performance of corrective action, record-keeping, and reporting
General Order 166	Standards for Operation, Reliability, and Safety During Emergencies and Disasters
General Order 174	Inspection requirements for substations to promote the safety of workers, the public, and enable adequacy of service
NERC FAC-003-5	Transmission Vegetation Management: To maintain a reliable electric transmission system by using a defense- in-depth strategy to manage vegetation located on transmission rights of way (ROW) and minimize encroachments from vegetation located adjacent to the ROW, thus preventing the risk of those vegetation- related outages that could lead to Cascading
Title 8 CCR § 5141.1	Cal/OSHA Protection from Wildfire Smoke regulation
Public Utilities Code § 768.6(a)	Statute related to emergency and disaster preparedness plans
Public Resources Code § 4292	CAL FIRE requires 10 feet of minimum clearance around the base of the pole cleared of all flammable vegetation down to bare soil and the removal of all

Name of Regulation, Code, or Standard	Brief Description
	dead tree branches within this cylinder up to the cross-arm (within the State Responsibility Area) *which supports a switch, fuse, transformer, lightning arrester, line junction, or dead end or corner pole, a firebreak*
Public Resources Code § 4293	CAL FIRE requires 10 feet of minimum clearance around the base of the pole cleared of all flammable vegetation down to bare soil and the removal of all dead tree branches within this cylinder up to the cross-arm (within the State Responsibility Area) which are carrying electric current
Public Utilities Code § 8386(a)	Statutory Law that requires each electrical corporation shall construct, maintain, and operate its electrical lines and equipment in a manner that will minimize the risk of catastrophic wildfire posed by those electrical lines and equipment
Resolution M-4835	Orders emergency residential and non-residential customer protections for wildfire victims
Resolution E-5308	Approval of the Remote Grid
SDG&E	Advice letter 3177-E/2645-G, approved February 21, 2018 and effective December 7, 2017.
OEIS Decision	SDG&E 2023-2025 WMP Update (October 23, 2023)
OEIS	SDG&E 2025 WMP Update May 14, 2024 (July 5, 2024 Revision 2)
OEIS Data Guidelines	Data Guidelines for electrical corporations submitting wildfire mitigation data reports. Wildfire mitigation data reports consist of geographic information system (GIS) and tabular wildfire mitigation data (February 28, 2025 v4.0)
International Organizations for Standardize	ISO 31000 – Risk Management Guidelines

Appendix F: Tables

APPENDIX F: TABLES

2026-2028 Base WMP

TABLE OF CONTENTS

1 OEIS TABLE 4-3: FREQUENTLY DE-ENERGIZED CIRCUITS

Entry #	Circuit ID	Name of Circuit	Dates of Outages	Number of Customers Hours of PSPS per Outage	Measures Taken, or Planned to Be Taken, to Reduce the Need for and Impact of Future PSPS of Circuit	Estimated Annual Decline in PSPS Events and PSPS Impact on Customers
1	1030	1030	Oct 10-11, 2019 Oct 24-25, 2019 Oct 30-31, 2019 Sept 9, 2020 Dec 2–4, 2020 Dec 7–9, 2020 Dec 23–24, 2020 Dec 9-11, 2024	556 3,830 34,959 204 90,733 70,063 1,121 76,079	Strategic Undergrounding: 44.61 miles completed to date; 8.77 miles planned for 2025; 59.5 miles planned for 2027-2028 that will be extended to 2031-2032 due to 2024-27 GRC Decision funding prioritization PSPS Sectionalizing: 7 SCADA reclosers available for sectionalizing Situational Awareness: 6 weather stations on circuit Customer Resiliency Programs: 175 customers have participated to date; customers will be invited to participate in 2025	60,844 fewer customer hours of PSPS per year
2	1166	1166	Oct 24-25, 2019 Oct 30-31, 2019 Dec 2-4, 2020 Dec 7-8, 2020 Dec 23-24, 2020 Nov 25-26, 2021 Dec 9-11, 2024	8,411 3,639 12,881 873 4,578 3,360 5,804	PSPS Sectionalizing: 3 SCADA reclosers available for sectionalizing Situational Awareness: 2 weather stations on circuit Customer Resiliency Programs: 60 customers have participated to date; customers will be invited to participate in 2025	5,957 fewer customer hours of PSPS per year
3	1215	1215	Oct 24-26, 2019 Oct 30-31, 2019 Oct 27, 2020 Dec 2-4, 2020 Dec 7-8, 2020 Nov 6-7, 2024 Dec 9-11, 2024	6,431 5,180 922 6,066 2,591 4,362 6,986	Strategic Undergrounding: 1.4 miles to be completed in 2025; 0.5 miles planned for 2025, 14.9 miles planned for 2026, and 8.1 miles planned for 2027 will be extended to 2029-30 due to 2024-27 GRC Decision funding prioritization PSPS Sectionalizing: 4 SCADA reclosers available for sectionalizing Situational Awareness: 1 weather station on circuit Customer Resiliency Programs: 30 customers have participated to date; customers will be invited to participate in 2025	2,758 fewer customer hours of PSPS per year
4	157	157	Oct 24-26, 2019 Oct 30-31, 2019 Dec 2-4, 2020	33,147 23,413 39,926	Strategic Undergrounding: 6.9 miles planned for 2027 will be extended to 2029-30 due to 2024-27 GRC Decision funding prioritization	8,042 fewer customer hours of PSPS per year

Entry #	Circuit ID	Name of Circuit	Dates of Outages	Number of Customers Hours of PSPS per Outage	Measures Taken, or Planned to Be Taken, to Reduce the Need for and Impact of Future PSPS of Circuit	Estimated Annual Decline in PSPS Events and PSPS Impact on Customers
			Dec 7-9, 2020 Dec 23-24, 2020 Nov 25-26, 2021 Nov 6-8, 2024 Dec 9-11, 2024	23,721 11,998 21,572 6,659 48,208	PSPS Sectionalizing: 7 SCADA reclosers available for sectionalizing Situational Awareness: 6 weather stations on circuit Customer Resiliency Programs: 114 customers have participated to date; customers will be invited to participate in 2025	
5	214/CTL1	214/CTL1	Oct 24-26, 2019* Oct 30-31, 2019 Dec 2-4, 2020* Dec 7-9, 2020* Dec 24, 2020* Nov 25, 2021 Dec 9-11, 2024*	29,003 11,723 38,947 27,007 10,345 4,701 36,284	Strategic Undergrounding: 9.4 miles planned for 2026, 35.27 miles planned for 2027, and 10.21 miles planned for 2028 will be extended to 2030-32 due to 2024-27 GRC Decision funding prioritization PSPS Sectionalizing: 7 SCADA reclosers available for sectionalizing Situational Awareness: 5 weather stations on circuit Customer Resiliency Programs: 47 customers have participated to date; customers will be invited to participate in 2025	3,433 fewer customer hours of PSPS per year
6	215	215	Oct 25-26, 2019 Oct 30-31, 2019 Dec 3-4, 2020 Dec 7-8, 2020 Dec 24, 2020 Dec 9-11, 2024	15,687 14,491 18,208 7,733 3,989 22,504	PSPS Sectionalizing: 4 SCADA reclosers available for sectionalizing Situational Awareness: 4 weather stations on circuit Customer Resiliency Programs: 82 customers have participated to date; customers will be invited to participate in 2025	5,009 fewer customer hours of PSPS per year
7	220	220	Oct 24-26, 2019* Oct 30-31, 2019 Dec 2-4, 2020* Dec 7-9, 2020* Dec 24, 2020* Dec 9-11, 2024*	12,158 12,384 16,252 13,905 4,187 15,166	Strategic Undergrounding: 11.45 miles completed in 2024; 6 miles to be completed in 2025; 10.4 miles planned for 2025, 35.44 miles planned for 2026, 8.41 miles planned for 2027, and 8 miles planned for 2028 will be extended to 2029-32 due to 2024-27 GRC Decision funding prioritization PSPS Sectionalizing: 3 SCADA reclosers available for sectionalizing Situational Awareness: 4 weather stations on circuit Customer Resiliency Programs: 16 customers have participated to date; customers will be invited to participate in 2025	8,781 fewer customer hours of PSPS per year

Entry #	Circuit ID	Name of Circuit	Dates of Outages	Number of Customers Hours of PSPS per Outage	Measures Taken, or Planned to Be Taken, to Reduce the Need for and Impact of Future PSPS of Circuit	Estimated Annual Decline in PSPS Events and PSPS Impact on Customers
8	222	222	Oct 24-26, 2019 Oct 30-31, 2019 Dec 2-4, 2020 Dec 7-10, 2020 Dec 23-24, 2020 Dec 9-11, 2024	59,335 50,094 61,822 54,124 4,703 66,226	Strategic Undergrounding: 62 miles completed to date; 6 miles to be completed in 2025; 13.7 miles planned for 2025, 13.52 miles planned for 2026, 44.52 miles planned for 2027, and 14.65 miles planned for 2028 will be extended to 2029-32 due to 2024-27 GRC Decision funding prioritization PSPS Sectionalizing: 7 SCADA reclosers available for sectionalizing Situational Awareness: 7 weather stations on circuit Customer Resiliency Programs: 618 customers have participated to date; customers will be invited to participate in 2025	95,367 fewer customer hours of PSPS per year
9	358	358	Oct 24-25, 2019 Oct 30-31, 2019 Dec 2-4, 2020 Dec 7-8, 2020 Dec 23-24, 2020 Nov 25-26, 2021 Nov 6-7, 2024 Dec 9-11, 2024	9,287 11,316 15,190 3,819 3,300 7,822 2,777 8,266	Strategic Undergrounding: 5.56 miles completed to date; 5.24 miles to be completed in 2025; 4.6 miles planned for 2026 and 3.5 miles planned for 2027 will be extended to 2030-31 due to 2024-27 GRC Decision funding prioritization PSPS Sectionalizing: 1 SCADA recloser available for sectionalizing; 1 device planned for 2026 Situational Awareness: 3 weather stations on circuit Customer Resiliency Programs: 41 customers have participated to date; customers will be invited to participate in 2025	13,017 fewer customer hours of PSPS per year
10	441	441	Oct 24-26, 2019 Oct 30-31, 2019 Oct 27, 2020 Dec 2-3, 2020 Dec 7-8, 2020 Nov 6-7, 2024 Dec 9-11, 2024	5,329 4,026 760 2,596 2,418 2,966 5,006	Strategic Undergrounding: 0.2 miles completed to date; 6.32 miles to be completed in 2025; 4 miles planned for 2026 and 4.75 miles planned for 2027 will be extended to 2030-31 due to 2024-27 GRC Decision funding prioritization PSPS Sectionalizing: 4 SCADA reclosers available for sectionalizing Situational Awareness: 2 weather stations on circuit Customer Resiliency Programs: 19 customers have participated to date; customers will be invited to participate in 2025	2,961 fewer customer hours of PSPS per year

Entry #	Circuit ID	Name of Circuit	Dates of Outages	Number of Customers Hours of PSPS per Outage	Measures Taken, or Planned to Be Taken, to Reduce the Need for and Impact of Future PSPS of Circuit	Estimated Annual Decline in PSPS Events and PSPS Impact on Customers
11	445	445	Oct 10-11, 2019 Oct 24-26, 2019 Oct 30-31, 2019 Oct 27, 2020 Dec 2–4, 2020 Dec 7–8, 2020 Nov 24-26, 2021 Nov 6-7, 2024 Dec 9-11, 2024	6,967 16,837 13,495 10,222 81,871 39,755 80,027 26,052 87,950	Strategic Undergrounding: 27.43 miles completed to date; 1.89 miles to be completed in 2025; 39.62 miles planned for 2026 and 2027 will be extended to 2032-33 due to 2024-27 GRC Decision funding prioritization PSPS Sectionalizing: 7 SCADA reclosers available for sectionalizing Situational Awareness: 4 weather stations on circuit Customer Resiliency Programs: 89 customers have participated to date; customers will be invited to participate in 2025	26,620 fewer customer hours of PSPS per year
12	75	75	Oct 24-25, 2019 Oct 30-31, 2019 Dec 2-4, 2020 Dec 7-9, 2020 Dec 23-24, 2020	345 493 13,863 689 238	Strategic Undergrounding: 12.55 miles completed to date; 0.1 miles in scope to be completed by 2025 (3 miles of underbuilt overhead to be removed from service) PSPS Sectionalizing: 2 SCADA reclosers available for sectionalizing Situational Awareness: 2 weather stations on circuit Customer Resiliency Programs: 87 customers have participated to date; customers will be invited to participate in 2025	4,012 fewer customer hours of PSPS per year
13	78	78	Oct 24-25, 2019 Oct 30-31, 2019 Dec 2-4, 2020 Dec 7-8, 2020 Dec 24, 2020 Nov 25, 2021 Dec 9-11, 2024	6,249 7,877 8,980 2,259 2,196 1,328 5,465	Strategic Undergrounding: 1.21 miles completed in 2024; 1 mile planned for 2026 will be extended to 2029 due to 2024-27 GRC decision prioritization PSPS Sectionalizing: 3 SCADA reclosers available for sectionalizing Situational Awareness: 2 weather stations on circuit Customer Resiliency Programs: 30 customers have participated to date; customers will be invited to participate in 2025	4,989 fewer customer hours of PSPS per year
14	79	79	Oct 10-11, 2019 Oct 24-26, 2019 Oct 29-31, 20219 Nov 17-18, 2019 Sept 8-9, 2020 Dec 2-4, 2020	451 29,262 27,981 182 512 74,951	Strategic Undergrounding: 3.38 miles completed to date; 25 miles planned for 2026-27 will be extended to 2030-31 due to 2024-27 GRC decision prioritization PSPS Sectionalizing: 10 SCADA reclosers available for sectionalizing	15,347 fewer customer hours of PSPS per year

Entry #	Circuit ID	Name of Circuit	Dates of Outages	Number of Customers Hours of PSPS per Outage	Measures Taken, or Planned to Be Taken, to Reduce the Need for and Impact of Future PSPS of Circuit	Estimated Annual Decline in PSPS Events and PSPS Impact on Customers
			Dec 7-9, 2020 Dec 23-24, 2020 Nov 24-26, 2021 Nov 6-7, 2024 Dec 9-11, 2024	67,229 596 8,738 740 81,906	Situational Awareness: 9 weather stations on circuit Customer Resiliency Programs: 113 customers have participated to date; customers will be invited to participate in 2025	
15	909	909	Oct 30-31, 2019 Dec 2-4, 2020 Dec 7-8, 2020 Dec 23-24, 2020 Dec 10-11, 2024	15,458 17,826 7,812 5,483 14,776	Strategic Undergrounding: 2.69 miles completed to date; 31.85 miles planned for 2026 and 2028 will be extended to 2031-32 due to 2024-27 GRC decision prioritization PSPS Sectionalizing: 2 SCADA reclosers available for sectionalizing Situational Awareness: 2 weather stations on circuit Customer Resiliency Programs: 8 customers have participated to date; customers will be invited to participate in 2025	1,986 fewer customer hours of PSPS per year

*Customers on 4 kV circuit CTL1 were impacted as a result of de-energizing circuit 214. No independent operations for PSPS purposes occurred on 4 kV circuit CTL1.

2 OEIS TABLE 5-5: SUMMARY OF TOP-RISK CIRCUITS, SEGMENTS, OR SPANS

Risk Ranking	Circuit, Segment, or Span ID	Overall Utility Risk Score	Wildfire Risk Score	Outage Program Risk Score	Top Risk Contributors	Total Miles	Version of Risk Model Used
1	78-782R	$7,202,316	$7,167,197	$35,119	Wildfire	1.72	(3, 192, 0, '2025-01-01')
2	975-22R	$6,417,038	$5,152,705	$1,264,334	Wildfire	1.65	(3, 192, 0, '2025-01-01')
3	222-1988R	$3,619,436	$3,592,934	$26,502	Wildfire	0.95	(3, 192, 0, '2025-01-01')
4	222-1986R	$79,194,349	$78,602,170	$592,179	Wildfire	21.26	(3, 192, 0, '2025-01-01')
5	78-35R	$5,696,336	$5,695,327	$1,009	Wildfire	1.53	(3, 192, 0, '2025-01-01')
6	1250-671R	$6,815,428	$6,443,061	$372,367	Wildfire	2.00	(3, 192, 0, '2025-01-01')
7	237-1765R	$28,249,252	$28,064,039	$185,213	Wildfire	8.34	(3, 192, 0, '2025-01-01')
8	222-1990R	$45,106,640	$44,939,414	$167,226	Wildfire	14.24	(3, 192, 0, '2025-01-01')
9	358-682F	$37,602,118	$37,073,061	$529,058	Wildfire	12.51	(3, 192, 0, '2025-01-01')
10	970-1341R	$12,961,613	$12,917,272	$44,341	Wildfire	4.40	(3, 192, 0, '2025-01-01')
11	358-33	$1,344,644	$1,340,076	$4,567	Wildfire	0.46	(3, 192, 0, '2025-01-01')
12	CB 975	$1,304,374	$1,298,020	$6,354	Wildfire	0.46	(3, 192, 0, '2025-01-01')
13	CB 358	$861,433	$162,618	$698,816	Outage Program	0.31	(3, 192, 0, '2025-01-01')
14	1021-25R	$18,825,690	$18,768,979	$56,711	Wildfire	6.97	(3, 192, 0, '2025-01-01')
15	909-451	$55,252,375	$54,850,769	$401,606	Wildfire	20.60	(3, 192, 0, '2025-01-01')
16	1458-1131R	$15,987,427	$15,842,278	$145,148	Wildfire	6.17	(3, 192, 0, '2025-01-01')
17	907-2820R	$6,348,476	$6,346,946	$1,530	Wildfire	2.46	(3, 192, 0, '2025-01-01')
18	973-1245R	$8,620,111	$8,579,828	$40,283	Wildfire	3.34	(3, 192, 0, '2025-01-01')
19	79-679R	$18,448,583	$18,245,132	$203,451	Wildfire	7.37	(3, 192, 0, '2025-01-01')
20	CB 237	$2,111,575	$2,101,904	$9,670	Wildfire	0.85	(3, 192, 0, '2025-01-01')
21	215-1534R	$19,489,706	$19,294,169	$195,538	Wildfire	7.81	(3, 192, 0, '2025-01-01')
22	RA1-402R	$9,339,338	$9,276,379	$62,959	Wildfire	3.81	(3, 192, 0, '2025-01-01')
23	909-453R	$5,703,040	$5,701,153	$1,887	Wildfire	2.35	(3, 192, 0, '2025-01-01')
24	909-805R	$32,313,161	$32,075,253	$237,908	Wildfire	13.42	(3, 192, 0, '2025-01-01')
25	1458-601R	$37,077,302	$36,838,604	$238,698	Wildfire	15.45	(3, 192, 0, '2025-01-01')
26	1021-1760R	$7,055,716	$6,926,993	$128,723	Wildfire	2.97	(3, 192, 0, '2025-01-01')
27	1030-1823F	$2,150,974	$2,139,065	$11,909	Wildfire	0.92	(3, 192, 0, '2025-01-01')
28	908-2038R	$41,258,574	$40,800,964	$457,611	Wildfire	17.93	(3, 192, 0, '2025-01-01')
29	78-26R	$14,526,727	$14,317,113	$209,613	Wildfire	6.37	(3, 192, 0, '2025-01-01')
30	CB 971	$11,456,698	$11,400,371	$56,327	Wildfire	5.11	(3, 192, 0, '2025-01-01')

Risk Ranking	Circuit, Segment, or Span ID	Overall Utility Risk Score	Wildfire Risk Score	Outage Program Risk Score	Top Risk Contributors	Total Miles	Version of Risk Model Used
31	CB 351	$14,599,735	$14,550,362	$49,373	Wildfire	6.73	(3, 192, 0, '2025-01-01')
32	908-1236	$11,763,931	$11,622,998	$140,933	Wildfire	5.43	(3, 192, 0, '2025-01-01')
33	357-2049F	$16,869,708	$16,664,985	$204,723	Wildfire	7.81	(3, 192, 0, '2025-01-01')
34	1022-17F	$9,800,679	$9,763,527	$37,152	Wildfire	4.56	(3, 192, 0, '2025-01-01')
35	908-1372R	$7,960,290	$7,828,738	$131,552	Wildfire	3.73	(3, 192, 0, '2025-01-01')
36	907-1716R	$27,066,455	$26,848,173	$218,282	Wildfire	12.78	(3, 192, 0, '2025-01-01')
37	79-676R	$9,714,146	$9,547,622	$166,525	Wildfire	4.59	(3, 192, 0, '2025-01-01')
38	971-29R	$8,015,407	$7,972,516	$42,890	Wildfire	3.80	(3, 192, 0, '2025-01-01')
39	907-1562AE	$8,439,769	$8,238,564	$201,206	Wildfire	4.11	(3, 192, 0, '2025-01-01')
40	1030-1777	$11,817,577	$11,650,338	$167,240	Wildfire	5.78	(3, 192, 0, '2025-01-01')
41	351-871R	$9,144,312	$9,119,654	$24,659	Wildfire	4.49	(3, 192, 0, '2025-01-01')
42	1021-883R	$1,386,630	$1,380,795	$5,835	Wildfire	0.68	(3, 192, 0, '2025-01-01')
43	353-900F	$1,991,358	$1,766,220	$225,138	Wildfire	0.99	(3, 192, 0, '2025-01-01')
44	CB 907	$2,742,284	$2,737,736	$4,548	Wildfire	1.37	(3, 192, 0, '2025-01-01')
45	1021-1748F	$35,156,122	$34,811,511	$344,612	Wildfire	17.73	(3, 192, 0, '2025-01-01')
46	214-647R	$22,354,309	$22,185,078	$169,231	Wildfire	11.30	(3, 192, 0, '2025-01-01')
47	237-30R	$65,515,492	$64,815,659	$699,833	Wildfire	33.47	(3, 192, 0, '2025-01-01')
48	908-2055F	$22,564,078	$22,357,449	$206,630	Wildfire	11.56	(3, 192, 0, '2025-01-01')
49	353-904R	$13,534,407	$13,457,602	$76,804	Wildfire	7.07	(3, 192, 0, '2025-01-01')
50	1030-1728R	$5,124,159	$5,035,021	$89,138	Wildfire	2.68	(3, 192, 0, '2025-01-01')
51	353-901F	$4,555,619	$4,296,049	$259,570	Wildfire	2.39	(3, 192, 0, '2025-01-01')
52	1030-18R	$6,620,910	$6,532,115	$88,794	Wildfire	3.53	(3, 192, 0, '2025-01-01')
53	79-808R	$19,978,326	$19,824,672	$153,653	Wildfire	10.67	(3, 192, 0, '2025-01-01')
54	351-819R	$23,517,428	$23,341,044	$176,383	Wildfire	12.62	(3, 192, 0, '2025-01-01')
55	1458-1061	$4,370,099	$4,312,123	$57,976	Wildfire	2.35	(3, 192, 0, '2025-01-01')
56	73-1164	$2,448,829	$2,415,513	$33,316	Wildfire	1.32	(3, 192, 0, '2025-01-01')
57	357-1299R	$5,098,733	$5,082,457	$16,276	Wildfire	2.75	(3, 192, 0, '2025-01-01')
58	237-17R	$27,080,738	$26,780,686	$300,052	Wildfire	14.64	(3, 192, 0, '2025-01-01')
59	237-2R	$30,894,123	$30,619,728	$274,395	Wildfire	16.72	(3, 192, 0, '2025-01-01')
60	353-594F	$2,215,650	$2,214,151	$1,498	Wildfire	1.22	(3, 192, 0, '2025-01-01')
61	1022-26R	$694,720	$689,285	$5,436	Wildfire	0.39	(3, 192, 0, '2025-01-01')
62	357-2047F	$878,930	$839,250	$39,680	Wildfire	0.50	(3, 192, 0, '2025-01-01')
63	971-371R	$4,351,506	$4,330,446	$21,060	Wildfire	2.47	(3, 192, 0, '2025-01-01')
64	1021-855	$5,034,375	$5,009,473	$24,902	Wildfire	2.91	(3, 192, 0, '2025-01-01')

Risk Ranking	Circuit, Segment, or Span ID	Overall Utility Risk Score	Wildfire Risk Score	Outage Program Risk Score	Top Risk Contributors	Total Miles	Version of Risk Model Used
65	907-1702R	$9,100,558	$9,075,654	$24,904	Wildfire	5.31	(3, 192, 0, '2025-01-01')
66	1030-42R	$28,398,789	$27,971,256	$427,534	Wildfire	16.72	(3, 192, 0, '2025-01-01')
67	1021-92	$794,363	$791,178	$3,185	Wildfire	0.47	(3, 192, 0, '2025-01-01')
68	CB 327	$1,456,709	$1,453,689	$3,020	Wildfire	0.88	(3, 192, 0, '2025-01-01')
69	216-1859F	$14,041,288	$13,926,879	$114,409	Wildfire	8.48	(3, 192, 0, '2025-01-01')
70	235-899R	$23,678,661	$23,291,810	$386,852	Wildfire	14.59	(3, 192, 0, '2025-01-01')
71	1030-20R	$25,318,462	$25,101,311	$217,151	Wildfire	15.72	(3, 192, 0, '2025-01-01')
72	1458-1058F	$2,365,690	$2,023,559	$342,131	Wildfire	1.47	(3, 192, 0, '2025-01-01')
73	237-28F	$2,530,225	$2,500,530	$29,696	Wildfire	1.59	(3, 192, 0, '2025-01-01')
74	CB 1250	$4,075,236	$4,072,564	$2,672	Wildfire	2.57	(3, 192, 0, '2025-01-01')
75	353-1429R	$9,221,802	$8,990,136	$231,667	Wildfire	5.95	(3, 192, 0, '2025-01-01')
76	908-1172R	$15,766,519	$15,502,578	$263,941	Wildfire	10.18	(3, 192, 0, '2025-01-01')
77	182-2250	$1,939,213	$1,934,190	$5,023	Wildfire	1.25	(3, 192, 0, '2025-01-01')
78	222-1433R	$9,617,971	$9,578,744	$39,227	Wildfire	6.28	(3, 192, 0, '2025-01-01')
79	971-383R	$14,770,596	$14,538,989	$231,607	Wildfire	9.71	(3, 192, 0, '2025-01-01')
80	215-1531R	$12,702,412	$12,475,573	$226,839	Wildfire	8.46	(3, 192, 0, '2025-01-01')
81	357-45R	$17,696,753	$17,249,773	$446,979	Wildfire	11.81	(3, 192, 0, '2025-01-01')
82	217-983R	$10,116,963	$10,020,804	$96,159	Wildfire	6.88	(3, 192, 0, '2025-01-01')
83	972-32R	$22,914,328	$22,336,491	$577,837	Wildfire	15.68	(3, 192, 0, '2025-01-01')
84	CB RA2	$5,229,902	$5,131,211	$98,691	Wildfire	3.60	(3, 192, 0, '2025-01-01')
85	CB MOR1	$5,119,714	$5,045,788	$73,926	Wildfire	3.55	(3, 192, 0, '2025-01-01')
86	1458-565R	$8,159,979	$8,098,401	$61,578	Wildfire	5.70	(3, 192, 0, '2025-01-01')
87	352-27R	$18,614,182	$18,495,149	$119,034	Wildfire	13.03	(3, 192, 0, '2025-01-01')
88	176-200F	$1,635,841	$1,459,888	$175,953	Wildfire	1.17	(3, 192, 0, '2025-01-01')
89	357-750R	$11,757,625	$11,499,648	$257,977	Wildfire	8.42	(3, 192, 0, '2025-01-01')
90	1250-27R	$6,418,508	$5,971,509	$446,999	Wildfire	4.62	(3, 192, 0, '2025-01-01')
91	1022-322R	$5,072,199	$5,029,594	$42,605	Wildfire	3.67	(3, 192, 0, '2025-01-01')
92	971-1973R	$15,148,796	$15,005,297	$143,499	Wildfire	10.95	(3, 192, 0, '2025-01-01')
93	79-785	$18,780,929	$18,244,488	$536,440	Wildfire	13.60	(3, 192, 0, '2025-01-01')
94	971-2050R	$28,484,584	$28,174,790	$309,794	Wildfire	20.70	(3, 192, 0, '2025-01-01')
95	1030-989R	$26,696,216	$26,471,622	$224,594	Wildfire	19.58	(3, 192, 0, '2025-01-01')
96	73-1163	$15,337,185	$15,116,479	$220,706	Wildfire	11.27	(3, 192, 0, '2025-01-01')
97	CB 236	$12,711,188	$12,408,602	$302,586	Wildfire	9.37	(3, 192, 0, '2025-01-01')
98	1166-18R	$10,108,490	$10,085,269	$23,221	Wildfire	7.59	(3, 192, 0, '2025-01-01')

Risk Ranking	Circuit, Segment, or Span ID	Overall Utility Risk Score	Wildfire Risk Score	Outage Program Risk Score	Top Risk Contributors	Total Miles	Version of Risk Model Used
99	236-1569R	$21,222,913	$20,875,681	$347,232	Wildfire	16.01	(3, 192, 0, '2025-01-01')
100	214-1122R	$26,281,150	$25,993,614	$287,536	Wildfire	19.91	(3, 192, 0, '2025-01-01')
101	357-1147R	$1,251,176	$1,239,446	$11,730	Wildfire	0.96	(3, 192, 0, '2025-01-01')
102	79-658R	$12,321,076	$12,230,391	$90,685	Wildfire	9.51	(3, 192, 0, '2025-01-01')
103	CB 1106	$1,646,984	$568,815	$1,078,169	Outage Program	1.28	(3, 192, 0, '2025-01-01')
104	1105-1483	$417,001	$394,048	$22,953	Wildfire	0.32	(3, 192, 0, '2025-01-01')
105	445-897R	$1,351,775	$1,314,502	$37,273	Wildfire	1.07	(3, 192, 0, '2025-01-01')
106	358-1175F	$599,583	$582,832	$16,752	Wildfire	0.48	(3, 192, 0, '2025-01-01')
107	CB 355	$11,288,353	$11,157,039	$131,314	Wildfire	8.97	(3, 192, 0, '2025-01-01')
108	221-788	$4,481,914	$4,457,135	$24,779	Wildfire	3.62	(3, 192, 0, '2025-01-01')
109	1250-677R	$11,748,909	$11,662,207	$86,701	Wildfire	9.49	(3, 192, 0, '2025-01-01')
110	182-2252R	$4,229,945	$4,196,758	$33,186	Wildfire	3.42	(3, 192, 0, '2025-01-01')
111	236-1535R	$9,719,042	$9,595,871	$123,171	Wildfire	7.87	(3, 192, 0, '2025-01-01')
112	1105-1479	$4,228,044	$4,224,871	$3,173	Wildfire	3.43	(3, 192, 0, '2025-01-01')
113	521-32R	$12,241,713	$12,165,680	$76,033	Wildfire	10.00	(3, 192, 0, '2025-01-01')
114	CB 357	$6,110,855	$5,866,849	$244,006	Wildfire	5.02	(3, 192, 0, '2025-01-01')
115	353-593F	$2,519,059	$2,498,440	$20,619	Wildfire	2.08	(3, 192, 0, '2025-01-01')
116	355-41R	$7,500,586	$7,388,137	$112,449	Wildfire	6.30	(3, 192, 0, '2025-01-01')
117	524-69R	$40,375,331	$39,985,025	$390,306	Wildfire	34.17	(3, 192, 0, '2025-01-01')
118	450-1851F	$8,274,122	$8,210,482	$63,640	Wildfire	7.09	(3, 192, 0, '2025-01-01')
119	972-942R	$9,149,684	$9,068,839	$80,845	Wildfire	7.84	(3, 192, 0, '2025-01-01')
120	CB RC1	$3,739,875	$3,707,620	$32,254	Wildfire	3.23	(3, 192, 0, '2025-01-01')
121	972-1590F	$23,409,154	$23,032,888	$376,266	Wildfire	20.66	(3, 192, 0, '2025-01-01')
122	TM1-10R	$3,782,857	$3,763,197	$19,659	Wildfire	3.39	(3, 192, 0, '2025-01-01')
123	524-46R	$13,710,953	$13,572,074	$138,879	Wildfire	12.31	(3, 192, 0, '2025-01-01')
124	221-35	$710,327	$706,480	$3,847	Wildfire	0.65	(3, 192, 0, '2025-01-01')
125	CB RA1	$10,517,062	$10,338,977	$178,085	Wildfire	9.63	(3, 192, 0, '2025-01-01')
126	176-161R	$11,523,305	$11,381,449	$141,856	Wildfire	10.61	(3, 192, 0, '2025-01-01')
127	307-1538F	$2,407,233	$2,192,285	$214,948	Wildfire	2.22	(3, 192, 0, '2025-01-01')
128	471-36F	$4,253,667	$4,039,168	$214,499	Wildfire	3.93	(3, 192, 0, '2025-01-01')
129	354-1706R	$20,510,259	$20,339,348	$170,911	Wildfire	18.93	(3, 192, 0, '2025-01-01')
130	597-595	$18,774,394	$17,938,779	$835,615	Wildfire	17.46	(3, 192, 0, '2025-01-01')
131	450-50R	$537,070	$174,706	$362,365	Outage Program	0.52	(3, 192, 0, '2025-01-01')
132	307-234R	$4,762,848	$4,550,699	$212,149	Wildfire	4.64	(3, 192, 0, '2025-01-01')

Risk Ranking	Circuit, Segment, or Span ID	Overall Utility Risk Score	Wildfire Risk Score	Outage Program Risk Score	Top Risk Contributors	Total Miles	Version of Risk Model Used
133	1118-1718F	$788,376	$783,678	$4,698	Wildfire	0.77	(3, 192, 0, '2025-01-01')
134	452-38AE	$2,823,751	$2,821,884	$1,867	Wildfire	2.77	(3, 192, 0, '2025-01-01')
135	454-48F	$3,441,166	$3,430,800	$10,367	Wildfire	3.42	(3, 192, 0, '2025-01-01')
136	354-24AE	$3,653,654	$3,234,792	$418,862	Wildfire	3.69	(3, 192, 0, '2025-01-01')
137	222-2063	$4,859,776	$4,852,517	$7,259	Wildfire	4.91	(3, 192, 0, '2025-01-01')
138	355-6R	$1,698,710	$1,357,932	$340,778	Wildfire	1.72	(3, 192, 0, '2025-01-01')
139	236-1573R	$6,927,856	$6,778,520	$149,336	Wildfire	7.15	(3, 192, 0, '2025-01-01')
140	1039-13	$15,957,171	$15,550,885	$406,286	Wildfire	16.59	(3, 192, 0, '2025-01-01')
141	357-50R	$10,432,489	$10,123,495	$308,994	Wildfire	10.86	(3, 192, 0, '2025-01-01')
142	1100-1172R	$2,144,979	$2,138,024	$6,955	Wildfire	2.24	(3, 192, 0, '2025-01-01')
143	157-1928R	$3,052,674	$3,024,213	$28,462	Wildfire	3.19	(3, 192, 0, '2025-01-01')
144	176-197F	$13,172,958	$12,751,842	$421,116	Wildfire	13.77	(3, 192, 0, '2025-01-01')
145	221-1230F	$3,690,962	$3,687,573	$3,389	Wildfire	3.87	(3, 192, 0, '2025-01-01')
146	CB OK1	$6,915,682	$6,846,549	$69,133	Wildfire	7.34	(3, 192, 0, '2025-01-01')
147	RB1-433R	$5,946,508	$5,905,825	$40,683	Wildfire	6.36	(3, 192, 0, '2025-01-01')
148	1001-1814AE	$409,062	$405,585	$3,478	Wildfire	0.44	(3, 192, 0, '2025-01-01')
149	441-30R	$5,348,877	$5,272,517	$76,360	Wildfire	5.73	(3, 192, 0, '2025-01-01')
150	350-2201R	$13,521,745	$13,424,968	$96,777	Wildfire	14.57	(3, 192, 0, '2025-01-01')
151	79-714R	$5,536,621	$5,332,551	$204,070	Wildfire	5.99	(3, 192, 0, '2025-01-01')
152	599-19R	$25,743,456	$25,588,005	$155,451	Wildfire	27.93	(3, 192, 0, '2025-01-01')
153	236-1567R	$5,332,004	$5,229,334	$102,670	Wildfire	5.86	(3, 192, 0, '2025-01-01')
154	356-16R	$5,437,438	$5,336,373	$101,064	Wildfire	5.99	(3, 192, 0, '2025-01-01')
155	521-14R	$11,350,287	$10,974,725	$375,563	Wildfire	12.70	(3, 192, 0, '2025-01-01')
156	1166-342R	$10,322,642	$10,227,749	$94,893	Wildfire	11.58	(3, 192, 0, '2025-01-01')
157	1250-8R	$3,684,980	$3,616,965	$68,015	Wildfire	4.21	(3, 192, 0, '2025-01-01')
158	182-2240F	$11,917,199	$11,236,832	$680,367	Wildfire	13.81	(3, 192, 0, '2025-01-01')
159	1458-1056	$427,448	$386,682	$40,766	Wildfire	0.50	(3, 192, 0, '2025-01-01')
160	73-683R	$9,288,033	$9,142,043	$145,990	Wildfire	10.91	(3, 192, 0, '2025-01-01')
161	470-40AE	$5,264,969	$5,176,968	$88,001	Wildfire	6.19	(3, 192, 0, '2025-01-01')
162	CB 1023	$3,332,739	$3,326,465	$6,274	Wildfire	3.92	(3, 192, 0, '2025-01-01')
163	215-38R	$5,434,815	$5,375,941	$58,875	Wildfire	6.43	(3, 192, 0, '2025-01-01')
164	524-50R	$8,801,877	$8,643,495	$158,382	Wildfire	10.51	(3, 192, 0, '2025-01-01')
165	789-4R	$10,274,006	$10,265,349	$8,657	Wildfire	12.30	(3, 192, 0, '2025-01-01')
166	500-1531	$800,550	$172,930	$627,621	Outage Program	0.98	(3, 192, 0, '2025-01-01')

