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

November 13, 2023

To: Pacific Gas and Electric Company Wildfire Mitigation Plan Stakeholders

Enclosed is the Draft Decision of the Office of Energy Infrastructure Safety (Energy Safety) presenting its evaluation of Pacific Gas and Electric Company's 2023-2025 Wildfire Mitigation Plan.

This Draft Decision is published for public review and comment. Opening comments must be submitted no later than December 4, 2023. Reply comments must be submitted no later than December 14, 2023.[1]

Comments must be submitted to Energy Safety's e-filing system in the 2023-2025 Wildfire Mitigation Plans docket (2023-2025-WMPs).[2]

Sincerely,

Shannon O'Rourke
Deputy Director | Electrical Infrastructure Directorate
Office of Energy Infrastructure Safety

[1] Dates falling on a Saturday or holiday as defined in Government Code Section 6700 have been adjusted to the next business day in accordance with Government Code Section 6707.

[2] Submit comments via the 2023-2025-WMPs docket on Energy Safety's e-filing system (https://efiling.energysafety.ca.gov/EFiling/DocketInformation.aspx?docketnumber=2023-2025-WMPs, accessed November 2, 2023).

OFFICE OF ENERGY INFRASTRUCTURE SAFETY

DRAFT DECISION ON 2023-2025 WILDFIRE MITIGATION PLAN

PACIFIC GAS AND ELECTRIC COMPANY

November 2023

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1. Executive Summary

The Office of Energy Infrastructure Safety (Energy Safety) works to ensure electrical corporations take effective actions to reduce utility-related wildfire risk. Pursuant to Public Utilities Code section 8386.3(a), this Decision serves as Energy Safety's assessment and approval of Pacific Gas and Electric Company's (PG&E's) 2023-2025 Wildfire Mitigation Plan. Energy Safety's Decision incorporates comments from the public and other stakeholders.

Energy Safety required that PG&E address a number of critical issues in its original Wildfire Mitigation Plan through a Revision Notice. PG&E subsequently revised its plan in a Response to Revision Notice and a Supplemental Response to Revision Notice. With the incorporation of changes made in response to the Revision Notice, PG&E's Wildfire Mitigation Plan is comparable to the other large electrical corporations and has relative strengths in certain areas as compared to the plans of the other large electrical corporations. For example, PG&E plans to further integrate its 600-plus wildfire cameras with artificial intelligence software to enable automated generation of wildfire notifications across its service territory. This effort can lead to early wildfire detection, assist in the confirmation of wildfires, and provide situational awareness of current and ongoing wildfires. PG&E is also relatively strong in its emergency preparedness: through its Multi-Year Training and Exercise Plan, PG&E goes beyond its peers in its training of key personnel and planning pertaining to potential internal and external hazards and emergency situations. Regarding its risk modeling framework approach, PG&E provides a thorough description that incorporates and balances the full spectrum of wildfire related risks and mitigations across the organization.

There are also certain areas of PG&E's Wildfire Mitigation Plan that can be further developed and improved. For example, PG&E must further improve its focused tree inspections, address the risk from hazard trees, and update its targets for reducing its backlog of open work order tags. Energy Safety also expects PG&E to describe the enhancements it has made and expects to make to its vegetation management recordkeeping and present its plan for consistent hazard tree-related risk reduction. Additionally, PG&E, along with other large electrical corporations, is not sufficiently addressing the known failures of covered conductors in its maintenance and inspection procedures.

2. Introduction and Background

Pacific Gas and Electric Company (PG&E) submitted its 2023-2025 Wildfire Mitigation Plan (Base WMP or WMP) covering a three-year term from 2023 through the end of 2025 (the current WMP cycle) on March 27, 2023, in response to the reporting requirements set forth in Energy Safety's 2023-2025 WMP Technical Guidelines (Technical Guidelines)[1] and the processes set forth in Energy Safety's WMP Process and Evaluation Guidelines (Process Guidelines).[2] On August 7, 2023, PG&E submitted a Response to Revision Notice. On September 27, 2023, PG&E submitted a Supplemental Response to Revision Notice.

Pursuant to Public Utilities Code section 8386.3(a), this Decision is Energy Safety's assessment of PG&E's 2023-2025 WMP.

Energy Safety approves PG&E's 2023-2025 WMP. In 2024, PG&E must submit a 2025 Update consistent with the 2025 WMP Guidelines. Energy Safety will approve or deny PG&E's 2025 Update to its Base Plan.

2.1 Consultation with California Department of Forestry and Fire Protection

The Office of the State Fire Marshal is part of the California Department of Forestry and Fire Protection (CAL FIRE). Public Utilities Code section 8386.3(a) requires Energy Safety to consult with the Office of the State Fire Marshal in reviewing electrical corporations'[3] WMPs and WMP Updates. The Office of the State Fire Marshal provided meaningful consultation and input on the evaluation, but this Decision is solely an action of Energy Safety and not the Office of the State Fire Marshal or CAL FIRE.

2.2 Stakeholder Comments

Energy Safety invited stakeholders, including members of the public, to provide comments on the utilities' 2023-2025 WMPs and Revision Notices. Opening comments on PG&E's Base WMP were due on May 26, 2023, and reply comments were due on June 5, 2023. Opening comments on PG&E's Revision Notice were due on August 22, 2023, and reply comments were due on September 1, 2023. Opening comments on PG&E's Supplemental Revision Notice

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[1] Energy Safety's 2023-2025 Wildfire Mitigation Plan Technical Guidelines (Dec. 2022) (hereafter Technical Guidelines) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[2] Energy Safety's 2023-2025 Wildfire Mitigation Plan Process and Evaluation Guidelines (Dec. 2022) (hereafter Process Guidelines) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53287&shareable=true, accessed May 5, 2023).

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

Response were due on October 13, 2023, and reply comments were due on October 20, 2023. See Appendices E and F for lists of stakeholders that submitted comments, including comments that Energy Safety concurred with and incorporated into its evaluation.

3. Energy Safety's 2023 Evaluation Process

Energy Safety issued the following guidelines for electrical corporations' 2023-2025 WMPs:

- **2023-2025 WMP Technical Guidelines**, which sets forth substantive and procedural requirements for electrical corporations to prepare and submit their WMPs.[4]
- **ITO Supplement to the 2023-2025 WMP Technical Guidelines**, which establishes the modified reporting requirements for independent transmission operators (ITOs).[5]
- **2023-2025 WMP Process and Evaluation Guidelines**, which outlines the process for Energy Safety's evaluation of WMPs, details the public participation process, and establishes submission requirements for the electrical corporations.[6]
- **2023-2025 Maturity Model and Survey**, which provides a quantitative method for assessing electrical corporation wildfire risk mitigation capabilities and examining how electrical corporations propose to continuously improve in key areas of their WMPs.[7, 8]

The WMP evaluation process includes some or all the following steps for each utility, which are described in more detail in the remainder of this section:

- Completeness check of the utilities' WMP pre-submissions.

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[4] Technical Guidelines (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[5] Energy Safety's Independent Transmission Operator Supplement to the 2023-2025 Wildfire Mitigation Plan Technical Guidelines (Dec. 2022) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53290&shareable=true, accessed May 5, 2023).

[6] Process Guidelines (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53287&shareable=true, accessed May 5, 2023).

[7] Second Revised Final Maturity Model and Maturity Survey Letter (Feb. 2023) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53393&shareable=true, accessed May 5, 2023);

2023-2025 Electrical Corporation Wildfire Mitigation Maturity Model (Second Revised Final, Feb. 2023) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53394&shareable=true, accessed May 5, 2023);

2023 Electrical Corporation Wildfire Mitigation Maturity Survey (Second Revised Final, Feb. 2023) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53395&shareable=true, accessed May 5, 2023). This is the version that electrical corporations saw when filling out the survey.

[8] 2023 Electrical Corporation Wildfire Mitigation Maturity Survey (Revised Final, April 2023) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53708&shareable=true, accessed May 5, 2023). This is the version used by Energy Safety when scoring the survey.

- Energy Safety's evaluation of utilities' WMPs, including consideration of Maturity Survey results, areas where the utility has progressed, and areas where the utility must improve.
- Issuance of a Revision Notice if Energy Safety identifies critical issues associated with a utility's WMP.
- Publication of Energy Safety draft Decision.
- Publication of Energy Safety's Decision approving or denying a utility's WMP.
- Various forms of public participation throughout the process.

3.1 WMP Completeness

The first step in Energy Safety's WMP evaluation is a completeness check.[9] PG&E provided its WMP pre-submission to Energy Safety on February 13, 2023.

Energy Safety determined that PG&E's WMP pre-submission did not satisfy the completeness check and notified PG&E on March 6, 2023, of what information was required to make its WMP complete.

PG&E submitted its revised Base WMP on March 27, 2023.

3.2 Maturity Model and Survey

Energy Safety used the 2023-2025 Electrical Corporation Wildfire Mitigation Maturity Model[10] (Maturity Model) and 2023 Electrical Corporation Wildfire Mitigation Maturity Survey[11] (Maturity Survey), which together provided a quantitative method to assess the maturity of each utility's wildfire risk mitigation program. The current version of the Maturity Model is an update to the original version that Energy Safety used to assess utility maturity during the first WMP cycle (2020-2022).

The Maturity Model consists of 37 individual capabilities describing the ability of electrical corporations to mitigate wildfire risk and Public Safety Power Shutoff (PSPS) risk within their service territory. The 37 capabilities are aggregated into seven categories. Maturity levels range from 0 (below minimum requirements) to 4 (beyond best practice). For each utility, Energy Safety calculated maturity levels for each capability, each category, five cross-

[9] Process Guidelines, Section 4.1, pages 3-5 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53287&shareable=true, accessed May 5, 2023).

[10] 2023-2025 Electrical Corporation Wildfire Mitigation Maturity Model (Second Revised Final, Feb. 2023) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53394&shareable=true, accessed May 5, 2023).

[11] 2023 Electrical Corporation Wildfire Mitigation Maturity Survey (Revised Final, April 2023) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53708&shareable=true, accessed May 5, 2023). This is the version used by Energy Safety when scoring the survey.

category themes, and the overall WMP, based on the utility's answers to Maturity Survey questions and the scoring system described in the Maturity Model.

Energy Safety evaluated each utility's reported and projected wildfire mitigation maturity in the context of the utility's corresponding current and planned initiatives described in its WMP.

The results from the 2023 Maturity Survey establish a baseline for maturity as well as the utility's anticipated progress over this three-year plan period.

Energy Safety assessed the results of each utility's Maturity Survey and discussed how the utility is progressing—or not—in maturity relative to each mitigation initiative. PG&E's results specific to each initiative are discussed in Sections 6 through 9 of this Decision, and overall results for PG&E can be found in Appendix H.

3.3 Areas for Continued Improvement

Energy Safety's evaluation of the 2023-2025 WMPs focused on each utility's strategies for reducing the risk of utility-related ignitions. Energy Safety assessed the electrical corporation's progress on areas for improvement resulting from 2022 WMP evaluations, evaluating the feasibility of its strategies, and measuring year-to-year trends. As a result of this evaluation, Energy Safety identified areas where the utility must continue to improve its wildfire mitigation capabilities in future plans.[12]

Areas for continued improvement relative to each mitigation initiative are discussed in Sections 6 through 9 of this Decision. Specific areas for continued improvement prescribed by Energy Safety in 2023, including specific required progress, are listed in Section 11.

3.4 Revision Notice

Public Utilities Code section 8386.3(a) states, "Before approval, [Energy Safety] may require modifications of the [WMP]." If Energy Safety requires modifications to a WMP, it does so by issuing a Revision Notice to a utility.[13]

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[12] Process Guidelines, Section 4.7 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53287&shareable=true, accessed May 5, 2023).

[13] Process Guidelines, Section 4.4, page 6 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53287&shareable=true, accessed May 5, 2023).

Energy Safety issued a Revision Notice to PG&E on June 22, 2023.[14] PG&E submitted its Revision Notice Response on August 7, 2023,[15] and its Supplemental Revision Notice Response on September 27, 2023.[16] Appendix C lists the critical issues contained in the Revision Notice, a brief overview of the utility's response, and Energy Safety's assessment of the utility's response. Energy Safety considered PG&E's Revision Notice Response and Supplemental Revision Notice Response in its comprehensive WMP evaluation, and this Decision includes Energy Safety's evaluation of PG&E's 2023-2025 WMP, Revision Notice Response, and Supplemental Revision Notice Response.

3.5 Decision

In its evaluation of an electrical corporation's 2023-2025 WMP, Energy Safety considers the areas where the electrical corporation must improve, as well as the progress it plans to achieve in its areas of strength. As a result of its evaluation, Energy Safety determines whether the 2023-2025 WMP is approved or denied.[17] If the WMP is approved, Energy Safety finds the electrical corporation's WMP is sufficient and expects it to complete mitigation initiatives as described in its WMP. An approved WMP demonstrates adequate progress toward wildfire mitigation, while still showing areas where the electrical corporation must improve.

If the WMP is denied, Energy Safety finds the electrical corporation's WMP is not satisfactory or does not include sufficient detail within a section or sub-section of the WMP. There may still be areas of strength within a denied WMP, but the issues are critical enough to warrant denial.

Energy Safety recognizes that planning for wildfire risk is a maturing capability and expects that electrical corporations will continue to improve year over year. Therefore, Energy Safety's Decision includes areas for continued improvement, identifying areas where the utility must continue to mature in its capabilities.

Energy Safety also highlights in its Decision areas of strength where the electrical corporation plans noteworthy improvements to its wildfire mitigation programs, sets ambitious and feasible targets for its programs, and/or sets out to achieve more than what is required.

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[14] Revision Notice for PG&E's 2023-2025 WMP (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=54183&shareable=true, accessed August 2, 2023).

[15] PG&E's 2023-2025 WMP Response to Revision Notice (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=54466&shareable=true, accessed September 11, 2023)

[16] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice (https://efiling.energysafety.ca.gov/Search.aspx?docket=2023-2025-WMPs, accessed October 17, 2023)

[17] Process Guidelines, Section 5.3, page 10 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53287&shareable=true, accessed May 5, 2023).

Pursuant to Public Utilities Code section 8386.3(a), this Decision is the totality of Energy Safety's review of PG&E's 2023-2025 WMP. PG&E's 2023-2025 WMP is approved.

3.6 Change Order Requests

For information regarding Energy Safety's change order process, refer to Section 12 of the Process Guidelines.

4. Introductory Sections of the WMP

In response to Sections 1 through 4 of the Technical Guidelines, PG&E provided basic information regarding persons responsible for executing the plan and adherence to statutory requirements.[18]

PG&E provided the required information for these sections:

- Section 1: Executive Summary (Summary of the 2020–2022 WMP Cycle, Summary of the 2023–2025 Base WMP).
- Section 2: Responsible Persons (titles and credentials for: executive-level owner with overall responsibility; program owners with responsibility for each of the main components of the plan; as applicable, general ownership for questions related to or activities described in the WMP).
- Section 3: Statutory Requirements Checklist.
    - This section provides a checklist of the statutory requirements for a WMP as detailed in Public Utilities Code section 8386(c).[19] By completing the checklist, the electrical corporation affirms that its WMP addresses each requirement. PG&E completed this checklist.
- Section 4: Overview of WMP (Primary Goal; WMP Objectives; Proposed Expenditures; Risk-Informed Framework).

4.1 PG&E's Wildfire Mitigation Expenditures

Section 4.3 of the Technical Guidelines requires electrical corporations to summarize projected expenditures for the current WMP cycle, as well as planned and actual expenditures from the previous WMP cycle (i.e., 2020–2022).[20]

PG&E provided all required information regarding expenditures. A summary of this information is presented below. Table 4.1-1 presents a comparison of territory-wide projected expenditures by wildfire mitigation initiative category across the three large investor-owned utilities (IOUs). Table 4.1-2 provides the same information but divided by

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[18] Technical Guidelines, Sections 1 through 4, pages 6-14 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[19] Public Utilities Code section 8386 (https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=8386.&lawCode=PUC, accessed May 9, 2023).

[20] Energy Safety's WMP evaluation and decision on a WMP is not an approval of, or agreement with, costs listed in the WMP.

planned expenditures within and outside the California Public Utilities Commission's (CPUC's) high fire threat district (HFTD). These tables present total projected expenditure for the current 2023-2025 WMP cycle.

Since all electrical corporations spend a considerably higher percentage of their wildfire mitigation expenditures within the grid design and vegetation management categories, Figures 4.1-1 and 4.1-2 provide a more detailed breakdown of how expenditures within these categories are divided across major activity types.

Table 4.1-1. Large IOU Territory-Wide Expenditures per Initiative Category[21]

Total Territory (Includes HFTD)

WMP Initiative Category	PG&E	%	SCE	%	SDG&E	%	Grand Total	%
Grid Design, Operations, and Maintenance	$13 B	72%	$5.8 B	71%	$1.8 B	80%	$20.6 B	72%
Vegetation Management and Inspection	$3.6 B	20%	$1.8 B	22%	$213.8 M	9%	$5.6 B	20%
Other	$712.4 M	4%	0	0%	$0.0 M	0%	$712.4 M	2%
Emergency Preparedness	$163.6 M	1%	$300.3 M	4%	$144.1 M	6%	$608.0 M	2%
PSPS	$300.0 M	2%	0	0%	0	0%	$300.0 M	1%
Situational Awareness and Forecasting	$114.3 M	1%	$101.8 M	1%	$18.1 M	1%	$234.2 M	1%
Community Outreach and Engagement	$160.8 M	1%	$50.4 M	1%	$22.2 M	1%	$233.3 M	1%
Environmental Compliance and Permitting	0	0%	$136.2 M	2%	$3.0 M	0%	$139.2 M	0%
Wildfire Mitigation Strategy Development	0	0%	$11.8 M	0%	$53.7 M	2%	$65.5 M	0%
Risk Methodology and Assessment	$33.2 M	0%	$137.3 K	0%	0	0%	$33.4 M	0%
Grand Total	$18 B	100%	$8.2 B	100%	$2.3 B	100%	$28.6 B	100%

Table 4.1-2. Large IOU Expenditures per Initiative Category, HFTD vs non-HFTD

HFTD vs. Non-HFTD Territory	PG&E			SCE			SDG&E		
WMP Initiative Category	HFTD	Non-HFTD	% Spend in HFTD	HFTD	Non-HFTD	% Spend in HFTD	HFTD	Non-HFTD	% Spend in HFTD
Grid Design, Operations, and Maintenance	$10 B	$3 B	77%	$3.8 B	$2 B	67%	$1.7 B	$66.4 M	96%
Vegetation Management and Inspection	$1.2 B	$2.4 B	34%	$1.3 B	$455.8 M	75%	$146.6 M	$67.2 M	69%
Other	$712.4 M	0	100%	0	0	0%	$0.0 M	0	0%
Emergency Preparedness	$163.6 M	0	100%	$300.3 M	0	100%	$144.1 M	0	100%
PSPS	$300.0 M	0	100%	0	0	0%	0	0	0%
Situational Awareness and Forecasting	$114.3 M	0	100%	$101.8 M	0	100%	$18.1 M	0	100%
Community Outreach and Engagement	$160.8 M	0	100%	$50.4 M	0	100%	$22.2 M	0	100%
Environmental Compliance and Permitting	0	0	0%	$136.2 M	0	100%	$3 M	0	100%
Wildfire Mitigation Strategy Development	0	0	0%	$11.8 M	0	100%	$53.7 M	0	100%
Risk Methodology and Assessment	$10.3 M	$22.9 M	31%	$137.3 K	0	100%	0	0	0%
Grand Total	**$13 B**	**$5.4 B**	**70%**	**$5.8 B**	**$2 B**	**71%**	**$2.1 B**	**$133.6 M**	**94%**

[21] The "Environmental Compliance and Permitting" initiative category above correlates to the "Overview of the Service Territory" initiative in WMPs.

