State of California – A Natural Resources Agency
Gavin Newsom, Governor

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Caroline Thomas Jacobs, Director

To: Stakeholders for San Diego Gas & Electric's 2022 Wildfire Mitigation Plan Update

May 19, 2022

Enclosed is the Draft Decision of the Office of Energy Infrastructure Safety (Energy Safety) presenting its evaluation of San Diego Gas & Electric Company's 2022 Wildfire Mitigation Plan (WMP) Update.

On May 19, 2022, this Draft Decision is hereby published for public review and comment. Comments must be submitted no later than June 8, 2022. Reply must be submitted no later than June 20, 2022.[1]

Comments must be submitted to Energy Safety's e-filing system in the 2022 Wildfire Mitigation Plans docket (#2022-WMPs).[2]

Sincerely,

Melissa Semcer
Deputy Director | Electrical Infrastructure Directorate
Office of Energy Infrastructure Safety

[1] Dates falling on a Saturday or holiday as defined in Government Code Section 6700 have been adjusted to the next business day in accordance with Government Code Section 6707.
[2] Submit comments to the 2022-WMPs docket via the Energy Safety e-filing system here: https://efiling.energysafety.ca.gov/EFiling/DocketInformation.aspx?docketnumber=2022-WMPs (accessed May 19, 2022)

OFFICE OF ENERGY INFRASTRUCTURE SAFETY'S

DRAFT EVALUATION OF 2022 WILDFIRE MITIGATION PLAN UPDATE

SAN DIEGO GAS & ELECTRIC COMPANY

May 2022

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Executive Summary

The Office of Energy Infrastructure Safety (Energy Safety) was formed in July 2021 to ensure electrical utilities take effective actions to reduce utility-related wildfire risk. Energy Safety strives to deliver near-term results while promoting a long-term utility vision to reduce wildfire and build cultures of safety.

The California Legislature enacted several measures requiring electrical corporations to reduce the risk of utility-caused catastrophic wildfires. Key legislative measures include Assembly Bills 1054 and 111, Public Utilities Code Sections 326(b) and 8389, Senate Bills 901 and 1028, and Government Code Section 15475 (see Section 1.1, "Legal Authority").

Pursuant to Public Utilities Code Section 8386.3(a), this Decision serves as Energy Safety's assessment and approval of San Diego Gas & Electric Company's Wildfire Mitigation Plan 2022 Update (2022 Update) submitted on February 11, 2022.

Energy Safety's Decision incorporates comments from the public and other stakeholders.

This Executive Summary includes a high-level summary of Energy Safety's assessment of San Diego Gas & Electric Company's maturity model, progress, and areas in the current plan Energy Safety determined warrant continued improvement. Energy Safety's comprehensive evaluation is included as Section 4, and a detailed list of all areas for continued improvement and required progress can be found in Section 7.

Maturity Model Evaluation

Energy Safety introduced a maturity model (the Utility Wildfire Mitigation Maturity Model) in 2020, providing a method to assess utility wildfire risk reduction capabilities and examine the relative maturity of individual wildfire mitigation programs. In February 2020, the utilities completed a survey that established a baseline for maturity as well as their anticipated progress over the three-year plan period. In 2021 and 2022, the utilities again completed the survey, enabling Energy Safety to monitor progress and ascertain potential improvements to maturity based on self-reported progress to date.

Energy Safety makes the following key findings regarding San Diego Gas & Electric Company's maturity progress in 2022 and over the three-year plan cycle. Detailed explanations of utility maturity are contained in each section of the evaluation.

- San Diego Gas & Electric Company's maturity, as measured by the Utility Wildfire Mitigation Maturity Survey, began at a relatively high level and has remained high over the three-year plan period.

Areas of Significant Progress

San Diego Gas & Electric Company (SDG&E) has made significant progress over the past year and/or has matured in its mitigation strategies for future years in the following areas:

- SDG&E's 2022 Update provides additional transparency about its decision-making processes by including decision-making flowcharts for system hardening, asset management and inspections, and vegetation management and inspections.
- SDG&E is the only utility thus far that integrates smoke impacts into safety impact considerations.
- SDG&E has nearly completed its expulsion fuse replacements and expects to complete these replacements in 2022.
- SDG&E is moving ahead with a new model—Wildfire Next Generation System - Operations—to scope and forecast Public Safety Power Shutoff events.
- SDG&E uses a proactive approach to enhance detection of faults and/or potential ignitions with wireless fault indicator deployment.
- SDG&E is improving its forecast accuracy with a machine learning wind gust model using its weather station network.

SDG&E also continues to develop several noteworthy practices in its Wildfire Mitigation Program:

- SDG&E continues its successful use of drones (with a relatively high find rate) in distribution system inspections.
- SDG&E is the only utility among the three large investor-owned utilities to include wildfire risk reduction effectiveness calculations in the discussion for each initiative.
- SDG&E is more advanced than the other large investor-owned utilities on the situational awareness front: its weather forecasting capabilities are highly developed in terms of granularity, frequency, and accuracy, and the utility continues to refine these capabilities.

Areas for Continued Improvement

Energy Safety evaluated 2022 Updates with a particular focus on how each utility is driving down the risk of utility-related ignitions. The evaluation included assessing the utility's progress implementing wildfire mitigation initiatives, evaluating the feasibility of its strategies, and measuring year-to-year trends. As a result of this evaluation, Energy Safety identified areas where the utility should continue to improve its wildfire mitigation capabilities in future plans.

Section 4 contains Energy Safety's detailed assessment and resulting areas for continued improvement. A complete list of all SDG&E's areas for continued improvement is included in Section 7.

Selected themes from SDG&E's areas for continued improvement are:

- SDG&E must improve its wildfire risk and consequence and equipment failure modeling (e.g., including climate change risks, community impacts, wind gusts, and fire spread beyond eight hours).
- SDG&E must continue to use risk models to further inform mitigation plan prioritization, inspection schedules, and Public Safety Power Shutoff decision making.
- SDG&E must participate in new and existing working groups on risk modeling, covered conductor, vegetation management best management practices, vegetation clearances, climate change modeling, community impacts of wildfires, and use of new technologies.

1. Introduction and Background

San Diego Gas & Electric Company (SDG&E) submitted a comprehensive Wildfire Mitigation Plan (WMP or Plan) in 2020 covering a three-year term from 2020 through the end of 2022 (the current WMP cycle). SDG&E submits annual updates to that Plan for Office of Energy Infrastructure Safety (Energy Safety) approval or denial. This Decision represents Energy Safety's assessment of SDG&E's 2022 WMP Update (2022 Update), which SDG&E submitted on February 11, 2022, in response to Energy Safety's Final 2022 WMP Update Guidelines[1] (Guidelines).

Energy Safety approves SDG&E's 2022 Update.

1.1 Legal Authority

In 2018, following the devastating wildfires in 2016 and 2017, the California Legislature passed several bills increasing regulatory supervision of electrical corporations' efforts to reduce utility-related wildfires. Assembly Bill (AB) 1054 (Statutes of [Stats.] 2019, Chapter [Ch.] 79) created Energy Safety (initially formed as the Wildfire Safety Division [WSD] at the California Public Utilities Commission [CPUC]) and tasked it with reviewing annual WMPs submitted by electrical corporations.

The main regulatory vehicle for Energy Safety to evaluate electrical corporations' wildfire risk reduction efforts is the WMP, which was first introduced in Senate Bill (SB) 1028 (Stats. 2016, Ch. 598) and further defined in subsequent legislation. Investor-owned electrical corporations[2] are required to submit WMPs assessing their level of wildfire risk and providing plans for wildfire risk reduction. The CPUC evaluated the utilities' first WMPs under the SB 901 (Stats. 2018, Ch. 626) framework in 2019.[3]

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[1] Final 2022 Wildfire Mitigation Plan Update Guidelines (accessed January 26, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51912&shareable=true.

[2] In this document, "utility" should be understood to mean "electrical corporation."

[3] See Rulemaking 18-10-007.

On July 1, 2021, all functions of the CPUC's WSD were transferred to Energy Safety.[4] Energy Safety "is the successor to […] and is vested with, all of the duties, powers, and responsibilities of the Wildfire Safety Division,"[5] including, but not limited to, jurisdiction for evaluating and approving or denying utilities' WMPs and evaluating compliance with the WMPs. Energy Safety must ensure utility wildfire mitigation efforts sufficiently address utility wildfire risk. To support its efforts, Energy Safety developed a long-term strategic roadmap, Reducing Utility-Related Wildfire Risk (2020).[6] This strategic roadmap underpins Energy Safety's evaluation of the WMPs.

1.1.1 Cost Recovery

Statute requires electrical corporations to seek cost recovery and prove all expenditures are just and reasonable in their General Rate Cases (GRCs) or an appropriate application.[7] Nothing in this Decision should be construed as approval of WMP-related costs.[8]

1.2 Multi-Year Plan Process

In February 2020, the utilities[9] submitted their three-year 2020-2022 WMPs. In 2020, Energy Safety conducted its evaluation and either approved, conditionally approved, or denied the Plans. In the case of conditional approval, Energy Safety identified areas for further improvement in the Plans, assigning these areas different severity levels, and required the utilities to address issues through various mechanisms depending on the designation of severity, Class A, B, or C.

[4] Public Utilities Code § 326(b).

[5] Gov. Code § 15475.

[6] Energy Safety's strategic roadmap Reducing Utility-Related Wildfire Risk (2020) (accessed January 26, 2022): https://energysafety.ca.gov/who-we-are/strategic-roadmap/.

[7] Public Utilities Code § 8386.4(b).

[8] Energy Safety's approval does not relieve the electrical corporation of any otherwise applicable permitting, ratemaking, or other legal and regulatory obligations.

[9] The following utilities submitted a WMP in 2020: Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), San Diego Gas & Electric Company (SDG&E), PacifiCorp, Bear Valley Electric Service, Inc. (BVES), Liberty Utilities, Trans Bay Cable, LLC, and Horizon West Transmission, LLC.

In 2021, the utilities submitted updates to their 2020 WMPs. Energy Safety evaluated the utilities' WMP Updates and either approved or denied the Plans. If Energy Safety identified a critical issue in a utility's Plan, Energy Safety issued a Revision Notice requiring the utility to remedy the issue prior to completion of Energy Safety's evaluation. (See Section 1.3.2 for more information on Revision Notices.) Upon receipt of the utility's response to the Revision Notice, Energy Safety determined if the response was sufficient to warrant approval of the WMP or insufficient such that denial of the WMP was warranted. Energy Safety did not issue a Revision Notice to SDG&E for its 2021 Update.

Plan year 2022 is the final year in the first three-year plan cycle. Therefore, Energy Safety's evaluation of SDG&E's 2022 Update focuses heavily on the progress the utility made over the three-year plan cycle and whether the utility matured in its understanding of its own wildfire ignition risks and appropriate mitigation activities to decrease those risks.

1.3 2022 Evaluation Process

Energy Safety issued WMP Update Guidelines (Guidelines) on December 15, 2021. The Guidelines streamline the reporting and evaluation and incorporate the requirements of SB 533 (Stats. 2021, Ch. 244). Pursuant to the adopted Guidelines, SDG&E submitted its 2022 Update on February 11, 2022.

Energy Safety begins evaluating WMPs and Updates by reviewing the submittal for completeness. Energy Safety determines whether the submittal addresses the statutory requirements contained in Public Utilities Code Section 8386(c) and the Guidelines. Energy Safety does not conduct a substantive evaluation at that time. If the WMP or Update is not complete, Energy Safety may reject the plan and require the utility to resubmit.

Once Energy Safety determines the WMP or Update is complete, Energy Safety begins its assessment using the criteria listed in Section 1.3.1. The prior year's WMPs or Updates are included in the review to gauge progress and trends.

At any time during the evaluation, Energy Safety may issue a Revision Notice for reasons listed in Section 1.3.2. The utility must respond to the Revision Notice and revise and resubmit the relevant sections of its WMP or Update.

1.3.1 Energy Safety Evaluation Criteria

Energy Safety evaluated 2022 Updates according to the following factors:

- *Completeness:* The utility comprehensively responds to the statutory requirements contained in Public Utilities Code Section 8386(c) and Energy Safety's Guidelines.
- *Technical and programmatic feasibility and effectiveness:* The proposed initiatives are technically feasible and effective in addressing the risks that exist in the utility's service territory. The proposed initiatives are programmatically feasible for the specific utility given its maturity and progress to date.
- *Resource use efficiency:* The proposed initiatives are an efficient use of utility resources and focus on achieving the greatest risk reduction at the lowest cost.
- *Demonstrated year-over-year progress:* The utility demonstrates sufficient progress on objectives and program targets reported in its 2021 Update.
- *Forward-looking growth:* The utility demonstrates a clear action plan to continue reducing utility-related ignitions and the scale, scope, and frequency of Public Safety Power Shutoff (PSPS) events.[10] In addition, the utility focuses sufficiently on long-term strategies to build the overall maturity of its wildfire mitigation capabilities while reducing reliance on shorter-term strategies such as PSPS and augmented vegetation management.
- *Progress metrics:* The utility tracks the degree to which its wildfire mitigation activity has changed the conditions of its wildfire risk exposure in terms of drivers of ignition probability.
- *Outcome metrics:* The utility uses outcome metrics to measure its performance and outcomes in its service territory in terms of both leading and lagging indicators of wildfire risk, PSPS risk, and other direct and indirect consequences of wildfire and PSPS, including the potential unintended consequences of wildfire mitigation work.
- *Program targets:* The utility uses targets to track its progress toward specific objectives for its wildfire mitigation activities.[11] Program targets track the utility's pace of activity completion as laid out in the WMP but do not track the efficacy of its activities. The primary use of these program targets is to track utility progress with its WMP.

[10] A Public Safety Power Shutoff (PSPS) event, also called a de-energization event, is when a utility proactively and temporarily cuts power to electric lines that may fail in certain weather conditions, in specific areas, to reduce electric facility-caused fire risk.

[11] Objectives are unique to each utility and reflect the 1-, 3-, and 10-year projections of progress toward the WMP goal.

To assess SDG&E's 2022 Update, Energy Safety relied on:

- SDG&E's WMP and Update submissions
- Input from the California Department of Forestry and Fire Protection (CAL FIRE)
- Public and stakeholder comments
- SDG&E's response to the Utility Wildfire Mitigation Maturity Survey (Maturity Survey)
- SDG&E's data submissions
- SDG&E's responses to data requests

Energy Safety's assessment of SDG&E's 2022 Update is summarized in Section 4.

1.3.2 Revision Notices

Public Utilities Code Section 8386.3(a) states, "Before approval, the division may require modifications of the plan." Energy Safety effectuates this provision by issuing a Revision Notice. The purpose of a Revision Notice is to hold utilities accountable for:

- Submitting a sufficiently detailed 2022 Update
- Addressing issues or improvement requests from the previous year
- Providing adequate data and information to justify proposed mitigation strategies

Examples of when Energy Safety may choose to issue a Revision Notice include, but are not limited to, the following:

- The utility failed to implement the remedies detailed in the prior year's Decision[12]
- The utility did not provide sufficient information for evaluation
- The utility made a significant shift in its wildfire mitigation strategy without sufficient substantiation
- The utility's submission does not meet evaluation criteria listed in Section 1.3.1
- An element of the WMP that is critical to life-safety or property is unsatisfactory

Energy Safety did not issue a Revision Notice to SDG&E for its 2022 Update.

[12] Also called an Action Statement (2020, 2021).

1.3.3 Final Decision

Upon completion of its review, Energy Safety determines whether each utility's 2022 Update will be:

- Approved (approval may include a requirement that the utility demonstrate continued growth in its 2023 WMP), or
- Denied (the utility does not have an approved 2022 Update and must reapply for approval in 2023).

Energy Safety's approval of a WMP or WMP Update does not mean that the utility has reached the highest levels of maturity or has reduced its ignition risk to zero. Rather, approval means the utility has satisfied the evaluation criteria and substantiated its mitigation strategy such that implementation of the plan is appropriate. When Energy Safety approves a WMP or WMP Update, it does so with an eye toward continued improvement. Therefore, in this Decision, Energy Safety lists areas where the utility must continue to mature in its capabilities, known as Areas for Continued Improvement.

2. Energy Safety Decision on SDG&E's 2022 Update

Pursuant to Public Utilities Code Section 8386.3(a), this Decision is the totality of Energy Safety's review of SDG&E's 2022 Update. SDG&E's 2022 Update is approved.

3. Public and Stakeholder Comments

Energy Safety invited stakeholders, including members of the public, to provide comments on the utilities' 2022 Updates. WMP comments were due on April 11, 2022, and reply comments were due on April 18, 2022. The following individuals and organizations submitted comments:

- California Department of Fish and Wildlife (CDFW)
- Green Power Institute (GPI)
- Mussey Grade Road Alliance (MGRA)
- Public Advocates Office at the CPUC (Cal Advocates)
- Rural County Representatives of California (RCRC)
- The Utility Reform Network (TURN)
- William B. Abrams

Comments received on the 2022 Updates can be viewed in the 2022 Wildfire Mitigation Plan Updates (2022-WMPs) docket log.[13]

Energy Safety evaluated these comments and concurred with and in some instances incorporated the following stakeholder input on SDG&E's 2022 Update, as reflected in this Decision:

- When implementing wildfire mitigation activities, SDG&E should consult CDFW and other responsible agencies as early as possible to complete required environmental documents and discretionary reviews (CDFW).
- SDG&E should "reduce the long-term need for extensive tree trimming and slash production" (GPI).
- Activities and mitigation in SDG&E's WMP should address drivers that resulted in utility-caused wildfires (GPI, Abrams).

[13] 2022 Wildfire Mitigation Plan Updates (2022-WMPs) docket log: https://efiling.energysafety.ca.gov/Lists/DocketLog.aspx?docketnumber=2022-WMPs (accessed April 14, 2022).

- SDG&E should evaluate risk outside of the CPUC's high fire threat district (HFTD) based on risk model outputs to identify any necessary additional areas that pose high wildfire risk and adjust their wildfire mitigations activities accordingly (GPI).
- SDG&E and its peer utilities should provide more information on mitigation initiative lifecycle benefits used to determine risk-spend efficiency estimates (GPI).
- SDG&E should perform a more compete assessment of the possible impacts of climate change on both probability of ignition and consequence (GPI).
- SDG&E and its peer utilities should address aeolian vibration wear and tear on covered conductor (GPI).
- SDG&E and its peer utilities should expand their collaboration to share lessons learned on system hardening practices beyond covered conductor (Cal Advocates).
- SDG&E and its peer utilities should be more specific in reporting the inputs, outputs, and assumptions of its models used to calculate PSPS safety and financial risk to customers (Cal Advocates).
- SDG&E and its peer utilities would benefit from forming a working group to study the use of rapid earth fault current limiter technology (MGRA).
- SDG&E should delay any major roll-out of undergrounding until the effectiveness of alternatives have been evaluated (MGRA).
- SDG&E's initiative introducing smoke as a safety risk is noteworthy, as smoke can be a dominant safety risk for utility wildfires (MGRA).
- SDG&E should inform Energy Safety of the outcomes of its third-party covered conductor tests (MGRA).
- SDG&E and its peer utilities should provide more information on third-party consequence modeling assumptions (MGRA).

In addition to the above, Energy Safety's review benefited from the discovery materials generated by data requests submitted to SDG&E by the stakeholders named above, in particular Cal Advocates and MGRA.

4. Energy Safety's Assessment of SDG&E's 2022 Update

The following sections present Energy Safety's comprehensive evaluation of SDG&E's 2022 Update, including Energy Safety's assessment of progress over the past year and throughout the current WMP cycle. Energy Safety looks at SDG&E's past and current WMP and Update submissions to assess year-over-year trends and track Energy Safety's past requirements as well as the utility's own projections. In addition to comparing SDG&E's initiatives from year to year, Energy Safety also assesses any new programs, plans, or technologies SDG&E is proposing in its 2022 Update. The sections below assess past progress, encourage growth through new initiatives or approaches, and identify areas for continued improvement following up on 2021 requirements.

Before commencing its evaluation, Energy Safety found SDG&E's 2022 Update to be complete.

4.1 Introductory Sections of the WMP

The introductory sections of the Guidelines[14] require the utility to report basic information regarding persons responsible for executing the plan and adherence to statutory requirements. Section 1 requires contact information (telephone and email) for the executive with overall responsibility and the specific program owners. In addition, Section 1 requires inclusion of the name and relevant background and credentials for all experts consulted in preparation of the 2022 Update. Contact information and names may be submitted in a redacted file.

Section 2 requires the utility to specify the location of the information required by Public Utilities Code Section 8386(c). Each utility must affirm that the WMP Update addresses each statutory requirement AND cite the section and page number(s) where each statutory requirement is addressed.

[14] Final 2022 Wildfire Mitigation Plan Update Guidelines, Attachments 2.1 and 2.2, pp. 25-35 (accessed February 15, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51912&shareable=true.

SDG&E provides the required information in Sections 1 and 2 of its 2022 Update, including all information required by Public Utilities Code Section 8386(c).

4.2 Actuals and Planned Spending for Mitigation Plan

The actuals and planned spending section of the Guidelines[15] requires utilities to report a summary of WMP expenditures, actual and planned, for the current WMP cycle. This summary must include an estimated annual increase in costs to the ratepayer due to utility-related ignitions and wildfire mitigation activities. The Guidelines require that ratepayer impact calculations be clearly shown to demonstrate how the utility derived each value.[16]

SDG&E provides all required information regarding expenditures.

According to Table 3-1.1, Summary of WMP Expenditures – Total (2022 Update, p. 14), SDG&E spent $124,693 more than planned in 2020 but $102,554 less than planned in 2021. Its 2022 planned expenditures ($770,393) are higher than its two previous planned or actual expenditures, exceeding its 2021 actual expenditures by 41.6 percent ($226,481).

See Table 4.2-1 below for a comparison of the WMP actual and planned expenditures of the three large investor-owned utilities (IOUs).[17] Also see below Table 4.2-2 for a breakdown of the large IOUs' planned expenditures by mitigation category; Figure 4.2-1 for the large IOUs' territory-wide expenditures and Figure 4.2-2 for their HFTD-only expenditures; and Figure 4.2-3 for SDG&E's cumulative increase in cost to ratepayers due to utility-ignited wildfires and mitigation activities.

[15] Final 2022 Wildfire Mitigation Plan Update Guidelines, Attachment 2.3, pp. 37-40 (accessed March 6, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51912&shareable=true.

[16] Nothing in the request for such information should be construed as approval of any such expenditure, which is left to the CPUC pursuant to Public Utilities Code § 8386.4(b).

[17] In this document, the term "large investor-owned utilities" (or "large IOUs") refers to Pacific Gas and Electric Company (PG&E), San Diego Gas & Electric Company (SDG&E), and Southern California Edison Company (SCE).

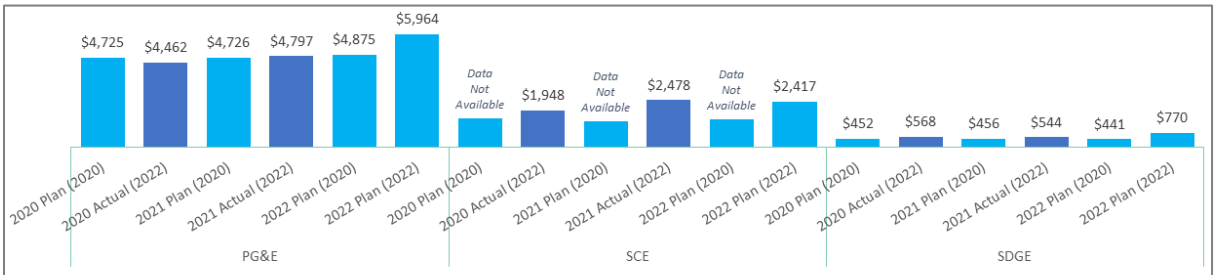
Table 4.2-1: Actual and Planned WMP Expenditures - Large IOUs (2020-2022)

Utility	2020 Actual	2021 Actual	2022 Planned	Total WMP Cycle as Reported in 2022
PG&E	$ 4,461,563.98	$ 4,797,530.02	$ 5,963,945.08	$ 15,223,039.07
SCE	$ 1,948,054.11	$ 2,478,208.87	$ 2,416,740.96	$ 6,843,003.94
SDG&E	$ 568,420.18	$ 543,911.56	$ 770,393.23	$ 1,882,724.97

Table 4.2-2: Breakdown of Planned WMP Expenditures by Category - Large IOUs, Ranked by Total Category Expenditure (2020-2022)

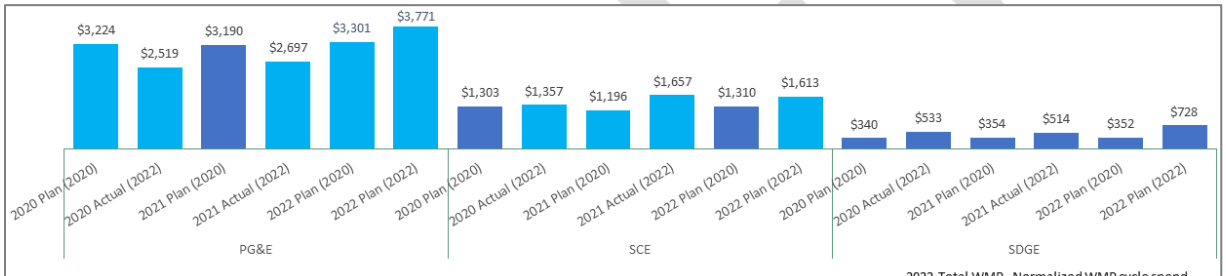
Category	PGE ($M) Plan Total	SCE ($M) Plan Total	SDGE ($M) Plan Total
Grid design and system hardening	$7,876 M (52%)	$3,991 M (58%)	$1,153 M (61%)
Vegetation management and inspections	$5,153 M (34%)	$1,518 M (22%)	$210 M (11%)
Asset management and inspections	$857 M (6%)	$943 M (14%)	$243 M (13%)
Grid operations and operating protocols	$458 M (3%)	$156 M (2%)	$77 M (4%)
Situational awareness and forecasting	$248 M (2%)	$66 M (1%)	$21 M (1%)
Data governance	$251 M (2%)	$22 M (0.33%)	$42 M (2%)
Stakeholder cooperation and community engagement	$166 M (1%)	$71 M (1%)	$46 M (2%)
Emergency planning and preparedness	$165 M (1%)	$19 M (0.28%)	$71 M (4%)
Resource allocation methodology	$27 M (0.18%)	$56 M (1%)	$14 M (1%)
Risk assessment and mapping	$23 M (0.15%)	$0 M (0%)	$7 M (0.38%)
Total Planned Spend for WMP Cycle	**$15,223 M**	**$6,843 M**	**$1,883 M**

Figure 4.2-1: Overview of Total Territory-Wide WMP Expenditures – Large IOUs (2020-2022)



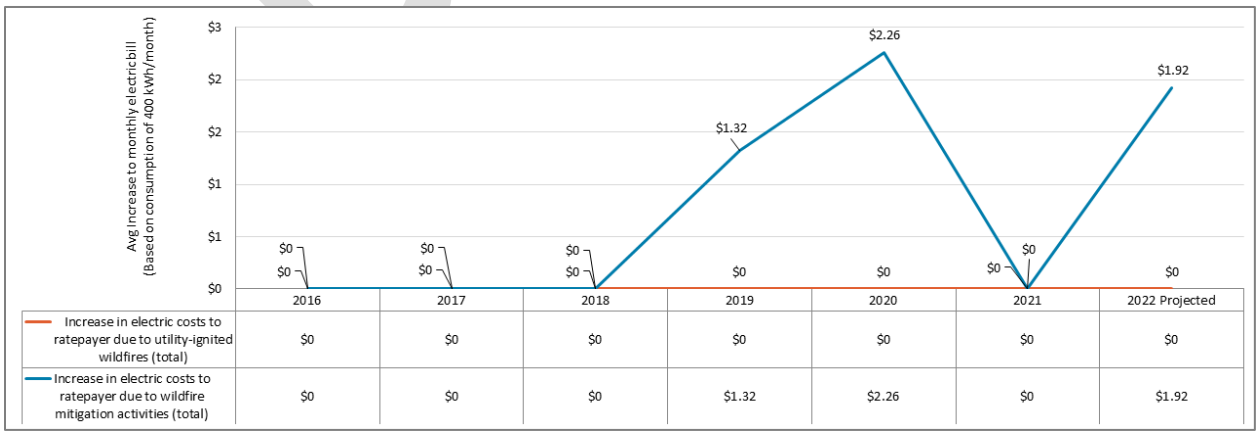
	2020 Plan (2020)	2020 Actual (2021)	2020 Actual (2022)	2021 Plan (2020)	2021 Plan (2021)	2021 Actual (2022)	2022 Plan (2020)	2022 Plan (2021)	2022 Plan (2022)	2022 Total WMP Cycle Planned Spend ($M)	Normalized WMP cycle spend (2022) per overhead circuit mile ($M)
PG&E	$4,725	$4,821	$4,462	$4,726	$4,894	$4,797	$4,875	$5,117	$5,964	$15,223	0.154
SCE*	-	$1,847	$1,948	-	$2,405	$2,478	-	$2,504	$2,417	$6,843	0.135
SDGE	$452	$569	$568	$456	$646	$544	$441	$670	$770	$1,883	0.234

Figure 4.2-2: Overview of Total HFTD-Only WMP Expenditures – Large IOUs (2020-2022)



	2020 Plan (2020)	2020 Actual (2021)	2020 Actual (2022)	2021 Plan (2020)	2021 Plan (2021)	2021 Actual (2022)	2022 Plan (2020)	2022 Plan (2021)	2022 Plan (2022)	2022 Total WMP Cycle Planned Spend ($M)	Normalized WMP cycle spend (2022) per HTFD overhead circuit mile ($M)
PG&E	$3,224	$3,339	$2,519	$3,190	$3,334	$2,697	$3,301	$3,626	$3,771	$8,987	$0.294
SCE	$1,303	$1,355	$1,357	$1,196	$1,696	$1,657	$1,310	$1,782	$1,613	$4,627	$0.333
SDGE	$340	$464	$533	$354	$502	$514	$352	$521	$728	$1,774	$0.401

Figure 4.2-3: SDG&E Cumulative Increase in Cost to Ratepayers Due to Utility-Ignited Wildfires and Mitigation Activities (Average Increase to Monthly Electricity Bill in Dollars, 2020-2022)



	2016	2017	2018	2019	2020	2021	2022 Projected
Increase in electric costs to ratepayer due to utility-ignited wildfires (total)	$0	$0	$0	$0	$0	$0	$0
Increase in electric costs to ratepayer due to wildfire mitigation activities (total)	$0	$0	$0	$1.32	$2.26	$0	$1.92

4.3 Lessons Learned and Risk Trends

The lessons learned and risk trends section of the Guidelines[18] requires utilities to report how their plans have evolved since 2021 based on lessons learned, current risk trends, and research conducted. This section also requires utilities to report on potential future learnings through proposed and ongoing research.

The utility must describe how it assesses wildfire risk in terms of ignition probability and estimated wildfire consequence using, at a minimum, CPUC-adopted risk assessment requirements (for large electrical corporations) from the General Rate Case (GRC) Risk-Based Decision-Making Framework Proceeding (formerly the Safety Model and Assessment Proceeding [S-MAP]) and the Risk Assessment Mitigation Phase (RAMP) Proceeding. The utility may additionally include other assessments of wildfire risk. The utility must:

- Describe how it monitors and accounts for the contributions of weather and fuel to ignition probability and wildfire consequence.
- Identify any areas where the CPUC's HFTD should be modified.
- Identify any areas classified by the utility as "high fire threat" that differ from the CPUC's HFTD and explain why these areas are so classified.
- Rank trends anticipated to have the greatest impact on ignition probability and wildfire consequence.

SDG&E provides all required information on lessons learned, current risk trends, and research conducted.

Examples of lessons learned SDG&E reports in its 2022 Update include the following:

- Outputs from the SDG&E Wildfire Next Generation System-Planning (WiNGS-Planning) and Wildfire Next Generation System-Operations (WiNGS-Ops) models can support PSPS decision making.
- Outputs from SDG&E's Machine Learning Wind Gust model (in use on 189 of 220 SDG&E weather stations) are vital to situational awareness 72 hours before a Red Flag Warning event.

[18] 2022 Wildfire Mitigation Plan Guidelines Template, Attachment 2.4, pp. 41-50 (accessed March 6, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51912&shareable=true.

- Undergrounding can be implemented effectively at shallower depths than previously thought, resulting in improved cost-effectiveness.
- SDG&E's Drone Investigation, Assessment and Repair (DIAR) Program was effective at detecting issues. This led to a 62 percent reduction in issues found in subsequent Corrective Maintenance Program inspections in 2021 in the Tier 3 HFTD, even with a 20 percent increase in distribution pole inspections.
- Prescribed goat grazing for fuel abatement was initially successful: SDG&E plans to expand the goat grazing program to sections of the transmission corridor.
- Data from smart meters could be useful in identifying potentially overloaded equipment posing a possible fire risk.
- In 2021, SDG&E developed a central repository reporting strategy to leverage common data sources to meet WMP non-spatial and geographic information system (GIS) spatial reporting requirements.
- The WiNGS-Planning model should be expanded to include evaluation of initiatives to account for asset health, circuit connectivity, and vegetation risk.
- Safety stand-downs at all operating centers were key to enhancing preparedness.
- Direct engagement with tribal leaders is needed to target generators to tribal members with the most need.

Regarding risk trends, SDG&E's 2022 Update cites the following trends in ignition probability drivers and the associated estimated wildfire consequence (pp. 43-45):

- Climate change: climate science has indicated an ongoing trend toward conditions leading to an increase in ignitions.
- Invasive species, such as bark beetles: some invasive species are leading to increased tree mortality and therefore increased ignition probability. In particular, the goldspotted oak borer, Agrilus auroguttatus, poses a significant threat in the HFTD.
- Fuel density and moisture: California's ongoing drought is leading to drier fuels, increasing ignition probability.
- Increased number of customers in the HFTD: there has been a 3 percent increase in customer accounts opened in the HFTD since SDG&E submitted its 2021 WMP Update. Further, in the same 2021-2022 period the number of customers in the HFTD identified

as having access and functional needs (AFN)[19] has increased by approximately 5 percent. Customers in the HFTD, particularly AFN customers, are likely to experience greater harm from wildfire.

SDG&E provides its prioritized list of wildfire risks and drivers in its 2022 Update (p. 48, Table 4-6), listing "contact from object" as the top category of ignition cause. Vehicle contact and balloon contact are ranked as the top risks in this category.

Regarding SDG&E's research projects:

- SDG&E provides an update on two academic research partnerships. One is with California Polytechnic State University San Luis Obispo (Cal Poly) Wildland-Urban Interface (WUI) Fire Information, Research, and Education (FIRE) Institute, and the other is with San Jose State University, with which SDG&E is collaborating to develop the Fire Science Innovation (FSI) lab.
- SDG&E summarizes a current research proposal it is developing with the Cal Poly WUI FIRE Institute to look at the environmental impacts of wildfire mitigation measures compared to the impacts of catastrophic wildfire. This research is intended to support potential applications for exemption of wildfire mitigation projects from environmental review through the Statutory Emergency Exemption.
- SDG&E provides the findings from 14 research projects it is conducting. The research projects are discussed more specifically in relevant wildfire mitigation initiative sections below.

4.3.1 Areas for Continued Improvement

In its 2023 WMP, SDG&E must further refine its prioritized list of wildfire risks and drivers (2022 Update, Table 4-6, p. 48) by weighting each risk driver by likelihood of causing a catastrophic wildfire. For example, the utility must factor in whether ignition caused by this driver tends to happen in high wildfire risk areas as identified by SDG&E's risk models, including the HFTD.

[19] For a definition of access and functional needs (AFN) in this context, see: https://www.caloes.ca.gov/cal-oes-divisions/access-functional-needs (accessed April 13, 2022).

In its 2023 WMP, SDG&E must also report on progress in collaborating with the other IOUs in estimating climate change impacts and integrating those estimated climate change impacts into their risk and consequence modeling.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 7.

4.4 Inputs to the Plan and Directional Vision for the WMP

The inputs and directional vision section of the Guidelines[20] requires the utility to rank and discuss trends it anticipates may have the greatest impact on ignition probability and wildfire consequence within the utility's service territory over the next 10 years. First, utilities must set forth objectives over the following timeframes: before the upcoming wildfire season, before the next annual update, within the next 3 years, and within the next 10 years. Second, utilities must report the current and planned qualifications of their workforce to meet these objectives.

4.4.1 Goal, Objectives, and Program Targets

The goal of the WMP is to ensure the utilities are sufficiently planning to reduce the number of ignitions caused by utility actions or equipment and minimize the societal consequences (with specific consideration of the impact on AFN populations and marginalized communities) of both wildfires and PSPS events.

This subsection of the Guidelines[21] requires utilities to provide their objectives, which are unique to each utility and reflect their 1-, 3-, and 10-year projections of progress toward the abovementioned goal. The Guidelines also require utilities to report their unique program targets. These are quantifiable measurements of activities identified in WMPs and Updates to show the utility's progress toward reaching its objectives.

[20] 2022 Wildfire Mitigation Plan Guidelines Template, Attachment 2.5, pp. 52-57 (accessed March 6, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51912&shareable=true.

[21] 2022 Wildfire Mitigation Plan Guidelines Template, Attachments 2.5.1-2.5.3, pp. 53-54 (accessed March 6, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51912&shareable=true.

SDG&E provides all required information.

- SDG&E characterizes its overarching WMP goal as follows: "Building on over 10 years of wildfire prevention and mitigation work, the 2022 Update continues to focus on reducing wildfire risk" (p. 144).
- SDG&E presents its 3-year and 10-year objectives for each of the 10 maturity capabilities in 2022 Update Table 5-1 (pp. 145-149).
- SDG&E lists and describes its program metrics and targets in 2022 Update Table 5-2 (pp. 150-157) and in its errata report for Table 5-2 submitted on March 31, 2022.[22]

4.4.2 Workforce Planning

This subsection of the Guidelines[23] requires utilities to report their worker qualifications and training practices regarding utility-related ignitions and PSPS mitigation for workers in mitigation-related roles including:

- Vegetation inspections
- Vegetation management projects
- Asset inspections
- Grid hardening
- Risk event inspection

SDG&E provides all required information regarding worker qualifications and training practices within each listed role.

In the Action Statement on SDG&E's 2021 Update (p. 18), Energy Safety required SDG&E to provide the size (in numbers) of the workforce available to restore service after an outage,

[22] "Supplement to First Errata to San Diego Gas and Electric Company's 2022 Wildfire Mitigation Plan," submitted March 31, 2022 (accessed April 7, 2022): https://efiling.energysafety.ca.gov/EFiling/GetPublicDocument.aspx?documentId=52221.

[23] 2022 Wildfire Mitigation Plan Guidelines Template, Attachment 2.5.4, pp. 56-57 (accessed March 6, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51912&shareable=true.

including a breakdown of the number of workers by classification.[24] SDG&E provides this information in its 2022 Update (pp. 169-170) in Table 5-13, Service Restoration Workforce (SDG&E Employees).

- SDG&E describes the minimum qualifications for its vegetation inspection and management workforce.
- SDG&E reports on its electrical asset training programs. Among other accomplishments in 2021, SDG&E:
    - Updated all levels of its Qualified Electrical Worker Skills Training Center curriculum, including training for electric troubleshooters, fault finders, line assistants, and apprentices.
    - Completed construction on a physical infractions test yard to train Journeymen on identifying and properly coding infractions.

SDG&E reports that it continues to participate in a cross-utility collaboration with the Utility Arborist Association and academia to develop and implement a "Utility Arborist Trainee" curriculum for California community colleges. Graduates of the training program are Line Clearance Qualified workers eligible for employment with SDG&E's contracted tree trimming companies.

4.4.3 Areas for Continued Improvement

SDG&E must provide in its 2023 WMP more details on utility vegetation management workforce (e.g., Utility Arborist) training initiatives it is developing and/or supporting. Details that would help Energy Safety understand the scope and effectiveness of these initiatives include the number of people entering classes using the Utility Arborist Trainee curriculum at California community colleges and/or other training programs developed and/or supported by SDG&E, the number completing the classes or other training programs, and the number of

[24] This issue was included in the 2021 SDG&E Action Statement as an additional issue that was not assigned a serialized number. The issue and remedy were described as follows (from p. 18): "Two of the statutory WMP requirements pursuant to Pub. Util. Code 8386(c) could have been met more completely. […] ISSUE: Requirement 15, supporting information regarding whether the utility has an adequately sized and trained workforce to promptly restore service after an outage was not clearly evident in the WMP Update. It was provided in response to a data request (see Appendix 10.2). REMEDY: Provide the size (in numbers) of the workforce available to restore service after an outage. Include a breakdown of the number of workers by classification."

those completing the classes or other training programs subsequently joining the utility vegetation management workforce. Any additional details on how SDG&E is addressing utility vegetation management labor constraints should also be provided.

4.5 Metrics and Underlying Data

The metrics and underlying data section of the Guidelines[25] requires utilities to report metrics and program targets as follows:

- *Progress metrics* that track how much utility wildfire mitigation activity has changed the conditions of a utility's wildfire risk exposure in terms of drivers of ignition probability.
- *Outcome metrics* that measure the performance of a utility and its service territory in terms of both leading and lagging indicators of wildfire risk, PSPS risk, and other direct and indirect consequences of wildfire and PSPS, including the potential unintended consequences of wildfire mitigation work.
- *Program targets* that track the utility's pace of completing proposed wildfire mitigation activities to show progress toward a utility's specific objectives.[26] Program targets do not track the efficacy of wildfire mitigation activities. The primary use of these program targets in 2022 is to assess the progress the utility made over the three-year plan cycle and whether the utility matured in its understanding of its own wildfire ignition risks and appropriate mitigations to decrease those risks.

This section also requires utilities to provide several GIS files detailing spatial information about their service territory and performance, including recent weather patterns, location of recent ignitions, area and duration of PSPS events, location of lines and assets, geographic and population characteristics, and location of planned initiatives.

See Section 4.6.7, "Data Governance," for a detailed review of the utility's progress and areas for continued improvement in this topic area.

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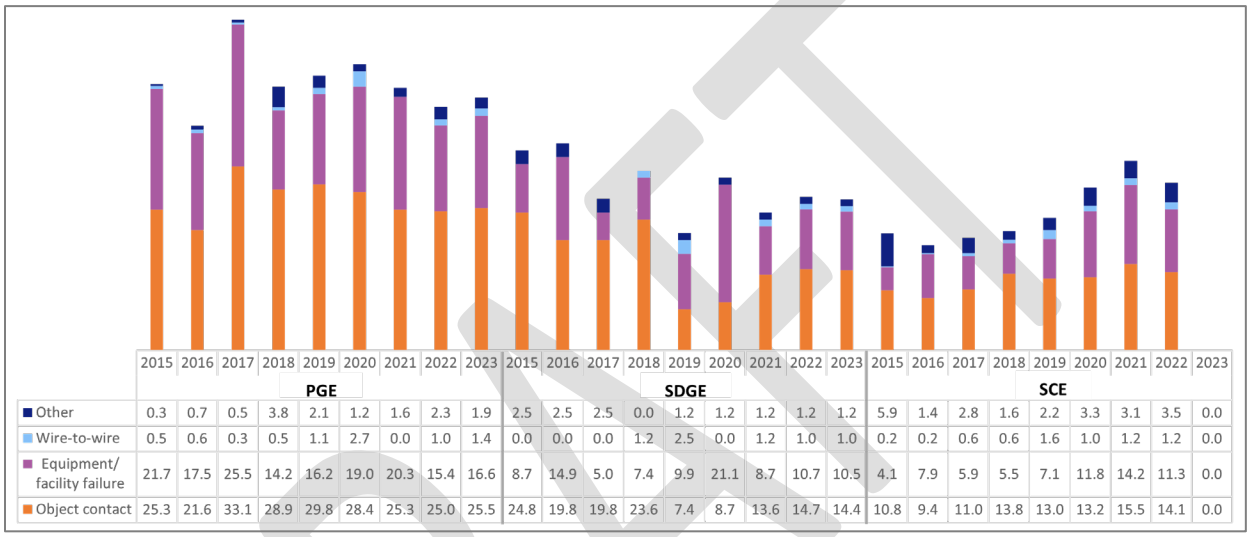
[25] 2022 Wildfire Mitigation Plan Guidelines Template, Attachment 2.6, pp. 58-69 (accessed March 6, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51912&shareable=true.

[26] Objectives are unique to each utility and reflect the 1-, 3-, and 10-year projections of progress toward the WMP goal.

See the following figures for more information on how the three large IOUs compare over the period 2015-2021 in actual numbers and 2022-2023 in projected numbers in terms of reported ignitions (Figure 4.5-1), risk events (Figure 4.5-2), Red Flag Warning circuit mile days per year (Figure 4.5-3), and asset inspection findings normalized by circuit miles inspected (Figure 4.5-4).