Risk Ranking	Circuit, Segment, or Span ID	Overall Utility Risk Score	Wildfire Risk Score	Outage Program Risk Score	Top Risk Contributors	Total Miles	Version of Risk Model Used
167	974-715R	$7,107,170	$7,075,030	$32,140	Wildfire	8.72	(3, 192, 0, '2025-01-01')
168	353-902F	$465,101	$292,268	$172,833	Wildfire	0.58	(3, 192, 0, '2025-01-01')
169	1166-15R	$3,965,222	$3,896,389	$68,833	Wildfire	5.07	(3, 192, 0, '2025-01-01')
170	524-27R	$11,317,694	$11,291,558	$26,136	Wildfire	14.60	(3, 192, 0, '2025-01-01')
171	452-1404F	$625,543	$624,941	$601	Wildfire	0.81	(3, 192, 0, '2025-01-01')
172	1023-200R	$2,889,973	$2,868,051	$21,922	Wildfire	3.78	(3, 192, 0, '2025-01-01')
173	1001-1140R	$1,005,685	$946,203	$59,482	Wildfire	1.33	(3, 192, 0, '2025-01-01')
174	73-678R	$10,591,377	$10,412,424	$178,953	Wildfire	14.17	(3, 192, 0, '2025-01-01')
175	182-2254R	$655,801	$650,139	$5,662	Wildfire	0.88	(3, 192, 0, '2025-01-01')
176	855-46AE	$188,553	$188,332	$221	Wildfire	0.25	(3, 192, 0, '2025-01-01')
177	1001-1130R	$2,758,283	$2,661,345	$96,938	Wildfire	3.70	(3, 192, 0, '2025-01-01')
178	176-1834R	$10,068,517	$9,779,527	$288,990	Wildfire	13.54	(3, 192, 0, '2025-01-01')
179	75-41	$1,937,585	$1,934,834	$2,751	Wildfire	2.61	(3, 192, 0, '2025-01-01')
180	1215-12R	$6,147,284	$6,017,064	$130,220	Wildfire	8.32	(3, 192, 0, '2025-01-01')
181	350-2182R	$302,428	$300,219	$2,209	Wildfire	0.41	(3, 192, 0, '2025-01-01')
182	283-55R	$5,299,634	$5,223,022	$76,612	Wildfire	7.23	(3, 192, 0, '2025-01-01')
183	445-1311R	$9,632,591	$9,146,839	$485,752	Wildfire	13.30	(3, 192, 0, '2025-01-01')
184	1215-28R	$2,215,156	$2,097,533	$117,623	Wildfire	3.06	(3, 192, 0, '2025-01-01')
185	75-2259F	$3,135,458	$3,128,270	$7,187	Wildfire	4.35	(3, 192, 0, '2025-01-01')
186	972-1582R	$8,019,179	$7,901,674	$117,505	Wildfire	11.15	(3, 192, 0, '2025-01-01')
187	450-1853F	$792,202	$734,912	$57,290	Wildfire	1.10	(3, 192, 0, '2025-01-01')
188	1215-32R	$8,696,504	$8,389,974	$306,530	Wildfire	12.19	(3, 192, 0, '2025-01-01')
189	75-32R	$1,708,385	$1,701,119	$7,266	Wildfire	2.42	(3, 192, 0, '2025-01-01')
190	73-23R	$5,733,791	$5,642,495	$91,295	Wildfire	8.22	(3, 192, 0, '2025-01-01')
191	521-18R	$8,713,017	$8,657,406	$55,612	Wildfire	12.51	(3, 192, 0, '2025-01-01')
192	521-1856R	$8,477,862	$8,290,638	$187,224	Wildfire	12.20	(3, 192, 0, '2025-01-01')
193	470-47R	$16,740,391	$16,634,977	$105,415	Wildfire	24.31	(3, 192, 0, '2025-01-01')
194	441-23R	$3,518,020	$3,428,405	$89,616	Wildfire	5.13	(3, 192, 0, '2025-01-01')
195	908-2040	$3,646,805	$3,351,774	$295,031	Wildfire	5.32	(3, 192, 0, '2025-01-01')
196	350-41R	$11,201,389	$11,075,404	$125,985	Wildfire	16.42	(3, 192, 0, '2025-01-01')
197	221-824	$2,324,221	$2,251,307	$72,915	Wildfire	3.42	(3, 192, 0, '2025-01-01')
198	521-700R	$9,012,545	$8,927,134	$85,411	Wildfire	13.35	(3, 192, 0, '2025-01-01')
199	157-81R	$18,749,596	$18,188,039	$561,557	Wildfire	27.79	(3, 192, 0, '2025-01-01')
200	176-164R	$4,184,747	$4,105,075	$79,671	Wildfire	6.25	(3, 192, 0, '2025-01-01')

Risk Ranking	Circuit, Segment, or Span ID	Overall Utility Risk Score	Wildfire Risk Score	Outage Program Risk Score	Top Risk Contributors	Total Miles	Version of Risk Model Used
201	1233-591R	$4,300,184	$4,242,542	$57,642	Wildfire	6.47	(3, 192, 0, '2025-01-01')
202	356-19R	$16,012,786	$15,654,558	$358,229	Wildfire	24.10	(3, 192, 0, '2025-01-01')
203	235-897R	$4,375,038	$3,877,449	$497,589	Wildfire	6.61	(3, 192, 0, '2025-01-01')
204	540-241R	$833,631	$564,790	$268,841	Wildfire	1.26	(3, 192, 0, '2025-01-01')
205	1001-1820F	$4,222,247	$3,859,583	$362,664	Wildfire	6.48	(3, 192, 0, '2025-01-01')
206	79-685R	$2,564,752	$2,548,703	$16,049	Wildfire	3.96	(3, 192, 0, '2025-01-01')
207	CB 576	$417,703	$327,341	$90,362	Wildfire	0.65	(3, 192, 0, '2025-01-01')
208	221-6R	$3,904,259	$3,899,503	$4,756	Wildfire	6.06	(3, 192, 0, '2025-01-01')
209	441-27R	$4,750,127	$4,655,244	$94,883	Wildfire	7.38	(3, 192, 0, '2025-01-01')
210	CB 790	$864,253	$541,657	$322,596	Wildfire	1.35	(3, 192, 0, '2025-01-01')
211	524-1782F	$5,468,134	$5,455,868	$12,266	Wildfire	8.57	(3, 192, 0, '2025-01-01')
212	520-1527R	$6,763,001	$6,541,016	$221,985	Wildfire	10.70	(3, 192, 0, '2025-01-01')
213	971-388R	$11,267,961	$11,152,745	$115,216	Wildfire	17.90	(3, 192, 0, '2025-01-01')
214	449-693R	$5,260,706	$5,196,145	$64,561	Wildfire	8.46	(3, 192, 0, '2025-01-01')
215	449-16R	$1,495,506	$1,450,226	$45,280	Wildfire	2.40	(3, 192, 0, '2025-01-01')
216	445-1325F	$7,250,723	$6,968,326	$282,397	Wildfire	11.71	(3, 192, 0, '2025-01-01')
217	177-955	$2,963,406	$2,318,247	$645,159	Wildfire	4.80	(3, 192, 0, '2025-01-01')
218	973-1226R	$5,177,870	$5,039,262	$138,608	Wildfire	8.48	(3, 192, 0, '2025-01-01')
219	236-1563R	$2,260,662	$2,229,176	$31,487	Wildfire	3.71	(3, 192, 0, '2025-01-01')
220	791-419F	$3,349,759	$3,101,216	$248,543	Wildfire	5.51	(3, 192, 0, '2025-01-01')
221	973-626R	$6,521,724	$6,393,286	$128,438	Wildfire	10.91	(3, 192, 0, '2025-01-01')
222	222-1523R	$7,406,689	$7,156,613	$250,076	Wildfire	12.44	(3, 192, 0, '2025-01-01')
223	217-835R	$10,686,933	$10,546,230	$140,703	Wildfire	18.32	(3, 192, 0, '2025-01-01')
224	CB JU1	$1,531,749	$1,498,742	$33,006	Wildfire	2.67	(3, 192, 0, '2025-01-01')
225	239-2211R	$1,585,172	$1,564,094	$21,078	Wildfire	2.77	(3, 192, 0, '2025-01-01')
226	1233-585R	$3,561,959	$3,505,653	$56,306	Wildfire	6.24	(3, 192, 0, '2025-01-01')
227	214-1135R	$6,666,922	$6,627,374	$39,547	Wildfire	11.68	(3, 192, 0, '2025-01-01')
228	788-34R	$9,132,237	$8,614,678	$517,559	Wildfire	16.10	(3, 192, 0, '2025-01-01')
229	230-133AE	$6,388,694	$6,277,696	$110,998	Wildfire	11.35	(3, 192, 0, '2025-01-01')
230	CB 470	$6,922,049	$6,609,552	$312,497	Wildfire	12.44	(3, 192, 0, '2025-01-01')
231	1090-73F	$5,899,045	$5,876,651	$22,395	Wildfire	10.61	(3, 192, 0, '2025-01-01')
232	521-27R	$5,618,623	$5,550,020	$68,603	Wildfire	10.17	(3, 192, 0, '2025-01-01')
233	908-30	$847,524	$818,047	$29,477	Wildfire	1.54	(3, 192, 0, '2025-01-01')
234	175-2024R	$4,029,008	$3,992,844	$36,165	Wildfire	7.37	(3, 192, 0, '2025-01-01')

Risk Ranking	Circuit, Segment, or Span ID	Overall Utility Risk Score	Wildfire Risk Score	Outage Program Risk Score	Top Risk Contributors	Total Miles	Version of Risk Model Used
235	175-24R	$2,651,435	$1,873,251	$778,185	Wildfire	4.85	(3, 192, 0, '2025-01-01')
236	236-1561R	$2,823,578	$2,746,271	$77,307	Wildfire	5.18	(3, 192, 0, '2025-01-01')
237	RB1-427R	$6,920,124	$6,752,264	$167,860	Wildfire	12.69	(3, 192, 0, '2025-01-01')
238	176-194R	$4,934,160	$4,820,768	$113,392	Wildfire	9.07	(3, 192, 0, '2025-01-01')
239	222-2013R	$7,426,976	$7,133,534	$293,442	Wildfire	13.70	(3, 192, 0, '2025-01-01')
240	222-2085	$16,772,308	$16,218,059	$554,250	Wildfire	31.28	(3, 192, 0, '2025-01-01')
241	920-1342R	$3,406,646	$3,384,147	$22,499	Wildfire	6.37	(3, 192, 0, '2025-01-01')
242	450-1854	$1,132,289	$1,078,517	$53,772	Wildfire	2.14	(3, 192, 0, '2025-01-01')
243	222-1503R	$1,359,395	$1,293,519	$65,877	Wildfire	2.60	(3, 192, 0, '2025-01-01')
244	442-728R	$11,572,221	$10,238,671	$1,333,550	Wildfire	22.25	(3, 192, 0, '2025-01-01')
245	239-2215R	$6,268,657	$6,158,320	$110,337	Wildfire	12.06	(3, 192, 0, '2025-01-01')
246	215-1544R	$1,412,430	$1,385,495	$26,935	Wildfire	2.74	(3, 192, 0, '2025-01-01')
247	73-1130R	$6,201,607	$6,033,466	$168,141	Wildfire	12.03	(3, 192, 0, '2025-01-01')
248	221-37AE	$3,934,773	$3,817,749	$117,024	Wildfire	7.72	(3, 192, 0, '2025-01-01')
249	CB SL1	$3,361,570	$3,150,270	$211,301	Wildfire	6.60	(3, 192, 0, '2025-01-01')
250	1090-74F	$4,990,920	$4,972,119	$18,801	Wildfire	9.89	(3, 192, 0, '2025-01-01')
251	DV1-3R	$3,719,400	$3,539,616	$179,784	Wildfire	7.39	(3, 192, 0, '2025-01-01')
252	442-758F	$549,983	$544,074	$5,909	Wildfire	1.10	(3, 192, 0, '2025-01-01')
253	401-39R	$323,232	$10,321	$312,911	Outage Program	0.65	(3, 192, 0, '2025-01-01')
254	395-33R	$396,976	$552	$396,423	Outage Program	0.80	(3, 192, 0, '2025-01-01')
255	991-1206R	$4,576,791	$4,566,682	$10,109	Wildfire	9.21	(3, 192, 0, '2025-01-01')
256	991-1	$626,862	$412,906	$213,956	Wildfire	1.26	(3, 192, 0, '2025-01-01')
257	1023-46AE	$9,469,915	$9,089,007	$380,908	Wildfire	19.17	(3, 192, 0, '2025-01-01')
258	450-1850	$296,714	$288,153	$8,561	Wildfire	0.60	(3, 192, 0, '2025-01-01')
259	1094-35F	$2,514,283	$2,510,139	$4,144	Wildfire	5.14	(3, 192, 0, '2025-01-01')
260	237-1761R	$3,634,146	$3,612,196	$21,950	Wildfire	7.49	(3, 192, 0, '2025-01-01')
261	859-42R	$8,606,972	$8,594,826	$12,146	Wildfire	17.81	(3, 192, 0, '2025-01-01')

3 OEIS TABLE 6-1: LIST OF PRIORITIZED AREAS IN AN ELECTRICAL CORPORATIONS SERVICE TERRITORY BASED ON OVERALL UTILITY RISK

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
1	222-1986R	21.26	$79,194,349	$78,602,170	$592,179	2.611537%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
2	237-30R	33.47	$65,515,492	$64,815,659	$699,833	2.160458%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
3	909-451	20.60	$55,252,375	$54,850,769	$401,606	1.822019%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
4	222-1990R	14.24	$45,106,640	$44,939,414	$167,226	1.487450%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
5	908-2038R	17.93	$41,258,574	$40,800,964	$457,611	1.360555%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
6	524-69R	34.17	$40,375,331	$39,985,025	$390,306	1.331429%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
7	358-682F	12.51	$37,602,118	$37,073,061	$529,058	1.239979%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
8	1458-601R	15.45	$37,077,302	$36,838,604	$238,698	1.222672%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
9	1021-1748F	17.73	$35,156,122	$34,811,511	$344,612	1.159319%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
10	909-805R	13.42	$32,313,161	$32,075,253	$237,908	1.065568%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
11	237-2R	16.72	$30,894,123	$30,619,728	$274,395	1.018774%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
12	971-2050R	20.70	$28,484,584	$28,174,790	$309,794	0.939316%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
13	1030-42R	16.72	$28,398,789	$27,971,256	$427,534	0.936487%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
14	237-1765R	8.34	$28,249,252	$28,064,039	$185,213	0.931556%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
15	237-17R	14.64	$27,080,738	$26,780,686	$300,052	0.893023%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
16	907-1716R	12.78	$27,066,455	$26,848,173	$218,282	0.892552%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
17	1030-989R	19.58	$26,696,216	$26,471,622	$224,594	0.880342%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
18	214-1122R	19.91	$26,281,150	$25,993,614	$287,536	0.866655%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
19	599-19R	27.93	$25,743,456	$25,588,005	$155,451	0.848924%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
20	1030-20R	15.72	$25,318,462	$25,101,311	$217,151	0.834909%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
21	235-899R	14.59	$23,678,661	$23,291,810	$386,852	0.780835%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
22	351-819R	12.62	$23,517,428	$23,341,044	$176,383	0.775518%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
23	972-1590F	20.66	$23,409,154	$23,032,888	$376,266	0.771947%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
24	972-32R	15.68	$22,914,328	$22,336,491	$577,837	0.755630%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
25	908-2055F	11.56	$22,564,078	$22,357,449	$206,630	0.744080%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
26	214-647R	11.30	$22,354,309	$22,185,078	$169,231	0.737162%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
27	236-1569R	16.01	$21,222,913	$20,875,681	$347,232	0.699853%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
28	354-1706R	18.93	$20,510,259	$20,339,348	$170,911	0.676352%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
29	79-808R	10.67	$19,978,326	$19,824,672	$153,653	0.658811%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
30	215-1534R	7.81	$19,489,706	$19,294,169	$195,538	0.642698%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
31	1021-25R	6.97	$18,825,690	$18,768,979	$56,711	0.620802%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
32	79-785	13.60	$18,780,929	$18,244,488	$536,440	0.619326%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
33	597-595	17.46	$18,774,394	$17,938,779	$835,615	0.619110%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
34	157-81R	27.79	$18,749,596	$18,188,039	$561,557	0.618292%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
35	352-27R	13.03	$18,614,182	$18,495,149	$119,034	0.613827%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
36	79-679R	7.37	$18,448,583	$18,245,132	$203,451	0.608366%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
37	357-45R	11.81	$17,696,753	$17,249,773	$446,979	0.583573%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
38	357-2049F	7.81	$16,869,708	$16,664,985	$204,723	0.556301%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
39	222-2085	31.28	$16,772,308	$16,218,059	$554,249	0.553089%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
40	470-47R	24.31	$16,740,391	$16,634,977	$105,414	0.552036%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
41	356-19R	24.10	$16,012,786	$15,654,558	$358,229	0.528042%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
42	1458-1131R	6.17	$15,987,427	$15,842,278	$145,148	0.527206%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
43	1039-13	16.59	$15,957,171	$15,550,885	$406,286	0.526208%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
44	908-1172R	10.18	$15,766,519	$15,502,578	$263,941	0.519921%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
45	73-1163	11.27	$15,337,185	$15,116,479	$220,706	0.505764%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
46	971-1973R	10.95	$15,148,796	$15,005,297	$143,499	0.499551%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
47	971-383R	9.71	$14,770,596	$14,538,989	$231,607	0.487080%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
48	CB 351	6.73	$14,599,735	$14,550,362	$49,373	0.481445%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
49	78-26R	6.37	$14,526,727	$14,317,113	$209,613	0.479038%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
50	216-1859F	8.48	$14,041,288	$13,926,879	$114,409	0.463030%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
51	350-2192R	31.88	$13,871,622	$13,613,238	$258,385	0.457435%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
52	524-46R	12.31	$13,710,953	$13,572,074	$138,879	0.452137%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
53	353-904R	7.07	$13,534,407	$13,457,602	$76,804	0.446315%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
54	350-2201R	14.57	$13,521,745	$13,424,968	$96,777	0.445897%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
55	176-197F	13.77	$13,172,958	$12,751,842	$421,116	0.434395%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
56	970-1341R	4.40	$12,961,613	$12,917,272	$44,341	0.427426%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
57	CB 236	9.37	$12,711,188	$12,408,602	$302,586	0.419168%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
58	215-1531R	8.46	$12,702,412	$12,475,573	$226,839	0.418879%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
59	79-658R	9.51	$12,321,076	$12,230,391	$90,685	0.406303%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
60	521-32R	10.00	$12,241,713	$12,165,680	$76,033	0.403686%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
61	182-2240F	13.81	$11,917,199	$11,236,832	$680,367	0.392985%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
62	1030-1777	5.78	$11,817,577	$11,650,338	$167,240	0.389700%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
63	908-1236	5.43	$11,763,931	$11,622,998	$140,933	0.387931%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
64	357-750R	8.42	$11,757,625	$11,499,648	$257,977	0.387723%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
65	1250-677R	9.49	$11,748,909	$11,662,207	$86,701	0.387436%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
66	442-728R	22.25	$11,572,221	$10,238,671	$1,333,550	0.381609%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
67	176-161R	10.61	$11,523,305	$11,381,449	$141,856	0.379996%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
68	CB 971	5.11	$11,456,698	$11,400,371	$56,327	0.377800%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
69	521-14R	12.70	$11,350,287	$10,974,725	$375,563	0.374290%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
70	524-27R	14.60	$11,317,694	$11,291,558	$26,136	0.373216%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
71	CB 355	8.97	$11,288,353	$11,157,039	$131,314	0.372248%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
72	971-388R	17.90	$11,267,961	$11,152,745	$115,216	0.371576%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
73	350-41R	16.42	$11,201,389	$11,075,404	$125,985	0.369380%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
74	217-835R	18.32	$10,686,933	$10,546,230	$140,703	0.352415%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
75	445-18R	24.86	$10,619,797	$10,161,862	$457,935	0.350202%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
76	73-678R	14.17	$10,591,377	$10,412,424	$178,953	0.349264%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
77	CB RA1	9.63	$10,517,062	$10,338,977	$178,085	0.346814%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
78	357-50R	10.86	$10,432,489	$10,123,495	$308,994	0.344025%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
79	1166-342R	11.58	$10,322,642	$10,227,749	$94,892	0.340403%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
80	789-4R	12.30	$10,274,006	$10,265,349	$8,657	0.338799%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
81	217-983R	6.88	$10,116,963	$10,020,804	$96,159	0.333620%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
82	1166-18R	7.59	$10,108,490	$10,085,269	$23,221	0.333341%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
83	176-1834R	13.54	$10,068,517	$9,779,527	$288,990	0.332022%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
84	1022-17F	4.56	$9,800,679	$9,763,527	$37,152	0.323190%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
85	236-1535R	7.87	$9,719,042	$9,595,871	$123,171	0.320498%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
86	79-676R	4.59	$9,714,146	$9,547,622	$166,524	0.320337%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
87	445-1311R	13.30	$9,632,591	$9,146,839	$485,752	0.317647%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
88	222-1433R	6.28	$9,617,971	$9,578,744	$39,227	0.317165%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
89	1023-46AE	19.17	$9,469,915	$9,089,007	$380,908	0.312283%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
90	RA1-402R	3.81	$9,339,338	$9,276,379	$62,959	0.307977%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
91	356-30AE	20.81	$9,294,675	$8,868,206	$426,469	0.306504%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
92	73-683R	10.91	$9,288,033	$9,142,043	$145,990	0.306285%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
93	353-1429R	5.95	$9,221,802	$8,990,136	$231,667	0.304101%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
94	972-942R	7.84	$9,149,684	$9,068,839	$80,845	0.301723%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
95	351-871R	4.49	$9,144,312	$9,119,654	$24,659	0.301546%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
96	788-34R	16.10	$9,132,237	$8,614,678	$517,559	0.301147%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
97	448-744R	29.22	$9,104,562	$8,347,200	$757,362	0.300235%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
98	907-1702R	5.31	$9,100,558	$9,075,654	$24,904	0.300103%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
99	521-700R	13.35	$9,012,545	$8,927,134	$85,411	0.297200%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
100	524-50R	10.51	$8,801,877	$8,643,495	$158,382	0.290253%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
101	521-18R	12.51	$8,713,017	$8,657,406	$55,612	0.287323%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
102	1215-32R	12.19	$8,696,504	$8,389,974	$306,530	0.286779%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
103	973-1245R	3.34	$8,620,111	$8,579,828	$40,283	0.284259%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
104	859-42R	17.81	$8,606,972	$8,594,826	$12,146	0.283826%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
105	CB 788	21.07	$8,569,068	$8,146,827	$422,241	0.282576%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
106	521-1856R	12.20	$8,477,862	$8,290,638	$187,224	0.279569%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
107	209-1769F	31.90	$8,462,802	$8,440,861	$21,941	0.279072%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
108	907-1562AE	4.11	$8,439,769	$8,238,564	$201,206	0.278312%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
109	450-1851F	7.09	$8,274,122	$8,210,482	$63,640	0.272850%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
110	1458-565R	5.70	$8,159,979	$8,098,401	$61,578	0.269086%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
111	972-1582R	11.15	$8,019,179	$7,901,674	$117,505	0.264443%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
112	971-29R	3.80	$8,015,407	$7,972,516	$42,890	0.264318%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
113	908-1372R	3.73	$7,960,290	$7,828,738	$131,552	0.262501%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
114	355-41R	6.30	$7,500,586	$7,388,137	$112,449	0.247342%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
115	222-2013R	13.70	$7,426,976	$7,133,534	$293,441	0.244914%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
116	222-1523R	12.44	$7,406,689	$7,156,613	$250,076	0.244245%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
117	CB 476	18.00	$7,260,322	$5,346,745	$1,913,577	0.239419%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
118	445-1325F	11.71	$7,250,723	$6,968,326	$282,396	0.239102%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
119	78-782R	1.72	$7,202,316	$7,167,197	$35,119	0.237506%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
120	974-715R	8.72	$7,107,170	$7,075,030	$32,140	0.234368%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
121	1021-1760R	2.97	$7,055,716	$6,926,993	$128,723	0.232671%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
122	236-1573R	7.15	$6,927,856	$6,778,520	$149,336	0.228455%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
123	CB 470	12.44	$6,922,049	$6,609,552	$312,497	0.228264%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
124	RB1-427R	12.69	$6,920,124	$6,752,264	$167,859	0.228200%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
125	CB OK1	7.34	$6,915,682	$6,846,549	$69,133	0.228054%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
126	1250-671R	2.00	$6,815,428	$6,443,061	$372,367	0.224748%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
127	520-1527R	10.70	$6,763,001	$6,541,016	$221,985	0.223019%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
128	449-13R	16.55	$6,729,965	$6,090,026	$639,939	0.221929%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
129	214-1135R	11.68	$6,666,922	$6,627,374	$39,547	0.219850%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
130	CB 1235	20.77	$6,645,572	$6,585,224	$60,348	0.219146%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
131	1030-18R	3.53	$6,620,910	$6,532,115	$88,794	0.218333%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
132	973-626R	10.91	$6,521,724	$6,393,286	$128,438	0.215062%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
133	1250-27R	4.62	$6,418,508	$5,971,509	$446,999	0.211659%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
134	975-22R	1.65	$6,417,038	$5,152,705	$1,264,334	0.211610%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
135	230-133AE	11.35	$6,388,694	$6,277,696	$110,998	0.210675%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
136	411-30R	24.61	$6,370,041	$6,272,318	$97,724	0.210060%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
137	907-2820R	2.46	$6,348,476	$6,346,946	$1,530	0.209349%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
138	CB 1234	17.31	$6,311,492	$5,319,837	$991,655	0.208130%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
139	239-2215R	12.06	$6,268,657	$6,158,320	$110,337	0.206717%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
140	73-1130R	12.03	$6,201,607	$6,033,466	$168,141	0.204506%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
141	1215-12R	8.32	$6,147,284	$6,017,064	$130,220	0.202715%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
142	CB 357	5.02	$6,110,855	$5,866,849	$244,006	0.201513%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
143	RB1-433R	6.36	$5,946,508	$5,905,825	$40,683	0.196094%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
144	1090-73F	10.61	$5,899,045	$5,876,651	$22,395	0.194529%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
145	175-90R	11.93	$5,741,495	$5,561,271	$180,223	0.189333%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
146	73-23R	8.22	$5,733,791	$5,642,495	$91,295	0.189079%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
147	909-453R	2.35	$5,703,040	$5,701,153	$1,887	0.188065%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
148	78-35R	1.53	$5,696,336	$5,695,327	$1,009	0.187844%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
149	448-9R	17.78	$5,644,811	$5,273,685	$371,126	0.186145%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
150	522-38R	17.49	$5,639,841	$5,439,140	$200,702	0.185981%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
151	521-27R	10.17	$5,618,623	$5,550,020	$68,603	0.185281%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
152	908-1368R	18.69	$5,570,793	$5,361,811	$208,982	0.183704%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
153	350-2196R	34.45	$5,570,686	$5,402,875	$167,811	0.183701%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
154	79-714R	5.99	$5,536,621	$5,332,551	$204,070	0.182577%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
155	157-189R	27.72	$5,507,024	$5,091,861	$415,162	0.181601%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
156	524-1782F	8.57	$5,468,134	$5,455,868	$12,266	0.180319%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
157	356-16R	5.99	$5,437,438	$5,336,373	$101,064	0.179307%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
158	215-38R	6.43	$5,434,815	$5,375,941	$58,875	0.179220%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
159	441-30R	5.73	$5,348,877	$5,272,517	$76,360	0.176386%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
160	236-1567R	5.86	$5,332,004	$5,229,334	$102,670	0.175830%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
161	283-55R	7.23	$5,299,634	$5,223,022	$76,612	0.174762%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
162	470-40AE	6.19	$5,264,969	$5,176,968	$88,001	0.173619%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
163	449-693R	8.46	$5,260,706	$5,196,145	$64,561	0.173479%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
164	CB RA2	3.60	$5,229,902	$5,131,211	$98,691	0.172463%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
165	973-1226R	8.48	$5,177,870	$5,039,262	$138,608	0.170747%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
166	231-1635R	29.75	$5,142,095	$5,074,262	$67,833	0.169567%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
167	1030-1728R	2.68	$5,124,159	$5,035,021	$89,138	0.168976%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
168	CB MOR1	3.55	$5,119,714	$5,045,788	$73,926	0.168829%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
169	357-1299R	2.75	$5,098,733	$5,082,457	$16,276	0.168137%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
170	1022-322R	3.67	$5,072,199	$5,029,594	$42,605	0.167262%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
171	1021-855	2.91	$5,034,375	$5,009,473	$24,902	0.166015%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
172	520-35R	14.36	$4,997,794	$4,822,591	$175,203	0.164809%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
173	1090-74F	9.89	$4,990,920	$4,972,119	$18,801	0.164582%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
174	234-48R	11.58	$4,939,379	$4,912,539	$26,840	0.162882%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
175	176-194R	9.07	$4,934,160	$4,820,768	$113,392	0.162710%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
176	212-725R	11.86	$4,887,827	$4,846,330	$41,497	0.161182%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
177	222-2063	4.91	$4,859,776	$4,852,517	$7,259	0.160257%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
178	307-234R	4.64	$4,762,848	$4,550,699	$212,149	0.157061%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
179	441-27R	7.38	$4,750,127	$4,655,244	$94,883	0.156642%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
180	1138-6R	19.43	$4,663,878	$4,249,839	$414,039	0.153797%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
181	991-1206R	9.21	$4,576,791	$4,566,682	$10,109	0.150926%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
182	353-901F	2.39	$4,555,619	$4,296,049	$259,570	0.150227%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
183	221-788	3.62	$4,481,914	$4,457,135	$24,779	0.147797%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
184	240-2004R	19.80	$4,437,659	$4,344,912	$92,747	0.146338%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
185	445-894R	26.88	$4,421,002	$3,895,845	$525,157	0.145788%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
186	175-64R	10.35	$4,385,400	$4,276,794	$108,606	0.144614%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
187	235-897R	6.61	$4,375,038	$3,877,449	$497,589	0.144273%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
188	1458-1061	2.35	$4,370,099	$4,312,123	$57,976	0.144110%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
189	971-371R	2.47	$4,351,506	$4,330,446	$21,060	0.143497%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
190	CB 599	11.46	$4,323,244	$4,315,017	$8,228	0.142565%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
191	1233-591R	6.47	$4,300,184	$4,242,542	$57,642	0.141804%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
192	471-36F	3.93	$4,253,667	$4,039,168	$214,499	0.140270%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
193	182-2252R	3.42	$4,229,945	$4,196,758	$33,186	0.139488%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
194	1105-1479	3.43	$4,228,044	$4,224,871	$3,173	0.139425%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
195	1001-1820F	6.48	$4,222,247	$3,859,583	$362,664	0.139234%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
196	176-164R	6.25	$4,184,747	$4,105,075	$79,671	0.137997%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
197	67-34R	20.31	$4,180,137	$3,921,084	$259,053	0.137845%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
198	CB 233	18.84	$4,127,696	$4,075,589	$52,106	0.136116%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
199	CB 1250	2.57	$4,075,236	$4,072,564	$2,672	0.134386%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
200	175-2024R	7.37	$4,029,008	$3,992,844	$36,165	0.132862%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
201	1166-15R	5.07	$3,965,222	$3,896,389	$68,833	0.130758%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
202	221-37AE	7.72	$3,934,773	$3,817,749	$117,024	0.129754%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
203	221-6R	6.06	$3,904,259	$3,899,503	$4,756	0.128748%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
204	157-204R	13.22	$3,876,133	$3,836,814	$39,319	0.127821%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
205	TM1-10R	3.39	$3,782,857	$3,763,197	$19,659	0.124745%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
206	1023-48R	16.53	$3,773,847	$3,675,354	$98,494	0.124448%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
207	249-24R	15.57	$3,753,230	$3,597,511	$155,719	0.123768%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
208	240-2006R	12.15	$3,742,572	$3,707,607	$34,965	0.123416%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
209	CB RC1	3.23	$3,739,875	$3,707,620	$32,254	0.123327%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
210	DV1-3R	7.39	$3,719,400	$3,539,616	$179,784	0.122652%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
211	221-1230F	3.87	$3,690,962	$3,687,573	$3,389	0.121714%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
212	1250-8R	4.21	$3,684,980	$3,616,965	$68,015	0.121517%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
213	445-39R	8.45	$3,678,581	$3,220,261	$458,320	0.121306%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
214	240-2032R	13.81	$3,665,735	$3,549,054	$116,681	0.120882%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
215	217-837R	12.68	$3,657,183	$3,461,858	$195,325	0.120600%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
216	354-24AE	3.69	$3,653,654	$3,234,792	$418,862	0.120484%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
217	908-2040	5.32	$3,646,805	$3,351,774	$295,031	0.120258%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
218	237-1761R	7.49	$3,634,146	$3,612,196	$21,950	0.119841%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
219	222-1988R	0.95	$3,619,436	$3,592,934	$26,502	0.119356%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
220	350-2188R	22.06	$3,602,012	$3,439,370	$162,642	0.118781%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
221	220-298R	33.13	$3,585,631	$3,204,472	$381,159	0.118241%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
222	1233-585R	6.24	$3,561,959	$3,505,653	$56,306	0.117460%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
223	441-23R	5.13	$3,518,020	$3,428,405	$89,616	0.116011%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
224	974-23R	16.08	$3,492,863	$3,272,567	$220,295	0.115182%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
225	230-2060R	9.14	$3,473,455	$3,392,757	$80,698	0.114542%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
226	454-48F	3.42	$3,441,166	$3,430,800	$10,367	0.113477%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
227	520-1509R	15.30	$3,413,912	$3,165,391	$248,521	0.112578%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
228	444-43R	20.61	$3,413,814	$3,334,275	$79,539	0.112575%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
229	920-1342R	6.37	$3,406,646	$3,384,147	$22,499	0.112339%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
230	176-1845R	7.35	$3,401,023	$3,324,151	$76,872	0.112153%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
231	246-34R	12.82	$3,387,006	$3,202,237	$184,769	0.111691%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
232	CB SL1	6.60	$3,361,570	$3,150,270	$211,301	0.110852%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
233	791-419F	5.51	$3,349,759	$3,101,216	$248,543	0.110463%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
234	CB 1023	3.92	$3,332,739	$3,326,465	$6,274	0.109901%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
235	CB 234	11.03	$3,294,853	$3,257,847	$37,006	0.108652%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
236	221-23R	7.99	$3,270,238	$3,013,933	$256,305	0.107840%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
237	157-232R	10.90	$3,160,508	$3,010,962	$149,546	0.104222%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
238	396-699R	20.45	$3,136,952	$2,766,177	$370,775	0.103445%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
239	75-2259F	4.35	$3,135,458	$3,128,270	$7,187	0.103396%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
240	157-1928R	3.19	$3,052,674	$3,024,213	$28,462	0.100666%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
241	233-123R	15.07	$3,035,805	$3,000,562	$35,242	0.100110%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
242	79-799R	6.76	$3,034,823	$2,947,433	$87,391	0.100077%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
243	CB PE1	6.76	$3,027,548	$2,867,898	$159,650	0.099837%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
244	1233-587R	7.61	$2,983,729	$2,921,128	$62,601	0.098392%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
245	520-1045R	8.73	$2,978,814	$2,899,718	$79,096	0.098230%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
246	206-1817	11.73	$2,976,573	$2,969,127	$7,447	0.098156%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
247	177-955	4.80	$2,963,406	$2,318,247	$645,159	0.097722%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
248	1023-200R	3.78	$2,889,973	$2,868,051	$21,922	0.095301%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
249	452-38AE	2.77	$2,823,751	$2,821,884	$1,867	0.093117%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
250	236-1561R	5.18	$2,823,578	$2,746,271	$77,307	0.093111%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
251	212-773R	11.84	$2,758,567	$2,642,067	$116,499	0.090967%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
252	1001-1130R	3.70	$2,758,283	$2,661,345	$96,938	0.090958%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
253	CB 907	1.37	$2,742,284	$2,737,736	$4,548	0.090430%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
254	221-344R	11.57	$2,735,928	$2,629,449	$106,479	0.090221%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
255	231-1136R	13.26	$2,730,918	$2,684,542	$46,376	0.090056%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
256	217-48AE	15.16	$2,727,585	$2,396,178	$331,407	0.089946%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
257	175-24R	4.85	$2,651,435	$1,873,251	$778,185	0.087435%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
258	520-1489R	17.83	$2,637,934	$2,552,368	$85,566	0.086989%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
259	448-47R	8.82	$2,612,271	$2,400,903	$211,368	0.086143%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
260	67-24R	13.61	$2,610,800	$2,443,585	$167,215	0.086095%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
261	79-685R	3.96	$2,564,752	$2,548,703	$16,049	0.084576%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
262	237-28F	1.59	$2,530,225	$2,500,530	$29,696	0.083437%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
263	353-593F	2.08	$2,519,059	$2,498,440	$20,619	0.083069%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
264	1094-35F	5.14	$2,514,283	$2,510,139	$4,144	0.082912%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
265	CB 231	8.61	$2,499,974	$2,482,127	$17,847	0.082440%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
266	73-1164	1.32	$2,448,829	$2,415,513	$33,316	0.080753%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
267	307-1538F	2.22	$2,407,233	$2,192,285	$214,948	0.079382%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
268	1458-1058F	1.47	$2,365,690	$2,023,559	$342,131	0.078012%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
269	233-86F	17.45	$2,341,674	$2,011,557	$330,118	0.077220%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
270	221-824	3.42	$2,324,221	$2,251,307	$72,915	0.076644%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
271	449-6R	5.33	$2,320,016	$2,216,710	$103,306	0.076506%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
272	236-1563R	3.71	$2,260,662	$2,229,176	$31,487	0.074548%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
273	387-11	13.79	$2,227,281	$1,988,428	$238,853	0.073447%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
274	353-594F	1.22	$2,215,650	$2,214,151	$1,498	0.073064%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
275	1215-28R	3.06	$2,215,156	$2,097,533	$117,623	0.073048%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
276	75-996R	10.91	$2,211,138	$2,194,050	$17,088	0.072915%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
277	188-11F	5.00	$2,209,344	$2,206,187	$3,157	0.072856%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
278	214-583R	6.14	$2,208,313	$2,188,307	$20,007	0.072822%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
279	220-288R	7.24	$2,198,680	$2,118,137	$80,543	0.072504%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
280	212-886R	8.91	$2,163,525	$2,135,826	$27,699	0.071345%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
281	1030-1823F	0.92	$2,150,974	$2,139,065	$11,909	0.070931%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
282	1100-1172R	2.24	$2,144,979	$2,138,024	$6,955	0.070733%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
283	448-714R	11.82	$2,119,752	$1,180,662	$939,090	0.069902%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
284	CB 237	0.85	$2,111,575	$2,101,904	$9,670	0.069632%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
285	79-660R	7.56	$2,087,039	$2,034,167	$52,871	0.068823%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
286	520-1904	7.69	$2,084,536	$2,011,217	$73,319	0.068740%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
287	230-1586R	8.61	$2,072,884	$1,887,664	$185,219	0.068356%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
288	CTL1-3R	6.87	$2,064,033	$1,628,525	$435,508	0.068064%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
289	157-257R	23.01	$2,061,188	$1,680,704	$380,484	0.067970%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
290	221-675R	7.01	$2,055,424	$2,045,346	$10,078	0.067780%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
291	520-45	9.47	$2,044,646	$1,994,999	$49,647	0.067425%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
292	217-41AE	13.78	$2,013,597	$1,796,629	$216,968	0.066401%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
293	283-71F	5.16	$2,013,590	$1,767,951	$245,639	0.066401%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
294	230-127AE	10.51	$2,000,465	$1,900,121	$100,345	0.065968%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
295	921-800F	5.88	$1,991,711	$1,525,775	$465,936	0.065679%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
296	353-900F	0.99	$1,991,358	$1,766,220	$225,138	0.065668%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
297	182-2250	1.25	$1,939,213	$1,934,190	$5,023	0.063948%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
298	75-41	2.61	$1,937,585	$1,934,834	$2,751	0.063894%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
299	220-294R	13.41	$1,925,888	$1,623,347	$302,541	0.063509%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
300	211-771R	14.12	$1,890,633	$1,721,677	$168,956	0.062346%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
301	1243-45R	4.23	$1,878,383	$1,860,483	$17,899	0.061942%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
302	157-273R	8.48	$1,867,403	$1,774,229	$93,174	0.061580%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
303	411-1873R	9.91	$1,857,539	$1,817,298	$40,241	0.061255%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
304	442-16R	10.81	$1,834,938	$1,763,136	$71,801	0.060509%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
305	211-312R	18.16	$1,809,515	$1,524,787	$284,727	0.059671%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
306	445-19R	11.20	$1,766,704	$1,496,872	$269,831	0.058259%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
307	212-1177R	12.49	$1,738,925	$1,659,398	$79,527	0.057343%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
308	185-51F	8.99	$1,723,971	$1,584,784	$139,186	0.056850%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
309	214-613R	5.49	$1,721,769	$1,475,342	$246,427	0.056778%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
310	75-32R	2.42	$1,708,385	$1,701,119	$7,266	0.056336%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
311	355-6R	1.72	$1,698,710	$1,357,932	$340,778	0.056017%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
312	CB 928	3.60	$1,655,011	$1,319,990	$335,021	0.054576%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
313	CB 1106	1.28	$1,646,984	$568,815	$1,078,169	0.054311%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
314	CB 232	6.81	$1,642,597	$1,599,467	$43,130	0.054167%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
315	176-200F	1.17	$1,635,841	$1,459,888	$175,953	0.053944%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
316	520-1525R	7.86	$1,632,803	$1,604,824	$27,979	0.053844%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
317	67-45R	10.24	$1,627,951	$1,510,503	$117,447	0.053684%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
318	79-668R	9.29	$1,606,907	$1,139,717	$467,190	0.052990%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
319	445-17R	3.43	$1,603,556	$1,422,688	$180,868	0.052879%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
320	239-2211R	2.77	$1,585,172	$1,564,094	$21,078	0.052273%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
321	212-1204R	10.01	$1,570,376	$1,491,430	$78,946	0.051785%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
322	1233-259R	4.90	$1,558,539	$1,536,152	$22,386	0.051395%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
323	920-735AE	7.53	$1,554,328	$1,072,820	$481,508	0.051256%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
324	CB JU1	2.67	$1,531,749	$1,498,742	$33,006	0.050511%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
325	449-16R	2.40	$1,495,506	$1,450,226	$45,280	0.049316%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
326	212-758R	9.68	$1,482,462	$1,442,028	$40,434	0.048886%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
327	520-10R	5.06	$1,478,745	$1,448,788	$29,957	0.048764%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
328	212-888R	6.99	$1,471,062	$1,438,972	$32,090	0.048510%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
329	908-1370R	5.85	$1,466,276	$1,346,129	$120,147	0.048352%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
330	CB 327	0.88	$1,456,709	$1,453,689	$3,020	0.048037%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
331	387-15	6.78	$1,455,053	$1,295,209	$159,844	0.047982%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
332	217-972R	9.58	$1,438,659	$1,307,400	$131,259	0.047442%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
333	CB 246	11.04	$1,438,442	$1,294,643	$143,798	0.047434%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
334	CB 1243	5.05	$1,438,363	$1,434,754	$3,609	0.047432%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
335	CB 1090	4.90	$1,414,511	$1,409,149	$5,362	0.046645%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
336	215-1544R	2.74	$1,412,430	$1,385,495	$26,935	0.046577%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
337	1021-883R	0.68	$1,386,630	$1,380,795	$5,835	0.045726%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
338	1233-589R	3.20	$1,386,491	$1,371,477	$15,013	0.045721%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
339	463-1229	11.50	$1,378,318	$1,364,772	$13,546	0.045452%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
340	247-46	6.46	$1,360,333	$1,258,488	$101,845	0.044859%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
341	222-1503R	2.60	$1,359,395	$1,293,519	$65,877	0.044828%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
342	445-897R	1.07	$1,351,775	$1,314,502	$37,273	0.044577%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
343	411-47R	14.60	$1,350,406	$1,296,039	$54,367	0.044531%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
344	358-33	0.46	$1,344,644	$1,340,076	$4,567	0.044341%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
345	CB 200	13.82	$1,342,656	$401,401	$941,254	0.044276%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
346	CB 975	0.46	$1,304,374	$1,298,020	$6,354	0.043013%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
347	91-7F	7.73	$1,295,991	$1,243,884	$52,107	0.042737%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
348	206-1105	4.27	$1,279,044	$1,276,283	$2,761	0.042178%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
349	212-734R	17.88	$1,265,960	$1,239,608	$26,352	0.041747%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
350	CB 240	6.58	$1,263,032	$1,233,691	$29,340	0.041650%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
351	357-1147R	0.96	$1,251,176	$1,239,446	$11,730	0.041259%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
352	CB 175	2.85	$1,236,507	$1,040,413	$196,095	0.040775%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
353	448-1234R	3.03	$1,211,619	$1,179,995	$31,625	0.039955%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
354	211-279R	15.38	$1,199,632	$1,073,512	$126,121	0.039559%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
355	240-1028R	5.54	$1,181,536	$1,162,446	$19,090	0.038963%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
356	1243-319R	3.32	$1,178,043	$1,170,365	$7,678	0.038847%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
357	CB 1101	3.04	$1,133,279	$1,130,105	$3,174	0.037371%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
358	CB 441	6.06	$1,133,081	$1,065,956	$67,124	0.037365%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
359	450-1854	2.14	$1,132,289	$1,078,517	$53,772	0.037339%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
360	239-2213R	5.40	$1,116,470	$1,076,921	$39,549	0.036817%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
361	CB 522	6.96	$1,074,326	$961,464	$112,862	0.035427%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
362	CB 204	14.63	$1,059,531	$856,339	$203,192	0.034939%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
363	212-799R	5.22	$1,038,800	$1,008,878	$29,922	0.034256%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
364	210-392R	10.60	$1,037,896	$889,812	$148,084	0.034226%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
365	CB FB2	5.27	$1,029,584	$971,192	$58,393	0.033952%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
366	239-2217R	4.91	$1,029,567	$713,201	$316,366	0.033951%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
367	1001-1140R	1.33	$1,005,685	$946,203	$59,482	0.033164%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
368	212-739R	9.59	$998,791	$965,055	$33,736	0.032936%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
369	198-37R	7.38	$973,100	$929,637	$43,463	0.032089%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
370	CB 248	4.48	$962,153	$957,351	$4,802	0.031728%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
371	242-1426F	3.42	$960,345	$633,435	$326,909	0.031669%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
372	CB 542	2.27	$949,478	$906,320	$43,157	0.031310%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
373	393-14R	2.64	$924,804	$173,746	$751,058	0.030497%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
374	1090-636R	8.19	$919,373	$863,579	$55,794	0.030318%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
375	CB RA3	5.07	$916,197	$636,737	$279,461	0.030213%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
376	450-88R	3.73	$894,374	$384,234	$510,141	0.029493%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
377	357-2047F	0.50	$878,930	$839,250	$39,680	0.028984%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
378	CB 790	1.35	$864,253	$541,657	$322,596	0.028500%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
379	CB 358	0.31	$861,433	$162,618	$698,816	0.028407%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
380	239-2207R	6.90	$860,323	$843,815	$16,508	0.028370%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
381	442-509R	4.97	$852,926	$724,344	$128,582	0.028126%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
382	908-30	1.54	$847,524	$818,047	$29,477	0.027948%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
383	175-94R	2.03	$836,246	$666,976	$169,269	0.027576%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
384	540-241R	1.26	$833,631	$564,790	$268,841	0.027490%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
385	CB 249	3.70	$826,921	$802,439	$24,482	0.027269%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
386	521-1819R	5.39	$811,000	$724,333	$86,667	0.026744%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
387	500-1531	0.98	$800,550	$172,930	$627,621	0.026399%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
388	1021-92	0.47	$794,363	$791,178	$3,185	0.026195%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
389	450-1853F	1.10	$792,202	$734,912	$57,290	0.026124%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
390	240-1044	2.76	$791,336	$781,085	$10,250	0.026095%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
391	230-181	2.47	$788,722	$774,443	$14,279	0.026009%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
392	1118-1718F	0.77	$788,376	$783,678	$4,698	0.025998%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
393	CB 1138	7.67	$765,496	$574,088	$191,408	0.025243%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
394	300-484F	10.46	$754,132	$696,898	$57,234	0.024868%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
395	520-1902R	10.45	$748,333	$578,741	$169,592	0.024677%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
396	307-1492R	1.54	$744,313	$688,944	$55,369	0.024545%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
397	504-2501R	5.51	$733,683	$730,076	$3,607	0.024194%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
398	1090-1734	2.13	$730,548	$725,008	$5,540	0.024091%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
399	157-207R	2.02	$719,086	$718,279	$808	0.023713%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
400	233-41R	10.11	$718,991	$701,522	$17,469	0.023710%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
401	221-35	0.65	$710,327	$706,480	$3,847	0.023424%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
402	442-729	2.77	$704,609	$680,766	$23,843	0.023235%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
403	1022-26R	0.39	$694,720	$689,285	$5,436	0.022909%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
404	CB 396	3.63	$669,815	$96,069	$573,745	0.022088%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
405	237-26F	2.46	$663,215	$470,121	$193,094	0.021870%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
406	182-2254R	0.88	$655,801	$650,139	$5,662	0.021626%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
407	CB NVS1	10.03	$638,079	$631,801	$6,277	0.021041%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
408	448-735R	8.21	$630,763	$499,073	$131,689	0.020800%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
409	991-1	1.26	$626,862	$412,906	$213,956	0.020672%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
410	452-1404F	0.81	$625,542	$624,941	$601	0.020628%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
411	449-683	1.60	$625,313	$604,656	$20,657	0.020621%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
412	67-37R	8.28	$622,304	$542,523	$79,781	0.020521%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
413	221-782R	3.29	$618,017	$609,875	$8,143	0.020380%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
414	CB 241	3.37	$614,484	$32,157	$582,327	0.020263%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
415	212-638R	4.28	$609,780	$604,091	$5,689	0.020108%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
416	358-1175F	0.48	$599,583	$582,832	$16,752	0.019772%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
417	916-381	1.39	$590,912	$419,985	$170,927	0.019486%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
418	1023-89R	4.33	$585,509	$513,363	$72,146	0.019308%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
419	441-279R	2.16	$582,163	$531,722	$50,442	0.019198%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
420	444-9R	14.72	$571,237	$403,911	$167,326	0.018837%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
421	96-47R	7.87	$553,695	$488,905	$64,791	0.018259%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
422	288-2380F	1.74	$550,610	$511,420	$39,190	0.018157%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
423	442-758F	1.10	$549,983	$544,074	$5,909	0.018136%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
424	450-50R	0.52	$537,070	$174,706	$362,364	0.017711%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
425	230-1606R	2.69	$536,384	$423,572	$112,812	0.017688%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
426	442-525	4.56	$526,126	$304,904	$221,222	0.017350%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
427	448-724R	8.77	$520,639	$396,646	$123,993	0.017169%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
428	591-1594R	3.07	$519,957	$500,848	$19,109	0.017146%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
429	214-536R	2.67	$513,329	$506,733	$6,596	0.016928%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
430	1090-639R	4.35	$509,502	$468,582	$40,920	0.016801%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
431	504-287R	7.84	$501,828	$496,494	$5,334	0.016548%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
432	210-172R	6.49	$498,150	$448,825	$49,324	0.016427%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
433	204-32R	17.63	$490,461	$472,621	$17,840	0.016174%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
434	214-17AE	6.83	$484,036	$471,453	$12,583	0.015962%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
435	CB 524	3.50	$481,331	$453,656	$27,675	0.015873%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
436	288-149R	4.86	$481,284	$453,892	$27,392	0.015871%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
437	442-764R	2.51	$474,738	$433,481	$41,256	0.015655%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
438	1139-4F	4.15	$472,177	$1,225	$470,952	0.015571%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
439	183-440	3.17	$471,201	$350,430	$120,772	0.015538%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
440	353-902F	0.58	$465,101	$292,268	$172,833	0.015337%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
441	300-483F	5.43	$458,782	$456,399	$2,383	0.015129%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
442	920-823	3.31	$458,219	$313,175	$145,044	0.015110%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
443	1242-1084	1.57	$456,193	$455,151	$1,042	0.015044%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
444	233-81F	4.08	$447,779	$425,199	$22,580	0.014766%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
445	CB 235	0.16	$443,543	$443,368	$175	0.014626%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
446	928-19	2.14	$434,883	$432,579	$2,304	0.014341%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
447	1458-1056	0.50	$427,448	$386,682	$40,766	0.014096%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
448	157-165R	4.86	$418,568	$367,109	$51,459	0.013803%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
449	CB 576	0.65	$417,702	$327,341	$90,362	0.013774%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
450	1105-1483	0.32	$417,001	$394,048	$22,953	0.013751%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
451	858-14	3.27	$411,696	$409,681	$2,016	0.013576%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
452	1242-1079R	1.63	$411,541	$410,114	$1,427	0.013571%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
453	1001-1814AE	0.44	$409,062	$405,584	$3,478	0.013489%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
454	CB 242	3.40	$406,818	$261,841	$144,977	0.013415%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
455	176-1836R	1.52	$404,482	$273,584	$130,898	0.013338%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
456	243-14R	13.05	$404,259	$119,250	$285,008	0.013331%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
457	214-4R	3.75	$400,189	$391,625	$8,565	0.013197%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
458	395-33R	0.80	$396,976	$552	$396,423	0.013091%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
459	CB 185	3.81	$396,851	$317,222	$79,628	0.013087%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
460	973-530AE	0.03	$388,006	$25,128	$362,878	0.012795%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
461	CB 980	1.87	$387,849	$386,670	$1,179	0.012790%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
462	CB 247	3.57	$379,742	$266,881	$112,861	0.012522%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
463	240-1148	3.43	$376,720	$364,957	$11,763	0.012423%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
464	239-89R	2.82	$376,425	$371,745	$4,680	0.012413%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
465	280-24AE	2.16	$365,789	$11,503	$354,285	0.012062%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
466	CB FB1	7.71	$346,587	$127,990	$218,597	0.011429%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
467	CB 91	2.78	$337,735	$315,531	$22,204	0.011137%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
468	CB 974	0.12	$334,304	$334,087	$217	0.011024%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
469	444-15R	8.35	$333,846	$322,554	$11,293	0.011009%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
470	840-308F	1.09	$330,349	$328,335	$2,014	0.010894%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
471	79-1215F	0.23	$324,126	$322,778	$1,348	0.010688%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
472	401-39R	0.65	$323,232	$10,321	$312,911	0.010659%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
473	221-38AE	0.70	$318,097	$106,237	$211,860	0.010490%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
474	210-9R	2.72	$317,772	$161,505	$156,267	0.010479%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
475	183-439	1.15	$316,478	$209,604	$106,873	0.010436%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
476	CB 280	4.07	$310,797	$50,007	$260,790	0.010249%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
477	CB 973	0.13	$310,401	$310,189	$213	0.010236%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
478	CB 523	6.31	$305,569	$113,664	$191,905	0.010077%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
479	523-31AE	4.41	$305,199	$35,698	$269,502	0.010064%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
480	350-2182R	0.41	$302,428	$300,219	$2,209	0.009973%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
481	450-1850	0.60	$296,714	$288,153	$8,561	0.009785%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
482	CB 244	5.26	$295,551	$110,842	$184,709	0.009746%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
483	454-49F	1.52	$292,974	$222,826	$70,149	0.009661%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
484	222-1992R	0.79	$288,771	$249,949	$38,821	0.009523%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
485	CB 243	3.28	$284,281	$261,821	$22,460	0.009375%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
486	311-14R	0.75	$278,652	$45,364	$233,288	0.009189%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
487	CB 596	1.47	$273,330	$272,281	$1,049	0.009013%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
488	454-53F	0.74	$272,540	$1,990	$270,550	0.008987%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
489	CB 386	7.92	$266,448	$156,901	$109,548	0.008786%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
490	212-743R	3.66	$261,428	$253,730	$7,698	0.008621%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
491	CB 331	2.89	$261,210	$259,592	$1,618	0.008614%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
492	CB 1525	6.23	$259,690	$92,171	$167,520	0.008564%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
493	520-22R	3.08	$258,296	$193,007	$65,289	0.008518%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
494	907-1602	0.10	$257,242	$253,809	$3,433	0.008483%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
495	CB 970	0.09	$251,007	$250,922	$85	0.008277%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
496	1162-363	1.63	$247,999	$242,411	$5,588	0.008178%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
497	1162-324R	3.33	$240,290	$211,906	$28,384	0.007924%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
498	221-1235F	0.05	$236,177	$0	$236,177	0.007788%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
499	840-374	1.31	$232,556	$224,795	$7,761	0.007669%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
500	795-816R	6.40	$228,765	$10,881	$217,885	0.007544%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
501	CB 597	1.06	$218,049	$217,312	$736	0.007190%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
502	CB 329	2.44	$215,285	$208,457	$6,828	0.007099%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
503	CB 230	0.63	$212,827	$212,430	$397	0.007018%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
504	315-485AE	1.64	$209,856	$208,811	$1,045	0.006920%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
505	1162-329R	3.43	$206,588	$199,607	$6,981	0.006813%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
506	501-786	1.07	$204,084	$203,332	$751	0.006730%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
507	92-619F	3.34	$202,869	$95,112	$107,757	0.006690%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
508	312-14F	0.87	$202,124	$306	$201,818	0.006665%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
509	CB 203	6.21	$195,752	$18,760	$176,992	0.006455%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
510	230-371AE	1.42	$195,725	$159,935	$35,791	0.006454%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
511	CB 911	0.94	$193,603	$193,113	$490	0.006384%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
512	971-381R	0.08	$191,895	$191,775	$121	0.006328%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
513	855-46AE	0.25	$188,553	$188,332	$221	0.006218%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
514	972-1642	0.04	$185,301	$0	$185,301	0.006111%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
515	197-1150F	1.36	$183,538	$182,319	$1,219	0.006052%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
516	452-1405	0.39	$181,217	$180,926	$292	0.005976%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
517	CB 799	1.13	$176,617	$175,677	$940	0.005824%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
518	230-1008R	0.76	$171,588	$170,503	$1,086	0.005658%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
519	210-394R	3.62	$170,593	$120,221	$50,372	0.005626%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
520	1458-456F	0.14	$167,569	$49,948	$117,621	0.005526%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
521	308-486AE	3.63	$164,678	$3,925	$160,753	0.005430%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
522	311-43	4.15	$159,858	$3,739	$156,119	0.005272%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
523	1243-38R	0.35	$158,251	$157,423	$828	0.005219%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
524	308-485AE	1.67	$157,977	$4,384	$153,594	0.005210%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
525	1215-10R	0.56	$157,888	$123,933	$33,955	0.005207%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
526	908-2062F	0.11	$153,311	$151,129	$2,182	0.005056%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
527	CB 282	1.06	$152,507	$7,242	$145,265	0.005029%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
528	386-25R	2.31	$143,657	$50,797	$92,860	0.004737%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
529	442-780	1.47	$141,385	$72,107	$69,277	0.004662%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
530	1090-70F	0.65	$140,837	$123,964	$16,873	0.004644%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
531	835-11F	1.06	$139,955	$139,435	$520	0.004615%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
532	452-1403	0.21	$137,227	$137,083	$144	0.004525%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
533	CB 196	0.59	$134,470	$4,225	$130,245	0.004434%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
534	CB 202	11.60	$133,986	$127,451	$6,535	0.004418%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
535	CB 215	0.15	$133,913	$133,772	$141	0.004416%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
536	CB 350	0.13	$133,574	$133,469	$104	0.004405%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
537	CB 981	0.87	$132,757	$132,287	$470	0.004378%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
538	CB 281	6.90	$131,323	$1,504	$129,819	0.004331%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
539	799-504R	1.34	$127,406	$126,494	$912	0.004201%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
540	595-1454F	1.36	$124,925	$104,030	$20,895	0.004120%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
541	CB 330	3.74	$124,250	$41,442	$82,808	0.004097%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
542	205-1550	2.79	$124,006	$122,174	$1,833	0.004089%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
543	230-2067	0.17	$121,607	$113,066	$8,541	0.004010%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
544	CB 444	0.43	$117,443	$114,721	$2,722	0.003873%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
545	1079-9	8.04	$117,302	$111,427	$5,876	0.003868%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
546	1001-1231F	0.09	$117,157	$116,026	$1,131	0.003863%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
547	522-36	2.28	$116,958	$26,355	$90,603	0.003857%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
548	1006-829F	0.47	$114,530	$114,256	$274	0.003777%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
549	522-34	1.80	$112,712	$48,494	$64,218	0.003717%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
550	CB 535	0.31	$111,498	$5,113	$106,386	0.003677%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
551	CB 1245	0.47	$108,100	$107,830	$270	0.003565%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
552	247-48	0.45	$105,203	$103,291	$1,912	0.003469%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
553	212-880R	1.64	$104,944	$102,617	$2,327	0.003461%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
554	CB 461	2.42	$101,871	$100,499	$1,372	0.003359%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
555	CB 463	1.50	$99,973	$99,155	$818	0.003297%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
556	308-563AE	0.99	$95,526	$18,508	$77,019	0.003150%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
557	1094-7	1.70	$95,330	$94,153	$1,177	0.003144%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
558	CB 292	0.81	$94,669	$62,928	$31,740	0.003122%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
559	1103-13AE	0.27	$94,466	$94,245	$221	0.003115%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
560	CB SSC1	5.05	$94,186	$1,887	$92,299	0.003106%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
561	196-43F	0.26	$93,765	$4,819	$88,946	0.003092%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
562	442-46R	0.06	$88,141	$1,538	$86,603	0.002907%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
563	463-1136F	0.59	$88,015	$85,684	$2,331	0.002902%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
564	CB 352	0.12	$87,874	$87,191	$683	0.002898%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
565	990-713	0.07	$85,922	$389	$85,534	0.002833%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
566	1458-519	0.06	$81,004	$80,966	$38	0.002671%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
567	445-1323	0.20	$78,544	$77,964	$580	0.002590%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
568	CB 308	2.34	$77,795	$14,284	$63,510	0.002565%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
569	CB 1162	1.59	$75,201	$72,679	$2,522	0.002480%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
570	1202-9	3.47	$73,442	$71,121	$2,321	0.002422%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
571	216-220R	0.05	$71,282	$71,210	$71	0.002351%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
572	CB 1166	0.09	$70,820	$70,676	$144	0.002335%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
573	1201-282F	1.70	$70,653	$69,709	$944	0.002330%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
574	434-301	0.76	$70,650	$70,320	$329	0.002330%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
575	CB 334	5.11	$70,516	$67,049	$3,467	0.002325%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
576	834-887AE	1.37	$70,347	$69,393	$954	0.002320%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
577	CB 540	0.94	$67,245	$66,736	$509	0.002217%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
578	CB 443	1.77	$67,147	$65,999	$1,148	0.002214%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
579	520-1936	0.14	$63,711	$63,566	$145	0.002101%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
580	197-1157F	0.45	$63,166	$824	$62,341	0.002083%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
581	909-812	0.02	$62,984	$62,909	$75	0.002077%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
582	968-476F	2.54	$62,492	$60,559	$1,933	0.002061%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
583	CB 214	0.04	$59,200	$59,129	$70	0.001952%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
584	CB 460	0.96	$58,917	$58,392	$525	0.001943%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
585	1458-1075F	0.03	$58,234	$58,197	$37	0.001920%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
586	CB 776	2.62	$55,068	$51,026	$4,042	0.001816%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
587	1100-1168F	0.18	$54,719	$54,035	$684	0.001804%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
588	CB 536	1.50	$54,110	$41,228	$12,882	0.001784%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
589	252-129	4.67	$49,485	$42,886	$6,599	0.001632%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
590	594-1379F	0.52	$49,429	$49,138	$291	0.001630%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
591	178-968AE	6.29	$47,611	$43,426	$4,184	0.001570%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
592	94-24F	7.71	$46,367	$42,509	$3,858	0.001529%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
593	311-1163F	0.66	$46,195	$39,124	$7,071	0.001523%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
594	287-1118	0.36	$43,578	$32,225	$11,353	0.001437%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
595	CB 835	0.49	$42,648	$42,402	$245	0.001406%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
596	770-259R	1.51	$42,511	$41,445	$1,066	0.001402%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
597	CB 462	2.10	$42,424	$41,018	$1,405	0.001399%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
598	288-2375R	0.27	$41,801	$41,062	$739	0.001378%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
599	CB 1299	4.47	$41,776	$39,301	$2,475	0.001378%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
600	1073-874F	1.53	$40,995	$9,653	$31,342	0.001352%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
601	CB 296	0.45	$39,570	$39,260	$310	0.001305%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
602	454-1814	0.10	$39,026	$37,945	$1,081	0.001287%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
603	728-1570F	0.07	$33,281	$33,210	$71	0.001097%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
604	CB RB1	0.03	$29,753	$29,717	$36	0.000981%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
605	CB CTL1	0.04	$27,481	$24,789	$2,691	0.000906%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
606	928-20	0.16	$27,175	$25,293	$1,882	0.000896%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
607	1073-886F	0.11	$27,078	$3,453	$23,625	0.000893%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
608	CB 217	0.03	$26,668	$26,591	$77	0.000879%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
609	445-1315	0.08	$26,249	$26,142	$107	0.000866%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
610	CB 78	0.04	$25,281	$25,169	$112	0.000834%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
611	242-1427F	0.17	$24,991	$17,762	$7,229	0.000824%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
612	452-717	0.29	$24,802	$24,564	$238	0.000818%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
613	CB 212	0.24	$22,981	$22,772	$208	0.000758%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
614	283-80F	0.03	$22,684	$11,406	$11,278	0.000748%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
615	CB 1215	0.05	$21,822	$21,747	$75	0.000720%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
616	CB 499	1.95	$19,419	$18,378	$1,041	0.000640%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
617	223-47AE	1.21	$19,415	$18,728	$688	0.000640%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
618	CB 1161	0.91	$18,247	$3,077	$15,169	0.000602%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
619	1073-872F	0.62	$17,966	$15,602	$2,364	0.000592%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
620	907-1604	0.02	$17,844	$14,869	$2,975	0.000588%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
621	75-2257F	0.05	$17,797	$17,679	$118	0.000587%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
622	223-536R	0.41	$17,369	$17,079	$289	0.000573%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
623	448-1196F	0.04	$16,696	$16,597	$99	0.000551%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
624	311-1199	0.44	$15,606	$7,707	$7,899	0.000515%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
625	CB DV1	0.03	$15,491	$15,462	$29	0.000511%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
626	315-1192F	0.40	$14,668	$14,390	$279	0.000484%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
627	835-10F	0.37	$12,414	$12,269	$145	0.000409%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
628	CB 521	0.41	$12,283	$2,063	$10,221	0.000405%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
629	CB 354	0.06	$12,069	$12,005	$65	0.000398%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
630	463-1137F	0.12	$11,798	$11,692	$105	0.000389%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
631	232-40AE	0.08	$11,430	$52	$11,378	0.000377%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
632	CB 67	0.04	$10,876	$10,800	$76	0.000359%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
633	CB 315	0.69	$10,771	$10,476	$295	0.000355%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
634	CB 239	0.04	$10,678	$10,639	$39	0.000352%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
635	CB 533	0.39	$10,605	$357	$10,249	0.000350%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
636	312-40F	0.09	$9,416	$7	$9,409	0.000311%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
637	CB 393	1.10	$8,377	$7,860	$517	0.000276%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
638	1525-23R	0.63	$8,268	$7,400	$868	0.000273%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
639	CB 449	0.05	$7,813	$7,673	$139	0.000258%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
640	CB 353	0.04	$7,590	$7,484	$106	0.000250%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
641	CB 297	0.43	$7,429	$7,042	$386	0.000245%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
642	CB 356	0.02	$6,806	$6,745	$61	0.000224%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
643	835-35F	0.07	$6,715	$6,650	$66	0.000221%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
644	197-1155F	0.22	$6,619	$6,379	$240	0.000218%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
645	1073-887F	0.05	$6,393	$2,196	$4,197	0.000211%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
646	CB 534	0.60	$6,305	$2,269	$4,036	0.000208%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
647	CB 157	0.03	$6,077	$6,043	$35	0.000200%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
648	CB 283	0.01	$6,045	$6,010	$35	0.000199%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
649	CB 75	0.15	$4,173	$4,074	$99	0.000138%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
650	266-485F	0.19	$3,903	$3,799	$104	0.000129%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
651	948-5R	0.65	$3,649	$3,290	$359	0.000120%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
652	296-68F	0.93	$3,230	$2,551	$679	0.000107%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
653	1242-127AE	0.05	$2,459	$2,425	$34	0.000081%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
654	CB 1160	0.16	$2,383	$215	$2,167	0.000079%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