Figure 4.1-1. PG&E Grid Design, Operations, and Maintenance Projected Expenditures

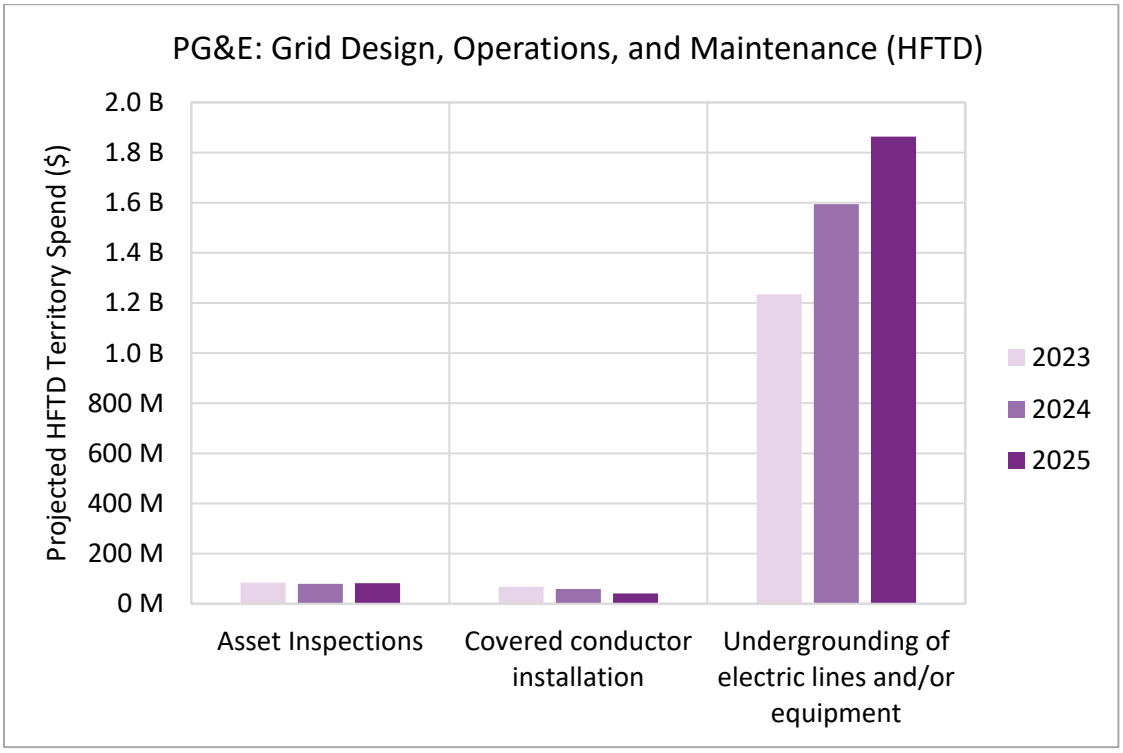
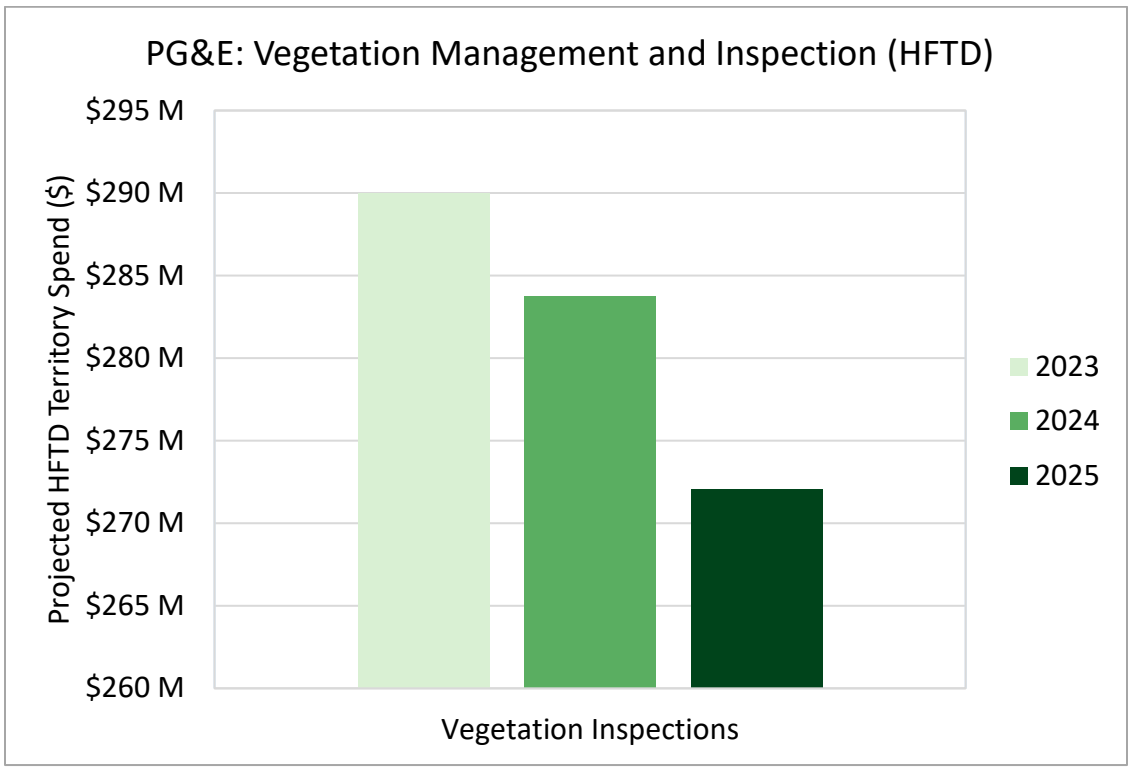


Figure 4.1-2. PG&E Vegetation Management Projected Expenditures



4.2 PG&E Revision Notice General Critical Issues

As described in Section 3.4, Energy Safety issued PG&E a Revision Notice in response to its WMP submitted on June 22, 2023. PG&E submitted its Revision Notice Response on August 7, 2023,[22] and its Supplemental Revision Notice Response on September 27, 2023.[23] This section evaluates PG&E's responses as it relates to critical issues that impacted more than one mitigation category. The remaining Revision Notice issues, Energy Safety evaluations, and PG&E responses are located in their respective mitigation initiative sections.

4.2.1 RN-PG&E-23-01: Many of PG&E's 3 and 10-year initiative objectives do not meet requirements as outlined in the Technical Guidelines.

Energy Safety required PG&E to revise its 3-year and 10-year objectives to address the specific issues that Energy Safety identifies above. PG&E may add, modify, and/or remove objectives, as needed, with the overall goal of strengthening its 3-year and 10-year objectives so they are "specific, measurable, achievable, realistic, and timely."[24] Energy Safety found critical issues associated with PG&E's objectives in the following WMP initiative categories: situational awareness and forecasting; emergency preparedness; community outreach and engagement; and Public Safety Power Shutoff.

4.2.1.1 RN-PG&E-23-01: PG&E Response Summary

In its responses to the Revision Notice, PG&E provided updated objectives and/or targets in the following sections: situational awareness and forecasting; emergency preparedness; community outreach and engagement; and Public Safety Power Shutoff. These updated objectives and/or targets are described below.

Situational Awareness and Forecasting

PG&E created four additional objectives within this section. These objectives focus on continuing work to enchance its Artifical Intelligence system performance, performing a feasibility study on the use of early fault detection (EFD) and distribution fault anticipation (DFA) technologies, and evaluating/discussing its situational awareness tools internally as well as with other California large IOUs.

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[22] PG&E's 2023-2025 WMP Response to Revision Notice (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=54466&shareable=true, accessed September 11, 2023).

[23] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice (https://efiling.energysafety.ca.gov/Search.aspx?docket=2023-2025-WMPs, accessed October 17, 2023).

[24] Technical Guidelines, Appendix A. Page A-12. (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 30, 2023).

In addition to these objectives, PG&E added two new targets that describe the installation of additional EFD and DFA reporting.

Emergency Preparedness

PG&E replaced its 10-year objectives with objectives that involve executing a Threat and Hazard Identification and Risk Assessment (THIRA)[25] every three years and the adoption of a common operating picture[26] technology.

Community Outreach and Engagement

PG&E updated its 3-year and 10-year objectives to be more measurable and added two new 10-year objectives to demonstrate additional community and customer outreach.

Public Safety Power Shutoff

PG&E created two new 3-year objectives which focus on sharing and receiving lessons learned and best practices with other California IOUs and evaluating whether weather drones can be used to support PSPS restoration efforts.

4.2.1.2 RN-PG&E-23-01: Energy Safety Evaluation

PG&E has resolved the critical issue described in RN-PG&E-23-01: it added and modified applicable 3 and 10-year objectives within the above subject areas so that they better align with the requirements listed in the Technical Guidelines.[27]

4.2.2 RN-PG&E-23-02: PG&E does not provide sample sizes and target pass rates for certain asset and vegetation management quality assurance and control programs as required by the Technical Guidelines.

Energy Safety required PG&E to:

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[25] The Threat and Hazard Identification and Risk Assessment (THIRA) is a Federal Emergency Management Agency (FEMA) program developed for public sector agencies that contains a three-step risk assessment process that defines a threat or hazard based on the likelihood of occurrence and impact on an organization's ability to deliver on core capabilities. For more information, see FEMA's National Risk and Capability Assessment web page (https://www.fema.gov/emergency-managers/national-preparedness/goal/risk-capability-assessment, accessed November 1, 2023).

[26] A common operating picture is a continuously updated overview of an incident compiled throughout an incident's lifecycle. For more information, see DHS' web page (https://www.dhs.gov/publication/common-operating-picture-emergency-responders, accessed November 1, 2023).

[27] Technical Guidelines, Appendix A. Page A-12. (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 30, 2023).

- Define yearly target pass rates for 2023 through 2025 for its asset management and inspections quality assurance and quality control programs.
- Provide sample sizes for the 2023-2025 WMP cycle for its vegetation management quality verification and quality control programs.
- Provide yearly target pass rates for 2023 through 2025 for its vegetation management quality control programs.

4.2.2.1 RN-PG&E-23-02: PG&E Response Summary

In PG&E's responses to the Revision Notice, it provided all the required information including yearly target pass rates and minimum sample sizes for 2023-2025 for its quality assurance and quality control activities.

4.2.2.2 RN-PG&E-23-02: Energy Safety Evaluation

PG&E has provided sample sizes and yearly target pass rates for the 2023-2025 WMP cycle for its quality assurance and quality control activities, as required by the 2023-2025 WMP Technical Guidelines.[28]

PG&E has resolved the critical issue described in RN-PG&E-23-02.

4.2.3 RN-PG&E-23-03: PG&E has not adequately demonstrated workforce planning and resource allocation to address both Enhanced Powerline Safety Setting risk and wildfire risk.

Energy Safety required PG&E to provide:

a. An analysis demonstrating PG&E's understanding of safety impacts due to its Enhanced Powerline Safety Setting (EPSS), including how PG&E considers safety impacts in its analysis and prioritization of mitigations around reducing EPSS risk.

b. PG&E's work plan for resourcing EPSS-directed mitigation measures, including ratios and work hours shifted from wildfire risk mitigations. Ratios should be provided in the form of an estimated percentage of personnel and work hours that would otherwise have been dedicated directly to the same mitigation used to address wildfire risk as opposed to EPSS risk. This should be broken down by each mitigation type, including, but not limited to:

    i. Vegetation management.

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[28] Technical Guidelines, Sections 8.1.6 "Quality Assurance and Quality Control," page 86 and Section 8.2.5 "Quality Assurance and Quality Control," page 110-111 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 30, 2023).

ii. Asset repair and replacement.
iii. Additional asset inspections.

c. Details on how PG&E uses EPSS risk to inform the prioritization of its mitigations in comparison to wildfire risk for all subparts listed in (b). For example, PG&E must provide details on how EPSS risk informs its asset repair and replacement program and may impact prioritization of work as a result.

d. Justification for reallocating resources toward EPSS risk, as opposed to high wildfire risk. This should include using the analysis performed in parts (a) and (b) in conjunction with detailed mitigation effectiveness calculations.

4.2.3.1 RN-PG&E-23-03: PG&E Response Summary

In PG&E's responses to the Revision Notice, it provided additional details on the balance between wildfire risk reduction from EPSS implementation and reliability impacts, stating that the wildfire mitigation benefits of EPSS outweigh the non-wildfire safety impacts such as unplanned outages.[29]

PG&E provided a table showing the internal resource hours and 2023 projected expenditures for EPSS reliability mitigations compared to other PG&E wildfire mitigations.[30] Within that table,PG&E stated that EPSS equates to only 1.8 percent of the hours and 1.9 percent of the spend for vegetation management, 4 percent of the hours and 5.9 percent of the spend for asset repair and maintenance, and 1.4 percent of the hours and 0.8 percent of the spend for undergrounding.This equates to PG&E devoting a total of 2.3 percent and 2.6 percent of its total wildfire mitigation work hours and expenditures on EPSS respectively.[31]

PG&E also provided the EPSS outage profiles, existing program prioritization, and EPSS risk consideration breakdown for vegetation management, asset repair, and replacements, additional asset inspections, and undergrounding.[32]

4.2.3.2 RN-PG&E-23-03: Energy Safety Evaluation

PG&E has resolved the critical issue described in RN-PGE-23-03 regarding resource allocation based on information demonstrating that PG&E is not fundamentally redirecting its vegetation management or asset management resources toward addressing EPSS risk. PG&E has provided its justification for shifting wildfire mitigation resources toward addressing

[29] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice Redline, page 43.

[30] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice Redline, Table RN-PG&E-22-03-01: Comparing EPSS Resources to Other Mitigation Programs, page 45.

[31] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice Redline, page 47.

[32] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice Redline, Table RN-PG&E-22-03-2: Mitigation Prioritization Considering EPSS Risk, page 46.

EPSS risk given that such a shift only encompasses a small percentage of the total work hours and spending, and demonstrates a greater focus on mitigating wildfire risk through vegetation management, asset management, and undergrounding.

Energy Safety finds that PG&E has de-escalated the issue regarding the evaluation of EPSS safety impacts from a critical issue to an area for continued improvement. This is further discussed in Section 8.6, Cross-Category Observations.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 11.

5. Overview of the Service Territory

In response to Section 5 of the Technical Guidelines, PG&E provided a high-level overview of its service territory that includes key characteristics of its electrical infrastructure, environmental settings, and community values at risk.[33]

Below are Energy Safety's summary and findings regarding the PG&E's reporting on its service territory. In addition, Energy Safety has identified areas where PG&E must improve, described at the end of this section.

5.1 Service Territory

Section 5.1 of the Technical Guidelines requires PG&E to provide a high-level description of its service territory, including areas served, number of customers served, and geospatial maps.[34]

PG&E reported that its service territory includes 71,732 square miles and serves roughly 5,726,039 customers. PG&E also stated that 37,887 square miles of its territory are in the CPUC's HFTD Tier 2 and 3 lands, which is 52 percent of its territory. Compared to the peer utilities of SCE and SDG&E, PG&E's service territory is the largest in size, serves the most customers, and encompasses the largest number of square miles of HFTD in its territory. Figures 5.1-1 and 5.1-2 below summarize the square miles served, customers served, and square miles of HFTD Tier 2 and 3 lands in PG&E, SCE, and SDG&E service territories.

[33] Technical Guidelines, Section 5, "Overview of the Service Territory," pages 15-29 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[34] Technical Guidelines, Section 5.4, "Service Territory," pages 15-16 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

Figure 5.1-1. Cross-Utility Square Miles Served

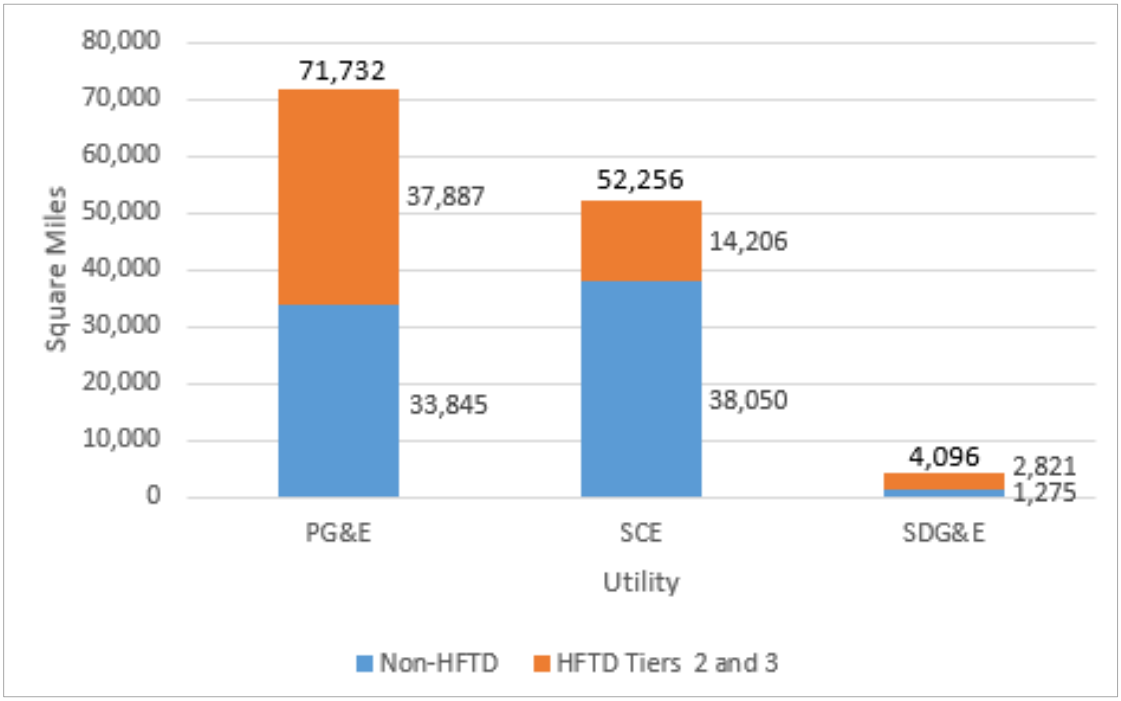
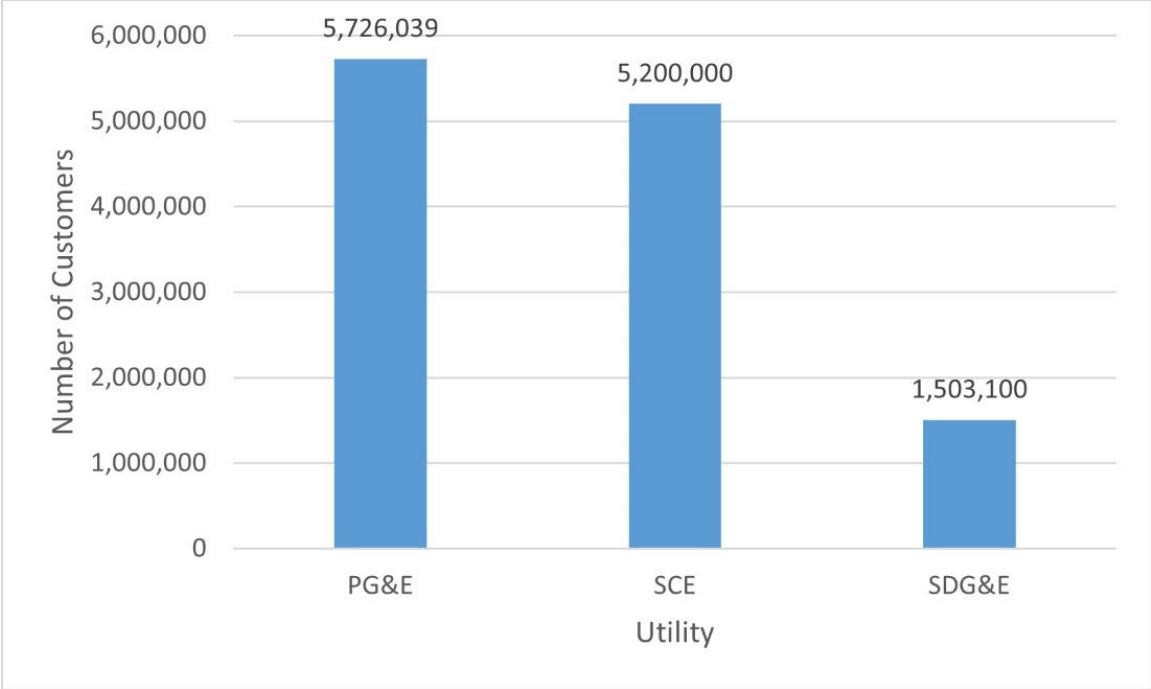


