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

OFFICE OF ENERGY INFRASTRUCTURE SAFETY
715 P Street, 20th Floor | Sacramento, CA 95814
916.902.6000 | www.energysafety.ca.gov

Caroline Thomas Jacobs, Director

February 14, 2025

Dear Stakeholders,

Enclosed is the Office of Energy Infrastructure Safety's (Energy Safety's) Annual Report on Compliance regarding Pacific Gas and Electric Company's execution of its 2022 Wildfire Mitigation Plan.

This Annual Report on Compliance is hereby published as of the date of this letter. Pacific Gas and Electric Company may, if it wishes to do so, file a public response to this Annual Report on Compliance within 14 calendar days of the date of publication. Comments must be submitted to Energy Safety's E-Filing system in the 2022 Annual Report on Compliance docket.[1]

Sincerely,

Patrick Doherty

Patrick Doherty
Program Manager | Compliance Assurance Division
Electrical Infrastructure Directorate
Office of Energy Infrastructure Safety

[1] Submit responses to the 2022-ARC docket via the Office of Energy Infrastructure Safety's E-Filing system here: https://efiling.energysafety.ca.gov/EFiling/DocketInformation.aspx?docketnumber=2022-ARC

OFFICE OF ENERGY INFRASTRUCTURE SAFETY

2022 ANNUAL REPORT ON COMPLIANCE

PACIFIC GAS AND ELECTRIC COMPANY

February 2025

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Executive Summary

The Office of Energy Infrastructure Safety (Energy Safety) is tasked with evaluating and either approving or denying Wildfire Mitigation Plans (WMP) annually filed by electrical corporations pursuant to Public Utilities Code section 8386 *et seq*. The law also directs Energy Safety to ensure that the electrical corporations have complied with their plans.

Pacific Gas and Electric Company (PG&E) completed 129 of 139 (or 93%) of its 2022 WMP Update initiative activities, including six of the ten initiatives with the largest planned expenditure.

PG&E failed to meet its commitments for eight of its WMP initiative activities in 2022, seven of which were vegetation management initiative activities. PG&E did not provide sufficient information for Energy Safety to determine compliance with two additional initiative activities.

PG&E spent less than planned on its initiative activity work by approximately $657 million (11%), compared to its planned expenditure of approximately $5,964,000,000 for the 2022 WMP Update. Ultimately, PG&E spent approximately $5,307,000,000 on work related to the 2022 WMP Update. PG&E attributed much of the variance between planned and actual expenditure as due to positive efficiencies in operations.

With respect to the overall performance of PG&E's system in 2022, PG&E's raw ignition counts in 2022 returned to counts observed in 2015, which represented a 20% decrease from levels observed in 2017 and a 6% decrease from 2020. PG&E's outage events remained stable compared to previous years. In 2022, zero Public Safety Power Shutoff (PSPS) events were executed on PG&E's system.

Pursuant to Government Code section 15475.1, Energy Safety's primary objective is to ensure that electrical corporations reduce wildfire risk and comply with energy infrastructure safety measures. Energy Safety's annual compliance evaluation of PG&E's execution of its 2022 WMP Update is a comprehensive look at whether PG&E's execution of its 2022 WMP Update reduced the risk of PG&E equipment igniting a catastrophic wildfire.

Energy Safety conducted its compliance review process through a variety of means including audits, field inspections, and analysis of data submitted by PG&E to Energy Safety. Energy Safety also evaluated several performance metrics, including metrics that reveal the risk on PG&E's system. Energy Safety additionally reviewed PG&E's self-assessment in its Electrical Corporation Annual Report on Compliance and the findings of its independent evaluator.

Energy Safety found that PG&E's missed targets did not significantly hinder PG&E's overall ability to mitigate its wildfire risk. On balance, PG&E was largely successful in executing its plan for wildfire risk mitigation in 2022 as it completed 93% of its WMP initiative activities. For example, PG&E completed 179.7 miles of undergrounding (exceeding its target of 175 circuit miles), hardened a total of 483 circuit miles (exceeding its target of 470 circuit miles), and

removed or replaced 37.8 circuit miles of transmission conductor traversing high fire threat districts or high fire risk areas (exceeding its target of 32 circuit miles). While Energy Safety acknowledges that PG&E achieved its overarching objectives, there are still areas for improvement and continued learning, especially concerning vegetation management.

1. Introduction

This Annual Report on Compliance presents the Office of Energy Infrastructure Safety's (Energy Safety's) statutorily mandated assessment of Pacific Gas and Electric Company's (PG&E's) compliance with its 2022 Wildfire Mitigation Plan (WMP) Update. (Pub. Util. Code § 8386.)

In the sections that follow, Energy Safety describes the statutory regulatory basis for its reporting, the information supplied by the electrical corporation, and the independent analysis conducted by Energy Safety to examine PG&E's execution of its 2022 WMP Update and how its infrastructure performed in 2022 relative to wildfire risk. Finally, Energy Safety provides its conclusions, observations, and recommendations for further actions by PG&E.

1.1 Compliance Process

The statutory objective of electrical corporation wildfire mitigation planning efforts is to ensure that electrical corporations are constructing, maintaining, and operating their infrastructure in a manner that will minimize the risk of catastrophic wildfire. (Pub. Util. Code § 8386.) The objective of a WMP, and consequently the focus of Energy Safety's assessment of compliance, is wildfire risk reduction. An electrical corporation's obligations extend beyond meeting WMP targets.

Energy Safety's 2022 Compliance Process establishes the parameters for this Annual Report on Compliance. Consistent with the 2022 Compliance Process, this report considers the totality of all compliance assessments completed with respect to PG&E's 2022 WMP Update. This includes all inspection, audit, investigation, and data analysis work performed by Energy Safety, as well as separate electrical corporation and independent third-party evaluations of compliance. (Compliance Process, p. 6.)

Energy Safety evaluated whether the electrical corporation implemented the initiatives in its 2022 WMP Update, looking specifically at whether the electrical corporation funded and performed the work stated for each initiative. (Compliance Process, p. 7.)

Energy Safety considered the electrical corporation's stated goals and objectives of its plan, its performance of initiatives essential to reducing wildfire risk and achieving its objectives, and the ultimate performance of its infrastructure relative to its wildfire risk, as measured by changes in the occurrence of events that correlate to wildfire risk. (Compliance Process, p. 7.)

2. PG&E'S 2022 Wildfire Mitigation Plan Update

PG&E submitted a comprehensive WMP in 2020, which covered a three-year term from 2020 through the end of 2022. PG&E submitted annual updates to the original 2020 WMP, including a 2022 Update to its 2020 WMP that is the subject of this Annual Report on Compliance. Energy Safety approved PG&E's 2022 Update to its 2020 WMP (hereinafter 2022 WMP Update) on November 10, 2022.

Among other things, PG&E's 2022 WMP Update proposed to implement:

a. Movement forward with undergrounding of powerlines in High Threat Fire Districts (HTFD) and hardening of its system using covered conductor or line removal;
b. Expansion of Enhanced Powerline Safety Settings (EPSS) to all risk areas;
c. Application of new mitigation technologies such as Supervisory Control and Data Acquisition (SCADA)-enabled automated sectionalizing devices, single phase recloser sets, and advanced system sensors;
d. Continued aggressive vegetation management practices;
e. Enhanced detailed inspections and up-to-date risk modeling capabilities to support its data-driven, risk informed approach;
f. Improved situational awareness by maximizing use of cameras and weather stations, and;
g. Using Public Safety Power Shutoff (PSPS) as a final safety action. (2022 WMP Update, pp. 2-3.)

PG&E included three goals for preventing catastrophic wildfires associated with electrical equipment: 1) reducing wildfire potential, 2) improving situational awareness, and 3) reducing the impact to customers and communities due to PSPS events and outages and outages on circuits with EPSS enabled. (2022 WMP Update, p. 7.)

Listed below are examples of how PG&E intended to operationalize its three goals.

1. Reducing Wildfire Potential: implement various programs such as vegetation management, inspections and repairs of electric facilities, system hardening and automation. During high-risk weather, leverage PSPS and EPSS as needed.
2. Improving Situational Awareness: enhance PG&E's ability to monitor and respond to potential wildfire threats by refining weather models, installing weather stations and high-definition cameras, and deploying advance technologies like Distribution Fault Anticipation and Early Fault Detection systems.
3. Reducing Impact on Customers and Communities: reduce the disruption caused by PSPS and EPSS by optimizing settings, updating protocols based on the latest data, and deploying resources to quickly restore power. Additionally, installing

> sectionalization devices, hardening systems, operating temporary distribution microgrids, and target frequently impacted circuit segments for undergrounding. Finally, PG&E is expanding outreach efforts to keep customers informed and prepared for potential outages. (2022 WMP Update, pp. 269-270.)

Section 5.1 provides a table that describes the activities of the varied programs and initiative commitments contained in PG&E's 2022 WMP Update. Please refer to Table 1 in Section 5.1 for more detail on those initiative commitments.

3. PG&E's Annual Report on Compliance

Public Utilities Code section 8386.3 directs electrical corporations to file a report addressing the electrical corporation's compliance with their WMP during a compliance year. This document is known as the Electrical Corporation Annual Report on Compliance (EC ARC).

Energy Safety's 2022 Compliance Process outlines the requirements for an EC ARC. The EC ARC must detail the electrical corporation's self-assessment of its compliance with the 2022 WMP Update during the 2022 compliance period. Energy Safety's 2021 Compliance Operational Protocols also apply to EC ARCs for the 2022 compliance period. These Protocols outline the requirements for EC ARCs, including an assessment by the electrical corporation of whether it met its intended risk reduction by implementing all of its approved WMP initiatives (i.e., the degree to which initiative activities have reduced ignition probabilities), and descriptions of all planned WMP initiative spending versus actual WMP initiative spending, and an explanation of any differentials between the planned and actual spending. (Ops Protocols, pp. 10-12.)

PG&E submitted its EC ARC to Energy Safety on March 31, 2023. While a narrative summary of PG&E's self-reported compliance appears below, please refer to Appendices A and B of this document for more information.

PG&E asserted that it complied with its 2022 WMP Update. According to PG&E's 2022 EC ARC, PG&E tracked 54 specific wildfire-related initiative activities included in its 2022 WMP Update.[1] (2022 EC ARC, p. 1.)

PG&E stated that it achieved its 2022 WMP Update objectives and goals to significantly reduce wildfire risk as a result of implementing its approved WMP initiatives and activities by meeting or exceeding 52 of 54 WMP initiative activity targets. For the two initiatives not completed (Vegetation Management – Quality Assurance/Quality Verification (E.05); and High Fire-Threat District/High Fire-Risk Area (HFTD/HFRA) Open Tag Reduction – Distribution (D.10), PG&E claimed to have made significant progress and developed corrective plans for continuous improvement. (2022 EC ARC, p. 1.)

For Vegetation Management – Quality Assurance/Quality Verification (E.05), PG&E had the following target: establish a 95% Acceptable Quality Level (AQL) score for audits/reviews for seven vegetation management programs. This initiative target had 14 different components,

[1] These 54 wildfire-related initiative activities all have initiative ID's (e.g., A.01, A.02, etc.) for tracking purposes. These 54 initiative activities are a subset of the total 139 initiative activities contained in PG&E's 2022 WMP Update and analyzed by Energy Safety.

seven related to the number of audits or reviews performed and seven related to programs achieving a 95% AQL score. PG&E included the following two tables in its 2022 WMP Update which outline the programs that were audited or reviewed, and each audit or review's associated AQL score target. (2022 WMP Update, pp. 772-773, SVM Audit, pp. A-37-38.)

Type of Audits	Number of Audits	AQL
Distribution - voltages less than 60kV in our Routine, Tree Mortality, Enhanced Vegetation Management (EVM) and Pole Clearing programs.	43	95%
Vegetation Pole Clearing	1	95%
Transmission - high voltage 60kV and greater and applies to maintaining high voltage transmission corridors to Minimum Routine North American Electric Reliability Corporation (NERC) clearance, Public Resources Code (PRC) 4293 clearance, and GO 95 Rule 35 clearance.	1	95%
Procedure audit of the following: Enhanced Vegetation Management, Record Keeping, Transmission and Distribution Line Verification, and Refusal Procedure	4	95%

Type of Verification	Number of Reviews or Poles	AQL
Distribution - voltages less than 60kV in our Routine, Tree Mortality, EVM and Pole Clearing programs.	1,522 Reviews	95%
Vegetation Pole Clearing	3,421 Poles	95%
Transmission – high voltage 60kV and greater and applies to maintaining high voltage transmission corridors to Minimum NERC clearance, PRC 4293 clearance, and GO 95 Rule 35 clearance	260 Reviews	95%

PG&E reported to have conducted the seven types of audits or reviews but did not achieve a 95% AQL score for four of the seven program types. PG&E stated that it conveyed in a Revision Notice dated June 6, 2022, that it may not be able to meet the 95% AQL target given that it was established midway through the year and much of the work had already taken place, primarily for pole clearing. (2022 EC ARC, p. 13.)

For HFTD/HFRA Open Tag Reduction (D.10), PG&E had a target of closing 55,000 distribution maintenance tags barring external factors, for facilities located in HFTD and HFRA that were in its workplan as of June 30, 2022. This target was specific to closing Priority E maintenance tags, given that these tags constituted the largest percentage of risk in its distribution tag backlog. PG&E reported that it was only able to complete 45,951 E tags in 2022. PG&E stated that it had to address higher priority A and B tags as those have shorter regulatory compliance requirements and are generally higher risk that E tags. PG&E stated that it completed a total of 58,275 A, B, E, and F tags in 2022. (2022 EC ARC, p. 14.)

PG&E's 2022 EC ARC also reported on risk reduction in addition to its initiative activities. It stated that by implementing its 2022 WMP Update initiative activities, wildfire risk was reduced in the following ways:

- 34% reduction in California Public Utilities Commission (CPUC)-reportable ignitions in High Fire Threat Districts (HFTD);
- 35% reduction in CPUC-reportable fire ignitions in High-Fire Risk Areas (HFRA);
- 59% reduction in CPUC-reportable ignitions caused by PG&E equipment in HFTD Tier 2 and Tier 3 areas;
- 40% reduction in CPUC-reportable ignitions caused by vegetation contact in HFTD Tier 2 and Tier 3 areas;
- 99% reduction in acres impacted by wildfires as compared to the three-year average from 2018 to 2020;
- 56% reduction in EPSS outages; and,
- 100% reduction in PSPS events. (2022 EC ARC, pp. 1-2.)

3.1 EC ARC Information on Initiative Funding

Pursuant to the 2022 Compliance Process adopted by Energy Safety, each Annual Report on Compliance produced by Energy Safety must include an analysis of whether an electrical corporation funded work stated for each initiative. This analysis is conducted by examining information supplied by the electrical corporation in its 2022 EC ARC. This examination reveals expenditures on various WMP initiatives. The information supplied by PG&E on its initiative funding appears in Table 8 in Appendix C. While a narrative description appears below, please refer to Table 8 for more detail.

In general, PG&E spent less than expected on its 2022 WMP Update initiatives by nearly $657 million (11% of planned expenditure). Despite this, PG&E reported that it met nearly all its

quantitative 2022 WMP Update initiative activity targets and notes that much of the spending variance was due to efficiencies in performing work, favorable environmental conditions, timing of its undergrounding work, and strategic opportunities to reduce costs for customers while still completing mitigation work. (2022 EC ARC, p. 15, 2022 EC ARC-B.)

4. Independent Evaluator ARC for PG&E

Energy Safety, in consultation with the Office of the State Fire Marshal, annually publishes a list of entities qualified to serve as independent evaluators of WMP compliance. (Pub. Util. Code § 8386.3(c)(2)(A).) Each electrical corporation is required to contract with an Independent Evaluator (IE) from the list to perform a compliance assessment. (Pub. Util. Code § 8386.3(c)(2)(B)(i).)

The IE reviews and assesses the electrical corporation's compliance with its approved WMP. As part of its evaluation, the IE must determine whether the electrical corporation failed to fund any activities included in its plan.

On July 1st of each year, the IE issues its Annual Report on Compliance (IE ARC) for a given electrical corporation. (Pub. Util. Code § 8386.3(c)(2)(B)(i).)

The 2022 IE ARC for PG&E was prepared by Bureau Veritas North America Inc. (BVNA), and C2 Group. The IE ARC reviewed the wildfire mitigation initiative commitments and activities implemented by PG&E in 2022 for verification of WMP compliance, validation of Quality Assurance/Quality Control (QA/QC) programs, and assessment of funding activities related to the 2022 WMP Update.

As a result of the work conducted, the IE made findings, including:

- With respect to PG&E's "Large Volume" QA/QC processes, inadequacies or inconsistencies were noted between photographic documentation and written inspection reports, making it a challenge to determine an actual condition. Inconsistencies included:
    - Bar code and pole numbers on inspection reports different from bar code and pole numbers in photos.
    - Differing conclusions of asset conditions for the same asset in some cases. For example, three assets inspected were reported as having moderate damage, but in another inspection were noted as having "no visual damage." (IE ARC, p. 5.)
- For Enhanced Vegetation Management (7.3.5.2 - E.01), PG&E committed to completing 1,800 circuit miles in 2022, which it exceeded by 123.8 circuit miles for a total of 2,047.6 circuit miles. The IE team performed field inspections at a sample of circuits

worked for this initiative and observed 15 segment locations where residual debris surrounded the remediated trees. (IE ARC, p. 6.)

- With respect to High Fire Threat Districts/High-Fire Risk Areas (HFTD/HFRA) Open Tag Reduction for Distribution Systems (7.3.3.12.4 - D.10), the IE noted PG&E did not meet its target of closing 55,000 E maintenance tags by the end of 2022. PG&E completed 45,951 E tags, as well as higher priority A, B, and F tags for a total of 58,275 tags completed. (IE ARC, p. 6.)
- For Vegetation Management Quality Assurance and Quality Verification (7.3.5.13 - E.05), PG&E identified targets for vegetation management quality assurance and quality verification activities for seven program types, and two components for each activity (a total of 14 target components). The IE confirmed that PG&E completed the activities for all seven areas, but did not meet the Acceptable Quality Level (AQL) target. (IE ARC, p. 6.)

The IE identified three initiative categories with an expenditure variance of more than $100 million compared to the initially planned 2022 expenditure[2]:

- 7.3.3 Grid Design and System Hardening: $256.112 million under planned expenditure primarily due to cost savings, over forecasting, and delays in project scheduling.
- 7.3.5 Vegetation Management and Inspections: $187.078 million under planned expenditure primarily due to reduction in Light Detection and Ranging (LiDAR) scope and forecast, transition from the Vegetation Management Enterprise System postponed, and reduced work volume in EVM and Routine Programs.
- 7.3.6 Grid Operations and Protocols: $130.088 million under planned expenditure primarily due to weather conditions being more favorable without the need for a PSPS event, and efficiencies in EPSS patrols. (IE ARC, pp. 92-93.)

In general, the Independent Evaluator found that PG&E spent less than planned on 69 of 78[3] initiative activities, and two of 54 initiative activity targets were not met. PG&E self reported both of the unmet initiative activity targets. (IE ARC, pp. 5-7.)

The IE did not make an overarching determination as to whether initiative spending below projected expenditure impacted completion of PG&E's portfolio of 2022 WMP Update initiative activity targets. (IE ARC, p. 92.) The IE also did not provide an overarching conclusion on whether PG&E applied and followed its QA/QC processes, but its conclusions at the individual activity level appear to indicate this is the case. (IE ARC, pp. 131-140.)

---

[2] The IE's analysis of planned and actual expenditure differs from PG&E's EC ARC due to additional data examination via data requests.

[3] The IE's verification of funding considered a larger population of 2022 WMP Update activities than those which were distinctly and explicitly identified as 2022 WMP Update activities by PG&E.

5. Energy Safety Evaluation of WMP Initiative Completion

Energy Safety's evaluation of PG&E's performance in 2022 indicates that PG&E attained 129 of 139 initiative activities, did not attain eight initiative activities, and did not provide sufficient information regarding two activities to allow Energy Safety to make a determination.

The subsections below describe Energy Safety's evaluation of PG&E's execution of its WMP in 2022.

5.1 PG&E's 2022 WMP Update Initiative Activities Assessed by Energy Safety

Energy Safety's evaluation is based on information sourced from PG&E's 2022 WMP Update, the EC ARC, the IE ARC, PG&E's Quarterly Data Reports (QDRs), and responses to data requests received from PG&E. (2022 WMP Update; 2022 EC AQRC; 2023 EC ARC; IE ARC; 2022 Q4 QDR; DR 234; DR 249.) The initiative activities that Energy Safety assessed in this ARC, a total of 139, are itemized in Table 1.

Table 1: PG&E 2022 WMP Update Initiative Activities

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
A Summarized Risk Map that Shows the Overall Ignition Probability and Estimated Wildfire Consequence Along the Electric Lines and Equipment; Section 7.3.1.1	Develop maps in Foundry to visualize risk model outputs and to implement Work Planning Applications (WPAs). Additionally, develop work planning applications for specific programs including – EVM, Transformer Replacement, Pole Replacement, and System Hardening.

[4] PG&E denotes its 43 quantitative and 11 qualitative program targets from Table PG&E 5.3-1(A) and PG&E 5.3-1(B) of the 2022 WMP Update with Initiative IDs. (2022 WMP Update, pp. 278-308, 313.) The 2022 WMP Update refers to these initiatives (with IDs) as those that "have the most significant impact on wildfire risk reduction." (2022 WMP Update, pp. 274.) Table 1 of this ARC has a compilation of the 54 identified targets from Table PG&E 5.3-1(A) and PG&E 5.3-1(B), as well as 85 more throughout the 2022 WMP Update, totaling 139 initiative activities altogether.

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Climate-Driven Risk Map and Modeling Based on Various Relevant Weather Scenarios; Section 7.3.1.2	Continue work and maintenance on mapping and modelling projects.
Ignition Probability Mapping Showing the Probability of Ignition Along the Electric Lines and Equipment (A.01); Section 7.3.1.3	Develop additional Distribution Equipment/Facility Failure (EFF) and Distribution Contact from Object (CFO) sub-models. Conduct assessment to determine whether newly developed sub models should be included in the Wildfire Distribution Risk Model (WDRM).
Ignition Probability Mapping Showing the Probability of Ignition Along the Electric Lines and Equipment (A.02); Section 7.3.1.3	Develop Threat and Hazard (Risk drivers) sub-models that cover Threats (e.g., Atmospheric corrosion, Underground corrosion, Fatigue, Mechanical Wear, Decay, Contamination, Vibration), and Hazards (primarily Wind). Conduct an assessment to determine whether newly developed sub-models are to be included in the Wildfire Transmission Risk Model (WTRM).
Initiative Mapping and Estimation of Wildfire and PSPS Risk-Reduction Impact (A.03); Section 7.3.1.4	Conduct and assessment of the PSPS Consequence model to inform if it is fit for use to inform PSPS mitigation plans to minimize customer impact.
Match Drop Simulations Showing the Potential Wildfire Consequence of Ignitions That Occur Along the Electric Lines and Equipment (A.04); Section 7.3.1.5	Develop and approach on how to incorporate ingress/egress into the Wildfire Consequence Model.
Match Drop Simulations Showing the Potential Wildfire Consequence of Ignitions That Occur Along the Electric Lines and Equipment (A.05); Section 7.3.1.5	Evaluate an approach to incorporate "Resistance to Control" (i.e., TDI or Terrain Difficulty Index) into the Wildfire Consequence Model. Resistance to Control is the relative difficulty of constructing and holding a control line as affected by resistance to line construction and by fire behavior.

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Numerical Weather Prediction (B.01); Section 7.3.2.1.1	Evaluate running the Fire Potential Index (FPI) and Ignition Probability Weather (IPW) Models with the ensemble mean output of the Operational Mesoscale Modeling System-Ensemble Prediction System (POMMS-EPS)
Advances Weather Monitoring and Weather Stations, Fuel Moisture Sampling and Modeling; Section 7.3.2.1.2	Continue work on fuel moisture sampling and modeling projects.
Weather Stations (B.02); Section 7.3.2.1.3	Install or optimize 100 weather stations. The definition of an installation is being in service and verified as operational. The definition of optimization is when a unit is moved to a new location to improve understanding of whether conditions.
High-Definition Cameras – Installations (B.03); Section 7.3.2.1.4	Install 98 new cameras facing HFTD Tier 2 or Tier 3 viewsheds.
Advanced Weather Monitoring and Weather Stations, Fire Detection & Alerting; Section 7.3.2.1.5	Continue work on fire detection and alerting projects.
Advanced Weather Monitoring and Weather Stations, Other Meteorology Tools and Upgrades; Section 7.3.2.1.6	Continue work on other metrology tools and upgrades, including High Performance Cloud Computing, Medium-to Seasonal-Range Diablo Wind Forecasting, Addressing Weather Forecast Model Uncertainty, PG&E Lightning Detection Network (PLDN), and Information Sharing.

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Continuous Monitoring Sensors, SmartMeter™ Partial Voltage Detection (Formerly Known as Enhanced Wires Down Detection); Section 7.3.2.2.2	Continue ongoing activities, which include software maintenance and activities to ensure continuing coverage on future meter models.
Distribution Fault Anticipation (DFA) and Early Fault Detection (EFD) Technology (B.04); Section 7.3.2.2.3	Install 40 DFA sensors on circuits feeding into HFTD areas or HFRA.
Distribution Fault Anticipation (DFA) and Early Fault Detection (EFD) Technology (B.05); Section 7.3.2.2.3	Install EFD sensors on two circuits feeding into HFTD areas or HFRA.
Continuous Monitoring Sensors, Sensor IQ (SIQ); Section 7.3.2.2.4	Continue to assess the performance and functionality of SIQ data in identifying developing conditions that may cause wildfire
Line Sensor Devices (B.06); Section 7.3.2.2.5	Install Line Sensor devices on 40 circuits feeding into HFTD areas or HFRA to cover mainline and major tap lines in areas meeting minimum load requirements and within cellular coverage areas to provide visibility.
Distribution Transmission Substation: Fire Action Schemes and Technologies (DTS FAST); Section 7.3.2.2.7	Continue work on the 2022 distribution pilot effort, which will focus on installing Light Detection and Ranging (LiDAR) and other sensors—placed at designated locations in HFTDs—on wood poles to monitor both vegetation risk and infrastructure failure and send alerts when specific conditions are met.
Fault indicators for Detecting Faults on Electric Lines and Equipment; Section 7.3.2.3	Continue to install fault indicators when needed.

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Forecast of a Fire Risk Index, Fire Potential Index, or Similar; Section 7.3.2.4	Continue work on Fire Potential Index Model.
Personnel Monitoring Areas of Electric Lines and Equipment in Elevated Fire Risk Conditions; Section 7.3.2.5	Continue work and maintenance on the Safety and Infrastructure Protection Teams (SIPT).
Weather Forecasting and Estimating Impacts on Electric Lines and Equipment; Section 7.3.2.6	Continue work and maintenance on the Ignition Probability Weather (IPW) Model.
Other, Wildfire Safety Operations Center (WSOC); Section 7.3.2.7	Continue use and work relating to the Hazard Awareness & Warning Center (HAWC).
Capacitor Maintenance and Replacement Program; Section 7.3.3.1	Complete annual Capacitor Bank Inspection/Testing. Inspect all distribution capacitor banks in PG&E's system as part of the capacitor maintenance program.
Circuit Breaker Maintenance and Installation to De-Energize Lines Upon Detecting a Fault, Maintenance Substation Distribution; Section 7.3.3.2-D	Complete approximately 630 transmission and distribution circuit breaker maintenance tasks in HFTD areas planned for 2022. The planned maintenance includes circuit breaker exercises, mechanism services and overhauls. Additional condition-based planned maintenance may be triggered during 2022. Circuit breakers will also be identified, prioritized, and proactively replaced based on condition, performance, capacity, and other factors.

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Circuit Breaker Maintenance and Installation to De-Energize Lines Upon Detecting a Fault, Maintenance Substation Transmission; Section 7.3.3.2-T	Complete approximately 630 transmission and distribution circuit breaker maintenance tasks in HFTD areas planned for 2022. The planned maintenance includes circuit breaker exercises, mechanism services and overhauls. Additional condition-based planned maintenance may be triggered during 2022. Circuit breakers will also be identified, prioritized, and proactively replaced based on condition, performance, capacity, and other factors.
Covered Conductor Installation; Section 7.3.3.3	Complete at least 470 circuit miles of system hardening work which includes overhead system hardening, undergrounding and removal of overhead lines in HFTD or buffer zone areas.
Covered Conductor Maintenance; Section 7.3.3.4	Continue to maintain, repair and/or replace covered conductor pursuant to established condition-based maintenance programs.
Crossarm Maintenance, Repair, and Replacement; Section 7.3.3.5	Continue to install composite crossarms at locations identified by General Order (GO) 165 inspections and patrols.
Distribution Pole Replacement and Reinforcement, Including with Composite Poles; Section 7.3.3.6	Continue to inspect poles and replace and/or reinforce poles as needed.
Expulsion Fuse Replacement (C.01); Section 7.3.3.7	Remove 3,000 non-exempt fuses/cutouts identified on distribution poles in HFTD areas or HFRA.
Distribution Line Sectionalizing (C.02); Section 7.3.3.8.1	Install and Supervisory Control and Data Acquisition (SCADA) commission 100 new PSPS SCADA enabled Distribution sectionalizing devices.
Transmission Line Sectionalizing (C.03); Section 7.3.3.8.2	Install and SCADA commission 15 transmission line switches on lines that traverse HFTD areas.

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Distribution Line Motorized Switch Operator (MSO) Program (C.04); Section 7.3.3.8.3	Replace at least 50 of the 104 remaining Motorized Switch Operators that are located within or are energizing line sections that feed into HFTD areas or HFRA.
Installation of System Automation Equipment (C.05); Section 7.3.3.9.1	Install 17 substation SCADA enabled reclosers on circuits serving line sections that feed into HFTD areas or HFRA, barring any exceptions due to connectivity issues necessary to SCADA-enable the recloser.
Single Phase Reclosers (C.06); Section 7.3.3.9.2	Install 80 single phase recloser sets in HFTD areas or HFRA.
Maintenance, Repair, and Replacement of Connectors, Including Hotline Clamps; Section 7.3.3.10	Maintain, repair and/or replace connectors pursuant to established condition-based maintenance programs. Replace existing connectors with new equipment on facilities that are hardened as part of the System Hardening Program.
Generation for PSPS Mitigation (Temporary Distribution Microgrids) (C.07); Section 7.3.3.11.1	Make operationally-ready at least four additional Distribution Microgrid Pre-installed Interconnection Hubs (PIH). This target will include one PIH that completed construction in December 2021 and will be made ready to operate in 2022.
Substation Activities to Enable Reduction of PSPS Impacts (C.08); Section 7.3.3.11.2	Replace the fuse with a circuit switcher on the Rincon Transformer Bank 1.
Emergency Back-up Generation – PG&E Service Centers & Materials Distribution Centers (C.09); Section 7.3.3.11.3	Equip 15 PG&E Service Centers or Materials Distribution Centers sites with emergency back-up generation.

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Fixed Power Solutions; Section 7.3.3.11.4	Begin implementation of the Fixed Power Solutions plan, including: a. Scoping of customer solutions; b. Customer journey mapping; c. Engagement and solicitation of implementation partners; d. Coordination opportunities with other proceedings and customer offerings; and e. Determination of the best mechanism to ensure that the program can be scaled to support customer affordability.
Other Corrective Action, Distribution Substation; Section 7.3.3.12.1	Continue performing corrective repairs and animal abatement activities: Corrective Repairs – PG&E has 584 Line Corrective (LC) notifications from 2021 in progress, and other corrective repair notifications will be generated through the inspections process on an ongoing basis. The LCs will be tracked and prioritized using the LC notification process throughout 2022. Animal Abatement – In 2022, PG&E will continue to execute small scale animal abatement as identified through the LC notification process. PG&E will also continue to monitor animal abatement project triggers in transmission substations to identify and prioritize additional large-scale projects as needed. PG&E will continue the installation of animal abatement in all new construction projects (i.e., transformer replacements, bus conversions and other temporary and permanent installations).

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Other Corrective Action, Transmission Substation; Section 7.3.3.12.2	Continue performing corrective repairs and animal abatement activities: Corrective Repairs – PG&E has 300 LC notifications from 2021 in progress, and other corrective repair notifications will be generated through the inspections process on an ongoing basis. The LCs will be tracked and prioritized using the LC notification process throughout 2022. Animal Abatement – In 2022, PG&E will continue to execute small scale animal abatement as identified through the LC notification process. PG&E will also continue to monitor animal abatement project triggers in transmission substations to identify and prioritize additional large-scale projects as needed. PG&E will continue the installation of animal abatement in all new construction projects (i.e., transformer replacements, bus conversions and other temporary and permanent installations).
Other Corrective Action, Maintenance, Transmission (D.11); Section 7.3.3.12.3	Close a minimum of 18,000 HFTD or HFRA transmission tags in PG&E's workplan as of June 30, 2022, barring external factors.
Other Corrective Action, Maintenance, Distribution (D.10); Section 7.3.3.12.4	Close a minimum of 55,000 HFTD or HFRA distribution tags in PG&E's workplan as of June 30, 2022, barring external factors.

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Other Corrective Action, Generation Substation; Section 7.3.3.12.5	Continue performing corrective repairs and animal abatement activities, as detailed below: Corrective Repairs – PG&E has 142 notifications from 2021 in progress that will be prioritized and tracked to completion using the H1 process (H1 is a list of notifications were created from the 2021 Supplemental Inspections). This is in addition to any new corrective repair notifications generated though ongoing inspections. Animal Abatement – In 2022, Power Generation will define and scope the Animal Abatement Program which will include the one Electric Operations (EO) animal abatement project referenced in Section 7.3.3.12.2 for implementation in 2023 and beyond.
Pole Loading Infrastructure Hardening and Replacement Program Based on Pole Loading Assessment Program; Section 7.3.3.13	Perform pole loading calculations for approximately 180,000 poles. This volume includes an additional 20,000 poles originally forecast to be completed in 2021.
Transformers Maintenance and Replacement; Section 7.3.3.14	Continue replacing overloaded transformers using the WDRM prioritization.
Transmission Tower Maintenance and Replacement; Section 7.3.3.15	Continue transmission tower repair, transmission tower coating, and transmission tower cathodic protection, specifically for structures in areas subject to atmospheric corrosion, particularly those located in HFTD areas.
Undergrounding of Electric Lines and/or Equipment (C.10); Section 7.3.3.16	Complete at least 175 circuit miles of undergrounding work.

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
System Hardening – Distribution (C.11); Section 7.3.3.17.1	Complete at least 470 circuit miles of system hardening work which includes overhead system hardening, undergrounding and removal of overhead lines in HFTD or buffer zone areas except for any mileage being undergrounded and tracked separately as part of PG&E's Butte County Rebuild efforts.
System Hardening – Transmission (C.12); Section 7.3.3.17.2	Remove or replace 32 circuit miles of transmission conductor on lines traversing the HFTD areas or HFRA.
Non-Exempt Surge Arrester Replacement Program (C.13); Section 7.3.3.17.3	Remove all the remaining non-exempt surge arrestors in HFTD areas (based on the known population of 4,590 surge arrestors as of January 1, 2022) through replacement with exempt equipment.
Updates to Grid Topology to Minimize Risk of Ignition in HFTDs, Rapid Earth Current Fault Limiter; Section 7.3.3.17.4	Repair and rebuild the Rapid Earth Fault Current Limiter (REFCL) installation at Calistoga to complete additional pilot evaluation. If the additional pilot is successful, PG&E will look for opportunities to place REFCL into full service as well as evaluate whether any additional sites are appropriate for future installations.
Remote Grid (C.14); Section 7.3.3.17.5	Operate 2 new Remote Grid Standalone Power System (SPS) units.
Butte County Rebuild Program (C.15); Section 7.3.3.17.6	Complete 55 circuit miles of undergrounding work as part of the Butte County Rebuild program.
Detailed Inspections of Distribution Electric Lines and Equipment (D.01); Section 7.3.4.1	Complete detailed inspections on a minimum of 396,000 distribution poles in HFTD areas or HFRA, barring external factors.
Detailed Inspections of Transmission Electric Lines and Equipment (D.02); Section 7.3.4.2	Complete detailed ground inspections on a minimum of 39,000 transmission structures in HFTD areas or HFRA, barring external factors.