Priority	Circuit Segment and/or Span ID	Length (miles)	Overall Utility	Wildfire Risk	Outage Program Risk	Percent of Overall Utility Risk	Associated Risk Drivers
655	296-66F	0.14	$2,284	$2,069	$215	0.000075%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
656	CB 210	0.05	$1,953	$1,879	$74	0.000064%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
657	CB 197	0.10	$1,920	$1,885	$35	0.000063%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
658	CB 520	0.01	$1,767	$1,729	$38	0.000058%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
659	189-750	0.38	$1,725	$1,521	$203	0.000057%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
660	401-684R	0.05	$1,596	$996	$600	0.000053%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
661	178-982	1.16	$955	$128	$827	0.000031%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
662	295-1203F	0.49	$804	$487	$318	0.000027%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
663	CB 1233	0.01	$762	$692	$69	0.000025%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
664	355-65R	0.01	$67	$31	$36	0.000002%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
665	CB 211	0.01	$37	$0	$37	0.000001%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure
666	CB 220	0.01	$34	$0	$34	0.000001%	Conductor failure, Vegetation failure, Other Equipment & Foreign Object failure, Vehicle Contact failure

4 OEIS TABLE 6 4: SUMMARY OF RISK REDUCTION FOR TOP-RISK CIRCUITS

Circuit, Segment, or Span ID	Initial Overall Utility Risk	2026 Activities	2026 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk
441-23R	$3,518.18	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$3,049.64	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$1,848.13	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,315.16
441-27R	$4,750.29	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$4,053.58	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$3,106.65	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,462.13
441-30R	$5,349.12	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$4,636.94	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$2,443.65	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,464.97
442-728R	$11,572.37	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$10,362.66	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$8,712.53	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$7,739.82
442-758F	$550.12	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$471.14	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$390.19	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$307.22
445-1311R	$9,632.59	['Oh Patrol Inspections', 'Fuel Management', 'Traditional Hardening', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Drone Inspections', 'Detailed Inspections', 'Pole Brushing']	$8,140.79	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$5,628.25	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$4,240.75
445-1325F	$7,250.79	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections',	$6,367.73	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol',	$4,527.48	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol',	$2,443.39

Circuit, Segment, or Span ID	Initial Overall Utility Risk	2026 Activities	2026 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk
		'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']		'Detailed Inspections', 'Pole Brushing']		'Detailed Inspections', 'Pole Brushing']	
445-897R	$1,352.00	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,175.89	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$803.14	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$488.30
449-16R	$1,495.54	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,295.50	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$789.03	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$589.29
449-693R	$5,260.70	['Oh Patrol Inspections', 'Fuel Management', 'Traditional Hardening', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Drone Inspections', 'Pole Brushing']	$4,394.42	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$2,764.28	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,045.70
450-1850	$296.94	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Off Cycle Patrol']	$266.43	['Drone Inspections', 'Oh Patrol Inspections', 'Veg Detail Inspections', 'Off Cycle Patrol']	$215.63	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections']	$79.44
450-1851F	$8,274.13	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$7,245.71	['Oh Patrol Inspections', 'Strategic Pole Replacement', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$6,071.08	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$2,979.40
450-1853F	$792.20	['Oh Patrol Inspections', 'Pole Brushing', 'Veg Detail Inspections', 'Off Cycle Patrol']	$731.95	['Oh Patrol Inspections', 'Strategic Pole Replacement', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$565.94	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$291.29

Circuit, Segment, or Span ID	Initial Overall Utility Risk	2026 Activities	2026 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk
450-1854	$1,132.54	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,002.58	['Oh Patrol Inspections', 'Strategic Pole Replacement', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$718.16	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$295.57
450-50R	$537.07	['Drone Inspections', 'Oh Patrol Inspections', 'Veg Detail Inspections', 'Off Cycle Patrol']	$514.09	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Off Cycle Patrol']	$505.31	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Detailed Inspections']	$475.93
452-1404F	$625.65	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Off Cycle Patrol']	$551.98	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol']	$422.30	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Strategic Pole Replacement', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections']	$76.39
452-38AE	$2,823.89	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,394.52	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,027.05	['Oh Patrol Inspections', 'Covered Conductor', 'Wood Pole Intrusive', 'Strategic Pole Replacement', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Drone Inspections', 'Detailed Inspections', 'Pole Brushing']	$0.00
454-48F	$3,441.24	['Oh Patrol Inspections', 'Pole Brushing', 'Veg Detail Inspections', 'Off Cycle Patrol']	$3,063.69	['Oh Patrol Inspections', 'Pole Brushing', 'Veg Detail Inspections', 'Off Cycle Patrol']	$2,676.73	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$844.74
470-40AE	$5,265.32	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$4,544.37	['Oh Patrol Inspections', 'Fuel Management', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$1,871.92	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,077.28

Circuit, Segment, or Span ID	Initial Overall Utility Risk	2026 Activities	2026 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk
470-47R	$16,740.60	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$13,573.41	['Oh Patrol Inspections', 'Fuel Management', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$9,038.10	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$6,735.05
471-36F	$4,253.75	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$4,035.97	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$3,724.98	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$3,513.27
500-1531	$800.69	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$776.06	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$737.35	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$670.97
520-1527R	$6,763.00	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$5,868.05	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$4,990.76	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$4,116.15
521-14R	$11,350.32	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$8,680.03	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$7,044.62	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$5,444.47
521-1856R	$8,478.01	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$6,688.74	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$5,519.30	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$4,396.88
521-18R	$8,713.08	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$7,237.07	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$4,561.75	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,769.42

Circuit, Segment, or Span ID	Initial Overall Utility Risk	2026 Activities	2026 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk
521-27R	$5,618.74	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$4,373.56	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$3,352.38	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,642.12
521-32R	$12,241.80	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$10,736.53	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$9,196.67	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$7,123.92
521-700R	$9,012.80	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$7,708.98	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$5,663.02	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$4,433.52
524-1782F	$5,468.33	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$3,602.79	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,804.77	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,988.07
524-27R	$11,317.95	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$8,067.66	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$6,725.07	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$5,355.05
524-46R	$13,711.04	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$8,899.81	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$7,109.84	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$5,095.38
524-50R	$8,802.01	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$5,890.12	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$4,692.13	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$3,453.55

Circuit, Segment, or Span ID	Initial Overall Utility Risk	2026 Activities	2026 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk
524-69R	$40,375.48	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$26,637.40	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$20,655.41	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$14,736.07
540-241R	$833.77	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Off Cycle Patrol']	$764.30	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Off Cycle Patrol']	$693.10	['Oh Patrol Inspections', 'Detailed Inspections', 'Veg Detail Inspections', 'Off Cycle Patrol']	$443.74
597-595	$18,774.53	['Oh Patrol Inspections', 'Fuel Management', 'Strategic Pole Replacement', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Drone Inspections', 'Pole Brushing']	$16,012.14	['Oh Patrol Inspections', 'Fuel Management', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$8,073.54	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$4,759.21
599-19R	$25,743.58	['Oh Patrol Inspections', 'Fuel Management', 'Strategic Pole Replacement', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Drone Inspections', 'Pole Brushing']	$21,888.45	['Oh Patrol Inspections', 'Fuel Management', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$11,243.89	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$6,840.83
73-1130R	$6,201.86	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$4,682.98	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$3,470.80	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,709.28
73-1163	$15,337.43	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$13,634.55	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$10,659.95	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$8,919.71
73-1164	$2,448.89	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,176.00	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,880.28	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,607.50

Circuit, Segment, or Span ID	Initial Overall Utility Risk	2026 Activities	2026 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk
73-23R	$5,733.89	['Oh Patrol Inspections', 'Covered Conductor', 'Fuel Management', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Drone Inspections', 'Detailed Inspections', 'Pole Brushing']	$3,652.79	['Oh Patrol Inspections', 'Pole Brushing', 'Veg Detail Inspections', 'Off Cycle Patrol']	$2,976.73	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,235.82
73-678R	$10,591.59	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$9,308.90	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$7,963.73	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$6,468.26
73-683R	$9,288.03	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$8,215.64	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$7,100.61	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$5,915.87
75-2259F	$3,135.65	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$2,048.68	['Oh Patrol Inspections', 'Fuel Management', 'Strategic Pole Replacement', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Drone Inspections', 'Pole Brushing']	$1,602.77	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,200.43
75-32R	$1,708.51	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$1,087.84	['Oh Patrol Inspections', 'Strategic Pole Replacement', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$829.97	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$551.03
75-41	$1,937.82	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$1,228.19	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$965.62	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$692.93
78-26R	$14,526.85	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$12,955.91	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$11,155.57	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$9,382.34

Circuit, Segment, or Span ID	Initial Overall Utility Risk	2026 Activities	2026 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk
78-35R	$5,696.51	['Drone Inspections', 'Oh Patrol Inspections', 'Pole Brushing']	$4,995.98	['Drone Inspections', 'Oh Patrol Inspections', 'Pole Brushing']	$4,277.93	['Drone Inspections', 'Oh Patrol Inspections', 'Pole Brushing', 'Detailed Inspections']	$2,069.97
78-782R	$7,202.34	['Oh Patrol Inspections', 'Pole Brushing', 'Veg Detail Inspections', 'Off Cycle Patrol']	$6,269.58	['Oh Patrol Inspections', 'Pole Brushing', 'Veg Detail Inspections', 'Off Cycle Patrol']	$5,313.49	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$4,327.57
788-34R	$9,132.53	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$8,554.22	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$7,638.54	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$6,527.25
79-658R	$12,321.13	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$10,770.05	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$7,038.47	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$4,945.90
79-676R	$9,714.17	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$8,788.07	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$6,886.65	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$5,895.72
79-679R	$18,448.80	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$16,558.71	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$14,193.55	['Oh Patrol Inspections', 'Fuel Management', 'Pole Brushing', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Drone Inspections', 'Strategic Undergrounding']	$0.00
79-685R	$2,564.94	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,246.87	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,899.84	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,554.89

Circuit, Segment, or Span ID	Initial Overall Utility Risk	2026 Activities	2026 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk
79-714R	$5,536.65	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$5,032.09	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$3,540.06	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$3,009.95
79-785	$18,781.02	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$17,096.22	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$12,248.53	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$10,449.93
79-808R	$19,978.48	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$17,544.91	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$12,806.21	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$9,543.25
791-419F	$3,349.92	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$3,120.19	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$2,695.94	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,454.57
855-46AE	$188.42	['Oh Patrol Inspections', 'Pole Brushing', 'Off Cycle Patrol']	$165.26	['Oh Patrol Inspections', 'Pole Brushing', 'Wood Pole Intrusive', 'Off Cycle Patrol']	$127.38	['Oh Patrol Inspections', 'Pole Brushing', 'Detailed Inspections', 'Off Cycle Patrol']	$44.22
859-42R	$8,607.14	['Oh Patrol Inspections', 'Fuel Management', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$7,538.70	['Oh Patrol Inspections', 'Fuel Management', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$6,652.54	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$6,004.63
907-1562AE	$8,439.94	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$7,376.87	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$6,191.91	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$4,521.01

Circuit, Segment, or Span ID	Initial Overall Utility Risk	2026 Activities	2026 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk
907-1702R	$9,100.56	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$7,533.91	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$6,269.87	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$4,401.70
907-1716R	$27,066.67	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$22,294.76	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$18,703.07	['Oh Patrol Inspections', 'Fuel Management', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$13,560.46
907-2820R	$6,348.64	['Oh Patrol Inspections', 'Pole Brushing', 'Veg Detail Inspections', 'Off Cycle Patrol']	$5,581.75	['Oh Patrol Inspections', 'Pole Brushing', 'Veg Detail Inspections', 'Off Cycle Patrol']	$4,795.71	['Oh Patrol Inspections', 'Fuel Management', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$3,632.73
908-1172R	$15,766.77	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$13,451.44	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$11,265.30	['Oh Patrol Inspections', 'Fuel Management', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$8,192.50
908-1236	$11,763.93	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$7,892.73	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$6,292.75	['Oh Patrol Inspections', 'Fuel Management', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,514.59
908-1372R	$7,960.29	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$5,247.00	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$3,997.86	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Pole Brushing', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Strategic Undergrounding']	$0.00

Circuit, Segment, or Span ID	Initial Overall Utility Risk	2026 Activities	2026 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk
908-2038R	$41,258.58	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$28,069.89	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$22,349.51	['Oh Patrol Inspections', 'Fuel Management', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$15,288.28
908-2040	$3,646.81	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$3,200.81	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,761.83	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,107.24
908-2055F	$22,564.08	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$16,780.19	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$13,948.01	['Oh Patrol Inspections', 'Fuel Management', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$9,338.66
908-30	$847.71	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$739.37	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$593.91	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$445.50
909-451	$55,252.70	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$36,496.06	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$28,693.49	['Oh Patrol Inspections', 'Fuel Management', 'Wood Pole Intrusive', 'Pole Brushing', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Drone Inspections', 'Strategic Undergrounding']	$0.00
909-453R	$5,703.38	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections']	$5,196.30	['Drone Inspections', 'Oh Patrol Inspections', 'Veg Detail Inspections', 'Off Cycle Patrol']	$4,760.59	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol']	$4,203.07
909-805R	$32,313.24	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$25,076.95	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$20,572.84	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone	$12,762.41