Figure 5.1-2. Cross-Utility Number of Customers Served

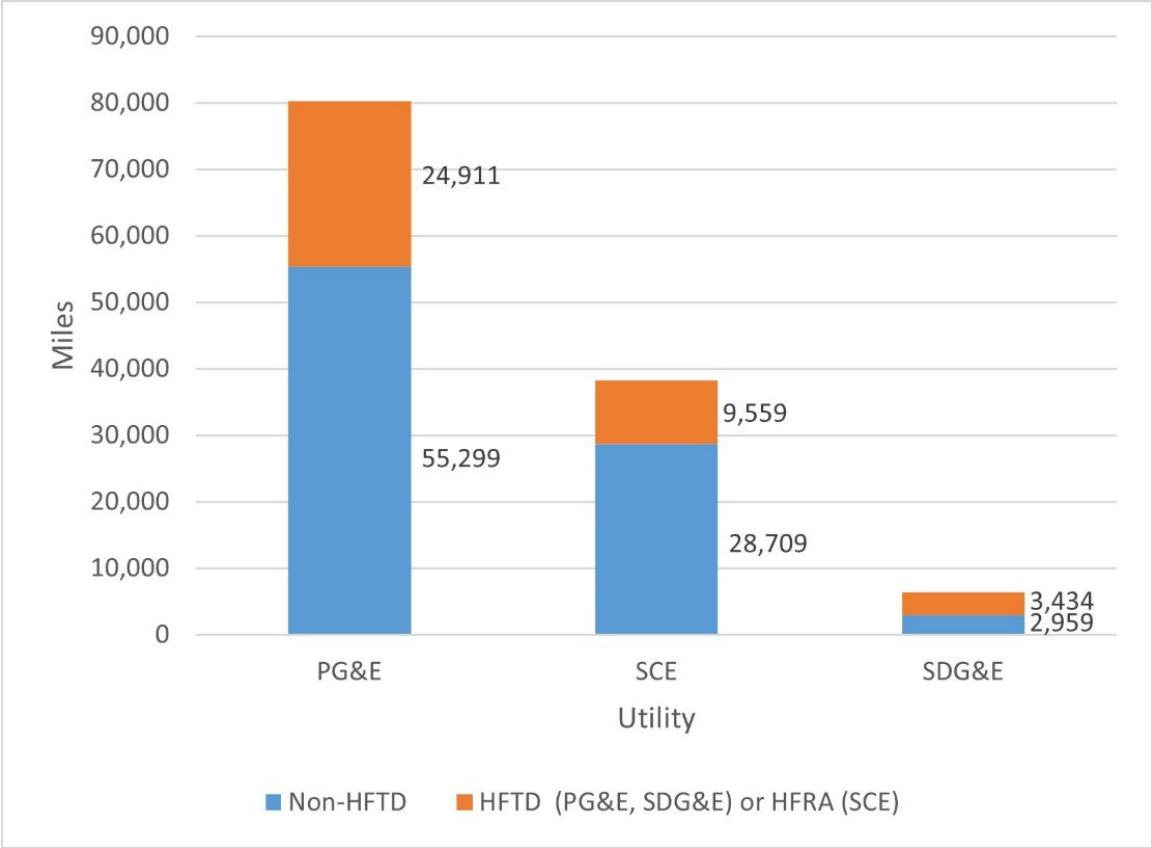


5.2 Electrical Infrastructure

Section 5.2 of the Technical Guidelines requires PG&E to provide a high-level description of its infrastructure, including all power generation facilities, transmission and distribution lines and associated equipment, substations, and other major equipment.[35]

PG&E provided a table showing the breakdown of conductor line miles of overhead and underground lines in and outside of its HFTD. Figures 5.2-1, 5.2-2, 5.2-3 below summarize conductor line miles presented by PG&E in comparison to its peer utilities.[36]

Figure 5.2-1. Cross-Utility Miles of Overhead Distribution Lines



[35] Technical Guidelines, Section 5.2, "Electrical Infrastructure," pages 16-17 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[36] In the legends of Figures 5.2-1 to 5.2-3, HFTD refers to the CPUC's high fire threat district and HFRA refers to SCE's High Fire Risk Area.

Figure 5.2-2. Cross-Utility Miles of Overhead Transmission Lines

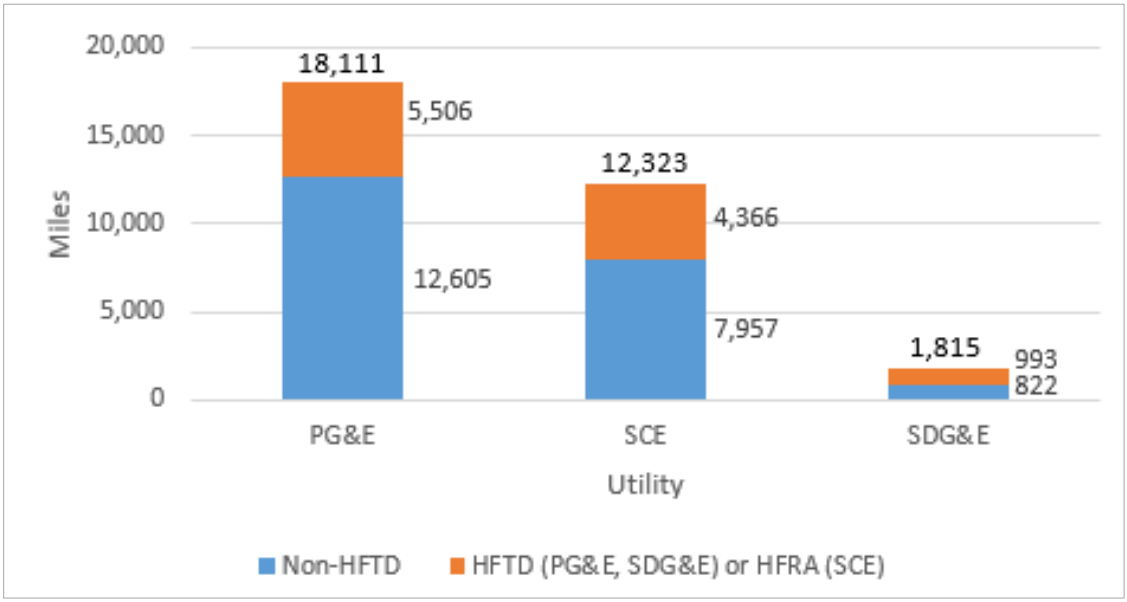
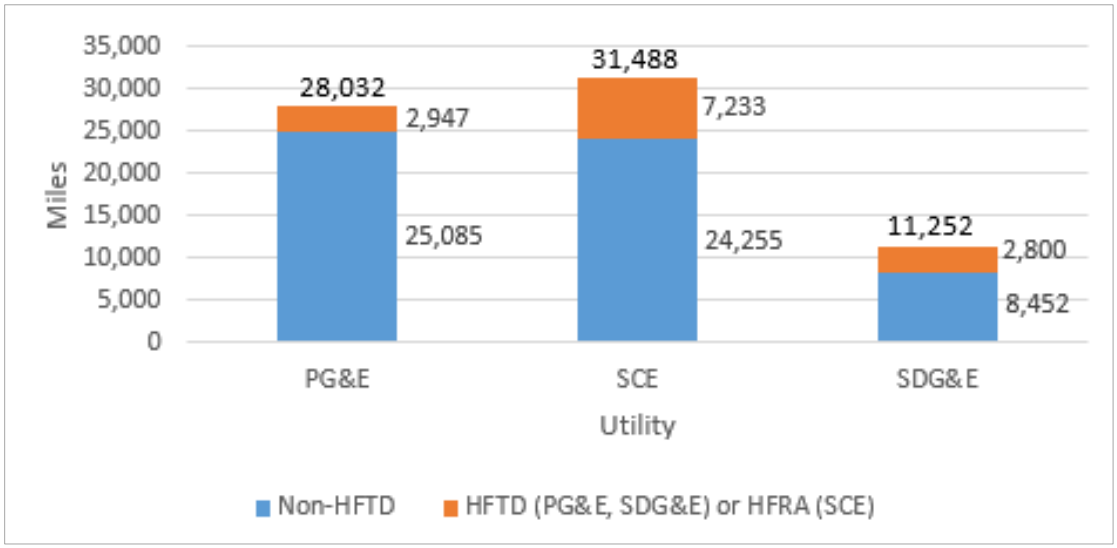


Figure 5.2-3. Cross-Utility Miles of Underground Distribution and Transmission Lines



5.3 Environmental Settings

Section 5.3 of the Technical Guidelines requires PG&E to provide a high-level overview of the environmental settings within its service territory.[37]

5.3.1 Fire Ecology

Section 5.3.1 of the Technical Guidelines requires PG&E to provide a brief narrative of the fire ecologies across its service territory, including how ecological features influence the propensity of the electrical corporation's service territory to experience wildfires. The Technical Guidelines also require tabulated statistics.[38]

PG&E provided a narrative describing the vegetative coverage across its service territory. PG&E additionally provided a table describing the existing vegetation types in PG&E's service territory and/or pie chart showing a breakdown of the vegetation types in its service territory in percentages.

5.3.2 Catastrophic Wildfire History

Section 5.3.2 of the Technical Guidelines requires PG&E to provide a brief narrative summarizing its wildfire history for the past 20 years as recorded by the electrical corporation, CAL FIRE, or another authoritative source.[39]

PG&E reported 14 catastrophic wildfires that were attributed to its facilities or equipment from 2015-2022.[40] Energy Safety defines catastrophic wildfires as those that resulted in at least one death, damaged over 500 structures, or burned over 5,000 acres. Figures 5.3-1, 5.3-2, and 5.3-3 below summarize the reported information on catastrophic wildfires for PG&E, SCE, and SDG&E.

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[37] Technical Guidelines, Section 5.3, "Environmental Settings," pages 17-26 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[38] Technical Guidelines, Section 5.3.1, "Fire Ecology," pages 17-18 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[39] Technical Guidelines, Section 5.3.2, "Catastrophic Wildfire History," pages 18-20 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[40] The reporting period for catastrophic wildfires represented here begins in 2015 because data limitations experienced by utilities. Also, although no data on wildfires associated with SDG&E appear in the charts in this section, SDG&E had two catastrophic wildfires between 2002 and 2022, both in 2007. These fires collectively burned 207,462 acres, caused 2 fatalities, and damaged or destroyed 1,984 structures.

Figure 5.3-1. Cross-Utility Number of Catastrophic Wildfires (2015-2022)

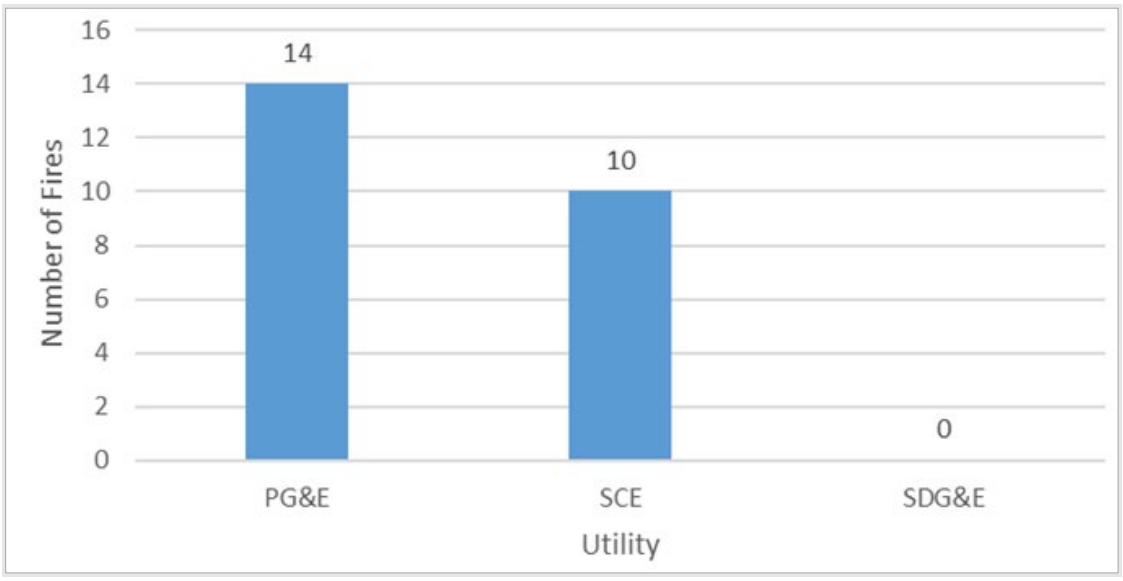


Figure 5.3-2. Cross-Utility Acres Burned by Catastrophic Wildfires (2015-2022)

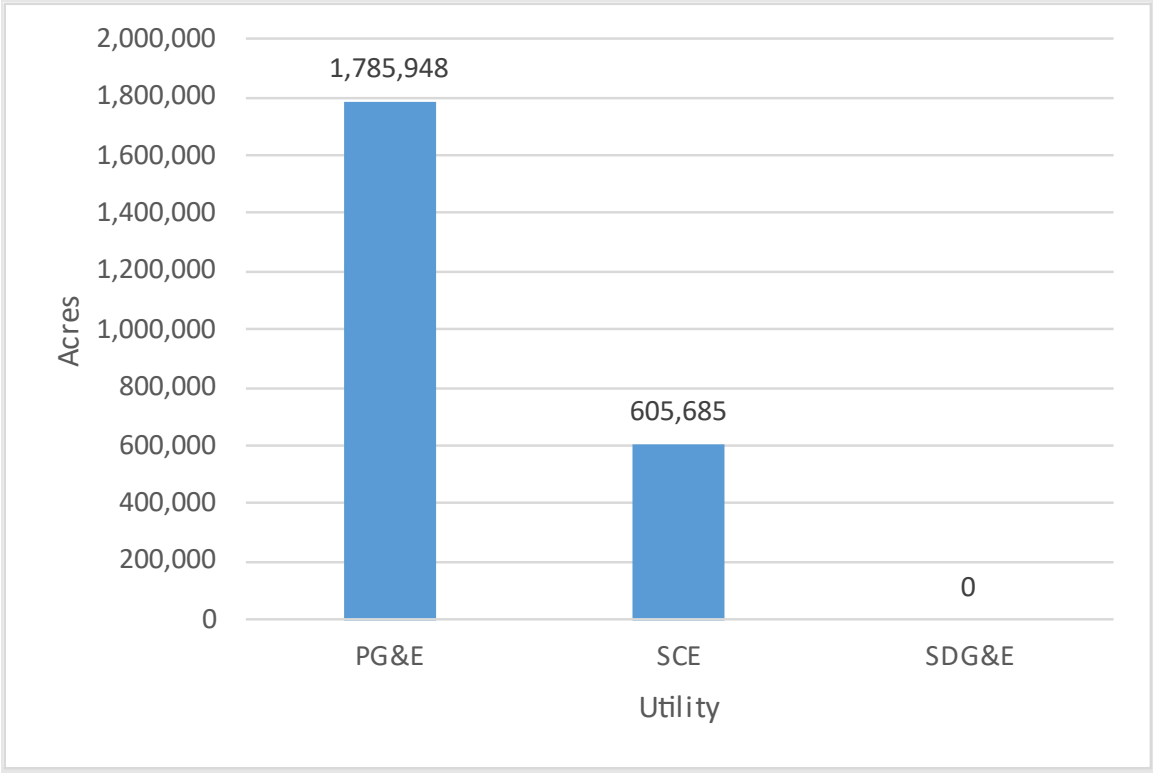
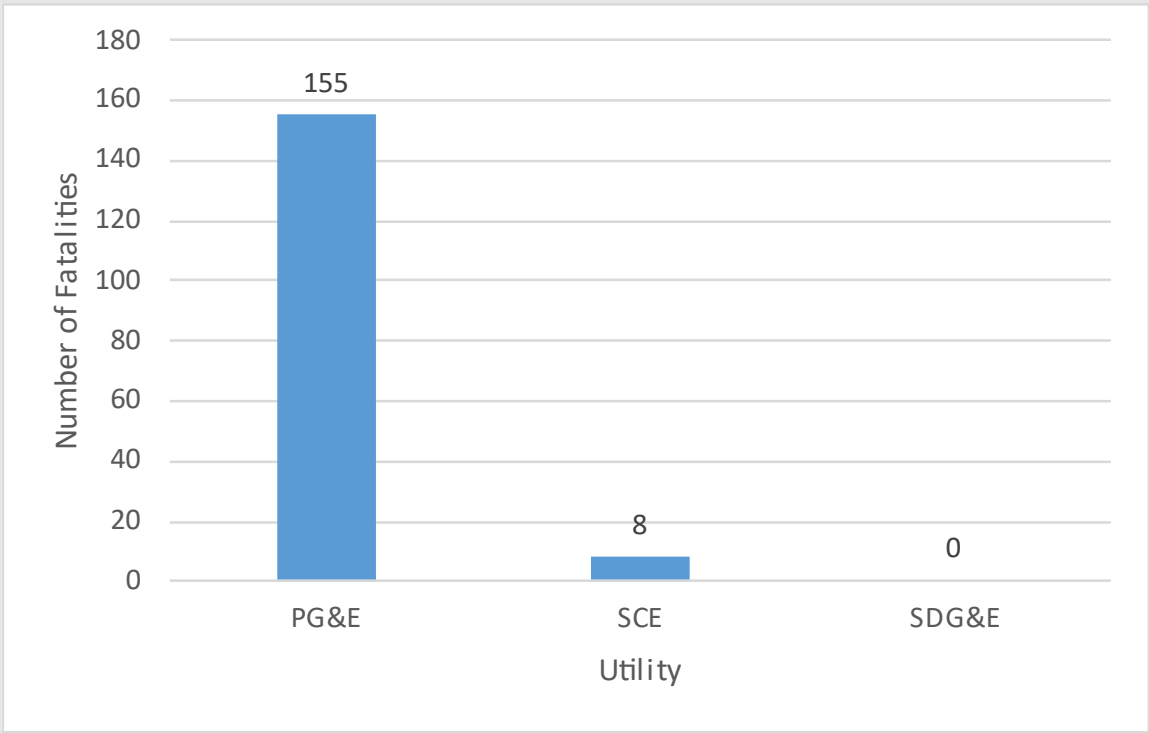


Figure 5.3-3. Cross-Utility Number of Fatalities Caused by Catastrophic Wildfires (2015-2022)



5.4 Community Values at Risk

Section 5.4 of the Technical Guidelines requires PG&E to identify the community values at risk across its service territory, including the distribution of urban, rural, and highly rural customers; the wildland-urban interface (WUI) in its territory; the community values at risk from wildfire as defined by the electrical corporation; the distribution of critical facilities within its territory; and a summary of how the utility complies with environmental laws.[41]

PG&E listed the percentages and number of people in its territory that are located in urban, rural, and highly rural areas and briefly summarized where these areas occur in its territory. PG&E also described where the WUI occurs in its territory and provided a table showing the sum of square miles in the WUI and non-WUI.[42] PG&E also provided a map of population density in the WUI.[43]

[41] Technical Guidelines, Section 5.4, "Community Values at Risk," pages 26-29 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[42] PG&E's 2023-2025 WMP, Table PG&E-5.4.2-1 "Square Miles in PG&E's Service Territory Corresponding to Population Density of WUI (Sum of Square Miles)," page 116.