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Detailed Inspections of Transmission Electric Lines and Equipment (D.03); Section 7.3.4.2	Complete detailed climbing inspections on a minimum of 1,800 transmission structures in HFTD areas or HFRA, barring external factors.
Detailed Inspections of Transmission Electric Lines and Equipment (D.04); Section 7.3.4.2	Complete detailed aerial inspections on a minimum of 39,000 transmission structures in HFTD areas or HFRA, barring external factors.
Improvement of Inspections; Section 7.3.4.3	Improve optimization and reliability of results for inspection program.
Infrared Inspections of Distribution Electric Lines and Equipment (D.05); Section 7.3.4.4	Complete infrared inspections on a minimum of 9,000 distribution circuit miles in HFTD areas or HFRA, barring external factors.
Infrared Inspections of Transmission Electric Lines and Equipment; Section 7.3.4.5	Continue infrared inspections on transmission electric lines and equipment.
Intrusive Pole Inspections, Distribution; Section 7.3.4.6.1	Perform intrusive pole inspections utilizing new field hardware and software and the revised refreshed technology solution and collect photographs of the poles inspected. Employ the revised utility procedure and enhanced testing method to drill at least one new bore hole when intrusively inspecting wood poles.
Intrusive Pole Inspections, Transmission; Section 7.3.4.6.2	Continue to schedule intrusive pole inspections on HFTD areas.
LiDAR Inspections of Distribution Electric Lines and Equipment; Section 7.3.4.7	Continue LiDAR data acquisition for distribution electric lines and equipment in HFTD and HFRA areas.

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
LiDAR Inspections of Transmission Electric Lines and Equipment; Section 7.3.4.8	Complete LiDAR data acquisition for 269 HFTD/HFRA circuit miles.
Other Discretionary Inspection of Distribution Electric Lines and Equipment, Beyond Inspections Mandated by Rules and Regulations; Section 7.3.4.9	Inspect and maintain all electric distribution miscellaneous overhead and underground equipment.
Other Discretionary Inspection of Transmission Electric Lines and Equipment, Beyond Inspections Mandated by Rules and Regulations; Section 7.3.4.10	Pilot the Ultrasonic Steel Pole and the Corrosion Climbing Assessment inspection methods. Perform Component Sampling and Testing. Continue the Conductor Measurement (Linevue) and Below Grade Inspections of HFTD/HFRA structures.
Patrol Inspections of Distribution Electric Lines and Equipment; Section 7.3.4.11	Continue inspection patrol in HFTD Tier 2 and other areas not subject to detailed inspection.
Patrol Inspections of Transmission Electric Lines and Equipment; Section 7.3.4.12	Continue to perform patrol inspections of electric transmission structures in HFTD and HFRA areas.
Pole Loading Assessment Program to Determine Safety Factor; Section 7.3.4.13	Continue to perform pole loading calculations.
Quality Assurance/Quality Control of Inspections (D.09); Section 7.3.4.14	Perform Transmission and Distribution system inspection quality audits prioritizing HFTD/HFRA areas. Statistically valid methodology parameters, such as a confidence level of 95 percent, will be utilized.

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Substation Inspections (D.06); Section 7.3.4.15	Complete supplemental inspections on 86 distribution substations in HFTD areas or HFRA, barring external factors.
Substation Inspections (D.07); Section 7.3.4.15	Complete supplemental inspections on 43 transmission substations in HFTD areas or HFRA, barring external factors.
Other – Substation Inspections Hydro Generation (D.08); Section 7.3.4.16	Complete supplemental inspections on 52 Hydroelectric Generation Substations and Powerhouses within HFTD areas or HFRA.
Additional Efforts to Manage Community and Environmental Impacts; Section 7.3.5.1	Plan to continue customer outreach across EVM and Routine programs through multiple touchpoints and continued advance notifications including prior to inspections, during tree work, and after post tree work. Expects to extend planning and customer outreach approach across all VM programs, where applicable.
Detailed Inspections of Vegetation Around Distribution Electric Lines and Equipment (E.01); Section 7.3.5.2	Complete EVM work on 1,800 risk ranked distribution circuit miles, barring external factors.
Detailed Inspections of Vegetation Around Distribution Electric Lines and Equipment (E.02); Section 7.3.5.2	Inspect and clear (where clearance is needed) all poles identified in PG&E's Vegetation Management Database as of October 1, 2021, in HFTD areas or HFRA, not required by PRC 4292, barring external factors.
Detailed Inspections of Vegetation Around Distribution Electric Lines and Equipment (E.10); Section 7.3.5.2	Inspect and clear, where clearance is needed, 80,258 distribution poles subject to PRC 4292 in State Responsibility Areas identified by PRC 4292, barring external factors or poles that are exempt under Title 14 Cal. Code of Regulations 1255.

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Detailed Inspections of Vegetation Around Distribution Electric Lines and Equipment; Section 7.3.5.2	Complete the work identified from the Tree Mortality Maintenance plan within 180 days for HFTD areas and within 365 days for non-HFTD areas.
Detailed Inspections and Management Practices for Vegetation Clearances Around Transmission Electrical Lines and Equipment; Section 7.3.5.3	Complete approximately 9,000 acres of Integrated Vegetation Management (IVM) work. Inspection and mitigation, as needed, of 6,800 miles of Routine North American Electric Reliability Corporation (NERC) critical lines. Prioritize routine NERC work based on aerial LiDAR detection. Reassess the LiDAR Risk Score Model annually with LiDAR collected data from routine NERC patrols. Inspection and mitigation, as needed, of approximately 11,400 miles of routine Non-NERC critical lines. Prioritize routine Non-NERC work based on aerial LiDAR detection.
Emergency Response Vegetation Management Due to Red Flag Warning (RFW) or Other Urgent Weather Conditions; Section 7.3.5.4	Continue to implement Procedure TD-7102P-17 during RFW events and other elevated fire weather events
Fuel Management and Management of All Wood and “Slash” From Vegetation Management Activities; Section 7.3.5.5	Complete work on opted-in parcels related to the 2020 wildfires and expects to begin Wood Management (WM) work on opted-in parcels related to 2021 wildfires.
Improvement of Inspections; Section 7.3.5.6	All Senior Vegetation Management Inspectors (SVMI) will have to successfully complete the introduction to Pre-Inspection courses in the Structured Learning Path (SLP).

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Improvement of Inspections; Section 7.3.5.6	Perform a series of four audits at the 1-month, 3-month, 6-month, and 1 year mark to evaluate the work that is being completed by the SVMI once they finish all their courses.
Remote Sensing Inspections of Vegetation Around Distribution Electric Lines and Equipment (E.03); Section 7.3.5.7	Complete at least 2,000 circuit miles of Mobile LiDAR capture on HFTD road access electric distribution lines, barring external factors.
Remote Sensing Inspections of Vegetation Around Transmission Electric Lines and Equipment (E.04); Section 7.3.5.8	Complete LiDAR inspection of a minimum of 18,000 circuit miles of transmission lines, barring external factors.
Other Discretionary Inspection of Vegetation Around Distribution Electric Lines and Equipment, Beyond Inspections Mandated by Rules and Regulations; Section 7.3.5.9	PG&E states that it did not have specific targets for this initiative and would not provide ongoing reporting each quarter on it; but that it was still doing the work as part of its overall plan, referring specifically to work under initiative 7.3.5.20.
Other Discretionary Inspections of Vegetation Around Transmission Electric Lines and Equipment; Section 7.3.5.10	PG&E states that it did not have specific targets for this initiative and would not provide ongoing reporting each quarter on it; but that it was still doing the work as part of its overall plan, referring specifically to work under initiative 7.3.5.3.
Patrol Inspections of Vegetation Around Distribution Electric Lines and Equipment; Section 7.3.5.11	PG&E states that it did not have specific targets for this initiative and would not provide ongoing reporting each quarter on it; but that it was still doing the work as part of its overall plan, referring specifically to work under initiative 7.3.5.2

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Patrol Inspections of Vegetation Around Transmission Electric Lines and Equipment; Section 7.3.5.12	PG&E states that it did not have specific targets for this initiative and would not provide ongoing reporting each quarter on it; but that it was still doing the work as part of its overall plan, referring specifically to work under initiative 7.3.5.3

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Quality Assurance/Quality Control of Vegetation Management (E.05); Section 7.3.5.13	1. Quality Assurance Audits Distribution – voltages less than 60 kV in PG&E's Routine, Tree Mortality, EVM and Pole Clearing Programs # Of Audits: 43 AQL: 95% Vegetation Pole Clearing # Of Audits: 1 AQL: 95% Transmission – High voltage 60 kV and greater and applies to maintaining high voltage transmission corridors to minimum NERC clearance, PRC 4293 clearance, and GO 95 Rule 35 clearance # Of Audits: 1 AQL: 95% 2. Quality Verification Reviews Distribution – voltages less than 60 kV in PG&E's Routine, Tree Mortality, EVM and Pole Clearing programs. #: 1,522 Reviews AQL: 95% Vegetation Pole Clearing #: 3,421 Poles AQL: 95% Transmission - high voltage 60 kV and greater and applies to maintaining high voltage transmission corridors to minimum NERC clearance, PRC 4293 clearance, and GO 95 Rule 35 clearance #: 260 Reviews AQL: 95%

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Recruiting and Training of Vegetation Management Personnel; Section 7.3.5.14	Have all employees and contractors complete applicable One Veg Tool Training by December 31, 2022. (Critical Issue Revision Notice (RN)-PG&E-22-11, Remedy #1.)
Recruiting and Training of Vegetation Management Personnel; Section 7.3.5.14	Expand and improve environmental courses for field crews and tree crews (VEGM-0301 and VEGM-0302). (Critical Issue Revision Notice (RN)-PG&E-22-11, Remedy #1.)
Identification and Remediation of "At-Risk Species"; Section 7.3.5.15	Analyze results of Targeted Tree Species study to more accurately identify and mitigate trees at elevated risk.
Removal and Remediation of Trees with Strike Potential to Electric Lines and Equipment; Section 7.3.5.16	PG&E states that it did not have specific targets for this initiative and would not provide ongoing reporting each quarter on it; but that it was still doing the work as part of its overall plan, referring specifically to work under initiatives 7.3.5.2 ad 7.3.5.3
Substation Inspections, Distribution (E.06); Section 7.3.5.17.1	Complete defensible space inspections in alignment with the guidelines set forth in Public Resource Code (PRC) 4291 at 132 distribution substations within HFTD areas or HFRA, barring external factors.
Substation Inspections, Transmission (E.07); Section 7.3.5.17.2	Complete defensible space inspections in alignment with the guidelines set forth in PRC 4291 at 55 transmission substations within HFTD areas or HFRA, barring external factors.
Substation Inspections, Hydro Generation Substation (E.08); Section 7.3.5.17.3	Complete defensible space inspections at 61 Hydroelectric Generation Substations and Powerhouses within HFTD areas or HFRA, barring external factors.

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Substation Vegetation Management, Distribution; Section 7.3.5.18.1	PG&E states that it did not have specific targets for this initiative and would not provide ongoing reporting each quarter on it; but that it was still doing the work as part of its overall plan, referring specifically to work under initiative 7.3.5.17.1. Complete Substation Inspections - Distribution in alignment with the guidelines set forth in PRC 4291 at 132 distribution substations within HFTD areas or HFRA, barring external factors.
Substation Vegetation Management, Transmission; Section 7.3.5.18.2	PG&E states that it did not have specific targets for this initiative and would not provide ongoing reporting each quarter on it; but that it was still doing the work as part of its overall plan, referring specifically to work under initiative 7.3.5.17.2.
Substation Vegetation Management, Maintenance Substation Generation; Section 7.3.5.18.3	Plan to inspect 61 Hydro Generation sites as detailed in section 7.3.5.17.3, and appropriate mitigations will be implemented. Vegetation management activities continue to be tracked and identified in order of risk priority with work to be completed.
Vegetation Management Enterprise System; Section 7.3.5.19	Plan to roll out One Vegetation Management (VM) Tool to the following teams: Routine Maintenance (Distribution) and Tree Mortality.
Vegetation Management to Achieve Clearances Around Electric Lines and Equipment (E.09); Section 7.3.5.20	Complete utility defensible space work on a minimum of 7,000 poles in the HFTD, barring external factors.
Additional Vegetation Management Practices Beyond Regulatory Requirements and Recommendations; Section 7.3.5.21	Plan to finalize the draft of the VM Wildfire Inspection Guidelines that were created in 2021.

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Automatic Recloser Operations; Section 7.3.6.1	Continue work and maintenance on automatic recloser operations.
Crew Accompanying Ignition Prevention and Suppression Resources and Services; Section 7.3.6.2	SIPT will continue to support fire prevention and mitigation activities and when possible, perform defensible space inspections for PG&E facilities as needed.
Personnel Work Procedures and Training in Conditions of Elevated Fire Risk; Section 7.3.6.3	Web-based training (WBT) SAFE-1503 will be updated in 2022 to incorporate key aspects of the revisions made to Utility Standard TD-1464S.
Protocols for PSPS re-energization, Distribution; Section 7.3.6.4-D	Continue work and maintenance on PSPS distribution re-energization protocols.
Protocols for PSPS re-energization, Transmission; Section 7.3.6.4-T	Continue work and maintenance on PSPS distribution re-energization protocols.
PSPS Events and Mitigation of PSPS Impacts, Distribution; Section 7.3.6.5-D	Continue to review and revise, as needed, PSPS Protocols to reduce the impact of PSPS events on customers while using PSPS under the appropriate circumstances to mitigate potential wildfire ignitions.
PSPS Events and Mitigation of PSPS Impacts, Transmission; Section 7.3.6.5-T	Continue to review and revise, as needed, PSPS Protocols to reduce the impact of PSPS events on customers while using PSPS under the appropriate circumstances to mitigate potential wildfire ignitions.
Stationed and On-Call Ignition Prevention and Suppression Resources and Services; Section 7.3.6.6	Continue to support fire prevention and mitigation activities and maintain an “on call” status during the summer preparedness period by SIPT crews.

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Other, Aviation Support; Section 7.3.6.7	Aviation Services will continue to provide support for wildfire mitigation programs and evaluate the best use of existing assets and to evaluate new technologies.
Protective Equipment and Device Settings (F.01); Section 7.3.6.8	Conduct laboratory testing to refine the circuit device design parameters for 2022 EPSS implementation.
Protective Equipment and Device Settings (F.02); Section 7.3.6.8	Load the engineered settings on protection line devices (line reclosers and fuse savers) on the identified 1,018 circuits on the following schedule, barring external factors: 80 percent of line devices by May 1, 2022, and on the remaining 20 percent of line devices by August 1, 2022.
Protective Equipment and Device Settings (F.03); Section 7.3.6.8	Develop the procedure to govern the enablement of EPSS settings in 2022.
Protective Equipment and Device Settings (F.04); Section 7.3.6.8	Initiate reliability mitigations on 50 EPSS capable circuits in the HFTD areas, HFRA and non-HFTD buffer zones based on highest projected Customer Experiencing Sustained Outage (CESO).
Centralize Repository for Data (G.01); Section 7.3.7.1	Document and implement a process to identify data gaps in Foundry for critical risk drivers. Identify and incorporate new high-priority datasets into Foundry in support of analytic products. Identify and incorporate 20 new, foundational ontology objects into Foundry.
Collaborative Research on Utility Ignition and/or Wildfire; Section 7.3.7.2	Continue work on and finish current collaborative research projects.

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Documentation and Disclosure of Wildfire-Related Data and Algorithms; Section 7.3.7.3	GIS Data Standard (Spatial QDR) – PG&E plans to successfully submit GIS Data Standard reports (Spatial QDR) to Energy Safety. Quarterly Data Report – PG&E plans to successfully submit QDRs to Energy Safety. Quarterly Initiative Update (QIU) – PG&E plans to successfully submit QIU reports to Energy Safety. Documentation and Disclosure of Ignition Events – PG&E plans to review and revise PG&E's Fire Incident Data Collection Plan and Reporting Standard, where applicable. Documentation and Disclosure of Ignition Events – PG&E plans to submit notifications and reports per Rules 29300 and 29001 in Energy Safety's Emergency Rulemaking Compliance Protocols. Documentation and Disclosure of Ignition Events – PG&E plans to complete the Preliminary Ignition Investigation Reports for Q1-Q3 CPUC-reportable ignitions in HFTD prior to year-end. Documentation and Disclosure of Ignition Events – PG&E plans to continue the revision and republishing of PG&E's Fire Incident Data Collection Plan and Reporting Procedure. Wildfire Risk Algorithms – PG&E will continue to add risk models representing additional risk drivers to the composite risk model framework for both the Wildfire Distribution Risk Model (WDRM) and Wildfire Transmission Risk Model (WTRM).
Tracking and Analysis of Near Miss Data; Section 7.3.7.4	Update the 2022 WDRM v3 with near miss data from 2021, roll out training to all Trouble persons to fill out the questionnaire for all equipment failure outage incidents, and transition wires down data analysis process to the Foundry tool.

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Other, IT Projects to Support Wildfire Mitigation Work; Section 7.3.7.5	Further develop the following projects in 2022: Wildfire Safety Division/Wildfire Mitigation Plan (WSD/WMP) Automated Reporting, Foundry Ontology, Wildfire Safety Operations Center (WSOC) Incident Viewer, Grid Data Analytics Suite (GDAT), Aerial Inspection-Sherlock Tool, Electric Asset Registry-Trusted Data (Sync dashboard), Emergency Web Remediation, Wind Loading Assessment, Transmission Support Structures 2, Asset Failure Data Collection, Asset Failure Analysis Data Product, Electric Transmission (ET) Operability Assessment, ET Overhead Asset Information Collection, PSPS Field Patrol, Enhanced Vegetation Management, One Vegetation Management, Wildfire Distribution Risk Model (WDRM), Wildfire Transmission Risk Model (WTRM), Outage Management Tool/Distribution Management System Enhancements (OMT/DMS), PSPS Viewer Enhancements, Sharing Wildfire & PSPS Data Externally, PSPS Situational Intelligence Platform (PSIP), System Inspection Wildfire Mitigation Program, Wildfire Risk Command Center, Maps + Asset Registry/Map Correction.
Allocation Methodology Development and Application; Section 7.3.8.1	Continue to develop value framework methodologies for each program in the Electric Portfolio, as well define an integrated process that evaluates all risks across the electric system.
Risk Reduction Scenario Development and Analysis; Section 7.3.8.2	Update the Subject Matter Expert (SME) informed mitigation effectiveness factors.
Risk Spend Efficiency (RSE) Analysis (H.01); Section 7.3.8.3	Develop and share Risk Spend Efficiency (RSE) Governance Process with Energy Safety.
Adequate and Trained Workforce for Service Restoration; Section 7.3.9.1	Incident Command System (ICS), Standardized Emergency Management System (SEMS), and Emergency Operation Center (EOC) activity is being tracked and/or reported consistent with regulatory requirements.

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Community Outreach, Public Awareness, and Communications Efforts; Section 7.3.9.2	Complete all activities and processes mentioned in initiatives 7.3.9.3 and 7.3.10.1.
Customer Support in Emergencies; Section 7.3.9.3	Continue to offer consumer protections, rebuild resources, and communications to support customers before, during and after a wildfire. Continue to gather feedback from customers and communities and adjust approach, as required.
Disaster and Emergency Preparedness Plan; Section 7.3.9.4	Continue to work on and maintain a disaster and emergency preparedness plan.
Preparedness and Planning for Service Restoration; Section 7.3.9.5	Continue to train employees on the 2022 restoration protocols, conduct field exercises for all impacted divisions, and support pre-flight requests as deemed necessary by field organizations.
Protocols in Place to Learn from Wildfire Events; Section 7.3.9.6	Develop a communications and operations plan that engages external agencies that participate in PG&E exercises and activations for inclusion in after-action reviews.
Community Engagement (J.01); Section 7.3.10.1	Host 22 customer and community focused virtual meetings (i.e., Safety Town Halls, Community Wildfire Safety Program (CWSP) Webinars) to further stakeholder and community awareness of PG&E's wildfire mitigation efforts.
Cooperation and Best Practice Sharing with Agencies Outside CA; Section 7.3.10.2	Continue to engage in the International Wildfire Risk Management Consortium (IWRMC). Continue to partner with educational institutions and other utilities on mitigating wildfire risk.

2022 WMP Update Initiative [4]	2022 Activity Assessed by Energy Safety (2022 WMP Update; DR 249)
Cooperation With Suppression Agencies; Section 7.3.10.3	Continue to provide ongoing engagement and collaboration with external public safety (fire) partners. Continue to support events in 2022, similar to those which the Public Safety Specialist (PSS) team engaged during 2021, such as tailored local engagements; Regional Working Group meetings; gas/electric safety workshops; professional group meetings; wildfire safety trainings; and gas safety outreach with external public safety partners.
Forest Service and Fuel Reduction Cooperation and Joint Roadmap; Section 7.3.10.4	Award up to $5 million to United States Forest Service (USFS) for fuels reduction projects in forests within PG&E's service territory but outside PG&E's Right of Ways.
Other, PMO and General Wildfire Support; Section 7.3.10.5	Continue work and maintenance on the Project Management Office (PMO) and general wildfire support.

5.2 Energy Safety Analysis of Substantial Vegetation Management Audits

Public Utilities Code section 8386.3(c)(5) requires Energy Safety to perform an audit to determine whether the electrical corporation "substantially compl[ied] with the substantial portion" of its vegetation management requirements in its WMP. (Pub. Util. Code § 8386.3(c)(5)(C).) Energy Safety refers to this audit as the Substantial Vegetation Management (SVM) Audit. Pursuant to Public Utilities Code section 8386(c)(5), Energy Safety conducted an audit of PG&E's compliance with the vegetation management requirements in its 2022 WMP Update.

On July 26th 2024, Energy Safety issued its SVM Audit for PG&E. The purpose of the SVM Audit is to assesses whether PG&E met its quantitative commitments and verifiable statements in its 2022 WMP Update related to vegetation management activities.

In the SVM Audit, Energy Safety found 15 initiatives where PG&E did not perform all required work and directed PG&E to provide a response in its Corrective Action Plan.

After reviewing PG&E's Corrective Action Plan, filed on August 26th 2024, Energy Safety issued its SVM Audit Report on October 11th 2024, finding that PG&E sufficiently addressed the issues identified for Corrective Actions, and therefore that PG&E substantially complied with a substantial portion of the vegetation management requirements in its 2022 WMP Update.

The specific findings from Energy Safety's SVM Audit Report are described in Appendix D.

5.3 Energy Safety Field Inspection Analysis

Energy Safety performs inspections utilizing an electrical corporation's initiative activity data applicable to the WMP year compliance period. Energy Safety conducts two types of inspections: 1) inspections of grid hardening and other work related to WMP initiatives related to physical infrastructure, and 2) inspections of general wildfire safety conditions at an inspection site. The second category of general wildfire safety conditions is not strictly related to WMP initiatives, and these inspections are additional to Energy Safety's WMP initiative-related inspection work.[5]

For the 2022 compliance period, Energy Safety conducted 4,339 GWS inspection activities and 1,119 WMP inspection activities in PG&E's territory. Energy Safety distinguishes its inspection activities related to WMP initiatives on grid hardening and physical infrastructure (WMP Inspections) and inspection activities related to general wildfire safety conditions (GWS Inspections) in Table 2 and Table 3.[6]

Table 2: Energy Safety's 2022 Observations of General Wildfire Safety Concerns

GWS Inspection Metrics for 2022 in PG&E's Territory	Totals
Total GWS Inspection Activities	4,339
Total Defects or Wildfire Safety Concerns Observed	38
Rate of Defects or Wildfire Safety Concerns	0.88%
Defects Overdue for Correction	0
Defect Timely Correction Rate	100%

[5] If Energy Safety observes a general wildfire safety concern during an inspection activity, then that is recorded as a "defect" or "Wildfire Safety Concern (WSC)." If Energy Safety observes non-compliance with a WMP initiative during an inspection activity that an electrical corporation claimed to have occurred at a site, then that is recorded as a "violation."

[6] Energy Safety uses the term "inspection activity" to refer to a specific question or condition assessed during an inspection. For example, if Energy Safety is inspecting a particular utility pole and looking for eight different conditions associated with a WMP initiative, then that would count as eight WMP inspection activities. If a general wildfire safety inspection occurs at the same time at that utility pole, and 20 general wildfire safety conditions are assessed, then that would count as 20 general wildfire safety inspection activities. In this example, a single utility pole inspection would lead to 28 inspection activities.

Table 3: Energy Safety's 2022 Observations of WMP Violations

WMP Inspection Metrics for 2022 in PG&E's Territory	Totals
Total WMP Inspection Activities	1,119
Total Violations Observed	0
Violation Rate	0%
Violations Overdue for Correction	0
Violation Timely Correction Rate	100%

5.4 PG&E's WMP Commitment Activity Attainment in 2022

As noted previously, Energy Safety's evaluation of PG&E's performance in 2022 indicates that PG&E attained 129 of 139 initiative activities, did not attain eight initiative activities, and did not provide sufficient information regarding two initiative activities to allow Energy Safety to make a determination.

Table 4 describes the 2022 WMP Update commitment activities that PG&E did not complete in 2022, based on Energy Safety's analysis of PG&E's EC ARC, the IE ARC, and Energy Safety's independent examination of PG&E's transmission and distribution system, as well as data submitted by PG&E for the 2022 compliance year. Based on its analysis, Energy Safety believes that any activity not described in the table below is complete for the 2022 compliance year.

Table 4: PG&E Non-attainment of WMP Initiative Activities

2022 WMP Update Initiative	2022 Initiative Activity	Details of Non-Attainment and Rationale
Covered Conductor Maintenance; Section 7.3.3.4	Continue to maintain, repair, and/or replace covered conductor pursuant to PG&E's established condition-based maintenance programs.	Energy Safety was unable to determine if compliance was achieved for this initiative activity. PG&E provided documentation regarding inspection and monitoring. However, data for maintenance, repairs, or replacements were not provided. (DR 249.) This overall initiative was underfunded by $2 million (4% of planned expenditure). Energy Safety cannot determine how much of the initiative underfunding was associated with this specific initiative activity. (2022 EC ARC-B.)
Other Corrective Action, Maintenance, Distribution (D.10); Section 7.3.3.12.4	Close a minimum of 55,000 HFTD or HFRA distribution tags in PG&E's workplan as of June 30, 2022, barring external factors.	PG&E was not able to meet the target, particularly E tags, because more category A and B tags were created during 2022 than PG&E anticipated. A and B tags were prioritized over E tags because of shorter regulatory compliance requirements, and because A and B tags are generally greater higher risk than E tags. (2022 EC ARC, p. 31.)

2022 WMP Update Initiative	2022 Initiative Activity	Details of Non-Attainment and Rationale
Detailed Inspections of Vegetation Around Distribution Electric Lines and Equipment; Section 7.3.5.2	Complete mitigation work of dead or dying trees identified by the Tree Mortality Patrol Program within 180 days for HFTD areas and within 365 days for non-HFTD areas.	PG&E failed to complete 13% of its mitigation work prescribed to address dead or dying trees identified by the Tree Mortality Patrol Program in both HFTD and non-HFTD areas in the prescribed timeframe. Additionally, 2% of the identified work in both HFTD and non-HFTD areas had no reported work completion date as of August 26, 2024. (SVM Audit Report, p. 8.) The overall initiative was underfunded by $32 million (2% of planned expenditure). Energy Safety cannot determine how much of the initiative underfunding was associated with this particular initiative activity. (2022 EC ARC-B.)

2022 WMP Update Initiative	2022 Initiative Activity	Details of Non-Attainment and Rationale
Detailed Inspections and Management Practices for Vegetation Clearances Around Transmission Electric Lines and Equipment; Section 7.3.5.3	Complete approximately 9,000 acres of IVM work.	PG&E completed 55%, or 4,979 acres, of IVM work in 2022, as opposed to its target of 9,000 acres. (SVM Audit, p. A-18; SVM Audit Report, pp. 13-14.) The overall initiative was underfunded by $36 million (19% of planned expenditure). Energy Safety cannot determine how much of the initiative underfunding was associated with this particular initiative activity. (2022 EC ARC-B.)

2022 WMP Update Initiative	2022 Initiative Activity	Details of Non-Attainment and Rationale
Improvement of Inspections; Section 7.3.5.6	All Senior Vegetation Management Inspectors (SVMIs) will have to successfully complete the introduction to pre-inspection courses in the Structured Learning Path (SLP).	PG&E could not provide documentation indicating that six SVMIs completed pre-inspection training. (SVM Audit, p. A-29; SVM Audit Report, p. 19.) PG&E's recordkeeping deficiencies in its 2022 training system prevented PG&E from ensuring that all of its SVMIs received all required inspection training in 2022. (SVM Audit Report, p. 19.) This initiative was underfunded by $74 million (52% of planned expenditure). PG&E explained that funding was reprioritized for higher risk work. (2022 EC ARC-B.) Energy Safety cannot determine how much of the overall initiative underfunding was associated with this particular initiative activity.

2022 WMP Update Initiative	2022 Initiative Activity	Details of Non-Attainment and Rationale
Improvement of Inspections; Section 7.3.5.6	Perform a series of four audits at the 1-month, 3-month, 6-month, and 1-year mark to evaluate the work that is being completed by the SVMIs once they finish all their courses.	PG&E did not perform post-training audits to assess the work of its SVMIs. (SVM Audit, p. A-29; SVM Audit Report, p. 19.) This initiative was underfunded by $74 million (52% planned expenditure). PG&E explains that funding was reprioritized for higher risk work. (2022 EC ARC-B.) Energy Safety cannot determine how much of the overall initiative underfunding was associated with this particular initiative activity.
Other Discretionary Inspections of Vegetation Around Transmission Electric Lines and Equipment, Beyond Inspections Mandated by Rules and Regulations; Section 7.3.5.10	PG&E's targets for activities under this initiative were tied to targets under initiative 7.3.5.3, including the target to complete approximately 9,000 acres of IVM work.	PG&E completed 55%, or 4,979 acres, of IVM work in 2022, as opposed to its target of 9,000 acres. (SVM Audit, p. A-18; SVM Audit Report, pp. 13-14.) Initiative 7.3.5.3 was underfunded by $36 million (19% of planned expenditure). Energy Safety cannot determine how much of the initiative underfunding was associated with this particular initiative activity. (2022 EC ARC-B.)

2022 WMP Update Initiative	2022 Initiative Activity	Details of Non-Attainment and Rationale
Patrol Inspections of Vegetation Around Transmission Electric Lines and Equipment; Section 7.3.5.12	PG&E's targets for activities under this initiative were tied to targets under initiative 7.3.5.3, including the target to complete approximately 9,000 acres of IVM work.	PG&E completed 55%, or 4,979 acres, of IVM work in 2022, as opposed to its target of 9,000 acres. (SVM Audit, p. A-18; SVM Audit Report, pp. 13-14.) Initiative 7.3.5.3 was underfunded by $36 million (19% of planned expenditure). Energy Safety cannot determine how much of the initiative underfunding was associated with this particular initiative activity. (2022 EC ARC-B.)

2022 WMP Update Initiative	2022 Initiative Activity	Details of Non-Attainment and Rationale
Removal and Remediation of Trees with Strike Potential to Electric Lines and Equipment; Section 7.3.5.16	PG&E's targets for activities under this initiative were tied to targets under initiatives 7.3.5.2 and 7.3.5.3, including: • The target under initiative 7.3.5.2 to complete mitigation work of dead or dying trees identified by the Tree Mortality Patrol Program within 180 days for HFTD areas and within 365 days for non-HFTD areas. • The target under initiative 7.3.5.3 to complete approximately 9,000 acres of IVM work.	PG&E failed to complete 13% of its mitigation work prescribed to address dead or dying trees identified by the Tree Mortality Patrol Program in both HFTD and non-HFTD areas in the prescribed timeframe. Additionally, 2% of the identified work in both HFTD and non-HFTD areas had no reported work completion date as of August 26, 2024. (SVM Audit Report, p. 8.) Initiative 7.3.5.2 was underfunded by $32 million (2% of planned expenditure). Energy Safety cannot determine how much of the initiative underfunding was associated with this particular initiative activity. (2022 EC ARC-B.) PG&E completed 55%, or 4,979 acres, of IVM work in 2022, as opposed to its target of 9,000 acres. (SVM Audit, p. A-18; SVM Audit Report, pp. 13-14.) Initiative 7.3.5.3 was underfunded by $36 million (19% of planned expenditure). Energy Safety cannot determine how much of the initiative underfunding was associated with this particular initiative activity. (2022 EC ARC-B.)

2022 WMP Update Initiative	2022 Initiative Activity	Details of Non-Attainment and Rationale
Stationed and On-Call Ignition Prevention and Suppression Resources and Services; Section 7.3.6.6	Continue to support fire prevention and mitigation activities and maintain an "on call" status during the summer preparedness period by SIPT crews.	Energy Safety was unable to determine if compliance was achieved for this initiative activity. Although PG&E provided documentation showing that it supported fire prevention mitigation activities by employing 130 individuals, and 45 crews, at 34 locations, the documentation did not clearly identify the "on call" status of the SIPT staff "during the summer preparedness period." (DR 249.) The overall initiative was underfunded by $4 million (84% planned expenditure). (2022 EC ARC-B.) Energy Safety cannot determine how much of the initiative underfunding was associated with this particular initiative activity.

PG&E's 2022 WMP Update included three "overarching goals," and associated examples of initiative activities intended to operationalize those goals. (2022 WMP Update, p. 7.) These three main goals were to:

1. Reduce wildfire potential by implementing various programs such as vegetation management, inspections and repairs of electric facilities, system hardening and automation. During high-risk weather, leverage PSPS and EPSS as needed.
2. Improve situational awareness by enhancing PG&E's ability to monitor and respond to potential wildfire threats by refining weather models, installing weather stations and high-definition cameras, and deploying advance technologies like Distribution Fault Anticipation and Early Fault Detection systems.
3. Reduce impacts on customers and communities by reducing the disruption caused by PSPS and EPSS by optimizing settings, updating protocols based on the latest data, and deploying resources to quickly restore power. Additionally, by installing sectionalization devices, hardening systems, operating temporary distribution

> microgrids, and targeting frequently impacted circuit segments for undergrounding. Finally, by expanding outreach efforts to keep customers informed and prepared for potential outages. (2022 WMP Update, pp. 269-270.)

For PG&E's first goal of reducing wildfire potential, Energy Safety found that PG&E did not meet all its vegetation management initiative activities in 2022, and did not fully fund all its vegetation management initiatives, primarily initiative 7.3.5.2 - Detailed Inspections and Management Practices for Vegetation Clearances Around Transmission Electrical Lines and Equipment.

Furthermore, with respect to PG&E's Pole Clearing program that attained its 2022 WMP Update targets, Energy Safety's SVM Audit Report indicated that "[w]hile PG&E cleared the number of poles in its database and met the pole clearing target for 2022, the fact that PG&E's database did not include a full population of PRC 4292 exempt poles in its service territory indicates a serious recordkeeping deficiency existed in PG&E's vegetation management database in 2022 which detracted from PG&E's ability to address wildfire risk." (SVM Audit Report, p. 11.)

Additionally, PG&E failed to perform all the work required by initiatives such as 7.3.3.4 - Covered Conductor Maintenance, 7.3.3.12.4 - HFTD/HFRA Open Tag Reduction-Distribution, and 7.3.6.6 - Stationed and On-Call Ignition Prevention and Suppression Resources and Services in 2022.

2022 WMP Update initiative targets related to PG&E's second and third goals of improving situational awareness and reducing the impact to customers and communities from PSPS and EPSS events were largely achieved in 2022.

6. Wildfire Risk Reduction: Performance Metrics and Overall WMP Execution

The Compliance Process applicable to the 2022 WMP Update compliance year defines goals for Energy Safety that extend beyond assessing compliance with WMP initiatives. Specifically, Energy Safety examines the ultimate performance of an electrical corporation's infrastructure relative to its wildfire risk, as measured by changes in the occurrence of events that correlate to wildfire risk. Energy Safety also considers whether the electrical corporation exhibited issues related to its execution, management, or documentation in the implementation of its WMP.