Circuit, Segment, or Span ID	Initial Overall Utility Risk	2026 Activities	2026 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk
						Inspections', 'Off Cycle Patrol', 'Pole Brushing']	
920-1342R	$3,406.84	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,916.70	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$1,577.05	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Off Cycle Patrol', 'EFD', 'Detailed Inspections', 'Pole Brushing']	$349.94
970-1341R	$12,961.79	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$11,351.38	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$9,914.61	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$8,153.54
971-1973R	$15,149.17	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$10,970.99	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$9,235.32	['Oh Patrol Inspections', 'Fuel Management', 'Strategic Pole Replacement', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Drone Inspections', 'Pole Brushing']	$7,044.05
971-2050R	$28,484.87	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$21,002.83	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$17,548.40	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$13,716.05
971-29R	$8,015.56	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$5,118.73	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$4,126.24	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,823.99
971-371R	$4,351.57	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$2,681.69	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,130.23	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,560.76
971-383R	$14,770.64	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections',	$9,766.27	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail	$7,691.65	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone	$5,636.75

Circuit, Segment, or Span ID	Initial Overall Utility Risk	2026 Activities	2026 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk
		'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']		Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']		Inspections', 'Off Cycle Patrol', 'Pole Brushing']	
971-388R	$11,268.07	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$9,924.17	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$8,546.70	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$7,006.11
972-1582R	$8,019.36	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$4,934.72	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$3,943.08	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,917.18
972-1590F	$23,409.15	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$15,945.96	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$13,108.89	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$10,283.46
972-32R	$22,914.33	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$15,150.70	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$12,293.99	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$9,190.46
972-942R	$9,149.72	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$5,894.59	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$4,824.13	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$3,578.71
973-1226R	$5,177.87	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$4,136.64	['Oh Patrol Inspections', 'Covered Conductor', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$549.29	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$0.00
973-1245R	$8,620.42	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$7,393.69	['Oh Patrol Inspections', 'Covered Conductor', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$3,303.58	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,696.83

Circuit, Segment, or Span ID	Initial Overall Utility Risk	2026 Activities	2026 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk
973-626R	$6,521.83	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$5,521.31	['Oh Patrol Inspections', 'Covered Conductor', 'Fuel Management', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$817.06	['Oh Patrol Inspections', 'Pole Brushing', 'Veg Detail Inspections', 'Off Cycle Patrol']	$0.00
974-715R	$7,107.34	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$6,176.70	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$5,043.28	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$4,082.02
975-22R	$6,417.07	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$5,927.63	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$5,425.96	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$4,911.76
991-1	$627.14	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$567.90	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$439.54	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$377.27
991-1206R	$4,576.88	['Oh Patrol Inspections', 'Pole Brushing', 'Veg Detail Inspections', 'Off Cycle Patrol']	$3,985.49	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$2,068.38	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$812.23
CB 1023	$3,332.74	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$2,913.95	['Oh Patrol Inspections', 'Pole Brushing', 'Veg Detail Inspections', 'Off Cycle Patrol']	$2,562.67	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,057.96
CB 1106	$1,647.10	['Oh Patrol Inspections', 'Pole Brushing', 'Veg Detail Inspections', 'Off Cycle Patrol']	$1,571.31	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,424.39	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$1,329.94

Circuit, Segment, or Span ID	Initial Overall Utility Risk	2026 Activities	2026 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk
CB 1250	$4,075.51	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Off Cycle Patrol', 'EFD', 'Pole Brushing']	$2,878.00	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,321.76	['Oh Patrol Inspections', 'Pole Brushing', 'Veg Detail Inspections', 'Off Cycle Patrol']	$1,765.31
CB 236	$12,711.43	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$9,890.47	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$8,674.60	['Oh Patrol Inspections', 'Fuel Management', 'Pole Brushing', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Drone Inspections', 'Strategic Undergrounding']	$0.00
CB 237	$2,111.59	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$1,836.25	['Oh Patrol Inspections', 'Pole Brushing', 'Veg Detail Inspections', 'Off Cycle Patrol']	$1,694.60	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,533.38
CB 327	$1,456.80	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,254.97	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Off Cycle Patrol', 'EFD', 'Pole Brushing']	$687.10	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$57.37
CB 351	$14,599.87	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$10,699.93	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$9,034.24	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Pole Brushing', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Strategic Undergrounding']	$0.00
CB 355	$11,288.55	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$8,463.02	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$6,805.01	['Oh Patrol Inspections', 'Fuel Management', 'Pole Brushing', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Drone Inspections', 'Strategic Undergrounding']	$0.00
CB 357	$6,111.06	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$4,588.72	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$3,569.01	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,819.04

Circuit, Segment, or Span ID	Initial Overall Utility Risk	2026 Activities	2026 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk
CB 358	$861.54	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$837.96	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$823.23	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$805.72
CB 470	$6,922.05	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$6,561.26	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$5,913.68	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$5,577.96
CB 576	$417.81	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$379.65	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$331.32	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$295.43
CB 907	$2,742.34	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$2,360.27	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,021.33	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,354.23
CB 971	$11,456.92	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$7,909.92	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$6,661.68	['Oh Patrol Inspections', 'Fuel Management', 'Pole Brushing', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Drone Inspections', 'Strategic Undergrounding']	$0.00
CB 975	$1,304.48	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$1,097.67	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$921.62	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$741.17
CB JU1	$1,531.89	['Oh Patrol Inspections', 'Traditional Hardening', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,211.67	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,026.30	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$830.45
CB MOR1	$5,119.84	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections',	$3,441.79	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail	$2,782.06	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail	$1,997.14

Circuit, Segment, or Span ID	Initial Overall Utility Risk	2026 Activities	2026 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk
		'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']		Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']		Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	
CB OK1	$6,915.89	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$5,871.82	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$5,039.23	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$4,178.63
CB RA1	$10,517.15	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$9,104.67	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$8,017.74	['Oh Patrol Inspections', 'Fuel Management', 'Pole Brushing', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Drone Inspections', 'Strategic Undergrounding']	$0.00
CB RA2	$5,230.12	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$3,875.17	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$3,387.27	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,849.67
CB RC1	$3,739.88	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$3,283.87	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$2,686.32	['Oh Patrol Inspections', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$1,389.10
CB SL1	$3,361.78	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,913.20	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,427.03	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,958.80
DV1-3R	$3,719.50	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$2,457.65	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,020.78	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$1,470.35

Circuit, Segment, or Span ID	Initial Overall Utility Risk	2026 Activities	2026 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk
RA1-402R	$9,339.40	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$8,425.89	['Oh Patrol Inspections', 'Pole Brushing', 'Veg Detail Inspections', 'Off Cycle Patrol']	$7,542.36	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$6,514.67
RB1-427R	$6,920.13	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$6,004.72	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Drone Inspections', 'EFD', 'Pole Brushing']	$4,013.54	['Oh Patrol Inspections', 'Fuel Management', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Detailed Inspections', 'Pole Brushing']	$2,849.90
RB1-433R	$5,946.73	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$5,177.77	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$4,391.85	['Oh Patrol Inspections', 'Fuel Management', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$3,207.56
TM1-10R	$3,782.94	['Oh Patrol Inspections', 'Fuel Management', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$3,318.52	['Oh Patrol Inspections', 'Veg Detail Inspections', 'Drone Inspections', 'Off Cycle Patrol', 'Pole Brushing']	$2,855.58	['Oh Patrol Inspections', 'Covered Conductor', 'Fuel Management', 'Wood Pole Intrusive', 'Veg Detail Inspections', 'Off Cycle Patrol', 'Drone Inspections', 'Pole Brushing']	$126.14

5 SDGE TABLE 8-3: TIMEFRAME FOR REMEDIATION OF DISTRIBUTION FINDINGS

Condition	Severity	Priority Level	Timeframe for Remediation*
Damaged/Missing Pole Hardware	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Damaged/Missing Pole Hardware	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
SDG&E Leaning Pole or Potential Overload	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
SDG&E Leaning Pole or Potential Overload	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Private Property Caused Pole Inaccessible	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Private Property Caused Pole Inaccessible	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
SDG&E/Vegetation Caused Pole Inaccessible or Cannot Locate	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
SDG&E/Vegetation Caused Pole Inaccessible or Cannot Locate	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Open/Damaged Ground	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Open/Damaged Ground	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Damaged Arrestor/Insulator/Dead-end	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical

Condition	Severity	Priority Level	Timeframe for Remediation*
Damaged Arrestor/Insulator/Dead-end	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Oil Leak	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Oil Leak	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Damaged Crossarm	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Damaged Crossarm	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Damaged Switch	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Damaged Switch	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Damaged Switch Gang Operator Mechanism	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Damaged Switch Gang Operator Mechanism	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Corrosion - OH Transformer	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Corrosion - OH Transformer	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
SDG&E Pole/ Stub Pole Damaged or Broken	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
SDG&E Pole/ Stub Pole Damaged or Broken	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
SDG&E Insufficient Clearance	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical

Condition	Severity	Priority Level	Timeframe for Remediation*
SDG&E Insufficient Clearance	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Avian Protection Damaged	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Avian Protection Damaged	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Private Property Hazardous Condition	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Private Property Hazardous Condition	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Foreign Objects	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Foreign Objects	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Damaged Capacitor	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Damaged Capacitor	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Slack Conductors	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Slack Conductors	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Damaged Conductors	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Damaged Conductors	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Guy Grounded	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical

Condition	Severity	Priority Level	Timeframe for Remediation*
Guy Grounded	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Slack Anchor Guy	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Slack Anchor Guy	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Damaged / Missing Guying	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Damaged / Missing Guying	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Slack Span Guy	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Slack Span Guy	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Infraction - No Applicable Code	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Infraction - No Applicable Code	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Trees/Veg in Proximity to Primary	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Trees/Veg in Proximity to Primary	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Trees/Veg. Contacting Open Wire	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Trees/Veg. Contacting Open Wire	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Veg in Secondary (SSC/Aerial Cable) - Trim	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical

Condition	Severity	Priority Level	Timeframe for Remediation*
Veg in Secondary (SSC/Aerial Cable) - Trim	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Veg in Secondary (SSC/Aerial Cable) - Guard	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Veg in Secondary (SSC/Aerial Cable) - Guard	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Veg in Secondary (SSC/Aerial Cable) - Reroute	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Veg in Secondary (SSC/Aerial Cable) - Reroute	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Veg in Service - Guard	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Veg in Service - Guard	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Veg in Service - Slack	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Veg in Service - Slack	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Veg in Service - Reroute	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Veg in Service - Reroute	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Veg in Service - Trim	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Veg in Service - Trim	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD

Condition	Severity	Priority Level	Timeframe for Remediation*
Veg in Guy - Heavy Strain or Abrasion	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Veg in Guy - Heavy Strain or Abrasion	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Pole replacement from POIN	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Pole replacement from POIN	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Restoration Recommended, Special Reject	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Restoration Recommended, Special Reject	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Restoration Rejected Replace, Special Reject	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Restoration Rejected Replace, Special Reject	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Restoration Rejected, Replace	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Restoration Rejected, Replace	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Restoration Recommended, Steel Rein	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Restoration Recommended, Steel Rein	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2 or Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD

*Timeframe is determined by GO 95, Rule 18

6 SDGE TABLE 8-4: TIMEFRAME FOR REMEDIATION OF TRANSMISSION FINDINGS

Condition	Severity	Priority Level	Timeframe for Remediation*
Balloon-Mylar	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Balloon-Mylar	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Assessment Required	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Assessment Required	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Cracked	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Cracked	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Woodpecker Hole(s)	Critical issues that present an imminent hazard to public safety, including fire risk, that require immediate action to either correct or make safe	Level 1	7 days, or as soon as practical
Woodpecker Hole(s)	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
3 Guys-1Rod	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Assessment Required	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Backed Out-Off	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Bent	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD

Condition	Severity	Priority Level	Timeframe for Remediation*
Bird Droppings	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Bird Nest	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Birdcaged	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Blackening	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Blown	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Broken	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Chipped	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Clearance-Insufficient	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Corona Damage	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Covered With	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Cracked	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Damaged	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD

Condition	Severity	Priority Level	Timeframe for Remediation*
Deterioration	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Disconnected	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Drainage	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Evidence Of Tracking	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Exposed	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Faded	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Fire Damage	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Flashed	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Foreign Object (Bird's Nest)	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Foreign Object (Specify)	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Greasing Needed	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Ground Line Insp Required	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD

Condition	Severity	Priority Level	Timeframe for Remediation*
Grounding Assessment Required	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Grounding Required	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Gunshot	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Heat Damage	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Improper Sag	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Installation Assessment Required	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Installation Required	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Installation-Improper	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Installation-Non Standard	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Isolating Insulators-Remove	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Kite	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Leaning-Tilted	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD

Condition	Severity	Priority Level	Timeframe for Remediation*
Loaded Improperly	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Loose	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Maintenance Required	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Mis-Aligned-Pulled	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Missing	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Moved-Slid	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Not Fully Closed	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Not Seated	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Not Sheared	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Open	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Out Of Adjustment	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Out Of Lay	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD

Condition	Severity	Priority Level	Timeframe for Remediation*
Painting Assessment Required	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Painting Required	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Reinforcing Assessment Required	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Reinforcing Required	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Removal Assessment Required	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Removal Required	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Replacement Assessment Required	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Replacement Needed	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Rotten	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Rust (Heavy)	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Rust (Medium)	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Split	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD

Condition	Severity	Priority Level	Timeframe for Remediation*
Submerged	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Tagging Required	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Twisted	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Unreadable	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Unwrapping	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Vibration	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Vines	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Washed Out	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Washing Needed	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Wire Contact	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Woodpecker Hole(S)	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Worn	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD

Condition	Severity	Priority Level	Timeframe for Remediation*
Wrong Size	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 2	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Danger Sign Components - Sign Warning (With Man)	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Signs-Danger	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Signs-High Voltage-At Top	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD
Aerial Number Bracket	Infraction issues that pose a moderate or low potential hazard to public safety, employee safety, or fire risk; issues that present a nonconformance with GO 95 requirements or specifications	Level 3	6 months in Tier 3 12 months in Tier 2 36-60 months in non-HFTD

*Timeframe is determined by GO 95, Rule 18

7 OEIS TABLE 11-3: HIGH-LEVEL COMMUNICATION PROTOCOLS, PROCEDURES, AND SYSTEMS WITH PUBLIC SAFETY PARTNERS

Public Safety Partner Group	Name of Entity	Key Protocols	Frequency of Prearranged Communication Review and Update
Emergency Response	2-1-1 Orange County	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	2-1-1 San Diego	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Alvarado Hospital	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	American Red Cross of Orange County	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly

Public Safety Partner Group	Name of Entity	Key Protocols	Frequency of Prearranged Communication Review and Update
Emergency Response	American Red Cross San Diego Region	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Communication Service Providers	AT&T	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Barona Band of Mission Indians	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
CAL FIRE	Cal Fire	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
CalOES	Cal OES	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
CalOES	Cal OES Office of Tribal Affairs	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	California Highway Patrol	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Caltrans	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Campo Band of Kumeyaay Indians	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Carlsbad Fire Department	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Carlsbad Water	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Communication Service Providers	Charter	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of Aliso Viejo	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of Carlsbad	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of Chula Vista	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of Coronado	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly

Public Safety Partner Group	Name of Entity	Key Protocols	Frequency of Prearranged Communication Review and Update
Emergency Response	City of Dana Point	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of Del Mar	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of El Cajon	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of Encinitas	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of Escondido	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of Imperial Beach	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of La Mesa	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of Laguna Beach	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of Laguna Hills	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of Laguna Niguel	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of Lemon Grove	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of Mission Viejo	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of National City	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of Oceanside	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of Poway	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of Rancho Santa Margarita	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly

Public Safety Partner Group	Name of Entity	Key Protocols	Frequency of Prearranged Communication Review and Update
Emergency Response	City of San Clemente	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of San Diego	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of San Diego Office of Emergency Services	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of San Diego Water Department	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of San Juan Capistrano	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of San Marcos	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of Santee	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of Solana Beach	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	City of Vista	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Community Choice Aggregators	Clean Energy Alliance	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Coronado Fire Department	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Coronado Police Department	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	County of Orange	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	County of San Diego	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	County of San Diego Office of Emergency Services	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Communication Service Providers	Cox Communications	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly

Public Safety Partner Group	Name of Entity	Key Protocols	Frequency of Prearranged Communication Review and Update
The Commission	CPUC	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
CalOES	CUEA	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Deer Springs Fire Protection District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Descanso Community Water District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	El Cajon Police Department	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Waste Water Service Providers	Encina Waste Water Authority	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Encinitas Fire Department	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Engineering and Capital Projects Department	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Escondido Fire Department	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Escondido Police and Fire Communications	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Ewiiaapaayp Band of Kumeyaay Indians	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	FACT (Facilitating Access to Coordinated Transportation)	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Affected Publicly Owned Utilities	Fallbrook Public Utility District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Family Health Centers San Diego	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Harrison Park Mutual Water	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Heartland Communications	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly

Public Safety Partner Group	Name of Entity	Key Protocols	Frequency of Prearranged Communication Review and Update
Emergency Response	Heartland Fire	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Helix Water District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Iipay Nation of Santa Ysabel	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Imperial Beach Fire Department	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Inaja-Cosmit Band of Indians	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Indian Health Council	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Jacumba Community Service District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Jamul Indian Village A Kumeyaay Nation	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Julian Community Service District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Kaiser Permanente	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	La Jolla Band of Luiseno Indians	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	La Posta Band of Mission Indians	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Laguna Niguel Police Services	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Lakeside Fire Protection District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Lakeside Water District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Waste Water Service Providers	Leucadia Wastewater Water District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly

Public Safety Partner Group	Name of Entity	Key Protocols	Frequency of Prearranged Communication Review and Update
Emergency Response	Los Coyotes Band of Indians	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Los Tules Mutual Water Company	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Manzanita Band of the Kumeyaay Nation	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Mesa Grande Band of Mission Indians	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Metropolitan Water District of Southern California	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Mission Hospital Laguna Beach	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Mission Hospital Mission Viejo	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Monte Vista Fire Dispatch Center	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Moulton Niguel Water District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Municipal Water District of Orange County	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Naval Base Coronado	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Navy Region Southwest	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	North County Dispatch Center	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	North County Fire Protection District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Oceanside Fire Department	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Oceanside Police Department	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly

Public Safety Partner Group	Name of Entity	Key Protocols	Frequency of Prearranged Communication Review and Update
Emergency Response	Office of Representative Darrell Issa	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Office of Representative Juan Vargas	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Office of Representative Mike Levin	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Office of Representative Sara Jacobs	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Office of Representative Scott Peters	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Office of Senator Catherine Blakespear	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Olivenhain Municipal Water District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Orange County Board of Supervisors	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Orange County Fire Authority	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Orange County OES	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Orange County Sheriff's Department	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Orange County United Way, 2-1-1 Orange County	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Otay Water District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Padre Dam Municipal Water District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Pala Band of Mission Indians	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Palomar Health	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly

Public Safety Partner Group	Name of Entity	Key Protocols	Frequency of Prearranged Communication Review and Update
Emergency Response	Palomar Health San Marcos Medical Office	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Palomar Medical Center Escondido	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Palomar Medical Center Poway	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Palomar Mountain Water District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Paradise Valley Hospital	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Pauma Band of Luiseno Indians	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Pechanga Band of Indians	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Pine Valley Mutual Water Company	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Port of San Diego	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Port of San Diego Harbor Police Department	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Rady Children's Hospital	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Rady Children's Hospital San Diego	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Rainbow Municipal Water District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Ramona Municipal Water District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Rancho Pauma Mutual Water Company	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Rancho Santa Fe Assn.	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly

Public Safety Partner Group	Name of Entity	Key Protocols	Frequency of Prearranged Communication Review and Update
Water Service Providers	Rancho Santa Teresa Water	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Rincon Band of Luiseno Indians	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Rincon Del Diablo Municipal Water District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Saddleback College	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Community Choice Aggregators	San Diego Community Power	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	San Diego County Regional Airport Authority	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	San Diego County Sheriff's Department	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	San Diego County Water Authority	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	San Diego Fire Rescue	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	San Diego Law Enforcement Coordination Center	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	San Diego Police Department	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	San Diego Zoo Wildlife Alliance - Safari Park	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Affected Publicly Owned Utilities	San Elijo Joint Powers Authority	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	San Marcos Fire Department	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	San Pasqual Band of Mission Indians	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Santa Fe Irrigation District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly

Public Safety Partner Group	Name of Entity	Key Protocols	Frequency of Prearranged Communication Review and Update
Water Service Providers	Santa Margarita Water District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Scripps Health	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	SDG&E	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Sharp Healthcare	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	South Coast Water District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	South Orange County Water Authority	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Southern Indian Health Council	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	State of California	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	State of California Department of Water Resources	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Sweetwater Water Authority	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Sycuan Band of the Kumeyaay Nation	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Communication Service Providers	T-Mobile/Sprint	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Tri-City Medical Center	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	VA Medical Ctr	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Vallecitos Water District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Valley Center Municipal Water District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly

Public Safety Partner Group	Name of Entity	Key Protocols	Frequency of Prearranged Communication Review and Update
Communication Service Providers	Verizon Wireless	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Viejas Band of Kumeyaay Indians	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Emergency Response	Vista Fire Department	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Vista Irrigation District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	West Cuca Mutual Water Company	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly
Water Service Providers	Yuima Municipal Water District	Partner Portal; Email; Voice; Meetings, Trainings, Exercises (hosted by SDG&E and by partner); GIS data services	Quarterly

8 OEIS TABLE 11-5: COLLABORATION IN LOCAL WILDFIRE MITIGATION PLANNING

Name of County, City, or Tribal Agency or Civil Society Organization (e.g., nongovernmental organization, fire safe council)	Program, Plan, or Document	Last Version of Collaboration	Level of Collaboration
2-1-1 San Diego	CEADPP	2024 version (April 2024)	Wildfire/PSPS protocols feedback and review
2-1-1 Orange County	CEADPP	2024 version (April 2024)	Wildfire/PSPS protocols feedback and review
CAL FIRE	CEADPP	2024 version (April 2024)	Wildfire/PSPS protocols feedback and review
County OES	CEADPP	2024 version (April 2024)	Wildfire/PSPS protocols feedback and review
Cal OES	CEADPP	2024 version (April 2024)	Wildfire/PSPS protocols feedback and review
San Diego County	CEADPP	2024 version (April 2024)	Wildfire/PSPS protocols feedback and review
American Red Cross	CEADPP	2024 version (April 2024)	Wildfire/PSPS protocols feedback and review
211 San Diego	Wildfire Preparedness	2024 version (June 2024)	Wildfire Preparedness and Resiliency Workshop

Name of County, City, or Tribal Agency or Civil Society Organization (e.g., nongovernmental organization, fire safe council)	Program, Plan, or Document	Last Version of Collaboration	Level of Collaboration
Cal OES Office of Tribal Coordination	Wildfire Preparedness	2024 version (June 2024)	Wildfire Preparedness and Resiliency Workshop
CAL FIRE	Wildfire Preparedness	2024 version (June 2024)	Wildfire Preparedness and Resiliency Workshop
California Governor's Office of Emergency Services	Wildfire Preparedness	2024 version (June 2024)	Wildfire Preparedness and Resiliency Workshop
California Public Utilities Commission	Wildfire Preparedness	2024 version (June 2024)	Wildfire Preparedness and Resiliency Workshop
City of San Diego	Wildfire Preparedness	2024 version (June 2024)	Wildfire Preparedness and Resiliency Workshop
County of San Diego OES	Wildfire Preparedness	2024 version (June 2024)	Wildfire Preparedness and Resiliency Workshop
County of San Diego	Wildfire Preparedness	2024 version (June 2024)	Wildfire Preparedness and Resiliency Workshop
CPUC	Wildfire Preparedness	2024 version (June 2024)	Wildfire Preparedness and Resiliency Workshop
Metropolitan Water District of Southern California	Wildfire Preparedness	2024 version (June 2024)	Wildfire Preparedness and Resiliency Workshop
Port of San Diego Harbor Police	Wildfire Preparedness	2024 version (June 2024)	Wildfire Preparedness and Resiliency Workshop
Rainbow Municipal Water District	Wildfire Preparedness	2024 version (June 2024)	Wildfire Preparedness and Resiliency Workshop
San Diego Community Power	Wildfire Preparedness	2024 version (June 2024)	Wildfire Preparedness and Resiliency Workshop
San Diego County Fire Prot. District	Wildfire Preparedness	2024 version (June 2024)	Wildfire Preparedness and Resiliency Workshop
San Diego County OES	Wildfire Preparedness	2024 version (June 2024)	Wildfire Preparedness and Resiliency Workshop
San Diego Sheriff's Department	Wildfire Preparedness	2024 version (June 2024)	Wildfire Preparedness and Resiliency Workshop
All local government, tribal, and public safety partners invited	Wildfire Preparedness and Resiliency	6/24/2024	PSPS Preparedness & Wildfire Safety Workshop
Representatives from local government, tribal, and public safety partners	Wildfire Preparedness	As scheduled	EOC Tours

Appendix G: Cost Benefit and Risk Reduction Supporting Data

APPENDIX G: COST BENEFIT AND RISK REDUCTION SUPPORTING DATA

2026-2028 Base WMP

Explanations of the calculations, a list of assumptions, and justifications for each assumption for wildfire and outage program risk reductions can be found here:

https://www.sdge.com/2026-wildfire-mitigation-plan

Appendix H: 2025 Plan to Support Populations with Access and Functional Needs During Public Safety Power Shutoffs

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Examine Electric Utility De Energization of Power Lines in Dangerous Conditions.	R.18-12-005 (Filed December 13, 2018)

SAN DIEGO GAS & ELECTRIC COMPANY (U 902E)
2025 PLAN TO SUPPORT ACCESS AND FUNCTIONAL NEEDS POPULATIONS DURING PUBLIC SAFETY POWER SHUTOFFS

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January 31, 2025

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Examine Electric Utility De Energization of Power Lines in Dangerous Conditions.	R.18-12-005 (Filed December 13, 2018)

SAN DIEGO GAS & ELECTRIC COMPANY (U 902E)
2025 PLAN TO SUPPORT ACCESS AND FUNCTIONAL NEEDS POPULATIONS DURING PUBLIC SAFETY POWER SHUTOFFS

Pursuant to Conclusion of Law 36 and Ordering Paragraph 1 of the California Public Utilities Commission's (Commission) Phase 2 De-Energization Decision (D.) 20-05-051 and Phase 3 De-Energization D. 21-06-034, San Diego Gas & Electric Company (SDG&E) submits its 2025 Access and Functional Needs (AFN) Plan which describes its efforts to address the AFN and vulnerable population during Public Safety Power Shutoffs (PSPS). SDG&E's 2025 AFN Plan is attached hereto as Attachment A.

Respectfully submitted,

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January 31, 2025

Attachment A

San Diego Gas & Electric Company's 2025
Plan to Support Populations with Access and Functional Needs During Public Safety Power Shutoffs

January 31, 2025

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APPENDIX A - F

EXECUTIVE SUMMARY

During extreme weather conditions, utilities may temporarily turn off power to specific areas to protect the safety of our customers and communities, enacting a Public Safety Power Shutoff (PSPS). This continues to be a necessary tool of last resort to prevent our electric system from becoming a source of wildfire ignition. To support individuals with Access and Functional Needs (AFN) during PSPS, each of the Joint Investor-Owned Utilities (IOUs)[1] developed its respective 2025 Annual AFN PSPS Plan ("AFN Plan" or "Plan") with assistance from regional and statewide AFN stakeholders, representing a broad spectrum of expertise. The Plan leverages the Six-Step Planning Process in the Federal Emergency Management Administration's (FEMA) Developing and Maintaining Emergency Operations Plans Comprehensive Preparedness Guide 101.[2]

The Joint IOUs are committed to addressing the needs of individuals with AFN before, during, and after a PSPS and have established a partnership with the AFN Collaborative Council and the AFN Core Planning Team[3] to seek guidance and address the "Why," "Who," "What," and "How" to better mitigate risk and support individuals with AFN.

The Joint IOUs acknowledge and sincerely thank to the AFN Collaborative Council and AFN Core Planning Team for their guidance and commitment in developing the 2025 AFN Plan.

WHY

As climate conditions change, the threat of wildfires in California continues to grow.
One critical tool used to prevent wildfires is the use of PSPS, in which an IOU may temporarily shut off power to a neighborhood during dangerous weather conditions to prevent the electric system from becoming a source of ignition. PSPS is a measure of last resort for keeping customers and communities safe. A PSPS, although necessary, disrupts the everyday lives of impacted individuals, including those with AFN and/or those who may be electricity dependent, which will be discussed further in this Plan. The purpose of this Plan is to mitigate the impact of PSPS on individuals with AFN.

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1 San Diego Gas & Electric (SDG&E), Southern California Edison (SCE), and Pacific Gas & Electric Company (PG&E)

2 For details on how to develop and maintain Emergency Operations Plans, visit: Developing and Maintaining Emergency Operations Plans Comprehensive Preparedness Guide (fema.gov)

3 See section 2.6.1.1 for details about the AFN Collaborative Council and AFN Core Planning Team. Additionally, see Appendix A for members of the AFN Core Planning Team and Collaborative Council

WHO

The IOUs have made progress in identifying individuals with AFN across their respective service areas, collectively identifying approximately 4 million[4] people across the state through defining, mapping, enabling, and promoting self-identification. In order to support and target individuals that are electricity dependent, the Joint IOU Statewide AFN Advisory Council[5] and AFN Core Planning Team developed a definition of Electricity Dependent Individuals[6] that this Plan seeks to support. That definition remains unchanged from 2022.

Electricity Dependent Definition: Individuals who are at an increased risk of harm to their health, safety, and independence during a PSPS event for reasons including, but not limited to:

- Medical and Non-Medical
- Behavioral, Mental and Emotional Health
- Mobility and Movement
- Communication

The IOUs understand that there is more work to be done and will continue these efforts to identify additional individuals with AFN in 2025.

WHAT & HOW

Working alongside the AFN Collaborative Council and AFN Core Planning Team, the IOUs identified goals, objectives, and potential opportunities for enhancements in 2025, outlined in this Plan.

The IOUs' overarching goal is to mitigate the impacts of PSPS events on individuals with AFN through improved customer outreach, education, assistance programs and services.

I. INTRODUCTION

In accordance with the California Public Utilities Commission (Commission or CPUC) Decision (D.) 21-06-034 Phase 3 OIR Decision Guidelines and using the Six-Step Planning Process in FEMAS's Developing and

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4 Represents total counts of AFN designations in each IOU's database not unique individuals or accounts.

5 See Appendix A for a list of the members of the Joint IOU Statewide AFN Advisory Council.

6 IOUs will strive to implement this proposed definition contingent on operational feasibility and in alignment with AFN identification requirements with the CPUC's PSPS decisions. See e.g. D. 21-06-034, Appendix A at A8 – A9; D.20-05-051, Appendix A at A8; D.19-05-042, Appendix A at A12-A14, A20-A21. The IOUs will continue to collaborate with AFN stakeholders to refine this definition as appropriate.

Maintaining Emergency Operations Plans Comprehensive Preparedness Guide 101, the Joint IOUs worked collaboratively with the AFN Core Planning Team to implement the "Whole Community"[7] approach to develop an overarching Joint IOU Statewide strategy to meet the diverse needs of individuals with AFN. Each IOU's comprehensive plans will reflect the geographical differences as well as the various needs of communities with AFN. The IOUs will provide the CPUC with quarterly updates regarding progress towards meeting the established objectives and the impact of their efforts to address this population before, during, and after PSPS, while optimizing opportunities for consistency statewide.

Section 1 below provides a high-level overview of the IOUs' shared vision for the 2025 AFN Plan and Sections 2-4 provide details for [IOU's] AFN Plan. The IOUs will continue benchmarking to create a consistent response across the IOU service area where possible, recognizing that resources may not be available consistently across the state.

1.1 Subject Matter Experts (Engage the Whole Community)

According to FEMA Step 1: Engaging the Whole Community in the Planning. Engaging in community-based planning—*planning that is for the whole community and involves the whole community—is crucial to the success of any plan.*

On September 17, 2024, the Joint IOUs introduced this effort at the broader Q3 Joint IOU Statewide AFN Advisory Council meeting, invited participation, and subsequently held a kick-off meeting with the Core Planning Team[8] members on October 23, 2024. The 2025 AFN Core Planning Team is comprised of 8 organizations representing the diverse needs of the AFN community. The table below reflects the organizations involved in the development of the 2025 AFN Plan.

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[7] Whole Community approach as defined by FEMA, refers to preparedness as a shared responsibility and involvement of everyone, including but not limited to individuals and families with access and functional needs. Complete definition available at www.fema.gov/about/glossary (scroll down to "Whole Community")

[8] See Appendix A and B.

Table 1 - Engaging the Whole Community

Planning Group	Participants/Stakeholders
AFN Collaborative Council (per the Phase 3 OIR PSPS Decision):	California Foundation for Independent Living Centers (CFILC) California Health & Human Services (CHHS) California Office of Emergency Services (Cal OES) Disability Rights California (DRC) Disability Rights Education & Defense Fund (DREDF) State Council on Developmental Disabilities (SCDD) California 211 Providers Network 2-1-1
AFN Core Planning Team	Department of Developmental Services Disability Policy Consultant Inland Regional Center Pacific Power Redwood Coast Regional Center San Diego Regional Center San Gabriel/ Pomona Regional Center Tri-Counties Regional Center
Joint IOUs	San Diego Gas & Electric (SDG&E) Southern California Edison (SCE) Pacific Gas & Electric (PG&E)

As a key component to engaging the Whole Community in planning, the Joint IOUs will continue to solicit feedback from the AFN Collaborative Council, the Joint IOU Statewide AFN Advisory Council, each utility's respective Regional PSPS Working Groups[9] and other regional and statewide AFN experts such as community-based organizations (CBOs), healthcare partners, representatives of durable medical equipment and local government agencies. These groups serve as thought leaders and offer insights, feedback, and input on the IOUs' customer strategy, programs, and priorities. The Joint IOUs seek to conduct regular meetings with these subject matter experts to actively identify issues, opportunities, and challenges related to the IOUs' ability to mitigate the impacts of wildfire safety strategies, namely PSPS.

The planning process we presented provides opportunities to collect feedback and implement strategic improvements with details included in specific IOU plans. We continue to look at expansion of program offerings, promote the Joint IOU statewide PSPS Preparedness website, www.PrepareForPowerDown.com[10], conduct outreach and education, as well as expand access to eligible populations.

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[9] These working groups convene at least quarterly to share lessons between the impacted communities and the IOUs. See D.20-05-051 Appendix A at A1.

[10] Please see Section 2.6.7, Statewide Website for AFN Solutions for more details on Prepare for Power Down.

1.2 Purpose, Scope, Situational Overview, and Assumptions

1.2.1 Purpose/Background – WHY

The Plan focuses on mitigating the impacts of PSPS for individuals with AFN. The Joint IOUs intend to build on this Plan and strive for continuous improvement based on insights from the experts and feedback channels outlined in this plan.

Each IOU's respective 2025 AFN Plan addresses the following:

- Who the IOUs need to communicate with
- What resources and services are needed during PSPS
- How the IOUs communicate with individuals with AFN
- How the IOUs make resources and service available to individuals with AFN

1.2.2 Scope – WHO

The Joint IOUs and the CPUC use the definition of AFN as defined by the California Government Code §8593.3: "individuals who have developmental disabilities, physical disabilities, chronic conditions, injuries, limited English proficiencies, who are non-English speakers, older adults, children, people living in institutional settings, or those who are low income, homeless, or transportation disadvantaged, including but not limited to, those who are dependent on public transit and those who are pregnant."[11]
Acknowledging that the California Government code definition of AFN is broad, the
CPUC authorized the IOUs to follow the FEMA 6 Step Process by engaging the Whole Community through the Joint IOU Statewide AFN Advisory Council to create a common definition of "Electricity Dependent."

Therefore, the IOUs use this common definition to help inform new enhancements to programs and resources that are currently available.

Electricity Dependent: Individuals who are at an increased risk of harm to their health, safety, and independence during a Public Safety Power Shutoff, for reasons including, but not limited to:

- Medical and Non-Medical
- Behavioral, Mental and Emotional Health
- Mobility and Movement

[11] See also D. 19-05-042.

- Communication

Examples of Electricity Dependent include, but are not limited to:

- **Medical and Non-Medical**:
  - Respiratory equipment: oxygen, respirator, inhalation therapy, apnea monitoring, suction machines, airway clearance, Airway Clearance Vests, cough assistive devices, hemodialysis.
  - Nutritional equipment: gastric feed tube, specialized diet meal preparation equipment (e.g., feeding pumps, blenders)
  - Heating/cooling equipment: refrigeration, body temperature regulation
- **Behavioral, Mental, and Emotional Health**:
  - Powered equipment supporting regulation of emotional behaviors (e.g., sensory lights)
- **Mobility and Movement Equipment**:
  - Moving and Positioning equipment: Lifts, mobility tracking system, power wheelchairs and mobility scooter, in home chair lift, electric bed
- **Communication**:
  - Augmentative communication devices (e.g., tablets, wearables, eye gaze), alert systems
  - Powered equipment for hearing or vision support (e.g., alert systems)

1.2.3 Situational Overview

According to FEMA Step 2: Understand the Situation – Understanding the consequences of a potential incident requires gathering information about the potential AFN of residents within the community.

"Understand the Situation" phase continues with identifying risks and hazards. This assessment helps a planning team decide what hazards or threats merit special attention, what actions must be planned for, and what resources are likely to be needed.

The Core Planning Team has consistently recognized the ongoing key risk of PSPS over the past years as:

- Individuals with AFN are unable to use power for devices or equipment for health, safety, and independence due to a PSPS.

During the planning process, the AFN Core Planning Team emphasized that the needs of individuals with AFN extend well beyond medical devices alone and that the risks are as diverse as the population. The IOUs recognize that the impacts of PSPS are dynamic and are committed to supporting customers before, during, and after a PSPS.

1.2.3.1 AFN Population and Identification

The IOUs have made progress in identifying the Electricity Dependent individuals with AFN through program enrollments and enabling self-identification. Each IOU identifies the following customers in their respective databases as AFN:

- Customers enrolled in the following programs:
  - California Alternate Rates for Energy (CARE)
  - Family Electric Rate Assistance (FERA)
  - Medical Baseline (MBL),[12] including Life-Support (Critical Care)
- Customers with disabilities
- Customers who receive their utility bill in an alternate format (e.g., Braille, large print)
- Customers who have identified their preferred language as a language other than English
- Customers who self-identify as an older adult (65+)
- Customers who self-certify or self-identify
- Customers who use durable medical equipment and/or assistive technology

Table 2 below accounts for the number of customers identified as AFN in each utility service area, as well as those most likely to experience a PSPS.

[12] Identification efforts also include "persons reliant on electricity to maintain necessary life functions including for durable medical equipment as assistive technology". See D. 21-06-034, Appendix A at A8-A9.