[43] PG&E's 2023-2025 WMP, Figure PG&E-5.4.2-1 "Population Density Map of Wildland Urban Interface," page 117.

PG&E summarized the critical facilities in the HFTD within its territory by providing a table showing the number of critical facilities and infrastructure (CFI) customers in HFTD Tiers 2 and 3 lands, as well as outside the HFTD,[44] and providing a map showing the number of critical facilities in each county in its service territory.[45]

5.4.1 Environmental Compliance and Permitting

Section 5.4.5 of the Technical Guidelines requires PG&E to summarize how it ensures it complies with applicable environmental laws and permits related to the implementation of its WMP, including its procedures/processes to ensure compliance, roadblocks it has encountered, and any notable changes to its environmental compliance and permitting procedures since the last WMP submission.[46]

New construction and/or large maintenance projects must comply, as necessary, with the California Environmental Quality Act, the Clean Water Act (Section 401 and 404), California Fish and Game Code (section 1602), the National Environmental Policy Act, the National Historic Preservation Act, Forest Practice Act and Rules, among other federal, state, and local requirements. Utilities must also obtain permits from land management agencies such as the National Forest Service, Bureau of Land Management, National Park Service, California Coastal Commission, among others.

The linear nature of utility infrastructure often warrants several permits for one project, including different permit conditions, environmental requirements, and post-work reporting requirements. Compliance with permitting requirements add time and complexity to project planning, cost and mitigations related to environmental analysis and impact, and sometimes result in long-term monitoring or restoration projects. These are all considerations factoring into a utility's project planning and execution.

PG&E summarized how it plans to ensure compliance with applicable environmental laws, regulations, and permitting requirements in planning wildfire mitigation projects.

5.5 Areas for Continued Improvement

Energy Safety has no areas for continued improvement for PG&E under the overview of service territory section of its Base WMP.

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[44] PG&E's 2023-2025 WMP, Table PG&E-5.4.4-1 "PG&E's CFI Customer County [sic] By Tier 3, Tier 2, and Non-HFTD," page 126.

[45] PG&E's 2023-2025 WMP, Figure PG&E-5.4.4-1 "Critical Facilities Count by County," page 127.

[46] Technical Guidelines, Section 5.4.5, "Environmental Compliance and Permitting," pages 28-29 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

6. Risk Methodology and Assessment

In response to Section 6 of the Technical Guidelines, PG&E provided information on how it operates its grid to reduce wildfire risk, including in relation to equipment settings, grid response procedures and notifications, and personnel work procedures and training.[47]

Below is Energy Safety's evaluation regarding the PG&E's objectives and targets, maturity levels, and strengths in this area.

6.1 Methodology

Section 6.1 of the Technical Guidelines requires PG&E to provide an overview of its risk calculation approach, including graphs showing the calculation process, a concise narrative explaining key elements, and definitions of risks and risk components.[48]

PG&E uses an Enterprise Risk Management (ERM) approach that includes risk identification, risk evaluation and quantification using risk bow ties,[49] risk response planning (mitigation), and risk monitoring and controlling with continuous improvement. PG&E's risk evaluation includes dividing the risk elements into tranches (e.g., circuits, equipment), quantifying risk exposure (likelihood), identifying risk drivers (factors that influence likelihood), and estimating consequences.[50]

This section includes an overview of PG&E's risk calculation approach.

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[47] Technical Guidelines, Section 6, "Risk Methodology and Assessment," pages 30-58 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[48] Technical Guidelines, Section 6.1, "Methodology," pages 30-35 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[49] A bow tie diagram is a tool that consists of a risk event in the center, a listing of drivers on the left side that potentially lead to the risk event occurring, and a listing of consequences on the right side that show the potential outcomes if the risk event occurs. Definition per CPUC Decision 18-12-014, Phase Two Decision Adopting Safety Model Assessment Proceeding (S-MAP) Settlement Agreement with Modifications (2018), page 16 (https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M250/K266/250266979.PDF, accessed September 5, 2023).

[50] PG&E's 2023-2025 WMP, pages 139-143.

6.2 Risk Analysis Framework

Section 6.2 of the Technical Guidelines requires PG&E to provide a high-level overview of its risk analysis framework, including a summary of key modeling assumptions, input data, and modeling tools used.[51]

This section includes an overview of PG&E's risk analysis framework.

PG&E's risk analysis framework is split into two separate frameworks. The first calculates ignition risk and the second calculates PSPS risk.[52] To calculate ignition risk, PG&E uses its Wildfire Distribution Risk Model version 3 (WDRM v3) and its Wildfire Transmission Risk Model (WTRM)[53] to analyze the likelihood of a risk event (LoRE) and the consequence of a risk event (CoRE), multiplying the two into an overall utility risk. [54] PG&E's process for calculating PSPS risk is similar. Likelihood risk and consequence risk are multiplied to arrive at an overall risk score for PSPS, but the PSPS calculations use different data inputs and models. For example, the PSPS risk calculations are largely determined by PSPS backcast, also called a hindcast or lookback, wherein PG&E applies current PSPS protocols to historical data generated from the fire potential index (FPI) and ignition probability weather (IPW) models, and potentially impacted customer data.[55]

6.3 Maturity Survey Results

According to its responses to the 2023 Maturity Survey, PG&E has a 2023 maturity level of 0.5 for risk assessment and mitigation strategy. For 2024, PG&E projects that it will slightly increase in maturity to a level of 0.83. For 2025, PG&E projects the same level of maturity as 2024 (Figure 6.3-1).

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[51] Technical Guidelines, Section 6.2, "Risk Analysis Framework," pages 36-44 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

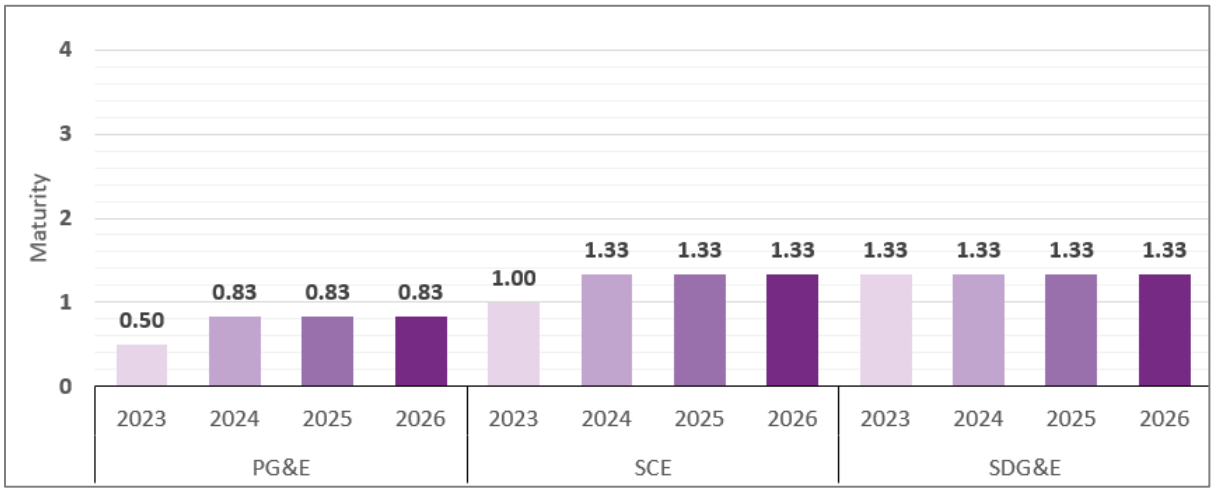
[52] PG&E's 2023-2025 WMP, pages 155.

[53] PG&E's 2023-2025 WMP, pages 145.

[54] PG&E's 2023-2025 WMP, pages 149 - 153.

[55] PG&E's 2023-2025 WMP, page 162.

Figure 6.3-1. Cross-Utility Maturity for Risk Assessment and Mitigation Strategy (Minimum Values)

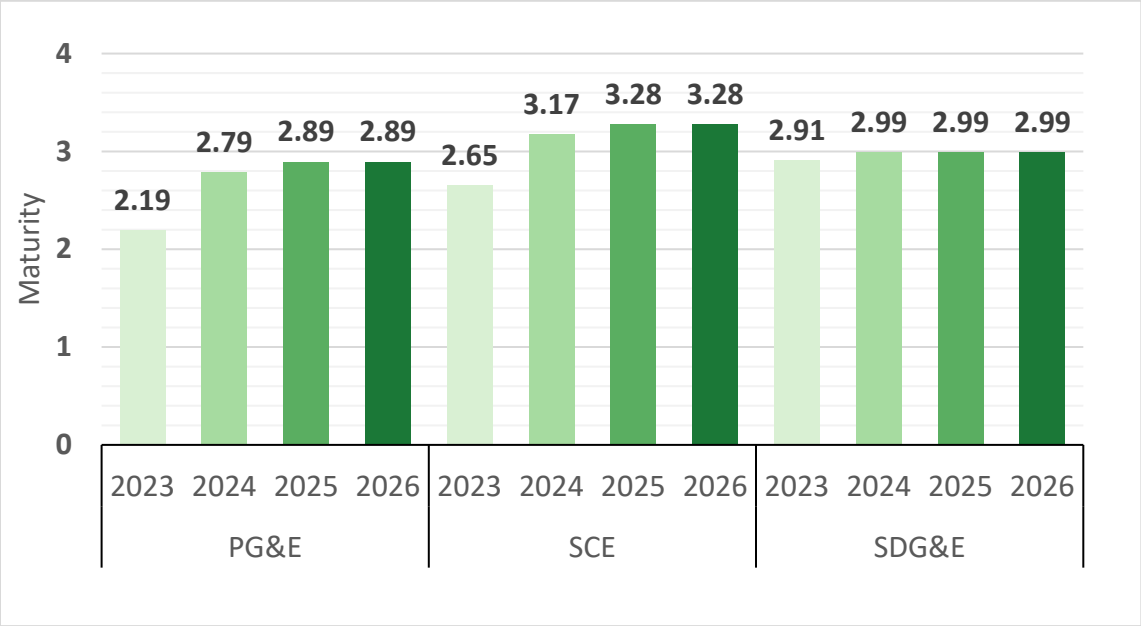


The utility's maturity level for the risk assessment and mitigation strategy category described above is calculated using the minimum value sub-capability of each capability. Using the capability average is another way to look at PG&E's performance in risk assessment and mitigation strategy. The capability average is determined from the average of all component sub-capabilities and is an additional tool to evaluate the utilities' maturity. [56]

When the category maturity is calculated using the capability average (rather than the minimum), PG&E has a maturity level for risk assessment and mitigation strategy of 2.19 for 2023, 2.79 in 2024, and 2.89 in 2025 (Figure 6.3-2).

[56] For further information on maturity level determinations, see Section 4 of the 2023-2025 Electrical Corporation Wildfire Mitigation Maturity Model (second revision), published February 21, 2023.

Figure 6.3-2. Cross-Utility Maturity for Risk Assessment and Mitigation Strategy (Average Values)



The rest of this section reports on maturity levels considering the minimum values.

PG&E's maturity level in this category is limited by its response to the following question:

- PG&E reports it is not using models to generate statistically relevant design conditions at baseline, 20-year, 60-year, and 300-year return intervals. To increase maturity level, PG&E would need to generate statistically relevant design conditions at all the baseline intervals.[57]

PG&E's current maturity level in this category is lower than its peers, with SCE and SDG&E reporting at levels 1.00 and 1.33, respectively. See Figure 6.3-1.

Based on its responses to the 2023 Maturity Survey, PG&E reported its highest levels of projected maturity in the following capability for 2023 and 2024: learning and continuous improvements.[58]

Based on its responses to the 2023 Maturity Survey, PG&E reported its lowest levels of projected maturity in the following capability for 2023 and 2024: modularization.[59]

[57] PG&E's 2023 Maturity Survey, response to 1.1.2.Q6.

[58] PG&E's 2023 Maturity Survey, response to 1.1.4.Q1.

[59] PG&E's 2023 Maturity Survey, response to 1.1.5.Q2.

6.4 PG&E's WMP Strengths

PG&E projects improvement in risk methodology and assessment over the WMP cycle in the following area: risk analysis results and presentation.

PG&E reports risk analysis results by using probability distributions, inclusion of nonlinearity, and detailed descriptions.

PG&E uses probability distributions, as opposed to maximums, when calculating risk event consequences.[60] Use of probability distributions is an appropriate approach because it enables statistically representative calculations of possible consequences from a risk event, whereas the use of maximum consequence values would not.

PG&E's methodology captures some of the nonlinearity inherent in wildfire consequence by using multiple points from the consequence probability distribution and nonlinear scaling factors.

Additionally, PG&E provides a thorough and methodical description of its risk modeling framework, including clear distinctions between likelihood models for distribution and transmission risk, and a classifier to assign a range of CoRE values.[61]

Moreover, PG&E provides a detailed description of how it models PSPS risk and its component pieces, including how the backcast works,[62] and how it models wind speed and moisture levels.[63]

6.4.1 2022 Areas for Continued Improvement

Energy Safety evaluated the progress PG&E made toward addressing areas for continued improvement identified in Energy Safety's 2022 WMP Decision. See Appendix B for the status of each 2022 area for continued improvement. Notable progress was made in the following selected areas:

In response to PG&E-22-07, Applying Modeling Lessons – Learned from Third-Party Review, PG&E's WDRM v3 model was reviewed by an independent third party which noted specific improvements within risk modeling and mitigations.[64] Notable improvements include:

- Substantial improvements between versions 2 and 3 in response to stakeholder feedback.

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[60] PG&E's 2023-2025 WMP, pages 141.

[61] PG&E's 2023-2025 WMP, pages 170-171.

[62] PG&E's 2023-2025 WMP, pages 162, 169.

[63] PG&E's 2023-2025 WMP, pages 154-163.

[64] PG&E's 2023-2025 WMP, page 997.

- Commitment to focus mitigation work on the highest risk line segments.

6.5 Areas for Continued Improvement

PG&E must continue to improve in the following areas.

6.5.1 Cross-Utility Collaboration on Risk Model Development

PG&E and the other IOUs have participated in past Energy Safety-sponsored risk model working group meetings. The risk model working group meetings facilitate collaboration among the IOUs on complex technical issues related to risk modeling. Regular meeting participants include Energy Safety, external stakeholders, risk model vendor representatives, and guest speakers. The meetings are ongoing and serve as a venue for stakeholders to delve into technical issues that impact the WMPs. PG&E and the other IOUs must continue to participate in all Energy Safety-organized risk model working group meetings.

6.5.2 PSPS and Wildfire Risk Trade-Off Transparency

PG&E provides insights into its trade-off decisions between mitigating wildfire and PSPS risk.[65] However, PG&E must improve transparency regarding how it decides to prioritize mitigation of wildfire risk vs PSPS risk, or how it uses risk ranking and risk buy-down to select risk mitigations.

PG&E selects mitigation initiatives considering impact to overall utility risk, [66] of which wildfire risk constitutes over 90%.[67] As a result, the impact of mitigations on PSPS risk is less transparent. A large change to PSPS risk could be overshadowed by small to medium changes to wildfire risk in the overall risk calculation. In its 2025 Update, PG&E must describe how it prioritizes mitigation of PSPS risk in its risk-based decisions and any trade-offs between mitigation of wildfire risk and mitigation of PSPS risk. It must also describe how the rank order of its planned mitigation initiatives compares to the rank order of mitigation initiatives ranked by risk buy-down estimate, along with an explanation for any instances where the order differs.

6.5.3 Incorporation of Extreme Weather Scenarios into Planning Models

PG&E currently relies on wind conditions data representing the past 30 years that do not consider rare but foreseeable and significant risks. PG&E applies an indirect method of incorporating risk of extreme weather scenarios into its planning models. For example, PG&E

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[65] PG&E's 2023-2025 WMP, pages 231 - 232.

[66] PG&E's 2023-2025 WMP, page 353 - 360.

[67] PG&E's 2023-2025 WMP, page 155, pages 348 – 349.

incorporates the impact of wind events with a relatively low occurrence rate (less frequent than 1 in 30 year) into its WTRM consequence planning model using a proxy method, fragility curves, rather than direct modeling.[68] This approach is meant to assess the probability of reaching or exceeding a certain level of damage under Wind Load Conditions 3 and 4 outlined in the Technical Guidelines.[69]

PG&E uses a 30-year meteorology data set to conduct its risk analysis of higher frequency scenarios. Weather data (in particular, wind and moisture) are critical inputs to the WTRM planning model.

Reliance on historic fire weather scenarios is limiting because:

- Fire weather scenarios systematically under-sample high consequence and low probability events.
- Many of the mitigation measures that PG&E is deploying will last longer than 30 years and so are likely to experience an exceedance of the 1-in-30 approach adopted by PG&E.
- An exceedance of 1-in-30-year historical wind load conditions may lead to exposure of assets that are not located in the HFTD. Using PG&E's current wind load data, PG&E may be underestimating risks of ignition and high consequence and therefore not hardening these assets because it is not identified by WTRM-Planning as requiring such hardening.
- A database of past events, even 30 years in duration and supplemented with synthetic scenarios, may underestimate risk faced today or in the future. Climate change is intensifying the conditions that lead to catastrophic wildfire in California.
- Fragility curves provide inadequate granularity to support decision making.

In its next Base WMP, PG&E must report on its progress developing statistical estimates of wind events with a frequency of once in the maximum asset life for its system. PG&E must evaluate results from incorporating these into WTRM planning when developing its mitigation initiative portfolio or explain why the approach would not serve as an improvement to its mitigation strategy.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 11.

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[68] PG&E's 2023-2025 WMP, pages 189-190.

[69] Technical Guidelines, Section 6, "Risk Scenarios," pages 54-58 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed August 30, 2023).

7. Wildfire Mitigation Strategy Development

In response to Section 7 of the Technical Guidelines, PG&E provided a high-level overview of its risk evaluation and process for deciding on a portfolio of mitigation initiatives to achieve the maximum feasible risk reduction while meeting WMP goals and objectives.[70]

Below is Energy Safety's evaluation regarding PG&E's objectives and targets, maturity levels, and strengths in this area.

7.1 Risk Evaluation

Section 7.1 of the Technical Guidelines requires PG&E to describe its approach to risk evaluation based on risk analysis outcomes.[71] The approach should inform the development of a wildfire mitigation strategy that meets WMP goals and objectives.

PG&E begins its risk evaluation by developing mitigation tranches prioritized based on risk buydown curves, which helps PG&E identify locations where mitigation spending will have the highest risk reduction.[72] When preparing these risk buydown curves, PG&E uses either a combination of probability and consequence, or only consequence, depending on the likelihood model's ability to accurately reflect local conditions. In neither case do the models incorporate feasibility of mitigation (e.g., topography [gradient, hard rock, water crossings, etc.], permitting issues, environmental concerns, customer refusals, execution, and how the planned mitigation work will impact the local community). Instead, the feasibility of mitigations is manually incorporated into the selection and ordering of mitigations.

7.1.1 PG&E's WMP Strengths

PG&E projects improvement in its wildfire mitigation strategy development over the WMP cycle in the following areas.

PG&E provides a clear description of its Wildfire Governance Steering Committee Charter, including the composition and scope of the committee responsibilities[73] and a table of the

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[70] Technical Guidelines, Section 7, "Wildfire Mitigation Strategy Development," pages 59-74 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[71] Technical Guidelines, Section 7.1, "Risk Evaluation," pages 59-66 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[72] PG&E's 2023-2025 WMP, pages 242-243.

[73] PG&E's 2023-2025 WMP, pages 233 - 241.

risk-related decision stakeholders, along with the role in the decision process for each stakeholder.