Below, this report outlines the metrics chosen by Energy Safety to evaluate the performance of an electrical corporation's infrastructure relative to risk. These metrics include data on ignitions and PSPS events in the territory of the electrical corporation. The data utilized by Energy Safety were provided by PG&E in its QDR submissions; but were analyzed and presented here using Energy Safety's own methodology. Where necessary, explanations of Energy Safety's methodology are provided.

This section also contains Energy Safety's analysis of PG&Es' own asset inspection regime, as well as a discussion of any issues exhibited by PG&E with respect to its execution, management, or documentation in the implementation of its WMP, if applicable.

6.1 Ignition Risk Metrics and Outcomes Metrics

Energy Safety assessed the performance of PG&E's infrastructure relative to its wildfire risk, as measured by changes in the occurrence of events that correlate to wildfire risk.

Energy Safety requires electrical corporations to report data, such as ignitions in the HFTD, that help Energy Safety assess whether an electrical corporation reduced its wildfire risk while also reducing its reliance on PSPS. In 2022, Energy Safety assessed each electrical corporation's infrastructure performance for the calendar years 2015 through 2022 with particular attention on the 2022 outcomes.

The collection of metrics evaluated are grouped into two categories: Ignition Risk Metrics, and Outcome Metrics. A list of all the metrics in each category is described fully in their respective following sections. For these sections, Energy Safety relied on data reported in the third quarter 2022 QDR for the year 2015 through 2021 values, and fourth quarter 2023 QDR for the 2022 values. (2022 Q3 QDR, 2023 Q4 QDR.)[7]

Normalizing Metrics:

For applicable performance metrics, the normalizing metrics Energy Safety uses are: "Overhead Circuit Miles" (OCM), "High Wind Warning Overhead Circuit Mile Days (High Wind Warning Days or HWWOCMD), and "Red Flag Warning Overhead Circuit Mile Days" (Red Flag Warning Days or RFWOCMD). To see the values for each year used, see Appendix E, Figure 23 through Figure 25. (2022 Q3 QDR Tables 6 and 8; 2023 Q4 QDR, Tables 4 and 7.)

Energy Safety uses these normalizing metrics to ensure a more nuanced interpretation of wildfire risk outcomes. For example, the outcome metric of "acres burned" is impacted directly by the presence of hot dry winds and, thus, this metric is presented in both raw counts and normalized by RFWOCMD. In this way, the acres burned are presented "accounting for" year by year variances in weather conditions that directly influence the outcome.

Findings:

- PG&E's raw ignition counts represented a 20% decrease from levels observed in 2017, and a 6% decrease from 2020.
- Equipment or facility failures, vegetation contacts, and object contacts are the primary drivers of ignition events from 2015-2022.

[7] The format of the required data reporting for all electrical corporations changed near the end of 2022, thus, all data for 2015-2021 were obtained from the third quarter 2022 QDR (old format) and all data for 2022 were obtained from the fourth quarter 2023 QDR (new format).

- There is no evidence of either upward or downward trends in PG&E wire down events from 2015-2022, although there is significant variance from year to year.
- PG&E outage events remained stable during the 2015-2022 period.
- All four of the PSPS event outcome metrics indicate that PSPS events had the most significant adverse impacts from 2018 to 2021 as reflected by the large numbers of customers and circuits affected. However, in 2022, zero PSPS events were executed and therefore there were no customers or circuits affected.

6.1.1 Ignition Risk Metrics

Energy Safety reviewed the following metrics associated with ignition risk:

1. *Ignitions* – Incidents in which electrical corporation infrastructure was involved in an ignition,
2. *Wire Down Events* – Incidents in which overhead electrical lines fall to the ground, land on objects, or become disconnected from their moors,
3. *Unplanned Outages* – All unplanned outages experienced,
4. *Vegetation-Caused Outages* – A subset of unplanned outages experienced in which the cause was determined to be vegetation contact with electrical lines,
5. *PSPS Events* – Planned outages called PSPS events.

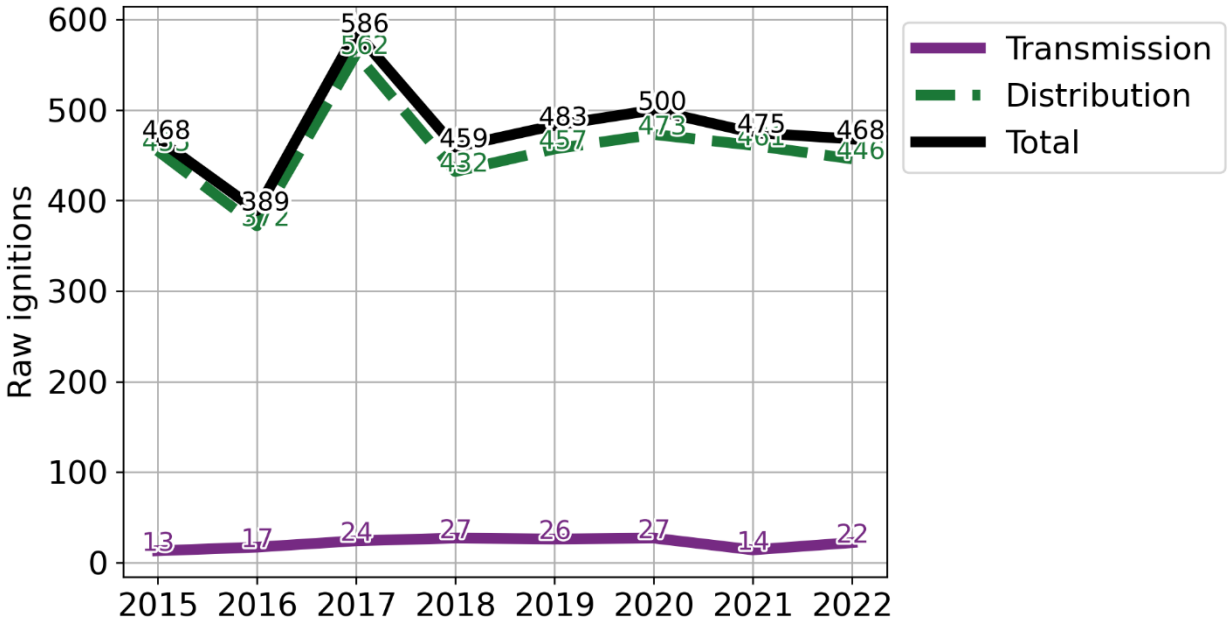
6.1.1.1 Ignitions Data Analysis

The Ignition Data Analysis section examines ignitions stemming from distribution and transmission lines located focusing on HFTD Tier 2 and HFTD Tier 3 areas. (2022 Q3 QDR, Table 7.2; 2023 Q4 QDR, Table 6.) In addition to showing raw ignition counts, ignitions are normalized by OCM, HWWOCMD, and RFWOCMD. PG&E's service territory is divided into three primary area designations: Non HFTD, HFTD Tier 2, and HFTD Tier 3. For a sense of scale, the percent of OCM each territory type is as follows: Non HFTD= 69%, Tier 2= 23% and Tier 3 = 8%. (DR 234.)

Raw Ignition Counts:

Raw ignitions in 2022 returned to counts observed in 2015, which represented a 20% decrease from levels observed in 2017 and a 6% decrease from 2020 (Figure 1). Transmission ignitions are generally very low in comparison to distribution ignitions.

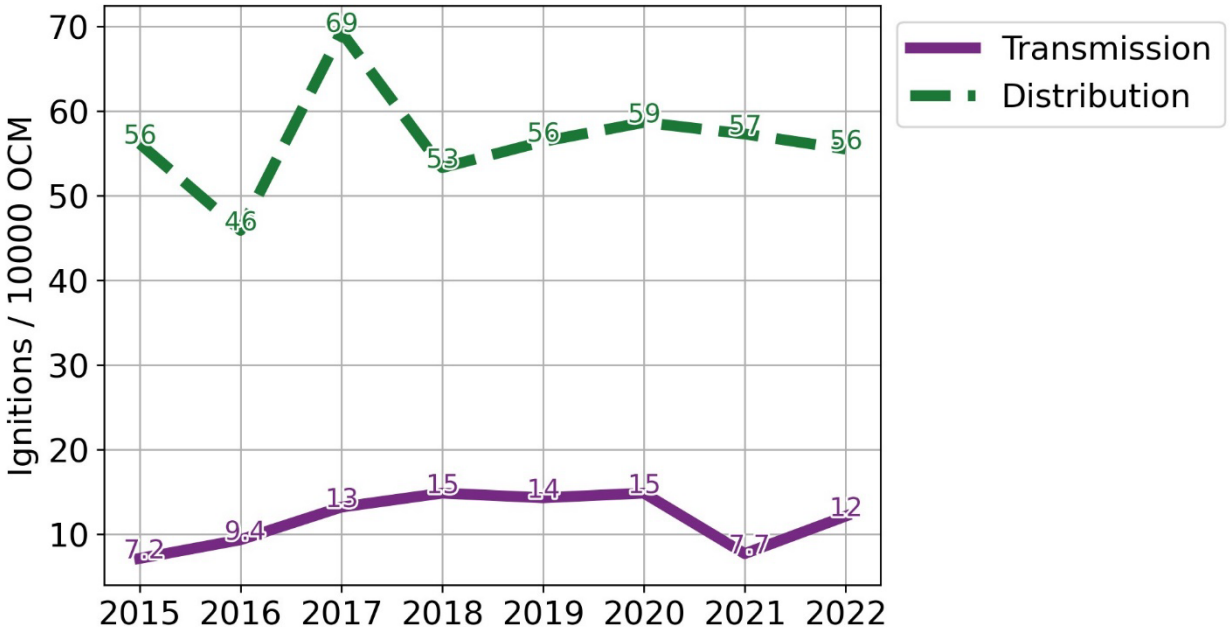
Figure 1: PG&E Ignition Counts (2015-2022) by Distribution and Transmission Lines



Ignitions Normalized by Overhead Circuit Miles:

To account for concurrent grid expansion within the territory, ignitions normalized by OCM are provided and delineated by distribution and transmission lines (Figure 2). The normalized ignition totals show the same general patterns as raw ignition counts, as overhead circuit miles did not change more than 1% between 2015 and 2022.

Figure 2: PG&E's Ignitions Normalized by Overhead Circuit Miles (2015-2022) by Distribution and Transmission Lines

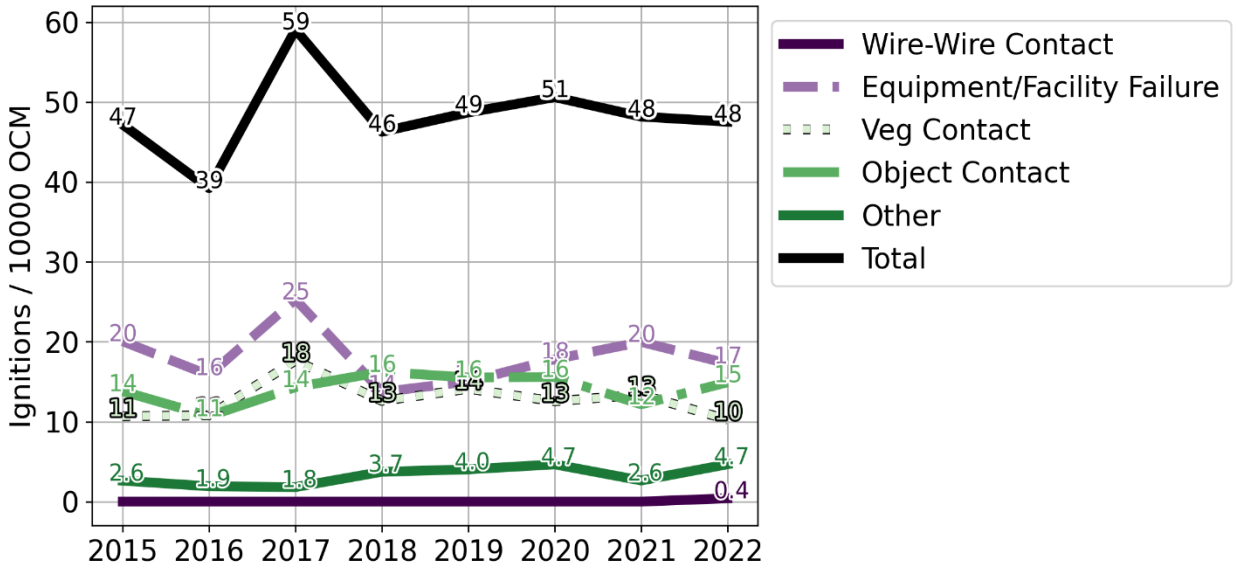


Ignitions Normalized by Overhead Circuit Miles Delineated by Risk Driver:

For insights into the causes of normalized ignitions by OCM, the ignitions are delineated by risk driver (Figure 3). From 2015 to 2022, normalized ignitions are primarily due, in approximately equal amounts, to equipment or facility failures, vegetation contact, and object contact.

This shows that efforts by PG&E to reduce ignition counts should focus on equipment or facility failures, vegetation contacts, or object contacts.

Figure 3: PG&E Ignitions Normalized by Overhead Circuit Miles (2015-2022) by Risk Drivers



Ignitions by HFTD Detail and normalized by High Wind Warning Overhead Circuit Mile Days and Red Flag Warning Overhead Circuit Mile Days:

To see more detail on ignitions by risk driver, HFTD tier, and ignition analyses normalized by HHWOCMD and RFWOCMD, see Appendix E (Figure 26 through Figure 36).

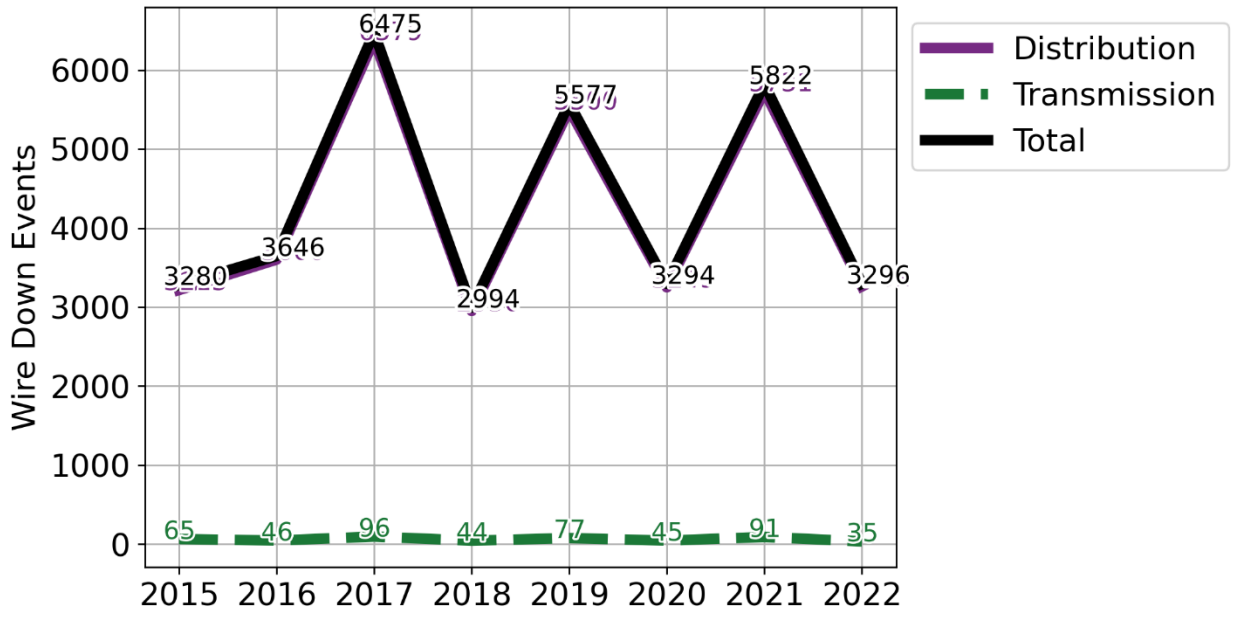
6.1.1.2 Wire Down Events Data Analysis

Wire down events occur when a wire is touching the ground or an object, or if the wire has become disconnected from its mooring. This type of event poses a risk of ignition or a danger to people if that wire is also energized with electricity. The data source for wire down information is the QDRs. (2022 Q3 QDR, Table 7.1; 2023 Q4 QDR, Table 5.)

Raw Wire Down Event Counts:

The PG&E wire down event counts show fluctuations with increases in 2017, 2019, and 2021 (Figure 4). However, no general upward or downward pattern is observed during that time. From 2021 to 2022, there were declines in both distribution and transmission wire down events.

Figure 4: PG&E Wire Down Event Counts (2015-2022) by Distribution and Transmission Lines



Wire Down Events Normalized by High Wind Warning Overhead Circuit Mile Days and Red Flag Warning Overheard Circuit Mile Days:

Please see Appendix E (Figure 37 and Figure 38) for wire down events normalized by HWWOCMD and RFWOCMD.

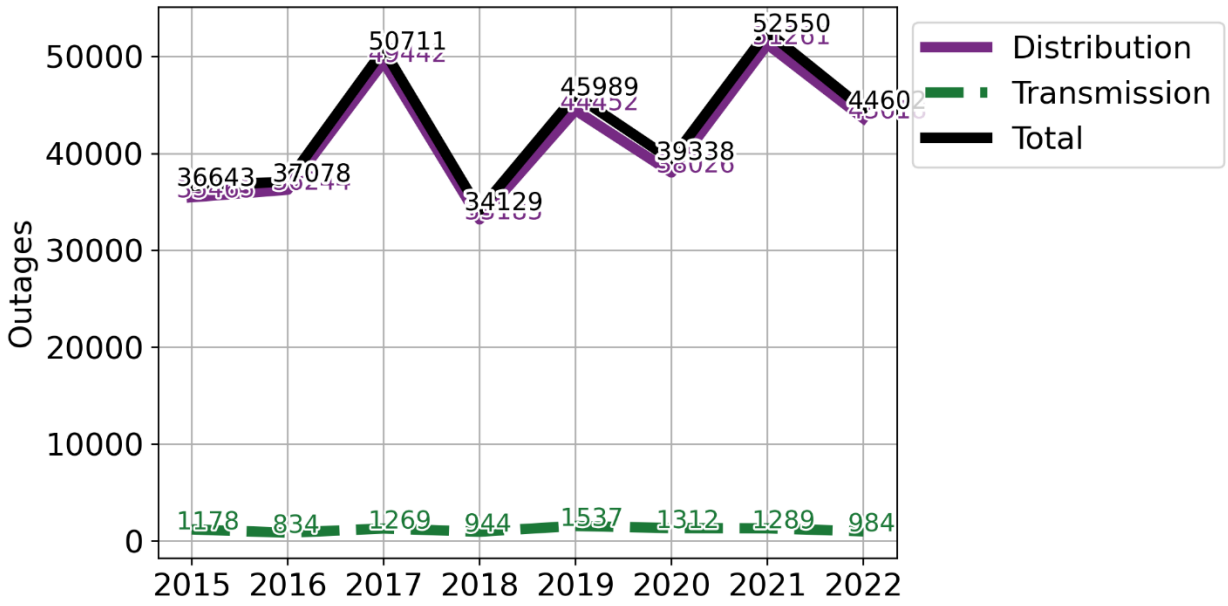
6.1.1.3 Outage Event Data Analysis

Power outages (outages) are unplanned power outage events (does not include PSPS events) tabulated by circuits and not by number of customers impacted. Outage events are tracked as outcomes that both may cause ignitions and impact customer's quality of life. The data source for outage event information is the QDRs. (2022 Q3 QDR, Table 7.1; 2023 Q4 QDR, Table 5.)

Raw Outage Event Counts:

Total unplanned outage event counts fluctuate between 2015 and 2022, with notable spikes in 2017 and 2021 (Figure 5). Though less than the year-to-year volatility, the data appear to demonstrate an upward trend over time. Distribution lines counts are much higher than transmission line counts. In 2022 there were fewer total outage events than in 2017, 2019, and 2021, but a greater number than in 2015, 2016, 2018, and 2020.

Figure 5: PG&E Outage Events (2015-2022) by Distribution and Transmission Lines



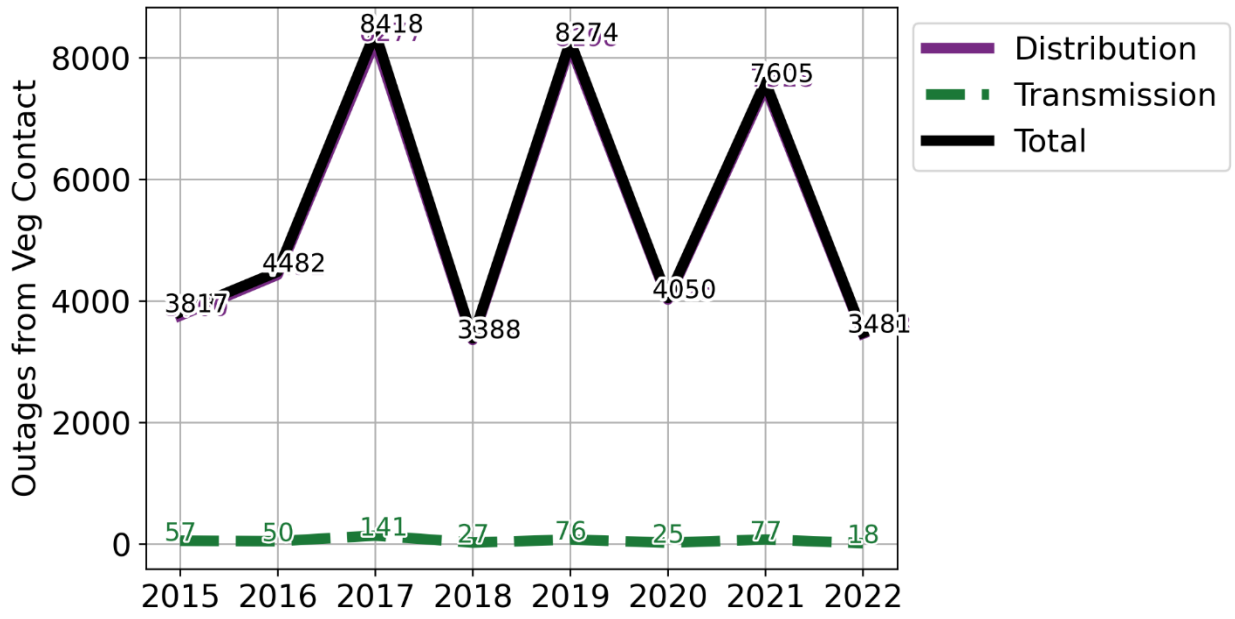
Outage Events Normalized by High Wind Warning Overhead Circuit Mile Days and Red Flag Warning Overheard Circuit Mile Days:

Please see Appendix E (Figure 39 and Figure 40) for outage events normalized by HWWOCMD and RFWOCMD.

Outage Events from Vegetation Contact Counts:

From 2015 to 2022, the number of outage events caused by vegetation contacts show a fluctuating pattern, with peaks in 2017, 2019, and 2021. Outage events caused by vegetation contact is only a small percentage of overall outage events (Figure 6 as compared to Figure 5). PG&E outage events from vegetation contacts do not appear to be increasing over time. The number of outage events caused by vegetation contact was fewer in 2022 than in any other year except 2018.

Figure 6: PG&E Outages from Vegetation Contact (2015-2022) by Distribution and Transmission Lines



Outage Events from Vegetation Contact Counts Normalized by High Wind Warning Overhead Circuit Mile Days and Red Flag Warning Overheard Circuit Mile Days:

Please see Appendix E (Figure 41 and Figure 42) for outage events caused by vegetation contact normalized by HWWOCMD and RFWOCMD.

6.1.1.4 Public Safety Power Shutoff Event Data Analysis

Power Safety Power Shutoff (PSPS) events are planned outages used as a wildfire mitigation tool during extreme fire conditions such as hot, dry, windy days. While useful as a wildfire mitigation measure, PSPS events carry their own risks and adverse impacts on customers – particularly vulnerable customers who need electricity to survive. For those reasons, electrical corporations take mitigating actions to reduce the frequency, scope, duration, and impacts of PSPS events.

As PSPS events are typically issued during extreme fire weather conditions, the PSPS outcomes are presented first in raw count form, and then normalized by RFWOCMD to account for variances in weather across years.

The following four PSPS event parameters are presented for each year and comprise the PSPS event data analysis:

- *Frequency* is measured as the number or count of all PSPS events,
- *Scope* is measured as the total number of utility circuits impacted because of all PSPS events,
- *Duration* is measured by the total number of customer-hours because of all PSPS events, and
- *Impacts* are measured by the number of critical infrastructure locations-hours impacted by all PSPS events.

The data source for PSPS events information is the QDRs. (2022 Q3 QDR, Table 11; 2023 Q4 QDR, Table 10.)

Frequency of PSPS Events:

PG&E reported no PSPS events from 2015 to 2017, followed by a single event in 2018. The number of PSPS events then increased to eight in 2019. Subsequently, the number of PSPS events decreased, dropping to six in 2020 and five in 2021. From 2021 to 2022, the data shows a significant reduction, with zero PSPS events reported in 2022 (Figure 7).[8]

The number of PSPS events normalized by RFWOCMD shows a similar trend as the raw event data, with the exception of a dip in 2020 and increase in 2021. As PG&E had no PSPS events in 2022, both the raw events and the normalized frequency are zero for the first time since 2017 (Figure 8).

For the subsequent PSPS metrics of Scope, Duration, and Impacts, the fact that the weather adjusted pattern mirrors the pattern of raw counts indicates that new insights are not gained by the adjustment. Close monitoring of subsequent years' data will reveal the level of utility in tracking PSPS events, and whether adjusting by weather, as one would expect, provides additional insights.

[8] These counts do not include instances where PG&E may have notified customers of a potential PSPS event, but later canceled the event without deenergizing any customers. For example, PG&E notified 5,769 customers of the potential for a PSPS event on October 22, 2022. However, no customers were actually deenergized as the PSPS event was cancelled.

Figure 7: PG&E PSPS Event Frequency (2015-2022)

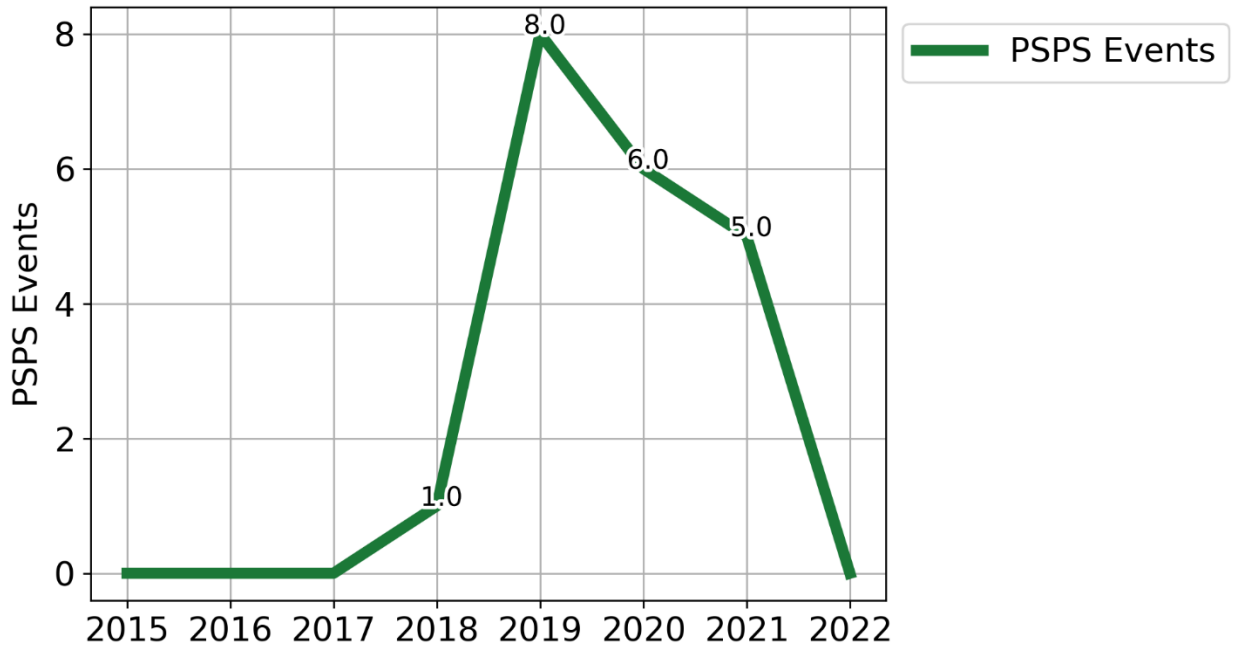
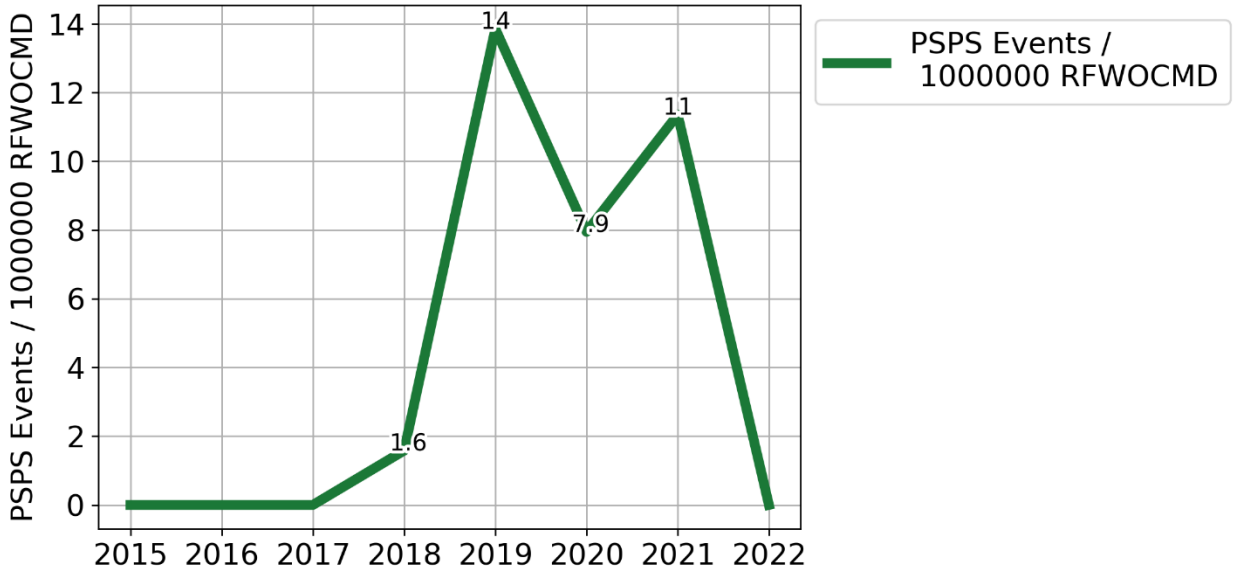


Figure 8: PG&E PSPS Event Frequency Normalized by RFWOCMD (2015-2022)



Scope of PSPS Events:

The number of PG&E circuits impacted by PSPS events from 2015 to 2022 are shown in Figure 9. Initially, there were no PSPS events impacting PG&E circuits from 2015 to 2017. However, the scope of PSPS events increased markedly starting in 2018. It peaked in 2019 at a maximum of 1,842 circuits. In 2020, the number of circuits dropped to 817, followed by a further reduction in 2021. Finally, in 2022, there were no circuits impacted by PSPS events.

When normalized by RFWOCMD (Figure 10), PSPS events have the same trend.

Figure 9: PG&E PSPS Event Scope (2015-2022)

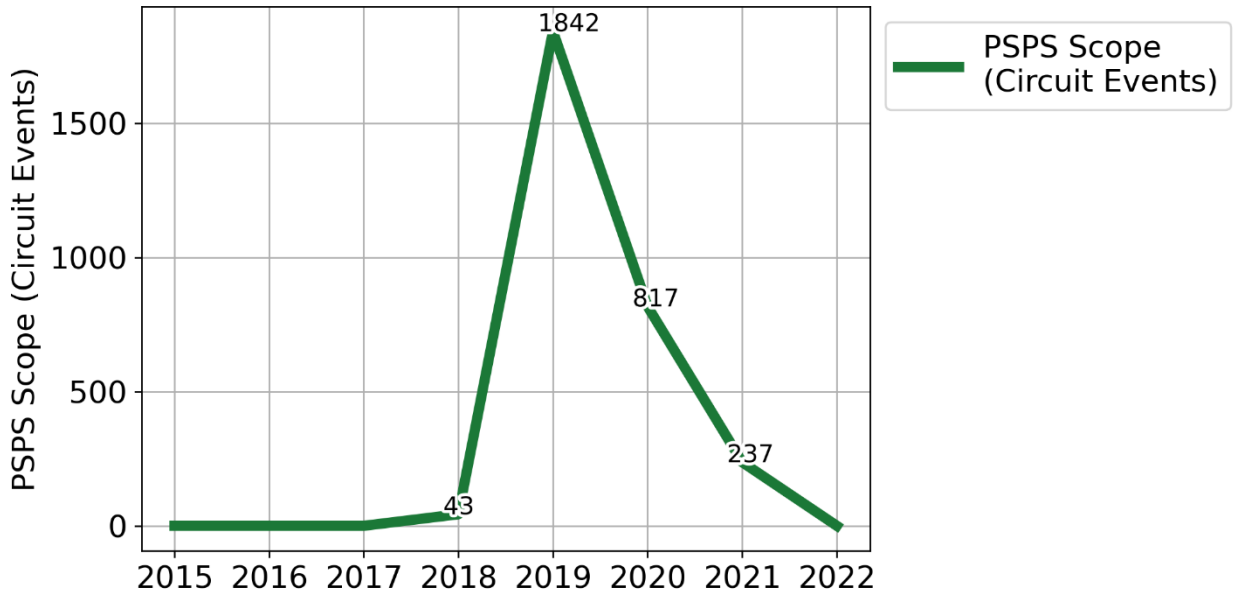
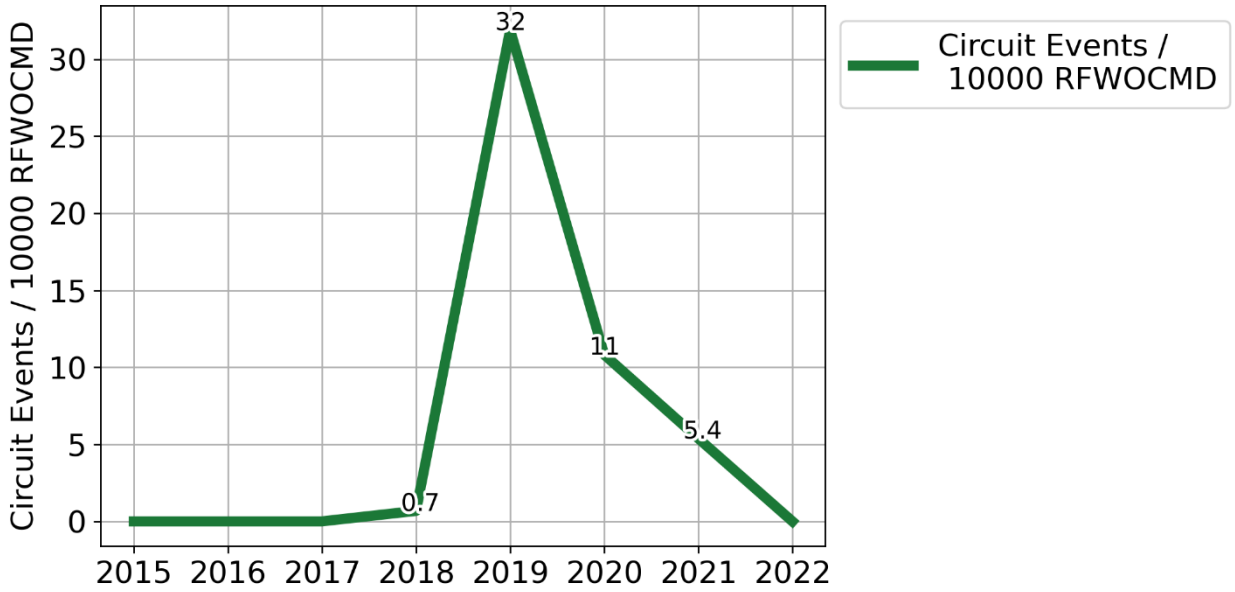


Figure 10: PG&E PSPS Event Scope Normalized by RFWOCMD (2015-2022)



Duration of PSPS Events:

The total number of customer-hours impacted by all PSPS events from 2015 to 2022 are shown in Figure 11. There were no PSPS events from 2015 to 2017. However, the total duration of PSPS events increase starting in 2018, peaking at nearly 92 million customer-hours in 2019, followed by a significant decline in subsequent years. In 2022, the total number of customer-hours impacted by all PSPS events has decreased to zero. Normalized customer-hours are also zero (Figure 12).