Table 2 - Joint IOU Access & Functional Needs Individuals[13]

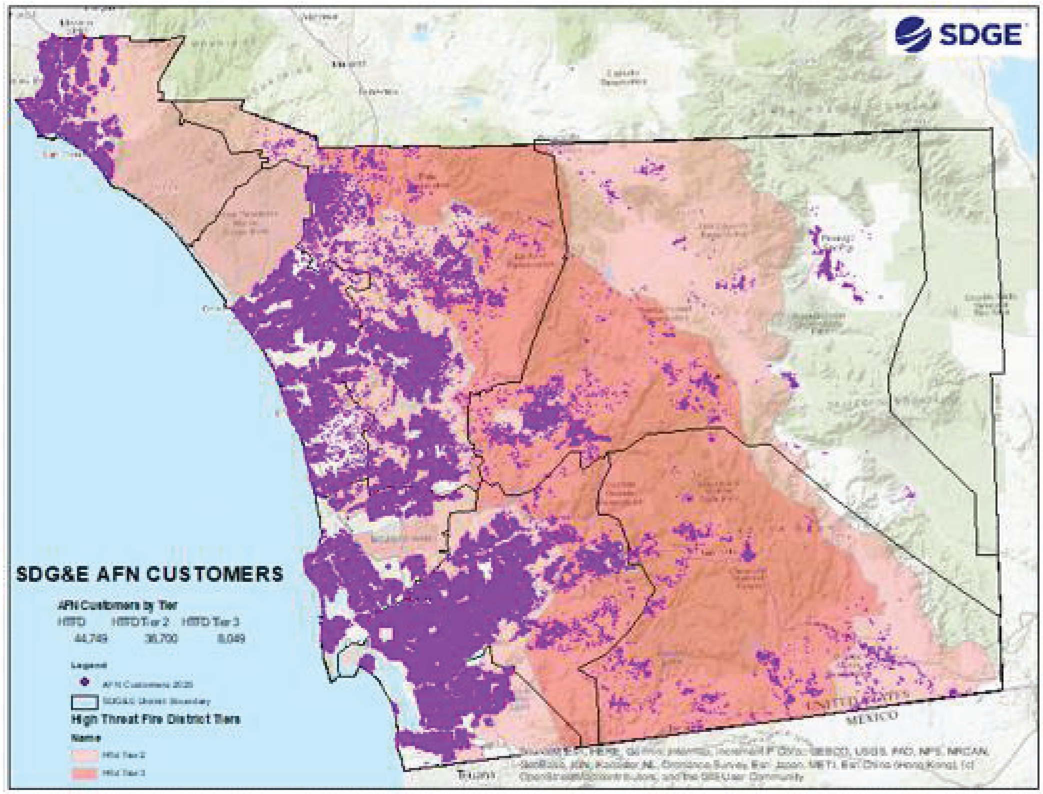
Joint IOU	MBL Individuals	Customers with Language Preference	Individuals Identified as AFN	Percentage of Individuals Identified as AFN base of Total Residential Customer Base
PG&E	**Total:** ~239,000	**Total:** ~255,000	**Total:** ~1.7 M	~31%
	HFRA: ~57,000	**HFRA:** ~13,000	**HFRA:** ~249,000	~27%
SDG&E	**Total:** ~62,000	**Total:** ~68,000	**Total:** ~404,000	~31%
	HFTD: ~12,000	**HFTD:** ~5,000	**HFTD:** ~46,000	~25%
SCE	**Total:** ~121,000	**Total:** ~562,000	**Total:** ~1.8M	~39%
	HFRA: ~41,000	**HFRA** ~101,000	**HFRA** ~386,000	~32%

The Joint IOUs have an AFN density map that allows for quick identification of geographical areas with larger populations of AFN individuals.[14] These maps enable the utilities to strategically allocate resources by geography such as staffing a support site or Customer Resource Center for individuals who are experiencing a PSPS. *See* **Table 3.**

[13] Data collected as of November 2024. Notes: High Fire Risk Area (HFRA) / High Fire Threat District (HFTD) refers to a geographic region of customers potentially in scope for PSPS. Additionally, (1) Customers enrolled in MBL may include customers with Language Preference other than English and customers with an AFN; (2) Customers with Language Preference other than English may include customers enrolled in MBL and customers with an AFN; (3) Customers with AFN characteristics or CARE or FERA may include customers enrolled in MBL and customers with Language Preference other than English.

[14] *See* section 1.2.2 for definition.

Table 3 - *Service Area Map of SDGE Customers with AFN*



This map displays SDG&E customers with Access and Functional Needs who reside in the service territory.

In 2025, the IOUs will continue identifying individuals who are electricity dependent above and beyond those enrolled in the Medical Baseline Allowance Program, through direct outreach to customers in each respective IOUs service area.

1.2.4 Planning Assumptions

Below are the initial planning assumptions used when developing the annual AFN Plan:

- For PSPS, every effort is made to provide notification in advance of power shutoff
- Resources are available to individuals with AFN regardless of advanced notification

- Effective support of individuals with AFN requires a Whole Community[15] approach (e.g., utilities, Community Based Organizations, non-profits organizations, government agencies)
- PSPS may occur concurrently with unrelated emergencies (e.g., active wildfires, earthquakes, floods, tsunamis, cyber-attacks, technological hazard incidents)
- The IOUs will continue to create a consistent statewide response with our support services (e.g., food support, accessible transportation, Community Resource Centers (CRCs), etc.) to PSPS, acknowledging there are different needs based on geographic areas
- The scope of PSPS can increase or decrease as weather conditions are monitored

1.3 Operational Priorities - WHAT

According *to FEMA Step 3: Operational priorities – specifying what the responding organizations are to accomplish to achieve a desired end-state for the operation.*

The goal of the AFN Plan is to mitigate the impacts of PSPS on individuals with AFN served by the IOUs through improved customer outreach, education, assistance programs and services.

The Joint IOUs will continue our commitment to mitigating impacts of PSPS by focusing on key objectives identified through the 2025 planning meetings.[16] Progress will be reported out within the IOU Quarterly updates. 2025 Key Objectives:

- Increase awareness of IOU programs and services available before, during and after a PSPS.
- Continue to identify individuals who are Electricity Dependent.
- Identify new enhancements to programs and resources needed to mitigate the impacts of PSPS.
- Coordinate and integrate resources with state, community, utility to minimize duplication.

1.4 Plan Development

According to FEMA Step 4: Plan Development Develop and Analyze Courses of Action – This *step is a process of generating, comparing, and selecting possible solutions for achieving the goals and objectives identified in Step 3*.

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[15] The term "Whole Community" refers to the concept as discussed in the FEMA Six Step Comprehensive Preparedness Guide.

[16] See Appendix C for continued efforts from key objectives identified in planning meetings from prior years.

The Joint IOUs have worked to deliver consistent services and resource offerings; however, the delivery and eligibility can be different due to the uniqueness of each IOUs' service territories and programs. The following are proposed recommendations to meet the Key Objectives for 2025:

Increase awareness of IOU programs and services available before, during and after a PSPS

- Explore making appropriate updates to PSPS material to reflect the needs of individuals in the intellectual and developmental community. Work with organizations including Regional Centers, Department of Developmental Services (DDS) and the State Council for Developmental Disabilities to identify potential changes and updates to PSPS material.
- Develop a PSPS resource guide in collaboration with the AFN Statewide Council and other stakeholders to identify gaps and overlaps with available customer resources.
- Share PrepareforPowerdown.com (P4PD) website analytics on the quarterly updates for each IOU's AFN Plan report that is filed with the CPUC.

Continue to identify individuals who are Electricity Dependent

- Enhance existing marketing and outreach campaigns based on data received through AFN self-identification efforts.
- Continue to work with CBOs, Regional Centers, and healthcare organizations to ensure their clients are informed about available PSPS resources.
- Partner with stakeholders including Regional Centers, Department of Developmental Services (DDS) and the State Council for Developmental Disabilities to better understand the needs for individuals in the intellectual and developmental disability community during a PSPS.

Identify new enhancements to programs and resources needed to mitigate the impacts of PSPS

- Continue to review customer feedback from PSPS survey results and verbatims to benchmark and evaluate if programmatic changes are needed to enhance existing resources and support[17].
- Develop a PSPS resource guide in collaboration with the AFN Statewide Council and other stakeholders to identify gaps and overlaps with available customer resources. Evaluate if additional resources or enhancements are needed to mitigate the impacts of PSPS.

Coordinate and integrate resources with state agencies, community-based organizations, and the utilities to minimize duplication

[17] PSPS survey results can be found in each IOUs' PSPS Post-Event and PSPS Pre-/Post-Season Reports.

- Identify opportunities and efficiencies to ease Medical Baseline (MBL) program enrollment in accordance with CPUC and legislative framework.

1.5 Plan Preparation and Review

According to FEMA Step 5, Plan Preparation, Review, and Approval – This step is a process of preparing the document and getting it ready for implementation.

Prior to finalizing the 2025 AFN Plans, the Joint IOUs provided members of the AFN Collaborative Council and AFN Core Planning Team a draft plan for their review. As a result, each of the IOUs will file their respective 2025 AFN Plans with the CPUC by January 31, detailing its programs to support individuals and communities with AFN before, during, and after PSPS.

1.6 Plan Implementation

According to FEMA Step 6 Implement and Maintain the Plan – This step is the final step which is an ongoing process of training personnel to perform tasks identified in the plan, exercising, and evaluating plan effectiveness, and revising and maintaining the plan.

Upon filing the AFN plan, the IOUs will implement new goals and objectives while maintaining existing ones as specified in the Plan. Additionally, the IOUs will provide quarterly updates on progress made and report on performance through identified success measures and metrics.

1.7 Research and Surveys

In 2025, the Joint IOUs will continue to collaborate and share best practices as they solicit feedback about PSPS resources offered to individuals with AFN through a variety of channels, including consultation with various advisory councils.

The Joint IOUs will continue to conduct listening sessions and working groups with local governments, tribes, and critical facilities; webinars for customers and communities; wildfire and PSPS awareness studies; feedback via digital channels; PSPS Tabletop Exercises; and notification message testing.

As a result of feedback and research from CBOs, local governments, and tribes who support AFN populations, the Joint IOUs are committed to continuously reviewing the needs of individuals with AFN before, during, and after PSPS. This thorough review allows the Joint IOUs to enhance support for individuals who rely on electricity to maintain necessary life functions, including those who utilize durable medical equipment and assistive technology.

1.8 Success Measures and Metrics

In 2025, the Joint IOUs will continue to use the Key Performance Indicators (KPIs) that were developed with the AFN Core Planning Team for the 2022 AFN Plan. These KPIs seek to measure the impacts of PSPS on individuals with AFN, awareness of support programs, and satisfaction of services offered. The most recent pre- and post-season survey results that address the KPI will be reported in the 2025 Q1 Progress Report.

Key Performance Indicators to measure the impact[18]:

1. The percentage of individuals with AFN who were aware of what support and resources were available to them during a PSPS.
2. The percentage of individuals with AFN who were able to use necessary medical equipment to maintain necessary life functions for the duration of any PSPS that affected them.
3. The percentage of individuals who utilize mitigation services (e.g. 211 support, CRC centers, battery programs) reported they were satisfied with the level of support received.

While Section 1 is a high-level overview of the IOUs' shared vision, the details for each of the IOUs AFN Plans can be found in Sections 2-4. The IOUs will continue benchmarking to create a consistent response across the IOU service areas where possible, recognizing that resources may not be available consistently across the state.

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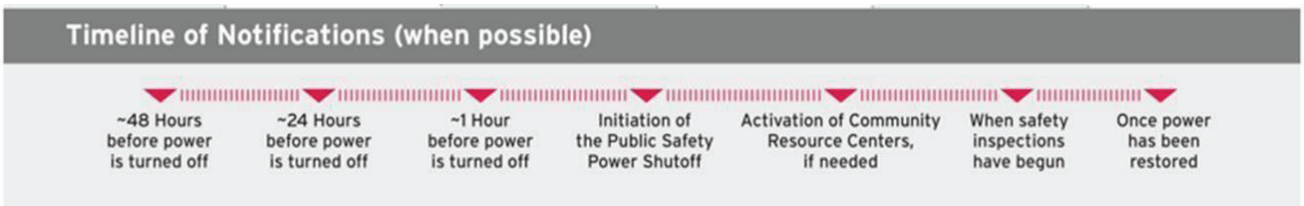
2. CONCEPT OF OPERATIONS | HOW

During a PSPS, forecasts are subject to change swiftly and preparation timelines must adjust quickly as well.

This Concept of Operations is separated into preparedness, before, during and after phases to account for the unique operational requirements over the course of PSPS. **Table 4** shows a general example sequence for a potential PSPS.

[18] Metrics related to KPI 4 are reported in each IOUs' PSPS post-event reports and PSPS post-season surveys.

Table 4: SDG&E PSPS Timeline Example



2.1 Preparedness/ Readiness (Before Power Shutoff)

2.1.1 Emergency Operations Center

Leading up to the PSPS season, SDG&E Emergency Management meets with public safety partners to determine the best method of communicating and providing situational awareness during Emergency Operation Center (EOC) activations. Public safety partners are proactively informed through different forms of communication throughout the year, including a Public Safety Partner Portal created in 2021. Over recent years, the SDG&E Public Safety Partner Portal has seen significant enhancements: initially directing impacted partners to receive the latest situational updates, then adding a mobile application to help ensure information is readily available on mobile devices, followed by improvements to include all-hazard updates and compliance with Web Content Accessibility Guidelines (WCAG) 2.1 AA success criteria for accessibility. The two-time award-winning Partner Portal will soon expand to include gas hazards, helping to ensure partners receive timely and accurate information during gas-related EOC activations. Additionally, for the sake of resilience, SDG&E maintains two physical EOCs alongside a virtual EOC, enabling SDG&E to respond either in-person, virtually, or through a hybrid approach depending on the situation and needs of our response.

Preparation Exercises & Training

SDG&E's Emergency Response team conducts extensive preparation and training in collaboration with the AFN team to prepare for PSPS and supporting individuals with AFN. These include:

- Two annual PSPS exercises, one tabletop and one operations-based, both of which addressed AFN concerns during a PSPS with external partner participation including AFN partners
- Additional exercises throughout the year on various all hazards topics that addressed and included AFN concerns and response expectations
- New responders onboarded in the New EOC Member Orientation course
- New responders onboarded with required participation in NIMS, SEMS, and ICS training through FEMA course 100, FEMA course 200, FEMA course 700, and California's SEMS course

- Targeted participation in SDG&E's Command and General position credentialing training, including specific responder completion of CSTI courses G-775 and G-191
- EOC responder participation in Summer Readiness Training which provided training to all responders on PSPS expectations and protocols, load curtailment expectations and protocols, general hazards EOC expectations and protocols, and seasonal weather forecasts.
- Outreach and engagement with Public Safety Partners, Community Partners and local jurisdictions, including tribes
- EOC tours for external stakeholders
- Joint planning with County OES, CalOES, CAL FIRE, emergency managers and Regional Fire Chiefs
- AFN Liaison Officer training on the process and protocols for communication and AFN CBO services
- Training on IOU programs and services to in-home workers, social service staff, CBOs, tribal orgs, CERTS etc.

EOC AFN Liaison Role

To ensure individuals with AFN have support and resources available during all phases of a PSPS, SDG&E has established a dedicated AFN Liaison position, which includes a roster of six responders who complete a series of yearly trainings to prepare and effectively respond to customer needs before, during, and after a PSPS. There will be internal recruitment in 2025 to increase the size of the roster with opportunities for newer responders to get exposure to the position through shadowing and exercises.

Specifically dedicated to supporting individuals with AFN during EOC activations, the AFN Liaison Officer reports directly to and advises the Officer-in-Charge (OIC) regarding the support services, resources, and activities to support customers with AFN.

The AFN Liaison Officer collaborates with SDG&E's AFN CBO support partners, including 211 San Diego, Orange County United Way (formerly 211 Orange County), Facilitating Access to Coordinated Transportation (FACT), Salvation Army, and local Community Based Organizations (CBOs), to prepare customers for a potential power outage, provide up-to-date information on PSPS operations, and address the power outage related needs of customers requesting assistance. The AFN Liaison Officer also coordinates and facilitates the residential customer battery back-up generator program during PSPS EOC activations.

Additionally, to ensure ongoing support, the AFN Liaison Officer responder team has a dedicated 24/7 "on-call" representative, who is available to support specific customer needs that may arise outside of a PSPS. Training for this position continued to expand in 2024 with a series of exercises to build the knowledge and skills needed to effectively serve customers with an AFN during an EOC activation. In addition to the general EOC training and exercises required by SDG&E's Emergency Management, position specific training on the processes and resources utilized during an EOC activation to support AFN customers were required. This additional AFN Liaison Officer training includes:

- Continually updated and improved AFN Liaison Check List and resource identification
- Accessible Hazard Alert System (AHAS) notification procedure
- AFN communication process and standards to AFN support and general partners
- Disability awareness and sensitivity
- Available internal and external resources

This team has been well-prepared through training and exercises focused on EOC operations and the specific role of the AFN Liaison Officer. This preparation enables the team to efficiently handle EOC procedures and community support resources that benefit customers with AFN. These efforts will continue through 2025, ensuring AFN Liaison Officers are kept up to date of any changes related to requirements or procedures.

Customer Care Support

SDG&E continues to support individuals and households with AFN, including during a PSPS. When customers call or chat with an agent regarding specific concerns related to an AFN, they will be directed to the appropriate resource to receive support (e.g., 211, AFN Liaison EOC responder, etc.). Additionally, SDG&E's Customer Care Center representatives are trained to speak with customers experiencing challenges and if it is the customers' preference, flag them in SDG&E's system as having a self-identified disability for additional consideration of tools, programs, and services.

2.1.2 AFN Identification Outreach

SDG&E recognizes the importance of continuing to identify individuals with AFN. As a result, SDG&E is committed to providing the education, resources, and notifications required to maximize resiliency during a PSPS. Building on Section 1.2.2 above, SDG&E continues to enhance its ability to identify individuals with AFN. There are approximately 404,000 customer accounts associated with AFN, which accounts for 31% of the residential customer class. Of the 404,000, approximately 45,000 customers reside in the high-fire threat district (HFTD).

In 2022, a Self-Identification campaign was initiated to allow customers to identify individuals in their household who may identify as:

- Blind/low vision
- Deaf/hard of hearing
- Disabled (cognitive, physical, developmental)
- AFN

Customers who participate in the Medical Baseline Program and are electricity dependent are also captured through these campaigns. In 2023, two additional categories were added to the AFN Self-ID web form that customers can select: assistive technology and durable medical equipment. These Self-Identification campaigns are planned to continue through 2025 and will further expand awareness of SDG&E's AFN landscape.

SDG&E is also committed to ensuring inclusiveness through ease-of-access for customers with language and accessibility needs. This resource undergoes continuous improvement with participation and feedback from the AFN Collaborative Team and stakeholders to ensure customers can self-identify and receive communications in their preferred manner. Campaigns in 2025 may be implemented through direct mail, e-mails linking to a digital web form, and promotion on social media. Outreach will continue to take a collaborative approach leveraging channels including the Regional PSPS Working Group, Energy Solutions Partners Network consisting of more than 200 CBOs, and relevant state agencies.

SDG&E will continue to partner and work with the AFN Collaborative Council to identify opportunities to enhance AFN identification.

2.1.3 AFN Support Resources

To support and prepare individuals who identify as AFN, SDG&E will continue to provide a comprehensive approach of programs and resources before, during, and after PSPS. SDG&E is committed to seeking new opportunities to identify organizations with quick response capacity that can meet the needs of customers across the region during PSPS activations.

In 2023, SDG&E launched a PSPS Customer Impact study to increase understanding of customer impacts during a PSPS de-energization, with a focus on individuals with AFN. This study utilized a comprehensive approach to gather factual data, including key findings from existing relevant studies, and direct survey feedback from SDG&E customers and employees, to inform how we target, support, and communicate with customers before, during and after a PSPS. Throughout 2024, the study findings were shared with key internal and external stakeholders and opportunities were prioritized.

In 2025, SDG&E plans to focus on implementation of these enhancements to further enhance and refine support services and resources provided to individuals with AFN who are impacted by a PSPS.

Additionally, in 2025, SDG&E aims to further strengthen its collaboration with the San Diego County Sheriff's Department to promote the Blue Envelope program. This initiative is designed to enhance communication and inclusivity between law enforcement and community members with conditions such as dementia, anxiety, or other disabilities that may require special accommodations during interactions. The SDG&E team will continue to seek opportunities to educate employees on recognizing and effectively using the Blue Envelope Program when engaging with customers.

211 – Centralized Resource Hub

SDG&E plans to continue its partnership with 211 San Diego and Orange County United Way (formerly 211 Orange County) into 2025 and is building on these partnerships to enhance services as new opportunities are identified. In addition to enhanced identification of customers with AFN, this collaboration also provides assessment of AFN population needs, hotel stays for those impacted by de-energization events, accessible transportation, food resources, and access to resiliency items.

In advance of a PSPS, 211 will focus on outreach to at-risk customers, including those living in each IOU's high-fire-risk areas, who are eligible for income-qualified assistance programs, and rely on life-sustaining medical equipment. This outreach provides opportunities for customers to prepare resiliency plans and connects them with existing programs for enhanced support. In 2025, 211 will expand upon this outreach and focus on targeting various customer segments, including customers on Medical Baseline and those who are eligible for income-qualified assistance programs.

211 also provides a holistic approach to assisting customers with completing applications for these programs and includes the exploration of Care Coordination screening outreach efforts. During a PSPS, 211 San Diego and Orange County United Way serve as a resource hub to connect individuals with services directly provided by partners contracted with SDG&E, as well as more than 1,000 regional CBOs who provide services. These agencies provide several unique advantages in that their services are available statewide, 24/7 and connect individuals with well-established local partners who have long served the broader AFN community. Additionally, 211's social workers are equipped to conduct needs assessments and escalate needs accordingly to higher tiers of support.

Below is SDG&E's 211 support services flyer that is used for marketing and outreach campaigns to those residing in the HFTD.

Please see **Image 1** for a sample of the marketing materials used:

Image 1

Accessible Transportation

Facilitating Access to Coordinated Transportation (FACT) provides accessible transportation to individuals with AFN across the entire HFTD during PSPS. FACT receives EOC PSPS daily notifications and amplifies the information, including zip codes, to approximately ~160 paratransit service providers. There are no eligibility criteria other than an individual seeking assistance and is available 7 days a week from 5:30 a.m. - 11:00 p.m. during a PSPS.

SDG&E will continue its partnership with FACT in 2025, as they have been able to facilitate all requests for transportation received and coordinated by 211 since the initiation of the collaboration in 2020. As an enhancement to FACT services, SDG&E Grant Funding was provided to FACT for the purchase of satellite phones improving communication reliability with impacted customers in rural areas during PSPS accessible transportation support. This consistency of meeting customers' needs when the utility experiences a de-energization hasn't necessitated identifying additional transportation partners.

In 2025, SDG&E plans to continue marketing of this solution through targeted campaigns to individuals with AFN, as well as provide training and materials for CBOs within the Energy Solutions Partner Network that SDG&E works with. See section 2.1.6 AFN Public Education and Outreach for additional details.

No-Cost Hotel Stays

SDG&E will continue its partnership with The Salvation Army in 2025, which provides no-cost hotel stays to individuals with AFN during PSPS. This is also available to individuals who would not normally be considered AFN, but due to circumstances (long duration, cold weather, living alone, etc.) request assistance. Hotel stays are arranged via The Salvation Army and 211, and do not require any payment up front or otherwise from individuals. Hotels are selected based on accessibility and proximity to a customer's residence or other requested location. The Salvation Army has facilitated all requests received since the partnership's initiation in 2020.

In 2025, SDG&E will continue to enhance the marketing of this solution through targeted campaigns to individuals with AFN through its network of CBOs. Additionally, SDG&E discussed potential enhanced screening for individuals with specific needs with The Salvation Army and will identify processes in early Q1.

Food Support

SDG&E has strengthened the pipeline of local food resources for older adults, individuals, and families with AFN by partnering with the San Diego Food Bank, Feeding America, Meals on Wheels, and other local food partners. These valued partnerships enable the support of vulnerable, rural, and tribal communities' year- round and during PSPS activations. Food support is available at many locations, including on tribal lands. Expanded San Diego Food Bank mobile food pantries ensure additional food support offerings during PSPS. As demonstrated during previous PSPS de-energizations, this has proven to be a valuable resource and as such will continue to play an important role in supporting customers in need.

SDG&E will continue expanded food resource options with the San Diego Food Bank (a Community Information Exchange partner of 211 San Diego) and resiliency solutions as identified for those impacted in the HFTD during PSPS. SDG&E will continue to leverage marketing and outreach campaigns to increase awareness of available support solutions to individuals with AFN via web and social media.

Supplemental to the above referenced partnerships SDG&E will continue to offer warm meals at Community Resource Centers when needed. Currently, 3 catering companies are contracted with SDG&E to provide catering services throughout the service territory. See SDG&E Resource Planning and Partnerships below for a listing of caterers.

Wellness Checks

SDG&E partners with (Community Emergency Response Teams) CERTS and You Are Not Alone (YANA)to perform in-home wellness checks when requests are made through 211 during a PSPS. PSPS educational resource flyers are distributed during wellness checks as part of their emergency preparedness efforts along with medical cooler organizers as needed. Additional support services can be provided through 211 as needed. The below partnerships will continue into 2025:

- **East County Community Emergency Response Team (CERT):** Educates people about disaster preparedness for hazards that may impact their area. Provides training in basic disaster response.
- **San Diego County Volunteer Sheriff Patrol - You Are Not Alone (YANA) Program:** A volunteer program designed to support older adults, people with disabilities or anyone who is otherwise homebound through weekly visits or by requests.

Resiliency Items

SDG&E will continue to distribute resiliency items at Community Resource Centers during a Public Safety Power Shutoff. These items may include portable solar cell phone charger, medical device charging, gift cards, solar power banks, cooler bags, 2.5-gallon water bags, bottled water, water for livestock and seasonal blankets and medical cooler organizer.   Additional opportunities will be explored to provide targeted resiliency items as they are identified.

SDG&E, along with the other IOUs, has quarterly working group meetings scheduled with the AFN Collaborative team to further identify opportunities to enhance support.

Table 6 - SDG&E PSPS Resource Planning and Partnerships

Partnership	Counties Served	Resources
211 San Diego and Orange County United Way	San Diego County & Orange County	• 24/7 connection to regional support services (hotel accommodations, accessible transportation, food support, etc.) • Proactive identification of individuals with AFN & preparedness coordination/pre-event outreach
Deaf Link, Inc.	San Diego County Orange County	• Accessibility solution providing a link with all PSPS messaging to customers to a video of an ASL interpreter signing the message including closed captions and voice reading of the message via the Accessible Hazard Alert System (AHAS) • Two ASL service agreements for interpretation during external video calls, press conferences and other community events as requested • Secured Service Agreement to provide any SDG&E employee access to Video
Food Bank and Warm Food Partnerships: • San Diego Food Bank • North County Food Bank • Feeding America • Meals on Wheels	San Diego County	San Diego Food Bank/North County Food Bank • Expanded food bank partnership to support rural/tribal/HFTD communities • 5 mobile food pantries • Support the services during emergencies and will standup mobile food pantries post PSPS in impacted communities • Food support cards may be available for individuals and households with AFN as needed • Support funding from shareholder/community relations

• Eurest • Terra San Diego Bistro • Ranch Catering		Meals on Wheels • Additional meal to impacted PSPS seniors per day of shutoff • Support funding from shareholder/community relations Feeding America • Support services during emergencies; will stand-up mobile food pantries post-PSPS in impacted communities • 17 mobile food pantries • Partnership with Indian Health Council • Support funding from shareholder/community relations Warm Food Support • Eurest Catering, Ranch Catering and Terra American Bistro catering service contracted to support at local CRCs when needed
Facilitating Access to Coordination Transportation (FACT)	San Diego County & Orange County	• Provides accessible transportation to customers' location of choice (hotels, CRCs, etc.) • Paratransit accessible transit broker • Provides accessible transportation 5:30 a.m. – 11:00 p.m.
Salvation Army	San Diego and Orange County	• Provides no-cost hotel stays

Indian Health Councils	San Diego County - 16 Tribal Communities	• Reserves back-up batteries for AFN Tribal members who qualify for GGP during a PSPS. • Provides requested resiliency items (e.g. power banks, hand crank flashlight/radios, blankets, emergency backpacks and bottled water) to tribal members in advance of and during a PSPS.
Community Resource Centers (11 CRCs)	San Diego County - High Fire Threat Communities (HFTD)Orange County - High Fire Threat Communities (HFTD)	• Activated only during PSPS in communities most impacted • Resources include ice, water for live- stock, restrooms, cell phone charging, device charging, seating, light snacks, and outage updates • Providing Disability Cultural Competency Training to our CRC and Branch office staff • ADA Accessibility and Disability Integration training • Adapted the CalOES Access and Inclusion Tips for Vaccine sites for the CRCs

San Diego County's Aging and Independence Services (AIS)	San Diego County	• 100+ Cool Zones sites that provide service to some of the hottest areas in the San Diego region • San Diego County's Aging and Independence Services (AIS) coordinates these sites at senior centers and public buildings, including libraries in partnership with the Health and Human Services Agency (HHSA) Live Well Network
San Diego County CERT	San Diego County	• Wellness checks
Deputy Sheriff's Association You Are Not Alone (YANA) program	San Diego County	• Wellness checks
Partner Relay Network (County's Office of Emergency Services & Public Health Services)	San Diego County	• Network of 700+ CBO and Public Safety Partner representatives. • Languages supported: o 200 + languages o Accessible formats

2.1.4 Back-Up Power

SDG&E offers several back-up power programs to enhance resiliency for individuals, many of which are targeted to individuals with AFN during PSPS activations including no-cost and low-cost options.

Portable Battery Program (Generator Grant Program)

The Generator Grant Program (GGP) provides no-cost portable backup batteries to customers. Eligible customers included those residing in the HFTD who have experienced one or more PSPS outages and are enrolled in the MBL Program or flagged in SDG&E's customer database as self-identified AFN or having a self-reported disability, including those that are blind/low vision, deaf/hard of hearing, and temperature sensitive. Approximately 5,600 customers have received batteries to date.
For 2025, the program will continue to prioritize MBL, Life Support, and qualifying AFN customers in the HFTD with a high likelihood of PSPS. Customers participating in the program will continue to be offered a resiliency assessment to determine their current awareness of PSPS resources, existing resiliency measures to which they may already have access, and other resiliency programs they may benefit from (such as permanent batteries). SDG&E also plans to build upon our partnership with 211 San Diego to support delivery of temporary portable backup battery units to individuals with AFN who need them during PSPS outages.

Generator Rebate Program (Generator Assistance Program)

SDG&E's Generator Assistance Program offers a rebate incentive for customers to prepare with back-up power sources. The program includes rebates for fuel generators and portable power stations to customers who reside in the HFTD and have experienced a PSPS-related outage. In addition, the program continues to target the low-income segment with enhanced rebates for CARE/FERA customers. To date, approximately 2,600 customers have received rebates from this program. The 2025 program will continue to target customers in the HFTD who have experienced previous PSPS events and provide enhanced rebates for low-income individuals including those with access and functional needs who elect to purchase portable generators and portable power stations.

Mobile Home Park Resilience Program

The Standby Power Programs (SPP) target customers and communities that will not directly benefit from other grid hardening initiatives. These targeted customers reside in the backcountry and are generally located on circuits in communities that are most prone to PSPS exposure. One sub-program within the SPP umbrella that offers potential benefits to individuals with access and functional needs is referred to as the Mobile Home Resilience Program (MHRP). This program provides a clean backup power solution to enhance community resilience within their respective mobile home park. More specifically, solar panels coupled with a battery system help keep the mobile home park clubhouse powered during a power outage. The clubhouse tends to be a central location where residents can charge phones or laptops, keep medical devices powered, seek air conditioning, or refrigerate medicine in the community refrigerator. This program has completed three installations since its inception and will continue to evaluate potential installations (SPP budget permitting).

Resiliency Surveys

In 2025, this Resiliency Survey offering will continue to be transitioned and incorporated into offerings such as the Generator Grant Program to support resiliency assessment and education for targeted customer populations in place of a standalone program.

Community Support

Building on our previous relationships and strategies, 2025 community partnerships will continue to be strong. Through our Safe San Diego charitable grant program, SDG&E will identify and support local community-based organizations that provide emergency preparedness education, response and support.

Funding is used to support participation in the San Diego County CERT Mutual Aid Plan and Neighborhood Evacuations Teams through the Office of Emergency Services and FEMA program.
Programmatic investments are made in several organizations to specifically serve the AFN population. This will include organizations that provide customized, often in-home, emergency preparedness and safety training for older adults, individuals with physical, intellectual, and developmental disabilities, those with vision or hearing impairments, individuals with chronic illness and many more.
SDG&E's charitable investments are grounded in the feedback received directly from the AFN community. SDG&E partners conduct extensive outreach and education and bring those issues back to inform SDG&E funding. Out of this feedback SDG&E developed mobile home fire alarm installation, creation of defensible space in the backcountry region, earthquake preparation trainings for the disability community and more. In 2025, SDG&E will also focus on connecting partners and programs with one another. Many partners are busy doing their own work, and SDG&E has a unique vantage point where we can see potential alignment and collaboration efforts across organizations.

Self-Generation Incentive Program (SGIP)

The Self Generation Incentive Program (SGIP) is administrated by the Center for Sustainable Energy (CSE) in SDG&E's service territory. The program offers incentives for generation and battery storage technologies installed for residential and nonresidential customers. The SGIP has a variety of different budget categories for the current program cycle that started in 2020 and is expected to run until 2025 or until all incentive funds are exhausted. In support of AFN customers, the program offers higher incentives for battery storage projects within the Equity Resiliency budget.

Customers can be eligible for the Equity Resiliency budget if they are located in a Tier 2 or Tier 3 High Fire Threat Districts (HFTD), experienced Public Safety Power Shutoff (PSPS) events, are currently enrolled in a medical baseline program, and/or is a customer that has a serious illness or condition that could be life threatening if electricity is disconnected (2024 SGIP Handbook, PG 25-26). In 2024, the SGIP Equity Resiliency budget received a total of 86 applications and paid out 107 applications totaling 1.368MW (CSE SGIP public data from CA DG Stats as of December 31, 2024).

In late March of 2024, Commission Decision (D.) 24-03-071 was adopted allocating $22M from the Greenhouse Gas Reduction Fund to the SGIP Residential Solar and Storage Equity (formally Residential Storage Equity) budget for the SDG&E service territory. This decision also made programmatic changes to improve the SGIP through eligibility requirements that cater to AFN customers.

Some of these changes include:

- Expanding categorical eligibility for SGIP equity budget incentive to customers income verified in California Alternate Rates for Energy (CARE), Family Electric Rate Assistance Program (FERA), and Energy Savings Assistance Program (ESA)
- Funding set-aside for customers living on tribal lands and enrolled members of California Tribes

The SGIP Program Administrators, which is the Center for Sustainable Energy in SDG&E's service territory, are working on the implementation of D. 24-03-071 to make these new directives effective and the new funding available statewide in 2025.

2.1.5 Customer Assistance Programs

Through SDG&E's comprehensive, marketing, education, and outreach (ME&O) engagement strategy, relevant information on available programs and services is targeted to individuals with AFN to support emergency preparedness, cost savings and resiliency. These programs not only help low-income and disadvantaged communities but are also a critical way for SDG&E to reach a variety of customer demographics within the AFN population.

In 2024 the Joint IOU's conducted trainings to statewide AFN service and healthcare organizations on Medical Baseline Allowance (MBL) program, PSPS preparedness to help those with AFN to learn about the services available during a PSPS, and eligibility requirements for program enrollment. This initiative will continue into 2025 to ensure ongoing engagement.

In 2025, the IOUs will also continue to engage with community partners and provide a coordinated one-stop marketing and education outreach program for CARE, FERA, ESA and pandemic assistance programs to streamline the efforts and share best practices. SDG&E will also explore additional ways to expand promotion of these programs to customers identified as AFN.

2.1.6 PSPS Preparedness Outreach and Community Engagement

AFN Public Education & Outreach

SDG&E will produce and execute the AFN Public Education campaign in 2025, that will enhance SDG&E's annual Wildfire Resiliency and PSPS public-education efforts. The territory-wide, AFN, mass-market communications effort aims to increase customer awareness and education about AFN resources. The annual paid advertising campaign, in combination with direct communications and outreach, helps ensure SDG&E reaches its AFN audience broadly and promotes message consistency and resiliency across the service territory. It will be especially important to keep this information top of mind for customers in the High Fire Threat District (HFTD), as SDG&E had multiple PSPS activations during 2024 and cut power to customers in the region for the first time since 2021 (PSPS protocols were activated in 2023, but customers weren't de-energized).

Outreach tactics supporting the public education campaign include, but are not limited to:

- Community events such as open houses
- Wildfire safety fairs and webinars
- Direct outreach and communications to vulnerable populations in high-risk areas
- Promotional communications for support services such as generator programs and resiliency surveys
- Emails to customers
- Accessible digital content (website and social media)
- Bill inserts
- Wildfire safety newsletters and wildfire safety-related messages in accessible formats

SDG&E's refreshed public education campaign will continue to incorporate territory-wide mass market media, such as TV, print and digital, in a way that treats the message in the style of a Public Service Announcement (PSA) versus a traditional ad campaign and combine this broader outreach with more targeted efforts where available, to areas such as the HFTD, and will include PSPS resiliency and wildfire safety preparedness messages.

Potential Tactics under consideration include:

- TV: Broadcast and proactive media outreach
- News: Billboards may be complemented with longer additional segments

- Print: Continue to target senior publications, hard-to-reach areas such as the HFTD and various multi-cultural, in-language and tribal publications
- Digital: Banner ads, paid search, and paid social ads, and continued utilization of various digital channels and social media platforms for more targeted outreach
- Collateral: Continue to expand and develop enhanced and accessible printed collateral and electronic content based on 2024 customer feedback that can be distributed through multiple diverse channels, such as medical offices, CBOs, schools, tribal organizations, in-community events, etc. Additional communication methods will be explored and utilized to continue to increase reach across the entire region as well as support statewide efforts with other IOUs

Public education materials, including wildfire safety and PSPS notifications, will continue to be made available in the 22 prevalent languages identified in SDG&E's service territory, including various print and digital collateral and the wildfire safety section of the company website (sdge.com/wildfire-safety). The website undergoes consistent review and updates to ensure it meets accessibility needs and American Disabilities Act (ADA) and Web Content Accessibility Guidelines (WCAG) global web standards. Clear, simplified, plain and inclusive language, accessible fonts, along with diverse AFN imagery will continue to be used to communicate information in a meaningful manner.

SDG&E maintains a robust website focused specifically on wildfire preparedness and safety. Customer research indicates that this website is heavily utilized before and during high wildfire risk events. Additionally, this website will continue to link to other SDG&E general safety and preparedness webpages that include safety information related to natural gas, electricity, vegetation management, generator use, emergency preparedness and power outages (sdge.com/safety).

SDG&E's overarching Wildfire Safety Public Education efforts direct customers and the public to a dedicated and regularly updated wildfire safety section of the company website (sdge.com/wildfire-safety). Communication tactics and materials that will continue to direct to the webpage include, but are not limited to, print collateral, broadcast media, newspaper advertising, PSPS notifications, as well as digital and in-community communications.

The wildfire-safety web section serves as the company's one-stop shop for wildfire preparedness, PSPS, safety and resiliency information, as well as available resources. Power outage safety and resiliency is emphasized throughout this section of the website. Also included are updated safety tip videos. Additionally, the section includes information about the extensive partnerships and systems used to ascertain fire-science data.

A primary call-to-action on the wildfire-safety section of the website and company's public-education campaign materials will continue to encourage customers and the public to sign up for wildfire safety-related messages and download the Alerts by SDG&E app, coupled with wildfire safety and PSPS preparedness, safety and resiliency tips.

A dedicated landing page will continue to be refreshed and provide resources to assist AFN communities, particularly for PSPS (sdge.com/AFN). The page provides extensive information and resource links which include but are not limited to notification sign-ups, emergency plan/kit checklists, generator safety, 211-service promotion and referral, the Medical Baseline program and application, CARE, FERA and ESA, as a representative sample of some of the information available to the viewer. The company also administers an annual AFN Self-ID campaign to encourage customers to account for any AFN members in their household. Direct communications about AFN resiliency during a PSPS are also mailed to those customers annually.

SDG&E will continue to enhance and expand tribal communications, education, and outreach. Culturally appropriate communications will continue to be provided and expand in 2025. The company plans to continue to work with local tribal leadership to secure feedback about SDG&E's AFN offerings during PSPS as well as other resources and needs for tribal communities. A contracted agency will support this opportunity to enhance support for public education and outreach efforts.