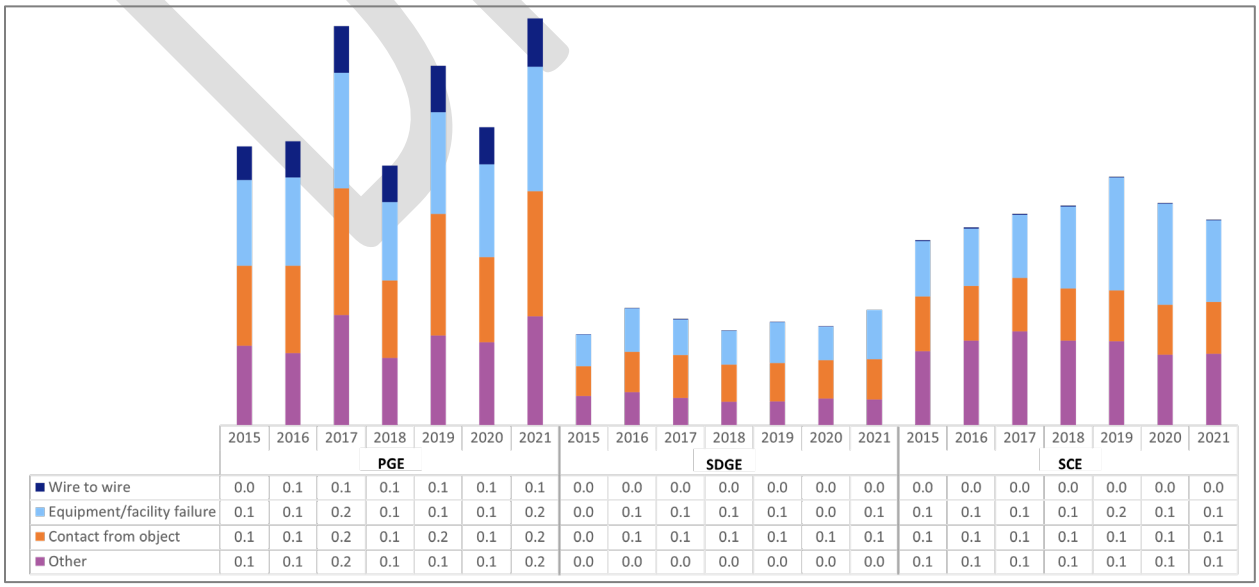
Figure 4.5-1: Ignitions per 10,000 Overhead Circuit Miles – Large IOUs (2015-2021 Actual, 2022-2023 Projected)



	PGE									SDGE									SCE								
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2015	2016	2017	2018	2019	2020	2021	2022	2023	2015	2016	2017	2018	2019	2020	2021	2022	2023
Other	0.3	0.7	0.5	3.8	2.1	1.2	1.6	2.3	1.9	2.5	2.5	2.5	0.0	1.2	1.2	1.2	1.2	1.2	5.9	1.4	2.8	1.6	2.2	3.3	3.1	3.5	0.0
Wire-to-wire	0.5	0.6	0.3	0.5	1.1	2.7	0.0	1.0	1.4	0.0	0.0	0.0	1.2	2.5	0.0	1.2	1.0	1.0	0.2	0.2	0.6	0.6	1.6	1.0	1.2	1.2	0.0
Equipment/ facility failure	21.7	17.5	25.5	14.2	16.2	19.0	20.3	15.4	16.6	8.7	14.9	5.0	7.4	9.9	21.1	8.7	10.7	10.5	4.1	7.9	5.9	5.5	7.1	11.8	14.2	11.3	0.0
Object contact	25.3	21.6	33.1	28.9	29.8	28.4	25.3	25.0	25.5	24.8	19.8	19.8	23.6	7.4	8.7	13.6	14.7	14.4	10.8	9.4	11.0	13.8	13.0	13.2	15.5	14.1	0.0

Note that SCE did not report any projected numbers for ignitions in 2023.

Figure 4.5-2: Risk Events per Overhead Circuit Mile – Large IOUs (2015-2021 Actual)



	PGE							SDGE							SCE						
	2015	2016	2017	2018	2019	2020	2021	2015	2016	2017	2018	2019	2020	2021	2015	2016	2017	2018	2019	2020	2021
Wire to wire	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equipment/facility failure	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1
Contact from object	0.1	0.1	0.2	0.1	0.2	0.1	0.2	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Other	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Figure 4.5-3: Red Flag Warning Overhead Circuit Mile Days per Year – Large IOUs (2015-2021 Actual)

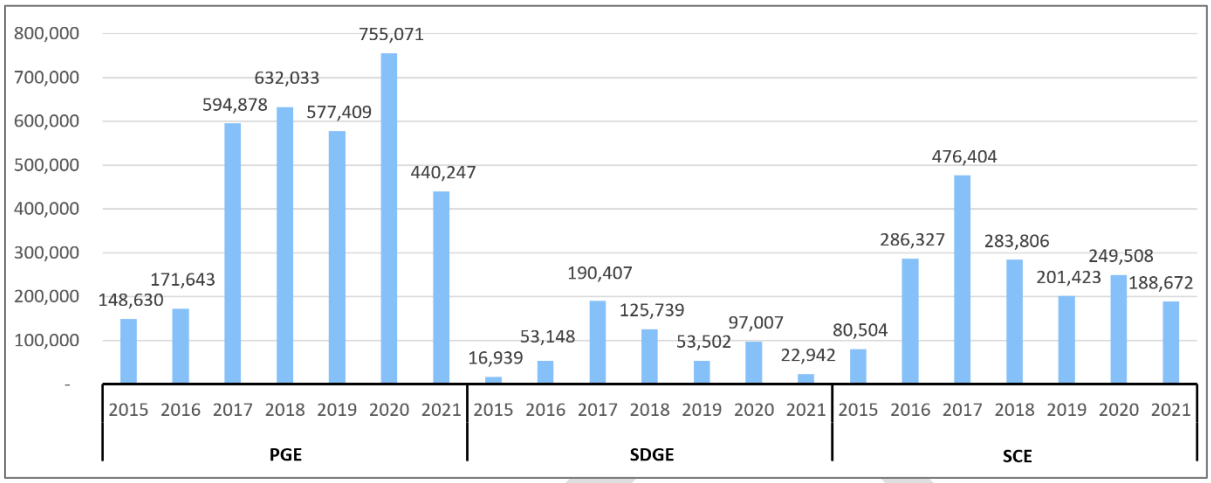
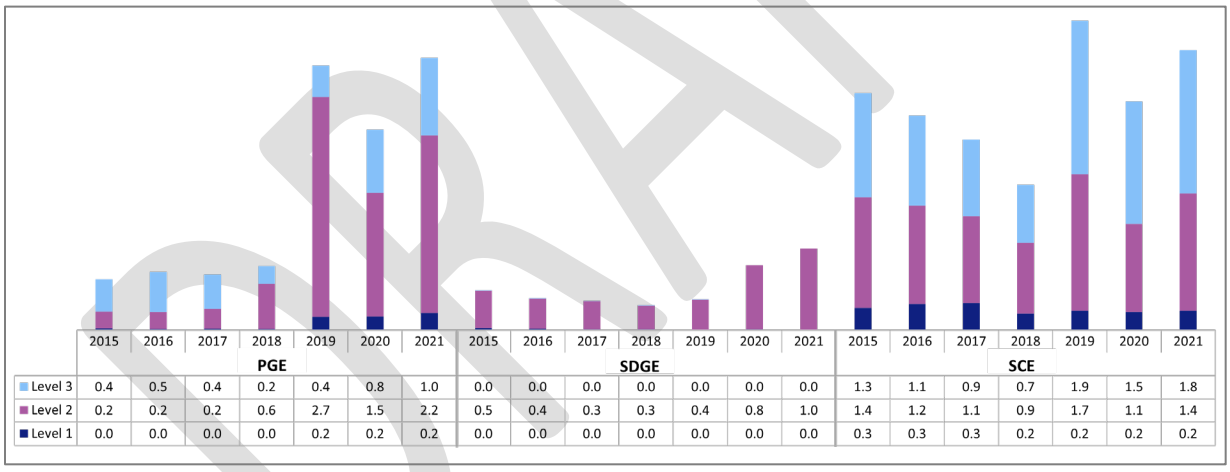


Figure 4.5-4: Asset Inspection Findings Normalized by Circuit Miles Inspected – Large IOUs (2015-2021 Actual)



	PGE							SDGE							SCE						
	2015	2016	2017	2018	2019	2020	2021	2015	2016	2017	2018	2019	2020	2021	2015	2016	2017	2018	2019	2020	2021
Level 3	0.4	0.5	0.4	0.2	0.4	0.8	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.1	0.9	0.7	1.9	1.5	1.8
Level 2	0.2	0.2	0.2	0.6	2.7	1.5	2.2	0.5	0.4	0.3	0.3	0.4	0.8	1.0	1.4	1.2	1.1	0.9	1.7	1.1	1.4
Level 1	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.2	0.2	0.2	0.2

4.6 Mitigation Initiatives and Maturity Evaluation

The mitigation initiatives and maturity evaluation section of the Guidelines[27] requires the utility to describe in its WMP Update each mitigation initiative it will undertake to reduce the risk of catastrophic wildfire. The Guidelines require the utility to self-report its current wildfire risk mitigation capabilities and plans for improvement in those capabilities.[28,29] The utility's self-reported capability level is referred to in this Decision as "maturity" and measured by Energy Safety's Utility Wildfire Mitigation Maturity Model (Maturity Model). Maturity levels range from zero to four, with four being the most mature. The utility reports on its maturity levels and mitigation initiatives using the same 10 categories, allowing Energy Safety to evaluate a utility's reported and projected maturity in wildfire mitigation in the context of its corresponding current and planned initiatives. The 10 maturity and mitigation initiative categories are listed below, with further details in Appendix D:

- Risk assessment and mapping
- Situational awareness and forecasting
- Grid design and system hardening
- Asset management and inspections
- Vegetation management and inspections

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[27] 2022 Wildfire Mitigation Plan Guidelines Template, Attachment 2.7, pp. 70-77 (accessed March 6, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51912&shareable=true.

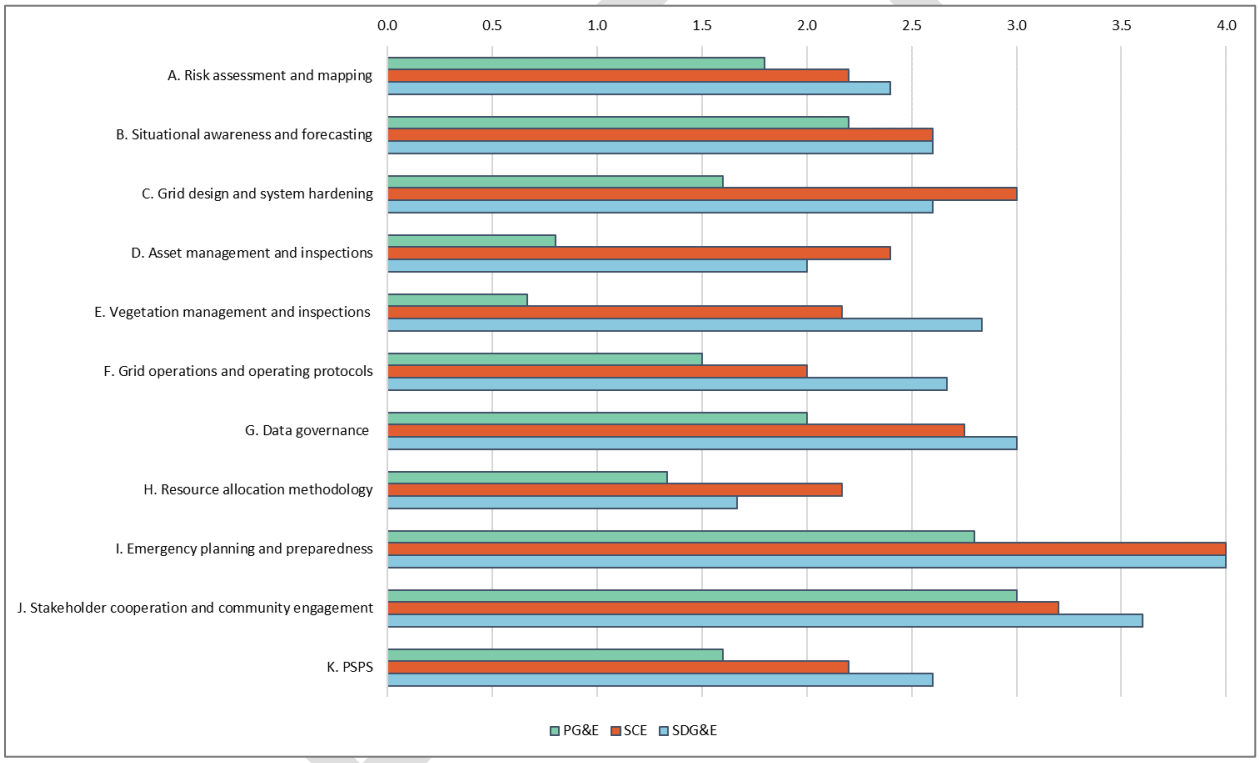
[28] The 2020 WMP Guidelines introduced the Utility Wildfire Mitigation Maturity Assessment as one of the four "key elements of the 2020 WMP submission and review process" (accessed April 29, 2022): https://energysafety.ca.gov/wp-content/uploads/docs/misc/docket/322133494.pdf.
The 2022 WMP Guidelines further defines the assessment process in Attachment 4: 2022 Maturity Model (accessed April 29, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51912&shareable=true. From that document (p. 3): "Energy Safety requires each utility to complete an annual Maturity Survey to report on its current capabilities and plans for improvement in those capabilities."

[29] Utilities that submitted a WMP were required to complete a survey (the Maturity Survey) in which they answered specific questions that assessed their existing and future wildfire mitigation practices across 52 capabilities at the time of submission and at the end of the three-year plan horizon. The 52 capabilities are mapped to the same 10 categories identified for mitigation initiatives. The most recent survey for each utility, including SDG&E, can be found on the Energy Safety website here: https://energysafety.ca.gov/what-we-do/electrical-infrastructure-safety/wildfire-mitigation-and-safety/wildfire-mitigation-plans/2022-wmp/ (accessed February 15, 2022).

- Grid operations and operating protocols
- Data governance
- Resource allocation methodology
- Emergency planning and preparedness
- Stakeholder cooperation and community engagement

Figure 4.6-1 and Table 4.6-1 below depict the self-reported maturity of the three large IOUs by initiative category for 2022. Figure 4.6-2 and Table 4.6-2 below depict SDG&E's projected growth in maturity by category for the current WMP cycle. Maturity is measured on a scale from zero to four, with four being the highest.

Figure 4.6-1: Self-Reported Maturity by Category - Large IOUs (2022)



Note that the above Figure 4.6-1 includes a "PSPS" category, which is not in the original Maturity Model. PSPS-related questions in the Maturity Survey are found under capabilities in various categories. The PSPS category in the figure above includes PSPS-related capabilities from the categories of situational awareness and forecasting, grid operations and operating protocols, and emergency planning and preparedness. It is calculated in the same way as the other categories.

Table 4.6-1: Self-Reported Maturity by Category - Large IOUs (2022)

Category	PGE	SCE	SDGE
A. Risk assessment and mapping	2.00	2.20	2.40
B. Situational awareness and forecasting	2.20	2.60	2.60
C. Grid design and system hardening	1.60	3.00	2.60
D. Asset management and inspections	0.80	2.40	2.00
E. Vegetation management and inspections	1.17	2.17	2.83
F. Grid operations and operating protocols	1.50	2.00	2.67
G. Data governance	2.00	2.75	3.00
H. Resource allocation methodology	1.33	2.17	1.67
I. Emergency planning and preparedness	3.60	4.00	4.00
J. Stakeholder cooperation and community engagement	3.00	3.20	3.60

Figure 4.6-2: SDG&E Projected Growth in Maturity throughout Current WMP Cycle by Category (Feb. 2020-Jan. 1, 2023)

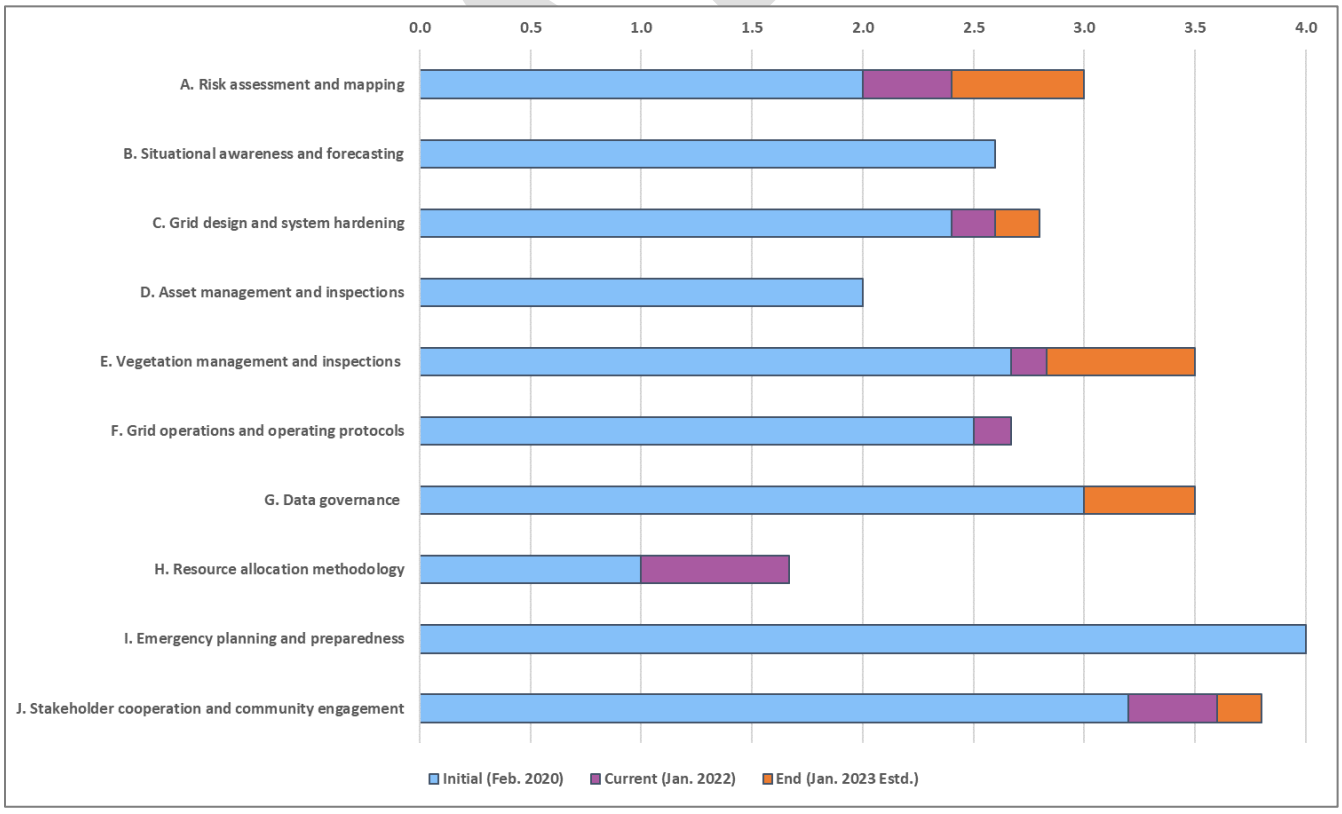


Table 4.6-2: SDG&E Projected Growth in Maturity throughout Current WMP Cycle by Category (2020-Jan. 1, 2023)

Category	Initial	Current	End
A. Risk assessment and mapping	2.00	2.40	3.00
B. Situational awareness and forecasting	2.60	2.60	2.60
C. Grid design and system hardening	2.40	2.60	2.80
D. Asset management and inspections	2.00	2.00	2.00
E. Vegetation management and inspections	2.67	2.83	3.50
F. Grid operations and operating protocols	2.50	2.67	2.67
G. Data governance	3.00	3.00	3.50
H. Resource allocation methodology	1.00	1.67	1.67
I. Emergency planning and preparedness	4.00	4.00	4.00
J. Stakeholder cooperation and community engagement	3.20	3.60	3.80

Below, Energy Safety evaluates SDG&E's initiatives across the 10 categories in terms of the utility's Maturity Survey responses. Energy Safety discusses the utility's maturity progress for each category within the relevant wildfire mitigation initiative section.

4.6.1 Risk Assessment and Mapping

The risk assessment and mapping section of the Guidelines[30] requires the utility to discuss the risk assessment and mapping initiatives implemented to minimize the risk of utility-related ignitions. Utilities must describe initiatives related to equipment maps and modeling of overall wildfire risk, ignition probability, wildfire consequence, risk reduction impact, match-drop simulations,[31] and climate/weather-driven risks.

[30] 2022 Wildfire Mitigation Plan Guidelines Template, Attachment 2.7.3, p. 74 (accessed March 6, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51912&shareable=true.

[31] Simulations of the potential wildfire consequences of ignitions that occur along electric lines and equipment effectively showing the potential consequences if an ignition or "match was dropped" at a specific point in a utility's territory.

The parameters of risk assessment (discussed here) and resource allocation (discussed later in Section 4.6.8) to reduce wildfire risk derive from the CPUC's Risk-Based Decision-Making Framework (formerly S-MAP) and RAMP proceedings.[32]

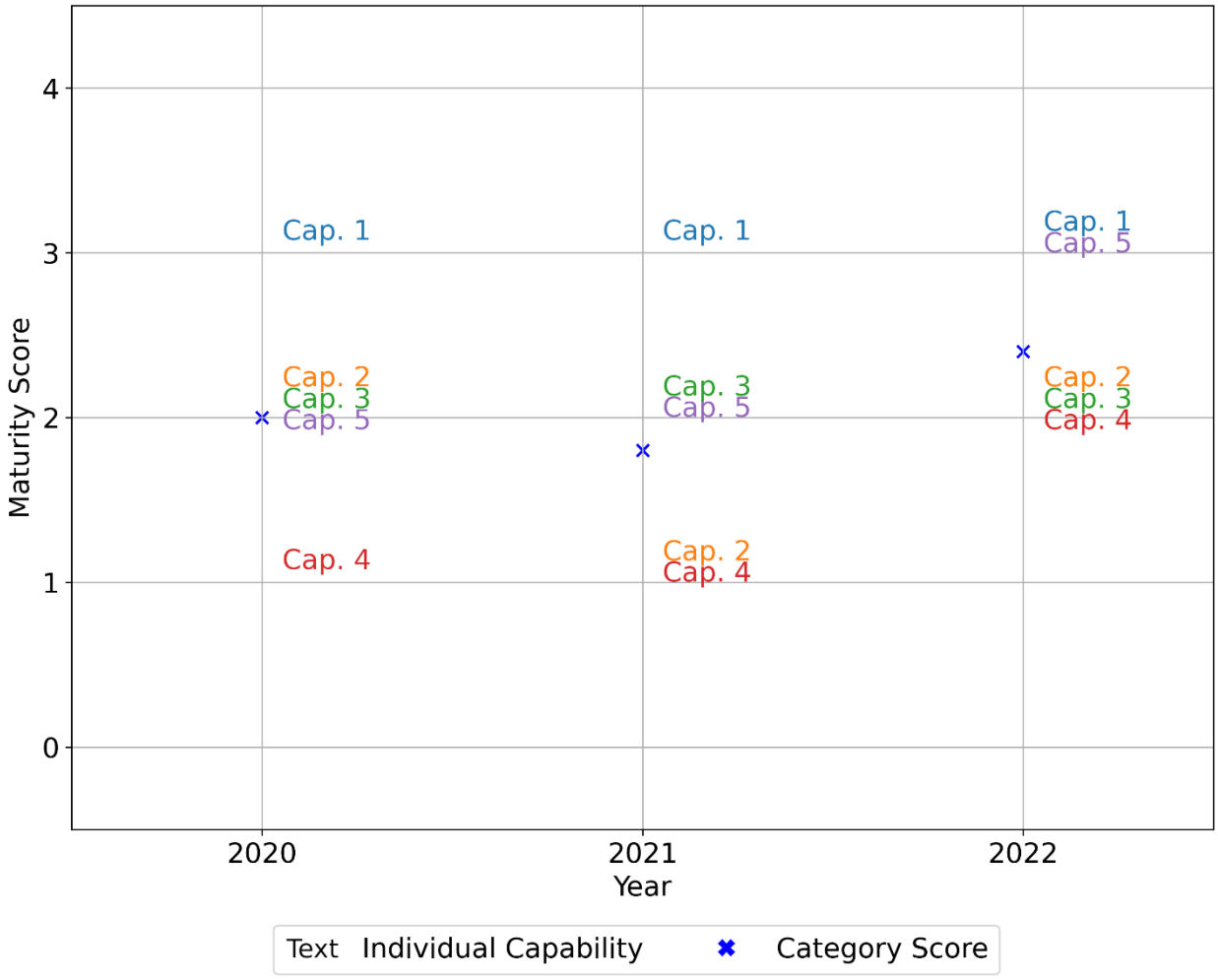
The utility's risk modeling should ultimately inform the utility of the highest risk risk-spend efficiency (RSE) analyses discussed in Section 4.6.8.

4.6.1.1 Maturity Assessment

According to its responses on the 2022 Maturity Survey, SDG&E increased its maturity in risk assessment and mapping from 2021 to 2022, as seen in Figure 4.6.1-1 below.

[32] The risk-based decision-making framework was adopted in the CPUC's D. 18-12-014 and refined in D. 21-11-009. An open CPUC proceeding R. 20-07-013 is addressing further developments to the risk-based decision-making framework. See the docket for this proceeding here: https://apps.cpuc.ca.gov/apex/f?p=401:56:0::NO:RP,57,RIR:P5_PROCEEDING_SELECT:R2007013 (accessed February 16, 2022).

Figure 4.6.1-1: SDG&E Risk Assessment and Mapping Maturity Levels for Individual Capabilities (2020-2022)



In particular, from 2021 to 2022 SDG&E increased in maturity in capability 2, dealing with ignition risk estimation, and capability 4, dealing with estimation of wildfire and PSPS risk reduction impact. Notably, SDG&E decreased in maturity in capability 2 from 2020 to 2021 due to its reinterpretation of automation capabilities; this decrease is also seen in Figure 4.6.1-1 above.[33] SDG&E is now back at its 2020 level for capability 2.

[33] See WSD-SDGE-03 (Question 1) "Regarding the explanation why SDG&E downgraded its ignition risk calculation from mostly to partially automated from 2020 to 2021," SDG&E 2021 Action Statement, pp. Appendix-14-15 (accessed April 29, 2022): https://energysafety.ca.gov/wp-content/uploads/tn10257_20210720t164339_revised_final_action_statement_on_san_diego_gas__electr.pdf.

Based on SDG&E's 2021 and 2022 Maturity Survey responses, it progressed in the following areas:

- SDG&E's incremental risk for weather scenarios can now be "accurately and quantitatively estimated," as opposed to "reliably estimated."[34]
- SDG&E's ignition risk calculation tool moved from partially to mostly automated, and SDG&E projects that this tool will be fully automated by January 1, 2023.[35]
- SDG&E's ignition risk reduction impact assessment tool is assessed by an independent expert and supported by historical incidents and events.[36]
- SDG&E uses data from other utilities and sources (in addition to its own data) to make decisions on whether to update algorithms.[37]

Areas limiting SDG&E's progress in maturity include the following:

- SDG&E has a confidence level of greater than 80 percent—not yet greater than 90 or 95 percent—for its wildfire risk assessments. However, SDG&E's confidence level has increased from greater than 60 percent since 2021.[38]
- SDG&E's risk reduction impact estimations do not include a quantitative confidence interval.[39]
- The granularity of SDG&E's ignition risk reduction impact assessment tool is only at a circuit-based level, not at a span- or asset-based level. SDG&E has, however, increased this tool's granularity from a regional level since 2021.[40]
- For detecting deviations between SDG&E's risk model output and actual ignitions and propagation detected in the field, SDG&E mostly uses a semi-automated process to update its algorithms, as opposed to a fully automated process.[41]

[34] SDG&E's Utility Wildfire Mitigation Maturity Survey, response to A.I.a.

[35] SDG&E's Utility Wildfire Mitigation Maturity Survey, response to A.II.b.

[36] SDG&E's Utility Wildfire Mitigation Maturity Survey, response to A.IV.d.

[37] SDG&E's Utility Wildfire Mitigation Maturity Survey, response to A.V.e.

[38] SDG&E's Utility Wildfire Mitigation Maturity Survey, response to A.II.e.

[39] SDG&E's Utility Wildfire Mitigation Maturity Survey, response to A.IV.e.

[40] SDG&E's Utility Wildfire Mitigation Maturity Survey, response to A.IV.c.

[41] SDG&E's Utility Wildfire Mitigation Maturity Survey, responses to A.V.b and A.V.c.

4.6.1.2 SDG&E's Progress

Throughout the current WMP cycle, SDG&E has continued to improve its risk assessment and mapping efforts by improving its Wildfire Risk Reduction Model (WRRM) and Wildfire Next Generation System (WiNGS) model, as well as its probability of ignition (PoI) and probability of failure (PoF) models for equipment and vegetation. Since SDG&E submitted its 2021 Update, the utility has improved its risk assessment and mapping as follows:

- Across SDG&E's service territory, there was a decrease in ignitions from 2020 to 2021, despite an increase in events (wires-down and outages), as seen in Figures 4.6.1-2 and 4.6.1-3 below.

Figure 4.6.1-2: SDG&E Risk Events (2015-2021)

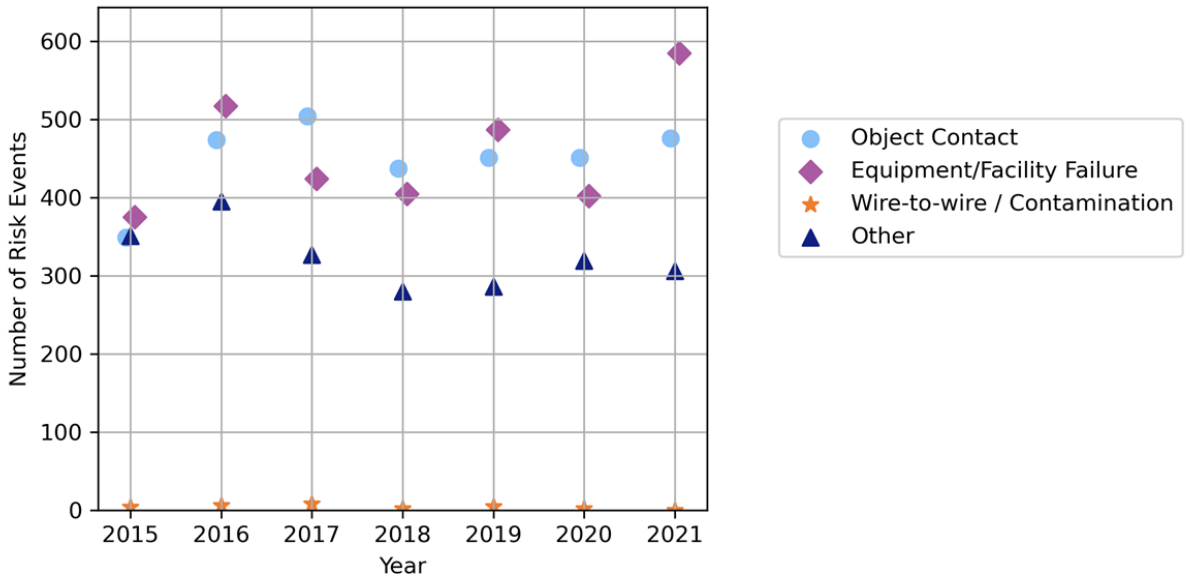
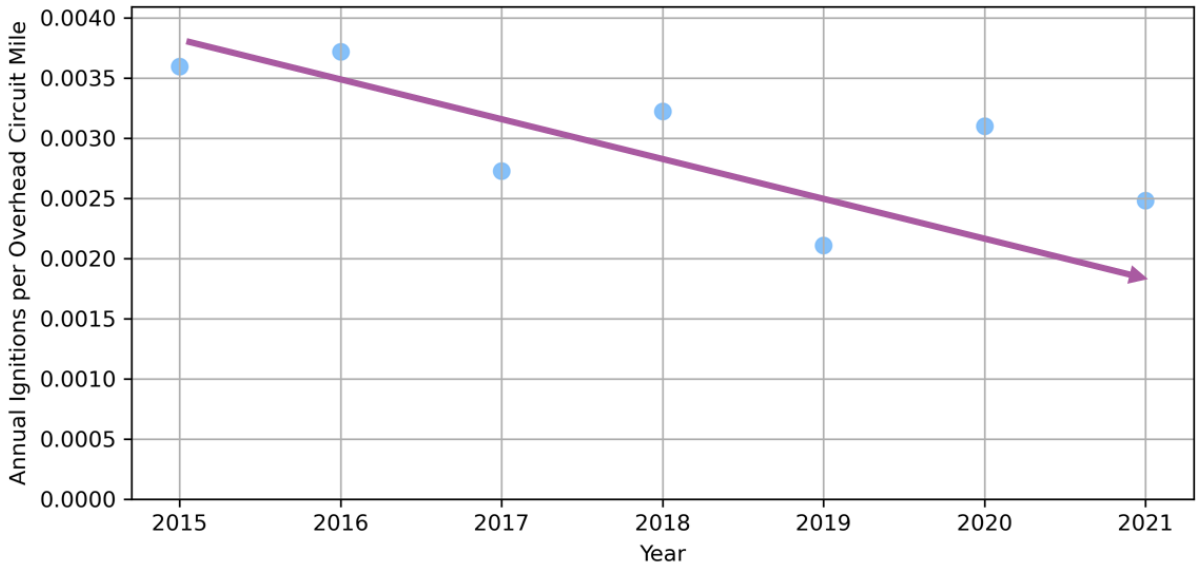


Figure 4.6.1-3: SDG&E Annual Ignition Trend (2015-2021)



- SDG&E states its risk modeling includes smoke impacts, which is important in terms of safety and larger public health impacts. SDG&E states it estimates a "quantification of additional significant injuries and fatalities resulting directly or indirectly from smoke, as a fraction of the population impacted."[42]
- Since the 2021 WMP Update, SDG&E has participated in the Energy Safety-led Wildfire Risk Modeling Working Group established on the basis of Energy Safety's 2021 WMP Action Statements. The Wildfire Risk Modeling Working Group is ongoing, and guidance is still pending. Energy Safety anticipates that guidance for modeling will impact SDG&E's 2023 WMP and/or 2024 Update. At this time, SDG&E has not applied any changes to its risk modeling methodologies, but plans to do so in future WMP filings.

4.6.1.3 Areas for Continued Improvement

In addition to progress made, SDG&E must continue to improve in the following areas:

[42] Data Request MGRA-SDGE-WMP22_DATAREQUEST2, Question 35.

- While SDG&E accounts for vulnerable communities (categorized as "medical baseline, essential, urgent, and sensitive") within its PSPS risk for its WiNGS-Planning model,[43] SDG&E does not currently evaluate community vulnerability as part of its wildfire consequence risk modeling. Factors such as income disparity, disability, and age diversity population ratios are vital in understanding communal impacts of wildfire risk. More socially vulnerable areas could face more devastating impacts with fewer resources available for recovery. SDG&E must evaluate and incorporate such factors as part of wildfire consequence risk modeling and should work with other utilities to determine best practices.
- SDG&E's wildfire spread modeling does not currently account for suppression efforts, such as from fire departments. In combination with evaluating spread beyond eight hours, discussed further below, evaluating past a given amount of spread accounts for a potentially broad area of consequence risk. Without accounting for fire suppression, SDG&E's efforts may lose granularity in the highest risk areas, given the ease with which unsuppressed spread can occur and the lack of real-world impacts suppression efforts may have (such as fire containment or other secondary impacts of firefighting response). SDG&E must coordinate with other utilities to evaluate and integrate suppression within consequence and spread modeling.
- SDG&E's current wildfire consequence simulations use a fire spread period of eight hours.[44] Many catastrophic fires burn longer than eight hours, with much of the growth occurring after the eight-hour mark.[45] Therefore, the eight-hour period may limit the ability of the wildfire consequence model to accurately determine the risk of catastrophic wildfire. SDG&E must evaluate how to incorporate risk of wildfires that burn longer than eight hours.
- In reporting the percentage of mitigation efforts completed in 2022, SDG&E only provides the percentages completed in its top cumulative risk for covered conductor and undergrounding. These are reported as 71.9 percent and 91.3 percent of collective top risk, respectively.[46] For its other mitigation initiatives, SDG&E relies on cumulative

[43] Data Request OEIS-SDGE-22-008, Question 1.

[44] Data Request MGRA-SDGE-WMP22_DATAREQUEST2, Question 31.

[45] MGRA Comments on 2021 WMPs of PG&E, SCE, and SDG&E; p. 48-55.

[46] SDG&E's 2022 Update, Table 5-2, pp. 151-152.

risk based on HFTD tiers instead of the top 20 percent of risk, using risk percentages of 61.4 percent for Tier 3 and 36.2 percent for Tier 2.[47] This disparity in approaches to determining top risk percentages stems from the fact that at this time SDG&E uses its WiNGS model output for determining the location of covered conductor installation and undergrounding, but not for other wildfire mitigation initiatives. SDG&E must determine top risk calculations for its other initiatives.

SDG&E has not yet undertaken any analysis of wildfire risk outside the HFTD defined by the CPUC. Other utilities have proposed expanding risk areas based on internal evaluation and changes in wildfire risk over time. The Public Utilities Code requires utilities to evaluate areas outside the HFTD for additional existing wildfire risk as follows:

> *The wildfire mitigation plan shall include all of the following: […] Identification of any geographic area in the electrical corporation's service territory that is a higher wildfire threat than is currently identified in a commission fire threat map, and where the commission should consider expanding the high fire threat district based on new information or changes in the environment.*[48]

Given that the HFTD map is almost five years old, SDG&E must evaluate its service territory for additional high-risk areas for which wildfire mitigations may be appropriate and propose changes as necessary.

- SDG&E does not currently verify its Vegetation Risk Index model because it is not used as a predictive model.[49] However, because SDG&E uses this model to inform PSPS-related decisions, verification is still important to effectively reduce PSPS impact and determine actual wildfire risk reduction. SDG&E must evaluate post-PSPS event data, compare the data to its model output, perform real-world scenario verification, and adjust the model as needed based on lessons learned.
- SDG&E's vegetation PoI/PoF model currently does not include wind gusts as a variable. SDG&E states that it needs to conduct more analysis on the relationship

[47] SDG&E's 2022 Update, Table 5.3-1, pp. 150-157.

[48] Public Utilities Code § 8386(c)(17).

[49] SDG&E's 2022 Update, p. 97.

between vegetation failure and wind gusts before including wind gusts as a variable but provides no further details.[50] SDG&E must provide details on the nature and timeline of the additional analysis needed. This is discussed more in Section 4.6.7, "Data Governance."

- Similar to SDG&E's 2021 WMP, SDG&E still ranks vehicle and balloon contacts as top risks based on the high number of outages, even though vegetation contact (ranking second) and other equipment failure (tied for third[51]) have higher ignition rates.[52] These rankings seemingly do not impact SDG&E's actual analysis for risks in the field, and SDG&E accounts for third-party ignition sources within its modeling.[53] However, these rankings are misleading regarding risks pertinent to catastrophic fires. This is discussed further in areas for continued improvement under Section 4.3.2, "Lessons Learned and Risk Trends."

Energy Safety sets forth specific areas for improvement and associated required progress in Section 7.

4.6.2 Situational Awareness and Forecasting

A strong weather monitoring and situational awareness system is an essential ignition risk reduction strategy: it mobilizes a utility's response to potentially dangerous fire weather conditions and informs its decisions on PSPS implementation, grid design, and system hardening. It is also one of the least expensive risk reduction strategies.

The situational awareness and forecasting section of the Guidelines[54] requires the utility to discuss its use of cameras, weather stations, weather forecasting and modeling tools, grid monitoring sensors, fault indicators, and equipment monitoring. Situational awareness requires the utility to be aware of actual ignitions in real time and to understand the

[50] Data Request MGRA-SDGE-WMP22_DATAREQUEST2, Question 25.

[51] The two items tied for third place in the list of risks and drivers are "Contact from object: Other contact from object" and "Equipment / facility failure: Other" (SDG&E's 2022 Update,Table 4-6, Prioritized List of Wildfire Risks and Drivers, p. 48).

[52] SDG&E's 2022 Update, Table 4-6 , Prioritized List of Wildfire Risks and Drivers, p. 48.

[53] SDG&E's 2021 WMP Action Statement Supplemental as part of its 2021 WMP Progress Report, p. 6.

[54] 2022 Wildfire Mitigation Plan Guidelines Template, Attachment 2.7.3, p. 74 (accessed March 6, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51912&shareable=true.

likelihood of utility ignitions based on grid and asset conditions, wind, fuel conditions, temperature, and other factors.

The Guidelines refer to key situational awareness measures, including:

- Installation of advanced weather monitoring and weather stations that collect data on weather conditions so as to develop weather forecasts and predict where ignition and wildfire spread are likely
- Installation of high-definition cameras throughout a utility's service territory, with the ability to control the cameras' direction and magnification remotely
- Use of continuous-monitoring sensors that can provide near-real-time information on grid conditions
- Use of a fire risk or fire potential index that takes numerous data points in given weather conditions and predicts the likelihood of wildfire
- Use of personnel to physically monitor areas of electric lines and equipment in elevated fire risk conditions

4.6.2.1 Maturity Assessment

SDG&E's maturity level has remained the same in the situational awareness and forecasting category throughout the current WMP cycle. According to its responses on the 2022 Maturity Survey, SDG&E's maturity level is similar to that of Southern California Edison (SCE) level and higher than that of Pacific Gas and Electric (PG&E) in this category. However, SDG&E has made progress from 2020 to 2022 in the following areas of situational awareness and forecasting:

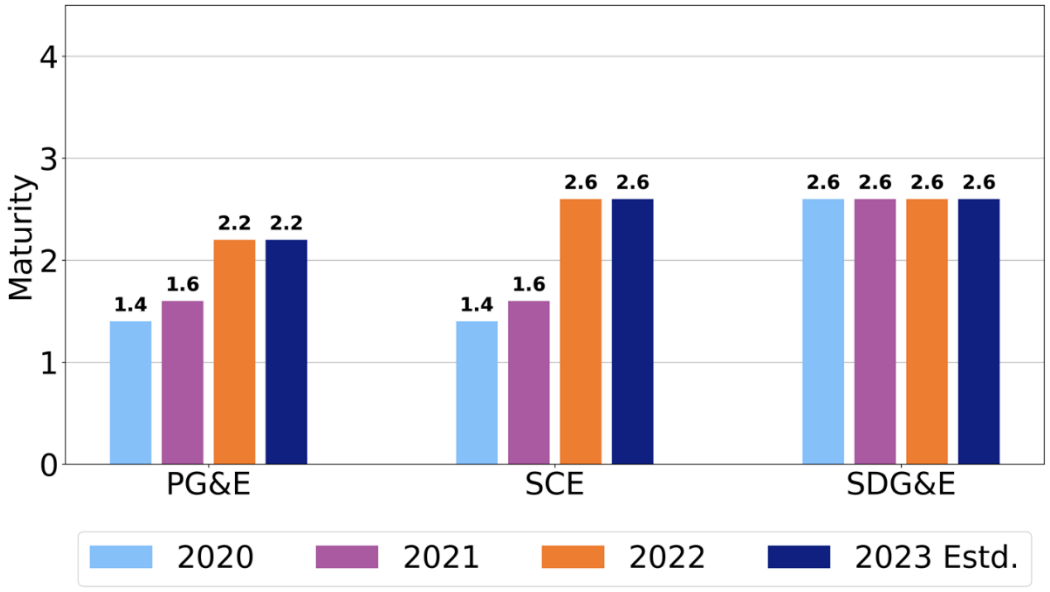
- Upgrading weather stations to report wind speeds on a more frequent basis (10-30 seconds)
- Implementing satellite monitoring for ignition detection for and notification of fire suppression resources (e.g., fire departments)

According to its responses on the Maturity Survey, SDG&E's progress in situational awareness and forecasting is limited in the following areas:

- Collecting additional weather data to measure the physical impact of weather on the grid (e.g., sway in lines, sway in vegetation)
- Improving the granularity of weather data resolution and the utility's ability to forecast from span-based to asset-based
- Extending weather forecasting to more than two weeks in advance

- Completely automating the process for error checking weather stations

Figure 4.6.2-1: Cross-Utility Maturity Levels for Situational Awareness and Forecasting - Large IOUs (2020-2022 Actual, 2023 Estimated)



4.6.2.2 SDG&E's Progress

SDG&E has made the following progress thus far in the current WMP cycle:

- SDG&E currently has 221 weather stations throughout its service territory. It reports that it has completed 21 new installations and over 100 upgrades to its weather stations. SDG&E has shifted from adding more weather stations to upgrading its existing stations to be able to report wind speeds every 10 to 30 seconds and adding 10-hour dead fuel moisture sensors and air quality sensors. These weather station upgrades, coupled with SDG&E's machine learning wind gust model and sectionalization devices, may enhance decision making for future PSPS events.
- SDG&E deployed 1,046 wireless fault indicators in 2020 and 2021, completing installations throughout the HFTD. In 2022, SDG&E plans to add 500 wireless fault indicators in its wildland urban interface (outside the HFTD). This may lead to improved response times for potential ignitions caused by faults or in instances where large areas are automatically de-energized due to sensitive protective relay settings.
- To improve its situational awareness of wildfires, SDG&E partnered with the Space Science and Engineering Center and San Diego Supercomputer Center to operationalize satellite fire detection capabilities and filter false positive detections

prior to sending alerts. In 2022, SDG&E plans to operationalize its machine learning camera smoke detection algorithm. This aligns with its Maturity Survey assessment.