Figure 11: PG&E PSPS Event Duration (2015-2022)

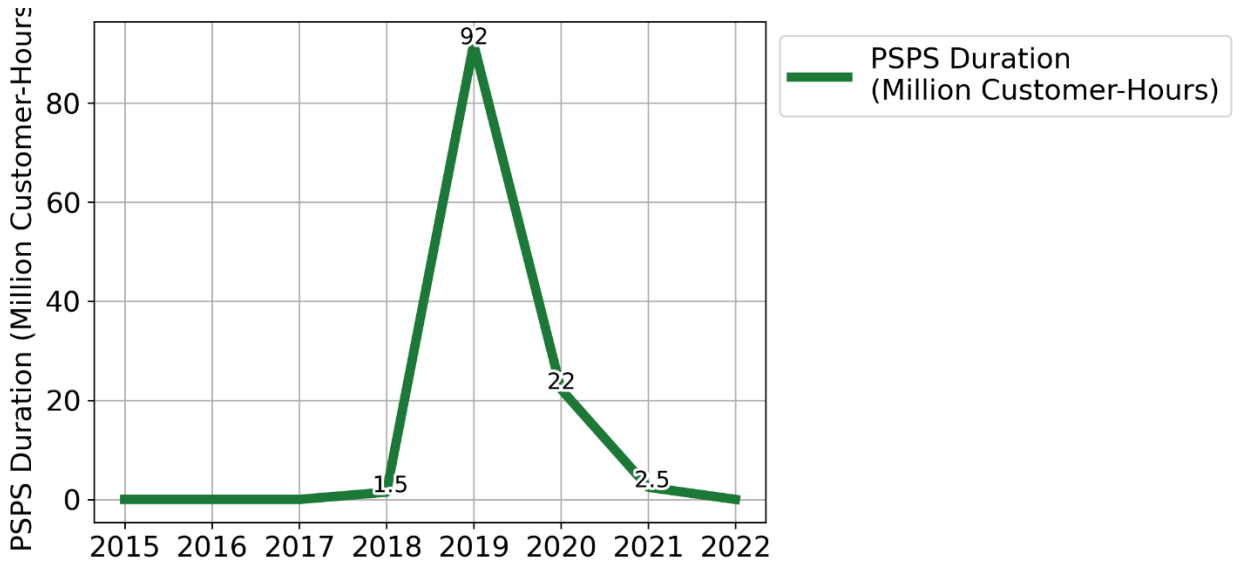
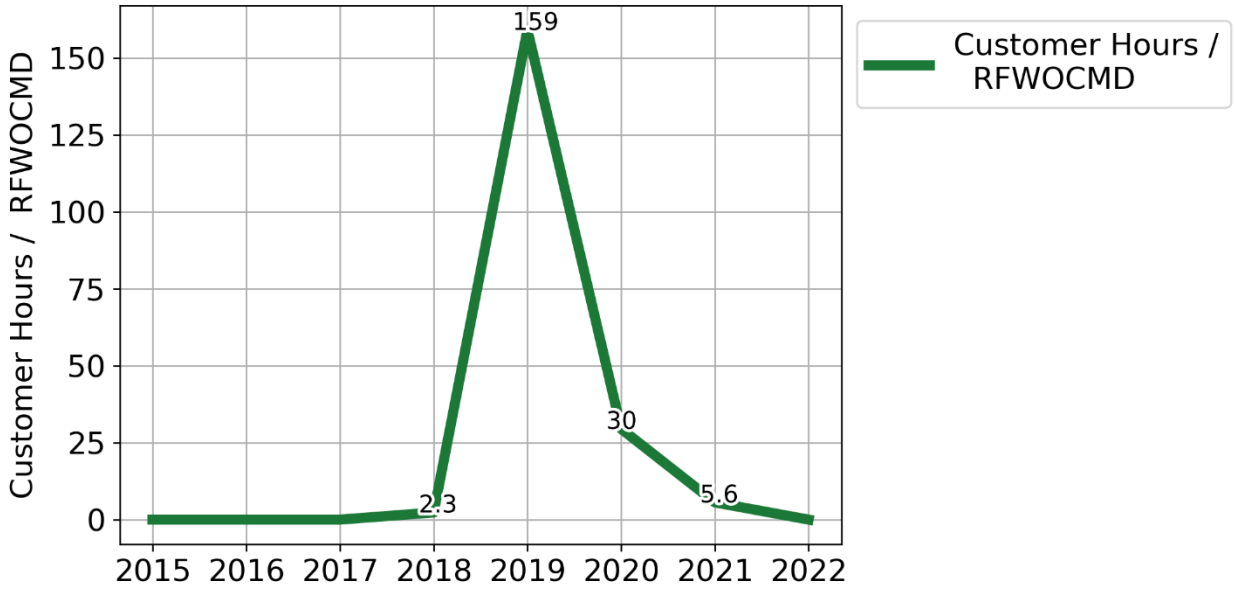


Figure 12: PG&E PSPS Event Duration Normalized by RFWOCMD (2015-2022)



Impacts of PSPS Events:

From 2015 to 2022, the number of PSPS events and the critical infrastructure location-hours affected by PSPS have shown a significant rise, peaking in 2019, followed by a decline in subsequent years. From 2021 to 2022, both the impacts of PSPS events (Figure 13) and the impacts of PSPS events normalized by RFWOCMD dropped to zero (Figure 14).

Figure 13: PG&E PSPS Event Impacts (2015-2022)

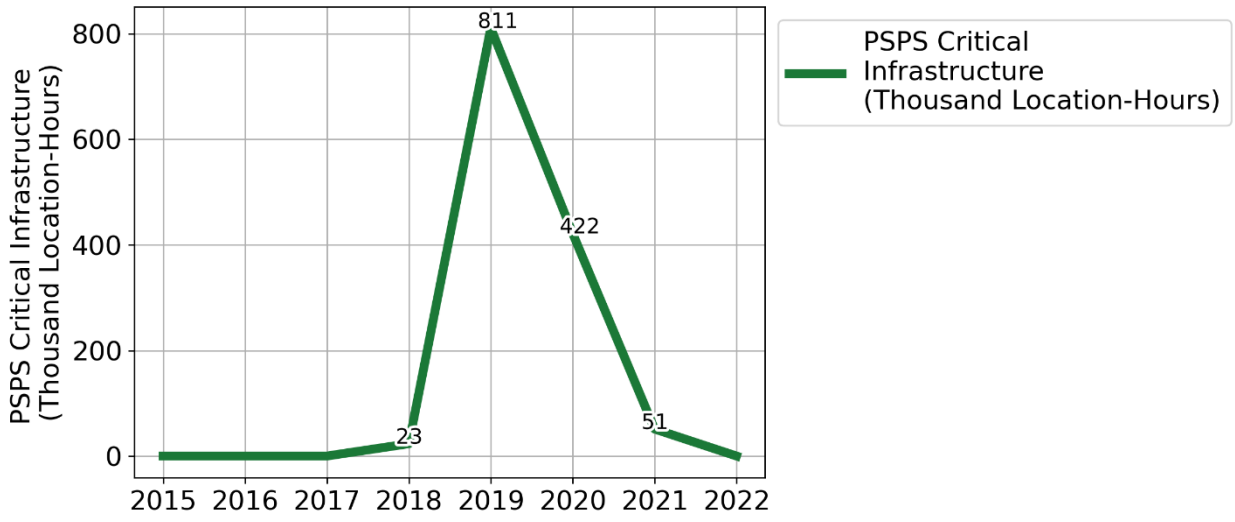
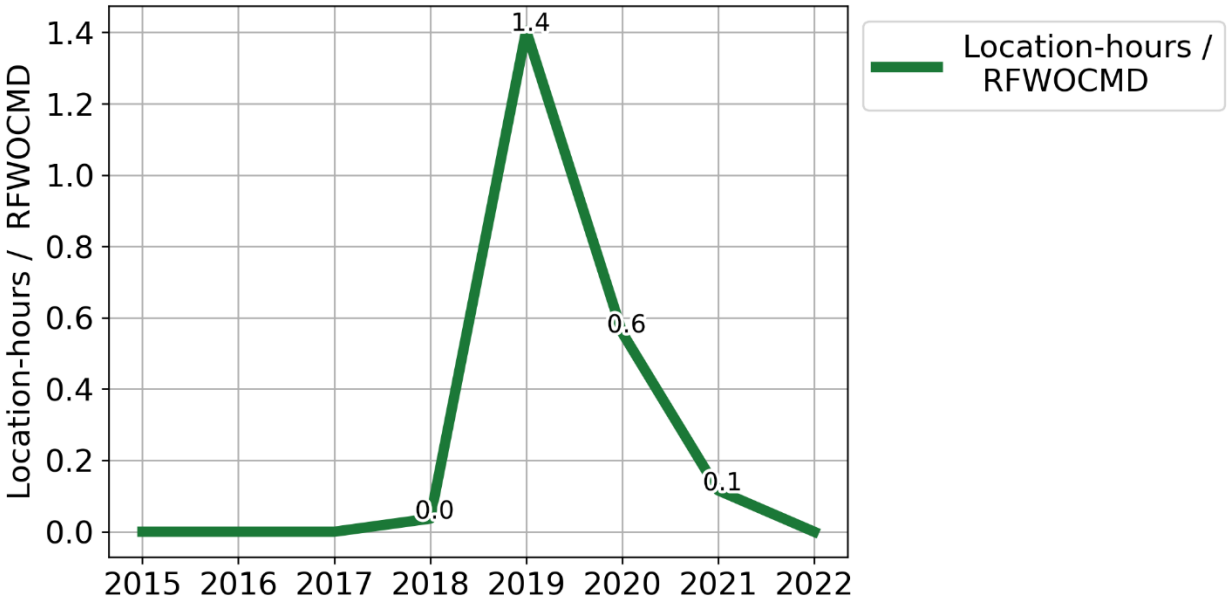


Figure 14: PG&E PSPS Event Impacts Normalized by RFWOCMD (2015-2022)



PSPS Event Management Finding:

All four of the PSPS event outcome metrics indicate that PSPS events had the most significant adverse impacts from 2018 to 2021. In 2022, there were no PSPS events.

6.1.2 Outcome Metrics

This section presents outcome metrics on electrical corporation-related wildfires including:

1. *Acres burned* – The total number of acres burned due to electrical corporation caused fires,
2. *Structures damaged/destroyed* - The total number of structures damaged or destroyed due to electrical corporation caused fires,
3. *Injuries/fatalities* - The total number of injuries and fatalities due to electrical corporation caused fires,
4. *Value of assets destroyed* - The total value of assets destroyed due to electrical corporation caused fires.

The data source for outcomes metrics information is the QDRs. (2022 Q3 QDR, Table 2; 2023 Q4 QDR, Table 2.)

Acres Burned:

From 2015 to 2022, the total number of acres burned by PG&E-ignited wildfires varied, with a peak of 969,000 in 2021 (Figure 15). When accounting for yearly variance in the weather, the normalized acres burned showed a similar trend (Figure 16). From 2015 to 2022, the total

number of acres burned by PG&E-ignited wildfires normalized by RFWOCMD shows an initial period of variability in acres burned, followed by a peak in 2021 and a significant reduction in 2022 to levels comparable to those seen in previous years. These data are largely influenced by two major fires:

- 2021 Dixie Fire: 963,309 Acres Burned. (2023-2025 WMP, p. 100.)
- 2022 Mosquito Fire (currently under investigation, but included by PG&E as acres burned in its QDR for 2022): 76,788 Acres Burned. (2023-2025 WMP, p. 100.)

Figure 15: PG&E Total Acres Burned (2015-2022)

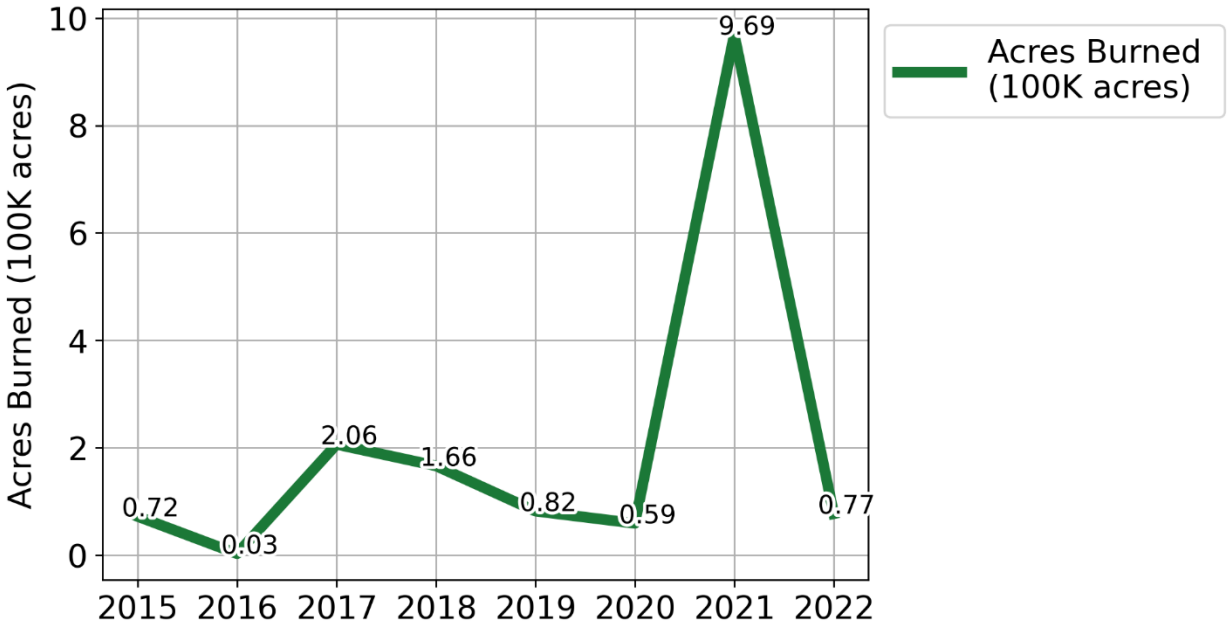
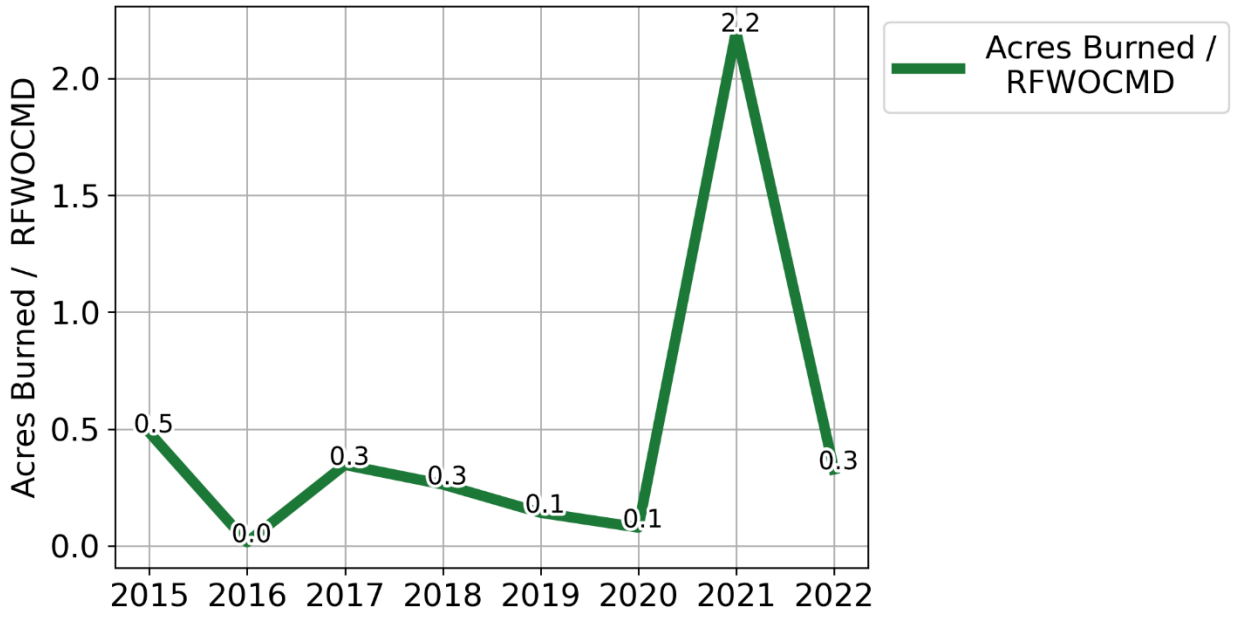


Figure 16: PG&E Total Acres Burned Normalized by RFWOCMD (2015-2022)



Structures Damaged or Destroyed:

From 2015 to 2022, the number of structures damaged or destroyed by PG&E-ignited wildfires is variable with a significant peak in 2018, and a reduction thereafter (Figure 17). Specifically, from 2021 to 2022, there is improvement, with a decrease in the total number of structures damaged or destroyed. When accounting for variances in yearly weather by normalizing by RFWOCMD, the same pattern is observed (Figure 18).

Figure 17: PG&E Structures Damaged or Destroyed (2015-2022)

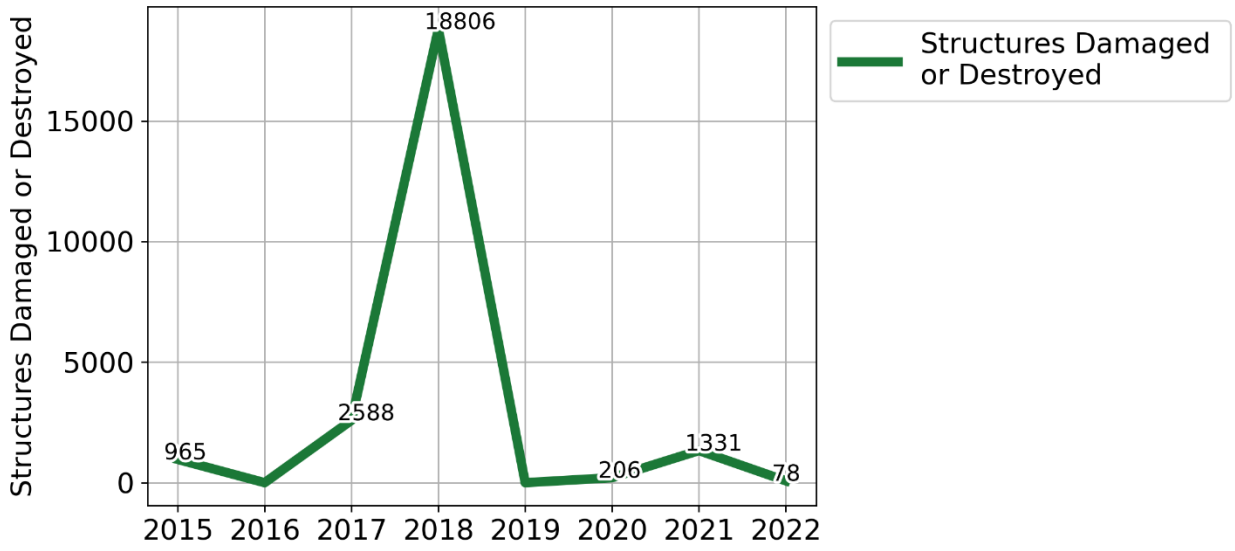
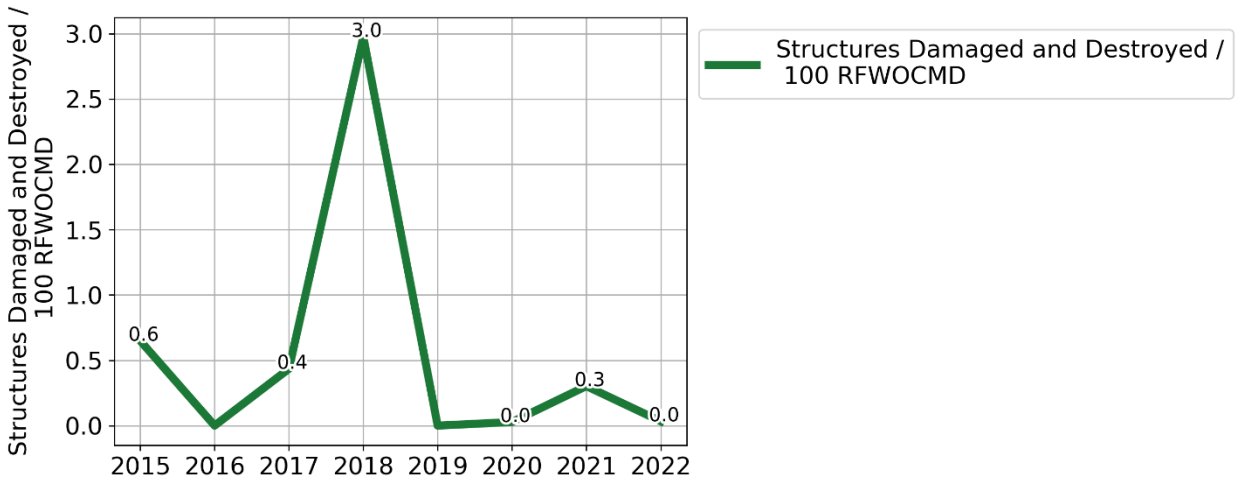


Figure 18: PG&E Structures Damaged or Destroyed Normalized by RFWOCMD (2015-2022)



Injuries and Fatalities:

The number of injuries and fatalities shows significant variance from 2015 to 2022, with a peak in 2018 when injuries and fatalities combined reach their maximum, and a general decrease to two injuries and zero fatalities in 2022 (Figure 19). When accounting for the yearly variances in weather, the injuries and fatalities normalized by RFWOCMDs show a consistent pattern highlighting the same peak in 2018 and decrease in 2022 (Figure 20).

Figure 19: PG&E Injuries and Fatalities (2015-2022)

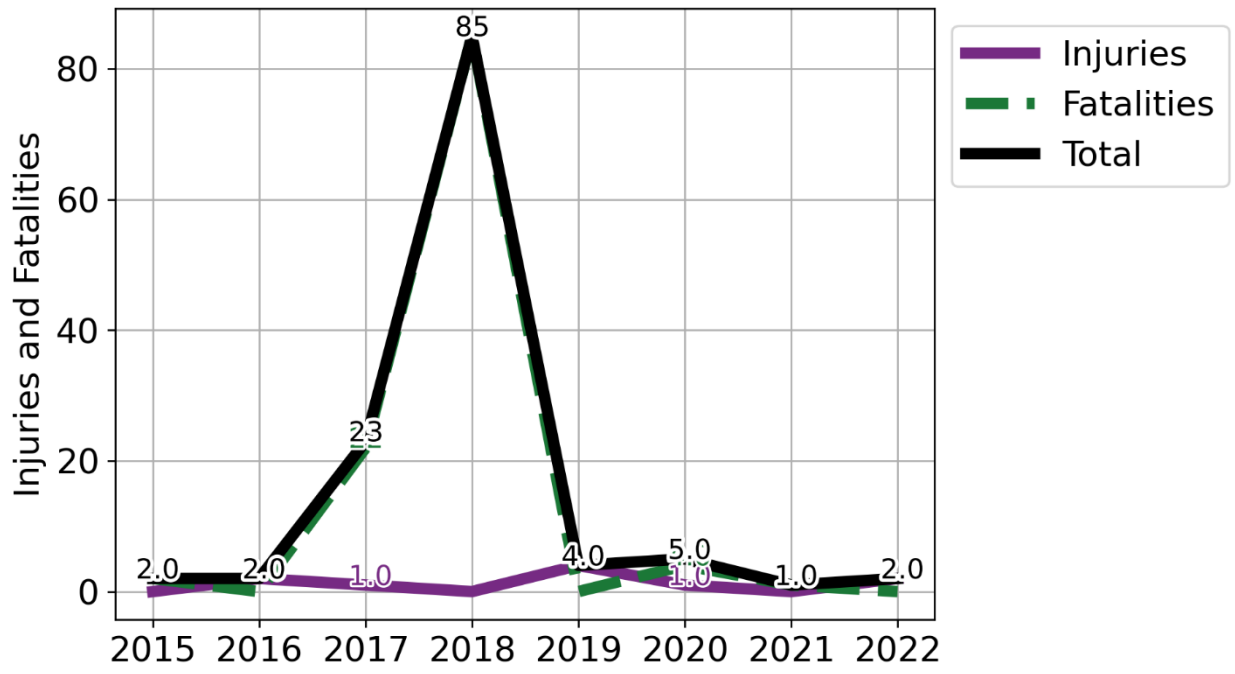
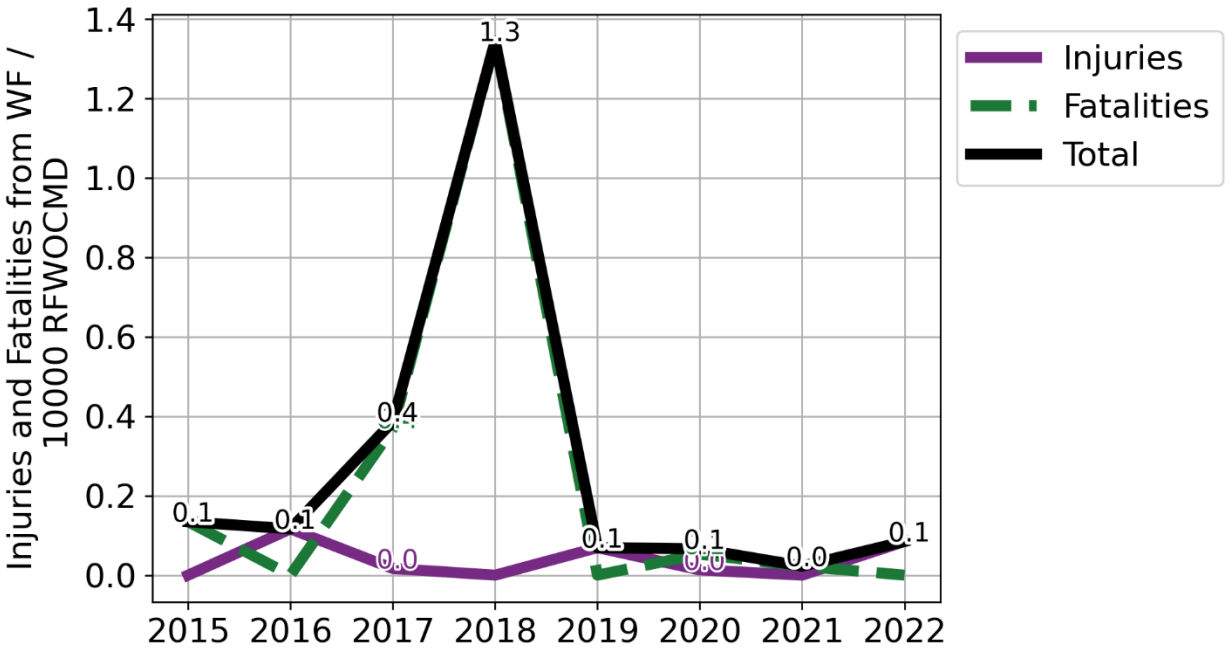


Figure 20: PG&E Injuries and Fatalities Normalized by RFWOCMD (2015-2022)



Value of Destroyed Assets:

From 2015 to 2022, there is a fluctuation in the value of assets destroyed with a maximum of $25.5 billion in 2017, and a reduction thereafter. There is an increase to $100 million in 2022 (Figure 21). (DR 289.) When accounting for variances in yearly weather by normalizing by RFWOCMD, this pattern remains consistent, with the highest value in 2017 (Figure 22). The figures for 2017 include the value of destroyed assets for 2017 and the value of destroyed assets related to the Camp Fire, which took place in 2018.

Figure 21: PG&E Value of Destroyed Assets (2015-2022)

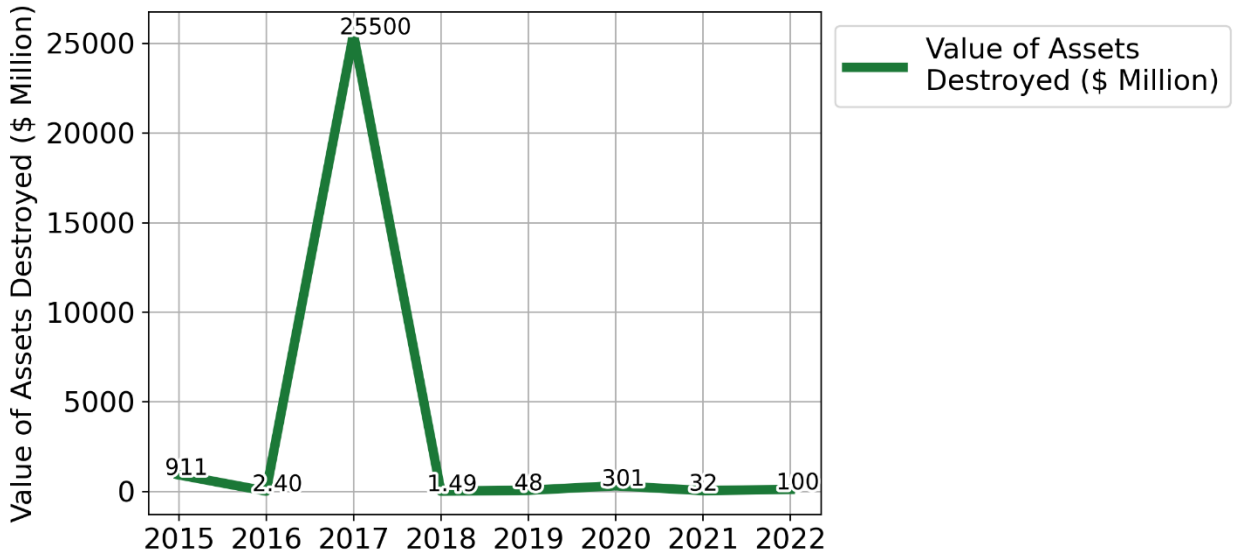
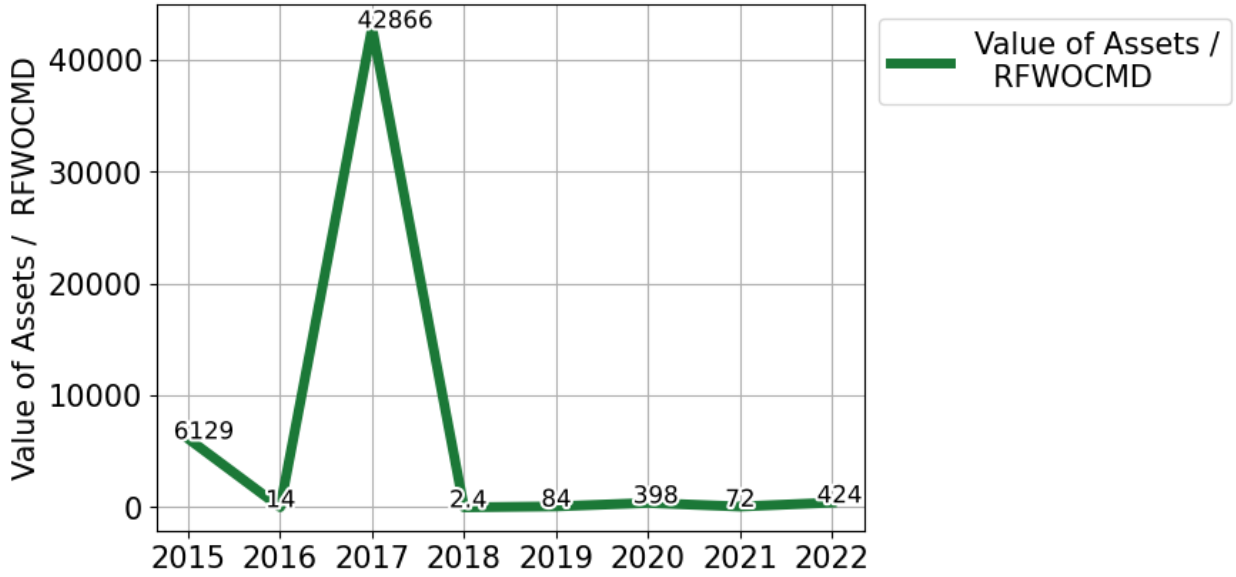


Figure 22: PG&E Value of Destroyed Assets Normalized by RFWOCMD (2015-2022)



6.2 Issues Related to PG&E's Execution, Management, or Documentation of its WMP Implementation

As noted previously, Energy Safety evaluated PG&E performance relative to targets for 139 initiative activities in 2022. For 19 of the initiative activities in the 2022 WMP Update, the reporting provided by PG&E in its EC ARC and QDR contained inconsistencies, in some instances impairing the ability to clearly understand if activities had been completed or not, and to what extent (see Table 5 for more details).

Out of the 139 initiative activities evaluated by Energy Safety, PG&E did not include 63 initiative activities in its reporting sources such as the EC ARC or QDR (Table 6). In future compliance reports and data submissions, PG&E must communicate necessary information in a clear and concise manner, otherwise compliance may not be able to be determined.

As noted in Energy Safety's SVM Audit Report, the inadequacies of PG&E's vegetation management database to document 2022 work posed challenges during Energy Safety's SVM Audit production process. The inability to provide complete data on pole clearing activities hampered accurate wildfire risk assessments, potentially compromised public safety, and undermined the overall objectives of its 2022 WMP Update. Without accurate reporting, PG&E could not effectively demonstrate that its mitigation strategies were successfully reducing wildfire risks. (SVM Audit Report, pp.10-12.)

7. Conclusion

Overall, PG&E implemented the majority of its WMP initiatives in 2022. PG&E completed 129 of 139 (93%) of its 2022 WMP Update initiative activities. At the initiative level, targets for six of the ten initiatives with the largest planned expenditure were met.

PG&E failed to meet its commitments for eight of its WMP initiative activities for 2022, seven of which were related to vegetation management initiative activities. For two other initiative activities, PG&E did not provide sufficient information for Energy Safety to determine compliance.

PG&E spent less than planned on its initiative activity work by $657 million (11%) compared to its planned expenditure for the 2022 WMP Update. Despite not meeting the planned expenditure, PG&E met a significant portion of its quantitative and qualitative 2022 WMP Update targets. PG&E attributed much of this variance to efficiencies in operationalizing its work.

With respect to the overall performance of PG&E's system in 2022, PG&E's raw ignition counts in 2022 returned to counts observed in 2015, which represented a 20% decrease from levels observed in 2017 and a 6% decrease from 2020. PG&E's outage events remained stable compared to previous years. In 2022, zero PSPS events were executed on PG&E's system.

On balance, PG&E was largely successful in executing its plan for wildfire risk mitigation in 2022 as it completed 93% of its WMP initiative activities. For example, PG&E completed 179.7 miles of undergrounding (exceeding its target of 175 circuit miles), hardened a total of 483 circuit miles (exceeding its target of 470 circuit miles), and removed or replaced 37.8 circuit miles of transmission conductor traversing high fire threat districts or high fire risk areas (exceeding its target of 32 circuit miles). While Energy Safety acknowledges that PG&E successfully implemented a majority of its 2022 WMP Update initiative activities, there are still areas for improvement and continued learning.

Energy Safety will continue to monitor PG&E's implementation of its ongoing wildfire mitigation activities to push PG&E to improve its ability to eliminate utility-caused catastrophic wildfires in California.