Communication and customer engagement is fundamental to ensuring wildfire preparedness and PSPS resiliency in the HFTD communities. SDG&E is dedicated to meeting customers' needs, meeting them where they're at, and will continue to leverage multiple channels of communication:

- Year-round wildfire safety education and communications campaign that leverages more than 20 diverse communications platforms
- Multiple webinars and wildfire safety fairs to connect customers with subject matter experts
- In-community electronic signage to share important and timely safety information during a PSPS

Statewide Website for AFN Solutions

PrepareForPowerDown.com (P4PD) is a Joint IOU website, created as a centralized resource for statewide CBO and agencies serving AFN communities, providing easy access to IOU information on PSPS preparedness and resources. The website offers downloads, including the Joint IOU CBO training presentations, PSPS social media graphics and utility specific PSPS support materials. While those materials are still available for CBOs, P4PD is now a customer-facing website with additional user-friendly features and emergency preparedness tools.

Joint IOUs performed Phase 2 updates that focused on enhancing the user journey through the website. The updated site offers a utility-customized view of programs and resources, customized preparedness checklists, and additional encouragement to sign up for outage alerts, enroll in Medical Baseline Allowance program, if eligible, and gain access to other utility customer support programs.

In 2025, the Joint IOUs will continue to share the website with stakeholder groups and organizations to drive awareness and potential use of the website. The website will be monitored and updated on a continuous basis. Website analytics will be provided in our quarterly report.

Accessibility of Communications

Effective communication is important for the safety and well-being of customers of every ability and requires accessibility. Enhancing the accessibility of customer notifications is a top priority. SDG&E worked with stakeholders and experts to identify accessibility enhancement opportunities in our notifications to customers. These include:

- Implementing the Accessible Hazard Alert System (AHAS), that provides customized on-demand accessible alerts in real time (approx. 15 min) with the same accessibility as the current pre-recorded PSPS customer notifications. This allows SDG&E to provide accessible communications during unforeseen emergencies. These notifications are also in accessible formats to be shared on social media and web platforms.

- Implementing the Video Remote Interpreting (VRI) resource and training to all CRC and Branch Office staff, allowing for complex conversations and information sharing in ASL and languages other than English. SDG&E employees may access the VRI resource by PC, tablet, or Smart Phone via the Boost Lingo platform. ASL interpreters via video chat, or language interpreters (voice only) are available 24/7 to equally provide important information and to engage in conversations with all customers.

- Maintaining compliance with WCAG 2.2 AA guidelines, through partnership with companies via ongoing review, scoring and remediation of the three external facing SDG&E web sites (SDGE.com, MyAccount.sdge.com, and SDGEnews.com). Detailed accessibility reports, web development team training, help desk and accessibility resources support are available throughout the year.

- Reviewing customer program application processes and forms to identify opportunities to make it more accessible and easier for customers to navigate.

- Conducting readability reviews of web content and marketing materials to ensure information is conveyed in a simple language and easy to understand format. SDG&E is exploring training for marketing and web contact contributors in creating accessible documents.

AFN Power Panel

To better understand the needs of customers with AFN, the power panel surveys will continue into 2025. The AFN Power Panel are surveys specifically for customers with AFN to serve as customer advocates for accessibility and accommodations in relation to PSPS. Topics may include outage needs, communication channels, electric-powered device needs, and other areas of interest that help SDG&E identify and refine accommodations and communications to better serve this population. In
2025, the surveys may include various AFN related marketing materials and communications for understanding and effectiveness. While SDG&E deems the information from respondents as valuable to understanding customer segment, the sample size of the AFN Power Panel is typically small (n=~350), so results from these surveys are interpreted with caution.

Community Based Organization Outreach

CBOs continue to serve as a key channel and support network throughout SDG&E's service territory. These organizations are considered trusted partners in the communities they serve and provide valuable insight and engagement across various segments, including support to individuals with an AFN. Additionally, these partners amplify SDG&E's wildfire preparedness and notification messaging to hard-to-reach customers, with an emphasis on reaching those located in the HFTD.

SDG&E's Energy Solutions Partner Network, which consists of more than 200 CBOs, is leveraged to help prepare customers, with a focus on individuals with AFN, for wildfires and other emergency situations. These partners, who receive financial compensation for their year-round support, leverage critical information and notifications through a variety of outreach tactics including presentations, events, meetings, and the amplification of emergency preparedness information through their respective social media channels. SDG&E targets outreach to the diverse needs of individuals with AFN and will continue to seek opportunities to promote enrollment and awareness of support services available during a PSPS.

In 2025 SDG&E will continue to strengthen existing partnerships while building new partnerships with organizations that represent the needs of customers with AFN, with a focus on the deaf and blind or low vision, those with assistive technology and durable medical equipment, and those who prefer a language other than English. We have identified these segments as areas of growth for outreach through feedback from council engagement and surveys.

SDG&E will continue to provide an enhanced compensation structure for CBOs to provide enhanced notification support, focusing on those in the HFTD as well as individuals with an AFN. To further reach these customers and amplify preparedness and active PSPS support, SDG&E strategically identified and leveraged support from CBOs within its Energy Solutions Partner (ESP) network. As part of this enhanced process, these CBOs, who reach a wide range of demographics including diverse, multicultural, multilingual, senior, disadvantaged and AFN communities, received comprehensive training and materials related to emergency preparedness and wildfire safety. Prior to a PSPS, SDG&E provides notifications and updates to these organizations, who then serve as a critical channel to amplify messaging and communicate with customers who may not utilize traditional channels. This PSPS messaging is then shared through the CBO's communication channels including social media platforms such as Facebook, X, and Instagram. Examples of these select CBOs include 1) Fallbrook Senior Center 2) San Diego Center for the Blind; 3) Deaf Community Services; 4) Julian Cuyamaca Resource Center; 5) Meals on Wheels; and 6) La Maestra Community Health Centers.

SDG&E currently has a network of roughly 50 CBOs that provide PSPS notification support. In 2025, SDG&E plans to continue to enhance this engagement effort and expand the PSPS support network.

SDG&E also provides presentations to local CBOs that may not be part of the ESP network, focusing on organizations with disabled and aging population constituents. These presentations provide educational awareness of PSPS support services, emergency preparedness, customer assistance programs and collaboration opportunities to enhance outreach efforts. Examples of targeted organizations who receive presentations include Fire Safe Councils, Serving Seniors, San Diego HHSA, Live Well Rural Collaborative, Rural Healthcare Collaborative and the Council on Access and Mobility.

In 2025 SDG&E will also continue to award key AFN organizations with shareholder grants who provide additional PSPS preparedness. SDG&E will work with these groups to identify PSPS support service educational trainings, shared AFN and PSPS materials, and other outreach opportunities as they are identified.

SDG&E recognizes there are additional opportunities to reach customers who are disabled and aging individuals with our preparedness and support services with accessible messaging. In 2025 SDG&E will continue working with a local communications firm to advise on strategic communication channels, effective collateral, and tactics to expand educational outreach to targeted AFN segments in the High Fire Threat District.

AFN Collaborative Council & Joint IOU AFN Statewide Advisory Council

SDG&E is committed to understanding the unique and diverse needs of individuals with AFN. To facilitate that understanding, SDG&E seeks feedback from stakeholders alongside other California IOUs through participation in the AFN Collaborative Council and Joint IOU Statewide AFN Advisory Council. Each council serves a specific purpose which provides support for SDG&E's diligence in assisting customers with AFN.

The AFN Collaborative Council consists of executive leaders across the AFN community and IOU executive leaders. This Council functions as the steering committee (decision-making forum) for the Statewide Joint

IOU AFN Advisory Council (working group forum). See Appendix A for the list of Collaborative Council members and Appendix B for Joint IOU Statewide AFN Advisory Council members. Both Councils meet on a quarterly basis, or more frequently as needed.

The Joint IOU AFN Statewide Advisory Council is comprised of a diverse group of recognized CBO leaders that support the AFN population as well as members and advocates from within the AFN community. The Joint IOU AFN Statewide Advisory Council serves as a working group and opens the dialogue to discuss unique needs of individuals with AFN and develop a holistic strategy on how to better serve them.

The Joint IOU AFN Statewide Advisory Council aids all stakeholders in developing and executing meaningful strategies to serve individuals with AFN. It provides independent expertise to help ensure that utility customer programs incorporate best practices. The Joint IOU AFN Statewide Advisory Council also helps utilities and other stakeholders further develop their AFN strategies to implement robust programs that will adequately and appropriately educate, communicate with, and aid individuals with AFN in building resiliency for emergencies, outages, and de-energization events such as PSPS.

Members of the Joint IOU AFN Statewide Advisory Council are encouraged each year to serve on the Core Planning Team by working alongside the utilities to develop the AFN Plan. See Appendices A and B for indicated members of the Core Planning Team members who participated this year.

SDG&E continues their commitment to building upon the expertise of these councils and identify opportunities to address the needs of individuals with AFN across the service area. SDG&E will engage these councils throughout the year and continue to incorporate feedback in quarterly reports. Building off the progress of developing a framework to share best practices in support of AFN communities, the utilities, AFN Collaborative Council, and Advisory Council will circulate the final materials to industry colleagues in 2025. The Collaborative Council will look to share the framework with peers nation-wide while identifying engagement opportunities with interested stakeholders.

Key Outreach Segments

Healthcare Industry and State Agencies

SDG&E recognizes that ongoing engagement with healthcare practitioners, medical associations, managed care program providers, and durable medical equipment suppliers is a key opportunity to increase enrollment in the Medical Baseline Program and connect individuals with AFN to programs and services that help our customers prepare for a PSPS.

The Joint IOUs will continue partnering to deliver statewide training sessions to the California's Department of Social Services In-Home Supportive Services (IHSS) Program Managers, the Department of Developmental Services' Regional Center staff, and the California Hospital Association/California Hospital Council. The training sessions will cover relevant information such as:

- Emergency preparedness and planning
- 211 Support Services during a PSPS
- Generator and back-up battery programs
- Medical Baseline Allowance Program and AFN Self-Identification other resources and offerings provided to customers before and during a PSPS (e.g., PSPS notifications sign-ups, Community Resource Centers, food support)

In 2025, the Joint IOUs will continue to cultivate new partnerships and expand on existing relationships increasing PSPS preparedness and driving enrollment in the MBL Program. Activity and results will be provided in our quarterly report.
SDG&E will continue to advance the current relationship with Sharp Grossmont Hospital and the Grossmont Rural Outreach Pilot program supporting the awareness and potential assistance of the Medical Baseline Applications and PSPS preparedness. This includes identifying potential challenges and collaborating on solutions making it easier to help customers.

Additionally, SDG&E will continue enhancing awareness around the Medical Baseline Allowance Program to reach individuals who may use durable medical equipment through partnering with local medical supply stores. These businesses make MBL applications (and PSPS preparedness flyers where applicable) available to interested customers.

SDG&E will continue to enhance these relationships and work collaboratively with the Joint IOUs in sharing best practices in the Healthcare space.

Paratransit Service Engagement

SDG&E partnered with FACT, a key paratransit broker agency in SDG&E's region, to develop communication protocols during PSPS events for the paratransit service providers in the SDG&E service territory. SDG&E provided updates on PSPS activation, who amplified the notification to approximately 160 paratransit service provider's network.

Master Meter Outreach

In 2025 SDG&E plans to continue a strong focus on reaching non-account holders through direct and email campaigns and presentations. These campaigns, and presentations with CBO's, educate and inform multifamily unit and manufactured home park account holders, property managers, building owners and tenants of PSPS preparedness and available support services. SDG&E will continue to identify outreach opportunities and communication channels to share preparedness information.

Advisory Councils

Wildfire Safety Community Advisory Council (WSCAC)

The Wildfire Safety Community Advisory Council (WSCAC) was established in 2019. WSCAC provides direct constructive input, feedback, recommendations, and support from community leaders to SDG&E senior management and the Safety Committee of SDG&E's Board of Directors on how SDG&E can continue to help protect the region from wildfires. This specialized group of diverse and independent leaders from public safety, tribal government, business, nonprofit, and academic organizations in the San Diego region possess extensive experience in public safety, wildfire management, community-based services, and applied technology.

WSCAC meetings are led by SDG&E's Chief Operating Officer, Kevin Geraghty, and are attended by members of the Safety Committee of the SDG&E Management Board. At WSCAC meetings, SDG&E annually presents its Wildfire Mitigation Plan and subsequent updates for discussion, suggestions, and recommendations by WSCAC members. SDG&E also welcomes input from WSCAC members on relevant emerging community issues on wildfire safety and preparedness. Meetings are organized by SDG&E's Wildfire and Climate Science department working with Community Relations, Wildfire Mitigation, Vegetation Management, Emergency Operations, Operations Communications, Fire Science and Climate Adaptation, Aviation Services, Distribution Operations, Electric System Planning & Grid Modernization, Regulatory Affairs, State Government Affairs, and other departments as necessary. In 2021, SDG&E began conducting quarterly WSCAC meetings.
Consistent with prior years, WSCAC meetings are planned to continue quarterly through 2025.

Tribal Engagement

SDG&E has a Tribal Relations team that includes a dedicated manager to engage and coordinate with tribal leaders and continue to meet with these partners to understand their greatest challenges with PSPS. Through these collaborations, the top-of-mind challenges identified include the impacts to vulnerable tribal members, food insecurity and access to the hardest to reach areas of reservations. Tribes continue telling us they have limited resources and cannot always provide feedback. In response, SDG&E established support systems with CBOs to provide generators, resiliency items, information, and resources in advance of wildfire season and support with emergency food distribution during PSPS. In 2024, SDG&E led a focus group with tribal government staff and first responders, a survey to tribal government staff and leaders to understand how to better support tribal communities through PSPS events and will be implementing focus groups following PSPS events with tribal governments impacted. Tribal Nations and Organizations were provided facetime through presentations and informational tables. Additionally, the SDG&E team increased partnerships with Tribal Nations to increase one-on-one opportunities to provide on-site enrollment for tribal members. SDG&E will continue to seek feedback to enhance support.

Building on the feedback we received from tribal leaders and first responders, in 2025, SDG&E will continue to increase one-on-one opportunities with tribal community members, meet tribes where they are at, and support tribal fire departments and law enforcement with resources and grants as a support system to provide resiliency items, generators, and information to reach more tribal members, particularly during PSPS because they are the most trusted and on-the-ground conducting wellness checks to the most vulnerable tribal members living on reservations. In addition, we will continue to have year-round listening sessions with tribal leaders and staff to increase our reach to tribal members living on and off the reservations.

2.2 PSPS Activation (During – Emergency Operation Center Activated)

2.2.1 PSPS Activation

SDG&E had two PSPSs in 2024, one in November and a second in December. The Emergency Operations Center was activated November 3rd to November 8th and again December 6th to December 12th. These activations were in response to the high wind warning and critical fire weather in the service territory. SDG&E monitored the conditions using several real-time situational awareness tools to assist with decision making**,** resulting in de-energizations across various parts of SDG&E service territory.

Table 7: Furnished Resources

AFN Resources Before, During, and After 2024 PSPS*	2024 Total
Accessible Transportation Trips	3
Over Night Hotel Stays	82
Warm Meals Served at CRC/tribal support	25
Generator Requests	28
$50 Gift Cards distributed	NA
CRCs Activated	11

** AFN Resource offerings listed above are not by census tract.*

Potential circuits were pre-patrolled to identify any potential issues before the winds arrived. Vegetation management pre-patrolled potentially impacted areas to ensure there was no possible tree contact.

Approximately 141,000 customers were notified with enhanced notifications for Medical Baseline Customers. An engagement survey was sent out to partners to gauge communication efficacy and 89% of partners rated SDG&E's engagement as good or great after the November activation which improved to 93% after the December activation.

2.2.2 PSPS Communications

Before PSPS Paid Media/Advertising

SDG&E will continue to maintain a robust Wildfire Safety community awareness campaign to educate customers and the general public throughout its service territory. This campaign helps the community prepare for the risk of wildfires and PSPS and encourages customers and the public to take preparedness measures, such as updating their profile contact information, signing up for SDG&E notifications and downloading the Alerts by SDG&E mobile app. Fundamental to the campaign's success is its collaborative framework – local public safety and community partnerships such as 211 San Diego, 211 Orange County, the San Diego County AFN Working Group and Community Based Organizations that serve the AFN communities, help disseminate important information to potentially impacted and vulnerable communities.

Communication efforts also focus on AFN populations and other hard-to-reach communities. A dedicated paid AFN public-education campaign is activated every year leading up to and during peak wildfire season. The 2025 campaign will continue to inform customers and the public about available services through SDG&E's collaboration with local community-based organizations (CBOs) including 211 San Diego, 211 Orange County, FACT, and others. Key materials are produced in prevalent languages spoken in the region. Some paid communications being considered include, but are not limited to:

- Promotion of community engagement events, emergency preparedness workshops, safety fairs and public participation meetings
- General Market TV
- Streaming TV
- General Market Radio
- Streaming Radio
- Radio Sponsorships (Traffic, News, Weather)
- Out-Of-Home (Bulletins/Posters/Transit)
- Digital (Banner Ads, Mobile Phone Ads, Online Video, Paid Search, Paid Social)
- Print Advertising
- Community newspapers in the HFTD and the service territory (Back Country, Latino/Hispanic, Asian, African American, General Market)
- Educational information disseminated through a bill newsletter or special insert included in customer bills.
- A series of wildfire safety and preparedness videos and vignettes to help customers and the public prepare for wildfire and PSPS
- Distribution of an annual Wildfire Safety newsletter that is mailed to customers in the HFTD.
- Promotion of weather information and system-outage status on SDGE.com
- Paid and organic social media messaging that includes platforms like X.com (formerly Twitter), Facebook, Instagram and Nextdoor.
- Partnership with a network of more than 400 non-profit and community-based organizations who share fire safety and emergency communications with their networks.
- Direct promotion of customer offerings such as generator incentives, resiliency surveys and AFN resources

SDG&E will continue to solicit and utilize customer feedback to refine and improve public education messaging and tactics listed above.

Communications During PSPS

During a PSPS, SDG&E uses voice, text, email and app notifications, website updates, media updates, in-community signage and situational awareness postings across social media and shares social media toolkits with community and public safety partners to communicate real-time information to a broad audience. Additionally, SDG&E activates communications to provide affected customers and the public with the latest real-time updates during a PSPS. Key communications are available in 22 prevalent languages including ASL and digitally accessible text.

During a PSPS, SDG&E has a dedicated AFN liaison, who is responsible for conveying real-time updates and talking points to AFN community partners. SDG&E also uses communication platforms, including social media channels, broadcast and print media, and the WCAG 2.2 AA accessible, SDG&E Today (our public-facing blog) and SDGE.com websites, to share enhanced support services available for individuals with AFN. SDG&E also produces and distributes a digital document that lists communities affected by a PSPS and shares it with local municipalities and agencies. This effort is intended to give additional context about PSPS events and help communities prepare.

In addition to mass media, SDG&E utilizes several communications channels geared towards individuals who may not be accountholders (e.g., visitors, mobile home park residents, caretakers, etc.) these channels include SDG&E's mobile app, *Alerts by SDG&E,* roadside electronic message signs placed in strategic, highly traveled locations, tribal casino marquees and flyers posted around impacted communities.

The company plans to continue customer research efforts with PSPS-affected customers at the end of the 2025 season.

PSPS Notifications

SDG&E sends PSPS notifications to all impacted individuals as soon as possible through its Customer Notification System (recorded voice message, email and text message). The company also works with Deaf Link to convert all notifications into American Sign Language (ASL) video, English audio read-out and screen reader accessible transcript. Additionally, SDG&E enables address-level alerts for customers and the general public through its accessible Alerts by SDG&E app. For assigned Critical Facility and Infrastructure customers, their respective SDG&E account executive also contacts them via contact methods (such as phone call and/or email) that are preferred by the customer. The account executives then provide situational updates and lists of potentially impacted meters. Additionally, as part of SDG&E's PSPS notification process, all account holders including multi-family building account holders, receive notices prior to conducting a de-energization.

Annually, SDG&E evaluates the content library of PSPS email, text and voice notifications for customers and non-accountholders. SDG&E also uses feedback solicited from and provided by customers who have been notified and affected by PSPS events to simplify notification messaging and make content more representative of the conditions being experienced. SDG&E will be reviewing notifications in 2025 for clarity and may make refinements to make messaging clearer and more accessible. SDG&E will continue to translate and record updated PSPS notifications into the 22 prevalent languages spoken in the region. Every year the SDG&E public-education campaign includes messaging about signing-up for notifications prior to the start of peak fire season.

For MBL and Life Support Customers, SDG&E reviews the results of each Customer Notification System campaign to determine if a positive confirmation for MBL customers was received through a voice contact (landline or cell phone, based on the customer's preferred contact number). For any MBL customers that SDG&E does not reach by voice contact, a list is provided to SDG&E's Customer Contact Center, who proactively call customers that have not been contacted. If they are unsuccessful in contacting the customer, SDG&E will then send a Customer Service Field representative to the customer's service address to notify them. SDG&E trains Customer Service Field representatives on the County of San Diego's First Responder AFN Training Series to promote an empathetic and supportive approach for customers with AFN.

Accessible Media Engagement

SDG&E continues to prioritize accessibility for its websites and mobile apps. The company takes a proactive approach to reach Americans with Disabilities Act (ADA) and Web Content Accessibility Guidelines (WCAG) 2.2 AA success criteria for accessibility.

SDG&E continues to leverage an AFN landing page (sdge.com/AFN) to allow customers to self-identify, as well as get personalized resources for AFN needs. Optimized Drupal (content management system) includes accessibility features such as search engine form and presentation, color contrast and intensity, image handling and form labeling. Implementation of the AudioEye services continuously test and remediate accessibility issues automatically and send alerts for other potential issues. SDG&E also works with the Center for Accessible Technology (C4AT) on testing and remediation of the company's digital mobile application properties.

While executing the development, implementation review and monitoring of our digital properties, SDG&E ensures that WCAG 2.2 AA accessibility standards are a priority so all customers can access our information.

In 2025, SDG&E will continue to engage with local broadcast media and utilize various mediums to reach the public, including AFN communities, and Limited English Proficient residents, to provide them with wildfire safety and emergency preparedness information, PSPS awareness and PSPS education.

Per the U.S. Census Bureau, San Diego County is home to more than 3.3 million residents, approximately 1.1 million of whom are Hispanic and Latino. SDG&E's service territory also borders Baja California, México, and is home to one of the busiest land border crossings in the world. In addition to providing communications in language, SDG&E's dedicated Spanish communications team produces wildfire safety and PSPS-related news releases, social media and other communications pieces in Spanish for the public and local Spanish broadcast media. SDG&E also continues to provide critical PSPS and wildfire safety information in all prevalent languages.

Prior to and during high fire risk conditions, SDG&E will engage local broadcast media, including local Spanish media and multicultural niche outlets, early and often to reach customers and notify them during a wildfire or high fire risk weather conditions to keep our diverse customer base and the public informed.

2.2.3 Community Resource Centers (CRCs)

As a result of meetings held in communities in SDG&E's service area, SDG&E established a network of Community Resource Centers (CRCs) to help communities in real-time during Public Safety Power Shutoffs. Currently, SDG&E has identified 11 customer-owned facilities located within the HFTD to serve as CRCs during Public Safety Power Shutoffs and maintains 3 mobile units for deployment. The CRC locations selected by SDG&E were identified through a rigorous process, which included input from fire and meteorological experts, as well as consideration of those areas most prone to adverse weather, as indicated by historical data.

Customers at CRCs are provided:

- Bottled water
- Light snacks
- Cell phone and medical device charging
- Seating
- Accessible Restrooms
- Ice
- Water trucks (for large animals)
- Up-to-date outage event information

SDG&E endeavors to provide cellular network services and will collaborate with the telecommunication providers who support services in CRC areas.

SDG&E has coordinated with each CRC site-facility owner on Americans with Disabilities Act (ADA) compliance and has provided additional accessibility and safety items in "AFN Go Kits". These Go Kits include items to mitigate trip hazards, communication aids, additional accessibility and directional signage, and materials to expand accessible parking and provide safe paratransit loading zones. Privacy screens are available to provide a private area for sensitive activities like administering medications, breastfeeding, or establishing a calming area for sensory disabilities and other needs.

Additionally, SDG&E has leveraged key takeaways from Cal OES's Inclusive Planning Blueprint for Addressing Access and Functional Needs at Mass Testing/Vaccination Sites. SDG&E has implemented Video Remote Interpreting (VRI) resource and training to all CRC staff, allowing for complex conversations and information sharing in ASL and other languages. Each CRC will also have non-English visual translator boards for simple and casual conversations. SDG&E will ensure all CRC staff are familiar with possible reasonable accommodation requests and know to refer such requests to the EOC AFN Liaison Officer for solution support.

SDG&E established a medical device drop-off process for charging AFN individuals at the CRCs and will have medical cooler organizers available. More details about SDG&E's CRCs, including siting and accessibility will be outlined in its forthcoming CRC plan as required by D.20-05-051.

2.3 Recovery (After – Power has been restored)

2.3.1 AFN Support

After Action Reviews and Reports

SDG&E will continue to follow the established emergency management After Action Review (AAR) process for all events in 2025. This process includes bringing together key internal personnel that participated in the event in any way. Other AARs are held with external partners and a joint report is then produced to combine all findings to understand our strengths, opportunities to improve and lessons learned into an AAR Improvement Plan for implementation.

Lessons Learned and Feedback

There were several lessons learned in 2024 which SDG&E used as an opportunity to develop more robust strategies to support our customers and focus on sharpening our AFN subject matter expertise. SDG&E will continue to leverage lessons learned from previous events including closer coordination and more advanced notice to AFN support model partners and vendors. The nature of a PSPS does not lend itself to extended advance notice, however, SDG&E will notify partners and vendors when there are early indications of weather conditions that may trigger a PSPS.

Customer Surveys

A post PSPS Wildfire Survey is conducted once a year at the end of Wildfire Season. The survey is being prepared and will be fielded late December/early January. Survey results will be reported in the 2025, Q1 AFN Progress Report. Results of the 2024 Pre-season and Post-season surveys will also be used to evaluate and improve communications for 2025. The company plans to resume Pre-season and Post-season research efforts during 2025 as well.

3. INFORMATION COLLECTION, ANALYSIS AND DISSEMINATION

3.1 Customer Privacy

To better serve our customers and individuals with AFN, SDG&E may communicate with account holders from time to time to update their account information, prioritizing those with health or safety related AFNs. Additionally, SDG&E enables customers to self-identify as having an AFN by selecting one or more of the identifiers listed. (See section 2.1.2 for additional information) These AFN identifiers are currently limited to blind or low vision, deaf or hard hearing, disabled, AFN, use of assistive technology or durable medical equipment. Information may also be used for safety, research, and data analysis such as informational dashboards aggregating AFN population quantities in high fire threat districts or developing maps showing distribution of AFN residents by zip code.

This information is used to provide program and PSPS support services marketing communications to customers who are identified as AFN in our system. Communications are not sent to customers who have opted out of receiving marketing related information. The customer's selected self-identification as having access and functional needs are not identified in the communications. Additionally, SDG&E reports overall metrics including total number of individuals with AFN in the service territory, and total within the HFTD, to external working groups, councils and the CPUC.

If information about the customer has changed or they no longer wish to be identified as AFN, they may contact SDG&E's customer call center at 1-800-411-7343. San Diego Gas & Electric Company takes the privacy and security of personal information seriously. Its Privacy Policy and CCPA Policy describes how we collect, use, and disclose customer information, including consumer rights regarding their personal information relating to California residents under the California Consumer Privacy Act of 2018 ("CCPA"). These policies can be located at sdge.com/privacy.

4. AUTHORITIES AND REFERENCES

4.1 Annual Report and Emergency Response Plan in Compliance with General Order 166

SDG&E updated the Company Emergency and Disaster Preparedness Plan which was approved and signed by the Vice President of Wildfire and Climate Science on 04/23/2024. This plan is updated annually, all updates are in compliance with GO 166. The next formal update will be completed by 4/30/2025.

4.2 Phase 3 OIR PSPS Guidelines: AFN Plan & Quarterly Updates

G.6. Each electric investor-owned utility's annual Access and Functional Needs plans and quarterly updates must incorporate, at minimum, the six steps outlined in the **Federal Emergency Management Administration's Comprehensive Preparedness Guide [ready.gov]:**

- Forming a collaborative team
- Understanding the situation
- Determining goals and objectives
- Developing the plan
- Plan preparation and approval
- Plan implementation and maintenance

As part of forming a collaborative planning team, utility representatives at the Senior Vice President level, or with comparable decision-making power over development and implementation of the Access and Functional Needs plans, must meet at least quarterly with representatives of state agencies and community-based organizations that serve and/or advocate on behalf of persons with access and functional needs. The purpose of these meetings will be to develop, implement, and review each IOU's annual Access and Functional Needs plans in accordance with the **Comprehensive Preparedness Guide [ready.gov].**

(Note: Phase 3 PSPS Guidelines (AFN section starts on p.106))

APPENDIX A – F

Appendix A:

Collaborative Council Members

APPENDIX A – COLLABORATIVE COUNCIL MEMBERS*

*Indicates member participated in the 2024 AFN Plan Core Planning Team

Name	Organization	Title	Group
Aaron Carruthers	State Council on Developmental Disabilities (SCDD)	Executive Director	Collaborative Council
Alana Hitchcock	California 211	Executive Director	Collaborative Council
Andy Imparato	Disability Rights California (DRC)	Executive Director	Collaborative Council
April Johnson*	San Diego Gas & Electric (SDG&E)	Customer Programs Supervisor	Collaborative Council
Audrey Williams	California Public Utilities Commission (CPUC)	Project and Program Supervisor – SPD	Collaborative Council
Aurora Cantu	Southern California Edison (SCE)	Senior Manager	Collaborative Council
Beena Morar*	Southern California Edison (SCE)	Senior Project Manager	Collaborative Council
Brett Eisenberg	California Foundation for Independent Living Centers (CFILC)	Executive Director	Collaborative Council
Britney Gaines	CPUC		Collaborative Council
Chris Alario	Liberty	President, California	Collaborative Council
Chris Zenner	Pacific Gas & Electric (PG&E)	Vice President, Residential Services & Digital Channels	Collaborative Council
Christina Rathbun*	San Diego Gas & Electric (SDG&E)	AFN Project Manager	Collaborative Council

Dana Golan	San Diego Gas & Electric (SDG&E)	Vice President of Customer Services	Collaborative Council
Julia Mendoza*	San Diego Gas & Electric (SDG&E)	AFN Customer Strategy Manager	Collaborative Council
Danielle Finch	San Diego Gas & Electric (SDG&E)	Manager of Customer Success	Collaborative Council
Edward Jackson	Liberty	President	Collaborative Council
Hollie Bierman	San Diego Gas & Electric (SDG&E)	Director, Customer Programs	Collaborative Council
James Cho	California Public Utilities Commission (CPUC)	Program Manager	Collaborative Council
James Dui	California Public Utilities Commission (CPUC)	Safety Policy Division	Collaborative Council
Jennifer Guenther	Liberty	Senior Regional Manager – West	Collaborative Council
Jennifer Ocampo*	Southern California Edison (SCE)	AFN Senior Advisor	Collaborative Council
John Hagoski	San Diego Gas & Electric (SDG&E)	Customer Programs Advisor	Collaborative Council
Jordan Davis	Disability Rights California (DRC)	Attorney	Collaborative Council
Junaid Rahman	California Public Utilities Commission (CPUC)	Senior Regulatory Analyst - SPD	Collaborative Council
Karen Mercado	Disability Rights California (DRC)	Senior Administrative Assistant - Executive Unit	Collaborative Council
Kate Marrone	Liberty	Key Account Manager	Collaborative Council
Kayla Price	Bear Valley Electric Services (BVES)		Collaborative Council

Larry Chung	Southern California Edison (SCE)	Vice President	Collaborative Council
Lizz Stout*	Pacific Gas & Electric (PG&E)	Program Manager, Principal	Collaborative Council
Maria Jaya	California Public Utilities Commission (CPUC)	Public Utilities Regulatory Analyst - SPD	Collaborative Council
Matthew Fehse*	San Diego Gas & Electric (SDG&E)	AFN Regulatory & Compliance Advisor	Collaborative Council
Matthew McVee	PacifiCorp	Vice President, Regulatory Policy and Operations	Collaborative Council
Moustafa Abou-taleb	California Public Utilities Commission (CPUC)	Safety Policy Division	Collaborative Council
Nicholas Raft	Liberty	Regulatory Analyst	Collaborative Council
Nicole Bohn	Disability Rights Education & Defense Fund (DREDF)	Executive Director	Collaborative Council
Paul Marconi	Bear Valley Electric Services (BVES)	President, Treasurer, & Secretary, Board Director	Collaborative Council
Pooja Kishore	PacifiCorp	Renewable Compliance Officer	Collaborative Council
Robb Henderson	San Diego Gas & Electric (SDG&E)	Communications Advisor	Collaborative Council

Robert Carbajal	Southern California Edison (SCE)	Senior Manager, Customer PSPS Compliance and Strategy	Collaborative Council
Robert Hand	California Foundation for Independent Living Centers	Interim Executive Director	Collaborative Council
Ryan Bullard*	Southern California Edison (SCE)	Senior Manager, PSPS Support and Accessibility	Collaborative Council
Sarah Lee	Southern California Edison (SCE)	Senior Advisor, Public Safety	Collaborative Council
Sean Matlock	Bear Valley Electric Services (BVES)	Energy Resource Manager / Assistant Corporate Secretary	Collaborative Council
Tawny Re	Bear Valley Electric Services (BVES)	Customer Program Specialist	Collaborative Council
Tom Smith*	Pacific Gas & Electric (PG&E)	Senior Manager, LCE Planning & Operations	Collaborative Council
Valarie Hernandez	Southern California Edison (SCE)	Principal Manager, Customer Program Services	Collaborative Council
Vance Taylor	California Governor's Office of Emergency Services (CalOES)	Chief, Office of Access and Functional Needs	Collaborative Council

Appendix B:
Statewide Council Members

APPENDIX B – STATEWIDE COUNCIL MEMBERS*

*Indicates member participated in the 2024 AFN Plan Core Planning Team

Name	Organization	Title
Aaron Christian	California Department of Development Services (DDS)	Assistant Deputy Director of Office of Community Operations
Adam Willoughby	California Department of Aging (CDA)	Asst. Director of Legislation and Public Affairs
Alana Hitchcock	California 211	Executive Director
Alejandro Garibay	Southern California Edison (SCE)	Marketing Project Manager/Advisor
Alexandria (Giobbi) Moffat	San Diego Gas & Electric (SDG&E)	Director of Clean Transportation
Alicia Menchaca	Bear Valley Electric Services (BVES)	Rate Analyst
Alyson Feldmeir	California Foundation for Independent Living Centers (CFILC)	Disability Disaster Access and Resource Manager
Amanda Kirchner	County Welfare Directors Association of California (CWDA)	Legislative Director
Annabel Vera	California Department of Social Services (DSS)	Program Analyst
April Johnson*	San Diego Gas & Electric (SDG&E)	Customer Programs Supervisor
Aurora Cantu	Southern California Edison (SCE)	Senior Manager
Beatrice Lavrov	California Department of Development Services (DDS)	Staff Service Manager
Beena Morar*	Southern California Edison (SCE)	PSPS Readiness Senior Project Manager

Carolyn Nava	Disability Action Center (DAC)	Executive Assistant
Carrie Bowers	San Diego Gas & Electric (SDG&E)	Fire Science Meteorologist
Chris Bober	Pacific Gas & Electric (PG&E)	Director, Customer Care
Chris Garbarini*	California Department of Developmental Services (DDS)	Senior Emergency Services Coordinator
Chris Zenner	Pacific Gas & Electric Company (PG&E)	Vice President of Customer Channels and Services
Christina Mills	California Association of the Area Agencies on Aging (C4A)	Executive Director
Christina Rathbun*	San Diego Gas & Electric	AFN Project Manager
Dan Heller	Deaf Link	President
Dan Okenfuss	California Foundation for Independent Living Centers (CFILC)	Public Policy Manager
Dana Golan	San Diego Gas & Electric (SDG&E)	Vice President of Customer Services
Julia Mendoza*	San Diego Gas & Electric (SDG&E)	AFN Customer Strategy Manager
Danielle Finch	San Diego Gas & Electric (SDG&E)	Manager of Customer Success
Dara Mikesell	San Gabriel Pomona Regional Center (SGPRC)	CFO
David Siuta	Southern California Edison (SCE)	Meteorology Senior Advisor
Eleonore Yotsov	PacifiCorp	Director, Emergency Management, PacifiCorp
Evan Duffey	Pacific Gas & Electric (PG&E)	Manager, Forecasting and Operations

Gabby Eshrati	North Los Angeles County Regional Center	Consumer Services Director

Gina Esparza	Eastern Los Angeles Regional Center (ELARC)	Emergency Management Coordinator
Greg Oliva	California Department of Social Services (DSS)	Assistant Deputy Director, Central Operations, Community Care Licensing Division
James Cho	California Public Utilities Commission (CPUC)	Program Manager
James Collins	California Council of the Blind (CCB)	Community Educator
James Dui	California Public Utilities Commission (CPUC)	Safety Policy Division
Jeana Arnold	Pacific Gas & Electric (PG&E)	ADA Specialist, Expert
Jennifer Guenther	Liberty	Senior Manager - Customer Solutions
Jennifer Nerida	Pacific Gas & Electric (PG&E)	Senior ADA Specialist
Jennifer Ocampo*	Southern California Edison (SCE)	Senior Advisor, Corporate Giving
Joe Xavier	Department of Rehabilitation (DOR)	Director
Jordan Davis	Disability Rights California (DRC)	Attorney
Jordan Parrillo	Liberty	Manager of Regulatory Affairs
Joseph Grounds	Kern Regional Center (KERNRC)	Emergency Services Officer
Josh Gleason	California Department of Social Services (DSS)	Unknown
JR Antablian	California Department of Social Services (DSS)	Chief, Disaster Services Branch

June Kailes*	Disability Policy Consultant	Disability Policy Consultant
Karey Morris	Kern Regional Center (KERNRC)	HR Manager
Kari Gardner	Southern California Edison (SCE)	Sr. Manager of Consumer Affairs
Kate Marrone	Liberty	Key Account Manager
Kayla Price	Bear Valley Electric Service (BVES)	
Kay Chiodo	Deaf Link	CEO
Kelly Brown	211, Interface Children & Family Services	Community Information Officer
Kendall Skillicorn	California Department of Social Services Disaster Unit (DSS)	Bureau Chief, Department Operations Bureau
Kevin Sharp	Pacific Gas & Electric (PG&E)	Customer Insights Strategist
Kristopher Bourbois	San Diego Gas & Electric (SDG&E)	Regulatory Case Manager
Larry Grable	Service Center for Independent Living (SCIL)	Executive Director
Lauren Burnett	Southern California Edison (SCE)	Senior Manager, Customer Insights
Lauren Giardina	Disability Rights California (DRC)	Executive Director Managing Attorney
Leora Filosena	California Department of Social Services Adult Program Division (DSS)	Deputy Director, Adult Programs Division
Lisa Corbly*	Pacific Power	Emergency Management Specialist
Lizz Stout*	Pacific Gas & Electric (PG&E)	AFN Program Manager
Malorie Lanthier	North Los Angeles County Regional Center	IT Director

Maria Aliferis-Gierde	Department of Rehabilitation (DOR)	Executive Officer, California Committee on Employment of People with Disabilities

Maria Jaya	California Public Utilities Commission (CPUC)	Public Utilities Regulatory Analyst - SPD
Matthew Fehse*	San Diego Gas & Electric	AFN Regulatory & Compliance Advisor
Matthew McVee	PacifiCorp	Vice President, Regulatory Policy
Megan Geraci	Pacific Gas & Electric (PG&E)	Manager, Customer Resiliency (Generation & Storage Team)
Melissa Kasnitz	The Center for Accessible Technology (C4AT)	Director, Legal
Michael Butier	California Department of Social Services Disaster Unit (DSS)	Functional Assessment Service Team Coordinator
Miguel Larios	San Diego Regional Center (SDRC)	Director, Community Services
Molly Giguiere	Disability Rights California (DRC)	Equal Justice Works Disaster Resilience Fellow
Moustafa Abou-taleb	California Public Utilities Commission (CPUC)	Safety Policy Division
Muhammad Al-Ahmar	Southern California Edison (SCE)	Safety Policy Division
Myisha Aban	San Gabriel Pomona Regional Center (SGPRC)	Emergency Management Coordinator
Nguyen Quan	Bear Valley Electric Services (BVES)	Regulatory Affairs
Nhu Tran	San Diego Gas & Electric	Supplier Diversity Project Manager
Nicole Pachaeco	California Council of the Blind (CCB)	Operations Manager

Paul Marconi	Bear Valley Electric Services (BVES)	President, Treasurer, & Secretary
Paula Villescaz	County Welfare Directors Association of California (CWDA)	Associate Director of Legislative Advocacy
Pooja Kishore	PacifiCorp	Renewable Compliance Officer
Rachel Sweetnam	The Center for Accessible Technology (C4AT)	Legal Fellow
Rapone Anderson	California Department of Development Services (DDS)	Northern Region Manager, Career Executive Assignment (CEA)
Rick Yrigoyen	California Department of Social Services Adult Program Division (DSS)	Staff Services Manager
Robb Henderson	San Diego Gas & Electric	Communications Advisor
Robert Carbajal	Southern California Edison (SCE)	Senior Manager, Customer PSPS Compliance & Strategy
Ron Lee*	Redwood Coast Regional Center	Emergency Management Coordinator
Ronald Moore	Bear Valley Electric Services (BVES)	Regulatory Affairs
Rose Samaniego	California Department of Development Services (DDS)	Community Program Specialist III-FHA Supervisor
Ryan Bullard*	Southern California Edison (SCE)	Senior Manager, PSPS Support and Accessibility
Samuel Jain	Disability Rights California (DRC)	Senior Attorney
Scott O'Connell	Red Cross	Regional Disaster Officer
Sean Matlock	Bear Valley Electric Services (BVES)	Energy Resource Manager / Assistant Corporate Secretary

Seneca St. James	California Department of Development Services (DDS)	Community Program Specialist III
Serra Rea	California Foundation for Independent Living Centers (CFILC)	DDAR Manager
Sheri Farinha	NorCal Services for Deaf and Hard of Hearing	CEO
Staphany Lu*	San Diego Regional Center (SDRC)	Emergency Management Coordinator
Stephanie Tews Sheldrick	Pacific Gas & Electric Company (PG&E)	Director, Customer Experience & Insights
Sydney Schellinger	California Department of Aging (CDA)	Senior Emergency Services Coordinator
T. Abraham	Hospital Council	Regional Vice President
Tamara Rodriguez*	California Department of Development Services (DDS)	Officer, Emergency Preparedness & Response
Tammy Tran	Southern California Edison (SCE)	Officer, Emergency Preparedness & Response
Tawny Re	Bear Valley Electric Services (BVES)	Customer Program Specialist
Tiffany Swan	San Diego Regional Center (SDRC)	Community Services Home and Community Based Services Specialist
Tom Smith*	Pacific Gas & Electric (PG&E)	Sr. Manager, LCE Planning & Operations
Valarie Hernandez	Southern California Edison (SCE)	Principal Manager, Customer Program Services
Zeus Ferrao	Southern California Edison (SCE)	Customer Insights Project Manager, Advisor

Appendix C:

Objectives and Considerations from Previous Plans

APPENDIX C – OBJECTIVES AND CONSIDERATIONS FROM PREVIOUS PLANS[19]

The objectives and considerations were carried over from the 2022 AFN Plan, and refined in 2023 to four Key Objectives and presented in the 2023 and 2024 AFN Plans (as shown below). The Key Objectives will remain unchanged, going forward subject to an annual review per the FEMA 6-Step Comprehensive Guide process. SDG&E continues to use the same language in this document, as these considerations are still part of the ongoing planning journey.[20]

2024 Key Objectives:

- Provide overall preparedness resources for individuals with AFN regardless of emergency type
- Increase awareness of IOU programs and services available before, during, and after a PSPS activation
- Implement tracking and metrics for escalations, programs and services offered and utilized by conducting surveys, table-top exercises, etc.
- Ensure customers with sensor disabilities are able to provide feedback, understand, and successfully operate the provided equipment

2023 Key Objectives:

- Provide overall preparedness resources for individuals with AFN regardless of emergency type
- Increase awareness of IOU programs and services available before, during and after a PSPS

[19] Each IOU's accomplishments will be included in the IOU-specific quarterly update.