- SDG&E states that it will add two new high-performance computing clusters in 2022 to further improve the quality of weather data integrated into its Fire Potential Index (FPI), the Santa Ana Wildfire Threat Index, and its WRRM-Ops model.

4.6.2.3 Areas for Continued Improvement

SDG&E must explore the use of its wildfire consequence modeling software in near real time on any faults/outages in its HFTD. This will increase SDG&E's situational awareness and detection of possible utility-related ignitions from known fault locations and its awareness of potential consequences. In its 2023 WMP, SDG&E must discuss how it explored using its wildfire consequence modeling on faults/outages in the HFTD as they happen.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 7.

4.6.3 Grid Design and System Hardening

The grid design and system hardening section of the Guidelines[55] examines how the utility is designing its system to reduce ignition risk and what it is doing to strengthen its distribution, transmission, and substation infrastructure to prevent utility-related ignitions resulting in catastrophic wildfires. This section also requires discussion of routine and non-routine maintenance programs, including whether the utility replaces or upgrades infrastructure proactively rather than running facilities to failure. Programs in this category, which are often the most expensive aspects of a WMP, include initiatives such as the installation of covered conductors to replace bare overhead wires, undergrounding of distribution or transmission lines, and pole replacement programs. The utility is required, at a minimum, to discuss grid design and system hardening in each of the following areas:

- Capacitor maintenance and replacement
- Circuit breaker maintenance and installation to de-energize lines upon detecting a fault
- Covered conductor installation

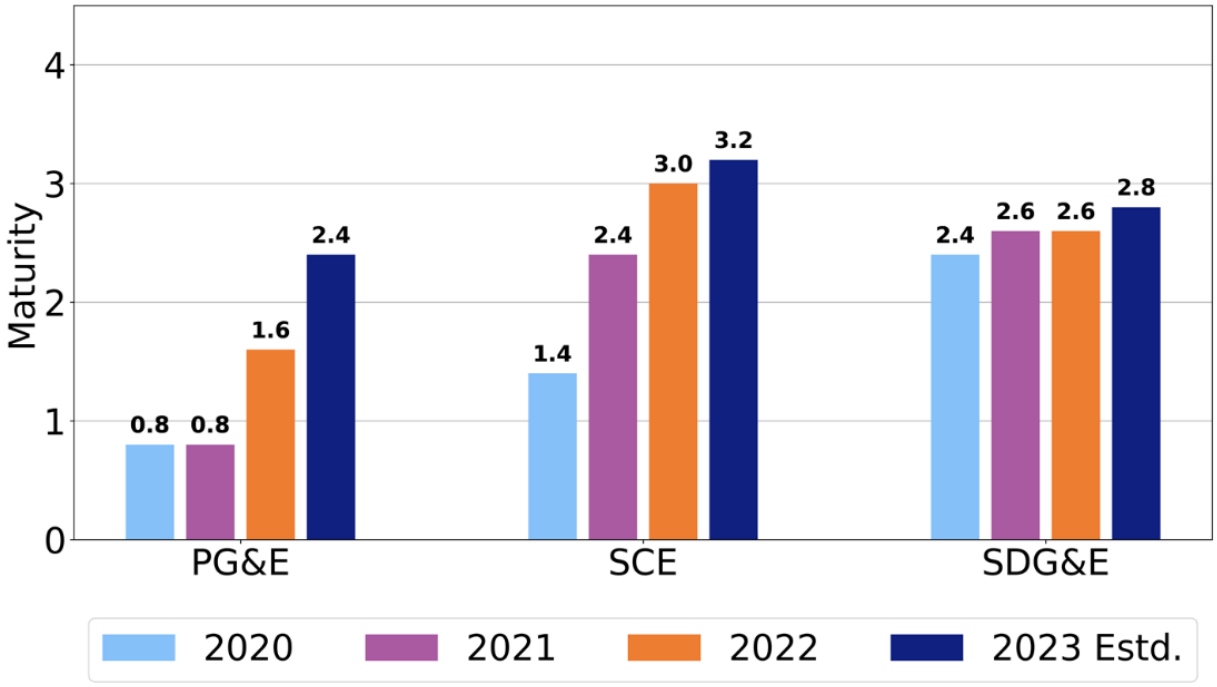
[55] 2022 Wildfire Mitigation Plan Guidelines Template, Attachment 2.7.3, pp. 74-75 (accessed March 6, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51912&shareable=true.

- Covered conductor maintenance
- Crossarm maintenance, repair, and replacement
- Distribution pole replacement and reinforcement, including with composite poles
- Expulsion fuse replacement
- Grid topology improvements to mitigate or reduce PSPS events
- Installation of system automation equipment
- Maintenance, repair, and replacement of connectors, including hotline clamps
- Mitigation of impact on customers and other residents affected during PSPS event
- Other corrective action
- Pole loading infrastructure hardening and replacement program based on pole loading assessment program
- Transformer maintenance and replacement
- Transmission tower maintenance and replacement
- Undergrounding of electric lines and equipment
- Updates to grid topology to minimize risk of ignition in the HFTD
- Other areas if an initiative cannot feasibly be classified within those listed above

4.6.3.1 Maturity Assessment

SDG&E's maturity level for grid design and system hardening started out at a relatively high maturity level and has increased, according to its responses on the 2022 Maturity Survey. However, this level has only increased approximately 0.2 points per year since 2020, with some capabilities not projected to meet 2023 commitments made in 2021: this is only an incremental increase, as seen in Figure 4.6.3-1 below.

Figure 4.6.3-1: Cross-Utility Maturity Levels for Grid Design and System Hardening - Large IOUs (2020-2022, 2023 Estimated)



Factors that may be preventing SDG&E from improving its maturity in grid design and system hardening include the following:

- SDG&E is only using known egress considerations as an input during construction, not mapping traffic simulations to determine egress.[56]
- SDG&E has limited redundancy and sectionalization of its distribution architecture.[57]
- SDG&E's initiatives are not independently evaluated or followed by field testing. SDG&E only measures the risk reduction impacts of hardening solutions based on observed changes in near-miss metrics.[58]
- SDG&E evaluates risk-spend efficiency (RSE) estimates for hardening initiatives at a circuit-based level, as opposed to a span- or asset-based level.[59]

[56] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, response to C.III.d.

[57] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, responses to C.III.b and C.III.c.

[58] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, responses to C.IV.d and C.V.a.

[59] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, response to C.IV.b.

- The performance of new initiatives is not independently audited. SDG&E initially projected in 2021 it would have the capacity for ensuring independent auditing by January 1, 2023, which SDG&E no longer projects for 2022. [60]

4.6.3.2 SDG&E's Progress

Throughout the current WMP cycle, SDG&E has improved its grid design and system hardening by fire hardening its overhead structures, piloting and installing enhanced advanced protection capabilities, increasing its coverage for communication through the installation of a private long-term evolution (LTE) network, and expanding its microgrid program. Since SDG&E submitted its 2021 Update, the utility has improved its grid design and system hardening through the following:

- SDG&E states that it achieved its goal of installing 21 miles of covered conductor in 2021 and set a target of installing 60 miles of covered conductor in 2022.[61] SDG&E plans to achieve this increase by reallocating some of its resources previously focused on traditional hardening. Examples of traditional hardening are reconductoring using bare conductor, such as copper to aluminum; increasing spacing; and replacing wood poles with steel poles.[62] SDG&E states traditional hardening installations are similar to covered conductor installations apart from conductor material and some hardware.[63] SDG&E has decreased its target for traditional hardening of its distribution system to five miles in 2022, although SDG&E is still focusing on traditional hardening to upgrade its transmission system, as seen in Table 4.6.3-1 below.

[60] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, response to C.V.c.

[61] SDG&E's 2022 Update, p. 215.

[62] SDG&E's 2022 Update, Attachment D, p. 2.

[63] "[T]he engineering, design, permitting, environmental, land and construction processes for covered conductor and traditional hardening are the same […]. The only appreciable difference with covered conductor installations as compared to bare conductor is the covered conductor material and hardware." (Data Request CalAdvocates-SDGE-2022 WMP-06, Question 7).

Table 4.6.3-1: SDG&E Grid Hardening Completion and Targets (2021-2022)[64]

Program Target	2021 Target	2021 Performance	2022 Target	Target % / Top Risk %[65]
Covered Conductor (mi.)	20	20.6	60	77.3%/71.9%[66]
Undergrounding (mi.)	25	25.92	65	70%/91.5%[67]
Traditional Hardening – Transmission (mi.)	6.7	6.7	23.83	Tier 2: 23.83 mi, 100%/36.2%
Traditional Hardening – Distribution (mi.)	100	100.4	5	Tier 3: 2.9 mi, 58%/61.4% Tier 2: 2.1 mi, 42%/36.2%
Expulsion Fuses (no.)	3,970	3,976	277	Tier 3: 50, 18.1%/61.4% Tier 2: 227, 81.9%/36.2%
Microgrids (no.)	0	6	4	Tier 3: 3, 75%/61.4% Tier 2: 1, 25%/36.2%
Advanced Protection (circuits enabled)	8	4	8	Tier 3: 100%/61.4%

[64] SDG&E's 2022 Update, Table 5-2, List and Description of Program Targets, Last 5 Years, pp. 150-157.

[65] "This column allows utilities to identify the percentage of the target that will occur in the highest risk areas" (2022 WMP Guidelines, p. 54). For Tier 2 and Tier 3, SDG&E assigned cumulative risk addressed to be 36.2% and 61.4% respectively, leaving 2.4% remaining risk outside of the HFTD.

[66] The items that SDG&E assigned risk by WiNGS output do not have tier break-downs in Table 5-2 (2022 Update, p. 150). The items that SDG&E assigned risk by tier had their risk percentages broken down by tiers in the table.

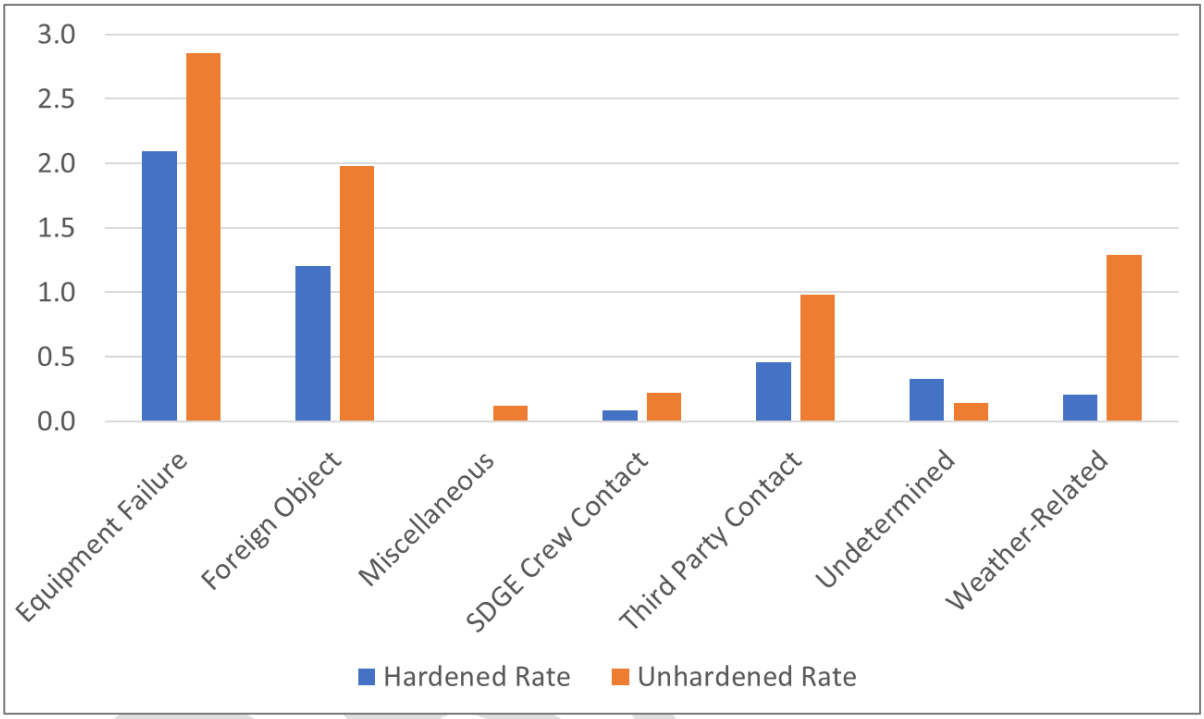
[67] The items that SDG&E assigned risk by WiNGS output do not have tier break-downs in Table 5-2 (2022 Update, p. 150). The items that SDG&E assigned risk by tier had their risk percentages broken down by tiers in the table.

- At the beginning of the grid design and system hardening section in its 2022 Update, SDG&E provides a decision-making chart that it uses to prioritize projects. This chart includes some discussion of initiative selection based on feasibility. Segments are prioritized based on the output of SDG&E's WiNGS model. This model ranks the riskiest segments, with additional segments within a circuit included in the scope for PSPS risk.
- SDG&E reports that it plans to complete its expulsion fuse replacement program in 2022, with 231 replacements in Tier 2 and 55 replacements in Tier 3 remaining.[68] This explains the decrease in the target for this initiative from 2021 to 2022, as seen in Table 4.6.3-1 above.
- SDG&E reports a reduced fault rate for hardened lines compared to unhardened lines for various risk factors when normalized per 100 miles, as seen in Figure 4.6.3-2 below. SDG&E attributed the reduced fault rate on hardened lines to the effectiveness of SDG&E's hardening efforts.[69]

[68] Data Request OEIS-SDGE-22-002, Question 3.

[69] SDG&E's 2022 Update, p. 60.

Figure 4.6.3-2: SDG&E Fault Rates for Unhardened versus Hardened Lines, Normalized per 100 Miles in Service Territory (Annual Rate, 2000-2020)[70]



- As shown in Table 4.6.3-1 above, SDG&E indicates that it is targeting and prioritizing covered conductor and undergrounding grid hardening efforts on the highest risk circuits. This can be seen further in Tables 4.6.3-2 and 4.6.3-3 below, which show the risk scores for the circuits SDG&E is targeting for undergrounding and covered conductor, respectively.[71] Additionally, SDG&E plans to harden areas deemed highest risk via its WRRM model output. [72] For more information, see the WRRM output map in the utility's 2022 Update. [73]

[70] This figure is adapted from one SDG&E provided in response to Data Request CalAdvocates-SDGE-2022 WMP-06, Question 10.

[71] It should be noted that these values are based on circuit scores and not circuit segment scores, and that not all of the cumulative risk associated with a circuit will be mitigated by SDG&E's planned hardening mileage.

[72] SDG&E's 2022 Update, p. 191.

[73] SDG&E's 2022 Update, p. 98.

Table 4.6.3-2: SDG&E Risk Scores for Undergrounding Projects (2022)[74]

Circuit ID	2022 miles	Risk Score	Risk Ranking
222	2.52	0.014653	1
445	3.08	0.0055	5
1030	27.68	0.001912	15
221	5.03	0.001299	20
1458	6.96	0.000751	25
358	1.62	0.000749	26
357	0.1	0.000718	28
908	2.89	0.00067	29
972	3.5	0.000613	30
216	5.56	0.000439	33
SL1	1.56	0.000171	54
75	4.16	4.31E-05	82
Total	64.66	0.027517	-

[74] Ranking calculated from Wildfire Risk Scores in "SDGE DR04_2021CalPA.xlsx" and "CONFIDENTIAL2021CalPA-SDGE_DR3_WF_Risk_Scores_Segment_Level_FINAL.xlsx" which show 1,052 total distribution circuits, meaning the top 20% would have a ranking of 210 or less.

Table 4.6.3-3: SDG&E Risk Scores for Covered Conductor Projects (2022)[75]

Circuit ID	2022 miles	Risk Score	Risk Ranking
442	0.4	0.011081	2
448	15.04	0.007715	3
212	11.41	0.006393	4
445	2.28	0.0055	5
157	19.95	0.002185	13
78	1.54	0.001088	22
176	9.13	0.000514	31
1090	0.25	0.000281	42
Total	60	0.034757	-

4.6.3.3 Areas for Continued Improvement

In addition to progress made, SDG&E must continue to improve in the following areas:

- The joint covered conductor effectiveness study[76] clarified the existing differences in approach toward and execution of covered conductor installation across utilities. However, SDG&E did not commit to applying any lessons learned. Many sections of the joint study state that the utilities will continue to do studies, collect documentation, or conduct discussion, rather than committing them to make changes. Many of the "next steps" described in the study also do not include concrete commitments (e.g., utilities are "continuing these efforts in 2022 and providing an update in their 2023-

[75] Cumulative underground risk score calculated from "SDGE DR04_2021CalPA.xlsx" and total risk score calculated from "CONFIDENTIAL2021CalPA-SDGE_DR3_WF_Risk_Scores_Segment_Level_FINAL.xlsx." Similarly to the footnote above, the top 20% would have a ranking of 210 or less.

[76] The joint covered conductor effectiveness study resulted from a directive in SDG&E's 2021 WMP Action Statement.

2025 WMPs"[77]). SDG&E must apply lessons learned to its assessments of covered conductor and show that it is progressing as a result of its joint efforts with the other utilities.

- SDG&E does not have a separate maintenance program or training program for covered conductor inspections. It relies instead on existing structure-based inspection practices that evaluate all equipment. SDG&E has not yet modified these practices to directly address covered conductor. It states that "infractions that are being coded by the inspectors do not vary with conductor type."[78] However, the joint covered conductor study described in SDG&E's 2022 Update, Attachment H, Joint IOU Response to Action Statement - Covered Conductor, found that several covered-conductor-specific failure modes exist that require operators to consider additional personnel training, augmented installation practices, and adoption of new mitigation strategies (e.g., additional lightning arrestors, conductor washing programs, etc.).[79] SDG&E must evaluate its existing covered conductor maintenance program to ensure that failure modes specific to covered conductor are being properly evaluated and new equipment specific to covered conductor is being maintained to extend the equipment's expected lifetime and maintain its health.
- SDG&E included a decision-making chart in its 2022 Update and appears to be prioritizing its highest risk circuits first for grid hardening efforts. However, SDG&E states that its prioritization is based on "geography, prior hardening, loading district, standards, land, environmental, easement constraints, PSPS improvements, line/reliability improvements, [and] construction cost savings"[80] without providing additional details on how it considers these factors. SDG&E must provide more detail on its decision-making process, including:
    - How each factor listed is weighted and considered for initiative selection
    - What risk factors align with which mitigation strategies to optimize effectiveness

[77] SDG&E's 2022 Update, Attachment H, Joint IOU Response to Action Statement-Covered Conductor, p. 58.

[78] Data Request OEIS-SDGE-22-003, Question 1.

[79] SDG&E's 2022 Update, Attachment H, Joint IOU Response to Action Statement-Covered Conductor, pp. 7-8.

[80] SDG&E's 2022 Update, Figure 7-4, Grid Hardening Flowchart, row 3, p. 211.

- SDG&E states, "Over the next 10 years, strategic underground scope will significantly increase as the understanding of costs and constraints improve."[81] When asked to define "significantly," SDG&E stated that it plans to ramp up to undergrounding "150 circuit miles per year beginning in 2024."[82] Given that SDG&E's current system is largely underground, with the majority in non-HFTD, as seen in Figures 4.6.3-3 and 4.6.3-4 below, it is not clear that the cumulative risk reductions would be cost-effective. SDG&E indicates it plans to underground 167.07 miles in 2023 and 193.15 miles in 2024.[83] These projections account for 62.4 percent of the cumulative risk based on circuit risk, further described in Table 4.6.3-4 below.[84] SDG&E must provide an analysis showing it takes into account risk/cost benefit in comparison to other alternatives when selecting and prioritizing undergrounding based on location and effectiveness.
- In 2020 and 2021, SDG&E did not meet its targets for enabling circuits with advanced protection. SDG&E completed two fewer circuits than targeted in 2020 and four fewer circuits than targeted in 2021.[85] SDG&E must provide a plan for how it intends to reach its targets moving forward.
- SDG&E reports it found through its pilot that a rapid earth fault current limiter (REFCL) system would have high up-front costs. SDG&E states that its current system is not ideal for implementing REFCL due to the configurations of equipment, and because existing equipment is not at the correct voltages needed to operate a REFCL system.[86] Other utilities have completed pilots or are at different stages for implementing and observing promising new technologies, including REFCL, distribution fault anticipation (DFA), early fault detection (EFD), other line sensor devices, and Sensor IQ; some of which are discussed in section 4.3.2: Situational Awareness and

[81] SDG&E's 2022 Update, p. 233.

[82] Data Request OEIS-SDGE-22-08, Question 2.

[83] Data Request OEIS-SDGE-22-06, Question 9, Attachment "OEIS SDGE 2022 006 Q9.xlsx."

[84] Cumulative underground risk score calculated from "OEIS SDGE 2022 006 Q9.xlsx" and total risk score calculated from "CONFIDENTIAL2021CalPA-SDGE_DR3_WF_Risk_Scores_Segment_Level_FINAL.xlsx."

[85] For 2020 target data, see SDG&E's 2022 Update, Table 5-2; for 2021 target data, see Table 5-2 or Table 4.6.3-1 above.

[86] SDG&E's 2022 Update, p. 79.

Forecasting above. Even if RECFL is not effectively feasible for its system, SDG&E must collaborate with other utilities to further explore the benefits of other system hardening and situational awareness technologies (such as DFA/EFD), including effectiveness against wildfire risk, particularly in combination with other initiatives such as covered conductor.

Figure 4.6.3-3: SDG&E Overhead versus Underground Mileage (Feb. 2022)

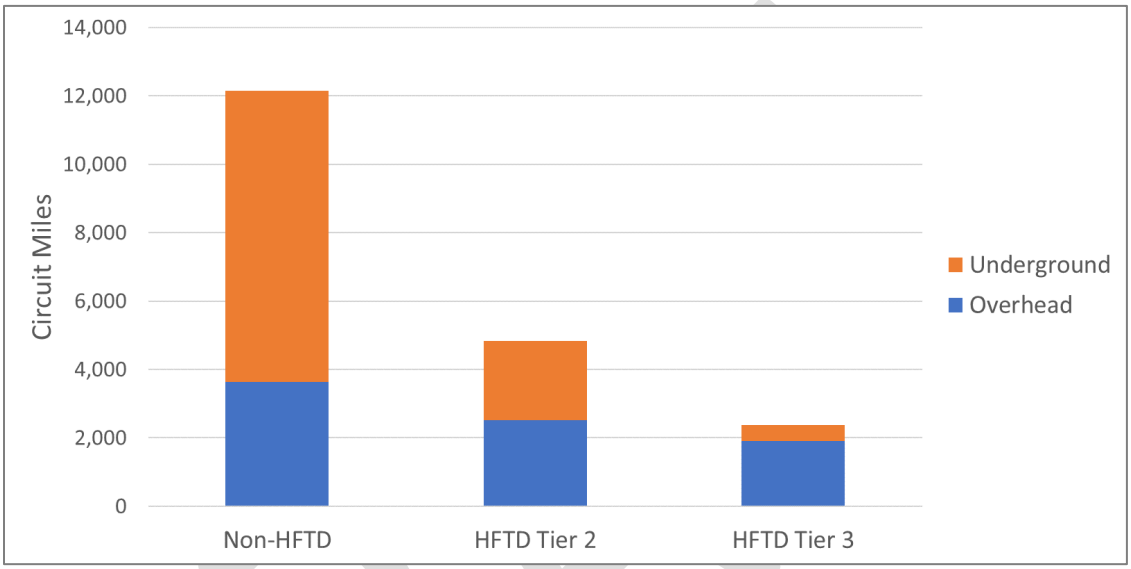


Figure 4.6.3-4: Cross-Utility Comparison of Overhead versus Underground Circuit Miles - Large IOUs (Feb. 2022)

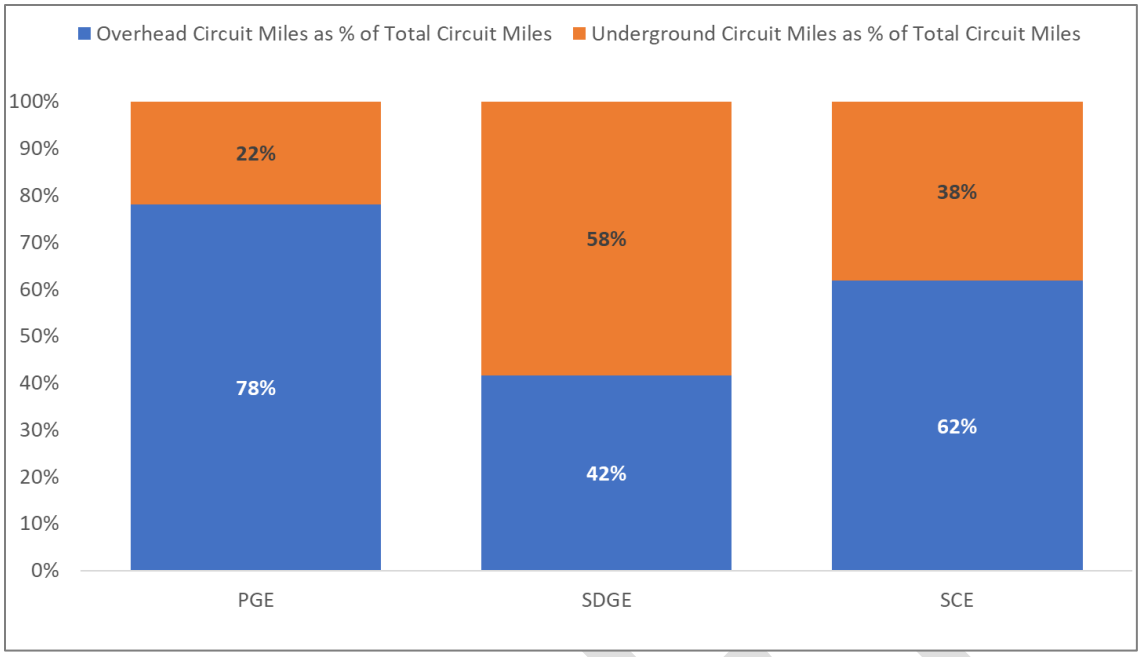

Overhead Circuit Miles as % of Total Circuit Miles
Underground Circuit Miles as % of Total Circuit Miles
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
22%
78%
58%
42%
38%
62%
PGE
SDGE
SCE

Table 4.6.3-4: SDG&E Risk Scores for Undergrounding Projects (2023, 2024)[87]

Circuit ID	2023 miles	2024 miles	Risk Score	Risk Ranking
222	59.42	0	0.014653	1
442	0	5.6	0.011081	2
212	0.00	24.19	0.006393	4
445	42.45	0	0.0055	5
441	0	4.4	0.004924	7
1215	0	20.38	0.004772	8
73	13.7	0	0.004177	10
237	0	23.52	0.003042	11
220	41.2	0	0.002639	12
210	0	31.6	0.002121	14
214	0	35.6	0.0015	17
211	0	31.4	0.001412	18
217	0	7	0.001368	19
78	0.00	1.8	0.001088	22
358	0	7.66	0.000749	26
909	4	0	0.000742	27
972	6.30	0	0.000613	30
Total	167.07	193.15	0.066775	-

[87] Calculations based on "OEIS SDGE 2022 006 Q9.xlsx" and "CONFIDENTIAL2021CalPA-SDGE_DR3_WF_Risk_Scores_Segment_Level_FINAL.xlsx." Similarly to previous tables, the top 20% would have a ranking of 210 or less.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 7.

4.6.4 Asset Management and Inspections

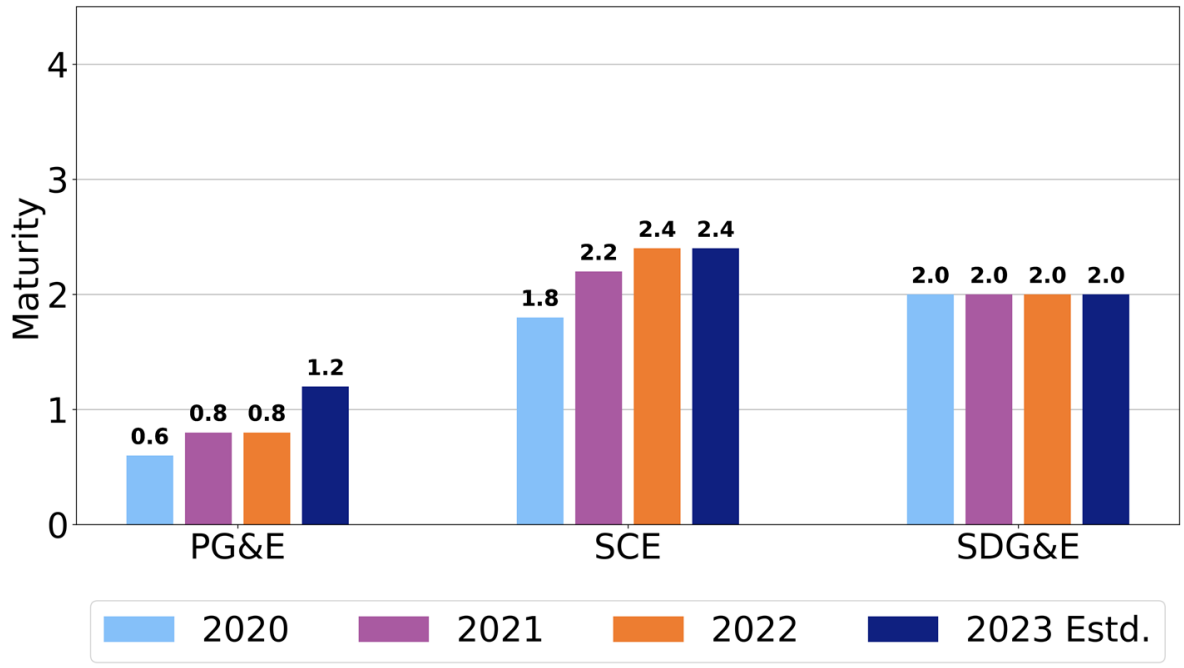
The asset management and inspections section of the Guidelines[88] requires the utility to discuss power line and infrastructure inspections for distribution and transmission assets within the HFTD. These include infrared, light detection and ranging (LiDAR), substation, patrol, and detailed inspections designed to minimize the risk of its facilities or equipment causing wildfires. The utility must describe its protocols relating to maintenance of any electric lines or equipment that could, directly or indirectly, relate to wildfire ignition. The utility must also describe how it ensures inspections are done properly through a program of quality control.

4.6.4.1 Maturity Assessment

According to its responses on the 2022 Maturity Survey, SDG&E has not progressed in overall maturity from 2021 to 2022 on asset management, as seen in Figure 4.6.4-1 below. This figure shows the actual and predicted maturity levels (zero to four, with four the maximum) for this category for the initial survey date and subsequent survey dates in early 2020, 2021, and 2022, and the maturity projected in early 2022 for the end date of the WMP cycle, January 1, 2023.

[88] 2022 Wildfire Mitigation Plan Guidelines Template, Attachment 2.7.3, p. 75 (accessed March 6, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51912&shareable=true.

Figure 4.6.4-1: Cross-Utility Maturity Levels for Asset Management and Inspections - Large IOUs (2020-2022 Actual, 2023 Estimated)



Factors that may be preventing SDG&E from maturing further include:

- Lack of continuous monitoring equipment for:
  - Service intervals for maintenance of equipment[89]
  - Detection of incipient malfunctions[90]
  - Inspection scheduling[91]
- Use of static maps instead of risk model outputs for inspection scheduling[92]
- Service intervals for inspections based on wildfire risk in the relevant area instead of risk modeling

[89] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, response to D.IV.b.

[90] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, response to D.I.c.

[91] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, responses to D.II.c, D.II.f, and D.II.i.

[92] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, responses to D.II.b, D.II.e, and D.II.h.

    - SDG&E reported on its 2021 Maturity Survey that it would mature in this area by 2023, but it has remained stagnant.[93]
- Updating of its condition assessment inventory quarterly instead of monthly
    - SDG&E reported on its 2021 Maturity Survey that it would mature in this area by 2023, but it has remained stagnant.[94]

4.6.4.2 SDG&E's Progress

Throughout the current WMP cycle, SDG&E has improved its asset management and inspections by augmenting existing patrols and detailed inspections. The utility now requires more frequent inspections in Tier 3 HFTD particularly tailored toward wildfire risk-related infractions. SDG&E has improved its asset management and inspections since its 2021 Update as follows:

- As required by the 2021 WMP Action Statement, SDG&E provides a breakdown of findings in its "other" category of inspections, which includes drone, infrared, and intrusive pole inspections. Some of these findings are shown in Table 4.6.4-1 below.
- Regarding SDG&E's progress on drone inspections:
    - SDG&E states that it completed drone inspections for its distribution system in Tier 3 areas in 2021 and plans to do so in Tier 2 areas in 2022. SDG&E also states that it plans to continue such inspections moving forward to augment routine patrols and detailed inspections.
    - SDG&E reports that its drone inspections at the distribution level thus far have a higher find rate than its other inspections, as shown in Table 4.6.4-1 below.
    - SDG&E did not find drones to be as useful in its transmission inspections, based on lower percentage of additional findings as seen in Table 4.6.4-1 below, and has therefore reallocated resources to prioritize other methods to inspect the transmission system. SDG&E now focuses on using drones to find specific failure modes on the transmission system, such as loose hardware.

[93] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, responses to D.IV.b.

[94] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, responses to D.I.b.

Table 4.6.4-1: SDG&E Distribution Inspection Findings (2020-2021)[95]

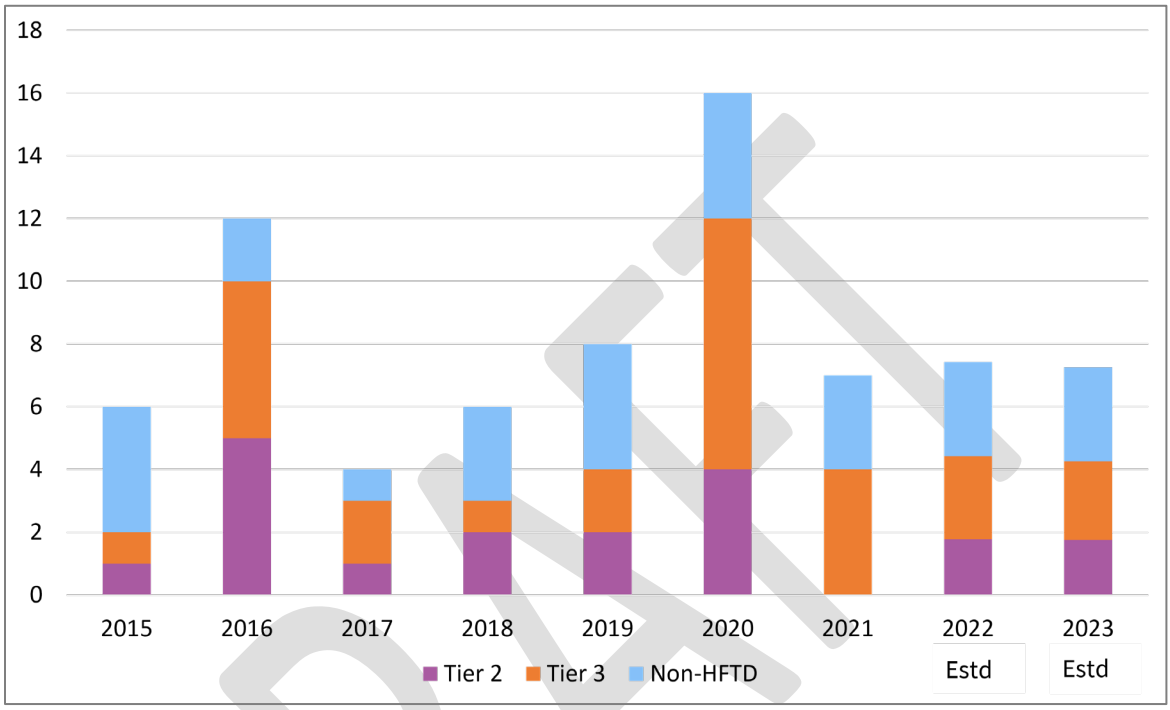
Inspection Type	Circuit Miles (HFTD, 2020-2021)	# Findings	Ratio of Findings per Mile
Patrol	6,920	669	0.097
Detailed	2,619	3,136	1.198
Drone	2,381	16,417	6.895

- SDG&E is implementing machine learning to process images to augment SDG&E's ability to detect damage and identify asset information. This includes image processing from inspections conducted via drone and helicopter. The utility also plans to integrate customer-provided images into this process.
- SDG&E shows a decrease in the number of structures in Tier 3 with issues, despite performing more inspections in 2021. SDG&E attributes this decrease to the success of previous inspection and repair programs that increased asset health.
- SDG&E shows a decrease in the number of ignitions caused by equipment failures from 2020 to 2021, as seen in Figure 4.6.4-2 below. SDG&E also shows a decrease in wire-down events within the HFTD since 2019. This decrease occurred despite an increase in wire-down events throughout its system due to failures of connectors and connection devices, capacitor banks, lightning arrestors, crossarms, and transformers.[96] This may indicate the effectiveness of SDG&E's asset management practices aimed at reducing ignitions and wire-down events caused by equipment failure in the HFTD.

[95] Data from Table 1 of Attachment 3, SDG&E's 2022 Update.

[96] Data Request OEIS-SDGE-22-002, Question 5.

Figure 4.6.4-2: SDG&E Distribution Ignitions from Equipment Failures (2015-2021 Actual, 2022-2023 Estimated)[97]



4.6.4.3 Areas for Continued Improvement

In addition to progress made, SDG&E must continue to improve in the following areas:

- SDG&E schedules its patrols and detailed inspections based on timing (e.g., three-year cycles) as opposed to information generated by risk modeling. This resulted in a decrease in detailed inspections scheduled to be completed from 22,354 units in 2021 to 18,177 units in 2022 (an "off" year for HFTD inspections).[98] When discussing prioritization of inspections, SDG&E focuses primarily on HFTD designations, as opposed to more granular locations identified as high risk by its risk model.
    - Energy Safety discussed this issue in its Action Statement for SDG&E's 2021 Update. However, SDG&E did not address all of Energy Safety's concerns in its 2022 Update.

[97] Data from Table 7.2 of Attachment 3, SDG&E's 2022 Update, with 2015-2021 actuals and 2022-2023 projections.

[98] Data Request OEIS-SDGE-22-004, Question 2.

  - While SDG&E mentions preparing for implementing risk-based prioritization for inspections, SDG&E did not provide a concrete timeline as required by the 2021 Update Action Statement and does not anticipate implementation by 2023.[99]

SDG&E must provide a plan to include risk assessment in inspection scheduling and inputs.

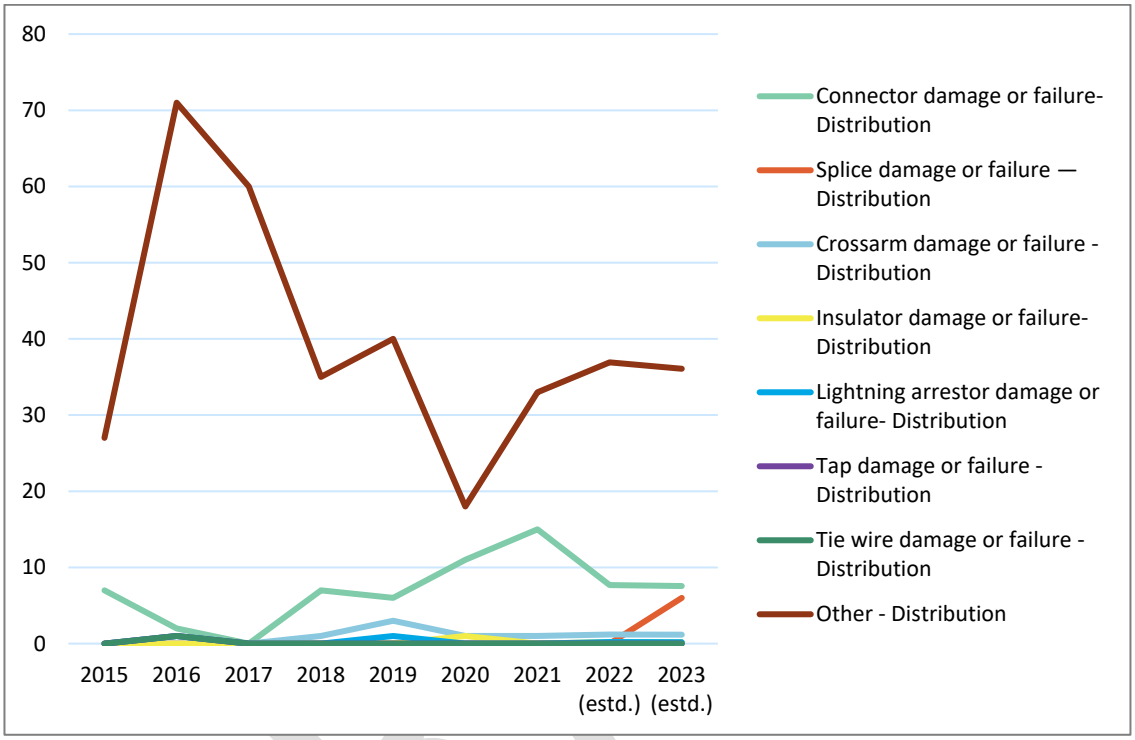
- SDG&E has a large number of risk events caused by equipment failures categorized under "other" as seen in Figure 4.6.4-3 below. When Energy Safety asked what this category captured, SDG&E stated that the category includes "weather-related" cause codes, or incidents where the "damaged device" field from reliability data is "null or not listed as a driver."[100] When asked to further disaggregate distribution wire-down events, SDG&E stated that 29.27 percent were "Wire slap/pole down/wire down (weather related)," 6.62 percent were "Conductor contact/wire slap," 5.92 percent were "Pole – contact/damage/broke/rotted/on fire," and 4.18 percent were "Lightning/arrestor/xfmr failure (weather related)," along with many other cause code categories.[101] Many of these categories seem to fall under other categories already represented in 2022 Update Table 7.1, Key Recent and Projected Drivers of Risk Events. Therefore, classifying them as "other" potentially misrepresents some risk events. In particular, by categorizing weather-related causes under "other," SDG&E may not accurately reflect wildfire risk from equipment failures, which can correlate with weather conditions, such as wind and lightning. SDG&E should re-consider the "other" category, including what equipment failures fall under it, specifically in terms of whether these failures might fit better under a different category to accurately represent the failure.

[99] SDG&E's 2022 Update, Attachment A, p. 10.

[100] Data Request OEIS-SDGE-22-002, Question 4.

[101] Data Request OEIS-SDGE-22-004, Question 1.

Figure 4.6.4-3: SDG&E Wire-Down Events - Distribution
(2015-2021 Actual, 2022-2023 Estimated)



- When discussing risk modeling, SDG&E states that it has difficulty determining asset installation dates for older assets, which is critical for failure rate calculations. The utility's PoI models are limited by these data gaps.[102]
  SDG&E explained these data gaps: "For the purposes of POI modeling, SDG&E did not determine or assume installation dates since this data point (corresponding to asset age) was not included as an input for the reported models."[103] The data gaps are relatively small, with only 0.18 percent of poles and 0.46 percent of wires missing data.[104] SDG&E does not supply any plan to address these data gaps. SDG&E must provide a proactive plan to address gaps, such as through inspections, in its asset data

[102] SDG&E's 2022 Update, p. 90.

[103] Data Request CalAdvocates-SDGE-2022 WMP-08, Question 11.

[104] Data Request OEIS-SDGE-22-008, Question 3.

instead of excluding data based on quality, especially given correlations seen with asset age and probability of failure.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 7.

4.6.5 Vegetation Management and Inspections

The vegetation management and inspections section of the Guidelines[105] requires utilities to discuss vegetation management and inspections. The discussion must include inspections that go beyond existing regulation, as well as remote sensing inspections and patrol inspections of vegetation around distribution and transmission lines and equipment. Utilities must also discuss quality control of those inspections and limitations on the availability of workers. In addition, they must discuss collaborative efforts with local land managers, including efforts to maximize benefit from fuel treatment activities and fire break creation as well as the collaborative development of methods for identifying "at-risk" vegetation, determining trim clearances beyond minimum regulations, and identifying and mitigating impacts from tree trimming and removal (e.g., erosion, flooding).

4.6.5.1 Maturity Assessment

SDG&E has an average maturity level of 2.8 in vegetation management and inspections, the highest among the large IOUs (Figure 4.6.5-1). SDG&E's individual capability levels in vegetation management have remained nearly static throughout the current WMP cycle except for capability 22, "vegetation inspection cycle," which from 2021 to 2022 moved from 2 to 3 (see Figure 4.6.5-2). SDG&E achieved this higher level by incorporating predictive modeling of vegetation growth and growing conditions into vegetation inspection scheduling.[106] By January 1, 2023, SDG&E plans to improve its capacity in some capabilities that are limiting its maturity, including capability 24, "vegetation grow-in mitigation" and capability 26, "QA/QC for vegetation management" (see Table 4.6.5-1).[107]

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[105] 2022 Wildfire Mitigation Plan Guidelines Template, Attachment 2.7.3, pp. 75-76 (accessed March 6, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51912&shareable=true.