8. References

Reference	Citation
2022 EC ARC	Pacific Gas and Electric Company, "Pacific Gas and Electric Company Annual Report on Compliance for 2022 Wildfire Mitigation Plan," Mar. 31, 2023. Available: https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53591&shareable=true
2022 EC ARC-B	Pacific Gas and Electric Company, "Pacific Gas and Electric Company Annual Report on Compliance for 2022 Wildfire Mitigation Plan-Appendix B," Mar. 31, 2023. Available: https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53592&shareable=true
2022 Q3 QDR	Pacific Gas and Electric Company, "PG&E's QDR for Third Quarter 2022," Nov. 1, 2022. Available: https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53165&shareable=true
2022 Q4 QDR	Pacific Gas and Electric Company, "Revised PG&E's QDR for Fourth Quarter 2022-Mar. 1, 2023," Mar. 1, 2023. Available: https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53410&shareable=true
2022 WMP Update	Pacific Gas and Electric Company, "Wildfire Mitigation Plan 2022-Revised," Jul. 26, 2022. Available: https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=52782&shareable=true
2023 EC ARC	Pacific Gas and Electric Company, "PG&E 2023 ARC, Revision 1 for the 2023-2025 WMP," Apr. 25, 2023. Available: https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=56539&shareable=true

Reference	Citation
2023 Q4 QDR	Pacific Gas and Electric Company, "PG&E_2023_Q4_Table 1-15_R2," Apr. 19, 2024. Available: https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=56510&shareable=true
2023-2025 WMP	Pacific Gas and Electric Company, "Wildfire Mitigation Plan 2023-2025," Jan. 8, 2024. Available: https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=56145&shareable=true
Compliance Process	Office of Energy Infrastructure Safety, "2022 WMP Compliance Process," Oct. 2022. Available: https://energysafety.ca.gov/wp-content/uploads/2022-wmp-compliance-process.pdf
DR 234	Pacific Gas and Electric Company, "PG&E's Responses to Data Request: Energy Safety DR-234," Jun. 7, 2024.
DR 249	Pacific Gas and Electric Company, "PG&E's Responses to Data Request: Energy Safety DR-249," Jul. 15, 2024; Jul. 26, 2024; and Aug. 02, 2024.
DR 289	Pacific Gas and Electric Company, "PG&E's Responses to Data Request: Energy Safety DR-289," Nov. 22, 2024.
IE ARC	Bureau Veritas, "Final Independent Evaluator Annual Report on Compliance," Jun. 30, 2023. Available: https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=54390&shareable=true
Ops Protocols	California Public Utilities Commission, "Wildfire Safety Division – Compliance Operational Protocols," Feb 16, 2021, https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=52615&shareable=true

Reference	Citation
Pub. Util. Code	Public Utilities Code. Available: https://leginfo.legislature.ca.gov/faces/codesTOCSelected.xhtml?tocCode=PUC&tocTitle=+Public+Utilities+Code+-+PUC
SVM Audit	Office of Energy Infrastructure Safety, "PG&E 2022 Substantial Vegetation Management (SVM) Audit," Jul. 26, 2024. https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=57083&shareable=true
SVM Audit Report	Office of Energy Infrastructure Safety, "Report on 2022 SVM Audit of PG&E," Oct. 11, 2024. https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=57509&shareable=true

DATA DRIVEN
FORWARD-THINKING
INNOVATIVE
SAFETY FOCUSED

OFFICE OF ENERGY INFRASTRUCTURE SAFETY

A California Natural Resources Agency

www.energysafety.ca.gov

APPENDICES

9. Appendices

Appendix A: PG&E Reporting Inconsistencies

Energy Safety receives data from the electrical corporations in the form of Quarterly Data Reports (QDR). These QDR submissions include information on the electrical corporation's progress toward meeting quantitative WMP initiatives. By analyzing the entire QDR dataset for 2022, Energy Safety can determine if the electrical corporation's data reflect attainment or non-attainment of some of the quantitative WMP initiatives. Qualitative WMP initiatives are not considered in this analysis.

Where there is dissonance between the assertions of an electrical corporation in its Annual Report on Compliance and Energy Safety's analysis of the QDR data, Energy Safety requests information from the electrical corporation to explain non-attainment of a quantitative WMP initiative. Where there is agreement between the electrical corporation's Annual Report on Compliance and the QDR data on attainment of quantitative WMP initiatives, no information related to the QDR analysis is requested.

Differences in how PG&E's initiative performance is reported in its WMP, QDR, EC ARC, and the IE ARC are summarized in Table 5. (2022 WMP Update, 2022 Q4 QDR, 2022 EC ARC, 2023 EC ARC, IE ARC.)

Table 5: PG&E 's Quantitative WMP Initiative Activities

2022 WMP Update Initiative Activity	QDR Attainment Status	EC ARC Attainment Status	IE ARC Attainment Status	Dissonance
Weather Stations – Installations and Optimizations 7.3.2.1.3 (B.02) Target: 100 weather stations	Met Target: 100 weather stations Actual: 111 weather stations	Met Target: 100 weather stations Actual: 111 weather stations	Met Target: 100 weather stations Actual: 105[9] weather stations	Six weather stations were potentially non-operational. (2022 IE ARC, p. 18.)
Distribution Fault Anticipation (DFA) – Installations 7.3.2.2.3 (B.04) Target: 40 DFA sensors	Met Target: 40 DFA sensors Actual: 48 DFA sensors	Met Target: 40 circuits Actual: 48 circuits	Met Target: 40 DFA sensors Actual: 48 DFA sensors	The EC ARC uses a different unit (circuit) than the WMP and QDR (DFA sensor).

[9] Six weather stations were potentially non-operational based on IE ARC.

2022 WMP Update Initiative Activity	QDR Attainment Status	EC ARC Attainment Status	IE ARC Attainment Status	Dissonance
HFTD/HFRA Open Tag Reduction – Distribution 7.3.3.12.4 (D.10) Target: 55,000 closed distribution EC tags	Not met Target: 55,000 closed distribution tags Actual: 45,951 closed distribution tags	Not met Target: 55,000 E tags Actual: 45,951 E tags	Not met Target: 55,000 closed distribution tags Actual: 45,951 closed distribution tags	The EC ARC uses a different unit (E tag) than the QDR or WMP (distribution tag).
System Hardening– Transmission 7.3.3.17.2 (C.12) Target: 32 circuit miles	Met Target: 33 circuit miles Actual: 37.8 circuit miles	Met Target: 33 circuit miles Actual: 37.8 circuit miles	Met Target: 32.6 circuit miles Actual: 37.8 circuit miles	The EC ARC and QDR utilize a target of 33 miles, while the WMP states a target of 32 miles.
Detailed Inspections – Distribution 7.3.4.1 (D.01) Target: 396,000 poles	Met Target: 396,000 poles Actual: 398,184 poles	Met Target: 396,000 ground inspections Actual: 398,184 ground inspections	Met Target: 396,000 poles Actual: 398,184 poles	The EC ARC uses a different target unit (ground inspections) than the QDR and WMP (poles).

2022 WMP Update Initiative Activity	QDR Attainment Status	EC ARC Attainment Status	IE ARC Attainment Status	Dissonance
Detailed Inspection Transmission –Ground 7.3.4.2 (D.02) Target: 39,000 structures	Met Target: 39,000 structures Actual: 39,005 structures	Met Target: 39,000 transmission climb inspections Actual: 39,005 transmission climb inspections	Met Target: 39,000 structures Actual: 39,005 structures	The EC ARC uses a different target unit (transmission climb inspections) than the QDR and WMP (structures).
Detailed Inspection Transmission – Climbing 7.3.4.2 (D.03) Target: 1,800 structures	Met Target: 1,800 structures Actual: 1,835 structures	Met Target: 1,800 ground inspections Actual: 1,835 ground inspections	Met Target: 1,800 structures Actual: 1,835 structures	The EC ARC uses a different target unit (ground inspections) than the QDR and WMP (structures).
Detailed Inspection Transmission – Aerial 7.3.4.2 (D.04) Target: 39,000 structures	Met Target: 39,000 structures Actual: 39,004 structures	Met Target: 39,000 ground inspection Actual: 39,005 ground inspections	Met Target: 39,000 structures Actual: 39,004 structures	The EC ARC uses a different target unit (ground inspections) than the QDR and WMP (structures). EC ARC actual value is not the same as reported in the QDR.

2022 WMP Update Initiative Activity	QDR Attainment Status	EC ARC Attainment Status	IE ARC Attainment Status	Dissonance
Supplemental Inspections – Substation Distribution 7.3.4.15 (D.06) Target: 86 distribution substations	Met Target: 86 distribution substations Actual: 86 distribution substations	Met Target: 86 supplemental inspections Actual: 86 supplemental inspections	Met Target: 86 distribution substations Actual: 86 distribution substations	The EC ARC uses a different target unit (supplemental inspections) than the QDR and WMP (distribution substations).
Supplemental Inspections - Substation Transmission 7.3.4.15 (D.07) Target: 43 transmission substations	Met Target: 43 transmission substations Actual: 43 transmission substations	Met Target: 43 supplemental inspections Actual: 43 supplemental substations	Met Target: 43 transmission substations Actual: 43 transmission substations	The EC ARC uses a different target unit (supplemental inspections) than the QDR and WMP (transmission substations).
Supplemental Inspections – Hydroelectric Substations and Powerhouses 7.3.4.16 (D.08) Target: 52	Met Target: 52 Hydroelectric Substations and Powerhouses Actual: 52 Hydroelectric Substations and Powerhouses	Met Target: 52 supplemental inspections Actual: 52 supplemental inspections	Met Target: 52 Hydroelectric Substations and Powerhouses Actual: 52 Hydroelectric Substations and Powerhouses	The EC ARC uses a different target unit (supplemental inspections) than the QDR and WMP (hydroelectric substations and powerhouses).

2022 WMP Update Initiative Activity	QDR Attainment Status	EC ARC Attainment Status	IE ARC Attainment Status	Dissonance
Pole Clearing Program 7.3.5.2 (E.02) Target: N/A	Met Target: 7,000 distribution poles Actual: 8,356 distribution poles	Met Target: 7,000 distribution poles Actual: 8,356 distribution poles	Met Target: 7,000 distribution poles Actual: 8,356 distribution poles	WMP did not provide a target quantity, as opposed to the QDR and EC ARC target of 7,000.
EPSS - Install Settings on Distribution Line devices 7.3.6.8 (F.02) Target: line reclosers and fuse savers on 1,018 circuits. 80% completed by 05/01/2022 and the remaining 20% completed by 08/01/2022.	Met Target: 3,580 line reclosers and fuse savers on 1,018 circuits Actual: 3,580 line reclosers and fuse savers on 1,018 circuits	Met Target: 3,580 line reclosers and fuse savers on 1,018 circuits Actual: 3,580 line reclosers and fuse savers on 1,018 circuits	Met Target: 3,580 line reclosers and fuse savers on 1,018 circuits Actual: 3,580 line reclosers and fuse savers on 1,018 circuits	WMP did not provide a target quantity, as opposed to the QDR and EC ARC target of 3,580.

As show in the table above, reporting on many of PG&E's quantitative commitment activities contained conflicting units between information sources. This posed a challenge for Energy Safety's analysis of initiative activity attainment.

Much of PG&E's 2022 WMP Update initiative activities in 2022 are accounted for in PG&E's EC ARC and QDR submissions. However, PG&E's approved 2022 WMP Update proposed several

WMP commitment activities for the 2022 compliance year that were not described in its EC ARC, the IE ARC, or in the QDR submissions reviewed by Energy Safety. In the cases where this accounting did not occur, Energy Safety requested further data from PG&E on those activities that were unaccounted for, including a description of the work completed in 2022. Table 6 includes a list of 63 commitments that were unaccounted for in PG&E's EC ARC, the IE ARC, or in the QDR, and for which Energy Safety requested additional information through a data request. (DR 249.)

Table 6: PG&E's WMP Initiative Activity Attainment - Data Requests

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
A Summarized Risk Map That Shows the Overall Ignition Probability and Estimated Wildfire Consequence Along the Electric Lines and Equipment; Section 7.3.1.1	Develop maps in Foundry to visualize risk model outputs and to implement Work Planning Applications (WPAs). Additionally, develop WPAs for specific programs including – EVM, Transformer Replacement, Pole Replacement, and System Hardening.	Continued to implement WPAs used in Foundry platform.
Climate-Driven Risk Map and Modeling Based on Various Relevant Weather Scenarios; Section 7.3.1.2	Continue work and maintenance on mapping and modelling projects.	Provided a Change Record for its Company Emergency Response Plan (CERP) showing updates in 2022 such as the consideration of extreme scenarios of wildfire risk coincident with other risk events.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Advances Weather Monitoring and Weather Stations, Fuel Moisture Sampling and Modeling; Section 7.3.2.1.2	Continue work on fuel moisture sampling and modeling projects.	Collected and processed live fuel moisture samples from over 30 locations in the PG&E territory. These samples were uploaded to the National Fuel Moisture Database for public use. PG&E continued to operate machine learning live fuel moisture models that estimate the moisture content in varying vegetation ecosystems (i.e. grasslands, woodlands, etc.).
Advanced Weather Monitoring and Weather Stations, Fire Detection & Alerting; Section 7.3.2.1.5	Continue work on fire detection and alerting projects.	Continued to utilize the wildfire alert cameras and provide data to the public via Alertcalifornia.org. PG&E also continued to operate the satellite fire detection and alert system which uses polar and geosynchronous satellite data to detect fires.
Advanced Weather Monitoring and Weather Stations, Other Meteorology Tools and Upgrades; Section 7.3.2.1.6	Continue work on other metrology tools and upgrades, including High Performance Cloud Computing, Medium-to Seasonal-Range Diablo Wind Forecasting, Addressing Weather Forecast Model Uncertainty, PG&E Lightning Detection Network (PLDN), and Information Sharing.	Continued to run a foundational high-resolution weather model as part of the Operational Mesoscale Modeling System (POMMS).

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Advanced Weather Monitoring and Weather Stations, Other Meteorology Tools and Upgrades; Section 7.3.2.1.6 (continued)	Continue work on other metrology tools and upgrades, including High Performance Cloud Computing, Medium-to Seasonal-Range Diablo Wind Forecasting, Addressing Weather Forecast Model Uncertainty, PG&E Lightning Detection Network (PLDN), and Information Sharing. (continued)	The 2022 POMMS model configuration deployed is the Weather Research and Forecasting (WRF) model, version 4.1.2, which provides data at 2x2 km spatial and hourly temporal resolution. The POMMS forecasts include two deterministic forecasts as well as an eight-member ensemble. One deterministic model is initialized using ¼° output from the National Centers for Environmental Prediction (NCEP) - GFS model data as well as 1/12° Sea Surface Temperature analyses. The GFS, often referred to as the American Model, is operated and maintained by NOAA's National Center for Environmental Prediction and is the United States' flagship global model. The second deterministic model is initialized with the European Center for Medium Range Weather Forecast (ECMWF) global model. The six ensemble members are split between GFS and ECMWF initialized simulations.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Continuous Monitoring Sensors, Smartmeter™ Partial Voltage Detection (Formerly Known as Enhanced Wires Down Detection); Section 7.3.2.2.2	Continue ongoing activities, which include software maintenance and activities to ensure continuing coverage on future meter models.	Started discussions with its SmartMeter™ network technology vendor to extend Partial Voltage Detection capabilities to newer model American National Standard for Utility Industry (ANSI) C12.19 based SmartMeters™.
Continuous Monitoring Sensors, Sensor IQ; Section 7.3.2.2.4	Continue to assess the performance and functionality of SIQ data in identifying incipient conditions that may cause wildfire	Evaluated the usefulness of SIQ data as part of the Electric Program Investment Charge (EPIC) 3.43 project. PG&E concluded that machine learning models using 5-minute interval data from SIQ did not provide a higher predictive performance in identifying incipient issues than the existing 15-minute or 60-minute Advanced Metering Infrastructure (AMI) data. A more effective, long-term and scalable approach would be to use distributed intelligence technologies provided by next generation SmartMeters™ which does compute at the edge and report by exception.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Distribution Transmission Substation: Fire Action Schemes and Technologies (DTS-FAST); Section 7.3.2.2.7	Continue work on the 2022 distribution pilot effort, which will focus on installing Light Detection and Ranging (LiDAR) and other sensors—placed at designated locations in HFTDs—on wood poles so as to monitor both vegetation risk and infrastructure failure and send alerts when specific conditions are met.	Filed a non-provisional patent application for DTS-FAST.
Fault Indicators for Detecting Faults on Electric Lines and Equipment; Section 7.3.2.3	Continue to install fault indicators when needed.	Installed Fault indicators in its divisions of Central Coast, De Anza, Diablo, Fresno, Humboldt, Los Padres, North Bay, North Valley, Peninsula, Sacramento, San Jose, Sierra, Sonoma, Stockton and Yosemite.
Forecast of a Fire Risk Index, Fire Potential Index, or Similar; Section 7.3.2.4	Continue work on Fire Potential Index Model.	The Fire Potential Index (FPI) was operational in 2022, and no major changes were made.
Personnel Monitoring Areas of Electric Lines and Equipment in Elevated Fire Risk Conditions; Section 7.3.2.5	Continue work and maintenance on the Safety and Infrastructure Protection Teams (SIPT).	In a second quarter of 2022, the Infrastructure Protection Team (SIPT) program expanded to 130 employees, 45 engine crews in 35 locations distributed across PG&E's service territory.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Weather Forecasting and Estimating Impacts on Electric Lines and Equipment; Section 7.3.2.6	Continue work and maintenance on the Ignition Probability Weather (IPW) Model.	The Ignition Probability Weather and Outage Models (OPW/IPW) were operational in 2022. PG&E updated the models with outage and weather data that occurred in 2021 for operations in 2022. This updated model output informed all PSPS events in 2022.
Other, Wildfire Safety Operations Center (WSOC); Section 7.3.2.7	Continue use and work relating to the Hazard Awareness & Warning Center (HWAC).	Created 36 positions in Hazard Awareness & Warning Center as part of the 2022 WMP Update commitment to increase the staffing.
Capacitor Maintenance and Replacement Program; Section 7.3.3.1	Complete annual Capacitor Bank Inspection/Testing. Inspect all distribution capacitor banks in PG&E's system as part of the capacitor maintenance program.	Completed PG&E's annual Capacitor Bank Inspection/Testing as governed by its internal standards.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Circuit Breaker Maintenance and Installation to De-Energize Lines Upon Detecting a Fault, Maintenance Substation Distribution; Section 7.3.3.2-D	Complete approximately 630 transmission and distribution circuit breaker maintenance tasks in HFTD areas planned for 2022. The planned maintenance includes circuit breaker exercises, mechanism services and overhauls. Additional condition-based planned maintenance may be triggered during 2022. In addition to ongoing circuit breaker maintenance in 2022, circuit breakers will be identified, prioritized, and proactively replaced based on condition, performance, capacity, and other factors.	Completed 197 distribution substation circuit breaker related tasks. It included 136 preventative maintenance tasks in HFTD substations and 61 distribution class circuit breaker replacement tasks across the system.
Circuit Breaker Maintenance and Installation to De-Energize Lines Upon Detecting a Fault, Maintenance Substation Transmission; Section 7.3.3.2-T	Complete approximately 630 transmission and distribution circuit breaker maintenance tasks in HFTD areas planned for 2022. The planned maintenance includes circuit breaker exercises, mechanism services and overhauls. Additional condition-based planned maintenance may be triggered during 2022. In addition to ongoing circuit breaker maintenance in 2022, circuit breakers will be identified, prioritized, and proactively replaced based on condition, performance, capacity, and other factors.	Completed 470 transmission substation circuit breaker related tasks. It included 433 preventative maintenance tasks in HFTD substations and 37 transmission class circuit breaker replacement across the system.
Covered Conductor Maintenance; Section 7.3.3.4	Continue to maintain, repair and/or replace covered conductor pursuant to established condition-based maintenance programs.	Inspected and monitored covered conductor conditions as part of PG&E's GO 165 inspection program throughout its service territory.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Crossarm Maintenance, Repair, and Replacement; Section 7.3.3.5	Continue to install composite crossarms at locations identified by GO 165 Inspections and Patrols.	Completed repairs or replacements of 11,700 deteriorated crossarms.
Distribution Pole Replacement and Reinforcement, Including with Composite Poles; Section 7.3.3.6	Continue to inspect poles and replace and/or reinforce poles as needed.	Completed replacements or reinforcements of over 19,000 poles.[10]
Maintenance, Repair, And Replacement of Connectors, Including Hotline Clamps; Section 7.3.3.10	Maintain, repair and/or replace connectors pursuant to established condition-based maintenance programs. Replace existing connectors with new equipment on facilities that are hardened as part of the System Hardening Program.	Completed the replacement of 8,054 connectors.

[10] The number of poles is different from the 2023 WMP, but because a target was not provided in the WMP, Energy Safety considers this progress sufficient for meeting this initiative target.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Fixed Power Solutions; Section 7.3.3.11.4	Begin implementation of the Fixed Power Solutions plan, including: a. Scoping of customer solutions; b. Customer journey mapping; c. Engagement and solicitation of implementation partners;	Analyzed and coordinated permanent and temporary outage mitigation solutions for vulnerable customers impacted by PSPS and EPSS outages. Engaged the implementation partners for K-12 school site resiliency assessments. Provide resiliency support for EPSS outages and initiated a K-12 school pilot program offering Automatic Transfer Switch (ATS) installation to assist with EPSS mitigation efforts. Initiated the Residential Storage Initiative (RSI) pilot program, designed to support financially disadvantaged customers located on circuits at highest risk of EPSS outages. Also executed a contract to install residential batteries to enhance the resiliency to EPSS outages.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Fixed Power Solutions; Section 7.3.3.11.4 (continued)	Begin implementation of the Fixed Power Solutions plan, including: d. Coordination opportunities with other proceedings and customer offerings; and e. Determination of the best mechanism to ensure that the program can be scaled to support customer affordability.	Coordinated with other proceedings and proposed a Financial Platform under Clean Energy Finance Options, allowing PG&E to offer the Fixed Power Solutions through outside funding or utility capital to support customer resiliency.
Other Corrective Action, Distribution Substation; Section 7.3.3.12.1	Continue performing corrective repairs and animal abatement activities: Corrective Repairs – PG&E has 584 LC notifications from 2021 in progress, and other corrective repair notifications will be generated through the inspections process on an ongoing basis. They will be tracked and prioritized using the LC notification process throughout 2022. Animal Abatement – In 2022, PG&E will continue to execute small scale animal abatement as identified through the LC notification process. PG&E will also continue to monitor animal abatement project triggers in transmission substations to identify and prioritize additional large-scale project as needed. PG&E will continue installation of animal abatement in all new construction projects (i.e., transformer replacements, bus conversions and other temporary and permanent installations).	Completed 913 distribution substation corrective LC tags related to repairs or animal abatement.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Other Corrective Action, Transmission Substation; Section 7.3.3.12.2	Continue performing corrective repairs and animal abatement activities: Corrective Repairs – PG&E has 300 LC notifications from 2021 in progress, and other corrective repair notifications will be generated through the inspections process on an ongoing basis. They will be tracked and prioritized using the LC notification process throughout 2022. Animal Abatement – In 2022, PG&E will continue to execute small scale animal abatement as identified through the LC notification process. PG&E will also continue to monitor animal abatement project triggers in transmission substations to identify and prioritize additional large-scale project as needed. PG&E will continue installation of animal abatement in all new construction projects (i.e., transformer replacements, bus conversions and other temporary and permanent installations).	Completed 534 transmission substation corrective LC tags related to repairs or animal abatement.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Other Corrective Action, Generation Substation; Section 7.3.3.12.5	Continue performing corrective repairs and animal abatement activities, as detailed below: Corrective Repairs – PG&E has 142 notifications from 2021 in progress that will be prioritized and tracked to completion using the H1 process. This is in addition to any new corrective repair notifications generated though ongoing inspections. Animal Abatement – In 2022, Power Generation will define and scope the Animal Abatement Program which will include the one EO animal abatement project referenced in Section 7.3.3.12.2 for implementation in 2023 and beyond.	Completed and closed 517 notifications from the 2021 Supplemental Inspections. Completed assessments at 24 switchyards by Power Generation.
Pole Loading Infrastructure Hardening and Replacement Program Based on Pole Loading Assessment Program; Section 7.3.3.13	Perform pole loading calculations for approximately 180,000 poles. This volume includes an additional 20,000 poles originally forecast to be completed in 2021.	Performed pole loading calculations on approximately 241,000 poles.
Transformers Maintenance and Replacement; Section 7.3.3.14	Continue replacing overloaded transformers using the WDRM prioritization.	Replaced 197 overloaded transformers.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Updates To Grid Topology to Minimize Risk of Ignition in HFTDs, Rapid Earth Current Fault Limiter (RECFL); Section 7.3.3.17.4	Repair and rebuild the REFCL installation at Calistoga to complete additional pilot evaluation. If the additional pilot is successful, PG&E will look for opportunities to place REFCL into full service as well as evaluate whether any additional sites are appropriate for future installations.	PG&E responded that it completed repair construction work at the Calistoga Substation. In its 2023 WMP V4, PG&E noted progress such as "completing changes to substation equipment after encountering equipment failures," and "…tests of the REFCL system." (DR 249; 2023-2025 WMP, p. 283.)
Improvement of Inspections; Section 7.3.4.3	Improve optimization and reliability of results for inspection program.	Completed several improvements to the inspection program, including project EPIC 3.41 for drone enablement as well as inspection checklist improvements.
Infrared Inspections of Transmission Electric Lines and Equipment; Section 7.3.4.5	Continue infrared inspections on transmission electric lines and equipment.	Provided Excel worksheets identifying completed infrared inspections on transmission lines of HFTD Tier 2 and Tier 3 lines.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Intrusive Pole Inspections, Distribution; Section 7.3.4.6.1	Perform intrusive pole inspections utilizing new field hardware and software and the revised refreshed technology solution and collect photographs of the poles inspected. Employ the revised utility procedure and enhanced testing method to drill at least one new bore hole when intrusively inspecting wood poles.	Implemented the Pole Test & Treat Distribution Application for intrusive pole inspections. Photographs of the poles were also collected. A new utility procedure was further introduced to drill new bore holes for intrusive inspections.
Intrusive Pole Inspections, Transmission; Section 7.3.4.6.2	Continue to schedule intrusive pole inspections on HFTD areas.	Provided inspection workplan identifying scheduled intrusive pole inspections on HFTD areas for 2022.
LiDAR Inspections of Distribution Electric Lines and Equipment; Section 7.3.4.7	Continue LiDAR data acquisition for distribution electric lines and equipment in HFTD and HFRA areas.	Collected LiDAR data covering 3,359 distribution circuit miles in HFTD areas.[11]
LiDAR Inspections of Transmission Electric Lines and Equipment; Section 7.3.4.8	Complete LiDAR data acquisition for 269 HFTD/HFRA circuit miles.	Collected LiDAR data covering 17,867 transmission circuit miles.[12]

[11] Although PG&E did not report mileage within HFRA areas, specifically, Energy Safety believes the dataset of 3,359 miles in HFTD areas miles is sufficient activity for this initiative and target.

[12] Although PG&E did not report mileage within HFTD/HFRA areas, specifically, Energy Safety believes PG&E's intent in sharing the dataset of 17,867 miles was that 269 HFTD/HFRA miles was included.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Other Discretionary Inspection of Distribution Electric Lines and Equipment, Beyond Inspections Mandated by Rules and Regulations; Section 7.3.4.9	Inspect and maintain all electric distribution miscellaneous overhead and underground equipment.	Inspected and maintained all electric distribution miscellaneous overhead and underground equipment. Maintenance requirements were also updated and revised.
Other Discretionary Inspection of Transmission Electric Lines and Equipment, Beyond Inspections Mandated by Rules and Regulations; Section 7.3.4.10	Pilot the Ultrasonic Steel Pole and the Corrosion Climbing Assessment inspection methods. Perform Component Sampling and Testing. Continue the Conductor Measurement (Linevue) and Below Grade Inspections of HFTD/HFRA structures.	Completed the following pilot inspections: Ultrasonic Steel Pole, Corrosion Climbing, Component Sampling and Testing, Conductor Measurement, and Below Grade Inspections.
Patrol Inspections of Distribution Electric Lines and Equipment; Section 7.3.4.11	Continue inspection patrol in HFTD Tier 2 and other areas not subject to detailed inspection.	Conducted patrols in all areas not subject to detailed inspections.
Patrol Inspections of Transmission Electric Lines and Equipment; Section 7.3.4.12	Continue to perform patrol inspections of electric transmission structures in HFTD and HFRA areas.	Conducted patrols on all transmission lines that did not undergo a detailed inspection, as per maintenance protocols.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Pole Loading Assessment Program to Determine Safety Factor; Section 7.3.4.13	Continue to perform pole loading calculations.	Performed pole loading calculations on approximately 241,000 poles.
Automatic Recloser Operations; Section 7.3.6.1	Continue work and maintenance on automatic recloser operations.	Published PG&E utility procedure for automatic recloser disabling.
Crew-Accompanying Ignition Prevention and Suppression Resources and Services; Section 7.3.6.2	SIPT will continue to support fire prevention and mitigation activities and when possible, perform defensible space inspections for PG&E facilities as needed.	Supported fire prevention mitigation activities by expanding the program to 130 employees, 45 crews, and 34 locations. In 2021, these numbers were 108, 40, and 31 respectively.
Personnel Work Procedures and Training in Conditions of Elevated Fire Risk; Section 7.3.6.3	WBT SAFE-1503 will be updated in 2022 to incorporate key aspects of the revisions made to Utility Standard TD-1464S.	WBT SAFER-1503 was updated on 1/28/2022 and incorporated key aspects of the revisions made to Utility Standard TD-1464S.
Protocols for PSPS re-Energization, Distribution; Section 7.3.6.4-D	Continue work and maintenance on PSPS distribution re-energization protocols.	Revised the PSPS for Transmission and Distribution to include Customer Owned Line process based on PSPS protocols, field asset assessments, and lessons learned.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Protocols for PSPS re-energization, Transmission; Section 7.3.6.4-T	Continue work and maintenance on PSPS distribution re-energization protocols.	Revised the PSPS for Transmission and Distribution to include Customer Owned Line process based on PSPS protocols, field asset assessments, and lessons learned.
PSPS Events and Mitigation of PSPS Impacts, Distribution; Section 7.3.6.5-D	Continue to review and revise, as needed, PSPS Protocols in order to reduce the impact of PSPS events on customers while using PSPS under the appropriate circumstances to mitigate potential wildfire ignitions.	Did not implement a PSPS de energization in 2022. Conducted 2022 PSPS/Wildfire Full Scale Exercise on June 13-17, 2022.
PSPS Events and Mitigation of PSPS Impacts, Transmission; Section 7.3.6.5-T	Continue to review and revise, as needed, PSPS Protocols in order to reduce the impact of PSPS events on customers while using PSPS under the appropriate circumstances to mitigate potential wildfire ignitions.	Did not implement a PSPS de energization in 2022. Conducted 2022 PSPS/Wildfire Full Scale Exercise on June 13-17, 2022.
Stationed and On-Call Ignition Prevention and Suppression Resources and Services; Section 7.3.6.6	SIPT crews will continue to support fire prevention and mitigation activities and maintain an “on call” status during the summer preparedness period.	Although PG&E provided documentation to support fire prevention mitigation activities expanding to 130 employees, 45 crews, and 34 locations (as noted in Section 7.3.6.2) the documentation did not clearly identify the “on call” status of the crews during the summer preparedness period.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Other, Aviation Support; Section 7.3.6.7	Aviation Services will continue to provide support for wildfire mitigation programs and evaluate the best use of existing assets and to evaluate new technologies.	Asset types and available resources for aviation support remained the same in 2022. Aviation Services participated in the PSPS Full Scale Exercise.
Collaborative Research on Utility Ignition and/or Wildfire; Section 7.3.7.2	Continue work on and finish current collaborative research projects.	The Redwood Coast Airport Microgrid (RCAM) went into operation in June 2022 in collaboration with the Redwood Coast Energy Authority. PG&E developed a new regulatory framework with project partners for California resilience goals. PG&E created an industry-first Microgrid Island Study because of RCAM's development. The developed microgrid projects are replicable and scalable to implement across PG&E's service territory.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Documentation and Disclosure of Wildfire-Related Data and Algorithms; Section 7.3.7.3	GIS Data Standard (Spatial QDR) – PG&E plans successfully submit GIS Data Standard reports (Spatial QDR) to Energy Safety. Quarterly Data Report – PG&E plans successfully submit QDRs to Energy Safety. Quarterly Initiative Update – PG&E plans to successfully submit QIU reports to Energy Safety. Documentation and Disclosure of Ignition Events – PG&E plans to review and revise PG&E's Fire Incident Data Collection Plan and Reporting Standard, where applicable. Documentation and Disclosure of Ignition Events – PG&E plans to submit notifications and reports per Rules 29300 and 29001 in Energy Safety's Emergency Rulemaking Compliance Protocols. Documentation and Disclosure of Ignition Events – PG&E plans to complete the Preliminary Ignition Investigation Reports for Q1-Q3 CPUC-reportable ignitions in HFTD prior to year-end.	Successfully completed and submitted all applicable reports.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Documentation and Disclosure of Wildfire-Related Data and Algorithms; Section 7.3.7.3 (continued)	Documentation and Disclosure of Ignition Events – PG&E plans to continue the revision and republishing of PG&E's Fire Incident Data Collection Plan and Reporting Procedure. Wildfire Risk Algorithms – PG&E will continue to add risk models representing additional risk drivers to the composite risk model framework for both the WDRM and WTRM.	See information in a row above.
Tracking and Analysis of Near Miss Data; Section 7.3.7.4	Update the 2022 WDRM v3 with near miss data from 2021, roll out training to all Trouble persons to fill out the questionnaire for all equipment failure outage incidents, and transition wires down data analysis process to the Foundry tool.	Did not incorporate near miss data into the WRDM and instead developed the Asset Failure Data Collection platform in Foundry. This will be incorporated into the WRDM in a future year. Equipment failure questionnaire rolled out to all Trouble persons. Migrated the wire down review and data into Foundry and incorporated the wire down data into the WRDM.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Other, IT Projects to Support Wildfire Mitigation Work; Section 7.3.7.5	Further develop the following projects in 2022: Wildfire Safety Division/Wildfire Mitigation Plan (WSD/WMP) Automated Reporting, Foundry Ontology, Wildfire Safety Operations Center (WSOC) Incident Viewer, Grid Data Analytics Suite (GDAT), Aerial Inspection-Sherlock Tool, Electric Asset Registry-Trusted Data (Sync dashboard), Emergency Web Remediation, Wind Loading Assessment, Transmission Support Structures 2, Asset Failure Data Collection, Asset Failure Analysis Data Product, Electric Transmission Operability Assessment, ET Overhead Asset Information Collection, PSPS Field Patrol, Enhanced Vegetation Management, One Vegetation Management, Wildfire Distribution Risk Model (WDRM), Wildfire Transmission Risk Model (WTRM), Outage Management Tool/Distribution Management System Enhancements (OMT/DMS), PSPS Viewer Enhancements, Sharing Wildfire & PSPS Data Externally, PSPS Situational Intelligence Platform (PSIP), System Inspection Wildfire Mitigation Program, Wildfire Risk Command Center, Maps + Asset Registry/Map Correction.	Completed and/or developed all the stated IT projects.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Allocation Methodology Development and Application; Section 7.3.8.1	Continue to develop value framework methodologies for each program in the Electric Portfolio, as well define an integrated process that evaluates all risks across the electric system.	Continued to develop the Value Framework Methodologies for the electric investment portfolio. Custom models were created for the transmission capital and distribution capital programs. Also, a portfolio prioritization framework that integrated RSEs was developed enterprise wide.
Risk Reduction Scenario Development and Analysis; Section 7.3.8.2	Update the SME informed mitigation effectiveness factors.	Resource allocation methodology for risk reduction underwent considerable development and optimization. These updates have been implemented for the 2023 WMP and beyond.
Adequate and Trained Workforce for Service Restoration; Section 7.3.9.1	ICS/SEMS EOC activity is being tracked and/or reported consistent with a regulatory requirement.	Continued to provide and track SEMS/ICS training for all EOC personnel.
Community Outreach, Public Awareness, and Communications Efforts; Section 7.3.9.2	Complete all activities and processes mentioned in initiatives 7.3.9.3 and 7.3.10.1.	Completed all activities in initiatives 7.3.9.3 and 7.3.10.1, which included proactive communication through e-mails, letters, bill insets, postcards, townhalls, social media campaigns, and more.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Customer Support in Emergencies; Section 7.3.9.3	Continue to offer consumer protections, rebuild resources, and communications to support customers before, during and after a wildfire. Continue to gather feedback from customers and communities and adjust approach, as required.	Red-ragged customers are provided emergency disaster relief through CPUC 19-07-105. Non red-tagged customers are offered assistance through programs such as the California Alternate Rates for Energy Program. PG&E also contacts CBOs to share impacted customers for prioritized support. Quarterly townhalls as well as virtual meetings were also held to inform customers and receive feedback.
Disaster and Emergency Preparedness Plan; Section 7.3.9.4	Continue to work on and maintain a disaster and emergency preparedness plan.	The Company Emergency Response Plan was reviewed, revised, and published for 2023.
Preparedness and Planning for Service Restoration; Section 7.3.9.5	Continue to train employees on the 2022 restoration protocols, conduct field exercises for all impacted divisions, and support pre-flight requests as deemed necessary by field organizations.	Did no implement a PSPS de energization but did conduct training exercises and restoration protocols through its PSPS/Wildfire Full Scale Exercise.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Protocols in Place to Learn from Wildfire Events; Section 7.3.9.6	Develop a communications and operations plan that engages external agencies that participate in PG&E exercises and activations for inclusion in after-action reviews.	External agencies were included as planners and players in the 2022 PSPS Tabletop Exercise, and the PSPS/Wildfire Full Scale Exercise. External agency feedback was solicited for inclusion in an after action report via the exercise hotwash process.
Cooperation and Best Practice Sharing with Agencies Outside CA; Section 7.3.10.2	Continue to engage in the IWRMC. Continue to partner with educational institutions and other utilities (in the US/CA) on mitigating wildfire risk.	Continued to engage with the industry and partner utilities for sharing of best practices for wildfire mitigation. Two examples include participation in the International Wildfire Risk Mitigation Consortium (IWRMC) including presenting on PG&E's biggest wildfire related learning and challenge and participation in the Joint Investor Owned Utilities (IOU) Covered Conductor discussions

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	PG&E Description of 2022 Work (DR 249)
Cooperation with Suppression Agencies; Section 7.3.10.3	Continue to provide ongoing engagement and collaboration with external public safety (fire) partners. Continue to support events in 2022, similar to those which the PSS team engaged during 2021, such as tailored local engagements; Regional Working Group meetings; Gas/electric safety workshops; Professional group meetings; Wildfire safety trainings; and Gas safety outreach with external public safety partners.	Continued to engage with external public safety partners, including the USFS, California Department of Forestry and Fire Protection (CAL FIRE), CPUC, and more of its Full Scale Exercise.
Forest Service and Fuel Reduction Cooperation and Joint Roadmap; Section 7.3.10.4	Award up to $5 million to USFS for fuels reduction projects in forests within PG&E's service territory but outside PG&E's ROWs.	Awarded funding to the USFS for fuels reduction equipment and projects in the Six Rivers, Lassen, Sequoia, and Plumas forests within the planned budget for this initiative.
Other, PMO and General Wildfire Support; Section 7.3.10.5	Continue work and maintenance on the Project Management Office (PMO) and general wildfire support.	Completed several 2022 public deliverables through the Project Management Office, including 2022 WMP Update work pertaining to QIUs, QNs, and QDRs.