- Implement tracking and metrics for escalations, programs and services offered and utilized by conducting surveys, table-top exercises, etc.
- Ensure customers with sensory disabilities are able to provide feedback, understand and successfully operate provided equipment

2022 Key Objectives:

- Identify individuals who are Electricity Dependent
- Establish a communication plan to reach AFN segments
- Continuously improve tools to make them easy to understand and navigate for individuals and external organizations to access the information
- Identify new enhancements to programs and resources needed to mitigate the impacts of PSPS
- Cultivate new partnerships and expand existing partnerships with the whole community
- Coordinate and integrate resources with state, community, utility to minimize duplication
- Establish measurable metrics and consistent service levels
- Effectively serve and adapt to the needs of individuals with AFN before, during, and after any PSPS

Appendix D:
AFN Q4 2024 YTD Recap

San Diego Gas & Electric Company's Quarterly Update to 2024 Plan to Support

Populations with Access and Functional Needs During Public Safety Power Shutoffs

January 31, 2025

Introduction

On January 31, 2024, San Diego Gas & Electric Company (SDG&E or Company) submitted its 2024 plan regarding planned efforts to support populations with access and functional needs (AFN) during Public Safety Power Shutoff (PSPS) de- energization (2024 AFN Plan) in accordance with California Public Utilities Commission (Commission or CPUC) Decision (D.) 20-05-051 Phase 3 OIR Guidelines leveraging the Federal Management Administration's (FEMA) Six Step Comprehensive Preparedness Guide (CPG) process. SDG&E's 2024 AFN Plan outlined its approach for serving individuals with AFN and vulnerable customers before, during and after PSPS.

Per D.20-05-051, SDG&E provides this quarterly update regarding its progress toward meeting its 2024 AFN Plan and the impact of its efforts to address the needs of AFN and vulnerable populations during a PSPS. This update maps to and follows the sequencing of SDG&E's 2024 AFN Plan[20] for ease of reference and builds upon the efforts described therein. Specifically, rather than repeating the activities SDG&E describes in its 2024 AFN Plan that were already taken, this update provides the incremental efforts taken since October 31, 2024.

Since its submittal of the 2024 Q3 update of the AFN Plan, SDG&E highlights progress on the following key activities:

- Provided training, presentations and collateral with the Autism Society of San Diego and the San Diego Housing and Community Development on AFN self-identification, PSPS preparedness and support services.
- Implemented a direct mail preparedness campaign to ~45,000 AFN customers in the HFTD that included informational flyers.
- Improved back up battery dispatch process with 211 to navigate and track emergency backup battery deliveries during a PSPS.
- Collaboration on the Blue Envelope program resulted in the additional offering of window stickers for homes and cars supporting individuals with AFN.

[20] https://www.sdge.com/sites/default/files/R.18-12-005%20SDGE%202024%20AFN%20Plan.pdf. Note the title on the second page is mislabeled as 2023.

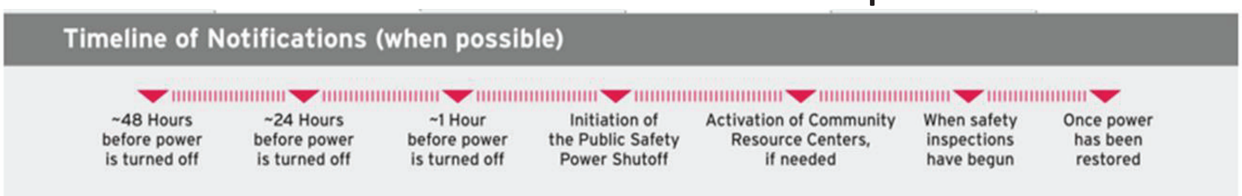
See E for quarterly progress towards the key objectives outlined in the 2024 AFN Plan.

1. CONCEPT OF OPERATIONS | HOW

During a PSPS, forecasts are subject to change swiftly and preparation timelines must adjust quickly as well.

This Concept of Operations is separated into preparedness before, during, and after phases to account for the unique operational requirements over the course of PSPS. Table 1 shows a general example sequence for a potential PSPS.

Table 1: SDG&E PSPS Timeline Example



1.1 Preparedness/ Readiness (Before Power Shutoff)

1.1.1 Emergency Operations Center

Leading up to the PSPS season, SDG&E Emergency Management meets with public safety partners to determine the best method of communicating and providing situational awareness during Emergency Operation Center (EOC) activations. Public safety partners are proactively informed through different forms of communication throughout the year. In 2021, public safety partners were directed to the new SDG&E Public Safety Partner Portal (PSPP) to receive the latest situational updates, and a mobile application was added in 2022 to enhance the PSPP, ensuring that partners have information at their disposal on their mobile devices. In 2023, enhancements were made to the portal to include all-hazard information and ensure compliance with the Web Content Accessibility Guidelines (WCAG) 2.1 AA success criteria for accessibility.

In 2024, the two-time award-winning Partner Portal will expand to include gas hazards to ensure that partners are receiving timely and accurate information during gas related

Emergency Operations Center (EOC) activations. Additionally, for the sake of resilience, SDG&E maintains two physical EOCs alongside a virtual EOC, enabling SDG&E to respond either in-person, virtually, or through a hybrid approach depending on the situation and needs of response.

1.1.2 Preparation Exercises & Training

SDG&E's Emergency Management Program and responder teams conduct extensive preparation and training in collaboration with the AFN team to prepare for PSPS and supporting individuals with AFN. These include:

- Two annual PSPS exercises in Q2 (one tabletop & one operations-based functional), both of which included a focus on addressing AFN support during a PSPS with external partner participation (including AFN partners)
- A targeted notifications/communications drill conducted in Q3 to ensure EOC responders that manage customer notifications, AFN, and public information messaging are aligned and ready to respond
- New responders onboarding with the New EOC Member Orientation course
- New responders onboarding with required participation in NIMS, SEMS, and ICS training through FEMA course 100, FEMA course 200, FEMA course 700, and California's SEMS course
- Outreach and engagement with Public Safety Partners, Community Partners, and local jurisdictions (including tribal partners, CBOs, and other AFN partners)
- EOC tours for external stakeholders
- Joint planning with County OES, Cal OES, CAL FIRE, emergency managers, and Regional Fire Chiefs
- AFN Liaison Officer training on the process and protocols for communication and AFN support services, including area-specific exercises throughout the year

1.1.3 Emergency Operations Center AFN Liaison Role

To ensure individuals with AFN have support and resources available during all phases of a PSPS, SDG&E has established a dedicated AFN Liaison position, which includes a roster of approximately six responders who complete a series of yearly trainings to prepare and effectively respond to customer needs before, during, and after a PSPS.

Specifically dedicated to supporting individuals with AFN during EOC activations, the AFN Liaison reports directly to and advises the Officer-in-Charge (OIC) regarding the support services, resources, and activities to support customers with AFN.

The AFN Liaison Officer collaborates with SDG&E's AFN CBO support partners, including 211 San Diego, Orange County United Way (formerly 211 Orange County), Facilitating Access to Coordinated Transportation (FACT), Salvation Army, and local CBOs, to prepare customers for a potential power outage, provide up-to-date information on PSPS operations, and address the power outage related needs of customers requesting assistance.

Additionally, to ensure ongoing support, the AFN Liaison Officer responder team has a dedicated 24/7 "on-call" representative, who is available to support specific customer needs that may arise outside of or before a PSPS. Training for this position has expanded to include a series of exercises to build the knowledge and skills needed to effectively serve customers with an AFN during an EOC activation. In addition to the general EOC training and exercises required by SDG&E's Emergency Management, position specific training on the processes and resources utilized during an EOC activation to support AFN customers were required. Year-to-date, there have been four additional AFN Liaison Officer trainings that have reviewed:

- Continually expanded AFN Liaison Checklist and resource identification
- Accessible Hazard Alert System (AHAS) notification procedure
- AFN communication process and standards to AFN support and general partners
- Disability awareness and sensitivity
- Available internal and external resources
- Tracking and reporting metrics for EOC staff and the PSPS Post-Event Report

Training and exercises for EOC operations and specific AFN Liaison Officers' role have prepared this team to effectively manage EOC procedures and community support resources to benefit customers with AFN and have continued through 2024 to ensure ongoing awareness of changes and updates to procedures.

1.1.4 Customer Care Support

SDG&E continues to support individuals and households with AFN, including during a PSPS. When customers call to speak with an agent regarding specific concerns related to an AFN, they will be directed to the appropriate resource to receive support (e.g., 211, AFN Liaison EOC responder, etc.).

Additionally, SDG&E's Customer Care Center representatives are trained to speak with customers experiencing challenges and if it is the customers' preference, flag them in SDG&E's system as having a self-identified disability for additional consideration of tools, programs, and services.

1.2 AFN Identification Outreach

SDG&E recognizes the importance of continuing to identify individuals with AFN. As a result, SDG&E is committed to providing the education, resources, and notifications required to maximize resiliency during a PSPS. There are approximately 404,000 customer accounts associated with AFN, which accounts for 31% of the residential customer class. Of the 404,000, approximately 45,000 customers reside in the HFTD.

Since 2022, SDG&E continues to implement Self-Identification campaigns to allow customers to identify individuals in their household who may identify as:

- Blind/low vision
- Deaf/hard of hearing
- Disabled (cognitive, physical, developmental)
- AFN
- Using Assistive Technology and Durable Medical Equipment

Customers who participate in the Medical Baseline Program and are electricity dependent are also captured through these campaigns. In 2023, two additional categories were added to the AFN Self-ID web form that customers can select: assistive technology and durable medical equipment.

These Self-Identification campaigns have continued through 2024 and will further expand awareness of SDG&E's AFN landscape. In Q4, SDG&E continued AFN Self-Identification outreach through the network of approximately 200 CBOs, known as its Energy Solutions Partner Network (ESP), that can be amplified through their social media channels Messaging is also added to SDG&E targeted preparedness campaigns. The messaging drives customers to the AFN self-ID webform and SDG&E's AFN webpage.

SDG&E is also committed to ensuring inclusiveness through ease-of-access for customers with language and accessibility needs. This resource undergoes continuous improvement with participation and feedback from the AFN Collaborative Team and stakeholders to ensure customers can self-identify and receive communications in their preferred manner.

SDG&E will continue to partner and work with the AFN Collaborative Council to identify opportunities to enhance AFN identification.

1.3 AFN Support Resources

To support and prepare individuals who identify as AFN, SDG&E will continue to provide a comprehensive approach of programs and resources before, during, and after PSPS. SDG&E is committed to seeking new opportunities to identify organizations with quick response capacity that can meet the needs of customers across the region during PSPS activations.

In Q4 2023, SDG&E launched a PSPS Customer Impact study to increase understanding of customer impacts during a PSPS de-energization, with a focus on individuals with AFN. The intent of the study is to identify areas where SDG&E can enhance and refine support services and resources to individuals with AFN who are impacted by a PSPS. This study utilized a comprehensive approach to gather factual data, including key findings from existing relevant studies, and direct survey feedback from SDG&E customers and employees, to inform how SDG&E targets, supports, and communicates with customers before, during and after a PSPS. In early 2024, SDG&E began socializing the observations and recommendations from this study with external stakeholders and provided high-level updates on progress with the study during the Q1 and Q2 AFN Collaborative Council meetings. Throughout the Q3 and Q4, the team met with key internal teams to share the study recommendations and identify next steps for implementing and refining support services offered during a PSPS to further support individuals with AFN. A few examples of this include:

- Expanding partnerships with healthcare providers to drive awareness and enrollment in the Medical Baseline program
- Refining coordination efforts between 211 and SDG&E's accessible transportation provider
- Implementing Tribal feedback sessions following a PSPS to provide opportunity for more immediate discussion with tribal members
- Provided a grant for FACT to purchase satellite phones and improve communication with impacted customers in rural areas during PSPS accessible transportation support

An ongoing partnership between the utility and the San Diego County Sheriff's Blue Envelope program, which focuses on "promoting inclusivity and serving as an enhanced communication awareness tool between law enforcement and community members diagnosed with a condition or disability that might require additional accommodations or awareness during a law enforcement interaction," continues to be developed. In Q4, the utility designated the Access and Functional Needs team to be the point-of-contact between the utility and the Sheriff's Blue Envelope Program to coordinate future orientation sessions with utility field staff.

211 San Diego & Orange County United Way – Centralized Resource Hub

SDG&E's continued partnership with 211 San Diego and Orange County United Way (formerly 211 Orange County) has allowed SDG&E to enhance services as new opportunities are identified. In addition to enhanced identification of customers with AFN, this collaboration also provides assessment of various needs for individuals with AFN, including hotel stays for those impacted by de-energization events, accessible transportation, food resources, and access to resiliency items.

In advance of a PSPS, 211 will provide support to at-risk customers, including those living in each IOU's high-fire-risk areas, who are eligible for income-qualified assistance programs, and/or rely on life-sustaining medical equipment. This provides opportunities for customers to prepare resiliency plans and connects them with existing programs for enhanced support. 211 also provides a comprehensive approach to assisting customers with completing applications for these programs and includes the exploration of Care Coordination screening outreach efforts.

SDG&E has partnered with 211 San Diego to implement a Care Coordination call campaign beginning with approximately 1,200 Medical Baseline (MBL) customers. The focus of the campaign is to assist MBL customers living in the HFTD by developing a safety plan in preparation of a PSPS or outage. Each customer will receive a personalized evaluation of resiliency plans and will be connected to existing programs and resources to prepare them for outages. Through collaboration with the Joint IOU partners and 211, the Personal Safety Plan form was adopted for statewide consistency.

During a PSPS, 211 San Diego and Orange County United Way serve as a resource hub to connect individuals with services directly provided by partners contracted with SDG&E, as well as more than 1,000 regional CBOs who provide support. These agencies provide several unique advantages in that their services are available statewide, 24/7 and connect individuals with well-established local partners who have long served the broader AFN community. Additionally, social workers are equipped to conduct needs assessments and escalate needs accordingly to higher tiers of support.

Please see Table 2 below for SDG&E's support services flyer that is used for marketing and outreach campaigns to those residing in the HFTD:

Table 2

Accessible Transportation

Facilitating Access to Coordinated Transportation (FACT) provides accessible transportation to individuals with AFN across the entire HFTD during PSPS. FACT receives EOC PSPS daily notifications and amplifies the information, including zip codes, to approximately 160 paratransit service providers. There is no eligibility criteria other than an individual seeking assistance and the service is available 7 days a week from 5:30 a.m. - 11:00 p.m. during a PSPS.

SDG&E is continuing its partnership with FACT in 2024 as they have been able to facilitate all requests for transportation received since the initiation of the collaboration in 2020. This consistency of meeting customers' needs when the utility experiences a de-energization has not necessitated identifying additional transportation partners.

SDG&E has established monthly meetings with FACT to ensure ongoing collaboration and ensure preparedness for timely PSPS support.

In 2024, SDG&E continued marketing this resource through targeted campaigns to individuals with AFN, as well as providing training and materials for CBOs within the Energy Solutions Partner Network that SDG&E works with. See section 1.7 AFN Public Education and Outreach for additional details.

No-Cost Hotel Stays

SDG&E is continuing its partnership with The Salvation Army in 2024, which provides no-cost hotel stays to individuals with AFN during PSPS. This is also available to individuals who would not normally be considered AFN, but due to circumstances (long duration, cold weather, living alone, etc.) request assistance. Hotel stays are arranged via The Salvation Army and 211/United Way, and do not require any payment up front or otherwise from individuals. Hotels are selected based on accessibility and proximity to a customer's residence or other requested location. The Salvation Army has facilitated all requests received since the partnership's initiation in 2020.

Throughout 2024 SDG&E continued marketing this solution through targeted campaigns to individuals with AFN through its network of CBOs. Additionally, the team held ongoing meetings with Salvation Army to discuss PSPS support and identified areas of opportunity to enhance hotel support and offerings.

Food Support

SDG&E has strengthened the pipeline of local food resources for older adults, individuals, and families with AFN by partnering with the San Diego Food Bank, Feeding America, Meals on Wheels, and other local food partners. These valued partnerships enable the support of vulnerable, rural, and tribal communities' year- round and during PSPS activations. Food support is available at many locations, including on tribal lands. Expanded San Diego Food Bank mobile food pantries ensure additional food support offerings during PSPS. As demonstrated during previous PSPS de-energizations, this has proven to be a valuable resource and as such will continue to play an important role in supporting customers in need.

Supplemental to the above referenced partnerships, SDG&E will continue to offer warm meals at Community Resource Centers when needed. Currently, three catering companies are contracted with SDG&E to provide catering services throughout the service territory.

Using an annual Shareholder grant from SDG&E, Neighborhood House Association Nutrition Services prepares1,400 emergency preparedness shelf stable food packages for distribution by San Ysidro Health to seniors in need

Wellness Checks

In 2022, SDG&E expanded its PSPS support services by partnering with service programs to perform in-home wellness checks when requests are made through 211 during a PSPS. PSPS educational resource flyers are distributed during wellness checks as part of their emergency preparedness efforts along with medical cooler organizers as needed. Additional support services can be provided through 211 as needed. The below partnerships continued throughout 2024.

- **East County Community Emergency Response Team (CERT):** Educates people about disaster preparedness for hazards that may impact their area. Provides training in basic disaster response.
- **San Diego County Volunteer Sheriff Patrol - You Are Not Alone (YANA) Program:** A volunteer program designed to support older adults, people with disabilities or anyone who is otherwise homebound through weekly visits or by requests.

Resiliency Items

SDG&E will continue to distribute resiliency items at Community Resource Centers during a PSPS. These items may include portable solar cell phone charger, medical device charging, gift cards, solar power banks, cooler bags, 2.5-gallon water bags, bottled water, water for livestock and seasonal blankets and medical cooler organizer. Additional opportunities will be explored to provide targeted resiliency items as they are identified.

Additionally, SDG&E will continue providing medical cooler bags through CERTS and YANA during individual wellness checks in advance of a PSPS to those living in higher PSPS risk areas. These medical cooler bags are also distributed throughout the HFTD during SDG&E's Mini-Wildfire Safety fairs, when applicable.

SDG&E and the other IOUs have quarterly working group meetings scheduled with the AFN Collaborative team to further identify opportunities to enhance support. In Q4 the Collaborative Council recommended Bed Shakers as a new resiliency item for those with a hearing disability. SDG&E identified the San Diego Red Cross provides Bed Shakers Alarms free to qualifying customers. Additionally, the Joint IOU team is planning to continue conversation around how this resource can be provided to individuals with AFN in future Collaborative Council meetings.

1.4 Customer Resiliency Programs and Continuous Power Solutions

1.4.1 Back-Up Power

SDG&E offers several back-up power programs to enhance resiliency for individuals, many of which are targeted to individuals with AFN during PSPS activations including no-cost and low-cost options.

1.4.2 Portable Battery Program (Generator Grant Program)

The Generator Grant Program (GGP) provides no-cost backup batteries to customers. Eligible customers included those residing in the HFTD who have experienced one or more PSPS outages and are enrolled in the MBL Program or flagged in SDG&E's customer database as self-identified AFN or having a self-reported disability, including those that are blind/low vision, deaf/hard of hearing, and temperature sensitive. Approximately 5,600 customers have received batteries to date. In terms of customer feedback for this program, 67% of customers who participated in 2019-2023 stated that they experienced a PSPS de-energization. Of those who stated they experienced a PSPS de-energization, 94% stated that they used their backup battery during the PSPS.

In 2024, customers participating in the Generator Grant Program were offered a resiliency assessment to determine their current awareness of PSPS resources, existing resiliency measures to which they may already have access, and other resiliency programs they may benefit from (such as permanent batteries). The program also continued to track changes in the portable battery market and updated the offering to provide customers with smaller sized units compared with prior years. The program continued to offer portable battery units to customers during PSPS activations on a temporary loaner basis to provide access to power for medical-type needs.

1.4.3 Generator Rebate Program (Generator Assistance Program)

SDG&E's Generator Assistance Program offers a rebate incentive for customers to prepare with back-up power sources. The program includes rebates for portable fuel generators and portable power stations to customers who reside in the HFTD and have experienced a PSPS-related outage. In addition, the program targets the low-income segment with enhanced rebates for CARE/FERA customers. To date, over 2,500 customers have received rebates from this program. The 2024 program provided all customers the option of an instant rebate or a post-purchase rebate to allow flexibility of retailer choice. There was also increased the rebate amount on portable power stations for all eligible customers, and on portable generators for income-qualified customers.

1.4.4 Mobile Home Park Resilience Program

The Standby Power Programs (SPP) target customers and communities that will not directly benefit from other grid hardening initiatives. These targeted customers reside in the backcountry and are generally located on circuits in communities that are most prone to PSPS exposure. One sub-program within the SPP umbrella that offers potential benefits to individuals with access and functional needs is referred to as the Mobile Home Resilience Program (MHRP). This program provides a clean backup power solution to enhance community resilience within their respective mobile home park. More specifically, solar panels coupled with a battery system help keep the mobile home park clubhouse powered during a power outage. The clubhouse tends to be a central location where residents can charge phones or laptops, keep medical devices powered, seek air conditioning, or refrigerate medicine in the community refrigerator. This program has completed three installations since its inception and will continue to evaluate potential installations (SPP budget permitting).

1.4.5 Resiliency Surveys

In 2024, SDG&E invited more than 150,000 customers to participate in the Personalized Preparedness Resource online survey as part of SDG&E's wildfire safety and resiliency efforts. It provides communication to vulnerable populations and provides customers with resources to support their resiliency during power outages. The survey was promoted through direct customer invitations, wildfire safety fairs, and SDG&E's annual wildfire newsletter. It served to allow customers to assess their preparedness and increase awareness of available resources from SDG&E and our support partners. Starting in 2024, resiliency survey assessments began to be included for participants of other customer offerings to increase awareness of various resources available to increase preparedness for PSPS outages and emergencies.

1.4.6 Self-Generation Incentive Program (SGIP)

The Self-Generation Incentive Program (SGIP) offers incentives for generation and battery storage technologies for residential and nonresidential customers. The SGIP has a variety of different budget categories for the current program cycle that started in 2020 and is expected to run until the end of 2025 or until all incentive funds are exhausted. In support of AFN customers, the program offers higher incentives for battery storage projects within the Equity Resiliency budget.

Customers can be eligible for the Equity Resiliency budget if they are located in Tier 2 or Tier 3 of the HFTD, experienced PSPS events, are currently enrolled in a medical baseline program, and/or have a serious illness or condition that could be life threatening if electricity is disconnected (2024 SGIP Handbook, PG 25-26). In 2024, the SGIP Equity Resiliency budget received a total of 86 applications and paid out 107 applications totaling 1.36MW (CSE SGIP public data from CA DG Stats as of December 31, 2024). This program is administrated by the Center for Sustainable Energy (CSE) in SDG&E's service territory and CSE will administrate SGIP until the end of the current program cycle [2020-2025].

In late March of 2024, Commission Decision (D.) 24-03-071 was adopted by the Commission which allocated $22M from the Greenhouse Gas Reduction Fund to the SGIP Residential Solar and Storage Equity budget for the SDG&E service territory. This decision also made programmatic changes to improve the SGIP through eligibility requirements that cater to AFN customers. The SGIP PAs, which is the Center for Sustainable Energy in SDG&E's service territory, are working on the implementation of D. 24-03-071 to make these new directives effective and the new funding available statewide in 2025.

1.4.7 Microgrid Incentive Program

SDG&E launched its Microgrid Incentive Program (MIP) in October 2023, which is aimed at disadvantaged and vulnerable communities for deploying, and incentivizing, multi-premise community microgrids. The only application window SDG&E held was open from October 14, 2024, through November 22, 2024.

The MIP team worked closely with SDG&E's Tribal Relations, Regional Public Affairs and Account Executive teams on an ongoing basis to build awareness for the program in addition to hosting one-on-one presentations with interested parties. The MIP team completed numerous Initial Resilience Consultations and Technical Consultations with interested parties through November 21, 2024. As of November 23, 2024, the application window is closed, and SDG&E is not accepting any new applications. SDG&E's MIP team is reviewing the received applications and applicant(s) selected for this program will be notified in the first quarter of 2025 of their results in the competitive process. Additional information can be found at www.sdge.com/MIP.

1.5 Customer Assistance Programs

Through SDG&E's comprehensive, marketing, education, and outreach (ME&O) engagement strategy, relevant information on available programs and services is targeted to individuals with AFN to support emergency preparedness, cost savings and resiliency. These programs not only help low-income and disadvantaged communities but are also a critical way for SDG&E to reach a variety of customer demographics within the AFN population.

1.5.1 Medical Baseline Allowance Program (MBL)

The MBL allowance program provides additional energy at a baseline rate (the lowest rate possible for residential customers) to customers with medical conditions that require heat, air conditioning, or have a qualifying medical device. To qualify for the Medical Baseline program, the applicant must have an eligible medical condition or medical device certified by a licensed Medical Doctor (M.D.), Doctor of Osteopathy (D.O.), Nurse Practitioner or Physician Assistant. The medical device must be for home use only.

Through the end of December 2024, SDG&E had 63,178 customers enrolled in the MBL allowance program.[21] SDG&E is collaborating with local healthcare providers, including Kaiser Permanente, to simplify and streamline the application process, potentially increasing enrollments for MBL participation. Communication and outreach continue to identify and enroll customers into the MBL program.

SDG&E developed and implemented a targeted campaign for seniors and customers with a disability to assist and ensure eligible customers receive MBL benefits. Additionally, the team implemented digital boards at 24 medical facilities to promote the program in 2025. Emergency kits were purchased for diabetic patients to distribute during SDG&E outreach events. Additionally, SDG&E will work with organizations to identify distribution of purchased power banks and power stations to assist customers in 2025 for power outages that may occur.

To better understand the experiences of customers currently enrolled in the MBL program, a comprehensive survey was conducted focusing on benefits, PSPS notifications, the application and recertification processes. This survey gathered valuable feedback and suggestions to better serve our customers.

[21] As reported in SDG&E's Disconnection Settlement Monthly Report for December 2024.

Additionally, in 2024, the Joint IOUs conducted trainings to statewide AFN service and healthcare organizations on the MBL allowance program, PSPS preparedness to help those with AFN to learn about the services available during a PSPS, and eligibility requirements for program enrollment. The IOUs will continue to engage with community partners and provide a coordinated one-stop marketing and education outreach program for CARE, FERA, ESA, and bill payment programs to streamline the efforts and share best practices. SDG&E will explore additional ways to expand promotion of these programs to customers identified as AFN.

Statewide MBL Eligibility Study

On December 22, 2021, the Joint IOUs filed a Motion in Rulemaking (R.) 18-07-005 (the Disconnection OIR) requesting authorization to submit a Tier 3 advice letter (AL) to request approval for a study of the eligible MBL population in each utility's service territory. The proposal encompasses the development of a single, coordinated, statewide study plan by a third-party consultant to produce an initial estimate of eligible MBL populations for each IOU's service territory. On August 31, 2023, the Commission approved the study request in D.23-08-049 with several additional requirements.

In Q3, Verdant developed a draft study design and, pursuant to D.23-08-049, the Joint IOUs held a public workshop on July 24, 2024[22] to raise awareness and incorporate feedback from stakeholders into the study design. Subsequently, the IOUs filed a joint Tier 3 AL to seek approval of the study design and budget on September 30, 2024.[23]

As of Q4 2024, the Tier 3 AL is still being reviewed. Once the AL is approved, Verdant will begin analysis for the Eligibility Study.

1.5.2 California Alternate Rates for Energy Program (CARE)

The CARE program provides a 30% or greater discount on natural gas and electricity bills to low-income residents, non-profit group living facilities, and agricultural housing

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[22] D.23-08-049 at COL 17(c) and OP 5.
[23] SDG&E AL 4524-E/3352-G.

facilities. Customers must meet eligibility guidelines to qualify for the CARE program. As of the end of Q4 2024, 307,227[24] customers were enrolled in CARE.

1.5.3 Family Electric Rate Assistance Program (FERA)

The FERA program provides qualified households with an 18% discount on electric usage every month. Household size and total household income guidelines apply. As of the end of Q4 2024, 12,821[25] customers were enrolled in FERA.

1.5.4 Energy Savings Assistance Program (ESA) Portfolio

The ESA portfolio of programs offers no-cost weatherization services, energy efficient lighting, energy efficient appliances, energy education, and other services to income-qualified customers of single family, mobile homes and qualified Deed Restricted and Non-Deed Restricted multifamily buildings in support of reducing energy consumption and costs, while improving health, comfort, and safety of customers. ESA's portfolio consists of the Main ESA Program, Multifamily Whole Building (MFWB), and ESA Whole Home Program. In Q4, the ESA Main program treated 1,554 homes, totaling 5,735 homes treated YTD. In Q4, the Southern ESA MFWB Program successfully completed 3 whole building properties and treated 4,801 in-units, totaling 7 whole building properties and 7,325 in-units treated YTD across the three IOUs service territories. In Q4, the ESA Whole Home program had a total of 66 customers enrolled, with an additional 27 undergoing assessment, and 2 installations completed.

1.5.5 Low Income Energy Assistance Program (LIHEAP)

LIHEAP is federally funded and helps low-income households with weatherization services and one-time financial assistance to help pay an eligible household's energy bill. The program is overseen by the California Department of Community Services and Development (CSD) and administered by three local nonprofit agencies in SDG&E's service territory. SDG&E customers are referred to 211 San Diego (211sandiego.org) for information. In Q1 there were 1,994 LIHEAP pledges totaling approximately $1,998,259.

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[24] As reported in SDG&E's Low Income Monthly Report for December 2024, CARE Table 2.
[25] As reported in SDDG&E's Low Income Monthly Report for December 2024, FERA Table 2.

In Q2, there were 1,526 LIHEAP pledges totaling $1,457,595. In Q3, there were 1,878 LIHEAP pledges totaling $1,929,101. In Q4, there were 1,808 LIHEAP pledges totaling $2,347,679.

1.5.6 Arrearage Management Plan (AMP)

CARE and FERA customers may also be eligible for AMP, which is a 12- month payment plan that forgives 1/12 of a participant's debt after each on time payment of the current month's bill. After twelve on-time payments of their current month's bills, the participant's debt will be fully forgiven up to a maximum of $8,000. Enrolled participants are protected from disconnection while participating. As of the end of Q4 2024, there were 22,614 customers enrolled in AMP with $52.3M in total amount forgiven since the program started.

1.5.7 Community Support

In 2024 charitable giving toward Emergency Preparedness and Safety totaled $955,490 of shareholder funds, across 46 programs. This includes nearly $150,000 of investment with CBOs whose primary purpose is to serve the AFN population. Programs supported included:

- In-home emergency preparedness for individuals with disabilities, seniors, and those with medical devices
- CPR and AED training conducted in American Sign Language (ASL) for deaf and hard of hearing individuals
- Disaster response interpreter training and education to ensure rapid deployment of sign language interpreters during an emergency
- Earthquake preparation and drills for those with intellectual and developmental disabilities
- Emergency meal distribution for seniors
- Digital safety training for seniors

1.6 PSPS Preparedness Outreach and Community Engagement

1.6.1 SDG&E Advisory Boards and Councils

SDG&E is committed to ongoing engagement with external stakeholders, public safety partners, tribal leadership, and advisory boards/councils to gain feedback on its approaches to serving customers before, during and after PSPS. The following section will outline Q4 2024 engagement, feedback received, and how SDG&E plans to incorporate the feedback to enhance the customer experience.

1.6.2 AFN Collaborative Council (See Appendix A)

SDG&E participated in the Q4 AFN Collaborative Council meeting on December 3, 2024. The meeting's goal was to review major projects completed throughout the year, updates to SDG&E's General Rate Case for Wildfire Mitigation, the IOU's reporting out on PSPS that occurred, and the development status of the 2025 AFN Plan.

Table 3: Q4 Collaborative Council Meeting Information

<table>
<tr><th colspan="2">Access and Functional Needs Collaborative Council Meeting</th></tr>
<tr><td>Meeting</td><td>Date: December 3, 2024
Location: Virtual
Purpose: Collaborative discussion on major projects completed in 2024, SDG&E GRC Wildfire Mitigation update, 2024 PSPS season updates, and progress on 2025 AFN Plan.</td></tr>
<tr><td>Summary of Engagement</td><td>Prepare for Power Down
• Joint IOUs provided an update that the Prepare for Power Down marketing materials have been finalized and are ready to be downloaded from the site.
• Joint IOUs encouraged Council members to share the materials with their constituents.
Framework for AFN Support
• CalOES provided an update on the Framework for AFN Support, noting that it is in its final stages of design.
• CalOES expressed the importance of this being a shared resource and published jointly.
    o Request to the Council members made to contribute their organizations' logos to the final document.
    o SCDD and DRC expressed openness to being a partner with the Framework.
SDG&E GRC Wildfire Mitigation Update
• SDG&E provided an update on their recent GRC Proposed Decision and shared input on next steps of the proceeding.
• SDG&E explained that San Diego was ranked one of the highest wildfire risks by FEMA last year and this year. In response, SDG&E believes that 600 miles of undergrounding is the best way to reduce wildfire risk.</td></tr>
</table>

	○ SCDD agreed that balancing affordability and safety is a top priority and asked for the others' perspectives. ○ PG&E concurred that undergrounding is an effective long-term mitigation. **PSPS Season Update** • Joint IOUs provided an overview of the still-active PSPS season so far and discussed impacts. **2025 AFN Plan** • Meeting facilitator provided an overview of the 2025 AFN Plan Working Group process. ○ Highlighted Working Group met over three sessions to discuss and align on key objectives and KPIs ○ Discussed current tracking and reporting of KPI #4 through post event reports in agreement with the Working group. For future Working Groups, Joint IOUs would like to encourage participation from a broader range of Statewide Joint IOU Advisory and representatives of the collaborative Council organizations.
Feedback	• Council members expressed that balancing affordability and safety should be a top priority. • SCDD asked if there is a way to determine whose needs are being met and who needs additional support. ○ Joint IOUs responded that programs are designed to meet the needs of most customers emphasized the importance of preparedness and CBO coordination before a PSPS. (211) added that when 211 encounters a unique situation where tools to support a customer are not readily available, they conduct additional research to provide support.
Action Items Guided by Feedback	**Completed Actions This Quarter:** • Conduct follow-up discussions regarding the Blue Envelope Program and SCDD's go-kits and peer training. • Joint IOUs to follow up on PSPS resources presented Cal OES and partnership opportunities with the Red Cross. • Continue to provide updates on statuses of Blueprint for Best Practices and Prepare for Power Down campaign **On-Going Actions:** • CPUC representative to identify additional opportunities to jointly present the AFN/Joint IOU progress made to the CPUC. ○ Status update: Additional follow up to be conducted in Q1 2025. • Collaborative Council to coordinate potential guest speaking opportunity during respective upcoming meetings, including: ○ Disability Rights California monthly staff meeting ○ Statewide AFN Community Advisory Committee ○ State Council on Developmental Disabilities meetings

	○ Status update: Additional follow up to be conducted in Q1 2025. • Collaborative Council to provide names of statewide disability leaders with capacity and networks to connect with the IOUs. ○ Status update: Additional follow up to be conducted in Q1 2025. **Future Actions:** • Joint IOUs to determine if it is possible to share data and GIS files with the CPUC from reporting provided in AFN reports. • Joint IOUs to provide Council with a finalized version of the Framework for AFN Support. • PG&E to research Medical Baseline enrollment drop-off with CPUC and SCDD. • Provide a list of Statewide Council members and AFN Plan Working Group participants to Collaborative Council members. Joint IOUs to follow up on bed-shaker resource in 2025.
Future Meeting(s)	Q1 2025

1.6.3 Statewide Joint IOU AFN Advisory Council (See Appendix B)

SDG&E participated in the Q4 Statewide Joint IOU AFN Advisory Council meeting on December 10, 2024. The meeting goals were to discuss the 2025 AFN Plan, updates to the Prepare For Power Down website, and a review of the IOUs' PSPS response through the year with any lessons learned.