[106] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, responses to E.II.c and E.VI.a.

[107] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, responses to E.IV.b and E.II.c.

Figure 4.6.5-1: Cross-Utility Maturity Levels for Vegetation Management and Inspections - Large IOUs (2020-2022 Actual, 2023 Estimated)

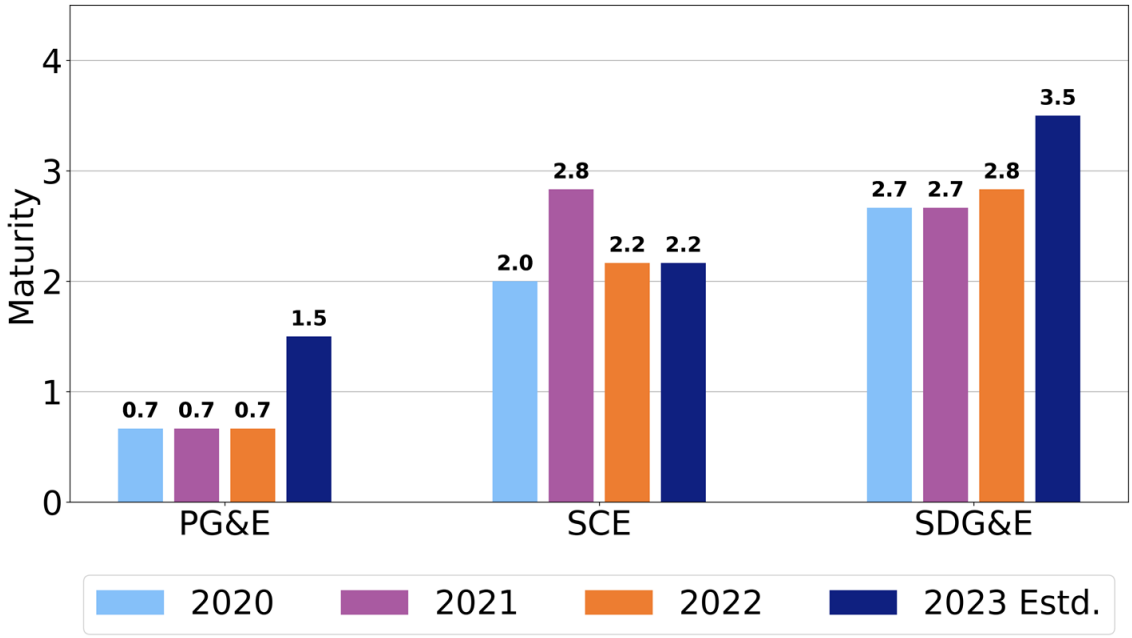


Figure 4.6.5-2: Maturity Model Levels for Individual Capabilities: Vegetation Management

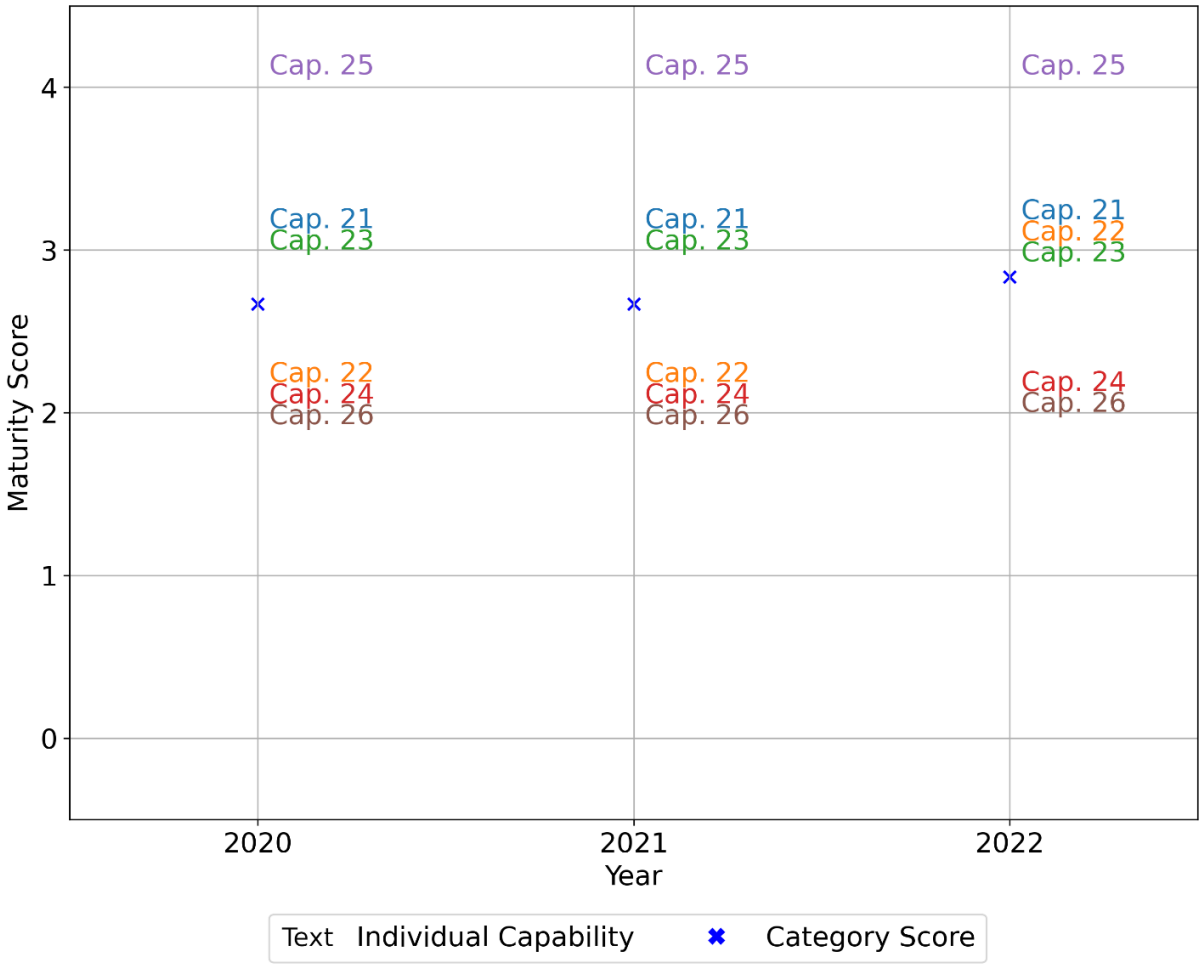


Table 4.6.5-1: Maturity Survey Responses Limiting SDG&E's Maturity Level in Vegetation Management

Limiting Question	2022 Response	Expected Response by Jan. 1, 2023
E.IV.c. "What modeling is used to guide clearances around lines and equipment?"	iii. None of the above	ii. Ignition and propagation risk modeling
E.VI.a. "How is contractor and employee activity audited?"	ii. Through an established and functioning audit process to manage and confirm work completed by subcontractors	iii. Through an established and demonstrably functioning audit process to manage and confirm work completed by subcontractors, **where contractor activity is subject to semi-automated audits using technologies capable of sampling the contractor's work** (e.g., LiDAR scans, photographic evidence)

4.6.5.2 SDG&E's Progress

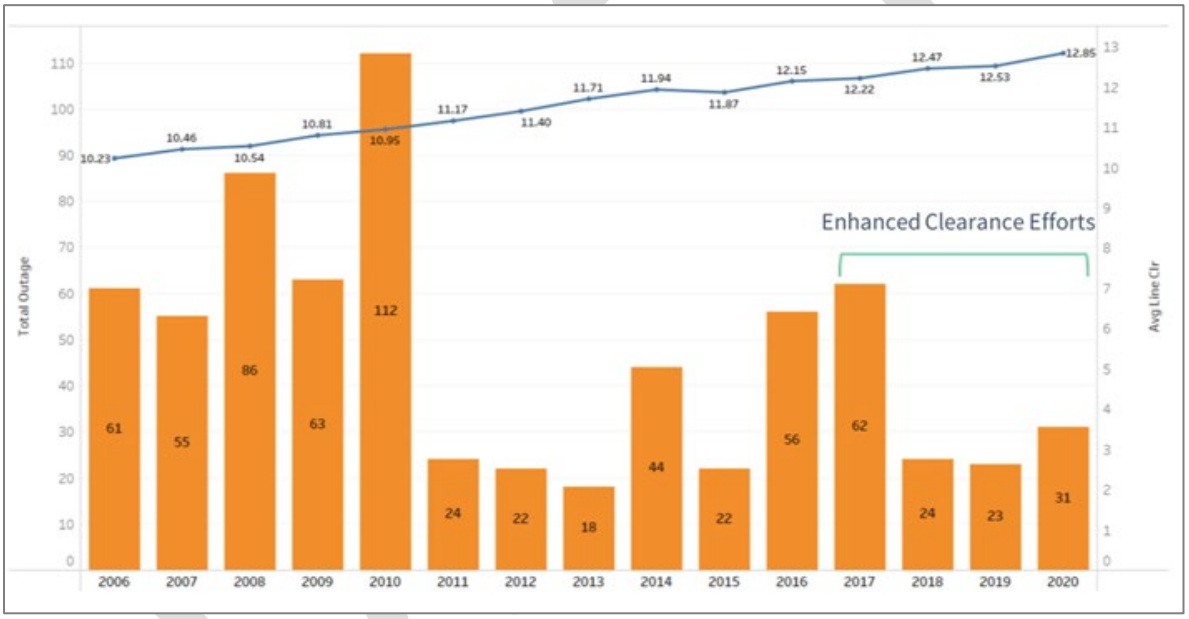
SDGE-21-04: Effectiveness of Enhanced Clearances

One key area for improvement cited in Energy Safety's Action Statement on SDG&E's 2021 Update was SDGE-21-04, Effectiveness of Enhanced Clearances. This required SDG&E, in partnership with PG&E and SCE, to participate in a multi-year vegetation clearance study. Since the publication of Energy Safety's Action Statements on the utilities' 2021 Updates, the large IOUs have focused on standardizing definitions and reviewing options for creating a cross-utility database for tree-related risk events. Each utility performed an initial analysis studying the relationship between line clearance and vegetation-related outages on its system.

SDG&E independently hired a third party to analyze the effect of enhanced clearances on reducing faults. Results from the third party's analysis show that the higher the percentage of

trees in SDG&E's inventory[108] receiving enhanced clearances (i.e., clearances greater than or equal to 12 feet at the time of trim) and the greater the average line clearance distance across the territory, the fewer the vegetation-related outages (see Figure 4.6.5-3: the green bracket shows the years when enhanced vegetation clearance efforts occurred). SDG&E also determined that its enhanced vegetation program will reduce vegetation-caused ignitions in the HFTD by 28.8 percent by January 1, 2023 (the end of the current WMP cycle).[109]

Figure 4.6.5-3: SDG&E Vegetation-Related Outages versus Average Line Clearance[110]



The large IOUs have set several objectives for 2022 for the multi-year vegetation clearance study:

- Hiring a third party to help achieve and validate the objectives of their study.
- Standardizing data collection for tree-caused risk events and creating a cross-utility database of these events.

[108] A tree in the utility's "inventory" is a tree that has the potential to encroach within the minimum clearance.required and/or could otherwise impact the overhead electrical facilities within three years of the inspection date (SDG&E's 2022 Update, Attachment E, p. 16).

[109] Data Request OEIS-SDGE-22-001, Question 3.

[110] The figure is taken from SDG&E's 2022 Update, Attachment D, p. 9.

- Examining whether the correlation between enhanced clearances and fewer tree-caused outage events may be attributable to other factors, such as the management of hazard trees and the installation of covered conductor.

Because the study spans multiple years, Energy Safety expects SDG&E, PG&E, and SCE to show progress as they continue the study year to year. See Section 4.6.5.3 for Energy Safety's requirements for continued improvement related to the effectiveness of the enhanced clearances joint study.

SDGE-21-07: Quantified Vegetation Management Compliance Targets

In response to the 2021 key area for improvement SDGE-21-07, Quantified Vegetation Management Compliance Targets, SDG&E provided nine targets in Table 5-2 in its 2022 Update.[111] This is an increase from the five in Table 5-2 of the 2021 Update. Energy Safety expects SDG&E to report on these targets (listed below in Table 4.6.5-2) in its Quarterly Initiative Updates.

Table 4.6.5-2: SDG&E Vegetation Management Compliance Targets for 2022

Target Name	2022 Target	Unit
Perform substation system inspections[112]	330	Inspections
Perform detailed inspections (tree trimming)	491,822	Trees inspected
Perform fuels management	500	Poles cleared
Remote sensing inspections of vegetation around distribution lines and equipment	730	Miles

[111] "Supplement to First Errata to San Diego Gas and Electric Company's 2022 Wildfire Mitigation Plan," dated March 31, 2022, submitted March 31, 2022 (accessed April 7, 2022): https://efiling.energysafety.ca.gov/EFiling/GetPublicDocument.aspx?documentId=52221.

[112] This target is not specific to vegetation management, but inspection of vegetation is an integral part of general substation inspections.

Target Name	2022 Target	Unit
Remote sensing inspections of vegetation around transmission lines and equipment	0[113]	Miles
Perform enhanced inspections, patrols, and trimming	12,500	Trees trimmed/removed
Perform pole brushing[114]	34,000	Poles brushed
Remove trees with strike potential	106	Vegetation management areas (VMAs)[115] inspected
Vegetation inspections audited	15%	% of vegetation inspections audited

Vegetation Risk Index

In the vegetation management and inspections section of its 2022 Update, SDG&E mentions its Vegetation Risk Index (VRI) multiple times. The VRI is a qualitative measurement "used to determine which distribution circuit segments are most at risk of vegetation-related outages during adverse weather conditions."[116] In 2021, SDG&E integrated a VRI GIS mapping layer into its mobile applications, allowing personnel to identify which circuit line segments have a

[113] A target for remote sensing inspection around transmission lines and equipment was required by the 2022 WMP Guidelines. In Data Request OEIS-SDGE-22-006, Question 2/Response 2, SDG&E confirmed it would not collect remote sensing data around transmission lines and equipment in 2022. For purposes of tracking compliance with the 2022 Guidelines, SDG&E's target of zero is included in this table. SDG&E also mentions this zero target in Supplement to First Errata to San Diego Gas and Electric Company's 2022 Wildfire Mitigation Plan, submitted on March 31, 2022, but it is not included in the errata Table 5-2 in that supplement.

[114] This target includes poles subject to Pub. Res. Code § 4292 requirements.

[115] "SDG&E divides its service territory into 133 distinct zones known as VMAs which are determined by multiple factors including city boundary, SDG&E Districts, and other geographical features" (SD&GE's 2022 Update, p. 285). See SDG&E's map of its VMAs: https://www.sdge.com/sites/default/files/documents/Public%20VMA%20Map.pdf (accessed May 4, 2022).

[116] SDG&E's 2022 Update, p. 95.

low, medium, or high VRI rating. SDG&E states that it also "may"[117] use the VRI to perform targeted off-cycle inspections and that it plans to further integrate the VRI into inspection activities for the HFTD.[118] SDG&E notes that the VRI is not a predictive model but a qualitative tool that can be used to focus vegetation management operations.[119]

SDG&E should continue to explore quantitative ways to incorporate not only its VRI but its risk and predictive modeling into vegetation management and inspections to optimize prioritization, protocols, and schedules, among many other activities.

4.6.5.3 Areas for Continued Improvement

Over the period of 2018 to 2020, SDG&E's vegetation management program and a suite of other mitigation efforts resulted in relatively fewer outages and ignitions per 10,000 overhead circuit miles when compared to PG&E (Figure 4.6.5-4). SDG&E had no vegetation-caused ignitions in the HFTD in 2018, no Tier 3 or non-HFTD vegetation-caused ignitions in 2019, and no vegetation-caused ignitions in 2020. Nevertheless, in 2021, SDG&E experienced an increase in vegetation-caused ignitions and outages (Figures 4.6.5-4 and 4.6.5-5). Even though SDG&E has demonstrated progress and generally has a low number of ignitions caused by vegetation, SDG&E must continue to develop its vegetation management program to reduce tree-caused risk events and any resulting ignitions.

[117] Data Request OEIS-SDGE-21-001, Question 3.

[118] SDG&E's 2022 Update, p. 286.

[119] Data Request OEIS-SDGE-21-001, Question 3.

Figure 4.6.5-4: Vegetation-Caused Ignitions and Outages per 10,000 Overhead Circuit Miles (OH CM) – Large IOUs (2015-2021)

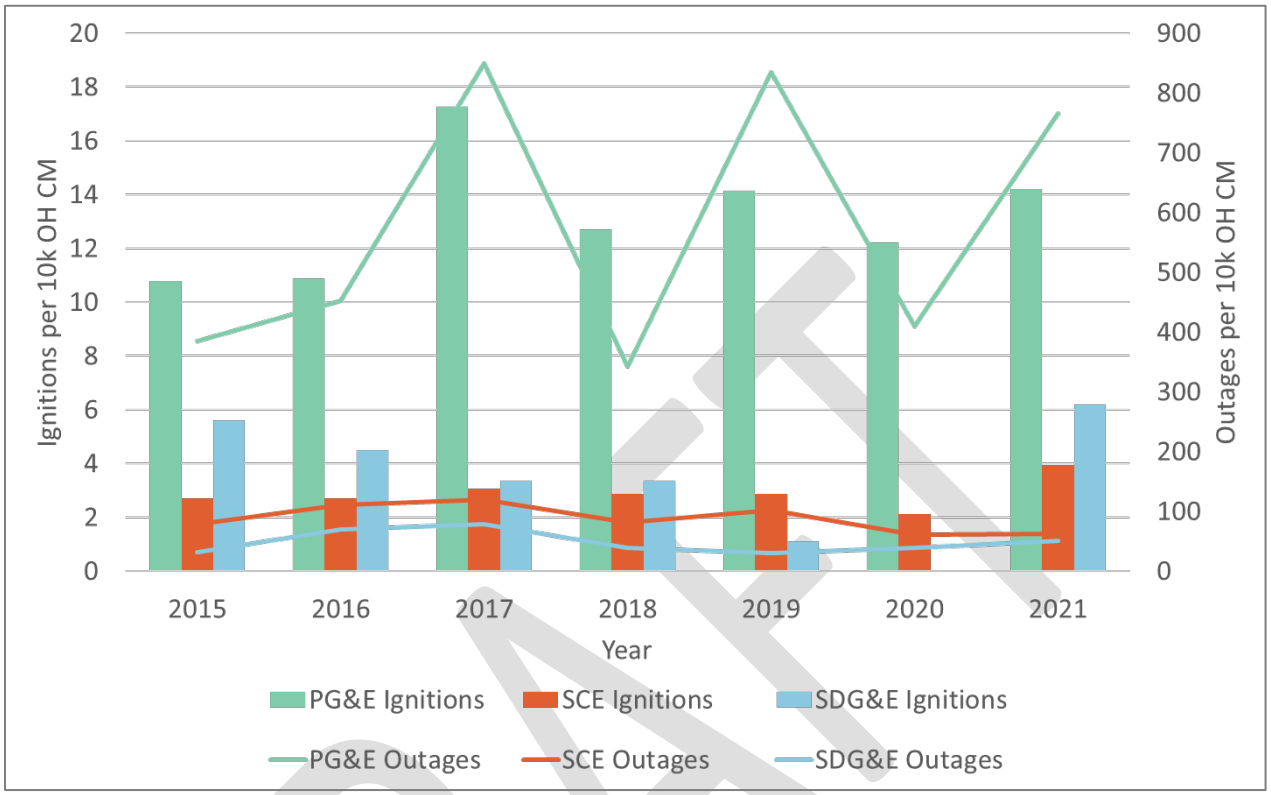
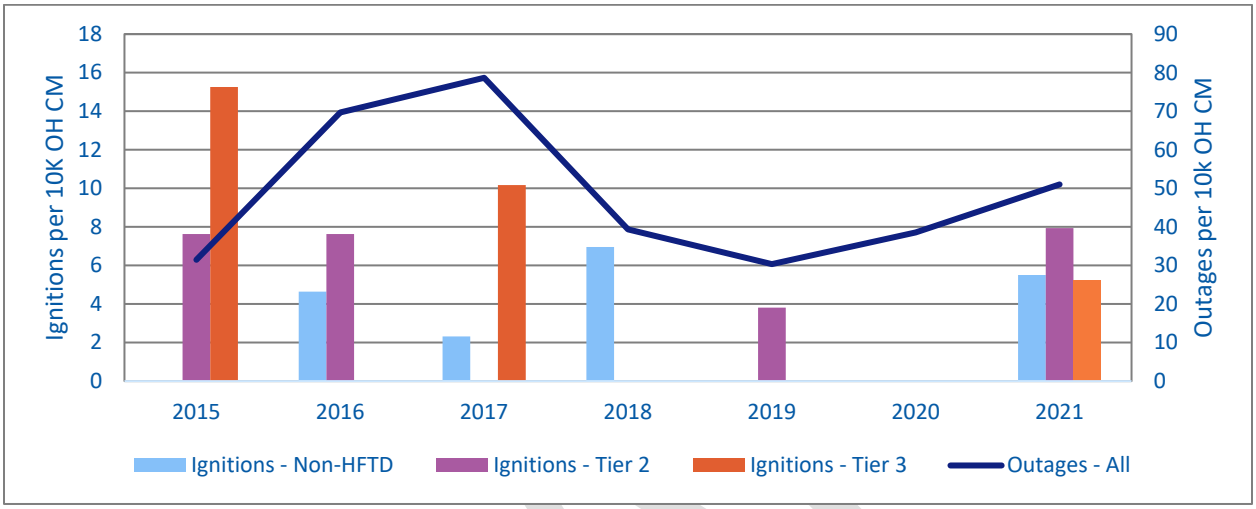


Figure 4.6.5-5: SDG&E Vegetation-Caused Ignitions by HTFD Tier and Outages per 10,000 Overhead Circuit Miles (OH CM)[120]



Not only can vegetation cause outages and ignitions, but it can also propagate sparks from equipment failure. In mitigating this propagation risk, SDG&E performs fuel reduction, stating that it removes "dead or dying fine fuels at ground level within a 50-foot radius of selected poles."[121] This activity is designed to reduce the risk of ignition and propagation in high-risk areas and to protect SDG&E's infrastructure from oncoming wildfire.[122] The poles are selected for this activity using the following criteria:

- "Poles that [are] located within the HFTD and/or the State Responsibility Area
- Poles that are subject to the brushing requirement of Public Resources Code 4292
- Integration of CRI (>5) and WRRM (>0.5) output to indicate priority level
- Poles with a relatively low environmental impact and mitigation
- Subject to the approval of the property owner" [123]

[120] It is important to note that SDG&E does not have 10,000 OH CM in each HTFD tier. After normalization using 10,000 OH CM, the x-axis can misleadingly inflate the total number of ignitions and outages. The total number of igntions caused by vegetation in 2021 are: Non-HTFD = 2; Tier 2 = 2; Tier 3 = 1.

[121] SDG&E's 2022 Update, p. 288.

[122] Data Request OEIS-SDGE-22-007, Question 1.

[123] Data Request OEIS-SDGE-22-005, Question 3.

While these criteria may be effective at selecting poles that are in high-risk areas, it is unclear whether this fuel reduction activity is a proper long-term solution to fuels management. Energy Safety asked SDG&E for its rationale for choosing 50 feet, including any scientific evidence, and if it is considering alternatives to this mitigation activity. SDG&E responded that choosing 50 feet "was based on the height of the power pole" and it "is considering the use of alternative fuels management treatment activities such as fire retardant."[124] Energy Safety considers the choice of 50 feet as arbitrary, having no scientific backing. If these poles are at high enough risk to warrant greater-than-normal clearances, other mitigations, such as replacement of wood poles with steel or undergrounding, may be warranted. Energy Safety has identified SDG&E's fuels treatment activity as an area for continued improvement.

As discussed in Section 4.6.5.2, the large IOUs have jointly made progress addressing the requirement of SDGE-21-04, Effectiveness of Enhanced Clearances. Energy Safety expects the large IOUs to continue their efforts and meet their self-identified objectives by the submission of the 2023 WMPs. Specifically, Energy Safety requires marked progress on development of data standards for the cross-utility tree-caused risk event database and creation of that database. Energy Safety also requires continuation of the effectiveness of enhanced clearances joint study through at least 2025.

Additionally, through analysis of current and past WMPs, Energy Safety has identified the need for scoping meeting to discuss how utilities would best learn vegetation management best management practices from each other. This scoping meeting may result in additional meetings, workshops, or the formation of a working group. Energy Safety believes this scoping meeting will lead to efforts to help clarify the current differences between electrical corporations' vegetation management programs and allow for collaboration among the electrical corporations, stakeholders, and academic experts. SDG&E must participate and collaborate with its peers and Energy Safety in this scoping meeting.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 7.

[124] Data Request OEIS-SDGE-22-005, Question 3.

4.6.6 Grid Operations and Operating Protocols, Including PSPS

The grid operations and operating protocols section of the Guidelines[125] requires discussion of ways the utility operates its system to reduce wildfire risk. For example, disabling the reclosing function of automatic reclosers[126] during periods of high fire danger (e.g., Red Flag Warning conditions) can reduce utility ignition potential by minimizing the energy released and the duration of the release when there is a fault. This section also requires discussion of work procedures in conditions of elevated fire risk and protocols to reduce the frequency and scope of de-energization, including PSPS events (e.g., through sectionalization). Further, this section requires the utility to report whether it has stationed and/or on-call ignition prevention and suppression resources and services.

4.6.6.1 Maturity Assessment

According to its responses on the 2022 Maturity Survey, SDG&E's average maturity in the grid operations and operating protocols category increased from 2021 to 2022. SDG&E is self-reporting higher maturity in this category than its peers (SCE and PG&E), as shown in Figure 4.6.6-1 below. According to its responses on the survey, SDG&E's individual capability levels in this category either remained the same or increased, as seen in Figure 4.6.6-2 below.[127]

[125] 2022 Wildfire Mitigation Plan Guidelines Template, Attachment 2.7.3, p. 76 (accessed March 6, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51912&shareable=true.

[126] A recloser is a switching device that is designed to detect and interrupt momentary fault conditions. The device can reclose automatically and reopen if a fault condition is still detected. However, if a recloser closes a circuit that poses the risk of ignition, wildfire may result. For that reason, reclosers are disabled in certain high fire risk conditions. During overcurrent situations, circuit breakers trip a switch that shuts off power to the electrical line.

[127] Maturity levels range from zero to four, with four being the most mature.

Figure 4.6.6-1: Cross-Utility Maturity Levels for Grid Operations and Operating Protocols - Large IOUs (2020-2022 Actual, 2023 Estimated)

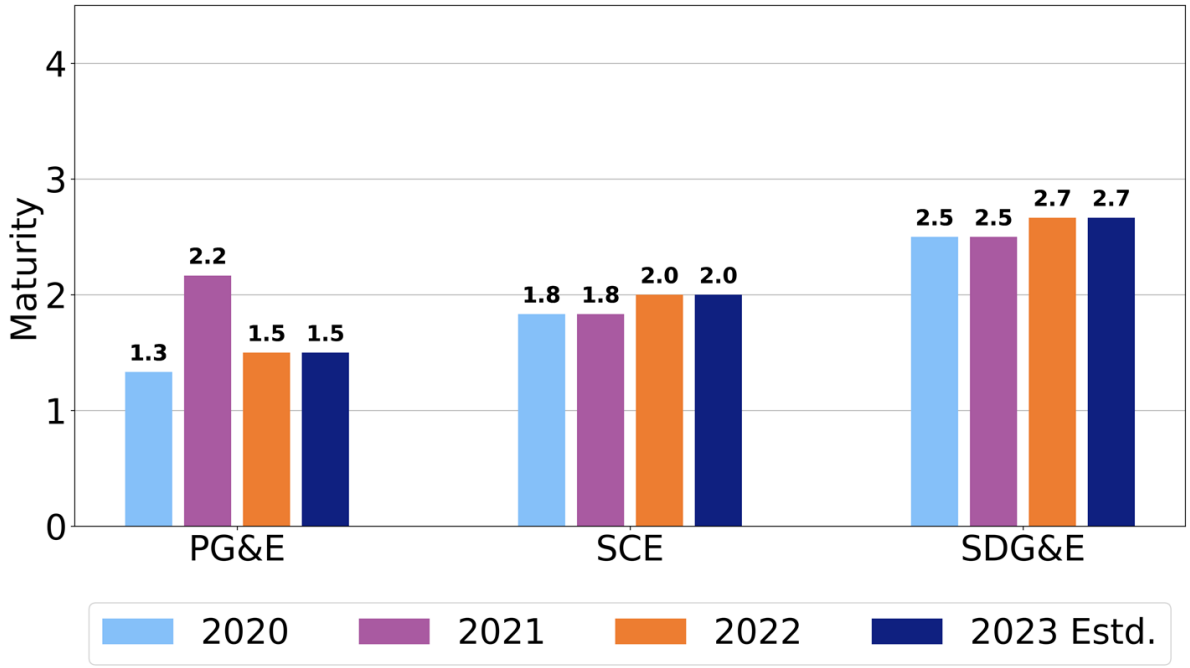
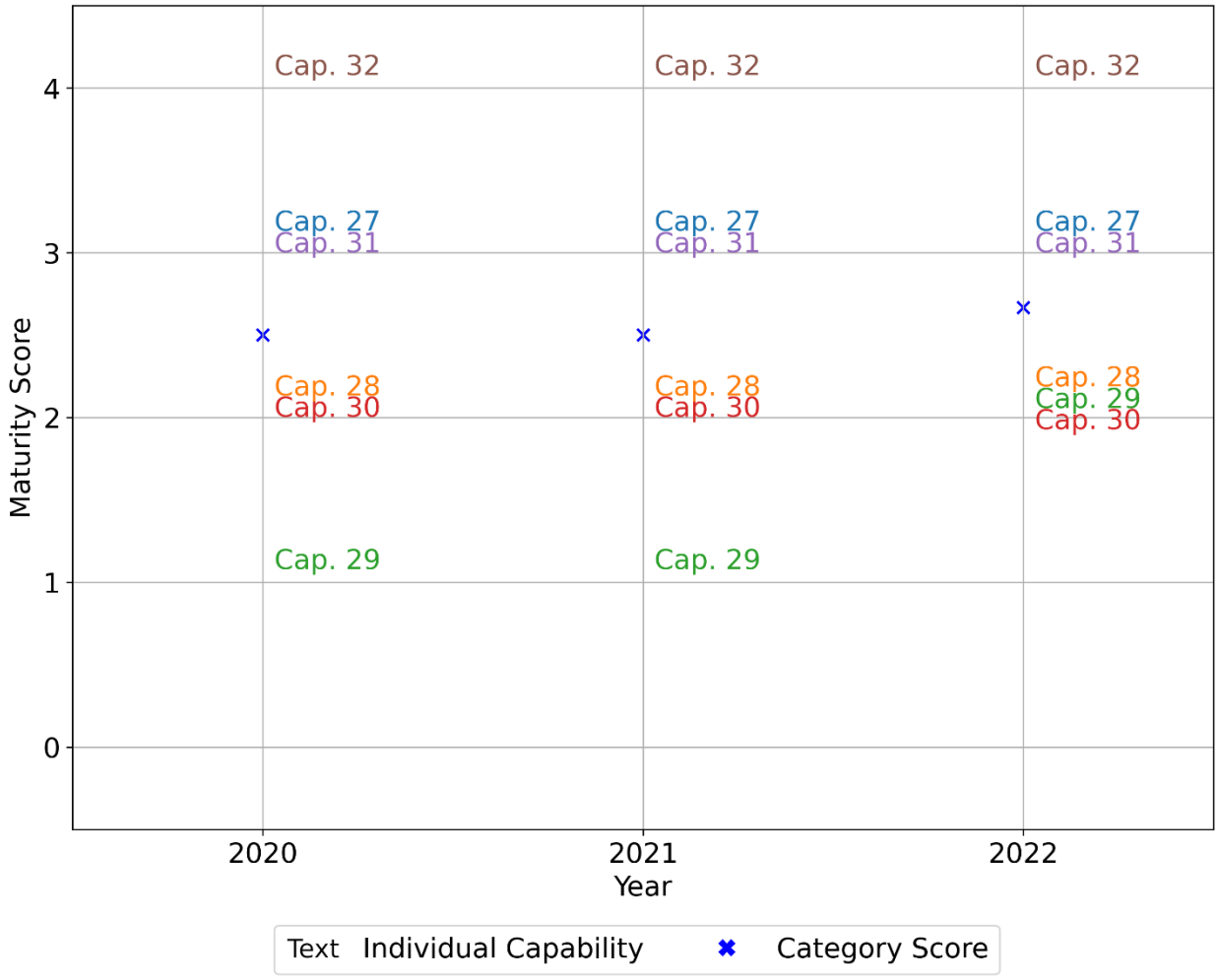


Figure 4.6.6-2: SDG&E Grid Operations and Operating Protocols Maturity Capabilities (2020-2022)[128]



In this category, SDG&E improved capability 29 by one level from 2021 to 2022. SDG&E's communications with affected customers prior to a PSPS event increased from greater than 95 percent to greater than 98 percent.[129] SDG&E also progressed from operating the grid above rated voltage and current load "during any conditions" to "never" (capability 28).[130]

[128] Titles of capabilities and SDG&E's levels can be found in SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey.

[129] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, response to F.III.b.

[130] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, response to F.II.d.

Factors that may be holding SDG&E back from maturing further in this category include the following:

- SDG&E does not currently use external experts or historical data to verify its model used for equipment maintenance, rebuilding, or replacement decisions.[131]
- SDG&E does not adjust grid element sensitivity or inspect de-energized sections of the grid in a manner that is primarily or fully automated.[132]

4.6.6.2 SDG&E's Progress

In the Action Statement on SDG&E's 2021 Update, Energy Safety required SDG&E to discuss its plans to validate the functionality of existing supervisory control and data acquisition (SCADA) switches and ensure functionality of newly installed switches (SDGE-21-08).[133] Energy Safety also required SDG&E to describe steps to improve its inspections and testing of switches.[134] In several incidents in 2020, non-communicative SCADA switches caused SDG&E customers to lose power without notice. Despite this, SDG&E indicated in its 2021 Update that it had no plans to alter its practices to ensure this issue did not continue. However, based on a review of SDG&E's Progress Report submitted on November 1, 2021, Energy Safety finds that SDG&E has fully addressed this issue (see Table A-1 in Appendix A of this Decision). This includes restoring remote functionality for 30 out of 33 devices identified in 2021, with mitigations in place for the remaining devices, including performing manual switching at the device or adjusting the customer notification list.[135]

Throughout the current WMP cycle, SDG&E has improved its grid operations and operating protocols. It has integrated indices like the Fire Potential Index (FPI) and the Santa Ana Wildfire Threat Index, used work procedures specific to high wildfire risk conditions, and

[131] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, response to F.II.c.

[132] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, responses to F.I.c and F.V.b.

[133] Energy Safety's Action Statement on SDG&E 2021 WMP Update, pp. 11-12 and 62 (accessed April 5, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51674&shareable=true.

[134] Energy Safety's Action Statement on SDG&E 2021 WMP Update, pp. 11-12 and 62 (accessed April 5, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51674&shareable=true.

[135] SDG&E's 2021 WMP Progress Report, p. 23.

enhanced its software for mobile devices. Specifically, SDG&E has done the following since submission of its 2021 Update:

- SDG&E restored the remaining three SCADA devices identified as having failed in 2020 and had no outages due to inoperable SCADA switches in 2021.[136] Energy Safety will continue to monitor whether SDG&E's SCADA devices operate correctly moving forward.
- SDG&E's 10-year plan now includes eliminating "use of PSPS as a primary wildfire mitigation measure for localized wind events."[137]
- In 2021, SDG&E exceeded its target to provide generators to Medical Baseline (MBL) and access and functional needs (AFN) customers impacted by PSPS.[138] SDG&E also exceeded its 2021 target for installing PSPS sectionalizing devices. It installed 13 sectionalizing devices in 2021 and plans to install 10 additional devices in 2022.[139] SDG&E is projecting a reduction of 4,607 customers impacted by PSPS in 2022 as a result of sectionalization (see SDG&E's 2022 Update, Table 8-4, p. 365).
- SDG&E has continued its partnership with CAL FIRE to enhance its fire prevention and suppression resources and services. In 2021, SDG&E's Aviation Firefighting Program incorporated night firefighting into this partnership, and it has begun night proficiency flights to familiarize pilots with night operations.

4.6.6.3 Areas for Continued Improvement

In addition to progress made, SDG&E must continue to improve in the following areas:

- SDG&E has not yet raised PSPS wind thresholds in correlation with grid hardening efforts. The covered conductor wind speed threshold and related questions are still undergoing evaluation. By the end of 2021, SDG&E had not fully completed hardening on any one circuit section—a criterion SDG&E lists as necessary for considering changing thresholds.[140] However, in a March 15, 2022, response to a data request,

[136] Data Request CalAdvocates-SDGE-2022 WMP-09, Questions 1 and 2.

[137] SDG&E's 2022 Update, Table 5-1, SDG&E's 3- and 10- Year Vision for Wildfire Risk Mitigation, p. 147.

[138] See Table 5-2, List and Description of Program Targets, Last 5 Years, in SDG&E's 2022 Update, p. 152.

[139] See Table 5-2, List and Description of Program Targets, Last 5 Years, in SDG&E's 2022 Update, p. 151.

[140] SDG&E's 2022 Update, p. 214.

SDG&E clarified that it has now completed one circuit section and plans to complete additional circuit sections by the end of 2023.[141] SDG&E also states that it plans to have a third-party contractor conduct a study to analyze covered conductor clashing and plans to use the data from the study to guide wind speed threshold changes.[142]

- However, when asked, SDG&E could not provide a timeline for this study's completion or for the introduction of possible wind speed threshold changes. Changing PSPS thresholds in correlation with grid hardening decreases PSPS risk for customers and provides additional value for system hardening. SDG&E states that its "distribution overhead hardening program has the ability to raise the alert speed of a circuit segment from the 95th percentile wind speed, or 35mph, to the 99th percentile wind speed, or 45mph."[143] However, customers are not yet experiencing this benefit. SDG&E should more proactively reflect the benefits of its grid hardening efforts by changing wind speed thresholds as soon as it is reasonably able to do so.
- SDG&E does not currently use risk-informed decision making for responding to faults. SDG&E has fault indicators and can detect the locations of faults during normal operations, particularly if multiple fault events occur at once. Therefore, SDG&E should be prioritizing response to fault events based on known local risk from risk modeling. This is important to minimize the potential of an event leading to a catastrophic fire, as faults occurring in areas of high risk should be addressed more quickly to minimize the time during which an ignition spreads. See Section 4.6.2, "Situational Awareness and Forecasting," for more discussion of SDG&E's areas for continued improvement regarding wildfire consequence modeling.
- SDG&E's increased sensitivity settings on protective devices are limited to extreme FPI days and days when PSPS conditions are present. Currently, 56.4 percent of SDG&E's field devices and 97 percent of its distribution substations are enabled to change the sensitivity settings.[144] Settings are based on load history and telemetry data and are specifically tailored for individual devices.[145] Over the period of 2015 to 2020, SDG&E

[141] Data Request OEIS-SDGE-22-004, Question 4.

[142] Data Request OEIS-SDGE-22-004, Question 4.

[143] Data Request CalAdvocates-SDGE-2022 WMP-08, Question 4.

[144] Data Request OEIS-SDGE-22-004, Question 3.

[145] Data Request OEIS-SDGE-22-004, Question 3.

had 62 fault events as a result of enabling sensitivity settings. This prevented six ignitions, per SDG&E's approximation.[146] SDG&E states that all new sectionalization devices will have sensitivity setting capabilities and projects that 63.3 percent of field devices will have these capabilities after the planned installations are completed. However, SDG&E does not have a plan to proactively replace old field devices to include sensitivity setting capabilities.[147]

Energy Safety sets forth specific areas for improvement and associated required progress in Section 7.

4.6.7 Data Governance

The data governance section of the Guidelines[148] requires the utility to report information on its initiatives to create a centralized wildfire-related data repository, conduct collaborative research on utility ignition and wildfire, document and share wildfire-related data and algorithms, and track and analyze near-miss data.

4.6.7.1 Maturity Assessment

SDG&E's reported maturity in data governance is high relative to that of its peers. That level has not changed since the previous update but is projected to increase by the end of the current WMP cycle. This trend of high maturity with projected increases has been consistent throughout the current WMP cycle: according to its responses on the 2022 Maturity Survey, SDG&E has not changed its reported current or projected maturity in data governance in the current WMP cycle.

4.6.7.2 SDG&E's Progress

SDG&E's 2022 Update improves upon its 2021 Update in every subcategory in the data governance section. SDG&E reports that it has continued to develop its data guidance frameworks, conducted internal audits, and integrated several data sources into its centralized data repository. SDG&E's 2022 Update provides more in-depth information on

[146] SDGE's 2022 Update, p. 307.

[147] Data Request OEIS-SDGE-22-005, Question 13.

[148] 2022 Wildfire Mitigation Plan Guidelines Template, Attachment 2.7.3, pp. 76-77 (accessed March 6, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51912&shareable=true.

several collaborative research projects, including a new research project that proposes to compare the environmental impact of wildfire to that of mitigation measures. The documentation of wildfire-related data and algorithms in its 2022 Update is significantly more detailed and thorough than in previous updates.

4.6.7.3 Areas for Continued Improvement

SDG&E has made significant progress in its disclosure and documentation of wildfire-related data and algorithms. However, it should continue to improve its specificity and detail in documenting both the data collected and its processing of those data. In particular, several documented models—including SDG&E's VRI and Wildfire Risk Reduction Model (WRRM)—have only vague or cursory descriptions of validation and uncertainty. SDG&E must determine a way to evaluate the output of the VRI and report on the results of that effort in its 2023 WMP. SDG&E must also determine which inputs to its WRRM can be more rigorously validated, conduct such validation, and report on the results of that effort in its 2023 WMP.

Also, in the Action Statement on SDG&E's 2021 Update, Energy Safety required SDG&E to improve the quality of its Quarterly Data Report (QDR) spatial data submissions. In 2022, Energy Safety finds that SDG&E has made acceptable progress in improving the completeness and quality of its QDR spatial data but notes that there are still significant gaps in the data submitted. Energy Safety is continuing to look at SDG&E's QDR quality but relegating questions about spatial data quality control to other compliance mechanisms, specifically a separate report, tentatively named "GIS Data Review Report,"[149] to be published in June 2022, covering the data submitted by all of the regulated IOUs and independent transmission operatorss for quarters three and four of 2021.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 7.

[149] Name subject to change during review.

4.6.8 Resource Allocation Methodology

The resource allocation methodology section of the Guidelines[150] requires the utility to describe its methodology for prioritizing programs by cost-effectiveness. Utilities must discuss their risk reduction scenario analysis and provide a risk-spend efficiency (RSE) analysis for each aspect of the plan.

4.6.8.1 Maturity Assessment

According to its responses on the 2022 Maturity Survey, SDG&E has continuously increased its maturity in resource allocation methodology throughout the current WMP cycle, with a larger increase from 2021 to 2022 than from 2020 to 2021. However, resource allocation methodology remains SDG&E's least mature category and the only category with a maturity level less than two (of a maximum of four; see Figure 4.6.8-1 below). SDG&E's maturity in this category is limited by capabilities 39 and 41 (see Figure 4.6.8-2 below).

[150] 2022 Wildfire Mitigation Plan Guidelines Template, Attachment 2.7.3, p. 77 (accessed March 6, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51912&shareable=true.