Appendix B: EC ARC Information on WMP Initiative Activity Attainment

Table 7: PG&E's WMP Initiative Activity Attainment

2022 WMP Update Initiative	2022 Activity Target	2022 Actual (EC ARC, pp. 20-38)
Ignition Probability Mapping Showing the Probability of Ignition Along the Electric Lines and Equipment (A.01); Section 7.3.1.3	Develop additional Distribution Equipment/Facility Failure (EFF) and Distribution Contact from Object (CFO) sub-models. Conduct assessment to determine whether newly developed submodels should be included in the WDRM model.	After further developing the scope and initiating exploratory analysis on model data, data pipelines for Asset models (including Capacitor Banks, Switches, Conductors, and Voltage Regulators) were built. Asset model prototype training was completed, and EVM work history data was obtained and incorporated into the Vegetation model. Analysis of Salo tree mortality data began, and EPSS device activation history data was obtained and analyzed in preparation for draft development into the probability of ignition model. The enhanced model analysis presented results to the Wildfire Risk Governance Steering Committee (WRGSC), and the modeling approach was approved by the WRGSC on December 7, 2022.

2022 WMP Update Initiative	2022 Activity Target	2022 Actual (EC ARC, pp. 20-38)
Ignition Probability Mapping Showing the Probability of Ignition Along the Electric Lines and Equipment (A.02); Section 7.3.1.3	Develop Threat and Hazard (Risk drivers) sub-models that cover: Threats (e.g., Atmospheric corrosion, Underground corrosion, Fatigue, Mechanical Wear, Decay, Contamination, Vibration), and Hazards (primarily Wind). Conduct assessment to determine whether newly developed sub-models are to be included in the WTRM model.	The first versions of all committed Threat/Hazard models that have the greatest impact to the safety of PG&E's Transmission line assets have been deployed. The WTRM models were approved for use by the WRGSC on September 14, 2022.
Initiative Mapping and Estimation of Wildfire and PSPS Risk-Reduction Impact (A.03); Section 7.3.1.4	Assess the PSPS Consequence model to inform if it is fit for use to inform PSPS mitigation plans to minimize customer impact.	Solicited stakeholder feedback and usage through meetings and review of results as part of the Undergrounding mileage selection framework. The assessment of the PSPS Consequence model was submitted and approved by the WRGSC on May 11, 2022.

2022 WMP Update Initiative	2022 Activity Target	2022 Actual (EC ARC, pp. 20-38)
Match Drop Simulations Showing the Potential Wildfire Consequence of Ignitions That Occur Along the Electric Lines and Equipment (A.04); Section 7.3.1.5	Develop and approach on how to incorporate ingress/egress into the Wildfire Consequence Model.	After receiving Egress and RAVE (Risk Associated with Value Exposure) models from UCLA and Technosylva respectively, resources were deployed to identify the preferred allocation to include Egress in the risk models. Upon further review, it was determined that the UCLA portion of the project was not practical as part of the 2022 model development. Thus, the focus of PG&E's resources went to the use and development of the RAVE data for the Egress model. PG&E developed an initial formulation of potential approaches to accounting for egress as part of the Wildfire Consequence model. The team evaluated several new potential variables that could be used to enhance the Wildfire Consequence model for the complications of egress, including population demographic factors such as age, poverty, and disability levels, and additional engineering factors such as burnable area, fuel layer content, and wind characteristics. Exploratory data analysis was performed, and new consequence model training and evaluation began. The approach for integrating egress was approved by the WRGSC on November 16, 2022.

2022 WMP Update Initiative	2022 Activity Target	2022 Actual (EC ARC, pp. 20-38)
Match Drop Simulations Showing the Potential Wildfire Consequence of Ignitions That Occur Along the Electric Lines and Equipment (A.05); Section 7.3.1.5	Evaluate an approach to incorporate "Resistance to Control" (i.e., TDI or Terrain Difficulty Index) into the Wildfire Consequence Model. Resistance to Control is the relative difficulty of constructing and holding a control line as affected by resistance to line construction and by fire behavior.	The team evaluated several new potential variables that could be used to enhance the Wildfire Consequence model for the complications related to fire suppression, including population demographic factors such as age, poverty, and disability levels, and additional engineering factors such as burnable area, fuel layer content, and wind characteristics. Exploratory data analysis was performed, and new consequence model training and evaluation took place. An analysis for a modeling approach for adding resistance to control (ingress and suppression) to the Wildfire Consequence model was completed and presented to the WRGSC. The approach for integrating resistance to control was approved by the WRGSC on November 16, 2022.

2022 WMP Update Initiative	2022 Activity Target	2022 Actual (EC ARC, pp. 20-38)
Numerical Weather Prediction (B.01); Section 7.3.2.1.1	Perform Transmission and Distribution system inspection quality audits prioritizing HFTD/HFRA areas. Statistically valid methodology parameters, such as a confidence level of 95 percent, will be utilized.	PG&E built and deployed its PSPS models in a separate data pipeline driven by the ensemble mean forecast in its lower computing environments to prove feasibility. After testing, PG&E have now promoted the pipeline through its QA and production environments and are now running its PSPS models in parallel allowing for direct comparison of outputs. We've also integrated the outputs into its ArcGIS pro environments and have built a front-end dashboard using Tableau to compare results. Forecast skill between model inputs has been evaluated and PG&E has evaluated and built the data pipelines needed to run the PSPS models using different inputs operationally. In addition, the new FPI model was presented and approved by the WRGSC on August 24, 2022.
Weather Stations – (B.02); Section 7.3.2.1.3	Install or optimize 100 weather stations. Install is defined as when it is in service and verified operational. Optimized is when moved to a new location to improve understanding of whether conditions.	In 2022, PG&E installed 105 new weather stations and optimized six weather stations, bringing the total number of new and optimized sites to 111, and exceeding the annual target of 100.
Wildfire Cameras (B.03); Section 7.3.2.1.4	Install 98 new cameras facing HFTD Tier 2 or Tier 3 view sheds.	In 2022, PG&E installed 100 cameras, exceeding the annual target of 98 by two.

2022 WMP Update Initiative	2022 Activity Target	2022 Actual (EC ARC, pp. 20-38)
Distribution Fault Anticipation (DFA) and Early Fault Detection (EFD) Technology (B.04); Section 7.3.2.2.3	Install 40 DFA sensors on circuits feeding into HFTD areas or HFRA.	PG&E completed a total of 48 circuits and exceeded its annual target of 40 circuits by eight.
Distribution Fault Anticipation (DFA) and Early Fault Detection (EFD) Technology (B.05); Section 7.3.2.2.3	Install EFD sensors on 2 circuits feeding into HFTD areas or HFRA.	PG&E completed installs on two circuits, meeting the annual target.
Line Sensor Devices (B.06); Section 7.3.2.2.5	Install Line Sensor devices on 40 circuits feeding into HFTD areas or HFRA.	The Line Sensor installation program surpassed the 2022 WMP Update target of 40 circuits, completing installations on 63 circuits.
Expulsion Fuse – Replacement (C.01); Section 7.3.3.7	Remove 3,000 non-exempt fuses/cutouts identified on distribution poles in HFTD areas or HFRA.	PG&E exceeded its target by removing 3,085 units.
Distribution Line Sectionalizing (C.02); Section 7.3.3.8.1	Install and SCADA commission 100 new PSPS SCADA enabled Distribution Sectionalizing devices.	The program met the WMP target of 100 commissioned devices with 124 devices commissioned.
Transmission Line Sectionalizing – Install and SCADA Commission (C.03); Section 7.3.3.8.2	Install and SCADA commission 15 transmission line switches on lines that traverse the HFTD areas.	PG&E installed a total of 18 sectionalizing switches, exceeding the annual target of 15 by three.

2022 WMP Update Initiative	2022 Activity Target	2022 Actual (EC ARC, pp. 20-38)
Distribution Line Motorized Switch Operator (MSO) Program (C.04); Section 7.3.3.8.3	Replace at least 50 of the 104 remaining Motorized Switch Operators located within or are energizing line sections that feed into HFTD areas or HFRA.	PG&E replaced a total of 57 units in 2022, exceeding the annual target of 50 by seven.
Installation of System Automation Equipment (C.05); Section 7.3.3.9.1	Install 17 substation SCADA enabled reclosers on circuits serving line sections that feed into HFTD areas or HFRA, barring any exceptions due to connectivity issues necessary to SCADA-enable the recloser.	PG&E installed 17 units in 2022, meeting the annual target.
Single Phase Reclosers (C.06); Section 7.3.3.9.2	Install 80 single phase recloser sets in HFTD areas or HFRA.	PG&E installed 81 single phase reclosers in 2022, exceeding the annual target of 80 by one.
Generation for PSPS Mitigation (Temporary Distribution Microgrids) (C.07); Section 7.3.3.11.1	Make operationally ready at least four additional Distribution Microgrid Pre-installed Interconnection Hubs (PIHs).	A total of four additional temporary distribution microgrids with pre-installed interconnection hubs reached operational readiness, completing the 2022 WMP Update target for this initiative.
Substation Activities to Enable Reduction of PSPS Impacts (C.08); Section 7.3.3.11.2	Replace the fuse with a circuit switcher on the Rincon Transformer Bank 1.	The Rincon Transformer Fuse Replacement was completed and went in service in May 2022, meeting its initiative target.
Emergency Back-up Generation – PG&E Service Centers & Materials Distribution Centers (C.09); Section 7.3.3.11.3	Equip 15 PG&E Service Centers or Materials Distribution Centers sites with emergency back-up generation.	The target of equipping 15 sites was completed in December 2022.

2022 WMP Update Initiative	2022 Activity Target	2022 Actual (EC ARC, pp. 20-38)
Undergrounding of Electric Lines and/or Equipment (C.10); Section 7.3.3.16	Complete at least 175 circuit miles of undergrounding work.	PG&E completed 179.7 miles of undergrounding in 2022, exceeding its annual target of 175 circuit miles.
System Hardening – Distribution (C.11); Section 7.3.3.17.1	Complete at least 470 circuit miles of system hardening work which includes overhead system hardening, undergrounding and removal of overhead lines in HFTD or buffer zone areas with the exception of any mileage being undergrounded and tracked separately as part of its Butte County Rebuild efforts.	PG&E hardened a total of 483 circuit miles in 2022, exceeding its annual target of 470 circuit miles.
System Hardening – Transmission (C.12); Section 7.3.3.17.2	Remove or replace 32 circuit miles of transmission conductor on lines traversing the HFTD areas or HFRA.	PG&E removed or replaced 37.8 circuit miles in 2022, exceeding its annual target of 32 circuit miles.

2022 WMP Update Initiative	2022 Activity Target	2022 Actual (EC ARC, pp. 20-38)
Non-Exempt Surge Arrester Replacement Program (C.13); Section 7.3.3.17.3	Remove all the remaining non-exempt surge arrestors in HFTD areas (based on the known population of 4,590 surge arrestors as of January 1, 2022) through replacement with exempt equipment.	PG&E exceeded that target by replacing 4,621 units in 2022. Not all surge arresters with known grounding issues in the HFTD were replaced in 2022 because the target was created using an estimate based on the historical number of cancellations each year. In 2022, PG&E experienced fewer cancellations than estimated. PG&E also reviewed its data to ensure PG&E was capturing all remaining surge arresters with known grounding issues in the HFTD. In total, 139 additional sites could not be completed in 2022 due to access issues, customer refusals, and poles that need replacement before surge arrester work can take place.
Remote Grid (C.14); Section 7.3.3.17.5	Operate 2 new Remote Grid Standalone Power System (SPS) units.	Two SPS units, Corning Remote 0001 and 0002, were brought online in December 2022 after successful commissioning and cutover.
Butte County Rebuild Program (C.15); Section 7.3.3.17.6	Complete 55 circuit miles of undergrounding work as part of the Butte County Rebuild program.	PG&E exceeded its WMP target of 55 circuit miles with 57.8 circuit miles undergrounding miles completed in 2022.
Detailed Inspections of Distribution Electric Lines and Equipment (D.01); Section 7.3.4.1	Complete detailed inspections on a minimum of 396,000 distribution poles, which were identified in PG&E's asset registry as of January 1, 2022, in HFTD areas or HFRA, barring external factors.	PG&E exceeded its WMP target of 396,000 detailed distribution ground inspections by completing 398,184 detailed distribution ground inspections in 2022.

2022 WMP Update Initiative	2022 Activity Target	2022 Actual (EC ARC, pp. 20-38)
Detailed Inspections of Transmission Electric Lines and Equipment (D.02); Section 7.3.4.2	Complete detailed ground inspections on a minimum of 39,000 transmission structures in PG&E's asset registry as of January 1, 2022, in HFTD areas or HFRA, barring external factors.	PG&E exceeded its WMP target of 39,000 detailed transmission ground inspections by completing 39,005 detailed transmission ground inspections in 2022.
Detailed Inspections of Transmission Electric Lines and Equipment (D.03); Section 7.3.4.2	Complete detailed climbing inspections on a minimum of 1,800 transmission structures in PG&E's asset registry as of January 1, 2022, in HFTD areas or HFRA, barring external factors.	PG&E exceeded its WMP target of 1,800 transmission climb inspections by completing 1,835 detailed climbing inspections in 2022.
Detailed Inspections of Transmission Electric Lines and Equipment (D.04); Section 7.3.4.2	Complete detailed aerial inspections on a minimum of 39,000 transmission structures in PG&E's asset registry as of January 1, 2022, in HFTD areas or HFRA, barring external factors.	PG&E exceeded its WMP target of 39,000 detailed transmission aerial inspections by completing 39,004 detailed aerial inspections in 2022.
Infrared Inspections of Distribution Electric Lines and Equipment (D.05); Section 7.3.4.4	Complete infrared inspections on a minimum of 9,000 distribution circuit miles in PG&E's asset registry as of January 1, 2022, in HFTD areas or HFRA, barring external factors.	PG&E exceeded the WMP target of 9,000 circuit miles of infrared inspections by completing 9,560 circuit miles of infrared inspections in 2022.
Substation Inspections (D.06); Section 7.3.4.15	Complete supplemental inspections on 86 distribution substations in HFTD areas or HFRA, barring external factors.	PG&E met its 2022 target of completing 86 supplemental inspections on distribution substations.
Substation Inspections (D.07); Section 7.3.4.15	Complete supplemental inspections on 43 transmission substations in HFTD areas or HFRA, barring external factors.	PG&E completed its WMP target of 43 supplemental inspections on transmission substations with 43 completed in 2022.

2022 WMP Update Initiative	2022 Activity Target	2022 Actual (EC ARC, pp. 20-38)
Other – Substation Inspections Hydro Generation (D.08); Section 7.3.4.16	Complete supplemental inspections on 52 Hydroelectric Generation Substations and Powerhouses within HFTD areas or HFRA,	PG&E completed its WMP target of 52 supplemental inspections on hydroelectric substations and powerhouses with 52 completed in 2022.
Quality Assurance/Quality Control of Inspections (D.09); Section 7.3.4.14	Perform Transmission and Distribution system inspection quality audits prioritizing HFTD/HFRA areas. Statistically valid methodology parameters, such as a confidence level of 95 percent, will be utilized.	The Quality Management Transmission System Inspection Audit, which followed a statistically valid sampling methodology using a 95% confidence level and was specifically concentrated in High Fire Threat District locations, was completed with a final total number of locations audited of 2,696 (versus a planned 2,695). The audit has achieved approximately 100% of its 2022 target. The Quality Management Distribution System Inspections Audit, which followed a statistically valid sampling methodology using a 95% confidence level and was specifically concentrated in High Fire Threat District locations, is complete with a final total number of locations audited of 3,041 (versus a planned 2,835). The audit has achieved approximately 107% of its 2022 target.
Other Corrective Action, Maintenance, Distribution (D.10); Section 7.3.3.12.4	Close a minimum of 55,000 HFTD or HFRA distribution tags in PG&E's workplan as of June 30, 2022, barring external factors.	For 2022, PG&E closed a total of 45,951 E tags in HFTD and HFRA areas, which was 16.5% lower than PG&E's target of 55,000 E maintenance tags.

2022 WMP Update Initiative	2022 Activity Target	2022 Actual (EC ARC, pp. 20-38)
Other Corrective Action, Maintenance, Transmission (D.11); Section 7.3.3.12.3	Close a minimum of 18,000 HFTD or HFRA transmission tags in PG&E's workplan as of June 30, 2022, barring external factors.	PG&E's annual total of completed transmission tags was 21,145, exceeding its annual target of 18,000 in 2022.
Detailed Inspections and Management Practices for Vegetation Clearances Around Distribution Electrical Lines and Equipment (E.01); Section 7.3.5.2	Complete EVM work on 1,800 risk ranked distribution circuit miles, barring external factors.	The EVM program completed 1,923.81 circuit miles by the end of 2022, exceeding the WMP target of 1,800 miles. 98.7% of the EVM work performed in 2022 was performed on the highest 20% risk-ranked miles.
Detailed Inspections and Management Practices for Vegetation Clearances Around Distribution Electrical Lines and Equipment (E.02); Section 7.3.5.2	Inspect and clear (where clearance is needed) all poles identified in PG&E's Vegetation Management Database as of October 1, 2021, in HFTD areas or HFRA, not required by PRC 4292 and barring external factors.	PG&E's Pole Clearing program completed inspection and clearing, where clearing was needed, of 8,356 poles cumulatively within the current annual inspection cycle.
Remote Sensing Inspections of Vegetation Around Distribution Electric Lines and Equipment (E.03); Section 7.3.5.7	Complete at least 2,000 circuit miles of Mobile LiDAR capture on HFTD road access electric distribution lines, barring external factors.	The LiDAR Ground program worked 3,358.66 circuit miles by the end of 2022, exceeding the WMP target of 2,000 circuit miles.

2022 WMP Update Initiative	2022 Activity Target	2022 Actual (EC ARC, pp. 20-38)
Remote Sensing Inspections of Vegetation Around Transmission Electric Lines and Equipment (E.04); Section 7.3.5.8	Complete LiDAR inspection of a minimum of 18,000 circuit miles of transmission lines, barring external factors.	The program has completed aerial LiDAR inspections of all transmission circuit miles resulting in 17,867 circuit miles completed.[13]

[13] PG&E informed Energy Safety of an error in the unit of measure used to define the 2022 WMP Update target for this initiative – at completion of initiative, PG&E stated that its target of approximately 18,000 "circuit miles" was intended to have meant "line miles" per the Energy Safety definition (resulting in 17,867 circuit miles vs. 18,194 line miles).

2022 WMP Update Initiative	2022 Activity Target	2022 Actual (EC ARC, pp. 20-38)
Quality Assurance/Quality Control of Vegetation Management (E.05); Section 7.3.5.13	1. Quality Assurance Audits Distribution – Voltages less than 60 kV in PG&E's Routine, Tree Mortality, EVM and Pole Clearing Programs # Of Audits: 43 AQL: 95% Vegetation Pole Clearing # Of Audits: 1 AQL: 95% Transmission – High voltage 60 kV and greater and applies to maintaining high voltage transmission corridors to Minimum NERC clearance, PRC 4293 clearance, and GO 95 Rule 35 clearance. # Of Audits: 1 AQL: 95%	QAVM Year-to-Date Status: 1. All 43 planned Distribution Audits were completed with a final 2022 pass rate of 99.78% resulting in meeting the AQL Target of 95% 2. One planned Vegetation Pole Clearing audit was complete with a final 2022 pass rate of 98.20% resulting in meeting the AQL Target of 95% 3. One planned Transmission audit was completed with a final 2022 pass rate of 100%, resulting in meeting the AQL Target of 95% 4. Four Procedure Audits were completed with a final 2022 pass rate of 76.00% which did not meet the AQL Target of 95%

2022 WMP Update Initiative	2022 Activity Target	2022 Actual (EC ARC, pp. 20-38)
Quality Assurance/Quality Control of Vegetation Management (E.05); Section 7.3.5.13 (continued)	2. Quality Verification Reviews Distribution – voltages less than 60kV in PG&E's Routine, Tree Mortality, EVM and Pole Clearing programs. #: 1,522 Reviews AQL: 95% Vegetation Pole Clearing #:3,421 Poles AQL: 95% Transmission - High voltage 60kV and greater and applies to maintaining high voltage transmission corridors to Minimum NERC clearance, PRC 4293 clearance, and GO 95 Rule 35 clearance. #:260 Reviews, AQL: 95%	QVVM Year-to-Date Status: 1. A total of 1,640 Distribution Reviews were completed (versus a plan of 1,522) with a final 2022 pass rate of 91.34% which did not meet the AQL Target of 95% 2. A total of 349 Transmission Reviews were completed (versus a plan of 260) with a final 2022 pass rate of 94.21% which did not meet the AQL Target of 95% 3. A total of 3,469 Poles were audited in the Pole Clearing audit (versus a plan of 3,421) with a final 2022 pass rate of 90.26% which did not meet the AQL Target of 95%

2022 WMP Update Initiative	2022 Activity Target	2022 Actual (EC ARC, pp. 20-38)
Quality Assurance/Quality Control of Vegetation Management (E.05); Section 7.3.5.13 (continued)	See information in a row above.	As part of the Revision Notice, Energy Safety directed PG&E to establish a 95% AQL for audits/reviews for seven VM programs. The initiative target has 14 different components; seven relate to the number of audits/reviews performed and seven relate to programs achieving a 95% AQL. In its Revision Notice response, PG&E explained that it may not be able to meet this target given that PG&E established it midway through the year and a lot of work had already taken place, especially for pole clearing. PG&E was able to achieve the specified number of audits/reviews for the seven programs. However, PG&E was unable achieve 95% AQL for four of the seven programs. Of these four programs, two of these programs (QVVM Distribution and QVVM Transmission) had 2021 AQL scores. These programs increased their AQL scores in 2022 (increases ranged from 3.41% - 6.25%).
Substation Inspections, Distribution (E.06); Section 7.3.5.17.1	Complete defensible space inspections in alignment with the guidelines set forth in PRC 4291 at 132 distribution substations within HFTD areas or HFRA, barring external factors.	All 132 Distribution Substation inspections were timely completed and executed.
Substation Inspections, Transmission (E.07); Section 7.3.5.17.2	Complete defensible space inspections in alignment with the guidelines set forth in PRC 4291 at 55 transmission substations within HFTD areas or HFRA, barring external factors.	All 55 Transmission Substation inspections were completed and prescribed routine maintenance activities were being executed by the second quarter of 2022.

2022 WMP Update Initiative	2022 Activity Target	2022 Actual (EC ARC, pp. 20-38)
Substation Inspections, Hydro Generation Substation (E.08); Section 7.3.5.17.3	Complete defensible space inspections at 61 Hydroelectric Generation Substations and Powerhouses within HFTD areas or HFRA, barring external factors.	All 61 Power Generation powerhouses and switchyards were inspected for Defensible Space by the second quarter of 2022.
Vegetation Management to Achieve Clearances Around Electric Lines and Equipment (E.09); Section 7.3.5.20	Complete utility defensible space work on a minimum of 7,000 poles in the HFTD, barring external factors.	The UDS program completed clearing 7,168 poles by the end of 2022, exceeding the annual target of 7,000 poles.
Detailed Inspections and Management Practices for Vegetation Clearances Around Distribution Electrical Lines and Equipment (E.10); Section 7.3.5.2	PG&E will inspect and clear, where clearance is needed, 80,258 distribution poles subject to PRC 4292 in State Responsibility Areas identified by PRC 4292, barring external factors or poles that are exempt under Title 14 Cal. Code of Regulations 1255.	At the end of the third quarter in 2022, PG&E reported this target as completed with 80,208 distribution poles inspected and cleared, where clearance was needed.

2022 WMP Update Initiative	2022 Activity Target	2022 Actual (EC ARC, pp. 20-38)
Protective Equipment and Device Settings (F.01); Section 7.3.6.8	Conduct laboratory testing to refine the circuit device design parameters for 2022 EPSS implementation.	In the first quarter of 2022, 174 tests were performed at the ATS High Current Test Yard. The testing results indicated the following: The probability of ignition is higher on dried sod compared to other natural fuel media with higher moisture content. As the fault current increases, the probability of sustained ignition increases. As the clearing time increases, the probability of sustained ignition increases for all the fault current magnitudes used for testing. Based on the test results, the reduction in clearing time (fast relaying) for all faults will help reduce the ignition risk and is aligned with enhanced safety practices by other utilities and industry research. Faster relaying will also help limit the movement of faults/traveling arcs on circuits and flashover/arcing to adjacent phases.
Protective Equipment and Device Settings (F.02); Section 7.3.6.8	Load the engineered settings on protection devices (line reclosers and fuse savers) on the identified 1,018 circuits (as of March 10, 2022) on the following schedule, barring external factors: (1) On 80 percent of line devices by 5/1/22 and, (2) On the remaining 20 percent of line devices by 8/1/22	PG&E met the target of 3,580 installed setting on distribution line devices on the 1,018 circuits as per schedule in Q3 2022, subject to exclusions.

2022 WMP Update Initiative	2022 Activity Target	2022 Actual (EC ARC, pp. 20-38)
Protective Equipment and Device Settings (F.03); Section 7.3.6.8	Develop the procedure to govern the enablement of EPSS settings in 2022.	The work on this initiative was completed on April 30, 2022, and the TD-1470S EPSS Standard and supplemental documentation were provided as evidence of completion.
Protective Equipment and Device Settings (F.04); Section 7.3.6.8	Initiate reliability mitigations on 50 EPSS capable circuits in the HFTD areas, HFRA and non-HFTD buffer zones based on highest projected Customer Experiencing Sustained Outage (CESO).	The program achieved the annual target with work completed on 50 circuits by the end of Q3 2022.
Centralize Repository for Data (G.01); Section 7.3.7.1	1. Document and implement a process to identify data gaps in Foundry for critical risk drivers 2. Identify and incorporate new high-priority datasets into Foundry in support of analytic products 3. Identify and incorporate 20 new, foundational ontology objects into Foundry.	This annual target has been met as PG&E has: (1) documented and implemented a process to identify data gaps in Foundry for critical risk drivers; (2) identified and incorporated new high-priority data sets into Foundry in support of analytic products; and (3) successfully completed the development and incorporation of 22 L2 Ontology objects in support of wildfire mitigation analytics.
Risk Spend Efficiency (RSE) Analysis (H.01); Section 7.3.8.3	Develop and share RSE Governance Process with Energy Safety.	The RSE Governance team documented the Risk Spend Efficiency (RSE) Governance Process, including third-party findings, to ensure continued improvements in the robustness of RSEs. The progress and findings are summarized in a PowerPoint presentation which was sent via email to OEIS on September 22, 2022, thereby completing this target.

2022 WMP Update Initiative	2022 Activity Target	2022 Actual (EC ARC, pp. 20-38)
Community Engagement (J.01); Section 7.3.10.1	Host 22 customer and community focused virtual meetings (i.e., Safety Town Halls, CWSP Webinars) to further stakeholder and community awareness of PG&E's wildfire mitigation efforts.	PG&E hosted a total of 23 Safety Town Halls and CWSP Webinars by the end of the third quarter in 2022, exceeding its annual target by one.

Appendix C: EC ARC Information on WMP Initiative Expenditures

Table 8: PG&E Initiative Expenditures[14]

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast (Thousand Dollars)	2022 Expense Actual (Thousand Dollars)	2022 Expense (Over)/Under Spend (Thousand Dollars) (2022 EC ARC-B)
A Summarized Risk Map That Shows the Overall Ignition Probability and Estimated Wildfire Consequence Along the Electric Lines and Equipment	7.3.1.1	$910	$511	$399
Climate-Driven Risk Map and Modeling Based on Various Relevant Weather Scenarios	7.3.1.2	$1,572	$2,685	($1,113)
Ignition Probability Mapping Showing the Probability of Ignition Along the Electric Lines and Equipment	7.3.1.3	$910	$511	$399
Initiative Mapping and Estimation of Wildfire and PSPS Risk-Reduction Impact	7.3.1.4	$168	$168	$0

[14] Total dollar figures shown are a summation of Capital and Operating expenditures for each initiative listed.

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast (Thousand Dollars)	2022 Expense Actual (Thousand Dollars)	2022 Expense (Over)/Under Spend (Thousand Dollars) (2022 EC ARC-B)
Match Drop Simulations Showing the Potential Wildfire Consequence of Ignitions That Occur Along the Electric Lines and Equipment	7.3.1.5	$4,394	$4,359	$35
Advanced Weather Monitoring and Weather Stations, Numerical Weather Prediction	7.3.2.1.1	$789	$827	($38)
Advanced Weather Monitoring and Weather Stations, Fuel Moisture Sampling and Modeling	7.3.2.1.2	$598	$552	$46
Advanced Weather Monitoring and Weather Stations, Weather Stations	7.3.2.1.3	$7,777	$7,559	$217
Advanced Weather Monitoring and Weather Stations, Wildfire Cameras	7.3.2.1.4	$11,211	$11,878	($667)
Advanced Weather Monitoring and Weather Stations, Fire Detection & Alerting	7.3.2.1.5	$341	$312	$29
Advanced Weather Monitoring and Weather Stations, Other Meteorology Tools and Upgrades	7.3.2.1.6	$1,020	$401	$619

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast (Thousand Dollars)	2022 Expense Actual (Thousand Dollars)	2022 Expense (Over)/Under Spend (Thousand Dollars) (2022 EC ARC-B)
Continuous Monitoring Sensors, Electric Transmission SEL T400L Relay	7.3.2.2.1	$0	$135	($135)
Continuous Monitoring Sensors, SmartMeter™ Partial Voltage Detection (Formerly Known as Enhanced Wires Down Detection)	7.3.2.2.2	$0	$7	($7)
Continuous Monitoring Sensors, Distribution Fault Anticipation Technology and Early Fault Detection	7.3.2.2.3	$17,153	$10,207	$6,946
Continuous Monitoring Sensors, Sensor IQ	7.3.2.2.4	$0	$27	($27)
Continuous Monitoring Sensors, Line Sensor Devices	7.3.2.2.5	$7,813	$3,524	$4,289
Continuous Monitoring Sensors, DTS FAST	7.3.2.2.7	$20,052	$3,554	$16,498
Fault Indicators for Detecting Faults on Electric Lines and Equipment	7.3.2.3	$0	$79	($79)
Forecast of a Fire Risk Index, Fire Potential Index, or Similar	7.3.2.4	$1,867	$1,525	$342

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast (Thousand Dollars)	2022 Expense Actual (Thousand Dollars)	2022 Expense (Over)/Under Spend (Thousand Dollars) (2022 EC ARC-B)
Personnel Monitoring Areas of Electric Lines and Equipment in Elevated Fire Risk Conditions	7.3.2.5	$5,071	$3,966	$1,106
Weather Forecasting and Estimating Impacts on Electric Lines and Equipment	7.3.2.6	$2,131	$1,475	$656
Other, Wildfire Safety Operations Center (WSOC)	7.3.2.7	$7,106	$4,293	$2,813
Capacitor Maintenance and Replacement Program	7.3.3.1	$12,918	$14,699	($1,780)
Circuit Breaker Maintenance and Installation to De-Energize Lines Upon Detecting a Fault, Maintenance Substation Distribution	7.3.3.2-D	$2,586	$3,483	($897)
Circuit Breaker Maintenance and Installation to De-Energize Lines Upon Detecting a Fault, Maintenance Substation Transmission	7.3.3.2-T	$2,445	$2,225	$219
Covered Conductor Installation	7.3.3.3	$366,000	$285,544	$80,456[15]

[15] Presented separately for information only – as indicated in PG&E Attachment B, the Capital expenditure associated with this initiative was already embedded within System Hardening initiative 7.3.3.17.1.