Table 4: Q4 Statewide Advisory Council Meeting Information

Statewide Joint IOU Advisory Council	
Meeting	**Date:** December 10, 2024 **Location:** Virtual **Purpose:** Collaborative discussion on the 2025 AFN Plan, Prepare for Power Down updates, and an overview of the PSPS season and lessons learned in 2024.
Summary of Engagement	**2025 AFN Plan** • IOUs gave an overview of the 2025 Plan process and Working Group sessions. • IOUs shared existing KPIs and objectives and how these are reported. ○ KPIs 1-3 are reported on a regular basis through the quarterly update. ○ KPI 4 is in the 10-day report following each PSPS event and in the annual post-season reports.

	Prepare for Power Down
	• IOUs gave an overview of updates made to the Prepare for Power Down website to highlight Medical Baseline, support resources and emergency preparedness resources.
	• IOUs gave a walkthrough of the redesigned website, including the graphics and resources available to share.
	• IOUs shared that there are marketing materials, including a social media toolkit, available for community organizations to use to promote and drive traffic to the site.
	• IOUs encouraged Council members to share the materials with their constituents.
	PSPS Season Update
	• PG&E shared overview of 2024 PSPS season, including 7 events, with one currently underway.
	    o Lessons learned include working to improve the accuracy of coding and holding CRC trainings to better assist AFN customers.
	    o PG&E clarified that the statistics shared cover PSPS only and not other types of outages.
	    o C4AT commented that it would be useful to understand how CRC staff direct customers in relation to specific resources.
	• SCE shared an overview of their PSPS season, noting that one was currently underway.
	• C4AT noted that over 17 PSPS events, just 5% of customers notified of a PSPS experienced de-energization. They expressed concern that SCE over-forecasts PSPS and that there is a risk of customers becoming desensitized to notifications that do not result in a shutoff.
	    o **Response:**
	    o SCE follows a specific set of criteria to determine a PSPS and when those criteria are met, customers in the area must be notified. After notifications are sent, SCE continues to work to avoid shutting off power and prioritizes safety and unnecessary outages.
	    o SCE has and continues to make refinements to its PSPS notification system to make them easier on customers.
	• C4AT expressed that SCE's communication with community safety partners is difficult to understand due to the volume of information shared and the format (spreadsheets) in which it is shared.
	    o **Response:**
	    o SCE provides the information that has been requested by safety partners though the Public Safety Partner portal and will work with partners to ensure they are able to navigate and understand the portal.
	• C4AT pointed out that the percentage of customers utilizing SCE's emergency resources is low compared with the other IOUs.
	    o **Response:**

<table>
<tr><td></td><td><li style="list-style-type:circle">SCE performs targeted outreach to customers to ensure they are prepared and aware of resources before a PSPS begins.
<li style="list-style-type:circle">When customers are already aware of the various resources available, they may reach out to a partner such as 211 for support, resulting in a lower need to use SCE's resources.
SDG&E shared an overview of their PSPS season noting that one is currently underway.
Utility noted that they are refining the process of obtaining impacted zip codes and community names through their new customer notification system (CNS), to share with AFN Support Partners.</td></tr>
<tr><td>Feedback</td><td>Hospital Council asked if PG&E is focusing its efforts in areas of the service territory that are most impacted by PSPS.
<li style="list-style-type:circle">PG&E shared that efforts are made to be intentional and meaningful, but also noted that weather patterns are always changing and unpredictable which makes widespread awareness and preparedness important.
C4AT asked if customer data is tracked at the locations where services are rendered.
PG&E shared that PG&E is working towards tracking at the CRCs. Some of this data is gathered through DDAR and 211 and shared in the quarterly reports.</td></tr>
<tr><td>Action Items
Guided by Feedback</td><td>Completed Actions This Quarter:
Joint IOUs to share Prepare for Power Down materials, which will be added to prepareforpowerdown.com, once they are available.
On-Going Actions:
Statewide Council member organizations to send a list of support services offered before, during, and after a PSPS to SCE.
<li style="list-style-type:circle">Status update: Additional follow-up completed with follow-up planned for Q1 2025.
Future Actions:
Prepare for Power Down team to connect with PacificCorp about potential website integration.</td></tr>
<tr><td>Future Meeting(s)</td><td>Q1 2025</td></tr>
</table>

1.6.4 Wildfire Safety Community Advisory Council (WSCAC)

The SDG&E Wildfire Safety Community Advisory Council (WSCAC) was established in 2019. WSCAC meetings are led by SDG&E's Chief Operating Officer and are attended by members of the Safety Committee of the SDG&E Management Board.

The WSCAC provides direct input, feedback, recommendations, and support from community and business leaders to SDG&E senior management and the Safety Committee of SDG&E's Board of Directors on how SDG&E can continue to help protect the region from wildfires and other disasters.

In Q4, the WSCAC met on November 1. At the meeting, SDG&E discussed the weather and fire outlook for the remainder of the year including a recent PSPS event, reviewed protocols around Battery Energy Storage Safety, and the merits of covered conductor vs. strategic undergrounding. Throughout the meeting there was a focus on how a PSPS impacts individuals with AFN and how potential undergrounding could reduce or eliminate the impacts on our most vulnerable customers.

1.6.5 Tribal Communities

SDG&E has a Tribal Relations team that includes a dedicated manager to engage and coordinate with tribal leaders, staff, and community members to understand their greatest challenges with PSPS. Through these collaborations, tribes have expressed impacts to elders and vulnerable community members including the need for backup battery support and access to water sources. Additionally, food insecurity has been shared as a common concern, as well as the need to integrate indigenous conversations around climate adaptation and ancestral wisdom. In response, SDG&E established support systems with Indian Health Councils to provide generators, resiliency items, information, and resources in advance of wildfire season and support with emergency food distribution during PSPS.

The Outreach team has been scheduling workshops and community resource fairs in remote tribal areas to provide one-on-one opportunities for tribal members to enroll in bill assistance programs, ESA, FERA, CARE, and MBL.

In Q4 2024, the Outreach and Tribal Relations team participated in three community resource fairs. Due to the diversity among tribes and their varying priorities, SDG&E will continue to host year-round listening sessions with tribal leaders and staff to increase its reach to tribal members living on and off the reservations. Tribal Relations in partnership with Intertribal Long Term Recovery Foundation released a children's book about wildfire safety and emergency preparedness in Q3 2024. This book provides a tribal perspective on preparedness and PSPS by integrating culture and the indigenous relationship with nature. SDG&E will continue to distribute copies of this book to San Diego County libraries, tribal schools and at the SDG&E Resilience Zone. This book is an example of culturally appropriate messaging and promotes innovation and a sense of responsibility to preparedness passed down by the first scientists based on hundreds of years of observations of their environment.

Additionally, in Q4 2024, an annual survey to enhance SDG&E's services and communication to both federally recognized and non-federally recognized tribes to evaluate the changing political, economic and social landscapes in tribal communities was conducted with a 19% return rate. Areas of opportunity included supporting tribal governments with backup power for their wells. Additionally, there is a desire for enhanced communication around home improvement, energy conservation, and energy management tools for Tribal Nations that do not have low-income members. Overall, Tribal Nations are looking for better support for their tribal governments with project planning support, microgrid resiliency, and tribal business support. This survey will be implemented every year to obtain direct feedback and identify areas of opportunity to enhance and strengthen SDG&E's partnerships with sovereign Tribal Nations and better understand the needs of the non-federally recognized tribes.

1.6.6 PSPS Working Group

SDG&E's PSPS Working Group (PSPSWG) includes representatives from small multi-jurisdictional electric utilities; CCAs; publicly owned electric utilities; communications providers; water service providers; the CPUC; tribes; local government entities; public safety partners; and agencies that serve community members with disabilities, aging, and access and functional needs (AFN) populations.

The PSPSWG met on December 4, 2024. Orange County United Way reviewed their PSPS customer intake process, showing the customer journey from initial call to services rendered. SDG&E's meteorology representative reviewed the conditions that were present which necessitated the utility's EOC being activated in response to a potential PSPS, which was then followed up by an overview of the utility's PSPS response that occurred on November 6th. A brief introduction to the 2025 AFN Plan was offered to attendees, highlighting next year's goals, key performance indicators, and where along the plan's drafting stage the utility was at.

The next working group meeting is scheduled for March 12, 2025, 10:00 AM – 11:00 AM.

1.7 AFN Public Education & Outreach

During Q4, SDG&E processed Direct Mail Campaigns targeting AFN Customers in the HFTD. The AFN Preparedness Direct-Mail Campaign targeted residential AFN customers and ~43,000 mailers were sent. The mailing promoted PSPS resiliency resources and information for AFN customers. The campaign was processed and sent at the end of October. In addition, the Wildfire Safety Newsletter was included as a bill insert that went out to all customers in the territory at the beginning of 2024 PSPS season as well.

The mass-market AFN Advertising Campaign continued in Q4 and ended on December 1. Customer feedback will be used for planning and refining efforts for the 2025 campaign.

1.7.1 Statewide Website for AFN Solutions

PrepareForPowerDown.com (P4PD) is a Joint IOU website, created as a centralized resource for statewide CBOs and agencies serving AFN communities, providing easy access to IOU information on PSPS preparedness and resources. The website offers CBOs educational tools, Joint IOU training presentations, PSPS social media graphics, and utility specific PSPS support materials. In response to the AFN Collaborative Council's request for a customer-facing website, the Joint IOUs embarked on a website refresh in 2022.

In Q4, Joint IOUs launched the marketing campaign for the P4PD website through the AFN Collaborative Council and AFN Statewide Council members to amplify to their constituents. The marketing campaign includes a marketing toolkit that is easy to download and share through their respective organizations through their communication platforms, including social media.

The Joint IOU team continued sharing awareness of the campaign to other partners and organizations throughout Q4. The PSPS preparedness materials are hosted on the P4PD website and include social media materials, Fact Sheets, Press Release and Newsletter.

1.7.2 Accessibility of Communications

SDG&E is continued to make minor updates to the Wildfire Safety and PSPS pages on the company website as described in the AFN Public Education & Outreach section above. Content updates were completed in Q3 for SDG&E's 2024 PSPS season. The PSPS page (sdge.com/PSPS) content was used during two PSPS activations in November and December, and page updates prioritized accessibility based on the Web Content Accessibility Guidelines (WCAG) 2.2 AA success criteria for accessibility.

Internal communications teams also met to review the WCAG guidelines for communication materials. Optimized Drupal (content management system) will continue to provide accessibility features such as search engine form and presentation, color contrast, heading structure, image handling, alternative text, and form labeling. Implementation of the AudioEye website accessibility services provide twice yearly manual accessibility audits in addition to continuous testing, reporting and remediation of accessibility issues automatically in real time. Reporting of issues found that must be fixed by human intervention is available weekly to be addressed by SDG&E's digital experience developer team. SDG&E also works with the Center for Accessible Technology (C4AT) on testing and remediation of the company's digital mobile application properties.

PSPS notifications were updated for the 2024 season and were translated into the prevalent languages spoken in the territory as well as American Sign Language (ASL). The new Customer Notification System was put in place, and successfully utilized for the November and December PSPS activations.

Effective communication is important for the safety and well-being of customers of every ability and requires that they be accessible. Enhancing the accessibility of customer notifications is a top priority. SDG&E worked with stakeholders and experts to identify accessibility enhancement opportunities for notifications to customers. SDG&E utilizes the following platforms to provide this enhanced level of accessibility:

- Activation of the Accessible Hazard Alert System (AHAS), that provides customized on-demand accessible alerts in real time (approx. 15 min) with the same accessibility as the current pre-recorded PSPS customer notifications. This allows SDG&E to provide accessible communications during unforeseen emergencies whenever they may occur. In addition to direct notifications to customers, these accessible notifications are shared on social media and web platforms.

- Implementation of Video Remote Interpreting (VRI) resource and training to all CRC staff, allowing for complex conversations and information sharing in ASL and languages other than English. SDG&E employees may access the VRI resource by PC, tablet, or Smart Phone via the Boost Lingo platform. ASL interpreters via video chat, or language interpreters (voice only) are available 24/7 to equitably provide essential information and to engage in conversations with all customers. As a redundancy to the VRI platform SDG&E has contracts in place for in-person ASL interpretation services in case of a network failure during a CRC activation.

SDG&E continues to prioritize accessibility for its websites and mobile applications. As mentioned above, the company takes a proactive approach to reach the Web Content Accessibility Guidelines (WCAG) 2.2 AA success criteria for accessibility. SDG&E continues to leverage an AFN landing page (sdge.com/AFN) to allow customers to self-identify, as well as get personalized resources for AFN needs.

Additionally, SDG&E continues to look for AFN communication improvement opportunities such as:

- Reviewing customer program application processes and forms to identify opportunities to make them more accessible and easier for customers to navigate.

- Conducting readability reviews of web content and marketing materials to ensure information is conveyed in simple language and easy to understand formats. SDG&E is building a training program for marketing and web content contributors in creating accessible digital documents.

1.7.3 AFN Power Panel

To better understand the needs of customers with AFN, the power panel surveys will continue into Q4. The AFN Power Panel are surveys specifically for customers with AFN to serve as customer advocates for accessibility and accommodations in relation to PSPS. Topics may include outage needs, communication channels, electric-powered device needs, and other areas of interest that help SDG&E identify and refine accommodations and communications to better serve this population.

The surveys may include various AFN related marketing materials and communications for understanding and effectiveness. While SDG&E deems the information from respondents as valuable to understanding customer segment, the sample size of the AFN Power Panel is typically small (n=~350), so results from these surveys are interpreted with caution.

The AFN Power Panel is a selection of customers self-identified as individuals or households with access and functional needs.

In Q4 a series of communication questions were fielded to the AFN Power Panel from October 15- November 4, 2024. A total of 125 panelists participated.

- Have you seen or heard communications related to PSPS in the last 3 months?
    - 48% - yes
- Of the 48% respondents:
    - 47% saw the communication on TV
    - 37% via email
    - 29% from their SDG&E monthly bill.
- Are you aware of the additional assistance offered by call 211 during a PSPS?
    - 39% responded yes
- Do you or does someone in your home rely on power for the use of their medical equipment or devices?
    - 71% responded yes
- Of the 71% respondents:
    - 37% experienced a PSPS in the last 5 years
- Do you or does someone in your household participate in the SDG&E Medical Baseline Program?
    - 63% responded yes
    - 11% were not aware of the program

- Do you or does someone in your household self-identify as blind-low vision, deaf-hard of hearing, disabled-cognitive or physical or AFN-dependent on power for your health and safety?
  - 53% responded yes
- Of the 53% respondents:
  - 27% responded yes to self – identifying as AFN with SDG&E
  - 42% responded were not sure

Key takeaways from the survey show a majority of the 71% respondents who need power for their medical equipment are in the MBL program. Most received their communication through TV advertising and email campaigns which will be continued in the 2025 campaigns. However, many respondents who identified AFN and dependent on power were not sure if they updated their account. Continuing to expand on AFN Self-ID outreach will be a focus in 2025.

1.7.4 Community Based Organization Outreach

CBOs continue to serve as a key channel and support network throughout SDG&E's service territory. These organizations are considered trusted partners in the communities they serve and provide valuable insight and engagement across various segments, including support to individuals with an AFN. Additionally, these partners amplify SDG&E's wildfire preparedness and notification messaging to hard- to-reach customers, with an emphasis on reaching those located in the HFTD.

SDG&E's Energy Solutions Partner Network, which consists of more than 200 CBOs, is leveraged to help prepare customers, with a focus on individuals with AFN, for wildfires and other emergency situations. These partners, who receive financial compensation for their year-round support, leverage information through a variety of outreach tactics including presentations, events, meetings, and the amplification of emergency preparedness information through their respective social media channels. SDG&E targets outreach to the diverse needs of individuals with AFN and will continue to seek opportunities to promote enrollment and awareness of support services available during a PSPS.

In Q4 SDG&E participated in over 160 activities, including PSPS partner presentations, Community Climate workshops, food distributions, health and safety fairs, and resource fairs. SDG&E continues to strengthen existing partnerships while identifying new partnerships with organizations that represent the needs of customers with AFN, with a focus on the deaf and blind, those with assistive technology and durable medical equipment, and those who prefer a language other than English. SDG&E has identified these segments as areas of growth for outreach through feedback from council engagement and surveys. Examples of CBOs the team has engaged include: 1) Backcountry Communities Thriving; 2) City of San Marcos Senior Activity Center; 3) County of San Diego - HHSA; 4) San Diego Housing Federation; and 5) Vista Community Clinic. Additionally, in support of the San Diego Center for the Blind, AFN resource cards in braille are provided at presentations, workshops, and targeted community events.

In 2021, SDG&E developed a compensation structure for CBOs to provide enhanced notification support, focusing on those in the HFTD as well as individuals with an AFN. To further reach these customers and amplify preparedness and PSPS support messaging, SDG&E strategically identified and leveraged support from CBOs within its Energy Solutions Partner (ESP) network. As part of this enhanced process, these CBOs, who reach a wide range of demographics including diverse, multicultural, multilingual, senior, disadvantaged and AFN communities, received comprehensive training and materials related to emergency preparedness and wildfire safety. Prior to a PSPS, SDG&E provides notifications and updates to these organizations, who then serve as a critical channel to amplify messaging and communicate with customers who may not utilize traditional channels. This PSPS messaging is then shared through the CBO's communication channels including social media platforms such as Facebook, X, and Instagram. SDG&E continues to expand the PSPS support network of CBOs and has since increased the number to roughly 50. Examples of these select CBOs include 1) Access to Independence; 2) San Diego Center for the Blind; 3) Ramona Senior Center; 4) Julian Cuyamaca Resource Center; 5) Deaf Community Services; and 6) County of San Diego – HHSA.

SDG&E also provides presentations to local CBOs that may not be part of the ESP network, focusing on organizations with disabled and aging population constituents. These presentations provide educational awareness of PSPS support services, emergency preparedness, customer assistance programs and collaboration opportunities to enhance outreach. In Q4, the Outreach team participated in evacuation and emergency preparedness clinics and continued partnerships with local organizations and agencies, including Fire Safe Councils, educational institutions, and the San Diego Housing Federation.

Additionally, in Q4, MBL outreach was conducted to durable medical equipment stores and clinics. Collaborations continued with the Live Well Rural Communities Group, promoting PSPS preparedness with organizations to share information with residents in hard-to-reach areas.

Cool Zone Program

In Q2, SDG&E in partnership with the County of San Diego and its Aging and Independence Services Department (AIS), launched the Cool Zone Program which focuses on providing support and resources to individuals with access and functional needs during high heat.

Over 100 Cool Zone sites were open and available to the public, which are facilities that provide an air-conditioned space for individuals to escape the heat, with the added benefit of saving on their utility bills. Cool Zone Tool Kits are provided to the sites to promote customer programs, including CARE, FERA, MBL, and AFN Self-ID.

The Cool Zone program concluded in the beginning of Q4. In 2024, over 370 outreach activities, including promotion on social media platforms, events, and presentations, were utilized to promote the Cool Zone program by CBOs and other community partners. The County of San Diego and its AIS Department partnered with 211 San Diego to provide call support to answer customer calls regarding the program. They handled over 300 calls and referred customers to the nearest Cool Zone site.

1.7.5 Participation in Community Events

To expand SDG&E's reach and support customers with AFN in the HFTD, SDG&E hosted a series of Wildfire Safety Fairs (WSFs) throughout Q3, to disseminate PSPS, CRC, and emergency preparedness information to its customers, including customers with AFN in key communities of concern. In 2024, SDG&E completed four fairs in the communities of Ramona, Alpine, Rancho Bernardo, and Valley Center.

Attendance at the fairs included approximately 500 attendees at Ramona, approximately 1,000 attendees at Rancho Bernardo, approximately 500 attendees at Alpine, and approximately 900 attendees at Valley Center. At these WSFs, customers can visit SDG&E subject matter experts and participating partners, including 211, American Red Cross, CalFire and others to learn more about ways they can better prepare themselves and their loved ones for the unexpected loss of power due to PSPS and other possible weather driven emergencies.

SDG&E also continued its Mini-Wildfire Safety Fair series in 2024. As of the end of Q4, SDG&E participated in 78 Mini-Wildfire Safety Fairs, which focus on providing enhanced support to customers, while engaging CBOs within SDG&E's ESP network. These mini-wildfire fairs provide an opportunity to enhance coordination efforts with Fire Safe Councils, CERT Teams, Fire Departments, and Tribal Governments, with a focus on educating and preparing customers for wildfires within rural communities, particularly individuals with AFN. Examples of CBOs that have supported this initiative include, Poway Neighborhood Emergency Corps, Southern California American Indian Resource Center (SCAIR), and the Southern Indian Health Council.

1.7.6 Collaboration with Partners and State Agencies

Healthcare Industry and State Agencies

SDG&E recognizes that ongoing engagement with healthcare practitioners, medical associations, managed care program providers, and durable medical equipment suppliers is a key opportunity to increase enrollment in the MBL Program and connect individuals with AFN to programs and services that help customers prepare for a PSPS.

In Q4, The Joint IOUs continued conversations with the AFN Statewide Councils to identify opportunities to collaborate to further educate their members and/or constituents regarding PSPS preparedness, AFN Self-Identification and MBL.

Joint IOUs presented to leaders within the Western Regional Alliance for Pediatric Emergency Management (WRAP-EM) on PSPS support services and program material such as the Joint IOU Prepare for Power Down Fact Sheet that incorporates the MBL program and AFN Self Identification information. Plans are underway for larger statewide training with WRAP-EM in 2025. The Joint IOU team shared the updated Prepare for Power Down Fact Sheet with the following healthcare groups, CA Hospital

Association, Department of Developmental Services, and California Area Agency on Aging Support. Additionally, the Joint IOUs launched Prepare for Power Down marketing material to the AFN Collaborative Council and the Statewide Joint IOU Advisory Council. Marketing material contained material that is easy to download and share through their respective organizations through their communication platforms, including social media.

In 2025, the Joint IOUs will continue relationships with relevant organizations and agencies to deliver statewide training sessions, including but not limited to the California's Department of Social Services In-Home Supportive Services (IHSS) program managers, the Department of Developmental Services' Regional Center staff. and the California Hospital Association/California Hospital Council. The training sessions will cover relevant information such as: Emergency preparedness and planning (Prepare for Power Down Website) MBL program and Self-Certify program 211 support services such as Care Coordination and direct support during PSPS Generator and backup battery programs

- Other resources and offerings provided to customers during PSPS activations (e.g., CRCs/CCVs, food support, etc.)

Joint IOU engagement activity will be provided in the 2025 AFN quarterly reports.

Paratransit Service Engagement

SDG&E continues to provide FACT, SDG&E's Paratransit Support Partner, with PSPS preparedness education and outreach information to share with their transportation partners FACT is amplifying SDG&E's AFN PSPS collateral with their stakeholders, organizations, and drivers.

In Q2, FACT shared digital information to over 100 of their partner agencies regarding what to expect during a Public Safety Power Shutoff, preparedness tools and support services available to individuals during a PSPS and continues to provide information and updates as needed. In Q3, an educational presentation was conducted to their Council on Mobility (CAM) consisting of approximately 30 regional transportation stakeholders.

In Q4, FACT was provided SDG&E grant funding to purchase satellite phones improving communication with service drivers when assisting customers in the backcountry where cell service may not be available during a PSPS.

1.8 PSPS Activation (During – Emergency Operation Center Activated)

1.8.1 PSPS Communications

Before PSPS Paid Media/Advertising

The paid PSPS/AFN Public Education campaign ended on December 1 and was part of the umbrella Wildfire and PSPS paid marketing campaign described in the AFN Public Education and Outreach section of the 2024 AFN Plan. The campaign targeted AFN customers in the High-Fire Threat District (HFTD) with refreshed creative content. The campaign also included information on community health and social services, including accessible transportation for those who qualify. Advertising encourages the public to call 211 for assistance during a PSPS and specific instructions are given to call 211 San Diego or 211 Orange County (Orange County United Way) for confidential assistance.

Communications During PSPS

SDG&E activated PSPS protocols in November and again in December. During those PSPS occurrences, SDG&E used notifications, website updates, media updates, in-community signage, and situational awareness postings across social media channels to communicate real-time information to a broad audience. Additionally, SDG&E activated communications to provide affected customers and the public with the latest real-time updates. Key communications are available in 22 prevalent languages including ASL and digitally accessible text.

During a PSPS, SDG&E has a dedicated AFN Liaison, who is responsible for conveying real-time updates and talking points to AFN community partners. SDG&E also uses communication platforms, including social media channels, broadcast and print media, and the WCAG 2.2 AA accessible SDG&E Today (formerly SDG&E News Center) and SDGE.com websites, to share enhanced support services available for individuals with AFN. Additionally, a digitally accessible document that lists communities affected by a

PSPS is shared with local municipalities and agencies. This effort is intended to give additional context about PSPS events and help communities prepare.

In addition to mass media, SDG&E utilized several communication channels geared towards individuals who may not have been accountholders (e.g., visitors, mobile home park residents, renter, caretakers, etc.) these channels include SDG&E's mobile app known as Alerts by SDG&E, roadside electronic message signs placed strategically in highly traveled locations, tribal casino marquees and flyers posted around impacted communities.

The company is implementing customer-research efforts with PSPS-affected customers. This research began in December with the fielding taking place at the end of December/beginning of January. Fielding efforts then had to be paused due to another round of PSPS activations. Research results will be reported in the 2025 AFN Q1 Report.

PSPS Notifications

SDG&E updated 2024 notifications for clarity and made minor refinements to make messaging clearer and more accessible during Q2. These messages were translated in the 22 prevalent languages spoken in the territory as well as ASL and digitally accessible text. Additionally, SDG&E launched a new Customer Notification System (CNS) that replaced the Enterprise Notification System and utilized for PSPS notifications during the November and December PSPS activations.

SDG&E sends PSPS notifications to all impacted individuals as soon as possible through the new notification platform (recorded voice message, email, and text message). The company also works with Deaf Link to convert all notifications into American Sign Language (ASL) video, English audio read-out and screen reader accessible transcript. SDG&E also enables address-level alerts for customers and the general public through its accessible Alerts by SDG&E app. For assigned Critical Facility and Infrastructure customers, their respective SDG&E account executive also contacts them via contact methods (such as phone call and/or email) that are preferred by the customer. The account executives then provide situational updates and lists of potentially impacted meters. Additionally, as part of SDG&E's PSPS notification process, all account holders including multi-family building account holders, receive notices prior to de-energization.

Annually, SDG&E evaluates the content library of PSPS email, text and voice notifications for customers and non-account holders. SDG&E also uses feedback solicited from and provided by customers who have been notified and affected by a PSPS to simplify notification messaging and make content more representative of the conditions being experienced. Every year, SDG&E's public-education campaign includes messaging about signing-up for notifications prior to the start of peak fire season.

For MBL and Life Support Customers, SDG&E reviews the results of each customer notification to determine if a positive confirmation for MBL customers was received through a voice contact (landline or cell phone, based on the customer's preferred contact number). For any MBL customers that SDG&E does not reach by voice contact, a list is provided to SDG&E's Customer Contact Center, who proactively calls customers who have not been reached. If they are unsuccessful in contacting the customer, SDG&E will then send a Customer Service Field representative to the customer's service address to notify them. SDG&E trains Customer Service Field representatives on the County of San Diego's First Responder AFN Training Series to promote an empathetic and supportive approach for customers with AFN.

1.8.2 Accessible Media Engagement

During the 2024 PSPS activations, SDG&E continued to engage with local broadcast media and utilize various mediums to reach the public, including AFN communities, and Limited English Proficient residents, to provide them with wildfire safety and emergency preparedness information, PSPS awareness and PSPS education.

Per the U.S. Census Bureau, San Diego County is home to more than 3.3 million residents, approximately 1.1 million of whom are Hispanic and Latino. SDG&E's service territory also borders Baja California, México, and is home to one of the busiest land border crossings in the world. In addition to providing communications in language, SDG&E's bilingual communications manager produces wildfire safety and PSPS-related news releases, social media, and other communications pieces in Spanish for the public and local Spanish broadcast media. SDG&E also continues to provide critical PSPS and wildfire safety information in all prevalent languages including American Sign Language (ASL).

Prior to and during high fire risk conditions, SDG&E will engage local broadcast media, including local Spanish media and multicultural niche outlets, early and often to reach customers and notify them to amplify SDG&E's messaging during a wildfire or high fire risk weather conditions to keep its diverse customer base and the public informed.

1.8.3 Community Resource Centers (CRCs)

As a result of meetings held in communities in SDG&E's service area, SDG&E established a network of Community Resource Centers (CRCs) to help communities in real-time during Public Safety Power Shutoffs. Currently, SDG&E has identified eleven customer-owned facilities located within the HFTD to serve as CRCs during Public Safety Power Shutoffs and maintains three mobile units along with two Community Support Vehicles for additional deployment purposes. SDG&E does not have any plans to add additional locations. The CRC locations selected by SDG&E were identified through a rigorous process, which included input from fire and meteorological experts, as well as consideration of those areas most prone to adverse weather, as indicated by historical data.

Customers at CRCs are provided:

- Bottled water
- Light snacks
- Cell phone and medical device charging
- Seating
- Accessible Restrooms
- Ice
- Water trucks (for large animals)
- Up-to-date outage event information

SDG&E endeavors to provide cellular network services access where possible.

SDG&E has coordinated with each CRC site-facility owner on Americans with Disabilities Act (ADA) compliance and has provided additional accessibility and safety items in "AFN Go Kits." These Go Kits include items to mitigate trip hazards, communication aids, additional accessibility and directional signage, and materials to expand accessible parking and provide safe paratransit loading zones. Privacy screens are available to provide a private area for sensitive activities like administering medications, breastfeeding, or establishing a calming area for sensory disabilities and other needs.

Additionally, SDG&E has leveraged key takeaways from Cal OES's Inclusive Planning Blueprint for Addressing Access and Functional Needs at Mass Testing/Vaccination Sites. SDG&E has implemented the Video Remote Interpreting (VRI) resource and training to all CRC staff, allowing for complex conversations and information sharing in ASL and other languages. Each CRC will also have non-English visual translator boards for simple and casual conversations with Deaf and non-verbal customers. SDG&E will ensure all CRC staff are familiar with possible reasonable accommodation requests and know to refer such requests to the EOC AFN Liaison Officer for solution support.

SDG&E established a medical device drop-off process for charging AFN individuals at the CRCs and will have medical cooler organizers available. More details about SDG&E's CRCs, including siting and accessibility, will be outlined in its forthcoming CRC plan as required by D.20-05-051.

Additionally, in Q3, SDG&E completed a mock CRC activation to ensure the program is fully optimized ahead of fire season.

1.9 Recovery (After - Power has Been Restored)

1.9.1 Customer Research and Feedback

The Post-season Survey is underway and being prepared to be fielded at the end of December/beginning of January. Results will be shared in the 2025 AFN Plan Q1 Update report.

1.9.2 AFN Support

After Action Reviews and Reports

SDG&E will continue to follow the established emergency management After Action Review (AAR) process for all events in 2024. This process includes bringing together key personnel that participated in the event. A detailed report is then produced to combine all findings to understand SDG&E's strengths, opportunities to improve and lessons learned into an AAR Improvement Plan for implementation.

Lessons Learned and Feedback

2024 required SDG&E to implement PSPS protocols during the November 3rd through November 8th and again on December 7th through December 11th. Some lessons learned resulted in procedural improvements which expedited information sharing with AFN Support Partners and service delivery to customers:

- Automating the sharing of SDG&E's EOC Liaison notifications to the AFN Liaison for dissemination to AFN Support Partners
- Restructuring the backup battery dispatch process which removed bottlenecks and reduced points-of-contact for the customer
- Implementing a "Daily Update" document to provide context and additional information for AFN Liaison as the position rotates among several on a roster

Additionally, SDG&E continues to leverage feedback based on collaborative councils to refine support services offered during a PSPS to further support individuals with AFN. As described in Table 1 of SDG&E's 2024 pre-season report[26], recommendations offered have contributed to 2024 key objectives and aligned actions the utility has taken:

- Partnering with statewide CBOs and local governments to promote PSPS preparedness and awareness of offerings
- Awareness campaigns, including targeted messaging to individuals within the HFTD, for AFN self-identification
- Using the CBO PSPS post-event survey to capture feedback and identify customers' needs from each CBO that participated directly after an activation.

[26] R1812005 SDG&E 2024 PSPS Pre-Season Report Tables_7.1.24_PUBLIC

Appendix E:

2024 AFN Plan Objective Tracker

2024 AFN Plan Objective Tracker

2024 Key Objectives	Team	Progress to Date	Q4 2024 Updates
§Increase awareness of IOU programs and services available before, during and after a PSPS	Joint IOUs	• Prepare for Power Down website • Coordinating and benchmarking with CalFresh for food support for individuals with AFN impacted by PSPS activations • JIOU presentation to IHSS to increase awareness of PSPS and resources • JIOUs updated the Joint IOU PSPS Fact Sheet • JIOUs participated at the California Hospital Association (CHA) 2024 Disaster Planning and 2024 Tribal Clean Energy Summit • SCE represented on behalf of the Joint IOUs at the Government and Disability Summit engaging in PSPS discussion with CFILC/DDAR and 211.	• Requested CBOs and statewide partners to promote Prepare for Power Down (P4PD) website by using the CBO toolkit, which is now hosted on the P4PD website. • Joint IOUs presented to leaders within the Western Regional Alliance for Pediatric Emergency Management (WRAP-EM) on PSPS support services and program material; plans are underway for larger statewide training in 2025.
§Increase awareness of SDG&E programs and services available before, during and after a PSPS	SDG&E	• Regional PSPS WG Survey to identify which utility resources are most valuable to stakeholders' constituents and the most effective medium to communicate resources offered. Identified organizations requesting a presentation by AFN team: • Meeting with CERT 3/26/24 • T-Mobile presentation occurred with Emergency Management on 3/14/24 • Partnered with Kaiser for customers to complete MBL. • CBO Social Media packet shared in newsletter for AFN Preparedness and Self-ID. Distributed collateral at Emer.	•Provided presentations and shared collateral on PSPS preparedness and support services to the Autism Society of San Diego and the San Diego Housing and Community Development. •Sent preparedness email referencing PSPS digital resources to the State Council on Developmental Disabilities, San Diego Chapter for distribution to their partners and contacts. •Conducted a direct mail preparedness campaign to ~45,000 customers in the HFTD. •The mass market AFN Advertising Campaign continued through Q4 ending on December 1. •Added a Wildfire Safety Newsletter insert with the SDG&E

		Prep. • Q2 Regional PSPS Working group reviewed Mobile Home Park & Multifamily Outreach Campaign; Prepare For Power Down Website. • Partnered with San Diego Housing Commission sharing PSPS preparedness information.	monthly bill.
§ IOUs continue to identify individuals who are Electricity Dependent	Joint IOUs	• Partnership with In-Home Services (IHSS), Regional Centers, Department of Rehabilitation • On September 30, 2024, the Joint IOUs filed a Tier 3 Advice Letter seeking CPUC approval of the final Study Design and Budget of the MBL Population Study	• The aforementioned Western Regional Alliance for Pediatric Emergency Management (WRAP-EM) partnership is a new agency partnership and has a potential of resulting in identifying additional individuals with electricity dependency • Leverage CBO and statewide partnerships to identify individuals who are electricity dependent through use of P4PD CBO toolkit materials.
§SDG&E continue to identify individuals who are Electricity Dependent	SDG&E	• Social media packet to Energy Solutions Partner Network (200+ CBOs) • On Bill AFN Self ID Message campaign to SDG&E residential customers	•A Wildfire Safety Newsletter was included as a bill insert that went out to all customers in the territory at the beginning of 2024 PSPS season that includes customer navigation to the SDG&E AFN Self ID. •Added targeted AFN language to the outside of SDG&E bill envelope in October
§Identify new enhancements to IOU programs and resources needed to mitigate the impacts of PSPS	Joint IOUs	• AFN Statewide and Collaborative Council • AFN Plan Core Planning Team • Review results of the PSPS Pre-/Post-Season Survey • Launched Phase 2 of the PrepareforPowerDown.com website; developed marketing materials for statewide partners. • JIOUs aligned and shared best practices of 211's care coordination to enhance offerings.	• In light of the active PSPS season, IOUs are actively benchmarking on resources and services provided to customers, making adjustments and alignments when possible. • JIOUs aligned and shared best practices of 211's care coordination across all three utilities to enhance the offering, with a possible expansion into battery referrals.

§Identify new enhancements to SDG&E programs and resources needed to mitigate the impacts of PSPS	SDG&E	• Began planning CBO survey to request feedback from CBO partners on items related to PSPS (survey slated for late q2/early q3) • Enhanced San Diego Food Bank partnership to provide fresh and shelf stable food after a PSPS.	•Improved back up battery dispatch process with 211 to navigate and track emergency back up battery during a PSPS.
§IOU coordinate and integrate resources with state, community, utility to minimize duplication	Joint IOUs	• JIOU Blueprint • CAS Concurrent Application System, universal "application" • Prepare for Power Down website • Coordination with CalFresh regarding food support • Working with AFN Council and CBOs partners for their list of resources (e.g., the American Red Cross who offer Bed Shakers).	• Continue to coordinate with CalFresh regarding food support for major outages.
§ SDG&E Coordinate and integrate resources with state, community, utility to minimize duplication	SDG&E	• Meeting with 211 to discuss gap analysis the organization provided and discuss contract related to the current scope-of-work • Refined process with 211 to expand opportunities around proactive customer engagement.	•Blue Envelope offering window stickers for homes and cars that came as a result from discussions with SDG&E.

Appendix F:

Census Tract Data for Generator & Back-up Battery Programs

SDG&E Generator Grant Program (GGP)

Census Tract Code	Access and Function Needs (AFN)	Life Support	Medical Baseline	2024 Total
8367			2	2
9504		2	2	4
15501			1	1
16812			1	1
16901		4	3	7
16902		2	1	3
17021		1		1
17040		1		1
17050		1		1
17064			1	1
17070		1	2	3
17106		1	1	2
17111		1		1
17112			2	2
18619		3	2	5
18801	1			1
18804		2		2
18805		1		1
18903	1	5	1	7
18906			2	2
19001		1	1	2
19002		3	1	4
19103		2		2
19105		1	1	2
19107		1	1	2
19108		2	1	3
19110		5	1	6
19111		1		1
20043	1	2		3
20044		2		2
20110			1	1
20111		1	1	2
20311			4	4
20312			1	1
20401		1		1
20711		2		2
20801	1	3	3	7
20805		1		1

20806	1	1	2	4
20807		4	1	5
20810		2		2
20811		2	2	4
20812		2		2
20813		1	1	2
20902		2		2
20903		2	1	3
20904		1	2	3
21101		8	1	9
21102		2	1	3
21202		1	2	3
21204		2	2	4
21205		7	1	8
21206		3	1	4
21302		1	4	5
21502		1		1
Grand Total	**5**	**95**	**58**	**158**

SDG&E Generator Assistance Program (GAP)

Census Tract Code	CARE	NonCARE	2024 Total
9504		3	3
15502		1	1
16621		2	2
16901	3	4	7
16902	1	1	2
17010		1	1
17021		4	4
17047		1	1
17070	3		3
17111		3	3
17112	2	4	6
17113		1	1
18619	2	2	4
18801	3	2	5
18805	1	1	2
18903	4	2	6
18904	1		1
19001	1	3	4
19002	3	6	9
19105	3	2	5
19107	1	2	3
19109		1	1
19110	3	4	7
19111	1	2	3
20043		2	2
20044	1	2	3
20110	1	2	3
20111	2	3	5
20311		3	3
20801	3	7	10
20805	1	3	4
20806	1	8	9
20807	3	4	7
20811	5	7	12
20812		2	2
20813	2		2
20902	4	3	7
20903	4	3	7
20904	3	5	8

21101	8	7	15
21102	3	1	4
21202	3	2	5
21204	8	6	14
21205	3	5	8
21206		6	6
21302	3	4	7
21304		3	3
21305		1	1
21502	1		1
Grand Total	**91**	**142**	**232**

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