Figure 4.6.8-1: SDG&E's Maturity Survey Responses for All WMP Categories (2020-2022)

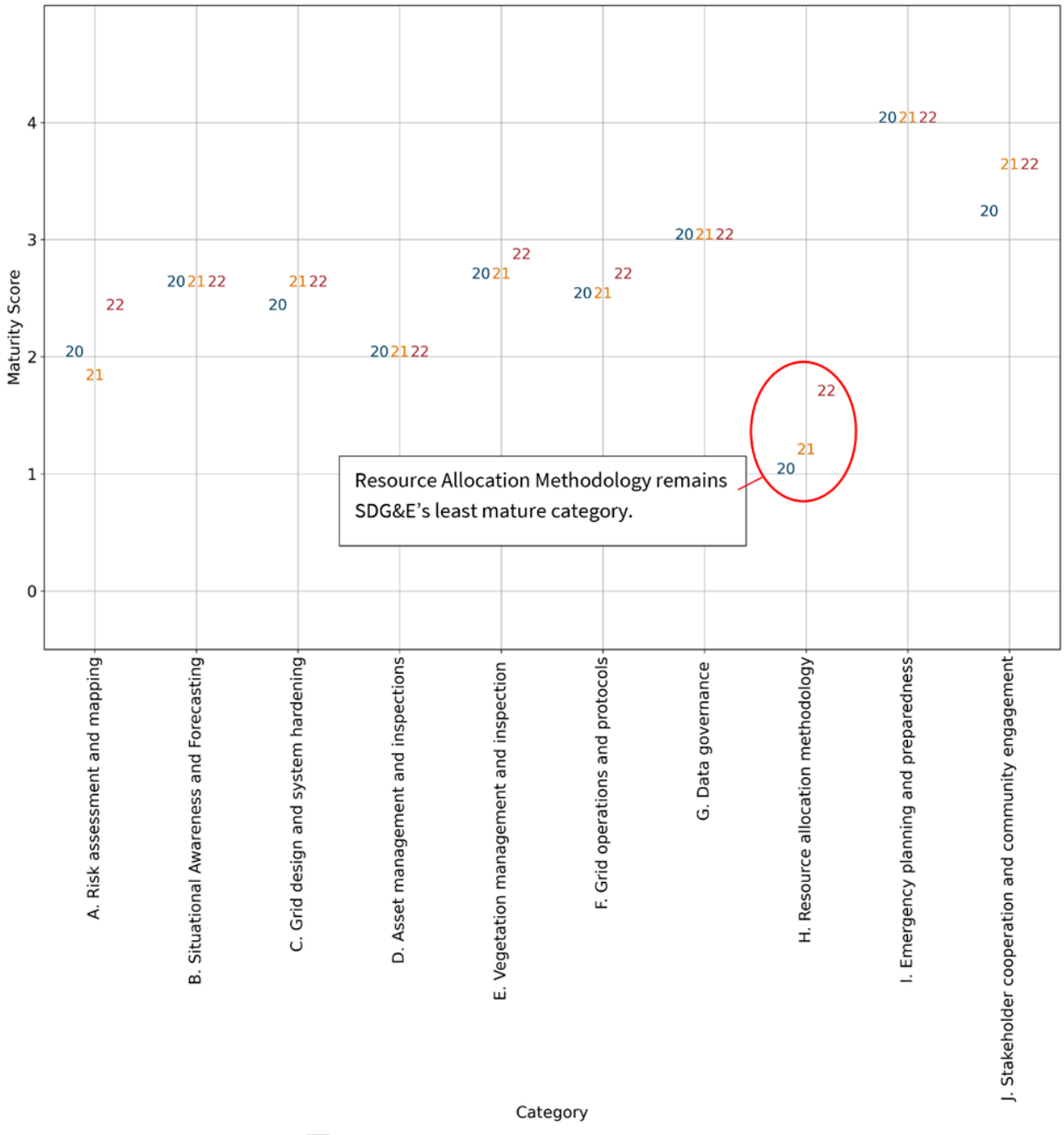
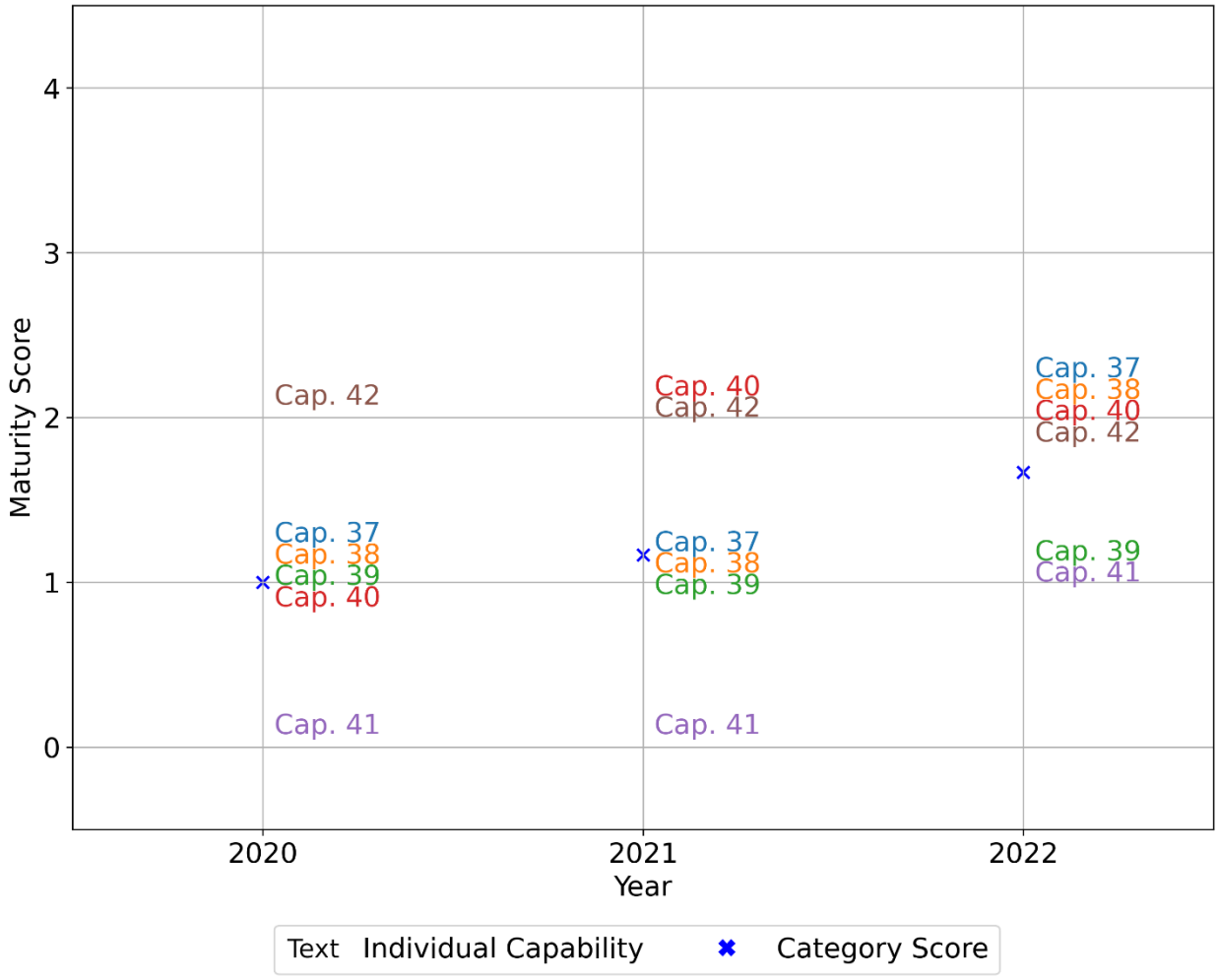


Figure 4.6.8-2: SDG&E's Maturity in Individual Capabilities: Resource Allocation Methodology (2020-2022)



4.6.8.2 SDG&E's Progress

During the 2021 Update evaluation, Energy Safety identified the importance of decision-making flowcharts, particularly in bringing transparency to a utility's mitigation selection and prioritization process. One of SDG&E's key areas for improvement was SDGE-21-09, Inadequate Transparency Associated with SDG&E's Decision-Making Process.[151] This year,

[151] Energy Safety's Action Statement on SDG&E's 2021 Update, p. 70.

SDG&E made great strides in increasing its decision-making transparency by providing the following flowcharts:

- Grid design and system hardening:
  - Figure 7-4: Grid Hardening Flowchart
- Asset management and inspections:
  - Figure 7-5: Asset Management and Inspections Decision Tree: Transmission
  - Figure 7-6: Asset Management and Inspections Decision Tree: Distribution
  - Figure 7-7: Asset Management and Inspections Decision Tree: Substation
- Vegetation management and inspections:
  - Figure 7-9: Vegetation Management Decision Tree: Pre-Inspection
  - Figure 7-10: Vegetation Management Decision Tree: Pruning and Removal
  - Figure 7-11: Vegetation Management Decision Tree: Pole Brushing
  - Figure 7-12: Vegetation Management Decision Tree: Auditing

Of these, SDG&E's grid hardening decision-making flowchart is the only one that illustrates where quantitative decision making takes place. The flowchart is organized into four subparts: scoping, engineering and design, construction, and post-construction.[152] The scoping phase begins with a list of "priority segments based on wildfire risk ranking and target mileage." SDG&E's Wildfire Next Generation System (WiNGS) model ranks circuit segments from highest to lowest wildfire risk. SDG&E then selects the riskiest segments to receive the appropriate mitigations first. SDG&E demonstrates growth in its quantitative risk-based decision-making process for grid hardening by considering the outputs of its WiNGS model as the first step.

SDG&E also improved its resource allocation methodology since 2021 by introducing lifecycle cost analysis into some RSE estimates and producing more RSE estimates. In its 2022 WMP Update, SDG&E states that it plans on incorporating lifecycle cost analysis into its WiNGS-Planning model.[153] Appropriate accounting for lifecycle cost and risk reduction of mitigation initiatives is crucial to selecting, prioritizing, and realizing the full benefit of the initiatives.

[152] SDG&E's 2022 Update, Figure 7-4, Grid Hardening Flowchart, p. 211.

[153] SDG&E's 2022 Update, p. 323.

Energy Safety looks forward to SDG&E's progress on developing RSE estimates that include lifecycle cost in subsequent WMP submissions.

4.6.8.3 Areas for Continued Improvement

As discussed above, capabilities 39 and 41 limit SDG&E's maturity in resource allocation methodology (see Figure 4.6.8-2).

- Capability 39 focuses on the RSE estimates for vegetation management initiatives. The limiting question is question H.III.b, "At what level can [RSE] estimates be prepared?" SDG&E responded on the 2022 Maturity Survey[154] with "regional," although it projected a response of "circuit-based" by 2022 in its 2021 Maturity Survey.[155] SDG&E must prepare vegetation management-related RSE estimates at a more granular level to increase the utility's understanding of the cost-benefit ratio and improve in this capability.
- Capability 41 assesses the utilities' approach to portfolio-wide initiative allocation methodology. The limiting question is question H.V.a, "To what extent does the utility allocate capital to initiatives based on [RSE]?" SDG&E improved its capacity in this regard from last year, selecting "iii. Accurate RSE estimates for all initiatives are used to determine capital allocation within categories only…."[156] However, in 2022, SDG&E walked back its 2021 projection that it would attain the level of maturity denoted by the response "iv. Accurate RSE estimates for all initiatives are used to determine capital allocation across portfolio…." by January 1, 2023.[157] The utility is evidently anticipating no progress in its capacity to produce portfolio-level RSE estimates by the beginning of 2023. SDG&E must strive to use accurate RSE estimates to determine capital allocation at a portfolio level to further mature in this capability.

While SDG&E did improve the transparency of its grid hardening and asset inspection processes by providing decision-making flowcharts, SDG&E can continue to improve its risk-based decision-making processes for grid hardening and asset inspections as follows:

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[154] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, response to H.III.b.

[155] SDG&E's 2021 Utility Wildfire Mitigation Maturity Survey, response to H.III.b.

[156] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, response to H.V.a.

[157] Italicized to highlight difference between iii and iv for question H.V.a.

- According to its grid hardening decision-making flowchart, SDG&E is prioritizing its highest risk circuits first for hardening projects. However, SDG&E can continue to improve its decision-making process by elaborating on how the mitigation initiative is selected. SDG&E states that the initiative selection process is based on "geography, prior hardening, loading district, standards, land, environmental, easement constraints, PSPS improvements, line/reliability improvements, [and] construction cost savings."[158] However, SDG&E does not provide additional details on how it considers its listed factors and weights them in making decisions. Please see Section 4.6.3.3 for more discussion on this topic.
- Currently, SDG&E's transmission and distribution asset inspections rely heavily on compliance regulations and cyclical schedules. SDG&E's transmission and distribution asset inspection processes contain 16 steps in total;[159] however, it is not clear where in the prioritization process it considers risk-based factors. While Energy Safety recognizes the necessity of following compliance regulations, such as General Orders 95, 128, and 165, it is also important to consider quantitative risk-based factors in prioritizing inspections to bring rigor to the decision-making process. See Section 4.6.4.3 for more discussion on this topic.

SDG&E can also continue to improve its RSE verification process. According to its responses on the 2022 Maturity Survey, SDG&E's RSE estimates are verified by historical or experimental pilot data but are not confirmed by independent experts or other utilities in California.[160] Moreover, its responses indicate SDG&E does not plan on improving its RSE verification process. RSE estimates are important to decision making because they are transparent and quantitative. It is crucial for SDG&E to verify the accuracy of its RSE estimates with independent experts or other utilities in California.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 7.

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[158] SDG&E's 2022 Update, Figure 7-4, Grid Hardening Flowchart, row 3, p. 211.

[159] SDG&E's 2022 Update, pp. 245-246.

[160] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, response to H.V.c.

4.6.9 Emergency Planning and Preparedness

The emergency planning and preparedness section of the Guidelines[161] requires the utility to provide a general description of its overall emergency preparedness and response plan, including a discussion of how the plan is consistent with legal requirements for customer support before, during, and after a wildfire. This discussion must cover support for low-income customers, billing adjustments, deposit waivers, extended payment plans, suspension of disconnection and nonpayment fees, and repairs. The utility is also required to describe emergency communications before, during, and after a wildfire in languages deemed prevalent in its territory (Decision 19-05-036, supplemented by Decision 20-03-004),[162] and other languages required by the CPUC.

This section of the Guidelines also requires discussion of the utility's plans for coordination with first responders and other public safety organizations; plans to prepare for and restore service, including workforce mobilization and prepositioning of equipment and employees; and a showing that the utility has an adequately sized and trained workforce to promptly restore service after a major event.

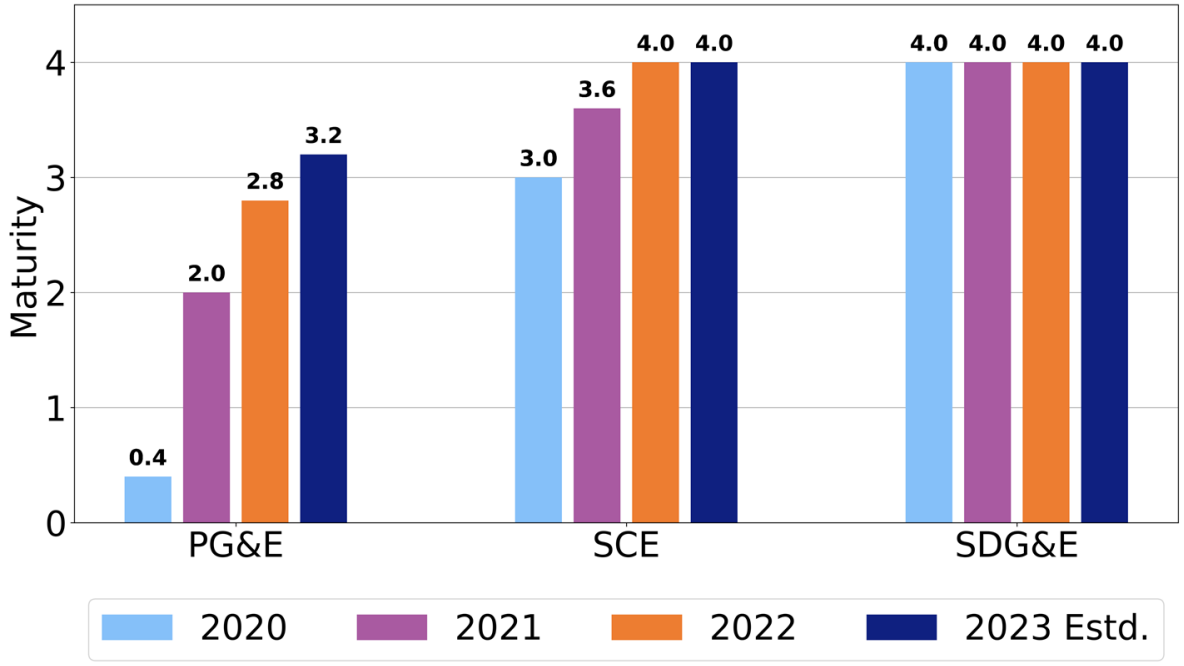
4.6.9.1 Maturity Assessment

SDG&E's maturity level in the emergency planning and preparedness category has remained the same throughout the current WMP cycle. In its responses on the 2022 Maturity Survey for this category, SDG&E continues to report the highest possible level of maturity, similar to SCE's level and higher than PG&E's level. For all but one question in this category, SDG&E's 2022 responses reflect the highest possible maturity level. The exception is question I.II.c, "To what level are procedures to restore service after a wildfire-related outage customized?" SDG&E's response was "span level"; the only higher response possible is "asset level." Figure 4.6.9-1 below illustrates SDG&E's consistent high level of maturity in this category. Maturity levels span from zero to four, with four being the highest.

[161] 2022 Wildfire Mitigation Plan Guidelines Template, Attachment 2.7.3, p. 77 (accessed March 6, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51912&shareable=true.

[162] A language is prevalent if it is spoken by 1,000 or more persons in the utility's territory or by 5 percent or more of the population within a "public safety answering point" in the utility's territory. See Cal. Gov. Code § 53112 for more information.

Figure 4.6.9-1: Cross-Utility Maturity Levels for Emergency Planning and Preparedness - Large IOUs (2020-2022 Actual, 2023 Estimated)



4.6.9.2 SDG&E's Progress

In its Action Statement on SDG&E's 2021 Update, Energy Safety required SDG&E to provide the following in its 2022 Update:[163]

- The number of trainees that have completed its Apprentice Lineman program
  - SDG&E provides this information in Table 5-13, Service Restoration Workforce (SDG&E Employees), as well as in response to a data request.[164,165]
- The number of employees trained for emergency preparedness (service restoration workforce)

[163] Each of the following are required "remedies" from Energy Safety's Action Statement on SDG&E's 2021 WMP Update, p. 80.

[164] SDG&E's 2022 Update, p. 169.

[165] Data Request OEIS-SDGE-22-006, Question 4.

    - SDG&E provides this information in Section 7.3.9.1, Adequate and Trained Workforce for Service Restoration, of its 2022 Update, stating that over 400 employees completed the Incident Command System training in 2021.[166] SDG&E also provides service restoration workforce numbers in Table 5-13.
- More information on customer feedback after a wildfire event—what information is collected, how it is collected, and how it is used to inform future outreach efforts
    - SDG&E provided this information in response to a data request.[167]
- Information on how employees are trained on SDG&E's Mutual Assistance Plan.
    - SDG&E provided this information in response to a data request,[168] as well as to a question asked during a call between Energy Safety and SDG&E on March 30, 2022.

Energy Safety finds that SDG&E has fully addressed each of these issues.

SDG&E has continued to progress in the development of its emergency planning and preparedness programs and initiatives. Among other emergency planning advancements over the past year, SDG&E made progress in the following areas:

- Improving the training of its service restoration workforce. In 2021, SDG&E completed construction of a physical infractions test yard to train Journeyman linemen. The test yard consists of overhead lines for Journeymen to patrol and practice identifying and properly coding fire-potential infractions.[169]
- Creating an access and functional needs (AFN) landing page on its company website to provide AFN resources (e.g., information on PSPS support, assistance for Medical Baseline [MBL] customers, utility bill assistance programs). The webpage also provides a link to an online form for AFN customers to self-identify and update contact information to receive tailored information about programs and services as well as support during a power outage.

[166] SDG&E's 2022 Update, p. 326.

[167] Data Request OEIS-SDGE-22-006, Question 5.

[168] Data Request OEIS-SDGE-22-006, Question 6.

[169] SDG&E states that it "modeled fire potential infractions identified under General Order 165" in its infractions test yard (Data Request OEIS-SDGE-22-006, Question 8d).

- Improving its PSPS notifications by including more accessible formats (e.g., American Sign Language [ASL] interpretation video, audio read-out).
- Updating its Company Emergency Response Plan to incorporate lessons learned and additional regulatory requirements (the update was delayed in 2020 due to COVID-19 and Emergency Operations Center [EOC] activations). When asked for examples of lessons learned during a call between Energy Safety and SDG&E on March 30, 2022, SDG&E stated that it created a formalized notifications group for PSPS incidents at its EOC.

4.6.9.3 Areas for Continued Improvement

Energy Safety has no areas for continued improvement for SDG&E under the emergency planning and preparedness section of its 2022 Update.

4.6.10 Stakeholder Cooperation and Community Engagement

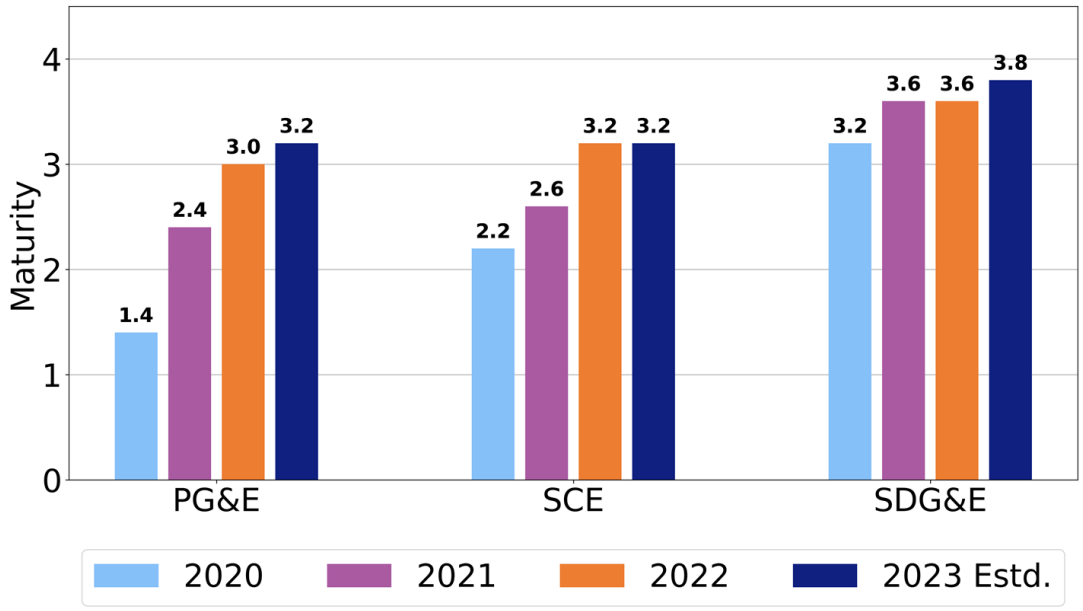
The stakeholder cooperation and community engagement section in the Guidelines[170] requires the utility to report on the extent to which it will engage the communities it serves. This engagement includes cooperating and sharing best practices with community members, agencies outside California, fire suppression agencies, the U.S. Forest Service, and others engaged in vegetation management or fuel reduction.

4.6.10.1 Maturity Assessment

According to its responses on the 2022 Maturity Survey, SDG&E remains at the same overall maturity level as it did in 2021 for stakeholder cooperation and community engagement. SDG&E's maturity in this category remains between three and four (with four being the highest possible level). SDG&E self-reports greater maturity in this category than SCE or PG&E.

[170] 2022 Wildfire Mitigation Plan Guidelines Template, Attachment 2.7.3, p. 77 (accessed March 6, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51912&shareable=true.

Figure 4.6.10-1: Cross-Utility Maturity Levels for Stakeholder Cooperation and Community Engagement - Large IOUs (2020-2022 Actual, 2023 Estimated)



4.6.10.2 SDG&E's Progress

In the Action Statement on SDG&E's 2021 WMP Update, Energy Safety identified one issue and corresponding remedy in the stakeholder cooperation and community engagement category:[171]

Energy Safety stated that, while SDG&E has made progress in its communication practices and cooperation with agencies, SDG&E did not specify how it was using feedback from stakeholder engagement activities. Energy Safety required SDG&E to explain how it is incorporating feedback into its community engagement efforts to improve its WMP.

Energy Safety finds that SDG&E has fully addressed this issue and remedy with the information it provided in Section 7.3.10 and relevant data request responses.[172]

[171] See Energy Safety's Action Statement on SDG&E's 2021 WMP Update, p. 83.

[172] Data Request OEIS-SDGE-22-006, Question 7.

SDG&E has continued to progress in the development of its stakeholder cooperation and community engagement programs and initiatives. Among other advancements, SDG&E made progress in the following areas:

- SDG&E partnered with Deaf Link, an interpreting agency, to convert all PSPS notifications into ASL video, audio read-out, and written transcript formats to increase accessibility for APN customers.
- SDG&E established a new community resource center in Fallbrook, California.
- SDG&E enhanced partnerships with and provided funding for 40 community-based organizations (CBOs) serving customers in SDG&E's HFTD.
- SDG&E launched a dedicated AFN campaign to better communicate with vulnerable populations and promote available services and resources (e.g., 211 San Diego and 211 Orange County, Facilitating Access to Coordinated Transportation, and the Salvation Army).

4.6.10.3 Areas for Continued Improvement

Energy Safety has no areas for continued improvement for SDG&E under the stakeholder cooperation and community engagement section of its 2022 Update.

4.6.10.4 Additional Observations

In addition to the points noted above, Energy Safety has the following observation:

In its 2022 Update, SDG&E does not include any information about initiative 7.3.10.4, Forest Service and Fuel Reduction Cooperation and Joint Roadmap. Instead of describing the initiative, SDG&E refers to Section 7.3.5.2, Detailed Inspections and Management Practices for Vegetation Clearances around Distribution Electrical Lines and Equipment. Upon further inquiry, Energy Safety learned that this is not an SDG&E initiative: it was included as part of the WMP template (from the 2022 WMP Guidelines' list of mitigation initiatives). Given that the 2022 WMP Guidelines do not require utilities to include every initiative listed under each WMP category,[173] it is not necessary for SDG&E to report on 7.3.10.4 in its WMP unless the

[173] Energy Safety's Final 2022 Wildfire Mitigation Plan (WMP) Update Guidelines, Attachment 2, p. 73: "It is not necessary for a utility to have every initiative listed under each category."

utility were undertaking that initiative. If it were, it would then need to report on it in future WMP submissions.

4.7 Public Safety Power Shutoff (PSPS), Including Directional Vision for PSPS

In recent years, utilities have increasingly used Public Safety Power Shutoffs to mitigate wildfire risk. PSPS events introduce substantial risk to the public and impose a significant burden on public services that must activate during these events. Energy Safety supports the use of PSPS only as a last resort and expects the utilities to present clear plans for reducing the scale, scope, and frequency of PSPS events.

In 2021, Energy Safety separated the reporting of PSPS from the reporting of mitigations and progress metrics to reflect the definition of PSPS as a last resort rather than a mitigation option (pursuant to CPUC Guidance Resolution WSD-002 and CPUC PSPS Decisions 19-05-036 and 20-03-004).[174] This section of the Guidelines[175] requires utilities to report their current and projected progress in PSPS mitigation, including lessons learned from the prior year, de-energization and re-energization protocols, PSPS outcome metrics, plans to reduce future PSPS impacts, and community engagement. The Guidelines specifically require utilities to address Senate Bill 533[176] requirements to identify circuits that have frequently been deenergized and provide measures for how utilities will reduce the need for, and impact of, future de-energization of those circuits.

[174] When calculating RSE for PSPS, electrical corporations generally assume 100 percent wildfire risk mitigation and very low implementation costs because societal costs and impact are not included. When calculated this way, PSPS will always rise to the top as a wildfire mitigation tool, but it will always fail to account for its true costs to customers. Therefore, electrical corporations must not rely on RSE calculations as a tool to justify the use of PSPS.

[175] 2022 Wildfire Mitigation Plan Guidelines Template, Attachment 2.8, pp. 78-83 (accessed March 6, 2022): https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51912&shareable=true.

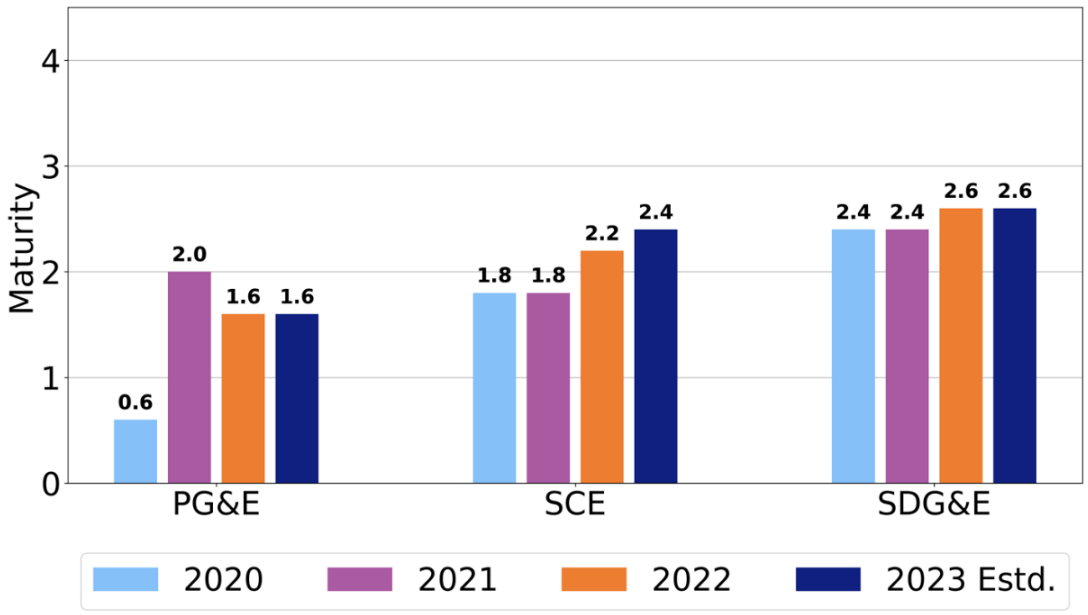
[176] Senate Bill No. 533, Chapter 244, An act to amend Section 8386 of the Public Utilities Code, relating to electricity: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB533 (accessed April 11, 2022).

4.7.1 Maturity Assessment

The Maturity Model does not include a distinct PSPS category. PSPS questions in the Maturity Survey are found under capabilities in various maturity categories. The PSPS-related capabilities referenced here are in the maturity categories of situational awareness, grid operations and operating protocols, and emergency planning and preparedness. The PSPS category represented in Figure 4.7-1 below includes PSPS-related capabilities from these categories. Maturity levels are calculated in the same way as the other categories.

According to its responses on the 2022 Maturity Survey, SDG&E started the current WMP cycle at a high maturity level relative to its peers and has remained there in several maturity categories and capabilities related to PSPS (see Figure 4.7-1 below). In 2020, the utility assessed itself at a high maturity level, which increased slightly (by 0.2) in its 2021 assessment.

Figure 4.7-1: Cross-Utility Maturity Levels for PSPS-Related Capabilities – Large IOUs (2020-2023)[177]



[177] Maturity levels derived from utility responses to PSPS-related questions in the categories of situational awareness and forecasting, grid operations and operating protocols, and emergency planning and preparedness. Maturity levels are calculated in the same way as the other categories.

Some factors that may be preventing SDG&E from maturing further are discussed below.

While SDG&E's maturity remained high on the "grid design for resiliency and minimizing PSPS" capability of the situational awareness category, its maturity level may be limited by its response to two questions on the Maturity Survey:

- In its 2021 and 2022 responses, SDG&E indicated its distribution system architecture has a level of redundancy covering at least 50 percent of customers in the HFTD. A higher level of maturity would be attained if SDG&E indicated 70 or 85 percent redundancy coverage.[178]
- SDG&E considers only egress points as an input for grid topology design. It does not yet use traffic simulation mapping, microgrids, or other means to reduce consequence for customers at frequent risk of PSPS. All of these represent a higher level of maturity.[179]

In the grid operations and operating protocols category, SDG&E's maturity is limited by three answers under three different capabilities.

- In a question under the "PSPS operating model and consequence mitigation" capability, SDG&E specified that advance communication regarding forecasted PSPS events goes to over 98 percent of affected customers (of a possible 99.9 percent) and over 99.5 percent of MBL customers (of a possible 100 percent).[180]
- In a question under the "protocols for PSPS initiation" capability, SDG&E answered that while it does have explicit thresholds for activating a PSPS, it does not yet maintain its grid in a condition of low enough risk not to require any PSPS activity. All utilities responding to the Maturity Survey expressed this limitation.[181]
- In a question under the "protocols for PSPS re-energization" capability, SDG&E indicated that the process for inspecting de-energized sections of the grid prior to re-energization is "mostly automated" (greater than or equal to 50 percent), not yet

[178] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, response to C.III.b.

[179] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, response to C.III.d.

[180] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, response to F.III.b.

[181] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, response to F.IV.a.

"primarily automated" with "minimal manual inputs." All utilities responding to the Maturity Survey expressed this limitation.[182]

In the "process for continuous improvement after wildfire and PSPS events" capability of the emergency planning and preparedness category, SDG&E remained at a high level throughout the current WMP cycle, with no survey question responses limiting its maturity.

4.7.2 SDG&E's Progress

Outcome Metrics

SDG&E's annual total customer hours of outages and PSPS events increased from 2019 to 2020, then decreased significantly from 2020 to 2021. Favorable weather conditions contributed significantly to PSPS impact reductions among all utilities in 2021. In particular, the total number of Red Flag Warning days and also the rate of Red Flag Warning days per overhead circuit mile were both unusually low across SDG&E's service territory in 2021. SDG&E implemented one PSPS event in 2021.

Using metrics provided in Table 11 of its 2022 Update with regard to scale and frequency of PSPS events from 2018 to 2021, SDG&E exceeds its peers (as shown in Figures 4.7-2 and 4.7-4 below). In terms of scope measured by overhead circuit miles, SDG&E's PSPS events impacted more overhead circuit miles than its peers in 2018, more than SCE but fewer than PG&E in 2019 and 2020. SDG&E's PSPS events impacted fewer overhead circuit miles than both utilities in 2021 and this trend is projected to continue in 2022 (as shown in Figure 4.7-3).

[182] SDG&E's 2022 Utility Wildfire Mitigation Maturity Survey, response to F.V.b.

Figure 4.7-2: Recent Use of PSPS: Frequency of PSPS Events (Total) – Large IOUs (2018-2021 Actual, 2022 Estimated)

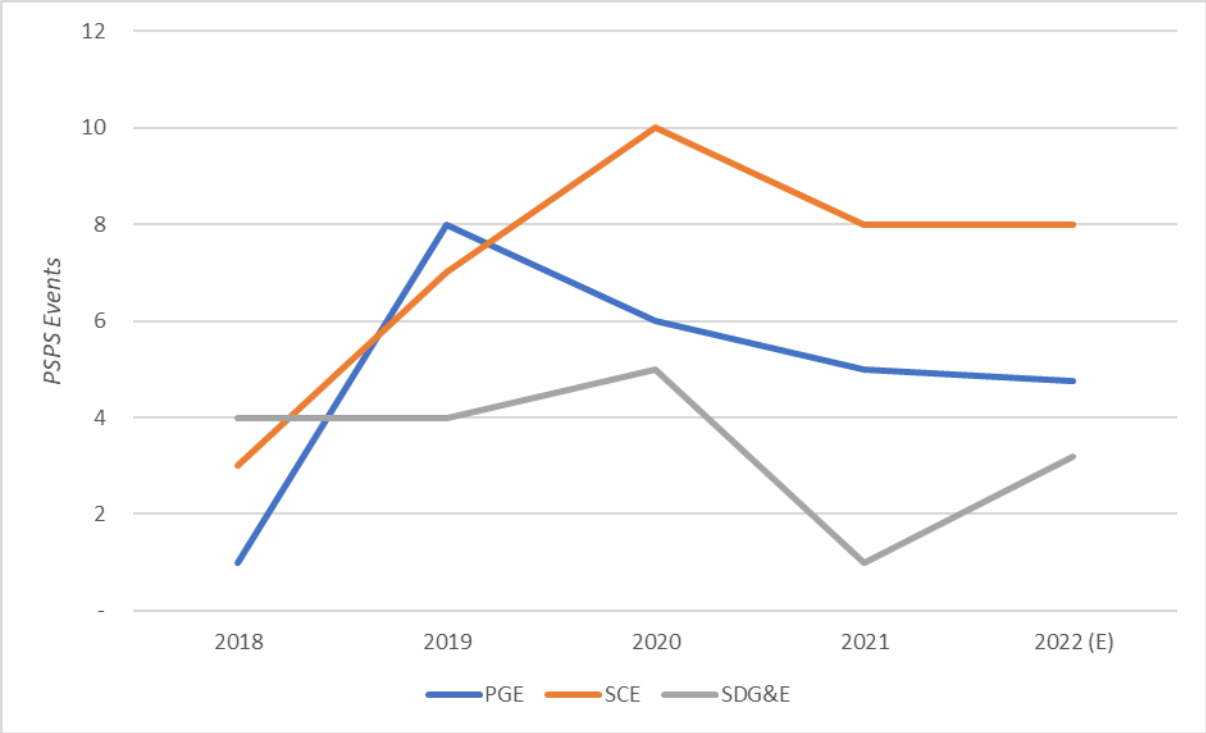


Figure 4.7-3: Recent Use of PSPS: Scope of PSPS Events (Total) by Overhead Circuit Mile – Large IOUs (2018-2021 Actual, 2022 Estimated)

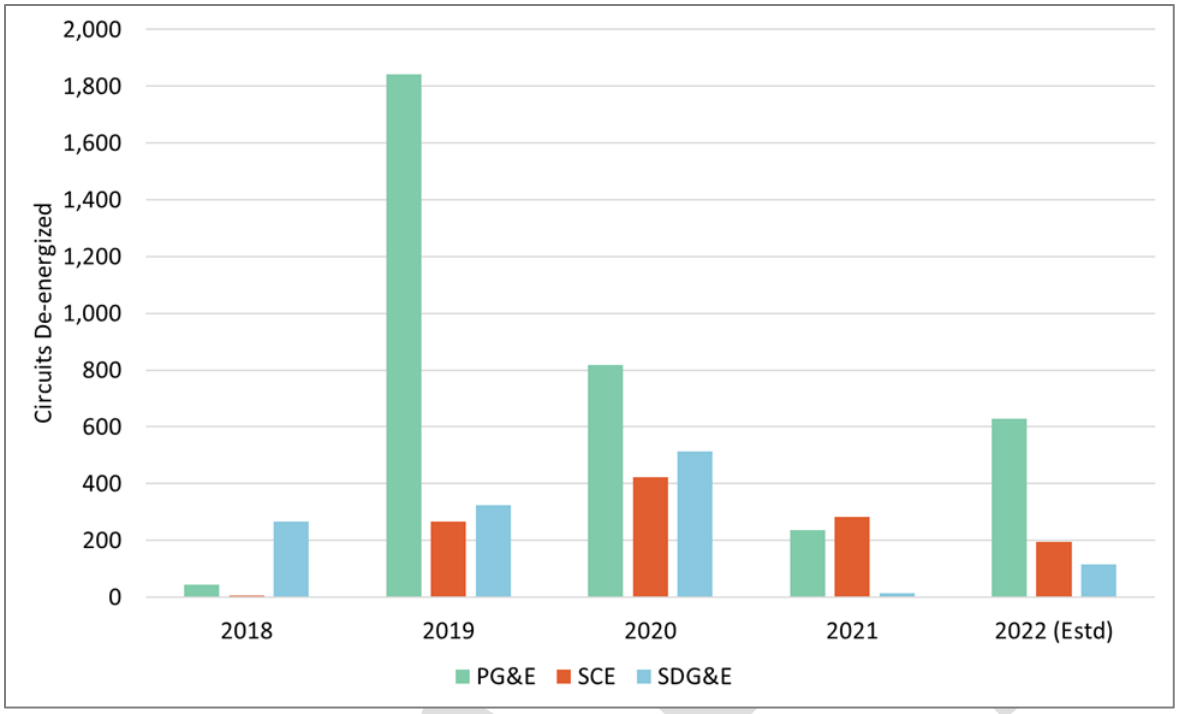
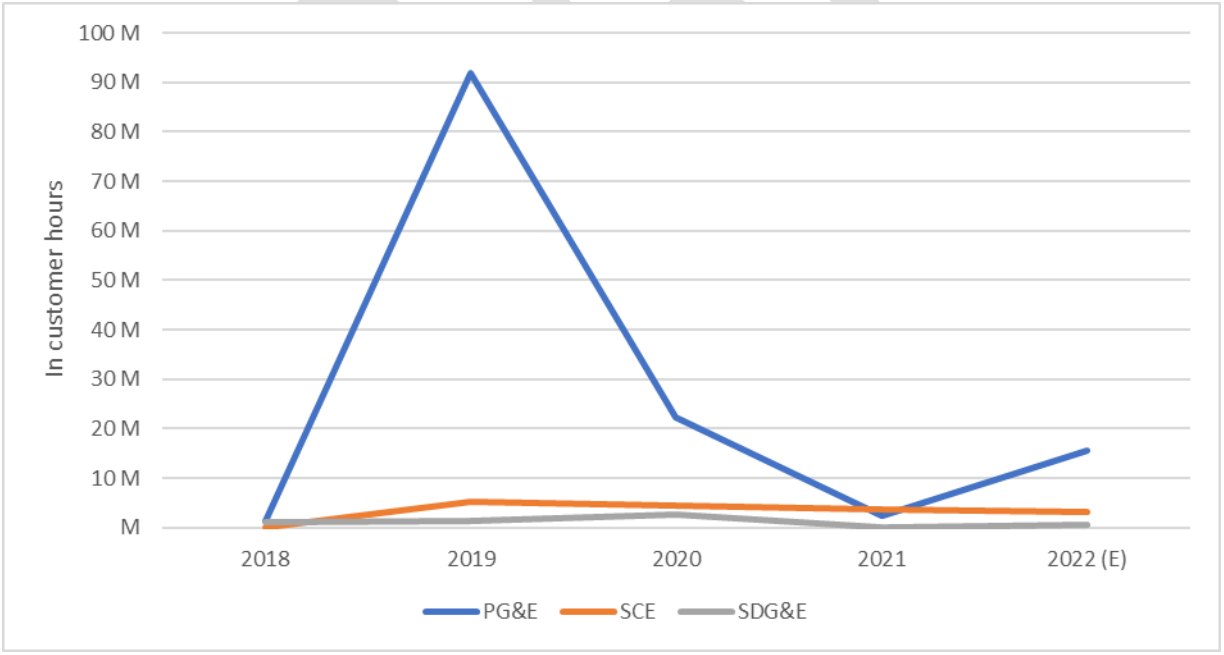


Figure 4.7-4: Recent Use of PSPS: Duration of PSPS Events (Total) – Large IOUs (2018-2021 Actual, 2022 Estimated)



PSPS Mitigation

In 2021, SDG&E implemented several strategies to minimize PSPS impacts across the highest fire risk areas in its service territory. These included strategic undergrounding, grid

sectionalization, and backup generation or battery storage programs. In its 2022 Update, SDG&E outlines a strategic vision including several mitigation initiatives to reduce the scale, scope, and frequency of PSPS in terms of number of customers impacted, as well as to mitigate the impacts for those losing electrical power.[183]

- SDG&E plans to reduce the impacts of PSPS on customers by using strategic undergrounding. The utility calculates that for each mile of undergrounding, 13 customers[184] will no longer be at risk of a PSPS event. SDG&E's plans to implement an average of 90 miles per year of strategic undergrounding would reduce the number of customers impacted by PSPS by approximately 1,170 customers to 11,170 customers per year over the next 10 years.[185]
    - SDG&E hardened over 100 miles of overhead lines in 2021.[186]
- SDG&E plans to continue installing sectionalization devices to increase the precision of conducting PSPS events on smaller line segments. It expects to install an average of 10 sectionalization devices per year and calculates that this may benefit 371 customers per device, reducing impacts for about 3,710 customers per year.[187]
    - The PSPS Sectionalizing Enhancement Program met the targets for 2021 and SDG&E has set targets for 2022. Regarding the sectionalizing prioritization methodology, no changes were made to this program in 2021, and none are expected to be made in 2022.[188]
- To reduce PSPS impacts on customers who need backup power SDG&E plans to continue its Generator Grant, Backup Power for Resilience, Emergency Backup

[183] Data Request OEIS-SDGE-22-001, Question 4.

[184] Per Public Utilities Code § 8370, "Customer" means a customer of a local publicly owned electric utility or of a large electrical corporation. A person or entity is a customer of a large electrical corporation if the customer is physically located within the service territory of the large electrical corporation and receives bundled service, distribution service, or transmission service from the large electrical corporation (from: https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PUC&division=4.1.&title&part&chapter=4.5.&article, accessed May 4, 2022). Although this code section defines "Customer" for purposes pertaining to microgrids, the definition is appropriate for purposes applicable herein.

[185] Data Request OEIS-SDGE-22-001, Question 4.

[186] SDG&E's 2022 Update, p. 352.

[187] Data Request OEIS-SDGE-22-001, Question 4.

[188] SDG&E's 2022 Update, p. 219.

Battery, and Standby Power Programs. SDG&E expects these programs to reduce PSPS impacts for approximately 2,000 customers per year with 20,000 customers seeing reduced PSPS impacts over 10 years.[189]

- SDG&E plans to expand its microgrid program to support more customers. It expects to complete two permanent renewable energy microgrid sites currently under construction by the first quarter of 2022. It plans to complete two additional microgrids by the end of 2022.[190]

SDG&E's 2022 Update describes a number of programs that aid in mitigating customer impacts of a PSPS event. These include customer backup power resiliency and microgrid programs, the PSPS sectionalizing enhancement program, and strategic undergrounding. Backup power provides emergency power to customers who are de-energized. Sectionalization and undergrounding configure and harden the system to potentially avoid de-energization from occurring on the mitigated portions of the grid. SDG&E reports that compared to 2020, 13,359 fewer customers were impacted by PSPS events in 2021, and 11,695 fewer are expected to be impacted in 2022.[191]

Protocols for De-Energization and Re-Energization

SDG&E's 2022 Update Section 8.2, Protocols on Public Safety Power Shut-Off, clearly describes SDG&E's protocols for PSPS de-energization and subsequent re-energization. The section provides a decision tree that depicts SDG&E's formal decision-making process.[192] SDG&E reports that it plans to make no fundamental changes, in terms of inputs to its decision-making process, in 2022.