7.1.1.1 2022 Areas for Continued Improvement

Energy Safety evaluated the progress PG&E made toward addressing areas for continued improvement identified in Energy Safety's 2022 WMP Decision. See Appendix B for the status of each 2022 area for continued improvement.

7.1.2 Areas for Continued Improvement

PG&E must continue to improve in the following areas.

PG&E must be more transparent in how it reports mitigation selection decisions and how risk buy-down rankings impact its decision making. As noted above in the area for continued improvement "PSPS and Wildfire Risk Trade-Off Transparency" (Section 6.5.3), PG&E's description of how it prioritizes mitigation initiatives warrants further development and improvement.

PG&E's WMP does not provide enough detail on how PG&E uses risk ranking and risk buy-down to determine mitigation selection. While PG&E provides in its WMP examples of calculations of operational risk values for operational and system resilience mitigations,[74] PG&E does not provide insight into how it uses projected risk or risk buy-down ranking its actual mitigation decisions. PG&E also does not explain cases where it prioritizes mitigations with a lower risk buy-down ranking.

In its 2025 Update, PG&E must describe how its prioritization of mitigation initiatives in practice compares to the list of mitigation initiatives ranked by risk buy-down estimate and provide an explanation for any instances where a mitigation initiative with a lower risk buy-down estimate was prioritized over an initiative with a higher risk buy-down estimate.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 11.

7.2 Risk-Informed Framework

Section 4.4 of the Technical Guidelines requires PG&E to adopt and describe its framework for making risk-informed decisions.[75]

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[74] PG&E's 2023-2025 WMP, Table PG&E-7.2.2-3 "Example Calculation – Operational Mitigation," page 302; Table PG&E-7.2.2-4 "Example Calculation – System Resilience Mitigation," pages 303-304.

[75] Technical Guidelines, Section 4.4 "Risk-Informed Framework," pages 11-14 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

7.2.1 PG&E's WMP Strengths

PG&E projects improvement in its risk-informed decision making over the WMP cycle in the following areas: comprehensive monitoring and data collection and operational mitigations; and system resilience.

PG&E's risk-informed decision making is holistic in nature, incorporating and balancing the full spectrum of wildfire related risks and mitigations across the organization.[76] This is represented by a clear mapping between the elements of its risk framework and other elements of its overall wildfire management strategy, as documented in other chapters of PG&E's WMP and various tables within this section.[77]

7.2.1.1 2022 Areas for Continued Improvement

Energy Safety evaluated the progress PG&E made toward addressing areas for continued improvement identified in Energy Safety's 2022 WMP Decision. See Appendix B for the status of each 2022 area for continued improvement.

7.2.2 Areas for Continued Improvement

PG&E must continue to improve in the following areas.

7.2.2.1 Cross-Utility Collaboration on Best Practices for Inclusion of Climate Change Forecasts in Consequence Modeling, Inclusion of Community Vulnerability in Consequence Modeling, and Utility Vegetation Management for Wildfire Safety

PG&E must make further improvements in the area of cross-utility collaboration on best practices for the inclusion of climate change forecasts in consequence modeling, inclusion of community vulnerability in consequence modeling, and utility vegetation management for wildfire safety. Although PG&E joined the other IOUs in participating in Energy Safety-sponsored scoping meetings in the past, it has not reported additional collaboration. In their 2025 Updates, the IOUs (not including independent transmission operators) must provide a status update on any collaboration with each other that has taken place in these areas, including a list of any resulting changes made to their WMPs since the 2023-2025 WMP submission.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 11.

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[76] PG&E's 2023-2025 WMP, pages 253-360.

[77] PG&E's 2023-2025 WMP, page 262.

7.3 Wildfire Mitigation Strategy

Section 7.2 of the Technical Guidelines requires PG&E to describe its proposed wildfire mitigation strategies based on the evaluation process identified in Section 7.1 of its WMP.[78]

7.3.1 Maturity Survey Results

According to its responses to the 2023 Maturity Survey, PG&E has a 2023 maturity level of 3.00 for risk prioritization. PG&E projects the same maturity level for 2024. For 2025, PG&E projects that it will slightly increase in maturity to a level of 3.57.

Note that cross-category themes are calculated by averaging the relevant sub-capability maturity levels.[79]

PG&E's maturity level in this cross-category theme is limited by its response to the following questions:

- PG&E reports that the integration of vegetative fuel moisture forecasts into its ignition model is not automated.[80] To increase its maturity level, PG&E would need to automate the integration of vegetative fuel moisture forecasts into its ignition model.
- PG&E reports that ignition estimation is not linked to a probabilistic real-time risk model.[81] To increase its maturity, PG&E would need to link ignition estimation to a probabilistic real-time risk model.

PG&E's current maturity level in this cross-category theme is around the same as its peers, with SCE and SDG&E reporting at levels 3.00 and 3.14, respectively (Figure 7.3-1).

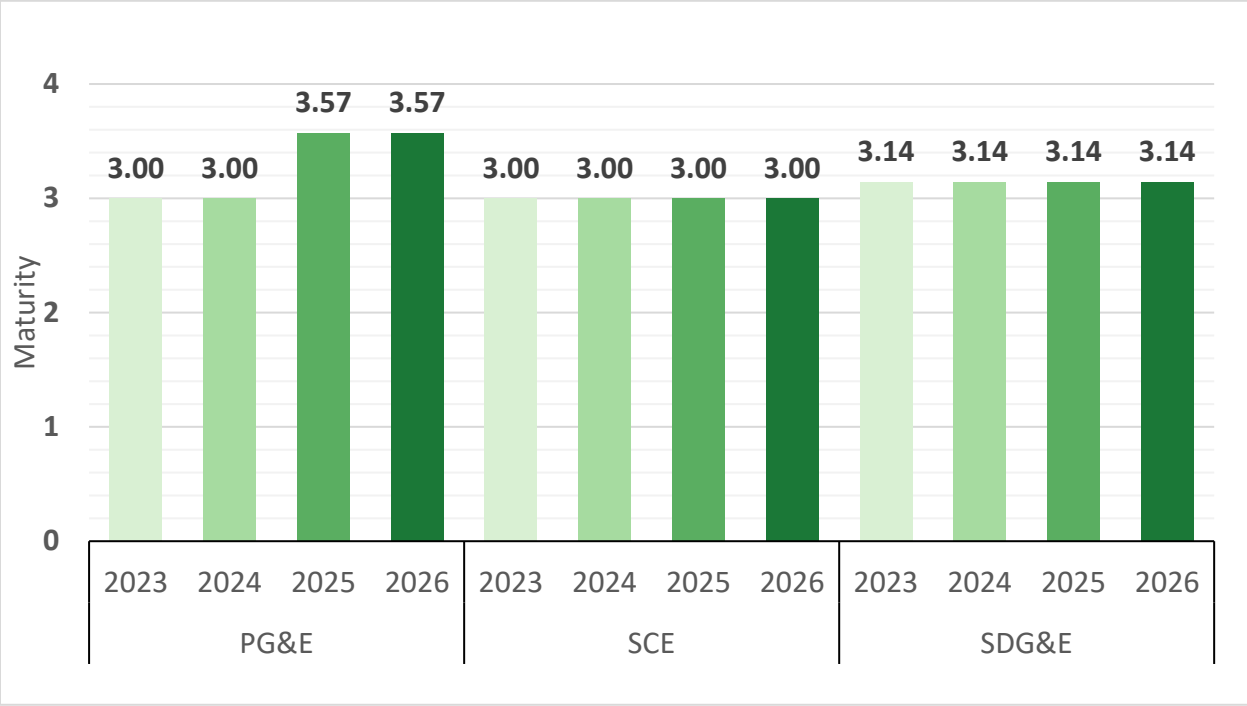
[78] Technical Guidelines, Section 7.2, pages 66-74 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[79] 2023-2025 Electrical Corporation Wildfire Mitigation Maturity Model (Second Revised Final, Feb. 2023) page 13 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53394&shareable=true, accessed May 5, 2023).

[80] PG&E's 2023 Maturity Survey, response to 2.1.1.Q5.

[81] PG&E's 2023 Maturity Survey, response to 2.1.1.Q7.

Figure 7.3-1. Cross-Utility Maturity for Risk Prioritization
(Cross-Category Theme; Average Values)



7.3.2 PG&E's WMP Strengths

PG&E projects improvement in its wildfire mitigation strategy over the WMP cycle in the following area: interim mitigation initiatives.

Interim mitigations can reduce risk while waiting for long-term mitigations to be put in place. This is particularly important when long-term mitigations may require years or even decades to fully complete. PG&E applies an interim mitigation approach that involves selecting from four types of interim mitigations depending on which is suitable and impactful for a particular situation pending a long-term solution.[82] The four types of interim mitigations are targeted programs, inspections and maintenance programs, operational mitigations, and community engagement events. PG&E's process for selecting the most suitable interim mitigation involves:

- Developing risk bow-ties models, which map risk-drivers, consequences, and the impact a mitigation may have.
- Generating pre- and post-mitigation risk scores to assign a quantitative value, making mitigations comparable.
- Producing risk spend efficiency calculations for each mitigation.

[82] PG&E's 2023-2025 WMP, pages 247-250.

- Disclosing inputs, computations, parameters, and assumptions used.

7.3.2.1 2022 Areas for Continued Improvement

Energy Safety evaluated the progress PG&E made toward addressing areas for continued improvement identified in Energy Safety's 2022 WMP Decision. See Appendix B for the status of each 2022 area for continued improvement. Notable progress was made in the following selected area:

- In response to PG&E-22-09, Evaluation of Model Reprioritization and Fire Rebuild in High-Risk Areas,[83] PG&E provided further details and analysis on how its WDRM v3 model has been improved, which changed the output risk scores and resulting prioritization of work compared to v2. PG&E described the improvements to v3 as follows:
    - Numerous improvements based on feedback from various resources: public safety specialists, partners, stakeholders, and third-party reviews.
    - More advanced machine-learning techniques.
    - Improved input data.
    - New estimation techniques for wildfire risk reduction from mitigations.

7.3.3 Areas for Continued Improvement

Energy Safety has no areas for continued improvement for PG&E under the wildfire mitigation strategy section of its Base WMP.

[83] PG&E's 2023-2025 WMP, pages 1017 – 1024.

8. Wildfire Mitigation Initiatives

This section comprises Energy Safety's evaluation of the mitigation initiatives PG&E undertakes to reduce the risk of catastrophic wildfire. For each mitigation initiative this section provides an analysis of PG&E's maturity level, the ways PG&E is progressing and specific areas where PG&E must continue to improve.

The following mitigation initiatives, each with corresponding capabilities and maturity levels, are discussed in Sections 8.1 through 8.6.

- Grid design, operations, and maintenance, including grid design and system hardening, asset inspections, equipment maintenance and repair, and grid operations and procedures.
- Vegetation management and inspections.
- Situational awareness and forecasting.
- Emergency preparedness.
- Community outreach and engagement.

PG&E's approach to PSPS is discussed in Section 9. PG&E's process for continuous improvement, including lessons learned, corrective action programs, and notices of violation and defect, are discussed in Section 10.

8.1 Grid Design, Operations, Maintenance

In response to Section 8.1 of the Technical Guidelines,[84] PG&E provided information about its grid design and system hardening; asset inspections; equipment maintenance and repair; asset management and inspection enterprise systems; quality assurance and quality control; open work orders; grid operations and procedures; and workforce planning.

Below is Energy Safety's evaluation regarding PG&E's objectives and targets, maturity levels, and strengths in these areas. In addition, Energy Safety has identified areas where PG&E must improve, described at the end of each subsection.

8.1.1 Objectives and Targets

As part of its Base WMP, PG&E provided 3-year and 10-year objectives for its grid design, operations, and maintenance programs.[85]

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[84] Technical Guidelines, Section 8.1, pages 75-93 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[85] PG&E's 2023-2025 WMP, pages 318-323.

PG&E revised its grid design and system hardening objectives in its Revision Notice Response.[86] For example, PG&E added quality pass rates for its asset inspection programs and modified its open tag reduction targets to also include quantitative values in addition to the risk percentages already provided. PG&E also provided an updated timeline to complete addressing its entire backlog in seven years opposed to ten.

PG&E also defined quantitative targets for initiative activities for grid design, operations, and maintenance programs. PG&E's Base WMP includes end-of-year targets for 2023, 2024, and 2025. Selected targets are included in Table 8.1-1 to demonstrate the utility's projected progress.

Table 8.1-1. PG&E Grid Design, Operations, and Maintenance – Selected Targets [87]

Initiative Activity	Target Unit	2023 Target	2024 Target	2025 Target
HFTD/HFRA Open Tag Reduction – Distribution Backlog	EC notifications closed	52,000	89,000	55,000
Downed Conductor Detection (DCD)	Protective device controllers	500	400	250
System Hardening - Distribution	Circuit miles	420	470	580
10K Undergrounding	Circuit miles	350	450	550
Expulsion Fuse Removal	Fuses removed	3,000	3,000	1,400

8.1.2 Grid Design and System Hardening

Section 8.1.2 of the Technical Guidelines requires PG&E to provide information on how it designs its system to reduce ignition risk and what it is doing to strengthen its distribution, transmission, and substation infrastructure to reduce the risk of utility-related ignitions resulting in catastrophic wildfires.[88]

8.1.2.1 Maturity Survey Results

According to its responses to the 2023 Maturity Survey, PG&E has a 2023 maturity level of 1.00 for grid design and resiliency. For 2024, PG&E projects no maturity level change for 2024 or 2025. (Figure 8.1-1).

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[86] PG&E's 2023-2025 WMP Response to Revision Notice, pages 34-36, and page 55.

[87] PG&E's 2023-2025 WMP R3, Revised Table 8-3 "Grid Design, Operations, and Maintenance Targets by Year."

[88] Technical Guidelines, Section 8.1.2, page 82 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

Figure 8.1-1. Cross-Utility Maturity for Grid Design and Resiliency[89] (Minimum Values)

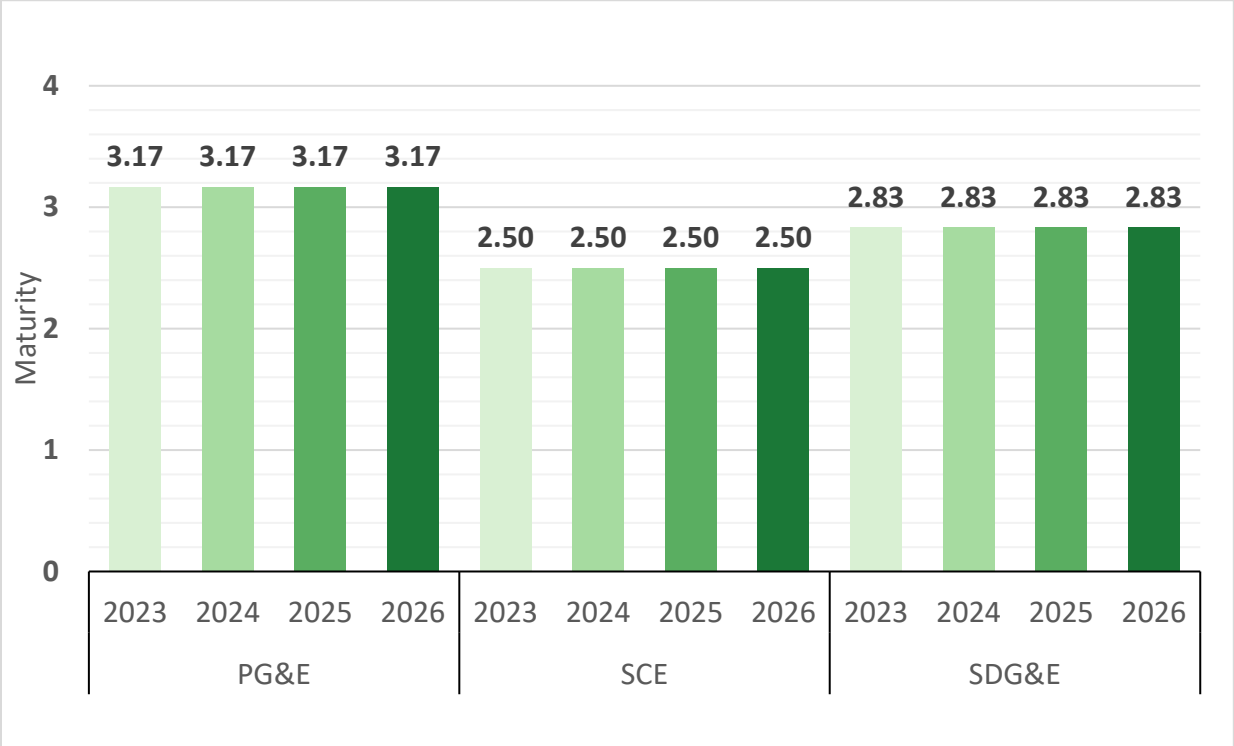
The utility's maturity level for the grid design and resiliency capability described above is calculated using the minimum value of component sub-capabilities. The capability average is another way to look at PG&E's performance in grid design and resiliency. The capability average is determined from the average of all component sub-capabilities and is an additional tool to evaluate the utilities' maturity. [90]

When the capability maturity is calculated using the average (rather than the minimum), PG&E has a maturity level for grid design and resiliency of 3.17 for 2023, 2024, and 2025 (Figure 8.1-2).

[89] 2023 Maturity Survey Category C "Grid Design, Inspections, and Maintenance," Capability 16 "Grid design and resiliency."

[90] For further information on maturity level determinations, see Section 4 of the 2023-2025 Electrical Corporation Wildfire Mitigation Maturity Model (second revision), published February 21, 2023.

Figure 8.1-2. Cross-Utility Maturity for Grid Design and Resiliency[91] (Average Values)



The rest of this section reports on maturity levels considering the average values.

PG&E's current maturity level in this capability is higher than its peers, with SCE and SDG&E reporting at levels 2.5 and 2.83, respectively. See Figure 8.1-2.

8.1.2.2 PG&E's WMP Strengths

PG&E projects improvement in grid design and system hardening over the WMP cycle in the following areas: microgrids and non-exempt expulsion fuse removals.

PG&E has multiple initiatives relating to microgrids, including remote grids, temporary distribution microgrids, community microgrid enablement program, microgrid incentive program, and other microgrid-related technology pilots.[92] PG&E states that microgrids help reduce ignition risk by removing the need for long overhead distribution feeders in remote areas.[93] PG&E also states that microgrids reduce customer impacts during outage events.[94] As

[91] 2023 Maturity Survey Category C "Grid Design, Inspections, and Maintenance," Capability 16 "Grid design and resiliency."

[92] PG&E's 2023-2025 WMP R3, page 441.

[93] PG&E's 2023-2025 WMP R3, page 442.

[94] PG&E's 2023-2025 WMP R3, page 441.

part of its grid hardening decision-making process, PG&E states that it first evaluates whether a location is viable for a remote grid or line removal, and then compares it to other hardening options via a cost-benefit analysis.[95] For its remote grid initiative, PG&E states that it has brought two new remote grids online since the 2022 WMP submission and has initiated field assessments for more than 50 possible remote grids.[96] For its microgrid incentive program, PG&E states that it is focusing on disadvantaged and vulnerable populations who have been impacted by grid outages.[97] PG&E's microgrid pilots include mobile battery storage, vehicle grid integration, and a clean substation microgrid.[98]

As shown in Table 8.1-1 above, PG&E is planning to maintain a rate of removing approximately 3,000 non-exempt expulsion fuses annually, with a projected total of 7,400 expulsion fuse removals from 2023 to 2025, which PG&E states would result in removal of all known expulsion fuses on its system.[99] PG&E removed 5,157 expulsion fuses from 2020 to 2022.[100]

2022 Areas for Continued Improvement

Energy Safety evaluated the progress PG&E made toward addressing areas for continued improvement identified in Energy Safety's 2022 WMP Decision. PG&E adequately addressed the 2022 areas for continued improvement for this topic. See Appendix B for the status of each 2022 area for continued improvement.