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast (Thousand Dollars)	2022 Expense Actual (Thousand Dollars)	2022 Expense (Over)/Under Spend (Thousand Dollars) (2022 EC ARC-B)
Covered Conductor Maintenance	7.3.3.4	$53,400	$51,186	$2,213
Crossarm Maintenance, Repair, and Replacement	7.3.3.5	$74,355	$77,192	($2,837)
Distribution Pole Replacement and Reinforcement, Including with Composite Poles	7.3.3.6	$422,630	$493,061	($70,431)
Expulsion Fuse Replacement	7.3.3.7	$35,000	$23,064	$11,936
Grid Topology Improvements to Mitigate or Reduce PSPS Events, Distribution Line Sectionalizing	7.3.3.8.1	$10,452	$13,217	($2,765)
Grid Topology Improvements to Mitigate or Reduce PSPS events, Transmission Line Sectionalizing	7.3.3.8.2	$54,248	$28,807	$25,441
Grid Topology Improvements to Mitigate or Reduce PSPS Events, Distribution Line Motorized Switch Operator Pilot	7.3.3.8.3	$10,452	$6,609	$3,844
Installation of System Automation Equipment	7.3.3.9.1	$15,599	$17,351	($1,752)

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast (Thousand Dollars)	2022 Expense Actual (Thousand Dollars)	2022 Expense (Over)/Under Spend (Thousand Dollars) (2022 EC ARC-B)
Installation of System Automation Equipment, Single Phase Reclosers	7.3.3.9.2	$4,400	$10,597	($6,197)
Maintenance, Repair, and Replacement of Connectors, Including Hotline Clamps	7.3.3.10	$17,732	$12,657	$5,074
Mitigation of Impact on Customers and Other Residents Affected During PSPS Event, Generation for PSPS Mitigation	7.3.3.11.1	$136,014	$51,950	$84,064
Mitigation of Impact on Customers and Other Residents Affected During PSPS Event, Substation Activities to Enable Reduction of PSPS Impacts	7.3.3.11.2	$681	$864	($183)
Mitigation of Impact on Customers and Other Residents Affected During PSPS event, Emergency Back-up Generation – PG&E Service Centers & Materials Distribution Centers	7.3.3.11.3	$18,000	$16,670	$1,330
Fixed Power Solutions	7.3.3.11.4	$7,800	$2,104	$5,696
Other Corrective Action, Distribution Substation	7.3.3.12.1	$977	$837	$140

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast (Thousand Dollars)	2022 Expense Actual (Thousand Dollars)	2022 Expense (Over)/Under Spend (Thousand Dollars) (2022 EC ARC-B)
Other Corrective Action, Transmission Substation	7.3.3.12.2	$504	$1,136	($632)
Other Corrective Action, Maintenance, Transmission	7.3.3.12.3	$540,030	$555,243	($15,213)
Other Corrective Action, Maintenance, Distribution	7.3.3.12.4	$290,245	$408,314	($118,069)
Other Corrective Action, Generation Substation	7.3.3.12.5	$2,839	$3,354	($514)
Pole Loading Infrastructure Hardening and Replacement Program Based on Pole Loading Assessment Program	7.3.3.13	$9,391	$16,365	($6,974)
Transformers Maintenance and Replacement	7.3.3.14	$23,820	$29,713	($5,893)
Transmission Tower Maintenance and Replacement	7.3.3.15	$205,242	$135,485	$69,757
Undergrounding of Electric Lines and/or Equipment	7.3.3.16	$611,250	$406,762	$204,488 [16]

[16] Presented separately for information only – as indicated in PG&E Attachment B, the Capital expenditure associated with this initiative was already embedded within System Hardening initiative 7.3.3.17.1.

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast (Thousand Dollars)	2022 Expense Actual (Thousand Dollars)	2022 Expense (Over)/Under Spend (Thousand Dollars) (2022 EC ARC-B)
Updates to Grid Topology to Minimize Risk of Ignition in HFTDs, System Hardening, Distribution	7.3.3.17.1	$977,250	$703,061	$274,189 [17]
Updates to Grid Topology to Minimize Risk of Ignition in HFTDs, System Hardening, Transmission	7.3.3.17.2	$19,051	$7,856	$11,195
Updates to Grid Topology to Minimize Risk of Ignition in HFTDs, Surge Arrestor	7.3.3.17.3	$33,172	$37,368	($4,196)
Updates to Grid Topology to Minimize Risk of Ignition in HFTDs, Rapid Earth Current Fault Limiter	7.3.3.17.4	$0	$894	($894)
Updates to Grid Topology to Minimize Risk of Ignition in HFTDs, Remote Grid	7.3.3.17.5	$31,824	$4,763	$27,061 [18]
Updates to Grid Topology to Minimize Risk of Ignition in HFTDs, Butte County Rebuild	7.3.3.17.6	$138,750	$151,307	($12,557)

[17] The Capital expenditure presented within initiative 7.3.3.17.1 also includes Capital expenditure associated with initiatives 7.3.3.3, 7.3.3.16, and 7.3.3.17.5.

[18] Presented separately for information only – as indicated in PG&E Attachment B, the Capital expenditure associated with this initiative was already embedded within System Hardening initiative 7.3.3.17.1.

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast (Thousand Dollars)	2022 Expense Actual (Thousand Dollars)	2022 Expense (Over)/Under Spend (Thousand Dollars) (2022 EC ARC-B)
Detailed Inspections of Distribution Electric Lines and Equipment	7.3.4.1	$100,379	$98,300	$2,079
Detailed Inspections of Transmission Electric Lines and Equipment	7.3.4.2	$86,707	$68,327	$18,380
Infrared Inspections of Distribution Electric Lines and Equipment	7.3.4.4	$2,226	$1,988	$238
Infrared Inspections of Transmission Electric Lines and Equipment	7.3.4.5	$2,220	$3,660	($1,440)
Intrusive Pole Inspections, Distribution	7.3.4.6.1	$21,239	$20,554	$686
Intrusive Pole Inspections, Transmission	7.3.4.6.2	$2,150	$1,694	$456
LiDAR Inspections of Distribution Electric Lines and Equipment	7.3.4.7	$10,500	$9,596	$904
LiDAR Inspections of Transmission Electric Lines and Equipment	7.3.4.8	$16,033	$8,462	$7,571

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast (Thousand Dollars)	2022 Expense Actual (Thousand Dollars)	2022 Expense (Over)/Under Spend (Thousand Dollars) (2022 EC ARC-B)
Other Discretionary Inspection of Distribution Electric Lines and Equipment, Beyond Inspections Mandated by Rules and Regulations	7.3.4.9	$3,258	$4,030	($772)
Other Discretionary Inspection of Transmission Electric Lines and Equipment, Beyond Inspections Mandated by Rules and Regulations	7.3.4.10	$8,000	$1,123	$6,877
Patrol Inspections of Distribution Electric Lines and Equipment	7.3.4.11	$6,063	$8,394	($2,331)
Patrol Inspections of Transmission Electric Lines and Equipment	7.3.4.12	$84	$49	$34
Pole Loading Assessment Program to Determine Safety Factor	7.3.4.13	$9,123	$8,952	$171
Quality Assurance / Quality Control of Inspections	7.3.4.14	$6,016	$6,415	($399)
Substation Inspections, Enhanced Transmission, Substation	7.3.4.15-T	$1,757	$1,740	$17
Substation Inspections, Enhanced Distribution, Substation	7.3.4.15-D	$4,397	$2,956	$1,441

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast (Thousand Dollars)	2022 Expense Actual (Thousand Dollars)	2022 Expense (Over)/Under Spend (Thousand Dollars) (2022 EC ARC-B)
Other, Substation Inspections, Generation	7.3.4.16	$1,141	$1,036	$105
Detailed Inspections and Management Practices for Vegetation Clearances Around Distribution Electrical Lines and Equipment	7.3.5.2	$1,370,788	$1,338,159	$32,630
Detailed Inspections and Management Practices for Vegetation Clearances Around Transmission Electrical Lines and Equipment	7.3.5.3	$190,310	$153,972	$36,338
Emergency Response Vegetation Management Due to Red Flag Warning or Other Urgent Climate Conditions	7.3.5.4	$3,127	$3,127	$0
Fuel Management (Including All Wood Management) and Reduction of “Slash” From Vegetation Management Activities	7.3.5.5	$92,610	$160,447	($67,837)
Improvement of Inspections	7.3.5.6	$143,138	$68,800	$74,339
Remote Sensing Inspections of Vegetation Around Distribution Electric Lines and Equipment	7.3.5.7	$37,090	$3,641	$33,449

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast (Thousand Dollars)	2022 Expense Actual (Thousand Dollars)	2022 Expense (Over)/Under Spend (Thousand Dollars) (2022 EC ARC-B)
Remote Sensing Inspections of Vegetation Around Transmission Electric Lines and Equipment	7.3.5.8	$13,000	$7,770	$5,230
Substation Inspection, Distribution	7.3.5.17.1	$553	$849	($296)
Substation Inspection, Transmission	7.3.5.17.2	$233	$740	($507)
Substation Inspections, Hydro Generation Substation	7.3.5.17.3	$1,766	$1,807	($41)
Substation Vegetation Management, Maintenance Substation Distribution	7.3.5.18.1	$1,266	$2,458	($1,193)
Substation Vegetation Management, Maintenance Substation Transmission	7.3.5.18.2	$1,253	$864	$389
Vegetation Management Enterprise System	7.3.5.19	$92,516	$21,379	$71,137
Vegetation Management to Achieve Clearances Around Electric Lines and Equipment	7.3.5.20	$32,354	$28,914	$3,440
Crew-Accompanying Ignition Prevention and Suppression Resources and Services	7.3.6.2	$15,214	$11,897	$3,317

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast (Thousand Dollars)	2022 Expense Actual (Thousand Dollars)	2022 Expense (Over)/Under Spend (Thousand Dollars) (2022 EC ARC-B)
Personnel Work Procedures and Training in Conditions of Elevated Fire Risk	7.3.6.3	$1,000	$808	$192
Protocols for PSPS re-energization, Distribution	7.3.6.4-D	$15,034	$10,567	$4,467
Protocols for PSPS re-energization, Transmission	7.3.6.4-T	$2,000	$440	$1,560
PSPS Events and Mitigation of PSPS I**mpacts,** Distribution	7.3.6.5-D	$68,814	$3	$68,812
PSPS Events and Mitigation of PSPS I**mpacts,** Transmission	7.3.6.5-T	$1,808	$8	$1,800
Stationed and On-Call Ignition Prevention and Suppression Resources and Services	7.3.6.6	$5,071	$793	$4,278
Other, Aviation Support	7.3.6.7	$6,467	$2,533	$3,934
Protective Equipment and Device Settings	7.3.6.8	$142,592	$100,864	$41,728
Centralized Repository for Data	7.3.7.1	$858	$858	$0
Collaborative Research on Utility Ignition and/or Wildfire	7.3.7.2	$866	$296	$570

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast (Thousand Dollars)	2022 Expense Actual (Thousand Dollars)	2022 Expense (Over)/Under Spend (Thousand Dollars) (2022 EC ARC-B)
Documentation and Disclosure of Wildfire-Related Data and Algorithms	7.3.7.3	$1,047	$1,047	$0
Tracking and Analysis of Near Miss Data	7.3.7.4	$651	$651	$0
Other, IT Projects to Support Wildfire Mitigation Work	7.3.7.5	$94,400	$96,556	($2,156)
Allocation Methodology Development and Application	7.3.8.1	$7,868	$5,964	$1,904
Risk reduction scenario development and analysis	7.3.8.2	$972	$573	$399
Risk Spend Efficiency Analysis (RSE)	7.3.8.3	$934	$934	$0
Adequate and Trained Workforce for Service Restoration	7.3.9.1	$7,666	$7,277	$389
Community Outreach, Public Awareness, and Communications Efforts	7.3.9.2	$21,739	$17,157	$4,582
Customer Support in Emergencies	7.3.9.3	$3,413	$2,288	$1,126
Disaster and Emergency Preparedness Plan	7.3.9.4	$6,843	$4,712	$2,131

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast (Thousand Dollars)	2022 Expense Actual (Thousand Dollars)	2022 Expense (Over)/Under Spend (Thousand Dollars) (2022 EC ARC-B)
Preparedness and Planning for Service Restoration	7.3.9.5	$15,794	$10,351	$5,443
Protocols in Place to Learn from Wildfire Events	7.3.9.6	$1,236	$1,236	$0
Community Engagement	7.3.10.1	$20,616	$16,347	$4,269
Cooperation and Best Practice Sharing with Agencies Outside CA	7.3.10.2	$193	$180	$14
Cooperation with Suppression Agencies	7.3.10.3	$4,532	$4,788	($256)
Forest Service and Fuel Reduction Cooperation and Joint Roadmap	7.3.10.4	$5,133	$3,099	$2,034
Other, PMO and General Wildfire Support	7.3.10.5	$24,193	$27,420	($3,227)

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast (Thousand Dollars)	2022 Expense Actual (Thousand Dollars)	2022 Expense (Over)/Under Spend (Thousand Dollars) (2022 EC ARC-B)
Less[19]: Adjustment to reverse double counting of Capital expenditures for the following initiatives moved to the System Hardening Initiative (7.3.3.17.1): Covered OH Conductor (7.3.3.3), Underground program (7.3.3.16) Remote Grid (7.3.3.17.5)	N/A - reconciling adjustment	-$994,250	-$695,039	-$299,211
Total	--	$5,963,945	$5,307,102	$656,843

[19] Adjustment to remove the double counting of Capital expenditures for three initiatives which are listed.

Appendix D: Substantial Vegetation Management Audit of PG&E

On July 26th 2024, Energy Safety issued its SVM Audit for PG&E. The purpose of the SVM Audit is to assesses whether PG&E met its quantitative commitments and verifiable statements in its 2022 WMP Update related to vegetation management.

In the SVM Audit, Energy Safety found 15 initiatives where PG&E did not perform all required work and required PG&E to provide a response in its Corrective Action Plan.

After reviewing PG&E's Corrective Action Plan, filed on August 26th 2024, Energy Safety issued its SVM Audit Report on October 11th 2024, finding that PG&E sufficiently addressed the issues identified for Corrective Actions, and therefore that PG&E substantially complied with a substantial portion of the vegetation management requirements in its 2022 WMP Update.

The findings from Energy Safety's SVM Audit Report are detailed in Table 9. (SVM Audit Report.)

Table 9: Energy Safety's Findings from PG&E 2022 SVM Audit Report of WMP Vegetation Management Initiatives

2022 WMP Update Initiative Number	2022 WMP Update Initiative Name	Determination
7.3.5.1	Additional Efforts to Manage Community and Environmental Impacts	Performed Required Work
7.3.5.2	Detailed Inspections and Management Practices or Vegetation Clearances around Distribution Electrical Lines and Equipment	Perform Required Work
7.3.5.3	Detailed Inspections and Management Practices for Vegetation Clearances Around Transmission Electric Lines and Equipment	Did Not Perform All Required Work
7.3.5.4	Emergency Response Vegetation Management due to Red Flag Warning or Other Urgent Climate Conditions	Performed Required Work

2022 WMP Update Initiative Number	2022 WMP Update Initiative Name	Determination
7.3.5.5	Fuels Management (including all wood management) and Reduction of "slash" from Vegetation Management Activities	Performed Required Work
7.3.5.6	Improvement of Inspections	Did Not Perform All Required Work
7.3.5.7	Remote Sensing Inspections of Vegetation Around Distribution Electric Lines and Equipment	Performed Required Work
7.3.5.8	Remote Sensing Inspections of Vegetation Around Transmission Electric Lines and Equipment	Performed Required Work
7.3.5.9	Other Discretionary Inspections of Vegetation Around Distribution Electric Lines and Equipment, Beyond Inspections Mandated by Rules and Regulations	Performed Required Work Refer to 7.3.5.20
7.3.5.10	Other Discretionary Inspections of Vegetation Around Transmission Electric Lines and Equipment, Beyond Inspections Mandated by Rules and Regulations	Did Not Perform All Required Work Refer to 7.3.5.3
7.3.5.11	Patrol Inspections of Vegetation Around Distribution Electric Lines and Equipment	Performed Required Work Refer to 7.3.5.2
7.3.5.12	Patrol Inspections of Vegetation Around Transmission Electric Lines and Equipment	Did Not Perform All Required Work Refer to 7.3.5.3
7.3.5.13	Quality Assurance / Quality Control of Vegetation Management.	Performed Required Work[20]

[20] PG&E indicated that it missed one activity (E.05) for this initiative in its fourth quarter QDR and EC ARC.

2022 WMP Update Initiative Number	2022 WMP Update Initiative Name	Determination
7.3.5.14	Recruiting and Training of Vegetation Management Personnel	Performed Required Work
7.3.5.15	Identification and Remediation of “At-Risk Species”	Performed Required Work
7.3.5.16	Removal and Remediation of Trees with Strike Potential to Electric Lines and Equipment	Did Not Perform All Required Work Refer to 7.3.5.2 and 7.3.5.3
7.3.5.17	Substation Inspections	Performed Required Work
7.3.5.18	Substation Vegetation Management	Performed Required Work Refer to 7.3.5.17
7.3.5.19	Vegetation Management System	Performed Required Work
7.3.5.20	Vegetation Management to Achieve Clearances Around Electric Lines and Equipment	Performed Required Work
7.3.5.21	Vegetation Management Activities Post-Fire	Performed Required Work

Appendix E: Performance Metrics Appendix Figures

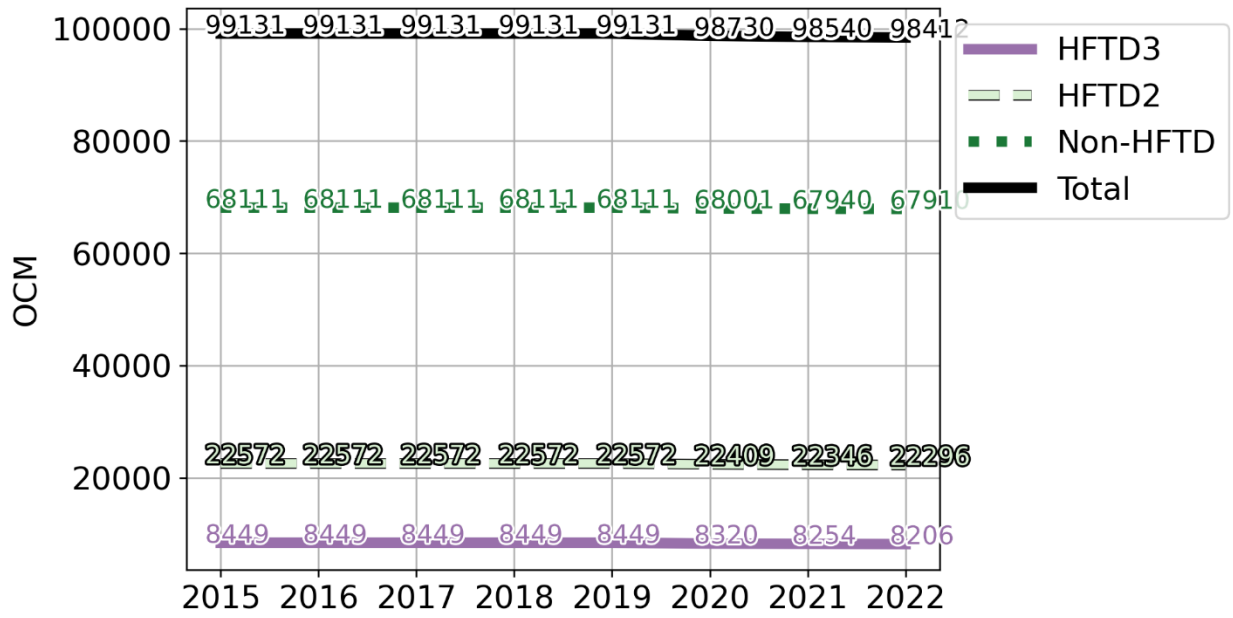
Data for this appendix comes from the QDRs as reported by PG&E. (2023 Q3 QDR, Table 6, 7.1, 7.2, and 8; 2023 Q4 QDR, Table 4, 5, 6, and 7.)

9.1.1 Normalizing Metrics

Overhead Circuit Miles:

PG&E Overhead Circuit Miles (OCM) have slightly decreased from 2015 to 2022 primarily due to recent line removals and undergrounding. (Figure 23).

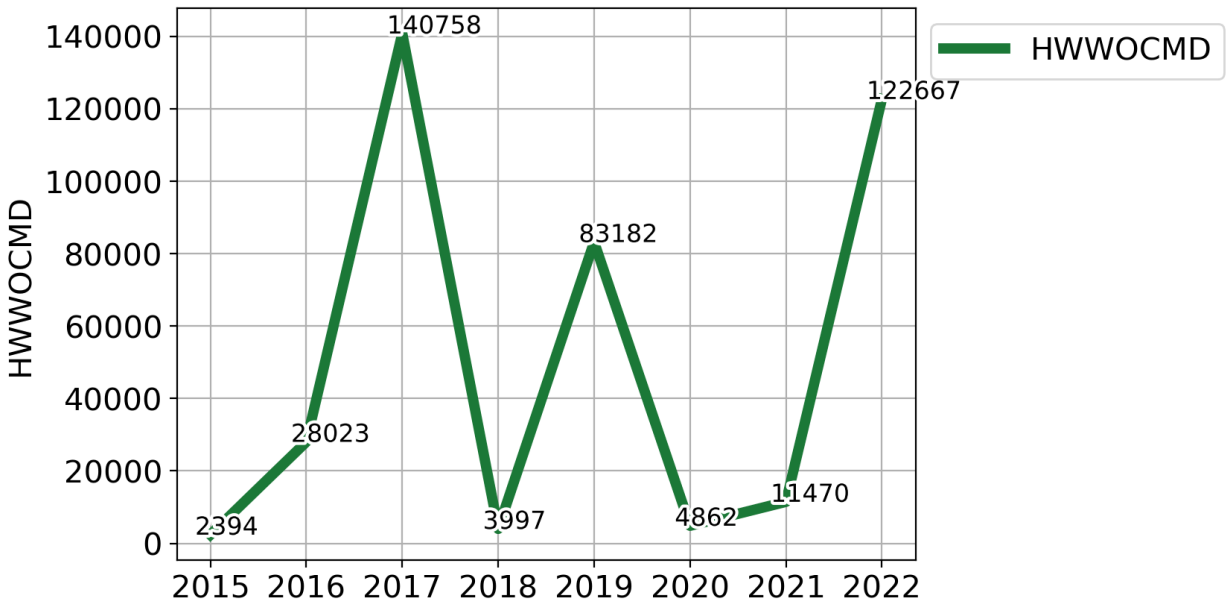
Figure 23: PG&E Overhead Circuit Miles (2015-2022)



High Wind Warning Overhead Circuit Mile Days:

From 2015 to 2022, the numbers of high wind warning overhead circuit mile days (HWWOCMD) have fluctuated, with the lowest in 2015 and the highest in 2017 (Figure 24).

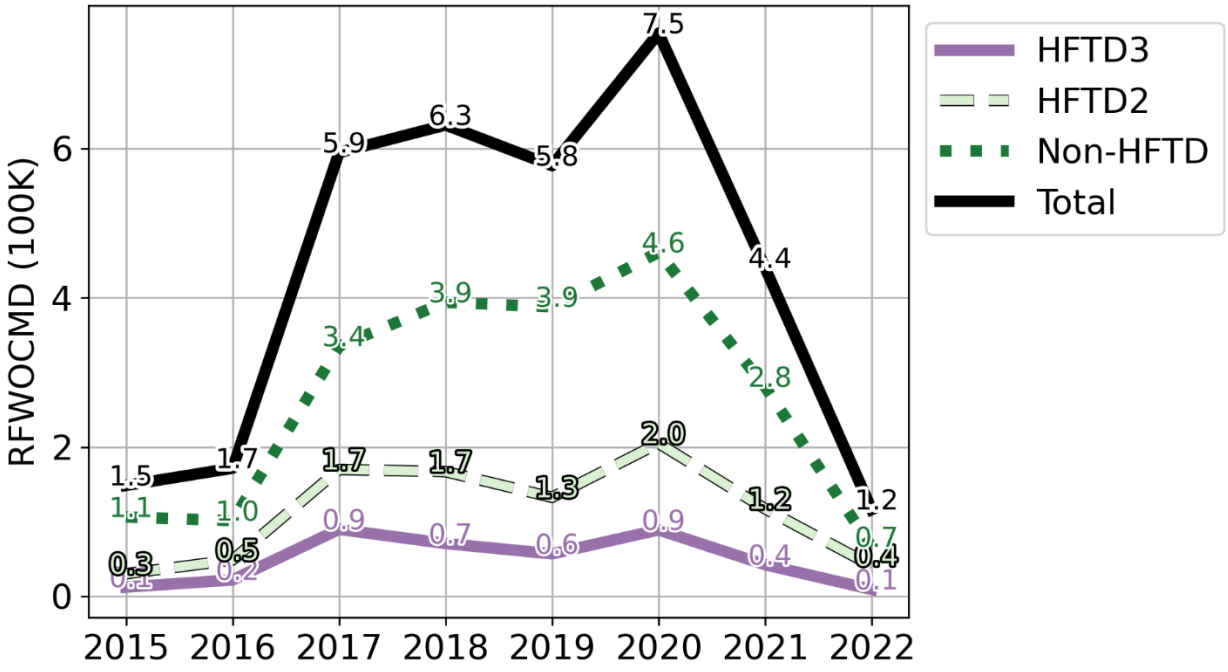
Figure 24: PG&E High Wind Warning Overhead Circuit Mile Days (2015-2022)



Red Flag Warning Overhead Circuit Mile Days:

The number of red flag warning overhead circuit mile days (RFWOCMD) generally increased from 2015 to 2020, followed by a significant drop from 2020 to 2022 in non-HFTD, HFTD Tier 2, and HFTD Tier 3 areas (Figure 25). The total number of RFWOCMDs in all areas decreased to nearly zero in 2022, which results in large fluctuations of the normalized data presented in figures normalized by RFWOCMD throughout this report.

Figure 25: PG&E Red Flag Warning Overhead Circuit Mile Days (2015-2022) by HFTD Locations

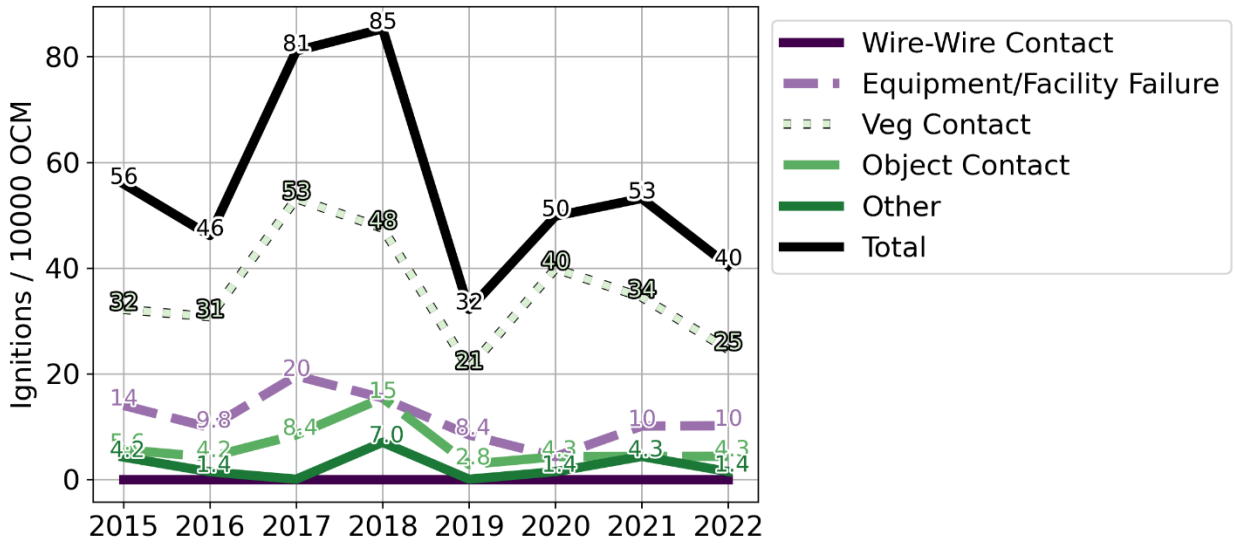


9.1.2 More Detailed Ignition Risk Findings

Distribution Ignitions Normalized by OCM in HFTD Tier 3 Delineated by Risk Driver:

Ignitions normalized by Overhead Circuit Miles (OCM) in HFTD Tier 3 areas for distribution lines showed significant reductions from 2018 to 2019, driven by decreases in vegetation contacts, equipment or facility failure, and object contacts. Between 2021 and 2022, it showed a further decrease, primarily due to reductions in vegetation contact (Figure 26).

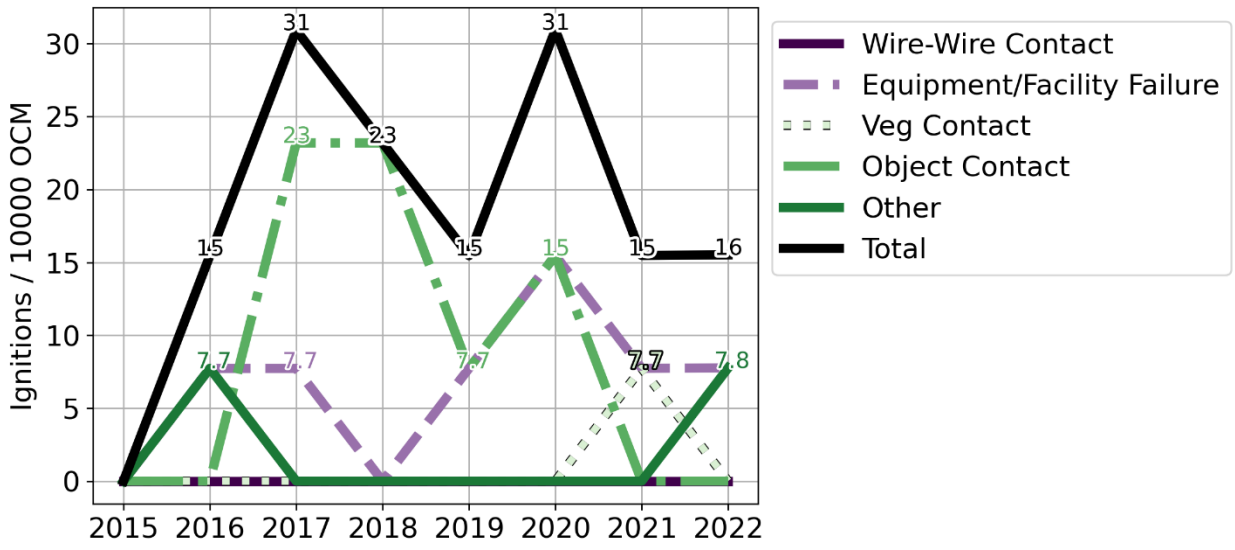
Figure 26: PG&E Distribution Ignitions in HFTD Tier 3 Areas Normalized by Overhead Circuit Miles (2015-2022) by Risk Drivers



Transmission Ignitions Normalized by OCM in HFTD Tier 3 Delineated by Risk Driver:

Transmission ignitions in HFTD Tier 3 areas normalized by overhead circuit miles show reductions from 2017 to 2019 driven by a decrease in vegetation contacts. However, in 2020, there was a notable increase in ignitions due to a spike in equipment or facility failures combined with a spike in object contacts. Subsequent years show a decrease, primary due to reductions in object contact (Figure 27).

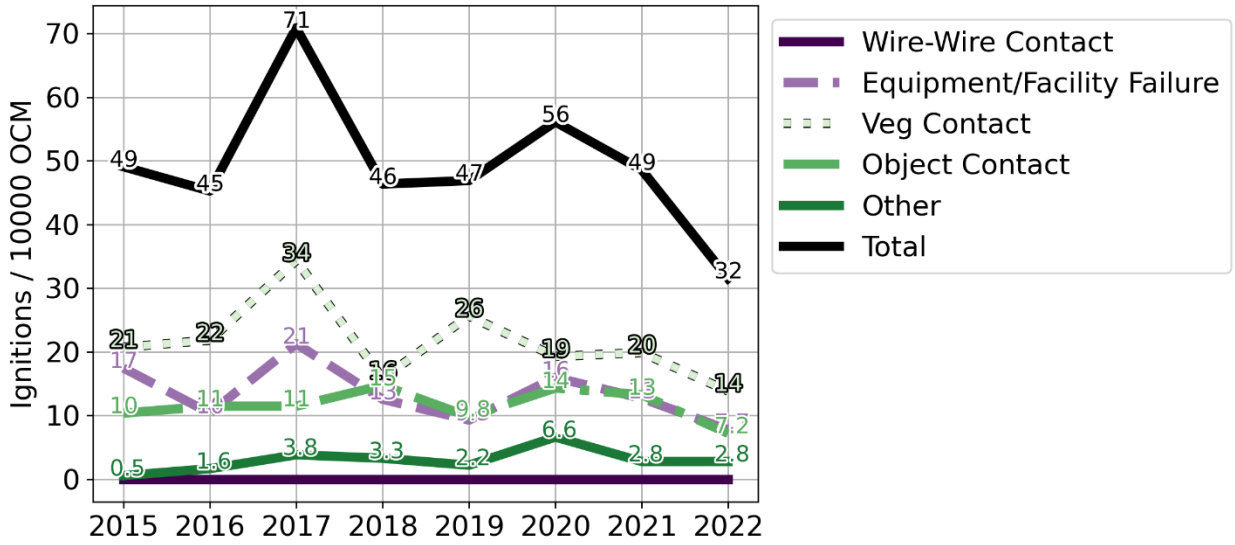
Figure 27: PG&E Transmission Ignitions in HFTD Tier 3 Areas Normalized by Overhead Circuit Miles (2015-2022) by Risk Drivers



Distribution Ignitions Normalized by OCM in HFTD Tier 2 Delineated by Risk Driver:

Distribution ignitions in HFTD Tier 2 areas normalized by OCM fluctuated year to year between 2015 and 2022 (Figure 28). There is a decrease from 2020 to 2022, primarily driven by vegetation contacts, equipment or facility failures, and object contacts.

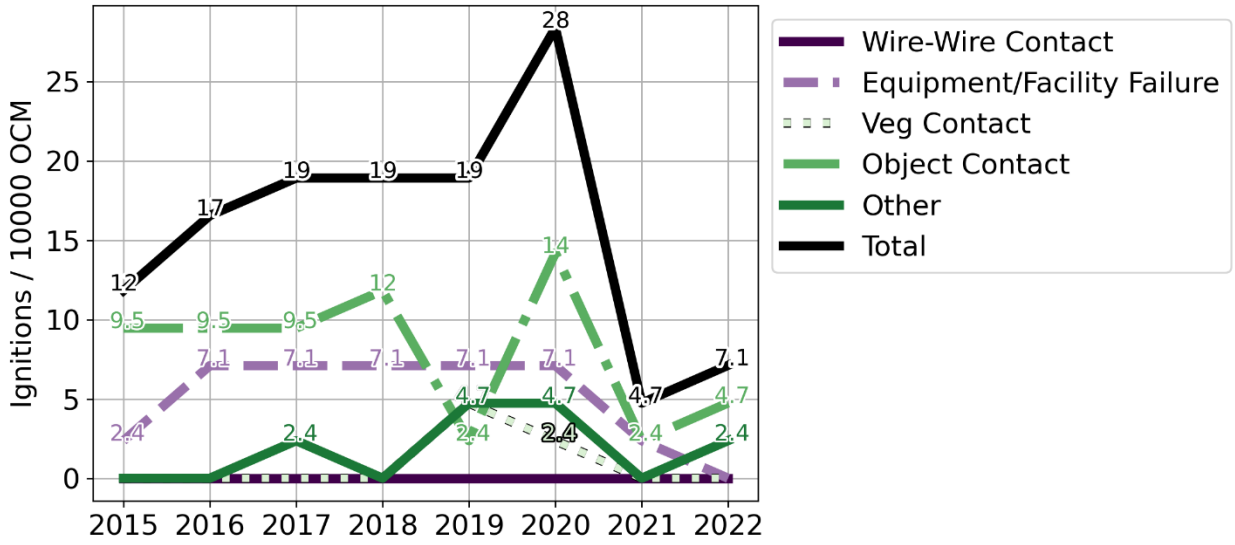
Figure 28: PG&E Distribution Ignitions in HFTD Tier 2 Areas Normalized by Overhead Circuit Miles in (2015-2022) by Risk Drivers



Transmission Ignitions Normalized by OCM in HFTD Tier 2 Delineated by Risk Driver:

Transmission ignitions in HFTD Tier 2 areas normalized by OCM show an overall increase from 2015 to 2020, followed by a significant decrease in 2021 and a slight increase again in 2022 (Figure 29).