SDG&E describes its real-time situational awareness input factors.[193] It indicates that its Wildfire Next Generation System-Operations (WiNGS-Ops) model—one input factor in determining whether to call a PSPS event—is in the development phase. It was first used in

[189] Data Request OEIS-SDGE-22-001, Question 4.

[190] SDG&E's 2022 Update, p. 220.

[191] SDG&E's 2022 Update, Table 8-4, Projected PSPS Reduced Impacts, p. 365.

[192] SDG&E's 2022 Update, Figure 8-1, PSPS Decision-Making Framework, p. 357.

[193] SDG&E's 2022 Update, pp. 358-362.

this capacity for the 2021 Thanksgiving PSPS event. The initial use of this model will be assessed in 2022.

SDG&E describes its re-energization process in detail in Section 7.3.6.5, Protocols for PSPS Re-Energization. The utility has a goal of restoring power within 24 hours from when it is safe to patrol. In 2021, to increase post-PSPS-event restoration efficiency, SDG&E used software to document and photograph damage and drone support where access is difficult or helicopter access is not possible. SDG&E says it will continue to refine protocols for PSPS re-energization in 2022.

With regard to forecasting:

- SDG&E continues to upgrade already highly accurate forecast capabilities. It is using machine learning to further improve granularity and forecast frequency of the wind gust models in the HFTD, as well as update weather models.
- Achievements in 2021 include an expanded, rebuilt, and upgraded weather station network and an enhanced ability to forecast fire threat.

With regard to risk assessment:

- SDG&E completed initial development of its WiNGS-Ops model in 2021. The model is built to compare wildfire and PSPS risks at the asset and segment levels at hourly intervals. The primary purpose of the model is to help inform decision makers in real time about these risks, which will guide risk-based de-energization decisions.[194]
- Related achievements include SDG&E's development of PoF and PoI models as inputs to the WiNGS-Ops model.

Community Engagement

In its 2021 Action Statement, Energy Safety indicated as an additional issue that SDG&E must demonstrate that its resiliency programs adequately cover all MBL and AFN customers in the HFTD.[195] In engaging and supporting vulnerable, marginalized, and at-risk communities, SDG&E reported the following progress:

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[194] SDG&E's 2022 Update, p. 129.

[195] Office of Energy Infrastructure Safety's Evaluation of 2021 Wildfire Mitigation Plan Update, San Diego Gas & Electric (Action Statement on 2021 Wildfire Mitigation Plan Update – SDG&E), p. 86.

- It increased the number of portable renewable generators available to MBL customers in the HFTD, expanded eligibility to include AFN customers, and strengthened support to tribes.[196]
- SDG&E expanded the Emergency Backup Battery Program for medically vulnerable customers.[197]
- By partnering with 211, SDG&E increased PSPS notifications for AFN customers and has significantly improved accessibility to target this audience.[198]
- In 2021, SDG&E provided additional training and resources to approximately 40 community-based organizations (CBOs) that serve the HFTD.[199]
- In its 2021 PSPS event, SDG&E notified all event-impacted MBL customers in advance.[200]
- SDG&E worked with Deaf Link[201] to convert all PSPS and outage notifications to accessible formats, including a video with an American Sign Language interpreter, an audio read-out, and a transcript.[202]

SDG&E indicates it has a strong relationship and coordinates with public safety partners throughout the year through wildfire preparedness meetings, with a focus on continuous improvement and discussion of enhancements.[203] In 2021, SDG&E:

- Released its public safety partner portal.
- Launched the Critical Facilities landing page, which allows customers to verify or request status as a critical facility and request a back-up power assessment.[204]

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[196] SDG&E's 2022 Update, p. 355.

[197] SDG&E's 2022 Update, p. 355.

[198] 211.org's website: https://www.211.org/ (accessed April 11, 2022).

[199] SDG&E's 2022 Update, p. 366.

[200] San Diego Gas & Electric Company (U 902-E) Public Safety Power Shutoff Post-Event Group Report for November 24 – November 26, 2021, p. A-18.

[201] Deaf Link's website: https://www.deaflink.com/ (accessed April 1, 2022).

[202] SDG&E's 2022 Update, p. 366.

[203] SDG&E's 2022 Update, p. 363.

[204] SDG&E's Critical Facilities web page: https://www.sdge.com/psps-critical-facilities (accessed April 5, 2022).

Frequently De-Energized Circuits (SB 533)

In its 2022 Update, SDG&E adequately addresses the new requirement to identify circuits that have frequently been de-energized and provides details on the measures taken, or planned to be taken, by the electrical corporation to reduce the need for, and impact of, future deenergization of those circuits.[205] It reports 17 circuits that have experienced three or more PSPS events in a calendar year since 2018 in Table 8.6-1 (2022 Update). SDG&E reports that it has taken the following steps to reduce the need for PSPS on these 17 circuits:

- Completing the undergrounding of 35.87 miles and overhead hardening of 103.95 miles on these circuits.
- Replacing, upgrading or adding 35 SCADA sectionalizing devices to these circuits.
- Planning an additional 101.13 miles of undergrounding and 54.71 miles of overhead hardening for 2022-2023 on these circuits.[206]

To date, SDG&E has taken initial steps to reduce the PSPS risk on these 17 frequently de-energized circuits. However, SDG&E does not prioritize these circuits highly enough in its forward-looking PSPS mitigation plan. This applies to the percent of PSPS risk reduced, percent of customers who will no longer be de-energized as a result of mitigation measures, and percent of circuit miles mitigated. For example, Circuit 79 is entirely in HFTD Tier 3 and has had more than 12 PSPS outage events from 2018 through 2021. SDG&E reports it has reduced only 12 percent of PSPS risk on Circuit 79. It states that completed mitigations on this circuit provide the potential for 14 percent fewer customers to experience loss of power due to need to not have to call a PSPS event. SDG&E has hardened 32 percent of the length of Circuit 79 by means of the following mitigation measures: completion of 3.38 miles of undergrounding, completion of 22.23 miles of overhead hardening, addition or replacement of six SCADA sectionalizing devices, and provision of backup power programs for 110

[205] Senate Bill No. 533, Chapter 244, An act to amend Section 8386 of the Public Utilities Code, relating to electricity: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB533 (accessed April 11, 2022).

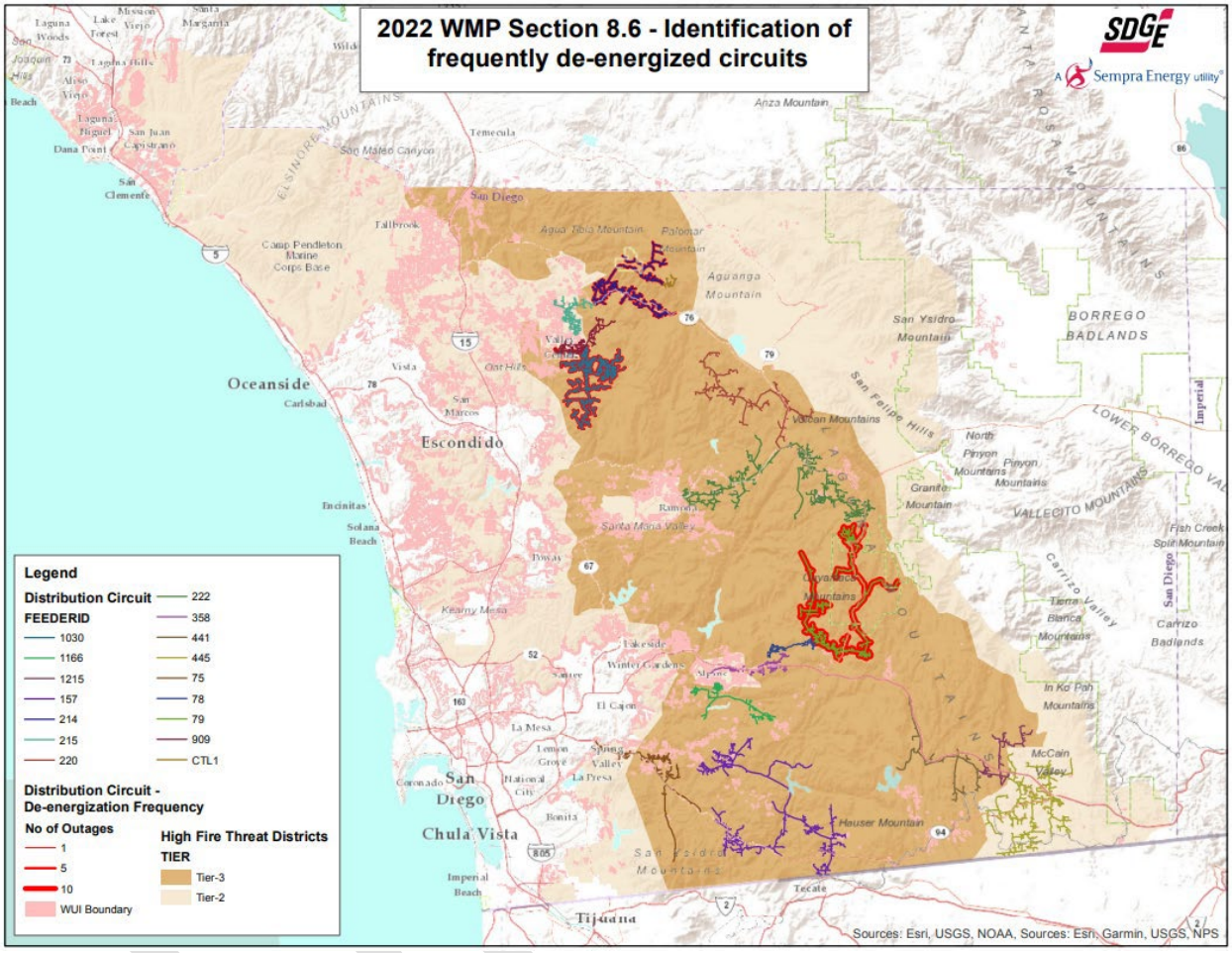
[206] SDG&E's 2022 Update, p. 369.

customers. For 2022-2023, SDG&E plans an additional 4.65 miles of overhead hardening on this circuit.[207]

SDG&E provides the required map of frequently de-energized circuits (Figure 4.7-5).

[207] Data Request OEIS-SDGE-22-006, Question 11.

Figure 4.7-5: Map of Frequently De-Energized Circuits (2021; source: SDG&E)[208]



4.7.3 Areas for Continued Improvement

In addition to progress made, SDG&E must continue to improve in the following areas.

WiNGS-Ops Enhancements

In its 2022 Update, SDG&E indicates that "WiNGS-Ops is at an early stage, and model outputs [in 2022 will] undergo heavy review, observation, and scrutiny."[209] SDG&E plans to improve the WiNGS model in 2022 in the areas of automation, user interface, and adding new inputs

[208] SDG&E's 2022 Update, Figure 8-4, Map of Frequently De-energized Circuits, p. 373.

[209] SDG&E's 2022 Update, p. 133.

and models, including integration of consequence modeling.[210] SDG&E must continue to rapidly evaluate the performance of the WiNGS-Ops model in the PSPS decision process. If SDG&E finds this model useful, it must incorporate it into the process for determining whether to call a PSPS event. This would include testing and confirming capabilities before the most anticipated critical PSPS "season" (the time of high fire danger weather, after September 1, 2022). SDG&E's planned WiNGS-Ops and WiNGS-Planning model enhancements are detailed in 2022 Update, Table 7-1, SDG&E's Near-Term Strategy and Goals by WMP Category.[211] SDG&E has indicated that PSPS risk reduction quantification through the WiNGS-Planning model does not include customers impacted by sectionalizing and resiliency programs.[212]

Frequently De-energized Circuit Prioritization

As mentioned above, SDG&E has identified 17 circuits with three or more PSPS events in a calendar year since 2018.[213] For each of these 17 circuits SDG&E has identified measures taken or planned to be taken to reduce the need for future PSPS events. [214] However, SDG&E must go further to reduce the risk of PSPS on these frequently de-energized circuits and should take steps to prioritize these circuits more highly within its forward-looking PSPS mitigation plan. SDG&E must take steps to significantly reduce the risk of PSPS on these circuits. [215]

Energy Safety sets forth specific areas for improvement and associated required progress in Section 7.

[210] SDG&E's 2022 Update, p. 198.

[211] SDG&E's 2022 Update, Table 7-1, SDG&E's Near-Term Strategy and Goals by WMP Category, p. 177.

[212] Data Request OEIS-SDGE-22-006, Question 11.

[213] Attachment 2: 2022 Wildfire Mitigation Plan Guidelines Template, Footnote 20: "Frequently de-energized circuit" has been defined in the glossary as "A circuit which has been de-energized pursuant to a de-energization event to mitigate the risk of wildfire three or more times in a calendar year," p. 83.

[214] SDG&E's 2022 Update, p. 372.

[215] SDG&E's 2022 Update, p. 372.

5. Next Steps

SDG&E is expected to continue to mature over the coming year. However, SDG&E must specifically demonstrate the required progress set forth in Section 7.

5.1 Change Orders

If SDG&E seeks to modify (reduce, increase, or end) WMP mitigation measures in response to data and results on electrical corporation ignition risk reduction impacts, SDG&E must submit a Change Order Report. At a high level, the objective of the change order process is to ensure the electrical corporation continues to follow the most effective and efficient approach to mitigating its wildfire risk. This could change as new information becomes available and as the electrical corporation gains experience and measures the outcomes of its initiatives. The Change Order Report must include significant shifts in the WMP starting from the date the WMP was submitted to Energy Safety for review.

The change order process is not the appropriate forum for the utility to change underlying assumptions, nor should the utility submit a change order that negates the strategic direction of its WMP. While Energy Safety promotes continued growth in response to new information, a utility should not make significant changes to its mitigation strategy over the course of the plan year.

The change order process provides a mechanism for the electrical corporation to make adjustments based on new information and experience. The goal of this process is to ensure that utilities make significant changes to their WMPs only if the utilities demonstrate these changes to be improvements per WMP approval criteria (i.e., completeness, technical feasibility, effectiveness, and resource use efficiency). Another goal of the change order process is to maximize Energy Safety's visibility and ability to respond to changes to the approved plan as efficiently and in as streamlined a way as possible. Finally, a change order allows the utility to explain whether a change is intentional or inadvertent.

Energy Safety will release further guidelines on the change order process in a separate document.

6. Consultation with the Office of the State Fire Marshal

The Office of the State Fire Marshal is a CAL FIRE program. Public Utilities Code Section 8386.3(a) requires Energy Safety to consult with the Office of the State Fire Marshal in reviewing electrical corporations' WMPs and WMP Updates. Energy Safety and CAL FIRE have a memorandum of understanding in place to facilitate this consultation.[216] The Office of the State Fire Marshal participated in all aspects of the evaluation, but this Decision does not purport to speak for the Office of the State Fire Marshal or CAL FIRE.

[216] Required by Public Utilities Code § 8386.5.

7. List of Utility Areas for Continued Improvement and Required Progress

Energy Safety evaluated 2022 Updates with a particular focus on how each utility is driving down the risk of utility-related ignitions. The evaluation included assessing the utility's progress implementing wildfire mitigation initiatives, evaluating the feasibility of its strategies, and measuring year-to-year trends. As a result of this evaluation, Energy Safety identified areas where the utility should continue to improve its wildfire mitigation capabilities in future plans. The complete list of all SDG&E's areas for continued improvement follows below.

- SDGE-22-01. Prioritized List of Wildfire Risks and Drivers.
  - Description: Currently, SDG&E's prioritized list of wildfire risks and drivers (Table 4-6) weights the risk drivers by average outage multiplied by ignition rate; it does not account for the likelihood of the ignition to cause a catastrophic wildfire.
  - Required Progress: In its 2023 WMP, SDG&E must further refine its prioritized list of wildfire risks and drivers. It must do so by weighting each risk driver by likelihood of causing a catastrophic wildfire (e.g., does this ignition tend to happen in high wildfire risk areas identified by SDG&E's risk models, including the HFTD).
  - Discussed in Section 4.3, "Lessons Learned and Risk Trends."

- SDGE-22-02. Collaboration and Research in Best Practices in Relation to Climate Change Impacts and Wildfire Risk and Consequence Modeling.
  - Description: SDG&E and the other large IOUs are currently pursuing their own efforts at integrating the potential impacts of climate change in their risk and consequence modeling. They are not actively collaborating with each other on these efforts nor taking advantage of the existing climate change modeling expertise of state agencies and academic institutions.

  - Required Progress: Prior to the submission of their 2023 WMPs, all electrical corporations (not including independent transmission operators) must participate in an Energy Safety-led scoping meeting to discuss how utilities can best learn from each other, external agencies, and outside experts. In addition, the climate change and risk modeling scoping meeting will identify future topics to explore regarding climate change modeling and impacts relating to wildfire risk. This scoping meeting may result in additional meetings or workshops or the formation a working group. Energy Safety will provide additional details on the specifics of this scoping meeting in due course.
  - Discussed in Section 4.3, "Lessons Learned and Risk Trends."

- SDGE-22-03. Utility Arborist Training Initiatives.
  - Description: SDG&E does not provide details on the scope of Utility Arborist training initiatives it is developing or supporting.
  - Required Progress: SDG&E must provide in its 2023 WMP more details on utility vegetation management workforce training initiatives it is developing and/or supporting. Details to include are as follows:
    - The number of people entering classes using the Utility Arborist Trainee curriculum at California community colleges and/or other training programs developed and/or supported by SDG&E.
    - The number completing the classes or other training programs.
    - The number of those completing the classes or other training programs subsequently joining the utility vegetation management workforce.
    - Any additional details on how SDG&E is addressing utility vegetation management labor constraints.
  - Discussed in Section 4.4, "Inputs to the Plan and Directional Vision for the WMP" (Section 4.4.2, "Workforce Planning").

- SDGE-22-04. Inclusion of Community Vulnerability in Consequence Modeling.
  - Description: SDG&E does not currently include the impacts of wildfire on communities, such as community vulnerability, within consequence modeling.
  - Required Progress: Prior to the submission of their 2023 WMPs, all electrical corporations (not including independent transmission operators) must participate in an Energy Safety-led scoping meeting to discuss how to best learn from each other, external agencies and outside experts. In addition, the

community vulnerability scoping meeting will identify future topics to explore regarding integration of community vulnerability into consequence modeling and impacts relating to wildfire risk. This scoping meeting may result in an additional meetings or workshops or the formation of a working group. Energy Safety will provide additional details on the specifics of this scoping meeting in due course.

  - Discussed in Section 4.6.1, "Risk Assessment and Mapping."

- SDGE-22-05. Fire Suppression Considerations.
  - Description: SDG&E's fire spread modeling does not currently factor in fire suppression effects (e.g., fire department efforts).
  - Required Progress: Prior to the submission of its 2023 WMP, SDG&E must work with other utilities to evaluate how to best account for, quantify, and model suppression effects on wildfire spread. Further guidance will be determined and covered during the risk model working group meetings established by Energy Safety's 2021 WMP Action Statements.
  - Discussed in Section 4.6.1, "Risk Assessment and Mapping."

- SDGE-22-06. Eight-Hour Fire Spread Simulations.
  - Description: SDG&E's eight-hour fire spread simulations may be impacting the accuracy of its wildfire spread consequence modeling.
  - Required Progress:
    - Prior to the submission of its 2023 WMP, SDG&E must benchmark against other utilities to account for catastrophic fire risk that occurs more than eight hours post-ignition and provide a summary of lessons learned in its 2023 WMP. Further guidance may be determined and covered within the risk model working group established by the 2021 WMP Action Statements.
    - In its 2023 WMP, SDG&E must include a description of resulting changes to its wildfire spread consequence modeling or anticipated changes and a timeline for implementation.
  - Discussed in Section 4.6.1, "Risk Assessment and Mapping."

- SDGE-22-07. Risk Prioritization for Mitigation Measures.

  - Description: SDG&E only calculated the cumulative top risk coverage estimates based on risk model output for covered conductor and undergrounding.
  - Required Progress: In its 2023 WMP, SDG&E must provide an update on its progress using risk model output to inform its initiative plans based on highest risk areas, including determination of top risk percentages, for all initiatives, including covered conductor and undergrounding.
  - Discussed in Section 4.6.1, "Risk Assessment and Mapping."

- SDGE-22-08. Evaluation of Wildfire Risk Outside of the HFTD.
  - Description: SDG&E has yet to evaluate the potential need for adjustment of the HFTD.
  - Required Progress: In its 2023 WMP, SDG&E must:
    - Analyze its service territory to determine if there are additional higher wildfire risk areas outside of the HFTD boundaries. SDG&E must include in its 2023 WMP its findings and a description of the analysis performed, including factors considered, and include any territory newly classified by SDG&E as high risk within the treatment area for its mitigation initiatives.
    - If it identifies any new areas of higher wildfire risk, SDG&E must provide a process outlining the formal steps necessary to have those areas considered for recognition in the CPUC-defined HFTD.[217]
  - Discussed in Section 4.6.1, "Risk Assessment and Mapping."

- SDGE-22-09. Evaluation of Wind Gust Effects on Vegetation-Related Failures.
  - Description: SDG&E does not currently account for wind gust effects within its vegetation probability of failure (PoF) model.
  - Required Progress: In its 2023 WMP, SDG&E must:

[217] Similarly to what occurred in the 2019 WMP review process, SCE was ordered to submit a "process for bringing its "High Fire Risk Areas" into conformity with the Commission's High Fire-Threat District area maps, or discuss in more detail why it should not be required to do so." (D. 19-05-038, p. 53) As a result, in August 2019 SCE submitted a petition to modify D. 17-12-024 to recognize SCE-identified HFRA as HFTD Tier 2 areas.

        - Provide a description of any analysis it has completed to evaluate the effects of wind gust effects on vegetation failures (including factors considered, weighing of various factors, and wind studies used) and provide a description of any additional analysis needed to evaluate wind gust effects on vegetation-related failures.
        - Provide an update on any changes made to its PoF model as a result of its analysis of wind gust effects on vegetation failures.
        - Provide a timeline for any future analyses on wind gust effects, as applicable, including reasoning for the need of future analysis, and cadence for performance of future analysis.
        - Provide a timeline for any future changes to its model related to wind gust effects.
    - Discussed in Section 4.6.1, "Risk Assessment and Mapping."

- SDGE-22-10. Wildfire Consequence Modeling Improvements.
    - Description: SDG&E has not yet improved its wildfire consequence modeling to allow the utility to be informed and respond in near real-time as faults/outages occur in the HFTD.
    - Required Progress: In its 2023 WMP, SDG&E must discuss how it explored and/or implemented using its wildfire consequence modeling on the locations of faults/outages in the HFTD as they happen. This should include incorporating considerations of the given risk for associated locations based on risk modeling and prioritizing response based on risk.
    - Discussed in Section 4.6.2, "Situational Awareness and Forecasting."

- SDGE-22-11. Applying Joint Lessons Learned Concerning Covered Conductor.
    - Description: SDG&E has not yet provided goals and timelines for implementing lessons learned from the covered conductor effectiveness joint study.
    - Required Progress: In its 2023 WMP, SDG&E must:
        - Provide a concrete list of goals with planned dates of implementation for any lessons learned in the covered conductor effectiveness joint study.
        - Provide a table indicating which WMP sections include changes (compared to its 2021 and 2022 Updates) as a result of the covered

conductor effectiveness joint study. This should include, but not be limited to:

- Changes made to covered conductor effectiveness calculations.
- Changes made to initiative selection based on effectiveness and benchmarking across alternatives.
- Inclusion of rapid earth fault current limiter (REFCL), open phase detection (OPD), early fault detection (EFD), and distribution fault anticipation (DFA) as alternatives, including for PSPS considerations.
- Changes made to cost impacts and drivers.
- An update on data sharing across utilities on measured effectiveness of covered conductor in-field and pilot results, including collective evaluation.

  - Discussed in Section 4.6.3, "Grid Design and System Hardening."

- SDGE-22-12. Covered Conductor Inspection and Maintenance.
  - Description: SDG&E lacks specific directives for inspection procedures regarding covered conductor inspection and maintenance.
  - Required Progress: All electrical corporations (not including independent transmission operators) must work to share and determine best practices for inspecting and maintaining covered conductor, including either augmenting existing practices or developing new programs. This should be considered as a continuation of the covered conductor study established by Energy Safety's 2021 WMP Action Statements. The study will continue to be utility-led, with the expectation for Energy Safety to be included as a participant.
  - Discussed in Section 4.6.3, "Grid Design and System Hardening."

- SDGE-22-13. New Technologies Evaluation and Implementation.
  - Description: SDG&E is not moving forward with its REFCL pilot and does not provide a plan for exploring new technologies that could increase effectiveness against ignition or wildfire risk.
  - Required Progress: All electrical corporations (not including independent transmission operators) must collaborate to evaluate the effectiveness of new technologies that support grid hardening and situational awareness such as REFCL and DFA/EDF, particularly in combination with other initiatives. Utilities

must also share practices and evaluate implementation strategies for these new technologies. This should be considered as a continuation of the covered conductor study established by Energy Safety's 2021 WMP Action Statements. The scope of this study should now be expanded to cover grid hardening overall. The study will continue to be utility-led, with the expectation for Energy Safety to be included as a participant.
    - Discussed in Section 4.6.3, "Grid Design and System Hardening."

- SDGE-22-14. Grid Hardening Decision-Making Process Transparency.
    - Description: SDG&E's description of how it selects mitigation initiatives based on risk factors lacks detail, such as how its listed considerations[218] affect initiative selection.
    - Required Progress: In its 2023 WMP, SDG&E must provide:
        - A description of its analysis of how it selects mitigation initiatives based on risk factors evident in certain locations. This should include how SDG&E selects mitigation initiatives to optimize risk reduction for specific ignition risks.
        - Details on how each consideration listed in Figure 7-4 row 3 "Desktop Feasibility" in SDG&E's 2022 Update is weighted, and how each consideration affects SDG&E's initiative selection for grid hardening.
    - Discussed in Section 4.6.3, "Grid Design and System Hardening."

- SDGE-22-15. Undergrounding Risk-Spend Efficiency Demonstration.
    - Description: SDG&E plans on ramping up future undergrounding efforts without adequately demonstrating cost-effectiveness based on specific ignition risks.
    - Required Progress: In its 2023 WMP, SDG&E, must provide a description of its decision-making process demonstrating risk/cost benefit analysis as it pertains to future undergrounding installations.

[218] SDG&E's 2022 Update, Figure 7-4, Grid Hardening Flowchart, p. 211. Considerations include geography, prior hardening, loading district, standards, land, environmental, easement constraints, PSPS improvements, line/reliability improvements, construction cost savings.

- Discussed in Section 4.6.3, "Grid Design and System Hardening."

- SDGE-22-16. Enabling Circuits with Advanced Protection.
  - Description: SDG&E has not been meeting its targets for enabling circuits with advanced protection.
  - Required Progress: SDG&E must explain how it will meet its current and future targets for enabling circuits with advanced protection and provide a detailed description of that plan in its 2023 WMP.
  - Discussed in Section 4.6.3, "Grid Design and System Hardening."

- SDGE-22-17. Further Development of Integrating Risk-Informed Decision Making for Inspection Scheduling and Planning.
  - Description: While SDG&E has some risk-informed prioritization for cyclical schedules (e.g., every three years) based on Tier 2 and Tier 3 designations, SDG&E has not yet implemented risk modeling-informed prioritization for its inspections.
  - Required Progress: In its 2023 WMP, SDG&E must provide a concrete timeline detailing when SDG&E plans to implement risk modeling-informed prioritization for each of its inspection types.
  - Discussed in Section 4.6.4, "Asset Management and Inspections."

- SDGE-22-18. Evaluation and Interpretation of "Other" Equipment Failures.
  - Description: Within Tables 7.1 and 7.2 (2022 Update), many of SDG&E's equipment failures are grouped in a category defined as "other," with some causes seemingly falling under other existing categories, or represented as "null."
  - Required Progress: In its 2023 WMP, SDG&E must provide a plan to reduce "null" causes, which includes:
    - A review of the categories that fall under "other" in order to ensure the categories accurately reflect the causes of equipment failures.
    - A clear justification for why causes are categorized as "other," including an explanation for why "weather related" causes are listed as such.
    - A breakout of the events that fall under "other."
  - Discussed in Section 4.6.4, "Asset Management and Inspections."

- SDGE-22-19. Plan to Address Missing Asset Data.
    - Description: Less than one percent of SDG&E's data on installation dates for older assets is missing, but SDG&E lacks a proactive plan to address the missing data.
    - Required Progress: In its 2023 WMP, SDG&E must:
        - Provide a plan, including a timeline, to obtain and address the missing installation dates within asset data. This includes developing a plan to determine missing installation dates and fill estimated installation dates into asset databases where possible.
            - Include an explanation for instances where installation dates cannot be estimated.
        - Evaluate whether using installation dates would increase predictability within the PoI and evaluate any additional causes for limitations on data quality.
    - Discussed in Section 4.6.4, "Asset Management and Inspections."

- SDGE-22-20. Progression of Effectiveness of Enhanced Clearances Joint Study.
    - Description: The 2021 Action Statements required the large IOUs to conduct a study assessing the effectiveness of enhanced clearances. Progress has been made in the study; however, the study must continue to progress.
    - Required Progress: By the submission of the 2023 WMPs, SDG&E, along with PG&E and SCE, must (1) standardize the data collection process for the cross-utility database of tree-caused risk events, (2) determine where and in what form the database will exist, (3) examine, to the best of their ability, whether the correlation between enhanced clearances and the lower number of tree-caused outage events may be attributable to other factors beyond clearances, such as the management of hazard trees and the installation of covered conductor. Energy Safety expects the large IOUs to make incremental progress and update their analyses with each WMP submission through at least 2025.
    - Discussed in Section 4.6.5, "Vegetation Management and Inspections."

- SDGE-22-21. Consideration of Alternatives to Fuels Treatment Activity.

  - Description: SDG&E's practice of removing dead or dying fine fuels within a 50-foot radius of selected poles is not a long-term solution to this particular wildfire mitigation challenge.
  - Required Progress: In its 2023 WMP, SDG&E must present an analysis of alternatives to its fuels treatment activity including consideration of, but not limited to, undergrounding, REFCL, and pole replacement (e.g., with steel). SDG&E must quantify the additional risk reduction achieved by removing dead or dying fine fuels within a 50-foot radius as compared to the Public Resources Code Section 4292 standard.
  - Discussed in Section 4.6.5, "Vegetation Management and Inspections."

- SDGE-22-22. Participation in Vegetation Management Best Management Practices Scoping Meeting.
  - Description: Vegetation management processes and protocols for the reduction of wildfire risk are not uniform across electrical corporations.
  - Required Progress: Prior to the submission of their 2023 WMPs, SDG&E and all other electrical corporations (not including independent transmission operators) must participate in an Energy Safety-led scoping meeting to discuss how utilities can best learn from each other and future topics to explore regarding vegetation management best management practices for wildfire risk reduction. This vegetation management best management practices scoping meeting may result in additional meetings or workshops or the formation of a working group. Energy Safety will provide additional details on the specifics of this scoping meeting in due course.
  - Discussed in Section 4.6.5, "Vegetation Management and Inspections."

- SDGE-22-23. PSPS Wind Threshold Change Evaluations.
  - Description: SDG&E has not yet evaluated PSPS threshold changes as a result of installing covered conductor.
  - Required Progress: In its 2023 WMP, SDG&E must:

        - Coordinate with other utilities[219] to understand the impacts of installing covered conductor and associated changes that could be made to PSPS thresholds as a result.
        - Provide a summary of key findings, including any changes implemented to SDG&E's PSPS procedures or practices.
        - Provide any studies completed by third-parties on wind speed thresholds for covered conductor, or, if not yet completed, a timeline for completion.
        - Provide a description and associated justification of any modifications to PSPS wind speed thresholds since the 2022 Update.
    - Discussed in Section 4.6.6, "Grid Operations and Operating Protocols, Including PSPS."

- SDGE-22-24. Replacing Protective Devices for Sensitivity Setting Capabilities.
    - Description: SDG&E does not have a plan to proactively replace old field devices to include protective device sensitivity setting capabilities.
    - Required Progress: In its 2023 WMP, SDG&E must evaluate whether it should replace field devices with sensitivity setting capabilities. SDG&E must include in this evaluation a survey of existing coverage and determination of which areas could benefit from replacements. The evaluation should assess the extent to which replacements for increased sensitivity settings would reduce ignition risk. If SDG&E determines that field device replacement would decrease ignition risk, SDG&E must create and implement a plan to do so. If SDG&E determines that replacement of field devices would not effectively decrease ignition risk, SDG&E must explain why it would not.
    - Discussed in Section 4.6.6, "Grid Operations and Operating Protocols, Including PSPS."

- SDGE-22-25. Validation of Vegetation Risk Index (VRI).

[219] "Other utilities" in this case being SCE and PG&E.

  - Description: SDG&E states that it does not conduct any standard verification or validation on the Vegetation Risk Index (VRI) because "this is not a predictive model but rather a qualitative index." Regardless of the nature of the index, if it is being used to drive decisions about PSPS as claimed, there should be evidence that there is in fact some relationship between the output and results (in this case, that the ratings of low/medium/high are correlated with increasing rates of vegetation-related outages).
  - Required Progress: SDG&E must:
    - Evaluate the VRI output and report on the results of that effort in its 2023 WMP.
    - Evaluate post-PSPS event data and compare to the VRI model to check for validity of output.
    - Adjust the model as needed based on lessons learned or provide a timeline and plan for associated adjustments.
  - Discussed in Section 4.6.7, "Data Governance."

- SDGE-22-26. Validation of Wildfire Risk Reduction Model (WRRM).
  - Description: SDG&E describes the validation of its WRRM as consisting only of visual verification by comparison using GIS software to determine that the results of the model "coincide with known conditions around the service territory." As described in its 2022 Update Section 4.5.1.3, the WRRM incorporates 10 separate data elements, many of which could be validated in a more robust fashion to determine sources and magnitude of uncertainty in the model.
  - Required Progress: SDG&E must determine which inputs to its WRRM can be more rigorously validated, conduct such validation, or provide a plan including a timeline to conduct such validation, and report on the results of that effort in its 2023 WMP.
  - Discussed in Section 4.6.7, "Data Governance."

- SDGE-22-27. Improvements to the Granularity of Vegetation Management-Related RSE Estimates.
  - Description: SDG&E's progress on the Maturity Survey for capability 39 under the Resource Allocation Methodology Section H.III "Process for determining

risk-spend efficiency of vegetation management initiatives" is limited by question H.III.b that asks "At what level can [RSE] estimates be prepared?"
    - Required Progress: In its 2023 WMP, SDG&E must provide a timeline with attainable benchmarks for preparing vegetation management-related RSE estimates at a circuit level.
    - Discussed in Section 4.6.8, "Resource Allocation Methodology."

- SDGE-22-28. Improvements to Capital Allocation Methodology.
    - Description: SDG&E's progress on the Maturity Survey for capability 41 under the Resource Allocation Methodology Section H.V "Portfolio-wide initiative allocation methodology" is limited by question H.V.a that asks "To what extent does the utility allocate capital to initiatives based on [RSE]?" Based on SDG&E's response to this question, the utility anticipates no progress on this question in 2022.
    - Required Progress: In its 2023 WMP, SDG&E must provide a timeline with attainable benchmarks for using accurate RSE estimates to determine capital allocation at a portfolio level.
    - Discussed in Section 4.6.8, "Resource Allocation Methodology."

- SDGE-22-29. Improvements to the RSE Verification Process.
    - Description: SDG&E does not currently, nor does it plan to, verify its RSE estimates with independent experts or other utilities in California.
    - Required Progress: In its 2023 WMP, SDG&E must provide a timeline with attainable benchmarks to verify its RSE estimates with independent experts or other utilities in California.
    - Discussed in Section 4.6.8, "Resource Allocation Methodology."

- SDGE-22-30. Mitigation Plan for Frequently De-Energized Circuits.
    - Description: SDG&E does not go far enough in its plans to reduce the future risk of PSPS on its most frequently de-energized circuits, identified in Table 8.6-1 (2022 Update).
    - Required Progress: In its 2023 WMP, SDG&E must demonstrate that it is planning to achieve a greater level of PSPS risk reduction on the frequently de-energized circuits identified in Table 8.6-1. This must include a greater

percentage of risk reduction, a higher percentage of customers who will no longer be de-energized, and a greater percentage of circuit miles mitigated.[220]
    - Discussed in Section 4.7, "Public Safety Power Shutoff (PSPS), Including Directional Vision for PSPS."

- SDGE-22-31. Improvements to the WiNGS-Ops and WiNGS-Planning Models.
    - Description: SDG&E indicates it is planning enhancements to its WiNGS-Ops model in 2022. Additionally, SDG&E indicates that the WiNGS-Planning model does not include customers impacted by sectionalizing and resiliency programs.
    - Required Progress: In its 2023 WMP, SDG&E must provide a progress report on the performance of WiNGS-Ops as used in its 2022 PSPS decision-making process, including successes, issues encountered, and lessons learned.
        - In particular, SDG&E must include in its report the progress it made prior to September 1, 2022, in incorporating WiNGS-Ops in the PSPS decision-making process.
        - SDG&E must also report any progress it made on incorporating PSPS risk reduction quantification to include customers impacted by sectionalizing and resiliency programs through the WiNGS-Planning model.
    - Discussed in Section 4.7, "Public Safety Power Shutoff (PSPS), Including Directional Vision for PSPS."

[220] SDG&E's 2022 Update, Table 8.6-1,"Identification of Frequently De-Energized Circuits, pp. 369-372.

8. Conclusion

SDG&E's 2022 Update is approved.

Catastrophic wildfires remain a serious threat to the health and safety of Californians. Electrical corporations, including SDG&E, must continue to make progress toward reducing utility-related ignition risk. Energy Safety expects SDG&E to effectively implement its wildfire mitigation activities to reduce the risk of utility-related ignitions and the potential catastrophic consequences if an ignition occurs, as well as to reduce the scale, scope, and frequency of PSPS events. SDG&E must meet the commitments in its 2022 Update and fully comply with the conditions listed in this Decision to ensure it meaningfully reduces utility-related ignition and PSPS risk within its service territory.

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Office of Energy Infrastructure Safety

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APPENDICES

Appendices

Appendix A. Status of 2021 WMP Issues

Energy Safety's 2021 Update Action Statement for each utility contained a set of "issues" and associated "remedies." Each issue was categorized into one of three groups:

- *Critical issues* were those for which Energy Safety issued a Revision Notice to the utility, with required remedies. The utility submitted a revised Update addressing the critical issues, and Energy Safety re-evaluated the Update with the utility's revisions. Upon that review, issues may have been downgraded to either "key areas for improvement," "additional issues" or were fully resolved.
- *Key areas for improvement* were areas Energy Safety identified as significant to reducing utility-related wildfire risk. Energy Safety provided remedies that utilities were required to address over the course of the year. Utilities were required to report on progress in these key areas in a progress report submitted to Energy Safety on November 1, 2021.
- *Additional issues* were those Energy Safety identified as areas for continued improvement to increase the maturity of the utility's wildfire mitigation capabilities. Energy Safety provided remedies that utilities were required to address over the course of the year. Utilities were required to report on progress in the 2022 Update.

Issues identified in 2021 either have been resolved or are incorporated in 2022 areas for continued improvement. The 2021 key areas for improvement are listed in Table A-1. The status column indicates whether each has been fully remedied. If not, the column notes where to find more information in this Decision.

Table A-1. SDG&E 2021 Key Issues Status

Issue #	Title	Status
SDGE-21-01	Ignition Sources in Risk Modeling and Mitigation	Utility sufficiently addressed the required remedy. For a related area for continued improvement, see Section 4.6.1 of this Decision.
SDGE-21-02	Wildfire Risk Modeling	Utility has sufficiently addressed the required remedy thus far; Energy Safety will continue to monitor progress.
SDGE-21-03	Effectiveness of Covered Conductor	Utility has sufficiently addressed the required remedy thus far; Energy Safety will continue to monitor progress. For discussion of progress and related areas for continued improvement, see Section 4.6.5.3 of this Decision.
SDGE-21-04	Effectiveness of Enhanced Clearances	Utility has sufficiently addressed the required remedy thus far; Energy Safety will continue to monitor progress. For discussion of progress and related areas for continued improvement, see Section 4.6.5.3 of this Decision.
SDGE-21-05	Vegetation Species and Record Keeping	Utility sufficiently addressed the required remedy. Energy Safety will monitor compliance through quality checks of SDG&E's Quarterly Data Reports.
SDGE-21-06	Quantitative Analysis to Identify "At-Risk" Species	Utility sufficiently addressed the required remedy.
SDGE-21-07	Quantified Vegetation Management Compliance Targets	Utility sufficiently addressed the required remedy.

SDGE-21-08	Non-Communicative Remote-Controlled Switches	Utility sufficiently addressed the required remedy. For more information, see Section 4.6.6 of this Decision.
SDGE-21-09	SDG&E's Decision-Making Process	Utility sufficiently addressed the required remedy. For related areas for continued improvement, see Sections 4.6.3 and 4.6.4 of this Decision.
SDGE-21-10	Prioritization of HFTD in Undergrounding and Covered Conductor Mitigation Efforts	Utility sufficiently addressed the required remedy. For more information, see SDG&E Progress under Sections 4.6.1 and 4.6.3 of this Decision.
SDGE-21-11	RSE Values Vary Across Utilities	Utility has sufficiently addressed the required remedy thus far; Energy Safety will continue to monitor progress.

Appendix B. Energy Safety Data Request Responses

The following are Energy Safety data requests and SDG&E's responses referenced in the Decision above.

All 2022 data requests received and responded to by SDG&E are available on its 2022 Update web page: https://www.sdge.com/2022-wildfire-mitigation-plan.

Regarding: Vegetation Management

Data Request: OEIS-SDGE-22-001 (Question 3)

Request date: February 22, 2022

Request:

Q03. Regarding Vegetation Management:

a. Table 5-2 provides SDG&E's program metrics including targets and performance. Why did SDG&E fall about 25% short of its 2021 target for "perform enhanced inspections, patrols, and trimming"?
   i. Additionally, provide a table on the model of the example below, identifying the reasons why SDG&E fell short of this target and the portion of the target affected by that reason.

Constraint Category	**Constrained Miles**
Land or Environmental Hold	
Customer Refusals or Non-Contacts	

Permitting & Operational Holds	

b. Under 7.3.5.15, Identification and remediation of "at-risk species," SDG&E states that during this WMP cycle its enhanced vegetation management program is projected to reduce 0.44 ignitions by the end of 2022. Considering projected ignitions in Tier 2 and Tier 3, what is the projected ignition from vegetation contact reduction percentage attributed to enhanced vegetation management? For example: 0.44/ "Projected ignitions caused by veg contact (distribution) for 2020-2022 in Tier 2+3" = x.
c. On page 97, SDG&E says its Vegetation Risk Index (VRI) is instrumental for PSPS decision making. In this Section (4.5.1.2) there is no mention of VRI's use in informing vegetation management initiatives. On page 189, SDG&E says VRI is a "decision-making regarding enhanced vegetation management work." There are also several mentions of how SDG&E plans to use VRI in the future. Clarify how VRI is currently used and will be used in executing SDG&E's WMP in 2022.
    i. Is VRI currently used to prioritize high-risk areas for VM initiatives, such as inspections and enhanced vegetation management?
        (1) If so, which VM initiatives?

Response date: February 25, 2022

Response:

a. The enhanced vegetation program includes trims and removals of targeted species within the HFTD. SDG&E's original target in 2020 and 2021 for this metric was approximately 17,000 trees annually. That original target was derived based on the known total population of "targeted species" in the HFTD (approximately 85,000) and a 5-year period for initial enhanced vegetation management efforts. In setting the target, SDG&E assumed that all 85,000 trees of the "targeted species" would be subject to enhanced trimming each year over a 5-year period – thus 85,000 trees/5 years would result in 17,000 enhanced trims annually. In putting the program in practice, however, upon performing enhanced inspections of the 17,000 trees for the year, either not all of them required enhanced pruning, or in some cases enhanced pruning was not possible. Thus, SDG&E did complete the necessary inspections, but the number of trims deemed necessary was less than SDG&E forecasted.

In 2022, SDG&E modified the annual target to approximately 12,500 trees, recognizing based on the aforementioned experience that not all trees within the original target would require trimming in any given year. The revised methodology for determining the target number of trees to perform enhanced trimming each year includes those trees that were either:

- trimmed at least 5 of the last 10 years, *or*
- trees which had no previous enhanced trim within the last 10 years, and with a current line clearance < 8 feet

The tree removal forecast was derived using the average number of removals in 2020 and 2021.

i. The reason for not reaching the target was not due to constraints to perform the work. Per the response above, the forecast target was modified downward in 2022 from the original 17,000/year based on experience implementing the program. The 25% reduction in the actual number was not a result of constraints to perform the work, but rather the determination that the inspected trees did not require enhanced trims. SDG&E did not experience an unusual number of land constraints or customer refusals related to its enhanced vegetation management program in 2021 – the constraints described in the table were proportional to SDG&E's regular vegetation management efforts.