8.1.2.3 Revision Notice Critical Issues

As described in Section 3.4, Energy Safety issued PG&E a Revision Notice in response to its WMP submitted on June 22, 2023. PG&E submitted its Revision Notice Response on August 7, 2023, and submitted its Supplemental Revision Notice Response on September 27, 2023.[101] This section evaluates those responses as it relates to grid design and system hardening.[102]

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[95] PG&E's 2023-2025 WMP R3, page 419; and PG&E's 2023-2025 WMP R1, page 372.

[96] PG&E's 2023-2025 WMP R3, pages 442-443.

[97] PG&E's 2023-2025 WMP R3, page 446.

[98] PG&E's 2023-2025 WMP R3, page 447.

[99] PG&E's 2023-2025 WMP R3, Revised Table 7-3-2: PG&E's WMP Targets, page 333.

[100] PG&E's 2023-2025 WMP R3, Table PG&E-1.1-1 "PG&E's Performance Against 2020-2022 Quantitative WMP Initiative Targets," page 1152.

[101] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice and PG&E's 2023-2025 WMP Response to Revision Notice.

[102] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice and PG&E's 2023-2025 WMP Response to Revision Notice.

RN-PG&E-23-05: PG&E's undergrounding plan may leave wildfire risk unaddressed in highest risk areas.

Energy Safety required PG&E to provide:

- Details on remaining top 20 percent riskiest circuits not currently covered by PG&E's hardening plan.
- Justification for its use of its Wildfire Feasibility Efficiency (WFE) when analyzing cost-benefit analysis, including evaluating other mitigations to undergrounding.
- Estimations for risk reduction effectiveness of undergrounding when factoring in secondary and service lines.
- Any changes to cost-benefit analysis, including mitigation selection or project prioritization.

RN-PGE-23-05: PG&E Response Summary

In PG&E's responses to the Revision Notice, PG&E discusses its decision making for undergrounding, including interim mitigations and its Comprehensive Monitoring and Data Collection initiatives.

PG&E states that the 139 circuits that were within the 2022 WMP undergrounding workplan are still within scope for PG&E's hardening plans, with 131 circuit segments scheduled for undergrounding after 2026.[103]

PG&E also identifies that there are 79 circuit segments out of the 720 circuit segments within the top 20 percent risk ranked circuits that are not currently within PG&E's undergrounding plan nor already hardened.[104] PG&E states that these 79 circuit segments are in the lower portion of the top 20 percent and cumulatively account for only 1 percent of PG&E's total wildfire risk.[105] PG&E further states that these 79 circuit segments are reassessed with every new risk model to determine whether they should be included within the scope of PG&E's hardening plans.[106] PG&E additionally states that it is addressing all 79 circuits segments through other mitigation measures outside of hardening, such as EPSS and vegetation management programs.[107]

PG&E provides more information on its Wildfire Feasibility Efficiency score (WFE) and states that using WFE helps prioritize based on feasibility to efficiently reduce risk.[108] It also provides

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[103] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice Redline, page 71.

[104] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice Redline, page 72.

[105] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice Redline, page 73.

[106] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice Redline, page 73.

[107] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice Redline, page 73.

[108] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice Redline, page 74.

additional information on its Wildfire Benefit Cost Analysis (WBCA) that it plans to implement with its WDRM Version 4 (WDRM v4).[109] PG&E provides information stating that WFE has greater correlation with risk as opposed to feasibility, therefore the resulting analysis should not skew prioritization significantly based on feasibility.[110]

PG&E provides an updated analysis of the effectiveness of undergrounding as a mitigation measure when factoring in secondary and service lines to be about 97.7 percent, compared to its originally calculated 99 percent.[111] PG&E does not provide any updated targets as a result of the adjustment to an efficacy of 97.7 percent efficacy , and states that it does not plan to change its mitigation selection at this time based on the relatively small change in effectiveness percentage.[112]

RN-PGE-23-05: Energy Safety Evaluation

Energy Safety finds that PG&E has de-escalated this from a critical issue to an area for continued improvement.

While PG&E's planned transition to the WBCA, as opposed to WFE, is an improvement in terms of properly accounting for alternative mitigations to undergrounding, PG&E still holds room for improvement in terms of effectiveness evaluations and ensuring proper location-specific decision making based on combinations of potential mitigations.

For the current undergrounding scope, PG&E used effectiveness estimates of 62 percent for covered conductor.[113] When evaluating recorded effectiveness, PG&E is seeing results closer to 69 percent to 72 percent in fault reductions for circuit segments that have 80 percent or greater covered conductor coverage.[114] This effectiveness value does not account for additional mitigations on top of covered conductor, such as downed conductor detection (DCD) or early fault detection (EFD).

For the current undergrounding scope, PG&E used an underground effectiveness estimate of 99 percent.[115] PG&E states that it showed effectiveness against ignition rate to be closer to 95 or 96 percent based on CPUC reportable ignitions.[116] PG&E states that it used the higher estimate of 99 percent, because it notes that the 95 or 96 percent estimate does not account

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[109] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice Redline, page 75.

[110] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice Redline, page 76.

[111] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice Redline, page 80.

[112] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice Redline, page 81.

[113] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice Redline, page 91.

[114] PG&E's 2023-2025 WMP Appendix D ACI PG&E-22-11 Attachment 1, 2023-2025 WMP Joint IOU Covered Conductor Working Group Report, Table 4: PG&E Recorded Effectiveness Snapshots, page 11.

[115] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice Redline, page 81.

[116] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice, page 80.

for wildfire frequency or consequence, emphasizing that none of the underground ignitions led to a fire greater than 10 acres.[117] This approach, however, fails to account for the fact that much of the underground ignitions that have occurred have been in urban areas. Around 81 percent of the 26 underground equipment failure ignitions that occurred from 2015 to 2023 occurred in urban areas; no underground equipment failure ignitions took place within the HFTD.[118] PG&E must focus on evaluating undergrounding effectiveness based on ignition risk instead of on consequence, especially given the lack of historical data on underground ignitions within the HFTD.

In terms of alternative mitigation options, PG&E's example provided for its WBCA calculation uses covered conductor in combination with EPSS and DCD.[119] When asked about which mitigations PG&E analyzes together, it stated that it evaluates combinations of mitigations currently applied across its system.[120] However, PG&E has not demonstrated that this evaluation also accounts for ongoing efforts such as vegetation and asset management. Additionally, as PG&E continues to develop technologies it once piloted, PG&E must ensure that it properly evaluates these mitigation alternatives as part of its decision-making process. PG&E must consider the full range of permutations and combinations of mitigations and consider all mitigation alternatives as part of its decision-making process.

WBCA also appears to factor in a variety of benefits via risk values outside of wildfire, including public safety, normal reliability, PSPS, and EPSS risks.[121] In PG&E's example, its selection of a mitigation for Circuit Segment 2 appears to be primarily driven by reliability risk reduction, with about 73 percent of the monetized risk value based on reliability, with 35 percent of that based on normal reliability.[122] PG&E must clearly identify projects it selected based primarily on a driver other than wildfire risk and provide a justification for why it is appropriate to include within its undergrounding initiative.

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[117] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice Redline, page 80.

[118] Data Request OEIS_010-Q001 Attachment 1, Evaluating Column N "Ignition," Column L "HFTD," and Column K "Density" (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=55661&shareable=true, accessed October 17, 2023).

[119] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice, Table RN-PG&E-23-05-3: Example WCBA Output, page 84.

[120] Data Request OEIS-P-WMP_2023-PG&E-014 (Question 1) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=55769&shareable=true, accessed October 17, 2023).

[121] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice, Table RN-PG&E-23-05-3: Example WCBA Output, page 84.

[122] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice, Table RN-PG&E-23-05-3: Example WCBA Output, page 84.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 11.

8.1.2.4 Areas for Continued Improvement

PG&E must continue to improve in the following areas.

Continuation of Grid Hardening Joint Studies

Since 2021, utilities have worked in close collaboration with one another to further evaluate and analyze covered conductor, including effectiveness calculations, maintenance and inspection practices, and implementation of new technologies.[123] This collaboration has brought insights on best practices for utilities to adopt, as well as spread workload on testing new technologies and sharing results from both lab studies and in-field applications. All of these instances of collaboration are outlined in the Joint IOU Covered Conductor Working Group Report supplied as an attachment to all utilities' 2023-2025 WMPs.

While such collaboration has proven beneficial, PG&E has not yet applied all lessons learned from other utilities. Additionally, many areas still need deeper exploration and would benefit from joint utility efforts, such as efforts related to undergrounding, use of protective equipment and device settings, and continued efforts evaluating new technologies.

In its 2025 Update, PG&E must work with other utilities to continue collaborating on grid hardening efforts to share lessons learned and determine best practices. In its next Base WMP, PG&E, along with other utilities, must submit a report that discusses continued efforts, including lessons learned.

Deployment of New Technologies

PG&E is behind SDG&E and SCE when it comes to the deployment of new technologies, as shown in Table 8.1-2 below. Additionally, PG&E's objectives around DFA and EFD are relatively small, with targets of 35 circuits for DFA and 8 circuits for EFD by the end of 2025.[124] In comparison, SCE is targeting to install EFD at 100 locations in 2023 and 2024,[125] and SDG&E is targeting to install EFD at 60 locations per year from 2023 to 2025.[126]

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[123] As required through PG&E-21-09 in the Final Action Statement on PG&E's 2021 WMP, and then PG&E-22-11 and PG&E-22-13 in the Final Decision on PG&E's 2022 WMP.

[124] PG&E's 2023-2025 WMP R3, Table 8-23 (Revised): Revised Situational Awareness Initiative Targets by Year, page 309.

[125] SCE's 2023-2025 WMP, Table 8-23: Situational Awareness Initiative Targets by Year, pages 449-450.

[126] SDG&E's 2023-2025 WMP, OEIS Table 8-3: Grid Design, Operations, and Maintenance Targets by Year, page 114.

Table 8.1-2: Status of Various New Technology Deployments by IOUs[127]

New Technology	PG&E	SCE	SDG&E
Distribution Fault Anticipation (DFA)	Pilot – Moving to Deployment	Yes	Yes
Early Fault Detection (EFD)	Pilot	Yes	Yes
Falling Conductor Protection (FCP)	Pilot	No	Yes
Rapid Earth Fault Current Limiter (REFCL)	Pilot	Pilot – Moving to Deployment	No

PG&E must continue to push forward these new technologies at a reasonable pace, especially given the potential effectiveness of DFA and EFD when combined with other mitigations.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 11.

8.1.3 Asset Inspections

Section 8.1.3 of the Technical Guidelines requires PG&E to provide an overview of its procedures for inspecting its assets.[128]

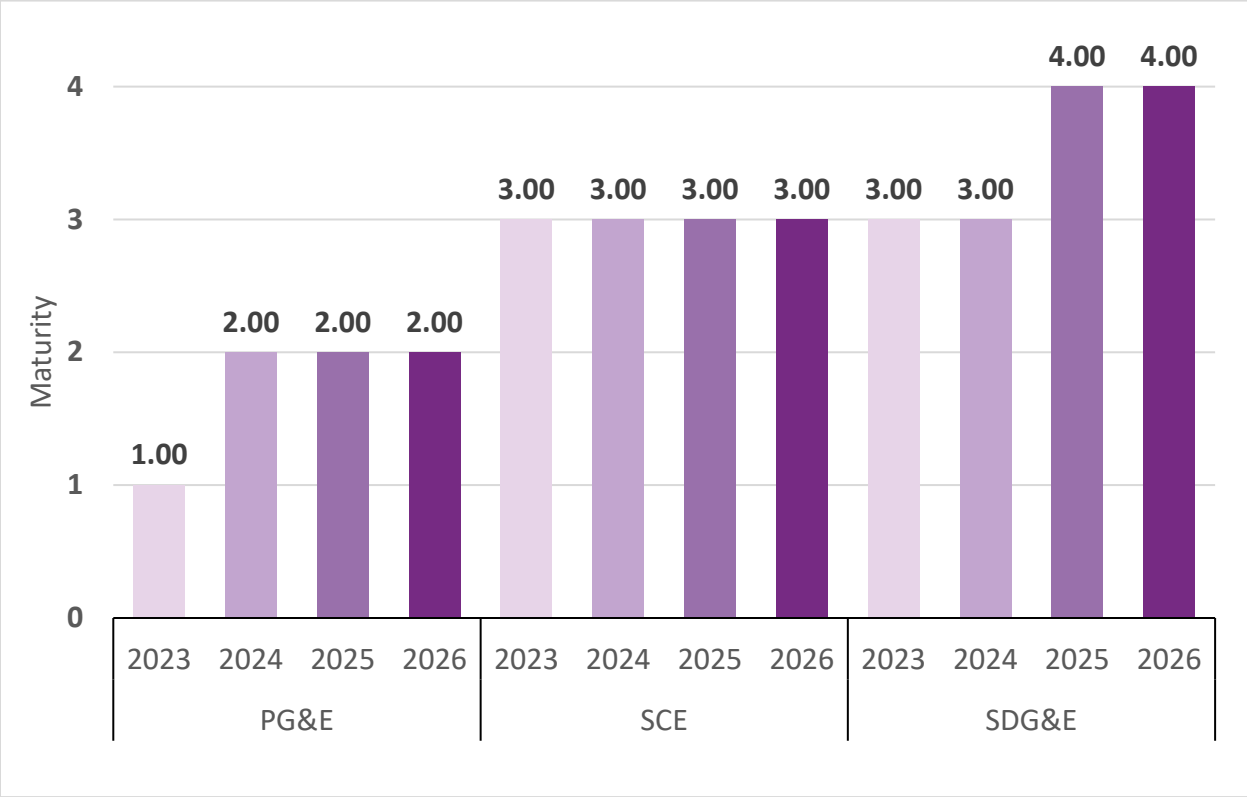
8.1.3.1 Maturity Survey Results

According to its responses to the 2023 Maturity Survey, PG&E has a 2023 maturity level of 1.00 for asset inspections. For 2024, PG&E projects that it will increase in maturity to a level of 2.00. For 2025, PG&E projects the same maturity level of 2.00 (Figure 8.1-3).

[127] PG&E's 2023-2025 WMP Appendix D ACI PG&E-22-11 Attachment 1, 2023-2025 WMP Joint IOU Covered Conductor Working Group Report, Table 8 "New Technologies by Utility," page 22.

[128] Technical Guidelines, Section 8.1.3, page 83-85 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023)

Figure 8.1-3. Cross-Utility Maturity for Asset Inspections[129] (Minimum Values)



The utility's maturity level for the asset inspections capability described above is calculated using the minimum value of component sub-capabilities. The capability average is another way to look at PG&E's performance in asset inspections. The capability average is determined from the average of all component sub-capabilities and is an additional tool to evaluate the utilities' maturity. [130]

When the capability maturity is calculated using the average (rather than the minimum), PG&E has a maturity level for asset inspections of 2.33 for 2023 and projects an increase to 3.33 in 2024 and 2025 (Figure 8.1-4).

[129] 2023 Maturity Survey Category C "Grid Design, Inspections, and Maintenance," Capability 14 "Asset inspections."

[130] For further information on maturity level determinations, see Section 4 of the 2023-2025 Electrical Corporation Wildfire Mitigation Maturity Model (second revision), published February 21, 2023.

Figure 8.1-4. Cross-Utility Maturity for Asset Inspections[131] (Average Values)

The rest of this section reports on maturity levels considering the average values.

PG&E's maturity level in this capability is limited by its response to the following questions:

- PG&E reports that it does not use a dynamic map based on real-time risk to adjust distribution inspection frequency.[132] To increase its maturity level, it would need to adjust distribution inspection frequency based on a dynamic real-time risk map.
- PG&E reports that other electrical corporations and government agencies do not participate in auditing its asset inspections.[133] To increase its maturity level, PG&E would need to include other electrical corporations and government agencies in its inspection audit process.

PG&E's current maturity level in this capability is lower than its peers, with SCE and SDG&E each reporting at levels of 3.67. See Figure 8.1-4.

8.1.3.2 PG&E's WMP Strengths

PG&E projects improvement in asset inspections over the WMP cycle in the following areas: transmission infrared and corona inspections, various transmission inspection pilots, and distribution LiDAR pole loading assessments.

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[131] 2023 Maturity Survey Category C "Grid Design, Inspections, and Maintenance," Capability 14 "Asset inspections."

[132] PG&E's 2023 Maturity Survey, response to 3.2.1Q5.

[133] PG&E's 2023 Maturity Survey, response to 3.2.3Q4.

PG&E states it performs infrared inspections on transmission overhead assets in the HFTD tier 3 annually and in the HFTD tier 2 every three years, using a workplan informed by historical electrical loading patterns to increase the inspection effectiveness.[134] PG&E indicates corona inspections, which are in pilot phase, are being performed alongside infrared inspections to detect insulator and insulator hardware conditions not apparent during visual inspections.[135]

In addition to corona inspections, PG&E states it is piloting the following transmission inspection programs: conductor measurements, below grade foundation assessments, ultrasonic pole inspections, corrosion climbing assessments, proactive sampling and testing, and LiDAR assessments.[136]

2022 Areas for Continued Improvement

Energy Safety evaluated the progress PG&E made toward addressing areas for continued improvement identified in Energy Safety's 2022 WMP Decision. PG&E adequately addressed the 2022 areas for continued improvement for this topic. See Appendix B for the status of each 2022 area for continued improvement.

8.1.3.3 Areas for Continued Improvement

PG&E must continue to improve in the following areas.

Covered Conductor Inspection and Maintenance

While PG&E's incorporation of specific covered conductor checks into its inspection practices has outpaced its peers, PG&E has not yet addressed water intrusion failure. PG&E must discuss how its inspections will identify water intrusion.

Decrease in Detailed Distribution Inspections

PG&E states that it will modify its distribution detailed inspection program in 2023. PG&E explains it has grouped assets into "plat maps" using its WDRM v3, and the plat maps are categorized based on wildfire consequence using the following designations: extreme, severe, high, medium, or low risk.[137] Inspection frequency will vary based on consequence, with all extreme and severe consequence structures inspected annually, high consequence structures inspected every two years, and the remaining plat maps inspected every three years.[138]

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[134] PG&E's 2023-2025 WMP R3, page 474.

[135] PG&E'S 2023-2025 WMP R3, Page 477.

[136] PG&E'S 2023-2025 WMP R3, pages 476-477.

[137] PG&E'S 2023-2025 WMP R3, page 481.

[138] PG&E'S 2023-2025 WMP R3, page 483.

Using the previous methodology, PG&E performed approximately 480,000 distribution detailed inspections in 2021[139] and approximately 398,000 in 2022.[140] PG&E plans to inspect an average of 237,000 structures per year from 2023-2025,[141] a 50 percent decrease from 2021 and a 40 percent decrease from 2022. PG&E must provide further explanation for a reduction of this magnitude. PG&E must provide analysis demonstrating that the proposed plan will more efficiently mitigate wildfire risk than alternative plans. Inspecting high consequence plat maps annually, in addition to extreme and severe, would increase risk mitigation and also significantly reduce the number of structures inspected per year compared to the previous plan.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 11.

8.1.4 Equipment Maintenance and Repair

Section 8.1.4 of the Technical Guidelines requires PG&E to provide a narrative of its maintenance programs, including its strategy for replacing/upgrading and for specific equipment types.[142]

8.1.4.1 Maturity Survey Results

According to its responses to the 2023 Maturity Survey, PG&E has a 2023 maturity level of 0.00 for asset maintenance and repair. PG&E projects no maturity level change for 2024 or 2025. (Figure 8.1-5).