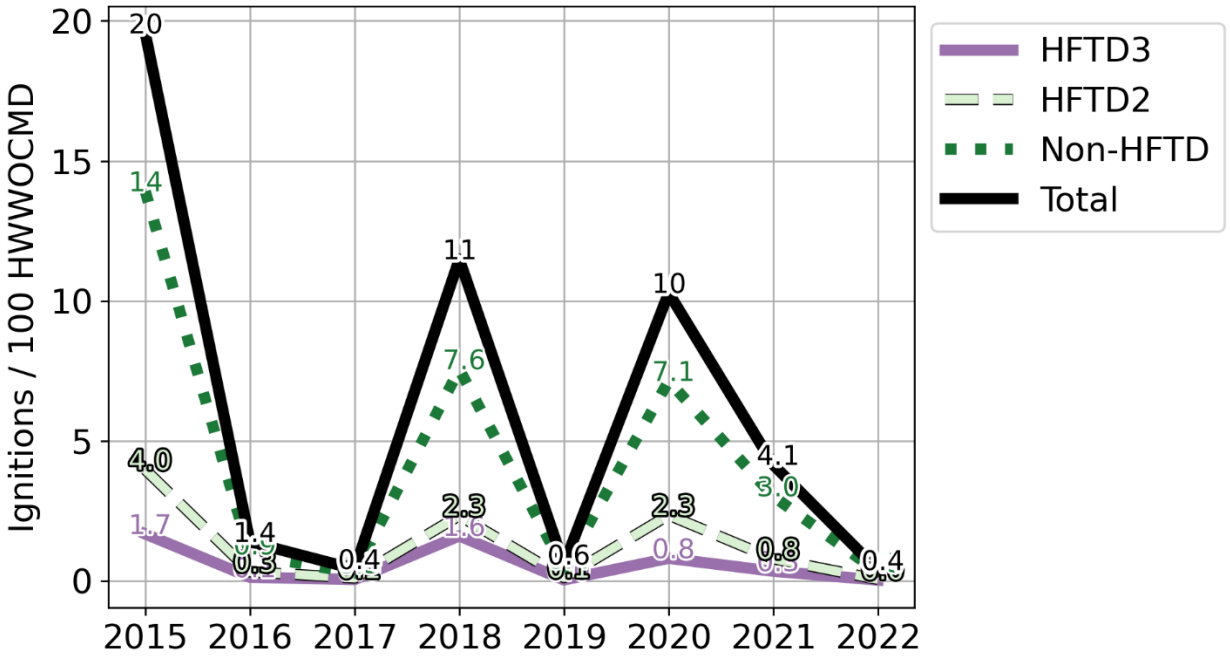
Figure 29: PG&E Transmission Ignitions in HFTD Tier 2 Areas Normalized by Overhead Circuit Miles (2015-2022) by Risk Drivers



Ignitions Normalized by High Wind Warning Overhead Circuit Mile Days:

To account for year-by-year variations in weather, ignitions were normalized by HWWOCMD. (Figure 30). From 2015 to 2022, there were significant fluctuations in normalized ignition rates across HFTD and non-HFTD areas, with peaks in 2015, 2018 and 2020, primarily driven by ignitions in non-HFTD. From 2021 to 2022, it was decreased, driven primarily by reductions in non-HFTD regions.

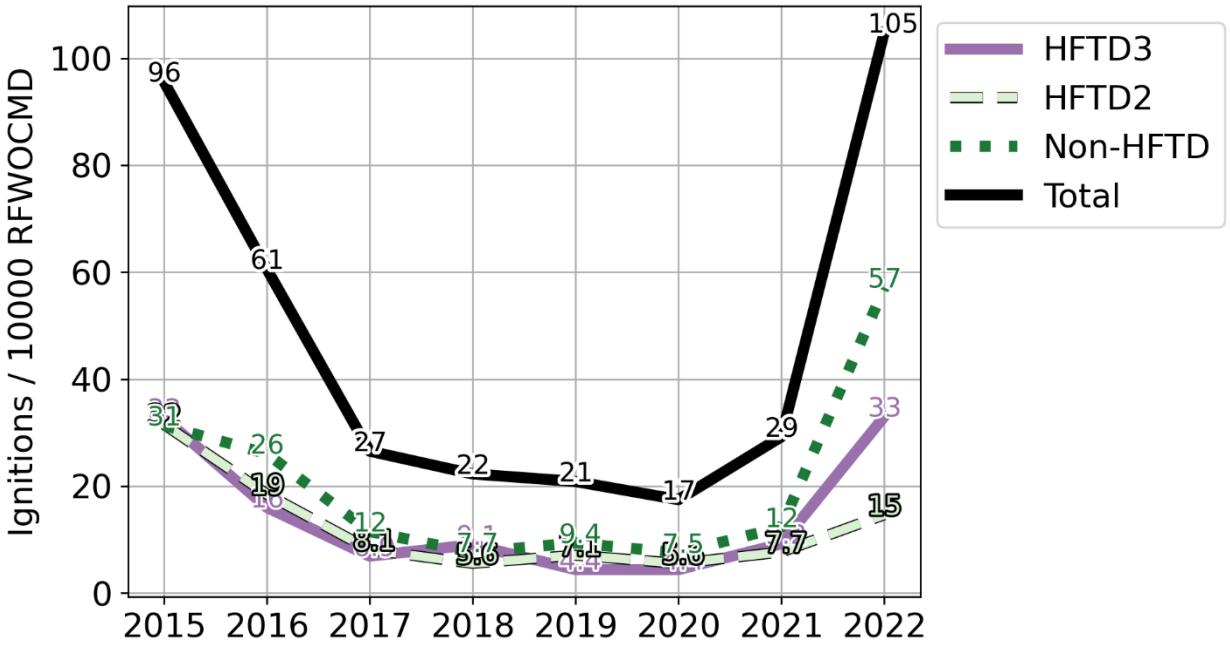
Figure 30: PG&E Ignitions Normalized by HWWOCMD (2015-2022) Delineated by HFTD.



Ignitions Normalized by Red Flag Warning Overhead Circuit Mile Days by HFTD Tiers:

The total number of ignitions normalized by RFWOCMD shows an overall decrease from 2015 to 2020, followed by a significant increase between 2020 and 2022, primarily driven by ignitions in non-HFTD areas (Figure 31). In 2015 and 2022, the total number of RFWOCMDs are nearly zero, which results in a relatively large values when the data are normalized due to dividing by a very small number. The large values do not reflect the number of raw ignitions.

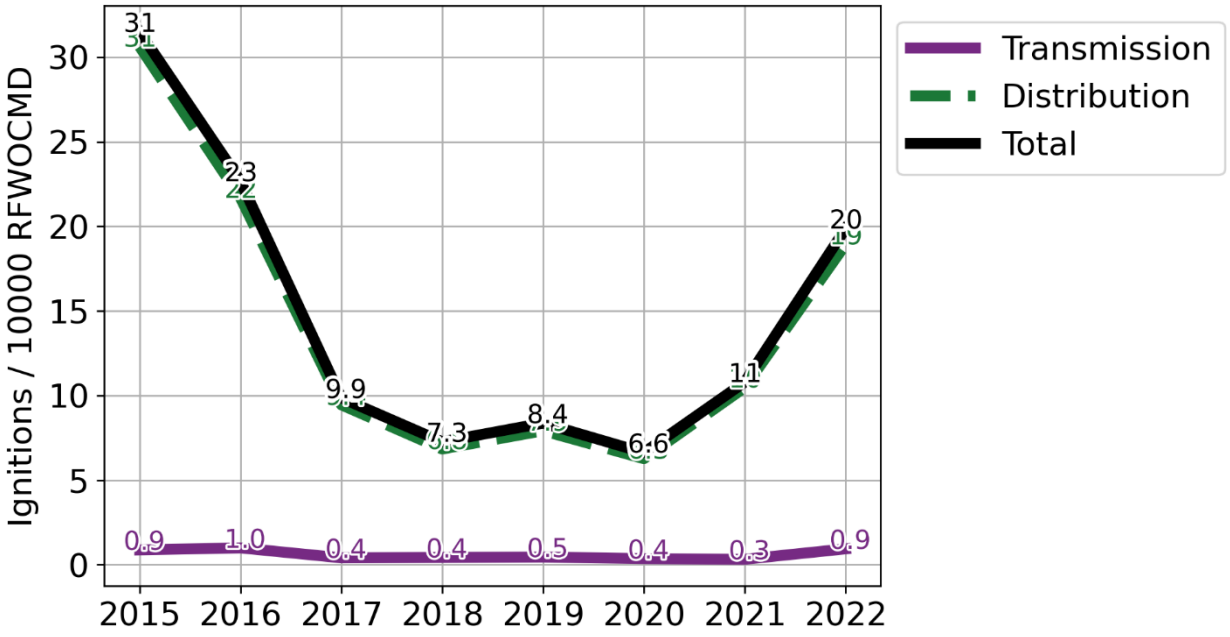
Figure 31: PG&E Ignitions Normalized by RFWOCMD (2015-2022) by HFTD Tiers



Ignitions Normalized by Red Flag Warning Overhead Circuit Mile Days by Distribution and Transmission Lines

The total number of ignitions normalized by RFWOCMD on distribution and transmission lines show a similar trend as the total number of ignitions by HFTD Tiers from 2015 to 2022 (Figure 32). It generally decreases from 2015 to 2020, followed by a significant increase from 2020 to 2022. In 2015 and 2022, the total number of RFWOCMDs are nearly zero, which results in a relatively large values when the data are normalized due to dividing by a very small number. The large values do not reflect the number of raw ignitions.

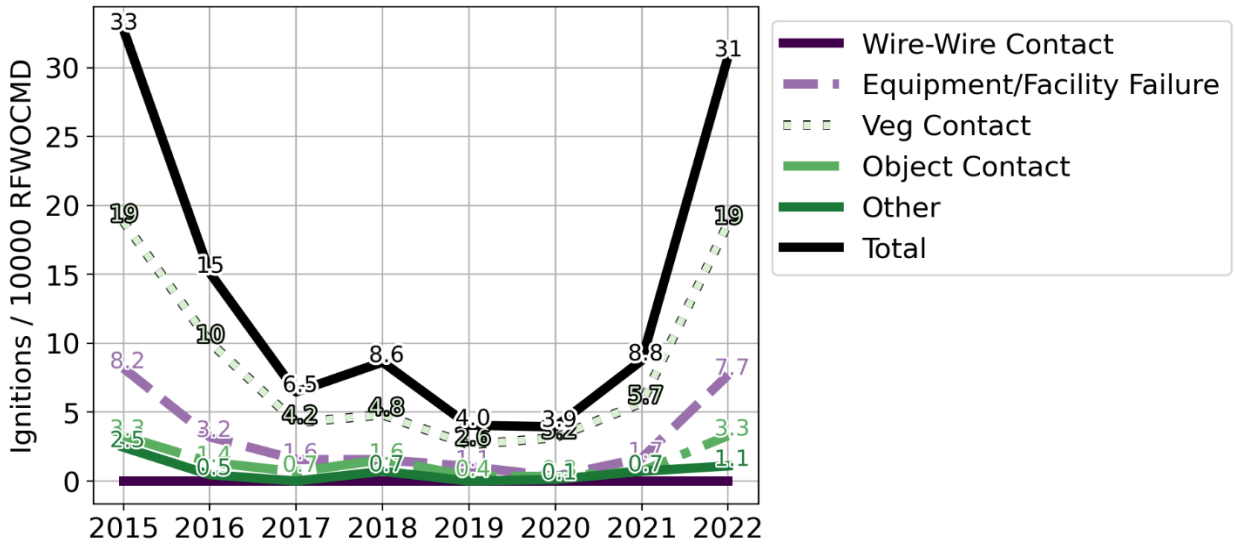
Figure 32: PG&E Ignitions Normalized by RFWOCMD (2015-2022) by Distribution and Transmission Lines



Distribution Ignitions Normalized by Red Flag Warning Overhead Circuit Mile Days in HFTD Tier 3 Delineated by Risk Driver:

Distribution ignitions in HFTD Tier 3 areas normalized by RFWOCMD show a general decrease from 2015 to 2020, followed by a significant increase from 2021 to 2022 (Figure 33). In 2015 and 2022, the total number of RFWOCMDs are nearly zero, which results in relatively large values when the data are normalized due to dividing by a very small number. The large values do not reflect the number of raw ignitions.

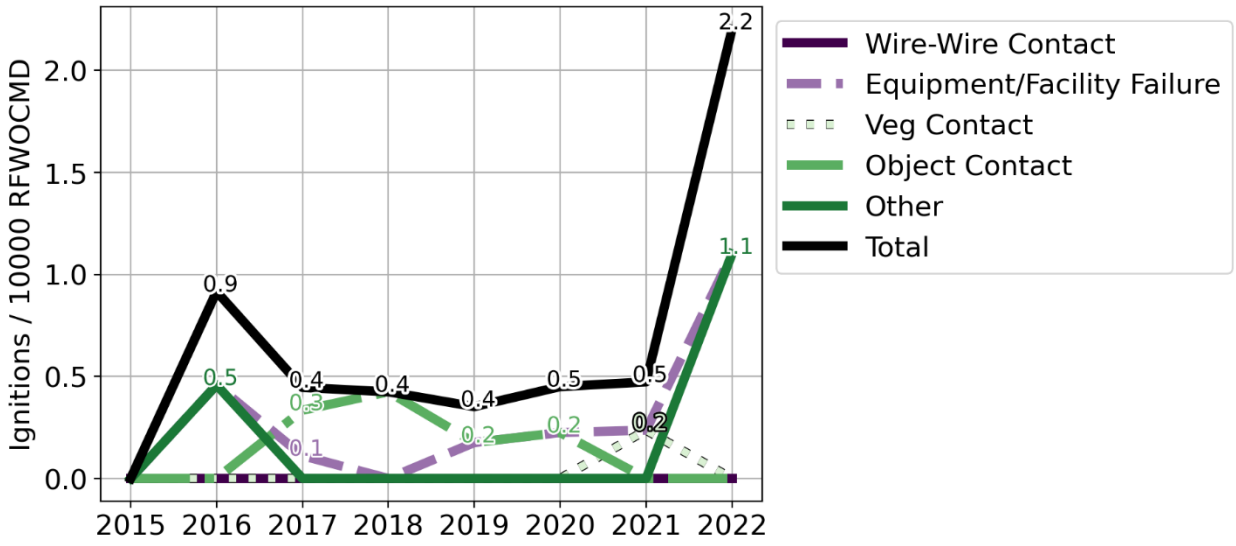
Figure 33: PG&E Distribution Ignitions in HFTD Tier 3 Areas Normalized by RFWOCMD (2015-2022) by Risk Driver



Transmission Ignitions Normalized by Red Flag Warning Overhead Circuit Mile Days in HFTD Tier 3 Delineated by Risk Driver:

Transmission ignitions in HFTD Tier 3 areas during RFWOCMD show a general stable trend from 2017 to 2021, followed by a significant increase from 2021 to 2022 (Figure 34). This increase is primarily driven by a rise in equipment or facility failures. In 2022, the total number of RFWOCMDs was nearly zero, which results in a relatively large increase when the data are normalized due to dividing by a very small number. The increase does not indicate an increase in the number of raw ignitions.

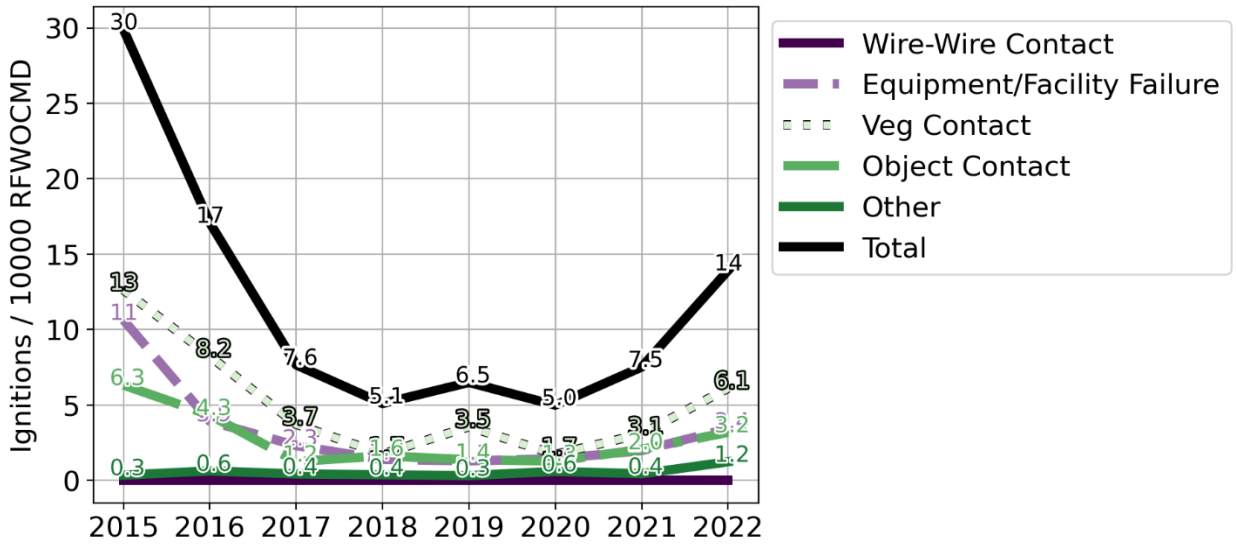
Figure 34: PG&E Transmission Ignitions in HFTD Tier 3 Areas Normalized by RFWOCMD (2015-2022) by Risk Driver



Distribution Ignitions Normalized by Red Flag Warning Overhead Circuit Mile Days in HFTD Tier 2 Delineated by Risk Driver:

Distribution ignitions in HFTD Tier 2 areas normalized by RFWOCMD show a general decrease from 2015 to 2020, followed by an increase from 2020 to 2022, primarily driven by vegetation contact (Figure 35). In 2015 and 2022, the total number of RFWOCMDs are nearly zero, which results in relatively large values when the data are normalized due to dividing by a very small number. The large values do not reflect the number of raw ignitions.

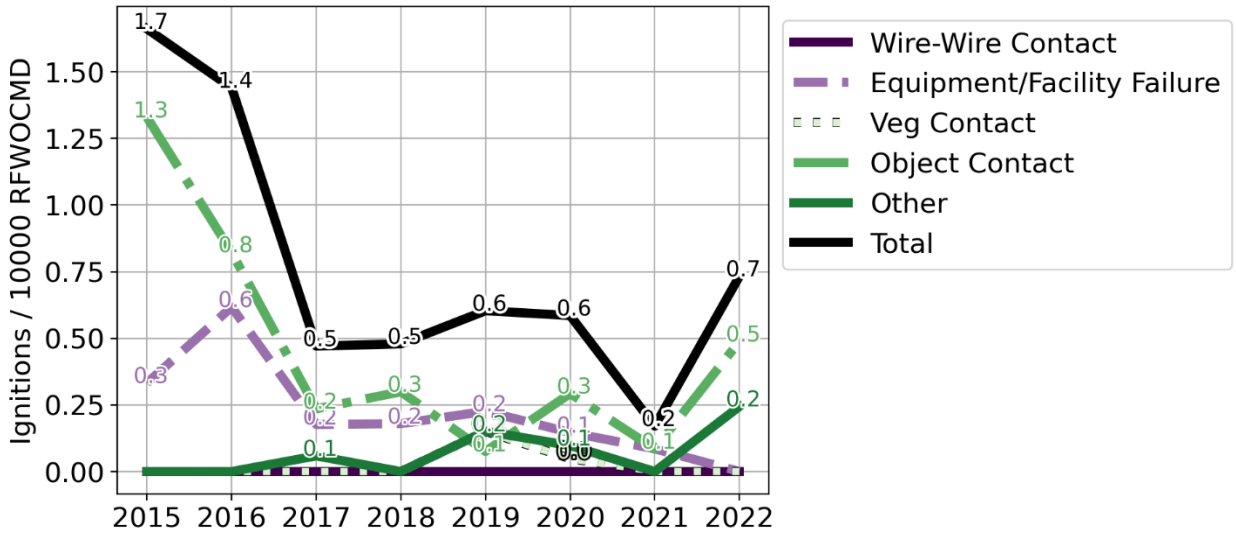
Figure 35: PG&E Distribution Ignitions in HFTD Tier 2 Areas Normalized by RFWOCMD (2015-2022) by Risk Driver



Transmission Ignitions Normalized by RFWOCMD in HFTD Tier 2 Delineated by Risk Driver:

Transmission ignitions normalized by RFWOCMD HFTD Tier 2 areas show a general decrease from 2015 to 2017. There is an increase from 2021 to 2022, primarily driven by object contact (Figure 36). In 2015 and 2022, the total number of RFWOCMDs are nearly zero, which results in relatively large values when the data are normalized due to dividing by a very small number. The large values do not reflect the number of raw ignitions.

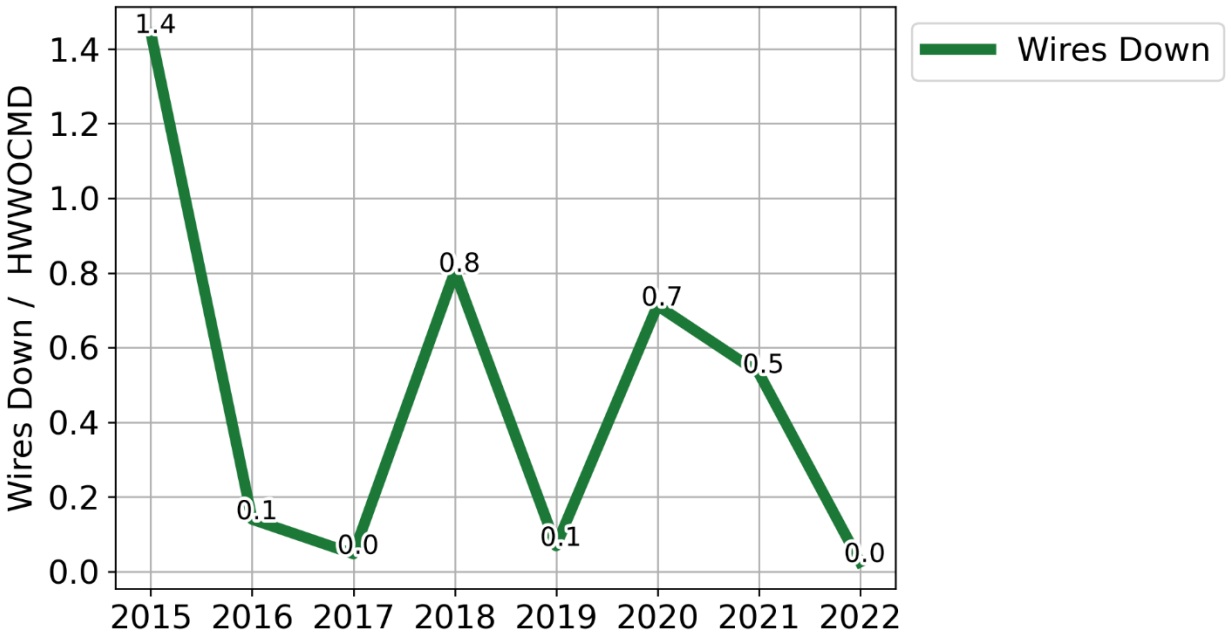
Figure 36 PG&E Transmission Ignitions in HFTD Tier 2 Areas Normalized by RFWOCMD (2015-2022) by Risk Driver



Wire Down Events Normalized by High Wind Warning Overhead Circuit Mile Days:

When accounting for weather conditions, the number of wire down events normalized by HWWOCMD shows similar fluctuations between 2015 and 2022, but with peaks and valleys on different years (Figure 37).

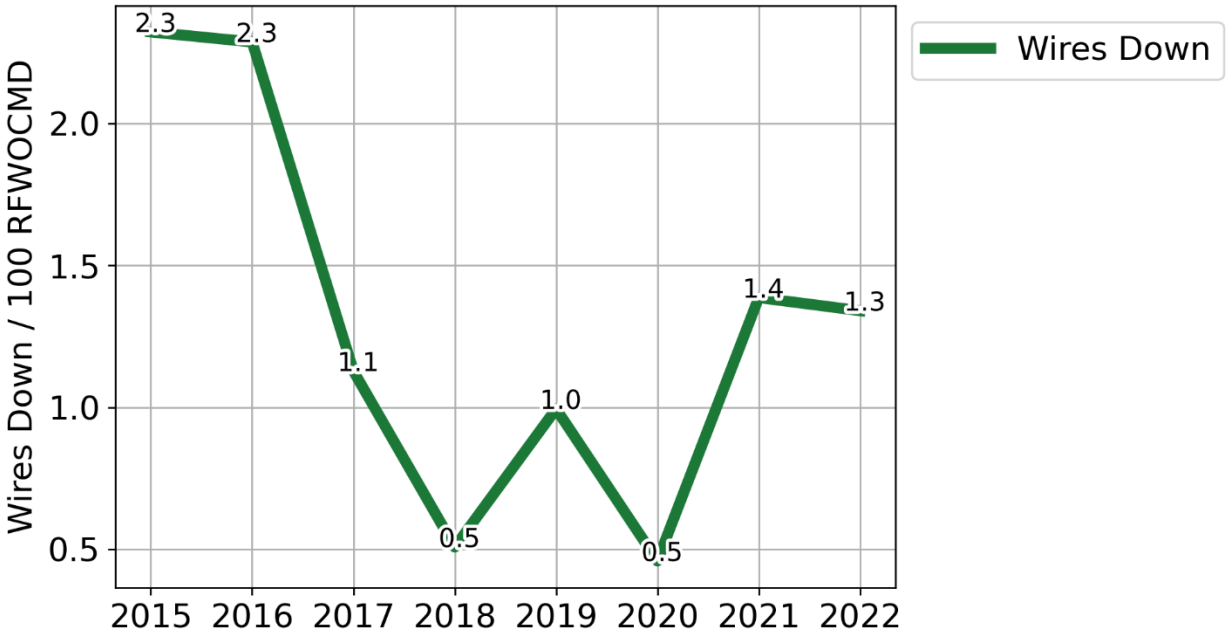
Figure 37: PG&E Total Wire Down Events Normalized (2015–2022) by HWWOCMD



Wire Down Events Normalized by Red Flag Warning Overhead Circuit Mile Days:

Wire down events normalized by RFWOCMD show an initial decrease from 2015 to lows in 2018 and 2020, followed by a slight increase in 2021, and a minor decrease in 2022 (Figure 38). In 2015 and 2022, the total number of RFWOCMDs are nearly zero, which results in relatively large values when the data are normalized due to dividing by a very small number. The large values do not reflect the number of raw wire down events.

Figure 38: PG&E Total Wire Down Events Normalized (2015 to 2022) by RFWOCMD

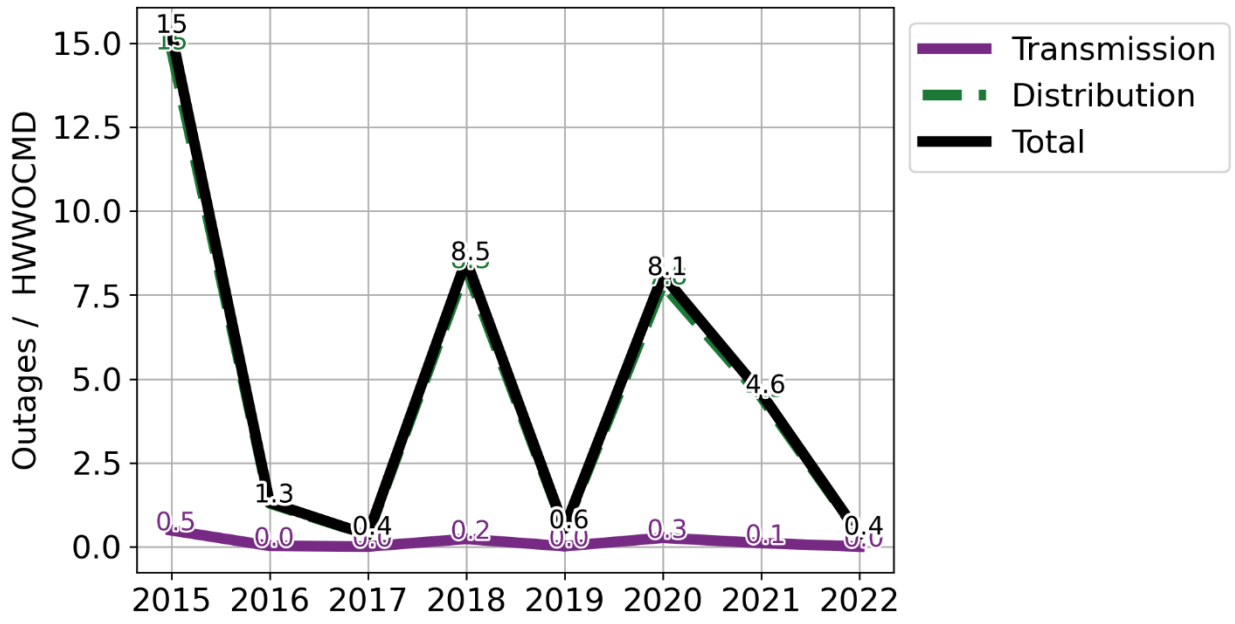


Outage Events Normalized by High Wind Warning Overhead Circuit Mile Days:

To view the outage event trends with respect to weather patterns that are typically associated with them, outage event counts have been normalized by HWWOCMD.

Once the outage event counts are adjusted for year-to-year variances in weather, outage events fluctuate significantly from 2015 to 2022, with peaks in 2015, 2018, and 2020, primarily driven by distribution outages (Figure 39). From 2021 to 2022, there is a significant decrease in distribution normalized outage events, and transmission normalized outage events drop to nearly zero.

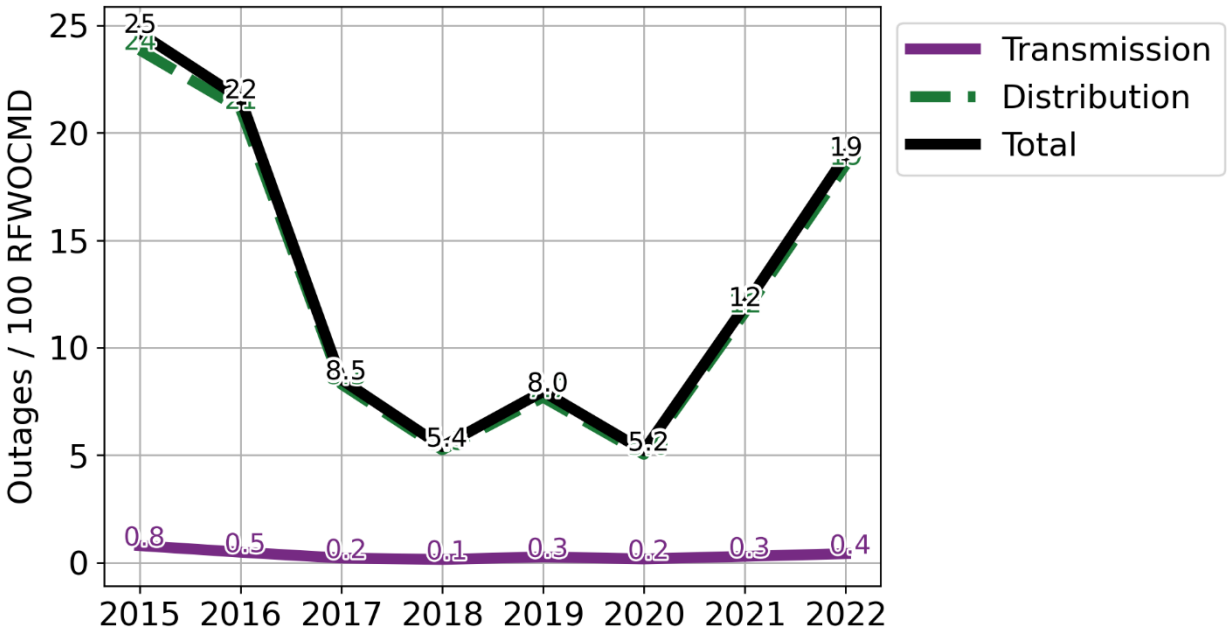
Figure 39: PG&E Outage Events Normalized by HWWOCMD (2015-2022) by Distribution and Transmission Lines



Outage Events Normalized by Red Flag Warning Overhead Circuit Mile Days:

Unplanned outage events normalized by RFWOCMD show a significant increase from 2020 to 2022 (Figure 40). In 2015 and 2022, the total number of RFWOCMDs are nearly zero, which results in relatively large values when the data are normalized due to dividing by a very small number. The large values do not reflect the number of raw outage events.

Figure 40: PG&E Outage Events Normalized by RFWOCMD (2015-2022) by Distribution and Transmission Lines

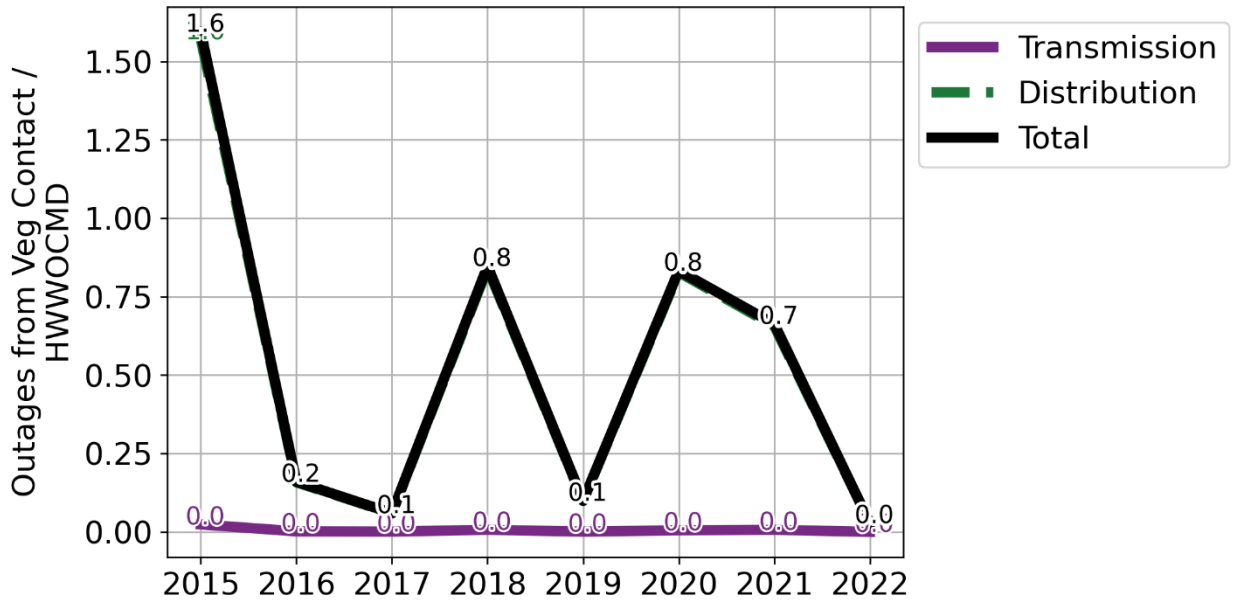


Outage Events from Vegetation Contact Counts Normalized by High Wind Warning Overhead Circuit Mile Days:

To gain insights on outage events from vegetation contacts adjusted for weather conditions, the raw counts were normalized by HWWOCMD.

From 2015 to 2022, the outage events caused by vegetation contact normalized by HWWOCMD on both transmission and distribution lines show significant fluctuation. The overall total for normalized transmission outages from 2015 to 2022 is small. For distribution outages, there are peaks and troughs during the same period. From 2021 to 2022, there is a decrease in normalized outages caused by vegetation contacts (Figure 41).

Figure 41: PG&E Outage Events from Vegetation Contacts Normalized by HWWOCMD (2015-2022) by Distribution and Transmission Lines



Outages Due to Vegetation Contact Normalized by Red Flag Warning Overhead Circuit Mile Days:

Unplanned outages due to vegetation contact normalized by RFWOCMD show a decrease from 2021 to 2022 (Figure 42).

Figure 42: PG&E Outages from Vegetation Contacts Normalized by RFWOCMD (2015-2022) by Distribution and Transmission Lines