Using the table below

Constraint Category	**Constrained Miles**
Land or Environmental Hold	
Customer Refusals or Non-Contacts	

Permitting & Operational Holds	

b. Table 7-31 on page 298 details the calculation for the ignitions reduced due to the enhanced vegetation management program. The 0.44 ignitions number is a cumulative total for the three-year WMP period (2020-2022). The projected ignitions for the vegetation contact driver (distribution) is 1.53 ignitions between 2020-2022. Using the equation provided in the question, that would result in 0.44/1.53 = 28.8% reduction percentage attributed to enhanced vegetation management.

c. As indicated in the 2022 WMP Update, the VRI is currently a qualitative tool that can be used to focus vegetation management operations, however, is not a predictive model. The VRI is currently used in vegetation management to identify which specific circuit line segments have a low, medium, or high VRI rating. This information is displayed visually as a map layer within SDG&E's work management tool. Pre-inspectors can utilize the map layer as an added element to aid in assessing relative risk (qualitatively) during routine inspection activities. Additionally, SDG&E may use the VRI to perform targeted, off-cycle inspections to identify where additional abatement measures may be warranted. SDG&E hopes to refine the VRI model by integrating LiDAR information to provide a more complete data set of strike potential trees.

Regarding: PSPS Lessons Learned

Data Request: OEIS-SDGE-22-001 (Question 4)

Request date: February 22, 2022

Request:

Q04. Regarding PSPS Lessons Learned:

a. In Section 8.1 "Directional Vision for Necessity of PSPS," the 2022 Wildfire Mitigation Plan Update Guidelines Template directs utilities to "[d]escribe any lessons learned from PSPS since the last WMP submission and describe expectations for how the utility's PSPS program will evolve over the coming 1, 3, and 10 years" (p. 79). While SDG&E describes recent progress in its 2022 WMP Update with a significant focus on the past year, it doesn't describe its expectations for the future. There is some relevant information in Table 8.1-1 "Anticipated Characteristics of PSPS Use Over Next 10

Years" (p. 353), however, Energy Safety is seeking to understand the broad, organization-wide vision for the future. Where can this information be found in the WMP Update?

i. If this information can't be found in the WMP Update, please provide it.

Response date: February 25, 2022

Response:

To further elaborate on the efforts and vision described in the 2022 WMP Update including Section 8 and Attachment A – Long Term Visison, SDG&E is continuously exploring ways to improve its PSPS programs across the enterprise – from meteorology to customer programs to grid hardening. SDG&E has outlined several initiatives in the 2022 WMP Update designed to reduce the number customers impacted by PSPS and mitigate the impacts of PSPS for those who may continue to experience them. SDG&E uses PSPS as a last-resort tool to reduce wildfire risk in extreme circumstances. But it may be impossible to eliminate the use of PSPS as a result of ongoing changes to the climate and the cost-efficiencies of hardening efforts such as undergrounding, as discussed in SDG&E's 2022 WMP Update.

In an effort to maintain the safety of our customers while mitigating future wildfire risk, some examples of our evolution over the next ten years based on our current trajectory are:

- Strategic undergrounding – average of 90 miles per year, 13 customers per mile will reduce customer impacts by approximately 1,170 customers per year and 11,170 customers over the next ten years.
- PSPS Sectionalizing – average of 10 devices installed per year, 371 customers per device will reduce customer impacts by approximately 3,710 per year. SDG&E will continue to investigate the locations with the largest impact to deploy these sectionalizing devices as more PSPS data is gathered over the next ten years.
- Customer Generation Programs – continuing to offer programs to our customers for backup generation or battery storage will reduce PSPS impacts to approximately 2,000 customers per year. Knowing that the rate of participation in these programs will reduce over time, we can anticipate a maximum of 20,000 customers seeing reduced PSPS impacts over ten years.

Having one of the leading Meteorology teams in the nation has put SDG&E at the forefront of predictive weather and fire risk modeling. In addition to all of the technological advances the Meteorology team has made and continues to make, SDG&E has been rebuilding existing weather stations to provide 30-second reads on wind speed data and adding particulate

sensors to provide additional information around air quality. This will allow SDG&E to more strategically pinpoint fire weather impacts and execute PSPS events with increased precision.

SDG&E continues to focus on the safety and comfort of our customers. In order to limit the impacts of PSPS events to our customers, we have participated in customer generation programs that provide portable or fixed generators and backup batteries to our most vulnerable customers. In recent years, SDG&E has increased customer engagement and communications surrounding PSPS events. Looking forward, SDG&E will continue to engage the community and make enhancements to the PSPS notification process based on community feedback.

Regarding: Expulsion Fuses

Data Request: OEIS-SDGE-22-002 (Question 3)

Request date: March 1, 2022

Request:

Q03. Regarding expulsion fuses:

a. Please provide SDG&E's timeline for replacing the remaining Tier 2 and Tier 3 expulsion fuses, broken down by replacements completed per year.

Response date: March 4, 2022

Response:

SDG&E will complete the replacement of all remaining Tier 2 and Tier 3 expulsion fuses, totaling approximately 286 fuse replacements, in 2022. Of the 286 fuse replacements currently scoped, 231 are Tier 2 and 55 are Tier 3.

Regarding: Attachment B Table 7.1: Key Recent and Projected Drivers of Risk Events

Data Request: OEIS-SDGE-22-002 (Question 4)

Request date: March 1, 2022

Request:

Q04. Regarding Attachment B Table 7.1: Key recent and projected drivers of risk events:

a. As shown in Row 14, why does SDG&E predict an increase in wire down events from splice damage or failure in 2023?
b. What is covered in the "Other" category in Rows 20, 39, 65, and 91?
c. What is the cause for the increase in 2021 for "Other" outage causes as seen in Row 65?

Response date: March 4, 2022

Response:

a. This is a data entry error. SDG&E has no wire down events from splice damage or failure in the previous seven years and does not forecast any in 2023.

b. The "Other" category in rows 20, 39, 65, and 91 include the following SDG&E defined cause codes:

Row	Driver	Cause Codes
20	Wire Down due to Equipment/Facility Failure - Other Distribution	• "Weather Related" cause code related to a wire down and the "Damaged Device" field from reliability data is null or not listed as a driver, such as fuse or cutout • "Wire Down" cause code when the "Damaged Device" field from reliability data is null or not listed as a driver, such as fuse or cutout
65	Outage due to Equipment/Facility Failure – Other Distribution	• "Weather Related" cause code and the "Damaged Device" field from reliability data is null or not listed as a driver, such as circuit breaker • "Wire Down" cause code when the "Damaged Device" field from reliability data is null or not listed as a driver, such as circuit breaker

39	Wire Down Event – Equipment/Facility Failure - Other Transmission	• "6020-Conductor" cause code but notes of the outage state the origin of the fault was something else such as static wire
91	Outage – Equipment/Facility Failure - Other Transmission	• "6999 - Other Transmission Equipment" cause code which can include items such as computer malfunction

c. SDG&E experienced severe weather events in Q3 and Q4 of 2021. The "Lightning Arrester/Transformer Failure (Weather Related)" cause code saw an increase during these events leading to the increased outages during this period.

Regarding: Equipment Failures at the Distribution Level

Data Request: OEIS-SDGE-22-002 (Question 5)

Request date: March 1, 2022

Request:

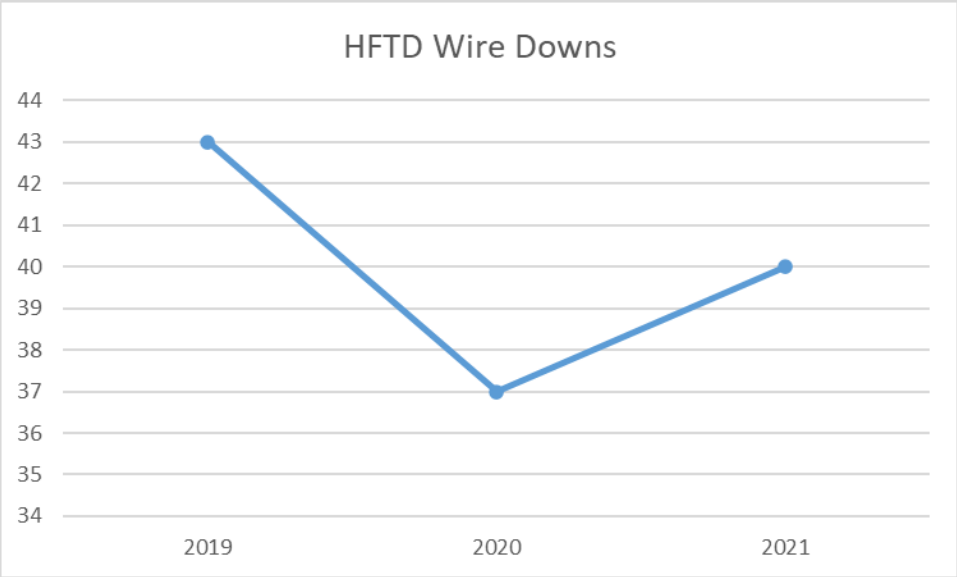
Q05. Regarding equipment failures at the distribution level:

a. How is SDG&E planning on addressing the wildfire risk presented by the following equipment failures at the distribution level, which showed increase wire down and/or outage events in 2021?
   i. Describe any root cause analyses evaluating the cause for the increases in 2021 and any associated changes in maintenance or inspections from lesson learned in 2021:
      (1) Connectors/connection devices
      (2) Capacitor banks
      (3) Lightning arrestors
      (4) Crossarms
      (5) Transformers

Response date: March 4, 2022

Response:

i. SDG&E has been reviewing the wire down data and has noted the increase in 2021 over 2020. When looking at only HFTD wire-downs, which include the areas of highest fire risk and where the WMP mitigations take place, SDG&E has shown a downward trend since the implementation of its WMP in 2019. SDG&E has an Electric Risk Assessment team that meets monthly to review wire down events and corrective actions across the service territory. Through this team and the WMP, SDG&E will continue to monitor its performance in this area and analyze where improvement is needed.



To reduce the number of wire down events in future years, SDG&E will continue to implement the grid hardening and inspection mitigations that reduce the risk of wire downs across the stated drivers including:

(1) Connectors/connection devices - Hot Line Clamp Replacements (7.3.3.10), Distribution Overhead Hardening (7.3.3.17.1), Covered Conductor (7.3.3.3), Undergrounding (7.3.3.16), Detailed Inspections (7.3.4.1), HFTD Tier 3 Inspections (7.3.4.9.1), and Drone Inspections (7.3.4.9.2)

(2) Capacitor banks - Capacitor Replacements (7.3.3.1), Distribution Overhead Hardening (7.3.3.17.1), Covered Conductor (7.3.3.3), Undergrounding (7.3.3.16),

Detailed Inspections (7.3.4.1), HFTD Tier 3 Inspections (7.3.4.9.1), and Drone Inspections (7.3.4.9.2)

(3) Lightning arrestors - Lightning Arrester Replacements (7.3.3.18.2), Distribution Overhead Hardening (7.3.3.17.1), Covered Conductor (7.3.3.3), Undergrounding (7.3.3.16), Detailed Inspections (7.3.4.1), HFTD Tier 3 Inspections (7.3.4.9.1), and Drone Inspections (7.3.4.9.2)

(4) Crossarms - Distribution Overhead Hardening (7.3.3.17.1), Covered Conductor (7.3.3.3), Undergrounding (7.3.3.16), Detailed Inspections (7.3.4.1), HFTD Tier 3 Inspections (7.3.4.9.1), and Drone Inspections (7.3.4.9.2)

(5) Transformers - Distribution Overhead Hardening (7.3.3.17.1), Covered Conductor (7.3.3.3), Undergrounding (7.3.3.16), Detailed Inspections (7.3.4.1), HFTD Tier 3 Inspections (7.3.4.9.1), and Drone Inspections (7.3.4.9.2)

Regarding: Covered Conductor Inspection and Maintenance

Data Request: OEIS-SDGE-22-003 (Question 1)

Request date: March 2, 2022

Request:

Q01. Regarding Covered conductor inspection and maintenance:

a. Please provide all supporting materials and procedures details specific to covered conductor maintenance and inspections. Include demonstration of adjustments or improvements to existing programs, if any have been made; any specific portions of SDG&E's inspection checklists relating to covered conductor compared to bare conductor, and statistics of inspections performed for covered conductor.

Response date: March 7, 2022

Response:

SDG&E does not currently have a separate standard or training for covered conductor inspections. SDG&E utilizes structure-based inspection cycles where all equipment on the associated structure is inspected at that time, including the conductor. The infractions that are being coded by the inspectors do not vary with conductor type.

Regarding: "Other" category in Response to OEIS-SDGE-22-002 Q4 Attachment B Table 7.1: Key Recent and Projected Drivers of Risk Events

Data Request: OEIS-SDGE-22-004 (Question 1)

Request date: March 10, 2022

Request:

Q01. Regarding the "Other" category in response to OEIS-SDGE-22-002 Q4 Attachment B Table 7.1: Key recent and projected drivers of risk events:

a. Please provide the number and percentage of each cause code under "Other" as referenced in OEIS-SDGE-22-002 Response 4.

b. If a field is null or not provided, how does "Other" differ from "Unknown"?

Response date: March 15, 2022

Response:

a. Please see the table below for the number and percentage of each cause code under "Other" as referenced in OEIS-SDGE-22-002 response 4.

Distribution Wire down			
Cause	Cause Description	Total outages	Ratio
510	Conductor contact/wire slap	19	6.62%
526	Guy wire/anchor failure	1	0.35%
550	Transformer faulted/mechanical	1	0.35%
408	Ice or snow/Equipment failure	2	0.70%
410	Lightning/arrester/xfmr failure (weather related)	12	4.18%
544	Switch faulted/mechanical	3	1.05%
517	Tee (dead break) failure	2	0.70%
532	Pole - contact/damage/broke/rotted/on fire	17	5.92%
518	Cutout failure	6	2.09%
412	Wire slap/pole down/wire down (weather related)	84	29.27%

204	Customer trouble/request	1	0.35%
214	Deenergized for safety	1	0.35%
314	Foreign object in distribution line	1	0.35%
515	OH connector failure (jumper/splice/squeeze-on)	1	0.35%
512	Faulted cable	2	0.70%
550	Transformer faulted/mechanical	3	1.05%
206	Fire	5	1.74%
214	Line-Xfmr deenerg for safety	5	1.74%
Null	Null (secondary cause field only)	121	42.16%

Transmission Wire Down			
Cause	Cause Description	Total outages	Ratio
6020	Conductor - Notes includes static wire	2	100%

Other Distribution			
Cause	Cause Description	Total outages	Ratio
404	Circ. Flashover/storm/high winds/undet.	1	0.67%
408	Ice or snow/Equipment failure	2	1.34%
410	Lightning/arrester/xfmr failure (weather related)	145	97.32%

517	Tee (dead break) failure	1	0.67%

Outage - Transmission			
Cause	Cause Description	Total outages	Ratio
6999	Other Transmission Equipment	3	100%

b. The "Other" category does not contain any Undetermined primary cause codes but does contain secondary cause fields that are blank or null. The primary cause field cannot be blank or null. If SDG&E cannot determine the cause of an outage, then those outages are categorized as Undetermined in the primary cause field. Not all outages will have a secondary cause which will result in a blank or null secondary cause field. When a secondary cause is known, the field will be populated with the appropriate cause code. An Undetermined cause code is not used in the secondary cause field.

Regarding: Aggregated Targets Presented by SDG&E in a PSPS Workshop on February 25, 2022

Data Request: OEIS-SDGE-22-004 (Question 2)

Request date: March 10, 2022

Request:

Q02. Regarding aggregated targets presented by SDG&E in a PSPS workshop on February 25, 2022:

SDG&E presented the following 2021 and 2022 targets:

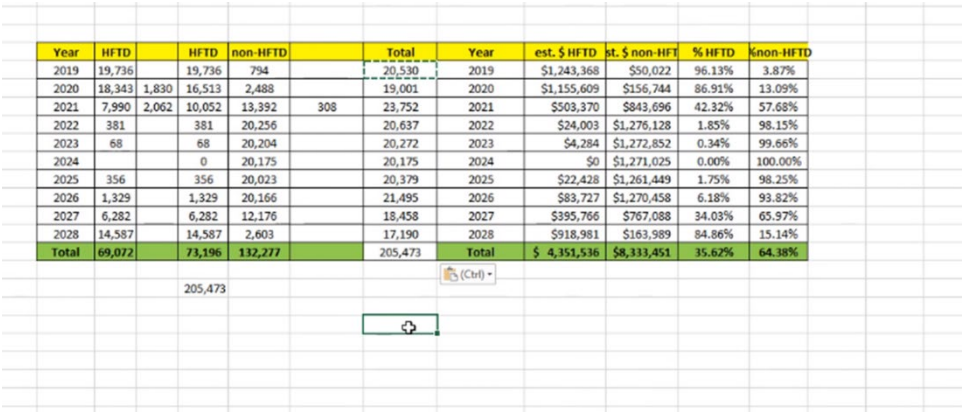
- Asset install/Replacement: 2021 target 7,176; 2022 target 4,325
- Distribution inspections: 2021 target 169k; 2022 target 151k
- Transmission inspections: 2021 target 19,638; 2022 target 16,707

a. Explain why SDG&E has decreased its targets for 2022 for each respective category.
b. Provide a breakdown of all initiatives aggregated into these targets, including the associated targets for each initiative (i.e., types of assets being installed and replaced).

Response date: March 15, 2022

Response:

a. The decreased targets for each respective category are driven by:
   - Asset install/replacement: The reduction is driven by the completion of the HFTD fuse replacements program. SDG&E is expected to complete all fuse replacements within the HFTD in 2022 leading to a reduction in units from 3,976 in 2021 to 277 in 2022.
   - Distribution inspections: Distribution inspections are performed on a multi-year cycle, and the annual targets will fluctuate year to year. In 2021 and previous years more wood pole intrusive inspections were scheduled for completion within the HFTD, while in 2022 SDG&E's wood pole intrusive inspections are due mostly in non-HFTD areas. The main drivers in the reduction from 2021 to 2022 are a 4,000 unit decrease in distribution detailed inspections, a 6,000 unit decrease in infrared inspections, and a 9,000 unit decrease in intrusive wood pole inspections (see table below). HFTD inspections are performed and remain within their required inspection schedules.
   - Transmission inspections: Transmission inspections are performed on a three-year cycle, and the annual targets will fluctuate year to year. The main driver in the reduction from 2021 to 2022 is a 900 unit decrease in drone inspections.



Year	HFTD		HFTD	non-HFTD		Total	Year	est. $ HFTD	st. $ non-HFT	% HFTD	%non-HFTD
2019	19,736		19,736	794		20,530	2019	$1,243,368	$50,022	96.13%	3.87%
2020	18,343	1,830	16,513	2,488		19,001	2020	$1,155,609	$156,744	86.91%	13.09%
2021	7,990	2,062	10,052	13,392	308	23,752	2021	$503,370	$843,696	42.32%	57.68%
2022	381		381	20,256		20,637	2022	$24,003	$1,276,128	1.85%	98.15%
2023	68		68	20,204		20,272	2023	$4,284	$1,272,852	0.34%	99.66%
2024			0	20,175		20,175	2024	$0	$1,271,025	0.00%	100.00%
2025	356		356	20,023		20,379	2025	$22,428	$1,261,449	1.75%	98.25%
2026	1,329		1,329	20,166		21,495	2026	$83,727	$1,270,458	6.18%	93.82%
2027	6,282		6,282	12,176		18,458	2027	$395,766	$767,088	34.03%	65.97%
2028	14,587		14,587	2,603		17,190	2028	$918,981	$163,989	84.86%	15.14%
Total	69,072		73,196	132,277		205,473	Total	$ 4,351,536	$8,333,451	35.62%	64.38%
			205,473								

b. The tables below provide breakdowns of all initiatives aggregated into these targets.

Asset install/replacement

Initiative	2021 Units	2022 Units
Expulsion Fuse Removal/Replacement (7.3.3.7)	3976	277
Hotline Clamp Removal/Replacement (7.3.3.10)	2743	1650
Lightning Arrestor Removal/Replacement (7.3.3.18.2)	1789	1848
Capacitor Removal/Replacement (7.3.3.1)	35	40
PSPS Sectionalizing Devices (7.3.3.8.1)	13	10
Wireless Fault Indicators (7.3.2.3)	544	500
Total	9,100	4,325

Distribution Inspections

Initiative	2021 Units	2022 Units

Annual Patrols (7.3.4.11)	86490	86490
Detailed Inspections (7.3.4.1)	22354	18177
Infrared Inspections (7.3.4.4)	17068	12000
Drone Inspections (7.3.4.9.2)	21420	22000
HFTD Tier 3 Inspections (7.3.4.9.1)	11535	12286
Wood Pole Intrusive Inspections (7.3.4.6)	8721	350
Total	167,588	151,303

Transmission Inspections

Initiative	2021 Units	2022 Units
Additional Tier 3 Inspections (7.3.4.10.2)	1652	1654
Detailed Inspections (7.3.4.2)	1957	2087
Infrared Inspections (7.3.4.5)	6239	6154
Drone Inspections (7.3.4.10.1)	1440	500
Visual Inspections (Helo Patrol) (7.3.4.12)	6423	6312
Total	17,711	16,707

Regarding: Sensitive/Fast Protection Settings (Section 7.3.6.2 "Protective equipment and device settings")

Data Request: OEIS-SDGE-22-004 (Question 3)

Request date: March 10, 2022

Request:

Q03. Regarding the sensitive/fast protection settings discussed in Section 7.3.6.2 "Protective equipment and device settings" of SDG&E's 2022 WMP Update (p. 307):

a. What number and percentage of remote sectionalizing devices have the capability to enable these settings?
b. Would all devices with such a setting capability within the HFTD be enabled during days with an extreme FPI rating or PSPS-triggering conditions?
    i. If not, how does SDG&E determine which devices are enabled and when?
c. How would conditions triggering a PSPS event differ from an extreme FPI rating when determining if settings are enabled?
d. What sensitive/fast protection settings are enabled on days where the fire potential is extreme and when conditions may warrant a PSPS?
    i. What is the increased sensitivity?
    ii. Are they factory-based settings? If not, how are settings determined?
    iii. Are the same settings enabled for all devices? If not, how are locations for settings determined?

Response date: March 15, 2022

Response:

SDG&E objects to Question 3 on the grounds set forth in General Objections Nos. 2 and 3. Subject to the foregoing objections, SDG&E responds as follows.

a. There are 649 capable field devices, which equates to 56.4% of all field devices. There are 100 capable 12kV distribution substations, which equates to 97% of all 12kV substations.

b. Yes, Devices are enabled during periods when there is an extreme FPI or conditions may trigger a PSPS. Devices are enabled in the areas or zones where extreme FPI or PSPS conditions are present.

c. In both instances, settings are enabled at the district level. During Extreme FPI events, settings are enabled based on the impacted tier of the HFTD, and thus may cross district boundaries or involve multiple districts. This differs from PSPS events that occur during Elevated FPI conditions. These events are usually more local and therefore settings are applied within the district/districts where the PSPS event is expected to occur.

d. Sensitive Phase and Ground Protection elements are enabled in all devices capable of sensitive settings.

    i. The increased sensitivity is based on the load profile of each sectionalizing device and determined by the historical peak loads determined by the telemetry data pulled from SDG&E's SCADA system.
    ii. SDG&E's sensitive settings are not factory based. These settings are based on specific methodologies developed by SDG&E system protection to make the devices trip faster if faults were to occur. Telemetry data obtained through SDG&E's SCADA system is pulled for each device and trended over the previous five years to obtain historical peak loads. The settings for both phase and ground protection are then set higher than those historical peaks with a safety margin to guard against mis-operation under load conditions. Time delays are also set to trip instantaneously to ensure fast clearing of the fault / damage.
    iii. Device settings are location specific based on telemetry data obtained through SDG&E's SCADA system.

Regarding: SDG&E's Statement on Covered Conductor's Potential to Raise the Threshold for PSPS Events

Data Request: OEIS-SDGE-22-004 (Question 4)

Request date: March 10, 2022

Request:

Q04. Regarding SDG&E's statement on covered conductor's potential to raise the threshold for PSPS events ("The Covered Conductor Program has the potential to raise the threshold for PSPS events to higher wind speeds compared to bare conductor hardening" from SDG&E's 2022 WMP Update, p. 214):

a. Has SDG&E determined how wind thresholds will be changed?
    i. If so, please provide estimates of wind thresholds that may be changed (i.e., changes of wind speed that would result in removing circuits from consideration of PSPS events).
b. When does SDG&E intend to complete a full covered conductor project?
c. When does SDG&E plan to change its wind thresholds, if changes in thresholds are being implemented separately from covered conductor installation?

Response date: March 15, 2022

Response:

a. No, SDG&E has not determined how wind thresholds will be changed as a result of covered conductor. SDG&E intends to engage a third-party contractor to perform a study, including but not limited to an analysis of covered conductor clashing and the subsequent electrical and mechanical effects. Once this study has been performed, SDG&E will then use that data to see if there are any opportunities to revise wind speed thresholds once full sections of covered conductor are completed.

b. SDG&E completed one circuit section of covered conductor that covered six spans of conductor between remotely operable (SCADA) switches. SDG&E intends to complete additional full circuit-sections with covered conductor on all spans by the end of 2023.

c. SDG&E intends to assess the potential changes to wind thresholds after additional installation of covered conductor and the completion of further studies. SDG&E will also assess information gathered during the joint workstreams regarding covered conductor. The timeframe is based on several factors and is not yet known.

Regarding: 500 Poles Cleared to 50-Foot Radius

Data Request: OEIS-SDGE-22-005 (Question 3)

Request date: March 16, 2022

Request:

Q03. Regarding the 500 poles cleared to 50-foot radius:

In the 2022 WMP workshop, SDG&E briefly touched on the removal of "dead or dying fine fuels at ground level within a 50-foot radius" of 500 poles in the HFTD.

a. Discuss how these 500 poles are chosen for the 50 ft radius.
b. Is SDG&E considering alternative mitigation measures (i.e., ones that would negate the need for the 50 ft)?
    i. If so, what are those mitigation measures?
    ii. If not, why not?

Response date: March 21, 2022

Response:

a. The population of poles selected for the fuels modification activity of thinning vegetation to a 50-foot radius was determined using the following criteria:

- Poles that located within the HFTD and/or the State Responsibility Area
- Poles that are subject to the brushing requirement of Public Resources Code 4292
- Integration of CRI (>5) and WRRM (>0.5) output to indicate priority level
- Poles with a relatively low environmental impact and mitigation
- Subject to the approval of the property owner

b. SDG&E is considering the use of alternative fuels management treatment activities such as fire retardant.

Regarding: Sensitive/Fast Protection Settings (Section 7.3.6.2)

Data Request: OEIS-SDGE-22-005 (Question 13)

Request date: March 16, 2022

Request:

Q13. Regarding the sensitive/fast protection settings discussed in Section 7.3.6.2 "Protective equipment and device settings" of SDG&E's 2022 WMP Update (p. 307):

a. In Response 3 to OEIS-SDGE-2022-004, SDG&E stated that 56.4% of all field devices have the capability to enable these protection settings. Does SDG&E intend to replace other equipment to include such capabilities? If so, provide SDG&E's plan for replacements.
b. What reliability analysis has SDG&E performed as it relates to enabling such protection settings? Provide any supporting calculations and documentation.

Response date: March 21, 2022

Response:

a. SDG&E is not replacing field devices to specifically add Sensitive Relay Profile (SRP) capabilities at this time. Any new devices installed to sectionalize HFTD overhead infrastructure will have SRP capabilities. There are an additional 124 devices installed and awaiting final commissioning to enable SRP. Once these are completed, 63.3% of all field devices will have the capability to enable SRP. Most circuits in the HFTD have at least one device with SRP capability.

b. No reliability analysis has been performed as to the incremental impacts from using sensitive relay profiles. An efficacy study as the effectiveness of SRP in preventing fire ignitions was performed and results are provided in SDG&E's 2022 WMP Update Section 4.4.2.5. As part of this study, SDG&E found that 80 risk events occurred due to devices with SRP enabled in the six-year period between 2015 and 2020. During this same period SDG&E had a total of 6,270 risk events on the system. Because SDG&E only applies SRP at times of PSPS activations or Extreme FPI, SRP risk events accounted for approximately 1.3% of all risk events.

Regarding: Collaboration with U.S. Forest Service on Fuel Reduction (Section 7.3.10.4)

Data Request: OEIS-SDGE-22-006 (Question 1)

Request date: March 18, 2022

Request:

Q01. Regarding collaboration with U.S. Forest Service on fuel reduction (Section 7.3.10.4 "Forest service and fuel reduction cooperation and joint roadmap," p. 350):

a. Section 7.3.10.4 doesn't include the details on the initiative (parts 1-5): it only points to Section 7.3.5.2; Energy Safety did not find the initiative details in that section. Please provide these details as follows:

1. Risk to be mitigated / problem to be addressed

2. Initiative selection ("why" engage in initiative)

3. Region prioritization ("where" to engage initiative)

4. Progress on initiative since the last WMP submission and plans, targets, and/or goals for the current year

5. Future improvements to initiative—include known future plans (beyond the current year) and new/novel strategies the utility may implement in the next five years (e.g., references to and strategies from pilot projects and research detailed in Section 4.4)

See p. 74 of the 2022 Wildfire Mitigation Plan Update Guidelines Template for more information.

b. Has SDG&E reached any agreements with the U.S. Forest Service for implementation of a long-term fuels management program?
   i. If it does have any agreements with the U.S. Forest Service, please provide details of any agreements, including a description of the work being carried out under them and the timeline for implementation.
   ii. If not, does SDG&E have any plans to collaborate with the U.S. Forest Service in the future?
      (1) If it does have plans, what are these plans and at what stage of development are they?

Response date: March 23, 2022

Response:

a. SDG&E believes the reference in Section 7.3.10.4 to Section 7.3.5.2 was made in error. SDG&E does not have specific agreements with the Forest Service regarding a fuels management program. SDG&E's is developing partnerships with the U.S. Forest Service in other areas; these are described below and referenced in Section 7.3.5.1 of the 2022 WMP Update.

b. In December 2021, SDG&E entered into agreement with the U.S. Forest Service on an updated plan to perform operations and maintenance (O&M) activities "*Master Special Use Permit Operations and Maintenance Plan for Electric Facilities on the Cleveland National Forest*" (Plan). Section B.3.3.1 of the Plan below describes fuels management activity requirements for wildfire management inside and outside the rights-of-way.

"Many of SDG&Es MSUP facilities on the CNF occur in Tiers 2 and 3 of the CPUC's HFTD, so SDG&E may submit fuel management projects (or programs) within the permitted ROW and easement areas of the CNF to mitigate or reduce the potential for wildfire ignition adjacent to poles and/or conductors consistent with SDG&E's most recent approved Wildfire Mitigation Plan (WMP). Any plan for fuels management activities that cannot be completed entirely within the permitted boundary and/or with BMPs and RPMs, would be submitted as a Class III activity. These fuels management projects or programs would include areas that occur outside of the NEPA analyzed permitted boundary, may require repeated treatments over time, will likely require more extensive environmental analysis and to ensure avoidance and minimization of impacts to environmental resources, including heritage resources, and will be developed in coordination with the USFS and the wildlife agencies".

SDG&E Vegetation Management (VM) does not have any current plans to perform specific fuels thinning activities on U.S. Forest Service property. SDG&E Fire Coordination does work and collaborate with all first responder agencies through the San Diego Fire Chiefs association and other community groups that would include the USFS as members. SDG&E continues to seek out additional partnerships related to fuels management and other programs to enhance the region's resiliency to fire.

Regarding: Quantified Vegetation Management Compliance Targets (SDGE-21-07)

Data Request: OEIS-SDGE-22-006 (Question 2)

Request date: March 18, 2022

Request:

Q02. Regarding Quantified Vegetation Management Compliance Targets:

a. Does SDG&E plan to perform LiDAR inspections on transmission lines and equipment for vegetation management in 2022 (Section 7.3.5.8 "Remote sensing inspections of vegetation around transmission electric lines and equipment," p. 292)?

   i. If so, how many circuit miles?

b. In SDG&E's response to SDGE-21-07 "Quantified Vegetation Management Compliance Targets," SDG&E states that Section 7.3.5.7 does not have a quantitative target: "Section 7.3.5.7 of the 2022 WMP Update - VM does not currently have quantifiable goals for the use of technologies such as LiDAR" (Attachment D, p. 19). However, in Table 5-2, SDG&E has a 730-mile target for "Remote sensing inspection of vegetation around distribution lines and equipment"; this is consistent with Table 12 where SDG&E shows the same number, 730, for initiative 7.3.5.7. Is the passage quoted above from p. 19 of Attachment D supposed to read "7.3.5.**8**" (i.e., SDG&E has no targets for remote sensing of **transmission** lines and equipment)?
   i. Please state clearly the targets set by SDG&E for 2022 for different kinds of remote sensing for (1) transmission and (2) distribution (including a target of "0" if applicable).

c. In SDG&E's response to SDGE-21-07, SDG&E states "SDG&E will begin quantifying [initiative 7.3.5.13, "Quality assurance/quality control of vegetation management"] in the WMP 2022 Update by recording the number of assets and percentage of completed work audited" (Attachment D, p. 20). In Section 7.3.5.13 of its 2022 WMP Update (p. 293), SDG&E states that it has a "minimum random sampling of 15 percent of completed work..." and in Table 12 under 7.3.5.13, SDG&E puts "15%" for "alternative units" (Cell AU84). However, this 15% does not appear in Table 5-2 "Plan Program Targets" (p. 150). Is this an error? Did SDG&E intend to include the 15% as a program target in Table 5-2?

Response date: March 23, 2022

Response:

a. SDG&E does not plan to perform LiDAR inspection on transmission lines for vegetation management in 2022. SDG&E's Transmission Engineering Department utilizes LiDAR in their design activities. Any potential vegetation conditions identified during this activity are communicated to Vegetation Management. SDG&E's Transmission Construction and Maintenance Department has used LiDAR in past transmission equipment inspection activities and communicated findings to VM.

b. SDG&E plans to refresh LiDAR data for all HFTD distribution circuits in 2022. This activity is described in Section 7.3.4.7. As part of this data capture, SDG&E has a target of 730 distribution circuit line miles in 2022 where vegetation clearance information will be calculated and reviewed. SDG&E does not have any target to complete LiDAR inspections of transmission lines for vegetation management in 2022.

a. 7.3.5.7 Remote sensing inspections of vegetation around distribution electric lines and equipment (LiDAR) - Target 730 miles
b. 7.3.5.8 Remote sensing inspections of vegetation around transmission electric lines and equipment (LiDAR) - 0 (No target)

c. Yes, the 15% should be included as a program target in Table 5-2.

Regarding: Trainees Completing the Apprentice Lineman Program (Emergency Planning and Preparedness Issues from SDG&E's 2021 WMP Update)

Data Request: OEIS-SDGE-22-006 (Question 4)

Request date: March 18, 2022

Request:

Q04. Regarding trainees completing the Apprentice Lineman Program (Emergency Planning and Preparedness issues from SDG&E's 2021 WMP Update):

In Energy Safety's Final Action Statement on SDG&E's 2021 WMP Update Section 5.9 "Emergency Planning and Preparedness," Energy Safety identifies three issues and remedies (p. 80). The first issue states, "SDG&E is making progress on training its workforce but doesn't provide the number of people trained. It mentions its preparation for service restoration through training with its Apprentice Lineman program for teaching construction standards and methods related to GO 95 and GO 128 and training its workforce in emergency preparedness in various programs." The first of two required remedies reads: "SDG&E must provide the number of trainees that complete its Apprentice Lineman program." On p. 169 of SDG&E's 2022 WMP Update, SDG&E provides the number of Service Restoration Apprentice Linemen **currently in the program** (68); however, SDG&E does not provide the number of SDG&E employees who have **completed the program**, as requested.

a. Please provide the number of SDG&E employees who have completed the program.
b. If the number provided in SDG&E's 2022 WMP Update (68) includes Apprentice Linemen that have completed the program, please provide the number currently in the program and the number who have completed the program.
c. Please provide the number of Apprentice Linemen employed by SDG&E who are qualified to work on primary voltages.

Response date: March 23, 2022

Response:

a. As of 12/30/21 SDG&E had 231 Qualified Electric Workers (QEW).Once an SDG&E employee becomes a QEW, they are considered to have completed the program which includes training of service restoration and emergency response.

b. As of 12/30/21 SDG&E had 68 apprentices in the lineman apprentice program. In 2021 we had 9 apprentices graduate the program to journeyman lineman (QEW).

c. In 2021 SDG&E had 30 apprentices that were qualified to work on the primary.

Regarding: How Customer Feedback Informs Emergency Planning (Emergency Planning and Preparedness Issues from SDG&E's 2021 WMP Update)

Data Request: OEIS-SDGE-22-006 (Question 5)

Request date: March 18, 2022

Request:

Q05. Regarding how customer feedback informs emergency planning (Emergency Planning and Preparedness issues from SDG&E's 2021 WMP Update):

The second issue listed in Energy Safety's Final Action Statement on SDG&E's 2021 WMP Update Section 5.9 "Emergency Planning and Preparedness" concerns the lack of detail provided by SDG&E about how customer feedback informs emergency planning ("SDG&E states that after a wildfire event the utility reviews and evaluates communications to customers and the general public…" […] "The 2021 WMP Update did not provide sufficient details about this process," p. 80). The remedy reads: "SDG&E must explain what information is being collected about wildfire outreach efforts, how it is collected, and how it is used to inform future outreach efforts." The information SDG&E provided in Section 7.3.9.2 "Community outreach, public awareness, and communication efforts" (SDG&E 2022 WMP Update, p. 327) does not fully respond to the required remedy.

a. Please provide a flowchart indicating at what points customer feedback is solicited (e.g., how long after a wildfire or PSPS event and/or the cycle of feedback solicitation if it happens on a regular schedule) and in what form (e.g., phone survey, online survey, etc.) and how each type of feedback informs emergency planning.
b. If surveys are used to solicit customer feedback, please provide examples of survey questions and customer response options.

   i. If possible, please provide a copy of a survey used to solicit customer feedback after a wildfire or PSPS event.

c. Is feedback solicited from all affected customers, including AFN customers?
   i. Are there different methods of solicitation for AFN customers? If so, what are they?

d. Please provide specific examples of how customer feedback is used to "improve customer and public communications and outreach efforts for the following year" (SDG&E 2022 WMP Update, p. 329)
   i. If possible, please provide specific examples of instances where a program, or part of a program, was changed or improved based on customer feedback and the nature of the feedback (in summary) that initiated the change(s).

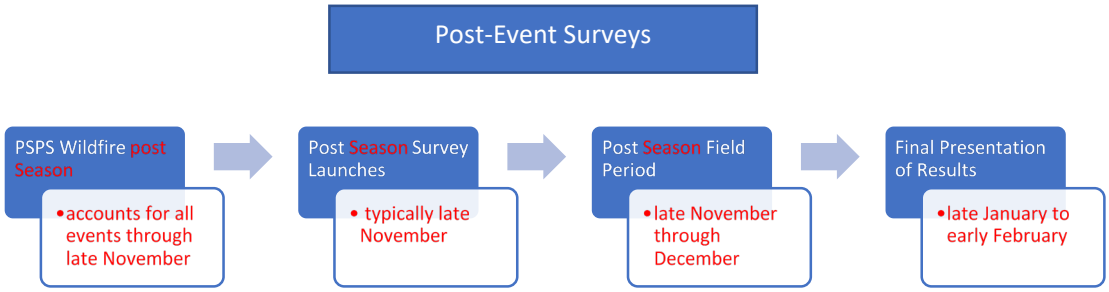
Response date: March 23, 2022

Response:

a. Customer feedback is solicited in several ways, on five distinct instruments, those being: Pre and Post Wildfire Communications, Post-Event, Pre-Season, and Post-Season PSPS Wildfire Surveys.

   Pre and Post Season Surveys. Currently, a Pre-Season Survey takes place each year in the 3rd quarter of the year leading up to wildfire season, with the Post-Season Survey occurring in typically in the 4th quarter of the year, or at the culmination of wildfire/PSPS events. These surveys combine insights on communication, customer overall sentiment of SDG&E processes, strategies, and outreach leading up to, during, and post PSPS/Wildfire season. Rather than focused on an individual incident or event, it is a higher-level survey that helps address overall strategic improvements that are used in planning for the next season.

   Post Event Surveys. Post Event Surveys occur immediately following an event. These surveys are distributed via email and an online questionnaire. The results of these surveys provide insights into the communications, experience, and re-energization or estimated time of re-energization (ETR) of the event. Additional insights are gleaned on customers with accessibility and functional needs (AFN) to ensure accommodations align with customer needs. The following flowchart shows when customer feedback is solicited.



PSPS Wildfire Calendar

Below is the full calendar for PSPS Wildfire Feedback efforts throughout the calendar year and further details on the timeline of each of the five surveys. There is also a post-Wildfire Safety Fair that occurs.

PROJECTS	DESCRIPTION	Vendor	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Wildfire / PSPS	PSPS Post-Event Survey - after each event	Travis Research												
	Wildfire Safety Communications (2 waves)													
	Wildire/PSPS Pre/Post Mitigation (2 waves)													
	Wildfire Safety Fairs (summary for each fair and roll-up report)	Qualtrics/In house												

Wildfire Safety Communications. Wildfire Safety Communications occur throughout the year, typically beginning in quarter 2 in preparation for wildfire season, September through December , and inform the effectiveness of wildfire communications leading up to the season as well as after, as well as to inform strategic planning for communication efforts in the year ahead.

a. Customer surveys is the method utilized by SDG&E to solicit customer feedback. Please refer to "Appendix_SDGE PSPS Questionnaires_2021.docx" for samples of customer surveys employed.

Pre-Season. Questions focus on overall favorability of SDG&E, language preferences for receiving PSPS/Wildfire communications, awareness or recall of receiving wildfire communications and the communication channel recalled, satisfaction with SDG&E safety efforts and performance pertaining to events, overall. Additional questions focus on PSPS preparedness, as well as differences in response of those in high-fire threat districts vs. those in non-high fire threat districts.

Post-Season. Questions on the Post-Season Survey are like those of the Pre-Season, with the addition of questions pertaining to the experience of a power shutoff, amount of and type of communication or notification, and ease of understanding messaging. Finally, actions taken because of notification of a possible PSPS/Wildfire event. Both seasonal survey efforts take into consideration customers with accessibility and functional needs (AFN), as well as those in need of vial electrical equipment within the instrumentation for additional planning and initiatives by SDG&E.

Post –Event. Post Event surveys focus on communication strategies and customer experiences for those de-energized and those not de-energized alike. Unlike the seasonal surveys, the Post-Event survey focuses specifically on an actual incident for insights on retroactive sessions that are held post-event focusing on ways to improve outreach, preparedness, and communications for future events. SDG&E conducts post-season surveys rather than post event surveys after every single event due to the small sample size of the same affected customers and the high risk of survey fatigue.

b. Feedback is solicited from all affected customers through a post PSPS and/or wildfire season survey, which includes those self-identified with AFN in SDG&E's customer account data management system.

    i. Feedback is solicited from customers with AFN through SDG&E's Post-Season surveys which solicits feedback on the effectiveness (informative and easy to understand) and frequency of PSPS notifications, the actions which recipients are likely to take in response to PSPS notifications, awareness and use of PSPS resources, and satisfaction with resources. The feedback is utilized to inform and modify PSPS notification content and preparedness materials the following season, as well as identify which solutions resonate most with customers so as to prioritize public education of those solutions the following year. In 2022, SDG&E is launching a monthly dedicated AFN customer research panel, where feedback will be solicited from customers on key topics (e.g. what channels are most effective?) and use this to further inform and refine communications and outreach to ensure they remain relevant and useful.

c. There are several examples where customer feedback and insights have been used to either modify public education and communications in real-time and/or inform strategy the following year. Examples include, but are not limited to, PSPS customer notifications, in-community communications, increased accessibility of communications, and tribal communications. As a result of feedback received by customers affected by a PSPS in 2020, the 2021 PSPS customer notifications were completely revamped. The specific feedback received was that the content did not clearly associate a PSPS as a mitigation tool for wildfire safety; the content was not easy to understand for the layman (content was higher than at a 6th grade level) and notifications did not refer to resources that may be available. The revised notification content sample was then 'tested' with customers through an online focus chat group before the upcoming wildfire season. This led to a material increase in the customer satisfaction rating of the notifications in the 2021 post event survey. Additionally, 2020 feedback informed that during a PSPS event, in-community communications would be of value to customers, as such we began to extend notification content into high traffic areas of the high fire threat district, specifically, we employed over approximately 30 portable roadside signs in strategically placed locations considered to be high traffic areas. In addition to portable roadside signs, we also partnered with tribal casinos, which are in the high fire threat district, in the use of their community marquees as an amplification of messaging included in customer PSPS notifications. Additionally, in-community flyers were developed to raise awareness of an impeding PSPS event, and the areas forecasted to be affected. Finally, from a notification perspective, we also posted messaging on community-based pages on Facebook and Nextdoor. We also increased accessibility of notifications and other public education in 2021. Notifications are also now translated into American Sign Language, via video translation; enhanced website accessibility is also now available to help meet the needs of those with sensory disabilities. From a public education perspective, customers advised that informational preparedness videos were valuable to customers which led the development of video addressing practical steps customers can take to prepare for and be resilient during a PSPS. Some of the content includes creating an emergency preparedness kit, how to prepare for a wildfire, generator safety, power outage safety tips, the full library of videos is available on SDGE's wildfire safety webpage, sdge.com/wildfire-safety. The videos are being translated into American Sign Language as well. A lesson learned from 2021 from feedback received by customers affected by a PSPS power outage was how SDG&E talked to customers about the PSPS process and the customer journey throughout the process, specifically, explaining the process in terms that was easily understood and the safety considerations that are followed by utility before power can be restored. As a result, an easy-to-understand video was developed, which can be viewed at SDG&E PSPS Power Restoration, as an example of video styles being developed as part of public

education campaigns. These newly developed videos will be inclusive of close captioning, American Sign Language and Spanish close captioning as the census data indicates that the Spanish the prevalent language most often spoken behind English in SDG&E's service territory. Lastly, tribal partners and customers have informed SDG&E there is opportunity to customize communications, public education and the communication platforms used to be more relevant and culturally appropriate to our tribal nations. As such, we have contracted with a tribal communications and marketing consultant to advise on a customized tribal public education and communications campaign starting in 2022.