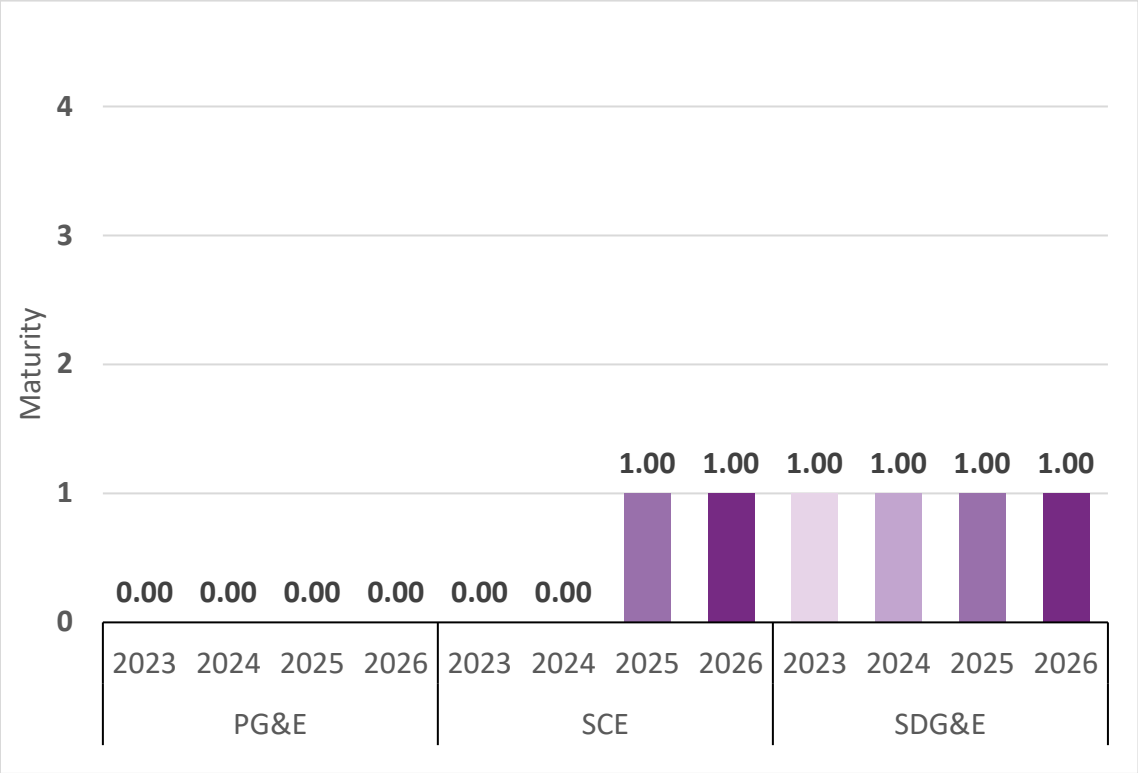
[139] PG&E's 2022 WMP Update, page 347.

[140] PG&E's 2023-2025 WMP R3, page 1153.

[141] PG&E's 2023-2025 WMP R3, page 381.

[142] Technical Guidelines, Section 8.1.4, pages 85-86 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

Figure 8.1-5. Cross-Utility Maturity for Asset Maintenance and Repair[143] (Minimum Values)



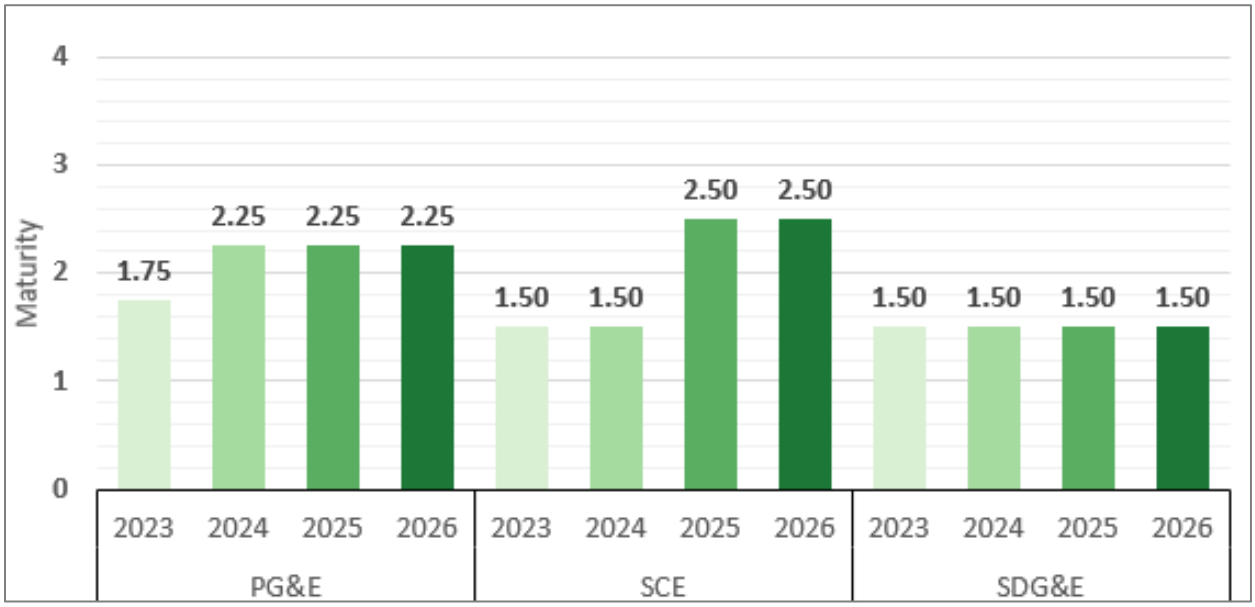
The utility's maturity level for the asset maintenance and repair capability described above is calculated using the minimum value of component sub-capabilities. The capability average is another way to look at PG&E's performance in asset maintenance and repair. The capability average is determined from the average of all component sub-capabilities and is an additional tool to evaluate the utilities' maturity. [144]

When the capability maturity is calculated using the average (rather than the minimum), PG&E has a maturity level for asset maintenance and repair of 1.75 for 2023 and projects an increase to 2.25 for both 2024 and 2025 (Figure 8.1-6).

[143] 2023 Maturity Survey Category C "Grid Design, Inspections, and Maintenance," Capability 15 "Asset maintenance and repair."

[144] For further information on maturity level determinations, see Section 4 of the 2023-2025 Electrical Corporation Wildfire Mitigation Maturity Model (second revision), published February 21, 2023.

Figure 8.1-6. Cross-Utility Maturity for Asset Maintenance and Repair[145] (Average Values)



The rest of this section reports on maturity levels considering the minimum and average values.

The rest of this section reports on maturity levels considering the minimum and average values.

When evaluating the minimum values, PG&E's maturity level in this category is limited by its response to the following questions:

- PG&E reports that at least 95 percent of its line miles are not continuously monitored using sensors to monitor the condition of lines and equipment with fire risk.[146] In order to increase maturity, PG&E would need to monitor at least 95 percent of its line miles continuously.
- PG&E reports that it does not address Level 2 nor Level 3 findings within the timeline identified in GO 95 Rule 18.[147] In order to increase in maturity, PG&E would need to meet GO 95 requirements. This is discussed further in Section 8.1.4.3.
- PG&E reports that it takes less than or equal to six months to address Level 2 findings within HFTD Tier 3, less than or equal to 12 months to address Level 2 findings in HFTD

[145] 2023 Maturity Survey Category C "Grid Design, Inspections, and Maintenance," Capability 15 "Asset maintenance and repair."

[146] PG&E's 2023 Maturity Survey, response to 3.3.1.Q6.

[147] PG&E's 2023 Maturity Survey, response to 3.3.2.Q2 and 3.3.2.Q3.

Tier 2, and greater than five years to address Level 2 findings outside of the HFTD.[148] In order to increase in maturity, PG&E would need to at least move towards less than or equal to three months for HFTD Tier 3, less than or equal to six months for HFTD Tier 2, and less than nor equal to five years outside of the HFTD.

When evaluating the average values, PG&E's current maturity level in this capability is slightly higher than its peers, with SCE and SDG&E reporting at levels 1.50 and 1.50, respectively. See Figure 8.1-6.

8.1.4.2 PG&E's WMP Strengths

PG&E projects improvement in equipment maintenance and repair over the WMP cycle in the following areas: surge arrestor replacement and distribution transformer predictive maintenance modeling.

In 2022, PG&E states it replaced CAL FIRE non-exempt surge arrestors with exempt counterparts at 4,621 locations with known grounding issues in the HFTD tier 2 and 3.[149] In 2023, PG&E states it will expand this program to replace non-exempt surge arrestors with deficient grounding in the HFRA.[150]

As part of its Electric Program Investment Charge (EPIC) Project 3.20, PG&E states it has created a production-ready model that can identify distribution transformers with a high probability of failure.[151] This analytical model leverages data collected from two way communication between the utility and end customers via smart meters to predict imminent transformer failures,[152] and has the potential to be a useful tool for proactively replacing transformers. PG&E states that it may leverage this model to replace the highest risk transformers.[153]

2022 Areas for Continued Improvement

Energy Safety evaluated the progress PG&E made toward addressing areas for continued improvement identified in Energy Safety's 2022 WMP Decision. PG&E adequately addressed

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[148] PG&E's 2023 Maturity Survey, response to 3.3.2.Q4, 3.3.2.Q5, and 3.3.2.Q6.

[149] PG&E'S 2023-2025 WMP R3, page 458.

[150] PG&E'S 2023-2025 WMP R3, page 458.

[151] EPIC 3.20, page 55 (https://www.pge.com/pge_global/common/pdfs/about-pge/environment/what-we-are-doing/electric-program-investment-charge/PGE-EPIC-Project-3.20.pdf, accessed November 1, 2023).

[152] EPIC 3.20, page 6 (https://www.pge.com/pge_global/common/pdfs/about-pge/environment/what-we-are-doing/electric-program-investment-charge/PGE-EPIC-Project-3.20.pdf, accessed November 1, 2023).

[153] PG&E's 2023-2025 WMP R3, page 513.

the 2022 areas for continued improvement for this topic. See Appendix B for the status of each 2022 area for continued improvement.

8.1.4.3 Revision Notice Critical Issues

As described in Section 3.4, Energy Safety issued PG&E a Revision Notice in response to its WMP submitted on June 22, 2023. PG&E submitted its Revision Notice Response on August 7, 2023, and submitted its Supplemental Revision Notice Response on September 27, 2023.[154] This section evaluates those responses as it relates to equipment maintenance and repair.[155]

RN-PGE-23-04: PG&E does not demonstrate how it will address its growing backlog of asset repairs.

Energy Safety required PG&E to revise its WMP to address a growing backlog of asset repairs. PG&E was instructed to provide the following:

- A workplan for monitoring the highest risk ignition tags.
- A revised Table 8-3 including numeric targets, procedures and documentation governing the determination of ignition risk tags.
- A status update on the number of backlogged work orders accumulated since the start of 2023.
- Evidence that Field Safety Reassessments[156] do not extend work orders' original due dates.
- Analysis examining the causes of increased find rates.
- An estimated find rate per quarter for 2023-2025.
- A plan to address the potentially increased number of work orders resulting from additional inspections on time.

RN-PGE-23-04: PG&E Response Summary

In its responses to the Revision Notice, PG&E provided a revised plan that it states will result in its distribution asset work order backlog being addressed by the end of 2029, three years earlier than proposed in its initial 2023-2025 WMP.[157] PG&E expects the proposed plan will

[154] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice and PG&E's 2023-2025 WMP Response to Revision Notice.

[155] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice and PG&E's 2023-2025 WMP Response to Revision Notice.

[156] Field Safety Reassessments are annual inspections of existing work orders to determine if the work order risk has increased to Priority A or B and the completion must be expedited. (PG&E's 2023-2025 WMP Revision 3, pages 547-548.)

[157] PG&E's 2023-2025 WMP R3, page 536.

allow the utility to close more tags per year. PG&E also updated Table 8-3 to include concrete numeric targets.

PG&E stated in its responses to the Revision Notice that distribution ignition risk tags are determined by aligning Facility Damage Actions (FDAs) with failure modes that can result in an ignition. It also stated that notifications containing the identified FDAs are categorized as ignition risk tags.[158] PG&E stated that Level A tags are addressed immediately and Level B tags within three months, while Level E and F tags are prioritized using PG&E's WDRM v3, which evaluates the consequence and likelihood of ignition.[159] PG&E also provided a status update on the number of backlogged work orders including GO 95 rule 18 priority level, PG&E priority level, HFTD/HFRA tags, and pole or non-pole infraction tags.[160]

PG&E provided a description of its Field Safety Reassessment (FSR) program and stated that it plans to revise document TD-8123P-200 to clarify that FSRs cannot extend the PG&E or CPUC deadlines or downgrade tag priority.[161]

PG&E produced find rate data for 2022 and 2023 broken down by location. Six FDAs were found to have increased find rates as well as a 2023 training emphasis and guidance change. Despite this correlation, PG&E stated it was unable to confirm the increased find rates were not a result of weather conditions or aging assets.[162] PG&E also provided a table forecasting find rates and tag generation of various inspection types and a plan to address the increased number of work orders resulting from additional inspections.[163]

RN-PGE-23-04: Energy Safety Evaluation

In its responses to the Revision Notice, PG&E stated it will address its distribution asset workorder backlog in seven years rather than the ten years proposed in its original 2023-2025 WMP by bundling tags by isolation zone.[164] PG&E stated it expects this approach to enable the closure of 66,200 ignition risk tags in 2024 and 59,000 ignition risk tags in 2025,[165] as opposed to the 46,000 in 2024 and 55,000 in 2025 expected in its original 2023-2025 WMP.[166] PG&E did

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[158] PG&E's 2023-2025 WMP R3, page 544.

[159] PG&E's 2023-2025 WMP R3, page 545.

[160] 2023-08-07_PGE_23-04_RNR_R0_Atch01, (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=54467&shareable=true, accessed October 10, 2023).

[161] PG&E's 2023-2025 WMP R3, pages 547-548.

[162] PG&E's 2023-2025 WMP R3, pages 548-550.

[163] PG&E's 2023-2025 WMP R3, pages 552-556.

[164] PG&E's 2023-2025 WMP R3, pages 536-539.

[165] PG&E's 2023-2025 WMP R3, page 555.

[166] PG&E's 2023-2025 WMP R1, page 456.

not adjust its targets to reflect these increased expectations, with Table 8-3 showing that PG&E commits to closing 46,000 backlog tags in 2024 and 55,000 backlog tags in 2025.[167]

PG&E noted that the new plan addresses 16 percent more risk in 2024 and 10 percent more risk in 2025 through the increased completion of ignition risk tags.[168] However, PG&E stated that part of its plan to execute the higher number of ignition risk tag closures, includes working non-ignition risk E and F tags on timelines that will not comply with GO 95 rule 18 until PG&E has eliminated its ignition risk tag backlog.[169,170] PG&E's revised plan is projected to mitigate more risk than the plan proposed in its original 2023-2025 WMP if PG&E is able to close the expected number of tags. The enforcement of GO 95 is not within the regulatory purview of Energy Safety and nothing in this decision should be interpreted to have any effect on PG&E's obligation to comply with GO 95 or any other orders under the CPUC's jurisdiction.

PG&E satisfactorily responded to the remainder of RN-PGE-23-04.

Energy Safety finds that PG&E has de-escalated this critical issue to an area for continued improvement.

PG&E stated in its revised plan to address its distribution asset work order backlog that it expects to close approximately 20,200 more ignition tags in 2024 and 4,000 more ignition tags in 2025 than under the plan proposed in its original 2023-2025 WMP.[171] While PG&E demonstrates through these updated numbers that its revised plan is expected to accelerate resolution of its tag backlog, PG&E only commits to targets that align with the pace of resolution that was expected under its original plan. PG&E must revise the targets provided in Tables RN-PG&E-23-04-2, 7-3-2, and 8-3 to close 79,200 distribution ignition tags in 2025. The

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[167] PG&E's 2023-2025 WMP R3, page 543.

[168] Data Request OEIS-P-WMP_2023-PG&E-014 (Question 2) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=55770&shareable=true, accessed October 17, 2023).

[169] PG&E's 2023-2025 WMP R3, page 546.

[170] PG&E also noted that it submitted a letter to CPUC on September 26, 2023, to request a stay of the GO 95, Rule 18 corrective action timelines for Levels 2 and 3 notifications. (PG&E's Reply Comments to the 2023-2025 Wildfire Mitigation Plan Supplemental Revision Notice Responses Docket # 2023-2025-WMPs, page 2, footnote 12).

[171] Difference in ignition tags closed found by comparing Table PG&E 8.1.7-2 (PG&E's 2023-2025 WMP Revision 1, page 455) to Table PG&E 8.1.7-2 (Revised) (PG&E's 2023-2025 WMP Revision 3, page 555).

number 79,200 encompasses the 59,000 backlog tags PG&E expects to close in 2025 plus the additional 22,200 backlog tags PG&E expects to close in 2024. [172]

Energy Safety sets forth specific areas for improvement and associated required progress in Section 11.

8.1.4.4 Areas for Continued Improvement

PG&E must continue to improve in the following areas.

Current Limiting Fuse Replacement

PG&E states that it has identified an increase in current limiting fuse failures to be the result of an internal weld separation associated with certain models of CAL FIRE exempt current limiting fuses.[173] PG&E is no longer installing the affected fuses but does not include a plan to address the risk posed by the fuses installed before the discontinuation. PG&E must explain how it plans to mitigate the risk of the installed fuses.

Transformer Predictive Maintenance

As discussed above, PG&E states that it has developed an analytical model capable of predicting distribution transformer failures.[174] However, PG&E does not commit to implementing this tool. PG&E must provide a timeline for the evaluation and implementation of this model and describe how PG&E will incorporate it into current transformer maintenance practices.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 11.

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[172] If PG&E completes more than 46,000 backlog tags in 2024, PG&E will only be expected to complete the difference subtracted from 79,200 in 2025.

$$T_e = 79{,}200 - (T_a - 46{,}000)$$

Where T_e is the expected number of backlog distribution tags closed in 2025 and T_a is the actual number of backlog tags closed in 2024.

[173] Data Request OEIS-P-WMP-2023-PGE-003 (Question14), (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53721&shareable=true, accessed October 11, 2023).

[174] PG&E's 2023-2025 WMP R3, page 513.

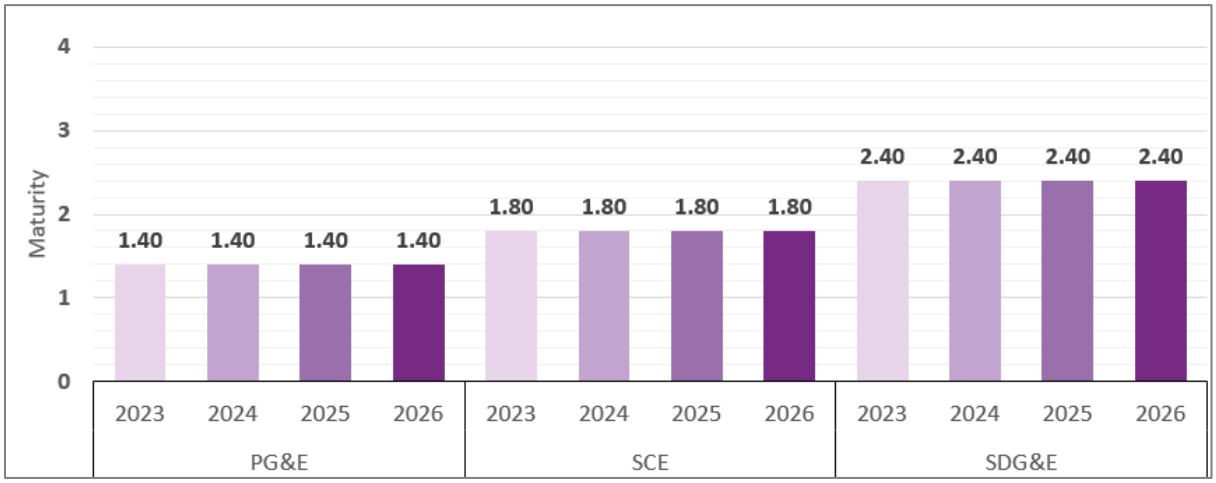
8.1.5 Grid Operations and Procedures

Section 8.1.8 of the Technical Guidelines requires PG&E to describe how it manages and operates its grid to reduce wildfire risk, including in relation to equipment settings, grid response procedures and notifications, and personnel work procedures and training.[175]

8.1.5.1 Maturity Survey Results

According to its responses to the 2023 Maturity Survey, PG&E has a 2023 maturity level of 1.4 for grid operations and protocols. For 2024 and 2025, PG&E projects no maturity level change for 2024 or 2025 (Figure 8.1-7).