Regarding: Formal Mutual Assistance Training Program (Section 7.3.9.5)

Data Request: OEIS-SDGE-22-006 (Question 6)

Request date: March 18, 2022

Request:

Q06. Regarding the formal mutual assistance training program (Section 7.3.9.5 "Preparedness and planning for service restoration," p. 336):

SDG&E states that it's developing a "formal mutual assistance training program" in 2022 (SDG&E 2022 WMP Update, p. 338).

a. Please provide details on this new program, including how it will differ from the current "just in time" training and how it will incorporate COVID-19 protocols.

Response date: March 23, 2022

Response:

The updated mutual assistance training builds on the current "just in time" training, which is specific to outbound mutual assistance deployments, to also include information on how we will request and support inbound mutual assistance situations. This training will incorporate all facets of the mutual assistance process from the beginning request made through to demobilization and after-action review.

Additionally, this training will incorporate the EESC recommendations on COVID-19 protocols and how they are integrated into our processes.

Regarding: SDG&E's Physical Infractions Test Yard (Section 7.3.9.1)

Data Request: OEIS-SDGE-22-006 (Question 8d)

Request date: March 18, 2022

Request:

Q08. Regarding SDG&E's physical infractions test yard (Section 7.3.9.1 "Adequate and trained workforce for service restoration," p. 325):

SDG&E states that it has "completed construction on a physical infractions test yard with infractions that will be changed regularly for Journeymen to identify and properly code" (SDG&E 2022 WMP Update, p. 326).

[…]

d. Is the infractions test yard exclusively for training Journeymen, or is it also used for training other personnel in other capacities?

i. If it is used for training other personnel, please provide a list of the personnel who train at the test yard along with descriptions of training and activities for each.

Response date: March 23, 2022

Response:

d. The infraction test yard is used strictly for training Journeymen.

Regarding: SDG&E's Responses to Cal Advocates' Data Requests 3 and 4

Data Request: OEIS-SDGE-22-006 (Question 9)

Request date: March 18, 2022

Request:

Q09. Regarding SDG&E's responses to Cal Advocates' data requests 3 and 4 (in particular DR03 Questions 1 and 2 and DR04 Questions 3 and 4):

a. Explain how the wildfire risk scores differ and compare between the Excel sheets provided.

b. Provide the list of projects in SDGE DR04_2021CalPA by circuit ID number that correlate to the risk calculations for undergrounding and covered conductor provided in Table 5-4 of SDG&E's 2022 WMP Update.
c. Provide the additional data in Excel format for SDG&E's 2023 and 2024 system hardening workplans for distribution circuits, similar to Cal Advocates' DR04 Questions 3 and 4.
    i. Circuit-segment ID number (matching those provided in response to Questions 1 and 2 of Data Request CalAdvocates-SDGE-2022WMP-03) associated with the project.
    ii. Relevant wildfire risk score(s).
    iii. The start date of the project.
    iv. The expected completion date of the project.
    v. Length of covered conductor to be installed in 2023 in miles.
    vi. Length of underground conductor to be installed in 2023 in miles.
    vii. Length of traditional overhead system hardening to be performed in 2023 in miles.
    viii. Length in miles of any other type of system hardening project to be installed in 2023 (if this is greater than zero, please describe the type of system hardening project).
    ix. Length of covered conductor to be installed in 2024 in miles.
    x. Length of underground conductor to be installed in 2024 in miles.
    xi. Length of traditional overhead system hardening to be performed in 2024 in miles.
    xii. Length in miles of any other type of system hardening project to be installed in 2024 (if this is greater than zero, please describe the type of system hardening project).
d. Provide the additional data in Excel format for SDG&E's 2023 and 2024 system hardening workplans for transmission circuits. Include the same information detailed in Q09 (c) above (*i – xii*).

Response date: March 23, 2022

Response:

a. The wildfire risk scores provided in columns i and j of the main Excel sheet ('CONFIDENTIAL_2021CalPA-SDGE DR03') are the *circuit level* wildfire risk scores of the distribution and transmission circuits/tielines as scoped by the WiNGS-Planning model. The additional attached sheet titled 'CONFIDENTIAL2021CalPA-SDGE_DR3_WF_Risk_Scores_Segment_Level_FINAL' is alternatively the *segment level* wildfire risk scores of the distribution circuits scoped by the WiNGS-Planning model,

where a *segment* is defined as the portion of a circuit between two automatic reclosing devices, or SCADA switch devices. The wildfire risk score of a circuit is effectively the sum aggregation of the risk scores of the scoped segments that make up that circuit.

The wildfire risk score provided in Column J of the CalPA DR-03 file will match the wildfire risk score provided in Column B of the CalPA DR-04 file.

b. SDG&E interprets this question to refer to Table 5-2 of SDG&E's 2022 WMP Update. The circuits used to calculate the risk percentages are the following circuits:
    i. Covered Conductor
        i. 442
        ii. 448
        iii. 212
        iv. 445
        v. 157
    ii. Strategic Undergrounding
        i. 222
        ii. 445
        iii. 1030
        iv. 221
        v. 1458

c. See attached file "OEIS SDGE 2022 006 Q9.xlsx"[221]

d. See attached file "OEIS SDGE 2022 006 Q9.xlsx"[222]

[221] Download "OEIS SDGE 2022 006 Q9.xlsx" here: https://www.sdge.com/sites/default/files/regulatory/OEIS-2022-06%20Attachments.zip (accessed May 6, 2022).

[222] Download "OEIS SDGE 2022 006 Q9.xlsx" here: https://www.sdge.com/sites/default/files/regulatory/OEIS-2022-06%20Attachments.zip (accessed May 6, 2022).

Regarding: PSPS and Circuit 79

Data Request: OEIS-SDGE-22-006 (Question 11)

Request date: March 18, 2022

Request:

Q11. Regarding PSPS and circuit 79:

According to Section 8.6 "Identification of Frequently De-Energized Circuits" (SDG&E 2022 WMP Update, p. 371), SDG&E indicates circuit 79 has been de-energized 12 times since January 2018. SDG&E listed a number of mitigating factors (p. 372).

a. What percentage of the length of this circuit is addressed by mitigations listed on p. 372?
b. What percentage of the PSPS risk on this circuit has been addressed by these mitigations?
c. How many customers on this circuit have benefitted from already-implemented mitigations?
    i. What percentage of the customers on this circuit have benefitted from already-implemented mitigations?
d. When are all mitigations for circuit 79 listed on p. 372 expected to be completed?

Response date: March 23, 2022

Response:

a. 32% of the length of C79 is addressed by the mitigations listed on p. 372.
b. 12% of PSPS risk on C79 has been reduced at this time. SDG&E quantifies current PSPS risk reduction on C79 utilizing WiNGS-Planning and analyzing customers impacted by direct undergrounding. PSPS risk reduction quantification through the WiNGS-Planning model does not include customers impacted by sectionalizing and resiliency programs.
c. 121 customers have benefitted from undergrounding and customer resiliency programs. Overhead hardening programs do not have direct links to customer impacts but they do create a more robust infrastructure that can withstand stronger weather systems, and while sectionalizing devices do have customer counts tied to each device, the avoided impacts rely heavily on the weather during the specific PSPS event.
    i. 14% of the customers on this circuit have benefitted from already-implemented mitigations

d. The overhead hardening program has 2.24 miles of traditional hardening in scope to be completed in 2022 and 2.53 miles of Covered Conductor in scope to be completed in 2023. Customer resiliency programs like the Generator Grant Program, Generator Assistance Program, and Fixed Backup Power Program are ongoing programs designed to support customers in the High Fire Threat District that are frequently impacted by PSPS events but will not benefit from other traditional mitigations.

Regarding: 500 Poles Cleared to 50-Foot Radius (OEIS-SDGE-22-005 Q03)

Data Request: OEIS-SDGE-22-007 (Question 1)

Request date: March 24, 2022

Request:

Q01. Regarding SDG&E's 500 poles cleared to 50-foot radius (OEIS-SDGE-22-005 Q03):

a. Please explain the rationale behind choosing 50 feet as the radius in which SDG&E removes fuels around 500 poles, including any scientific or wildfire safety rationales behind the extent of clearance.
b. Has SDG&E chosen a 50-foot clearance to protect its poles from being impacted (i.e., burned, damaged, or destroyed) by wildfire?
c. Does SDG&E expect the poles to fail catastrophically and consequently generate sparks within the falling distance of the pole?
    i. If so, why does SDG&E expect its poles to fail (e.g., structural defects, storms, wind, wildfire, etc.)?
d. Has SDG&E considered the environmental impacts of the 50-foot clearance distance? If so, what are environmental impacts, both positive and negative? (e.g., erosion, removal of invasive species, habitat fragmentation, water quality, etc.)

Response date: March 29, 2022

Response:

a. SDG&E's rationale for choosing 50 feet as the radius for its fuels thinning activity around poles was based on the height of a power pole to mitigate an instance of catastrophic pole failure; to increase a buffer of thinned vegetation to reduce risk due to pole-mounted hardware failure that could cause ignition and propagate fire; and for the protection of poles from fire.

b. Yes, but the main driver is really trying to ensure no wildfires are started from any equipment failure on the poles and including the poles.

c. SDG&E does not expect its poles to fail catastrophically, however, the fuels thinning activity is intended to reduce risk associated with the possibility of such an event.

d. SDG&E's Environmental Services Department performs a biological and cultural assessment of each work site to determine impacts to species, habitat, or resources, and provides environmental monitoring support if needed. Site-specific factors such as nesting birds, percentage of fuels thinning, erosion, habitat fragmentation, and water quality are all assessed. In addition, the fuels management activity is thinning of vegetation and not clearing of vegetation like it is for pole brushing but can include removing dead brush and non-native brush.

Regarding: Technosylva's Risk Associated with Value Exposure (RAVE) Module

Data Request: OEIS-SDGE-22-008 (Question 1)

Request date: March 30, 2022

Request:

Q01. Regarding Technosylva's Risk Associated with Value Exposure (RAVE) module:

a. Please provide a list of the community factors evaluated, including the weights assigned to each factor when added to the model.
b. What is the current status of SDG&E's implementation of the RAVE module?
c. What are SDG&E's conclusions from its analysis of the RAVE module?
d. What is SDG&E's timeline for implementation of the RAVE module?
e. If the RAVE module is not currently in use, how is SDG&E accounting for community factors in the meantime? In particular, what factors are SDG&E considering regarding vulnerable communities, and how are these factors accounted for in its risk analysis and modeling, including weights?

Response date: April 4, 2022

Response:

a. N/A

b. SDG&E received the RAVE data in December of 2021 and is currently evaluating the incorporation of this data into current and future models.

c. N/A

d. To be determined

e. Vulnerable communities are accounted for in the PSPS risk section of the WiNGS Planning model. See Page 120, Section 4.5.1.7 Wildfire Next Generation System-Planning for details of this model. The vulnerable customers accounted for are categorized as Medical Baseline, Essential, Urgent, and Sensitive.

Regarding: SDG&E's Future Undergrounding Plans

Data Request: OEIS-SDGE-22-008 (Question 2)

Request date: March 30, 2022

Request:

Q02. Regarding SDG&E's future undergrounding plans:

In SDG&E's 2022 WMP Update, SDG&E states that it is planning to "Significantly increase strategic undergrounding and implementation of covered conductor" (p.146) in the next 10 years.

a. Describe what SDG&E means by "significantly."
b. Provide an annual estimate of circuit miles planned for undergrounding over the next 10 years.
c. Provide an annual estimate of circuit miles planned for covered conductor installation over the next 10 years.

Response date: April 4, 2022

Response:

a. SDG&E plans to ramp up the Covered Conductor and Undergrounding programs to harden 100 circuit miles and underground 150 circuit miles per year beginning in 2024. Several factors may impact the ultimate feasibility of these targets, including but not limited to land (easement, rights-of-way acquisition), environmental and cultural (permitting), and construction (availability of materials and labor) constraints. SDG&E will continue to revisit and revise these estimated annual targets to reflect the latest outputs from the Wildfire Next

Generation System (WiNGS) Planning Model as well as engineering, design, and construction conditions.

b/c. An annual estimate of circuit miles planned for undergrounding and covered conductor over the next 10 years are provided below. Covered conductor and undergrounding scope are based on the results of SDG&E's WiNGS-Planning Model; therefore, as the WiNGS-Planning Model is updated to account for new data (e.g., system hardening and reconfiguration, sectionalizing devices, mitigation unit costs), the scope of circuit miles for covered conductor and undergrounding will most likely change and impact the annual estimates over the next 10 years. Currently, we do not have additional mileage scoped for future mitigation. However, as SDG&E continues to advance the WiNGS-Planning Model, additional or different circuit segment mileage may be scoped.

Mitigation	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Undergrounding	65	125	150	150	150	150	150	150	50	
Covered Conductor	60	100	100	80						

Regarding: SDG&E's Asset Installation Dates

Data Request: OEIS-SDGE-22-008 (Question 3)

Request date: March 30, 2022

Request:

Q03. Regarding SDG&E's asset installation dates:

In SDG&E's 2022 WMP Update, SDG&E states, "Similarly, the determination of asset installation date for older assets, which is critical for failure rate calculations, requires heavy investigation into documents that are often difficult to manage or access. The PoI models rely on this foundational data infrastructure and are limited by the quality of this data" (p.90).

a. What percentage of assets are missing age installation dates within SDG&E's asset inventory?
b. Describe how SDG&E's EAMP helps to increase data quality, including in relation to missing asset installation data.

c. Describe SDG&E's additional plans and execution timelines for addressing data quality issues, including missing asset installation dates.

Response date: April 4, 2022

Response:

a. Of the distribution assets (poles and wires) that have been analyzed for installation dates, 0.18% of poles and 0.46% of wires are missing this value.

b. One of the current priorities of EAMP is to analyze and measure data accuracy of critical data attributes of each electric distribution asset. These baseline measurements determine which records need further investigation and remediation. Installation dates are considered critical attributes and have been the focus of current remediation activities.

c. SDG&E is undergoing an effort to measure the accuracy of data quality for each distribution asset. This will be an iterative, on-going process throughout the year to capture the accuracy percentages for each critical data attribute of each distribution asset. Poles and wires have been analyzed; switches and capacitors will be assessed within the next few months. This process will also facilitate any remediations that may be necessary based on the findings.

Regarding: Regarding SDG&E's Asset Inspections

Data Request: OEIS-SDGE-22-008 (Question 4)

Request date: March 30, 2022

Request:

Q04. Regarding SDG&E's asset inspections:

a. What percentage of inspections are completed by contractors vs. internally by SDG&E?
b. Provide a list of contractors used for asset inspections.
c. How does training for contractors performing asset inspections differ from the training for internal SDG&E personnel?
d. Provide the find rate for QA/QC of asset inspections performed by contractors.

e. Provide documentation and procedures for SDG&E's QA/QC process for asset inspections.
f. Provide the number of inspectors that performed detailed asset inspections in 2021.
g. Provide the number of detailed asset inspections performed by inspectors in 2021.
h. Provide the average circuit mile per inspector per day completed for detailed asset inspections in 2021.

Response date: April 4, 2022, and April 7, 2022 (electric transmission inspections data)

Response:

For Substation Inspections:

a. 0% (All substation inspections are performed internally by SDG&E)

b. N/A

c. N/A

d. N/A

e. The following excerpt comes from *SOP 810.006 Substation Inspector Maintenance Order Reporting and Tracking,* and relates specifically to QA/QC.

4.1. Procedure for recording CMxO on Patrol Inspection

4.1.6. The SCM Scheduler will do a SMMS query every two weeks, just prior to the SCM Compliance and Trouble check meeting, to pull all open CMxO Patrolinsp orders.

4.1.7. Management will review open orders to ensure they are being completed prior to their severity code resolution time period.

4.3 Periodic Review Process

4.3.1. The patrol checklist shall be reviewed by the Construction Supervisor in charge of the inspectors on an annual basis.

4.3.1.1. The checklist will be reviewed for relevancy, regulatory requirements and company-specific considerations.

4.3.1.2. A CMxO will be automatically triggered for the checklist review. Any changes made to the inspection checklist will be included in

the notes of the CMxO.

4.3.1.3. The Construction Supervisor will select the Project ID: dropdown CMxO Patrolinsp for the annual review CMxOReview Process.

4.3.2. The Construction Supervisor will review 10 inspections, at different substations, for each inspector. This review shall be conducted every 6 months.

4.3.2.1. The Construction Supervisor will look for all deficiencies noted and check in SMMS to ensure CMxO were opened.

SUBSTATION INSPECTOR MAINTENANCE ORDER REPORTING AND TRACKING 810.006

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4.3.2.2. The Construction Supervisor will issue a report listing the inspector, the substations, all noted deficiencies

4.3.2.3. A CMxO will be automatically triggered for the inspections review. The report will be included in the notes of the CMxO.

f. 9

g. 405

h. N/A

For Electric Distribution Inspections:

a. 18%

b. Wood pole intrusive inspections – Davey Tree

Drone inspections – HiLine Nation and its subcontractors

c. For wood pole intrusive inspections, the contractor is specifically skilled for this activity. There are no internal skilled inspectors for this type of inspection. For drone inspections, contractor Qualified Electrical Workers (QEWs) and pilots are used for

capturing the drone pictures and performing the assessment in the field and using the photographs.

d. 1.2%

e. 
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f. 71

g. 38,410 poles

h. 1.7 average miles per day / per inspector

For Electric Transmission Inspections:

a. SDG&E QEW's perform 100% of detailed inspections on the transmission system. Contractors perform wood pole intrusive inspections and Drone inspections of SDG&E's transmission system.
b. HiLine Nation and its subcontractors perform the drone inspections for distribution and transmission
c. For wood pole intrusive inspections, the contractor is specifically skilled for this activity. There are no internal skilled inspectors for this type of inspection.
d. For DIAR, SDG&E has had minimal items found during QA/QC (either through review by the supervisor or by IIP) at a rate of approximately 20 items over 30,000 inspections.
e. Per TCM's maintenance practice, when an Inspector/Patrolman identifies a condition, a severity rating is assigned, which triggers the secondary assessment date by a Foreman or Supervisor. The Foreman/Supervisor may either evaluate the component/condition utilizing electronic inspection data and digital photos or conducting a field assessment. Once the component/condition has been assessed, the Foreman/Supervisor will determine appropriate follow up actions required, including

[223] Chrome icon represents link to eight-page PDF "ESP 612 - Distribution QA Audits" available here: https://www.sdge.com/sites/default/files/regulatory/OEIS-2022-08%20Attachment.pdf (accessed April 15, 2022).

feedback to Patrollers should there be findings regarding the quality of the asset inspection.

f. 5
g. 3,528 detailed asset inspections were performed in 2021.
h. Inspectors averaged 0.94 miles per day while performing detailed asset inspections in 2021.

Appendix C. Comments on the Draft Decision

This appendix will contain Energy Safety's summary of stakeholder comments on the draft Decision.

Appendix D. The Ten Maturity and Mitigation Initiative Categories

The following table presents the ten categories of questions on the Maturity Survey, and, where relevant, the version of the category name used in the 2022 WMP Guidelines or Decisions. All mitigation programs and initiatives should fit into one or more of the following categories. Some examples of activities or data products that fit under each category are listed.

Maturity and Mitigation Categories	Examples of Activities
1. Risk mapping and simulation; Per WMP Guidelines/this Decision document: Risk assessment and mapping	Risk and ignition probability mapping; match drop simulations; consequence mapping
2. Situational awareness and forecasting	Weather monitoring; weather station installation; fault indicator technology implementation; fire potential index
3. Grid design and system hardening	Capacitor maintenance and replacement; covered conductor installation and maintenance; expulsion fuse replacement; pole loading infrastructure hardening and replacement
4. Asset management and inspections	Infrared, LiDAR, or drone inspections and routine or detailed patrol inspections of distribution/transmission electric lines and equipment; intrusive pole inspections; pole loading assessments; quality assurance and quality control of inspections

5. Vegetation management and inspections	Fuel management and reduction of "slash"; LiDAR or drone inspections and routine or detailed patrol inspections of vegetation around distribution/transmission electric lines and equipment; inventory, remediation, or removal of hazardous vegetation; quality assurance and quality control of vegetation management inspections
6. Grid operations and protocols; Per this Decision document: Grid operations and operating protocols, including PSPS	Automatic recloser operations; protocols for re-energization after PSPS; mitigation of PSPS impacts; work procedures and training in conditions of elevated fire risk
7. Data governance	Centralized data repository; ignition/wildfire collaborative research; documentation/disclosure of wildfire-related data and algorithms; risk event data tracking and analysis
8. Resource allocation methodology	Method of allocation of resources; method of calculating the risk-spend efficiency of initiatives (not including PSPS, which is not considered a mitigation initiative within WMPs); risk reduction scenario development and analysis
9. Emergency planning and preparedness	Ensuring the utility has an adequate and trained workforce for service restoration; community outreach, public awareness, and communications efforts; customer support during emergencies
10. Stakeholder cooperation and community engagement	Cooperation with suppression agencies; community engagement efforts; sharing best

	practices and cooperating with agencies outside California; coordinating fuel management with the U.S Forest Service

Appendix E. Definition of Initiatives by Category

Category A. Risk Mapping and Simulation / Risk Assessment and Mapping

Category A. Risk Mapping and Simulation / Risk Assessment and Mapping Initiative Activity	Definition
A summarized risk map that shows the overall ignition probability and estimated wildfire consequence along the electric lines and equipment	Development and use of tools and processes to develop and update risk map and simulations and to estimate risk reduction potential of initiatives for a given portion of the grid (or more granularly, e.g., circuit, span, or asset). May include verification efforts, independent assessment by experts, and updates.
Climate-driven risk map and modeling based on various relevant weather scenarios	Development and use of tools and processes to estimate incremental risk of foreseeable climate scenarios, such as drought, across a given portion of the grid (or more granularly, e.g., circuit, span, or asset). May include verification efforts, independent assessment by experts, and updates.
Ignition probability mapping showing the probability of ignition along the electric lines and equipment	Development and use of tools and processes to assess the risk of ignition across regions of the grid (or more granularly, e.g., circuits, spans, or assets).
Initiative mapping and estimation of wildfire and PSPS risk-reduction impact	Development of a tool to estimate the risk reduction efficacy (for both wildfire and

Category A. Risk Mapping and Simulation / Risk Assessment and Mapping Initiative Activity	Definition
	PSPS risk) and risk-spend efficiency of various initiatives.
Match drop simulations showing the potential wildfire consequence of ignitions that occur along the electric lines and equipment	Development and use of tools and processes to assess the impact of potential ignition and risk to communities (e.g., in terms of potential fatalities, structures burned, monetary damages, area burned, impact on air quality and greenhouse gas, or GHG, reduction goals, etc.).

Category B. Situational Awareness and Forecasting

Category B. Situational Awareness and Forecasting Initiative Activity	Definition
Advanced weather monitoring and weather stations	Purchase, installation, maintenance, and operation of weather stations. Collection, recording, and analysis of weather data from weather stations and from external sources.
Continuous monitoring sensors	Installation, maintenance, and monitoring of sensors and sensorized equipment used to monitor the condition of electric lines and equipment.
Fault indicators for detecting faults on electric lines and equipment	Installation and maintenance of fault indicators.

Category B. Situational Awareness and Forecasting Initiative Activity	Definition
Forecast of a fire risk index, fire potential index, or similar	Index that uses a combination of weather parameters (such as wind speed, humidity, and temperature), vegetation and/or fuel conditions, and other factors to judge current fire risk and to create a forecast indicative of fire risk. A sufficiently granular index shall inform operational decision-making.
Personnel monitoring areas of electric lines and equipment in elevated fire risk conditions	Personnel position within utility service territory to monitor system conditions and weather on site. Field observations shall inform operational decisions.
Weather forecasting and estimating impacts on electric lines and equipment	Development methodology for forecast of weather conditions relevant to utility 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.

Category C. Grid Design and System Hardening

Category C. Grid Design and System Hardening Initiative Activity	Definition
Capacitor maintenance and replacement program	Remediation, adjustments, or installations of new equipment to improve or replace existing capacitor equipment.

Category C. Grid Design and System Hardening Initiative Activity	Definition
Circuit breaker maintenance and installation to de-energize lines upon detecting a fault	Remediation, adjustments, or installations of new equipment to improve or replace existing fast switching circuit breaker equipment to improve the ability to protect electrical circuits from damage caused by overload of electricity or short circuit.
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

Category C. Grid Design and System Hardening Initiative Activity	Definition
	(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.
Covered conductor maintenance	Remediation and adjustments to installed covered or insulated conductors. 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.
Crossarm maintenance, repair, and replacement	Remediation, adjustments, or installations of new equipment to improve or replace existing crossarms, defined as horizontal support attached to poles or structures

Category C. Grid Design and System Hardening Initiative Activity	Definition
	generally at right angles to the conductor supported in accordance with GO 95.
Distribution pole replacement and reinforcement, including with composite poles	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.
Expulsion fuse replacement	Installations of new and CAL FIRE-approved power fuses to replace existing expulsion fuse equipment.
Grid topology improvements to mitigate or reduce PSPS events	Plan to support and actions taken to mitigate or reduce PSPS events in terms of geographic scope and number of customers affected, such as installation and operation of electrical equipment to sectionalize or island portions of the grid, microgrids, or local generation.
Installation of system automation equipment	Installation of electric equipment that increases the ability of the utility 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

Category C. Grid Design and System Hardening Initiative Activity	Definition
	automatically and detect if a fault remains, remaining open if so).
Maintenance, repair, and replacement of connectors, including hotline clamps	Remediation, adjustments, or installations of new equipment to improve or replace existing connector equipment, such as hotline clamps.
Mitigation of impact on customers and other residents affected during PSPS event	Actions taken to improve access to electricity for customers and other residents during PSPS events, such as installation and operation of local generation equipment (at the community, household, or other level).
Other corrective action	Other maintenance, repair, or replacement of utility equipment and structures so that they function properly and safely, including remediation activities (such as insulator washing) of other electric equipment deficiencies that may increase ignition probability due to potential equipment failure or other drivers.
Pole loading infrastructure hardening and replacement program based on pole loading assessment program	Actions taken to remediate, adjust, or install replacement equipment for poles that the utility has identified as failing to meet safety factor requirements in accordance with GO 95 or additional utility standards in the utility's pole loading assessment program.

Category C. Grid Design and System Hardening Initiative Activity	Definition
Transformers maintenance and replacement	Remediation, adjustments, or installations of new equipment to improve or replace existing transformer equipment.
Transmission tower maintenance and replacement	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).
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).
Updates to grid topology to minimize risk of ignition in the HFTD	Changes in the plan, installation, construction, removal, and/or undergrounding to minimize the risk of ignition due to the design, location, or configuration of utility electric equipment in the HFTD.

Category D. Asset Management and Inspections

Category D. Asset Management and Inspections Initiative Activity	Definition
Detailed inspections of distribution electric lines and equipment	In accordance with GO 165, careful visual inspections of overhead electric distribution lines and equipment where individual

Category D. Asset Management and Inspections Initiative Activity	Definition
	pieces of equipment and structures are carefully examined, visually and through use of routine diagnostic test, as appropriate, and (if practical and if useful information can be so gathered) opened, and the condition of each rated and recorded.
Detailed inspections of transmission electric lines and equipment	Careful visual inspections of overhead electric transmission lines and equipment where individual pieces of equipment and structures are carefully examined, visually and through use of routine diagnostic test, as appropriate, and (if practical and if useful information can be so gathered) opened, and the condition of each rated and recorded.
Improvement of inspections	Identifying and addressing deficiencies in inspections protocols and implementation by improving training and the evaluation of inspectors.
Infrared inspections of distribution electric lines and equipment	Inspections of overhead electric distribution lines, equipment, and right-of-way using infrared (heat-sensing) technology and cameras that can identify "hot spots," or conditions that indicate deterioration or potential equipment failures, of electrical equipment.
Infrared inspections of transmission electric lines and equipment	Inspections of overhead electric transmission lines, equipment, and right-of-way using infrared (heat-sensing)

Category D. Asset Management and Inspections Initiative Activity	Definition
	technology and cameras that can identify "hot spots," or conditions that indicate deterioration or potential equipment failures, of electrical equipment.
Intrusive pole inspections	In accordance with GO 165, intrusive inspections involve movement of soil, taking samples for analysis, and/or using more sophisticated diagnostic tools beyond visual inspections or instrument reading.
LiDAR inspections of distribution electric lines and equipment	Inspections of overhead electric distribution lines, equipment, and right-of-way using LiDAR (Light Detection and Ranging, a remote sensing method that uses light in the form of a pulsed laser to measure variable distances).
LiDAR inspections of transmission electric lines and equipment	Inspections of overhead electric transmission lines, equipment, and right-of-way using LiDAR (Light Detection and Ranging, a remote sensing method that uses light in the form of a pulsed laser to measure variable distances).
Other discretionary inspection of distribution electric lines and equipment, beyond inspections mandated by rules and regulations	Inspections of overhead electric distribution lines, equipment, and right-of-way that exceed or otherwise go beyond those mandated by rules and regulations, including GO 165, in terms of frequency, inspection checklist requirements or detail, analysis of and response to problems

Category D. Asset Management and Inspections Initiative Activity	Definition
	identified, or other aspects of inspection or records kept.
Other discretionary inspection of transmission electric lines and equipment, beyond inspections mandated by rules and regulations	Inspections of overhead electric transmission lines, equipment, and right-of-way that exceed or otherwise go beyond those mandated by rules and regulations, including GO 165, in terms of frequency, inspection checklist requirements or detail, analysis of and response to problems identified, or other aspects of inspection or records kept.
Patrol inspections of distribution electric lines and equipment	In accordance with GO 165, simple visual inspections of overhead electric distribution lines and equipment that is designed to identify obvious structural problems and hazards. Patrol inspections may be carried out in the course of other company business.
Patrol inspections of transmission electric lines and equipment	Simple visual inspections of overhead electric transmission lines and equipment that is designed to identify obvious structural problems and hazards. Patrol inspections may be carried out in the course of other company business.
Pole loading assessment program to determine safety factor	Calculations to determine whether a pole meets pole loading safety factor requirements of GO 95, including planning and information collection needed to support said calculations. Calculations shall

Category D. Asset Management and Inspections Initiative Activity	Definition
	consider many factors including the size, location, and type of pole; types of attachments; length of conductors attached; and number and design of supporting guys, per D.15-11-021.
Quality assurance / quality control of inspections	Establishment and function of audit process to manage and confirm work completed by employees or subcontractors, including packaging QA/QC information for input to decision-making and related integrated workforce management processes.
Substation inspections	In accordance with GO 175, inspection of substations performed by qualified persons and according to the frequency established by the utility, including record-keeping.

Category E. Vegetation Management and Inspections

Category E. Vegetation Management and Inspections Initiative Activity	Definition
Additional efforts to manage community and environmental impacts	Plan and execution of strategy to mitigate negative impacts from utility vegetation management to local communities and the environment, such as coordination with communities to plan and execute vegetation management work or promotion of fire-resistant planting practices

Category E. Vegetation Management and Inspections Initiative Activity	Definition
Detailed inspections of vegetation around distribution electric lines and equipment	Careful visual inspections of vegetation around the right-of-way, where individual trees are carefully examined, visually, and the condition of each rated and recorded.
Detailed inspections of vegetation around transmission electric lines and equipment	Careful visual inspections of vegetation around the right-of-way, where individual trees are carefully examined, visually, and the condition of each rated and recorded.
Emergency response vegetation management due to red flag warning or other urgent conditions	Plan and execution of vegetation management activities, such as trimming or removal, executed based upon and in advance of forecast weather conditions that indicate high fire threat in terms of ignition probability and wildfire consequence.
Fuel management and reduction of "slash" from vegetation management activities	Plan and execution of fuel management activities that reduce the availability of fuel in proximity to potential sources of ignition, including both reduction or adjustment of live fuel (in terms of species or otherwise) and of dead fuel, including "slash" from vegetation management activities that produce vegetation material such as branch trimmings and felled trees.
Improvement of inspections	Identifying and addressing deficiencies in inspections protocols and implementation by improving training and the evaluation of inspectors.

Category E. Vegetation Management and Inspections Initiative Activity	Definition
LiDAR inspections of vegetation around distribution electric lines and equipment	Inspections of right-of-way using LiDAR (Light Detection and Ranging, a remote sensing method that uses light in the form of a pulsed laser to measure variable distances).
LiDAR inspections of vegetation around transmission electric lines and equipment	Inspections of right-of-way using LiDAR (Light Detection and Ranging, a remote sensing method that uses light in the form of a pulsed laser to measure variable distances).
Other discretionary inspections of vegetation around distribution electric lines and equipment	Inspections of rights-of-way and adjacent vegetation that may be hazardous, which exceeds or otherwise go beyond those mandated by rules and regulations, in terms of frequency, inspection checklist requirements or detail, analysis of and response to problems identified, or other aspects of inspection or records kept.
Other discretionary inspections of vegetation around transmission electric lines and equipment	Inspections of rights-of-way and adjacent vegetation that may be hazardous, which exceeds or otherwise go beyond those mandated by rules and regulations, in terms of frequency, inspection checklist requirements or detail, analysis of and response to problems identified, or other aspects of inspection or records kept.
Patrol inspections of vegetation around distribution electric lines and equipment	Visual inspections of vegetation along rights-of-way that is designed to identify

Category E. Vegetation Management and Inspections Initiative Activity	Definition
	obvious hazards. Patrol inspections may be carried out in the course of other company business.
Patrol inspections of vegetation around transmission electric lines and equipment	Visual inspections of vegetation along rights-of-way that is designed to identify obvious hazards. Patrol inspections may be carried out in the course of other company business.
Quality assurance / quality control of vegetation inspections	Establishment and function of audit process to manage and confirm work completed by employees or subcontractors, including packaging QA/QC information for input to decision-making and related integrated workforce management processes.
Recruiting and training of vegetation management personnel	Programs to ensure that the utility is able to identify and hire qualified vegetation management personnel and to ensure that both full-time employees and contractors tasked with vegetation management responsibilities are adequately trained to perform vegetation management work, according to the utility's wildfire mitigation plan, in addition to rules and regulations for safety.
Remediation of at-risk species	Actions taken to reduce the ignition probability and wildfire consequence attributable to at-risk vegetation species,

Category E. Vegetation Management and Inspections Initiative Activity	Definition
	such as trimming, removal, and replacement.
Removal and remediation of trees with strike potential to electric lines and equipment	Actions taken to remove or otherwise remediate trees that could potentially strike electrical equipment, if adverse events such as failure at the ground-level of the tree or branch breakout within the canopy of the tree, occur.
Substation inspection	Inspection of vegetation surrounding substations, performed by qualified persons and according to the frequency established by the utility, including record-keeping.
Substation vegetation management	Based on location and risk to substation equipment only, actions taken to reduce the ignition probability and wildfire consequence attributable to contact from vegetation to substation equipment.
Vegetation inventory system	Inputs, operation, and support for centralized inventory of vegetation clearances updated based upon inspection results, including (1) inventory of species, (2) forecasting of growth, (3) forecasting of when growth threatens minimum right-of-way clearances ("grow-in" risk) or creates fall-in/fly-in risk.

Category E. Vegetation Management and Inspections Initiative Activity	Definition
Vegetation management to achieve clearances around electric lines and equipment	Actions taken to ensure that vegetation does not encroach upon the minimum clearances set forth in Table 1 of GO 95, measured between line conductors and vegetation, such as trimming adjacent or overhanging tree limbs.

Category F. Grid Operations and Operating Protocols

Category F. Grid Operations and Operating Protocols Initiative Activity	Definition
Automatic recloser operations	Designing and executing protocols to deactivate automatic reclosers based on local conditions for ignition probability and wildfire consequence.
Crew-accompanying ignition prevention and suppression resources and services	Those firefighting staff and equipment (such as fire suppression engines and trailers, firefighting hose, valves, and water) that are deployed with construction crews and other electric workers to provide site-specific fire prevention and ignition mitigation during on-site work
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

Category F. Grid Operations and Operating Protocols Initiative Activity	Definition
	procedures to increased mitigation measures to constraints on work performed.
Protocols for PSPS re-energization	Designing and executing procedures that accelerate the restoration of electric service in areas that were de-energized, while maintaining safety and reliability standards.
PSPS events and mitigation of PSPS impacts	Designing, executing, and improving upon protocols to conduct PSPS events, including development of advanced methodologies to determine when to use PSPS, and to mitigate the impact of PSPS events on affected customers and local residents.
Stationed and on-call ignition prevention and suppression resources and services	Firefighting staff and equipment (such as fire suppression engines and trailers, firefighting hose, valves, firefighting foam, chemical extinguishing agent, and water) stationed at utility facilities and/or standing by to respond to calls for fire suppression assistance.

Category G. Data Governance

Category G. Data Governance Initiative Activity	Definition
Centralized repository for data	Designing, maintaining, hosting, and upgrading a platform that supports storage, processing, and utilization of all utility

Category G. Data Governance Initiative Activity	Definition
	proprietary data and data compiled by the utility from other sources.
Collaborative research on utility ignition and/or wildfire	Developing and executing research work on utility ignition and/or wildfire topics in collaboration with other non-utility partners, such as academic institutions and research groups, to include data-sharing and funding as applicable.
Documentation and disclosure of wildfire-related data and algorithms	Design and execution of processes to document and disclose wildfire-related data and algorithms to accord with rules and regulations, including use of scenarios for forecasting and stress testing.
Tracking and analysis of near miss data	Tools and procedures to monitor, record, and conduct analysis of data on near miss events.

Category H. Resource Allocation Methodology

Category H. Resource Allocation Methodology Initiative Activity	Definition
Allocation methodology development and application	Development of prioritization methodology for human and financial resources, including application of said methodology to utility decision-making.
Risk reduction scenario development and analysis	Development of modeling capabilities for different risk reduction scenarios based on wildfire mitigation initiative

Category H. Resource Allocation Methodology Initiative Activity	Definition
	implementation; analysis and application to utility decision-making.
Risk spend efficiency analysis	Tools, procedures, and expertise to support analysis of wildfire mitigation initiative risk-spend efficiency, in terms of MAVF and/ or MARS methodologies.

Category I. Emergency Planning and Preparedness

Category I. Emergency Planning and Preparedness Initiative Activity	Definition
Adequate and trained workforce for service restoration	Actions taken to identify, hire, retain, and train qualified workforce to conduct service restoration in response to emergencies, including short-term contracting strategy and implementation.
Community outreach, public awareness, and communications efforts	Actions to identify and contact key community stakeholders; increase public awareness of emergency planning and preparedness information; and design, translate, distribute, and evaluate effectiveness of communications taken before, during, and after a wildfire, including Access and Functional Needs populations and Limited English Proficiency populations in particular.
Customer support in emergencies	Resources dedicated to customer support during emergencies, such as website pages

Category I. Emergency Planning and Preparedness Initiative Activity	Definition
	and other digital resources, dedicated phone lines, etc.
Disaster and emergency preparedness plan	Development of plan to deploy resources according to prioritization methodology for disaster and emergency preparedness of utility and within utility service territory (such as considerations for critical facilities and infrastructure), including strategy for collaboration with Public Safety Partners and communities.
Preparedness and planning for service restoration	Development of plans to prepare the utility to restore service after emergencies, such as developing employee and staff trainings, and to conduct inspections and remediation necessary to re-energize lines and restore service to customers.
Protocols in place to learn from wildfire events	Tools and procedures to monitor effectiveness of strategy and actions taken to prepare for emergencies and of strategy and actions taken during and after emergencies, including based on an accounting of the outcomes of wildfire events.

Category J. Stakeholder Cooperation and Community Engagement

Category J. Stakeholder Cooperation and Community Engagement Initiative Activity	Definition
Community engagement	Strategy and actions taken to identify and contact key community stakeholders; increase public awareness and support of utility wildfire mitigation activity; and design, translate, distribute, and evaluate effectiveness of related communications. Includes specific strategies and actions taken to address concerns and serve needs of Access and Functional Needs populations and Limited English Proficiency populations in particular.
Cooperation and best practice sharing with agencies outside CA	Strategy and actions taken to engage with agencies outside of California to exchange best practices both for utility wildfire mitigation and for stakeholder cooperation to mitigate and respond to wildfires.
Cooperation with suppression agencies	Coordination with CAL FIRE, federal fire authorities, county fire authorities, and local fire authorities to support planning and operations, including support of aerial and ground firefighting in real-time, including information-sharing, dispatch of resources, and dedicated staff.
Forest service and fuel reduction cooperation and joint roadmap	Strategy and actions taken to engage with local, state, and federal entities responsible for or participating in forest management and fuel reduction activities; and design

Category J. Stakeholder Cooperation and Community Engagement Initiative Activity	Definition
	utility cooperation strategy and joint stakeholder roadmap (plan for coordinating stakeholder efforts for forest management and fuel reduction activities).

Appendix F. Glossary of Terms

Term	Definition
AB	Assembly bill
AFN	Access and functional needs
ALJ	Administrative law judge
BVES	Bear Valley Electric Service
CAISO	California Independent System Operator
Cal Advocates	Public Advocate's Office
CAL FIRE	California Department of Forestry and Fire Protection
CBO	Community-based organization
CEJA	California Environmental Justice Alliance
CNRA	California Natural Resources Agency
CPUC	California Public Utilities Commission
D.	Decision
DFA	Distribution fault anticipation
DR	Data request
EBMUD	East Bay Municipal Utility District
EFD	Early fault detection
EPIC	Electric Program Investment Charge
EPUC	Energy Producers and Users Coalition
EVM	Enhanced vegetation management

Term	Definition
FERC	Federal Energy Regulatory Commission
FGDC	Federal Geographic Data Committee
FIRIS	Fire Integrated Real Time Intelligence System
FMEA	Failure Modes and Effects Analysis
FPI	Fire Potential Index
GIS	Geographic information systems
GO	General order
GPI	Green Power Institute
GRC	General rate case
HFRA	High fire risk area
HFTD	High fire threat district
HWT or Horizon West	Horizon West Transmission
I.	Investigation
ICS	Incident command system or structure
IOU	Investor-owned utility
ISA	International Society of Arboriculture
ITO	Independent transmission operator
IVM	Integrated vegetation management
IVR	Interactive voice response
JIS	Joint information system
kV	Kilovolt

Term	Definition
Liberty	Liberty Utilities / CalPeco Electric
LiDAR	Light detection and ranging
LTE	Long-term evolution
Maturity Model	Utility Wildfire Mitigation Maturity Model
Maturity Survey	Utility Wildfire Mitigation Maturity Survey
MARS	Multi-attribute risk score
MAVF	Multi-attribute value function
MBL	Medical Baseline
MGRA	Mussey Grade Road Alliance
MMAA	Mountain Mutual Aid Association
NERC	North American Electric Reliability Corporation
NFDRS	National Fire Danger Rating System
OCFA	Orange County Fire Authority
OEIS or Energy Safety	Office of Energy Infrastructure Safety
OP	Ordering paragraph
OPD	Open phase detection
OPW	Outage-producing winds
PG&E	Pacific Gas and Electric Company
PLP	Pole Loading Assessment Program
PMO (PacifiCorp)	Project Management Office

Term	Definition
PMO (SCE)	Public Safety Program Management Office
PMU	Phasor measurement unit
PoF	Probability of failure
PoI	Probability of ignition
PRC	Public Resources Code
PSPS	Public Safety Power Shutoff
Pub. Util. Code or PU Code	Public Utilities Code
QA	Quality Assurance
QC	Quality Control
R.	Rulemaking
RAMP	Risk Assessment and Management Phase
RAR	Remote automatic reclosers
RBDM	Risk-based decision making
RCP	Remedial compliance plan
RCRC	Rural County Representatives of California
REFCL	Rapid earth fault current limiter
RFW	Red Flag Warning
RSE	Risk-spend efficiency
SAWTI	Santa Ana Wildfire Threat Index
SB	Senate bill
SCADA	Supervisory control and data acquisition

Term	Definition
SCE	Southern California Edison Company
SDG&E	San Diego Gas & Electric Company
S-MAP	Safety Model Assessment Proceeding, now the Risk-Based Decision-Making Framework Proceeding
SMJU	Small and multijurisdictional utility
SUI	Wildland-urban interface
TAT	Tree Assessment Tool
TBC	Trans Bay Cable
TURN	The Utility Reform Network
USFS	United States Forest Service
VM	Vegetation management
VRI	Vegetation Risk Index
WMP	Wildfire Mitigation Plan
WRRM	Wildfire Risk Reduction Model
WSAB	Wildfire Safety Advisory Board
WSD	Wildfire Safety Division
WSIP	Wildfire Safety Inspection Program