Figure 8.1-7. Cross-Utility Maturity for Grid Operations and Protocols[176] (Minimum Values)



The utility's maturity level for the grid operations and protocols category described above is calculated using the minimum value sub-capability of each capability. Using the capability average is another way to look at PG&E's performance in grid operations and protocols. The capability average is determined from the average of all component sub-capabilities and is an additional tool to evaluate the utilities' maturity. [177]

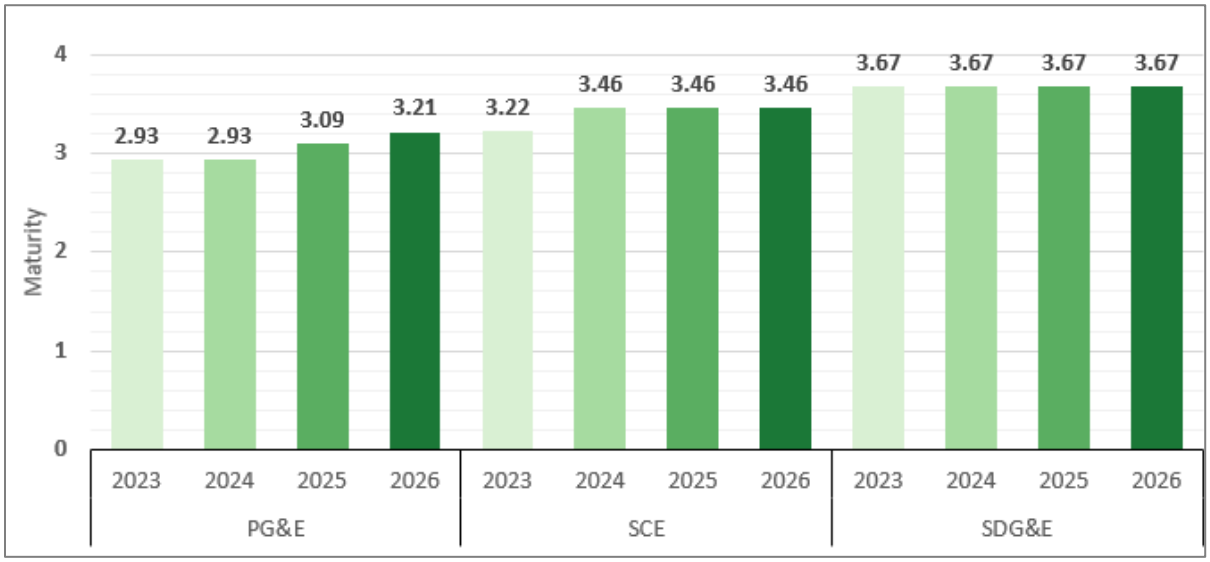
[175] Technical Guidelines, Section 8.1.8, pages 88-89 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[176] 2023 Maturity Survey Category E "Grid Operations and Protocols."

[177] For further information on maturity level determinations, see Section 4 of the 2023-2025 Electrical Corporation Wildfire Mitigation Maturity Model (second revision), published February 21, 2023.

When the category maturity is calculated using the capability average (rather than the minimum), PG&E has a maturity level for grid operations and protocols of 2.93 for 2023. PG&E projects no change in maturity for 2024 but projects an increase to 3.09 in 2025 (Figure 8.1-8).

Figure 8.1-8. Cross-Utility Maturity for Grid Operations and Protocols[178] (Average Values)



The rest of this section reports on maturity levels considering the average and minimum values.

PG&E's minimum maturity level in this category is limited by its response to the following questions:

- PG&E reports that it does not control all reclosers within the HFTD remotely, nor are there remote adjustments completed for these reclosers.[179] To progress in maturity, PG&E would need to have multiple protective settings available by remote control for all reclosers within the HFTD, such as adjusting for Red Flag Warnings and special conditions.
- PG&E reports that it only completes subject matter expert review annually of its thresholds for grid elements and protective equipment.[180] To progress in maturity, PG&E would need to review its policies and procedures at least every six months or preferably once per quarter.

[178] 2023 Maturity Survey Category E "Grid Operations and Protocols."

[179] 2023 PG&E Maturity Survey, responses to 5.1.1.Q1, Q2, Q3, Q4, and Q5.

[180] 2023 PG&E Maturity Survey, response to 5.1.4.Q1.

- PG&E reports that it does not have a defined process for incorporating wildfire risk into electric control limits beyond current carrying capacities.[181] To progress in maturity, PG&E would need to implement a clearly defined process for doing so.

PG&E's current average maturity level in this category is lower than its peers, with SCE and SDG&E reporting at levels 3.22 and 3.67, respectively. See Figure 8.1-8.

Based on its responses to the 2023 Maturity Survey, PG&E reported its highest levels of projected maturity in the following capability for 2023 and 2024:

- Ignition prevention and suppression.[182]

Based on its responses to the 2023 Maturity Survey, PG&E reported its lowest levels of projected maturity in the following capabilities for 2023 and 2024:

- Incorporation of ignition risk factors in grid control.[183]
- Protective equipment and device settings.[184]

8.1.5.2 PG&E's WMP Strengths

PG&E projects improvement in grid operations and procedures over the WMP cycle in the following areas: addition of downed conductor detection and piloting pole mounted sensors.

Starting in 2023, PG&E implemented DCD in addition to EPSS settings. PG&E states that DCD improves EPSS settings by increasing the ability to detect high impedance faults and further reduce ignition likelihood.[185] As reported in its revised 2023-2025 WMP, PG&E plans to make 1,150 protective device controllers or relays capable for DCD settings from 2023 to 2025.[186]

PG&E is in the process of piloting two sensor technologies at its poles.[187] PG&E states that these pole mounted sensors could help identify vegetation management needs, evaluate unknown outage causes, and provide more granular weather condition data.[188] PG&E is still in the testing and demonstration phase for pole mounted sensors and will determine further expansion once the pilot plan is developed.[189]

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[181] 2023 PG&E Maturity Survey, response to 5.2.5.Q1.

[182] 2023 Maturity Survey Capability 26 "Ignition prevention and suppression."

[183] 2023 Maturity Survey Capability 23 "Incorporation of ignition risk factors in grid control."

[184] 2023 Maturity Survey Capability 22 "Protective equipment and device settings."

[185] PG&E's 2023-2025 WMP R3, page 455.

[186] PG&E's 2023-2025 WMP R3, Revised Table d7-3-2: PG&E's WMP Targets, page 339.

[187] PG&E's 2023-2025 WMP R3, page 574.

[188] PG&E's 2023-2025 WMP R3, page 574.

[189] PG&E's 2023-2025 WMP, page 574.

2022 Areas for Continued Improvement

Energy Safety evaluated the progress PG&E made toward addressing areas for continued improvement identified in Energy Safety's 2022 WMP Decision. PG&E adequately addressed the 2022 areas for continued improvement for this topic. See Appendix B for the status of each 2022 area for continued improvement.

8.1.5.3 Revision Notice Critical Issues

Revision Notice critical issue regarding this section can be found in Section 4.2.3.

8.1.5.4 Areas for Continued Improvement

PG&E must continue to improve in the following areas.

Workforce Planning and Resource Allocation to Respond to EPSS Events

PG&E did not have as many wind events in 2021 and 2022 compared to 2018 through 2020.[190] Therefore, EPSS outages in 2021 and 2022 may have been significantly lower than those that could occur in a year with more wind events. With such extensive use of EPSS, PG&E could see a major increase in outages during high-wind events that it had not yet experienced or observed to date.

Given the increase in outages occurring while EPSS is enabled, there may be an increased resource demand for both personnel and crew in relation to responding to EPSS outages. This could lead to delays responding to ignitions given the competition for resources.

Based on the above, PG&E must provide additional details on how it plans to prioritize and respond to EPSS outages, particularly when there is the potential for these resources to compete with resources for PG&E's response to ignitions.

Effectiveness Analysis for EPSS including Implementation of DCD

PG&E lists the cause of nearly 46 percent of its EPSS outages in 2022 as "Unknown."[191] While some of these may have resulted in ignitions, it is unclear how many ignitions were actually avoided, given that the cause of the outage is unknown. PG&E, however, estimates that more than 95 percent of EPSS outages were successful in preventing an ignition.[192] This is likely an overestimation of success given that some causes of outages may not have presented any ignition risk. PG&E must analyze EPSS data to develop a more accurate estimation for

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[190] SPD Data Request 4, Question 3 and Question 4, which shows that 2021 had 78 days and 2022 had zero days for each Fire Index Area (FIA) with an FPI at R5+, compared to 2019 and 2020 which had 349 and 328 respectively.

[191] PG&E's 2023-2025 WMP Appendix D, ACI PG&E-22-32 Attachment 1, evaluating Column E "Cause."

[192] Data Request OEIS-P-WMP-2023-PGE-002 (Question 9), (https://efiling.energysafety.ca.gov/Search.aspx?docket=2023-2025-WMP-DRs, accessed October 24, 2023).

avoided ignitions by evaluating the probability that an EPSS-enabled outage avoided an ignition based on cause.

Additionally, PG&E has begun implementing DCD and partial voltage detection (PVD) in addition to EPSS. In its 2023-2025 WMP, PG&E estimates DCD to have an additional effectiveness of approximately 12 percent wildfire risk reduction on top of EPSS.[193] Given 2023 is the first year PG&E has implemented DCD, it must provide a summarization of the actual observed effectiveness of DCD, as well as analysis of the additional reliability and safety impacts of using DCD.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 11.

8.2 Vegetation Management and Inspections

In response to Section 8.2 of the Technical Guidelines, PG&E provided information on its vegetation management programs, including vegetation inspections, vegetation and fuels management, vegetation management enterprise systems, environmental compliance and permitting, quality assurance and quality control, open work orders, and workforce planning as applicable.[194]

Below is Energy Safety's evaluation regarding PG&E's objectives and targets, maturity levels, and strengths in these areas. In addition, Energy Safety has identified areas where PG&E must improve, described at the end of this section.

8.2.1 Objectives and Targets

As part of its Base WMP, PG&E provided 3-year and 10-year objectives for its vegetation management programs.[195]

PG&E also defined quantitative targets for initiative activities for its vegetation management programs. PG&E's Base WMP includes end-of-year targets for 2023, 2024, and 2025. Selected targets are included in Table 8.2-1.

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[193] Data Request OEIS-P-WMP_2023-PGE-002 (Question 5) and Data Request OEIS-P-WMP_2023-PGE-003 (Question 16), (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53679&shareable=true and https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53723&shareable=true, accessed November 2, 2023).

[194] Technical Guidelines, Section 8.2, "Vegetation Management and Inspections," pages 94-113 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[195] PG&E's 2023-2025 WMP, pages 493-498.

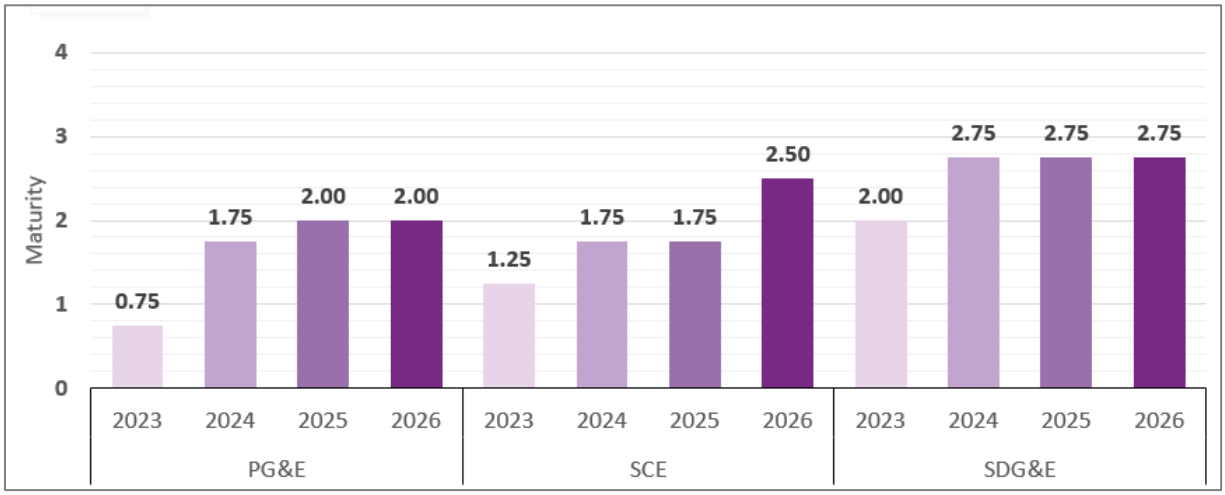
Table 8.2-1. PG&E Vegetation Management – Selected Targets

Initiative Activity	Target Unit	2023 Target	2024 Target	2025 Target
Routine Patrol – Distribution	Circuit miles	79,000	78,650	78,200
Focused Tree Inspections	Circuit miles	1,800	1,800	1,800
Tree Removal Inventory	Trees	15,000	20,000	25,000

8.2.2 Maturity Survey Results

According to its responses to the 2023 Maturity Survey, PG&E has a 2023 maturity level of 0.75 for vegetation management and inspections. For 2024, PG&E projects that it will increase in maturity to a level of 1.75. For 2025, PG&E projects that it will increase in maturity to a level of 2.0 (Figure 8.2-1).

Figure 8.2-1. Cross-Utility Maturity for Vegetation Management and Inspections (Minimum Values)

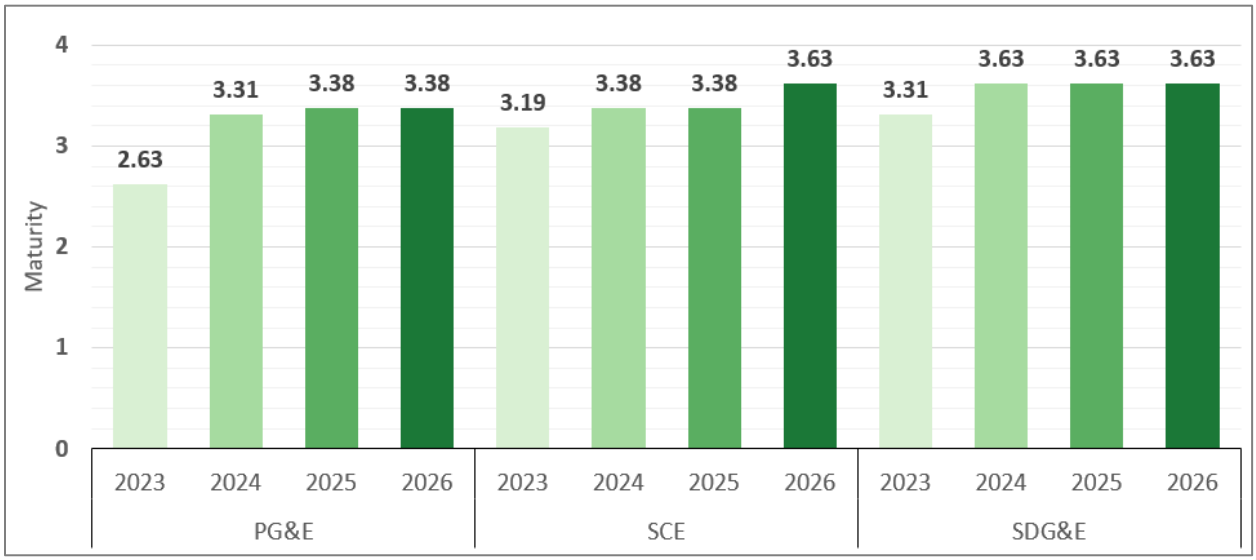


The utility's maturity level for the vegetation management and inspections category described above is calculated using the minimum value sub-capability of each capability. Using the capability average is another way to look at PG&E's performance in vegetation management and inspections. The capability average is determined from the average of all component sub-capabilities and is an additional tool to evaluate the utilities' maturity. [196]

[196] For further information on maturity level determinations, see Section 4 of the 2023-2025 Electrical Corporation Wildfire Mitigation Maturity Model (second revision), published February 21, 2023.

When the category maturity is calculated using the capability average (rather than the minimum), PG&E has a maturity level for vegetation management and inspections of 2.63 for 2023, and projects an increase in maturity to 3.31 in 2024, and another increase to 3.38 in 2025 (Figure 8.2-2).

Figure 8.2-2. Cross-Utility Maturity for Vegetation Management and Inspections (Average Values)



The rest of this section reports on maturity levels considering the minimum values.

PG&E's maturity level in this category is limited by its response to the following questions:

- PG&E reports that it does not have procedures for exchanging best practices and lessons learned with other California electrical corporations and implementing information from other electrical corporations regarding the training and quality assurance of vegetation personnel.[197] To mature in this capability, PG&E would have to develop these procedures.
- PG&E reports that the time between routine vegetation inspection and treatment (i.e., trimming or removal) of non-urgent vegetation inspection findings is between less than or equal to 30 days.[198] To mature in this capability, PG&E would have to reduce that time to less than or equal to 7 days.

PG&E's current maturity level in this category is lower than its peers, with SCE and SDG&E reporting at levels 1.25 and 2.0, respectively. See Figure 8.2-1.

[197] PG&E's 2023 Maturity Survey, response to 4.4.1 Q5.

[198] PG&E's 2023 Maturity Survey, response to 4.3.2 Q3.

Based on its responses to the 2023 Maturity Survey, PG&E reported its highest level of projected maturity in the following capability for 2023 and 2024:

- Vegetation inventory and condition database.[199]

Based on its responses to the 2023 Maturity Survey, PG&E reported its lowest levels of projected maturity in the following capabilities for 2023 and 2024:

- Vegetation inspections.[200]
- Vegetation treatment.[201]

8.2.3 PG&E's WMP Strengths

PG&E projects improvement in vegetation management over the WMP cycle in the following area: vegetation management inspections.

PG&E has operationalized its updated Distribution Inspection Procedure[202] effective June 20, 2023. The preceding procedure, Distribution Routine Patrol Procedure, was published October 27, 2015. PG&E's vegetation management program has gone through dramatic changes over the last five years. This updated procedure shows maturation in PG&E's vegetation management program as PG&E better understands its wildfire risk related to vegetation contact. For example, this updated procedure explicitly compels a Level 2 inspection if the inspector suspects a tree may have a significant defect.[203] This specificity, as it relates to the identification of hazard trees, was not present in the legacy procedure, which mainly focused on maintenance of minimum clearance requirements[204]

8.2.3.1 2022 Areas for Continued Improvement

Energy Safety evaluated the progress PG&E made toward addressing areas for continued improvement identified in Energy Safety's 2022 WMP Decision. See Appendix B for the status

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[199] PG&E's responses to questions on the 2023 Maturity Survey under Category D "Vegetation Management and Inspections," Capability 18 "Vegetation inventory and condition database."

[200] PG&E's responses to questions on the 2023 Maturity Survey under Category D "Vegetation Management and Inspections," Capability 19 "Vegetation inspections."

[201] SCE's responses to questions on the 2023 Maturity Survey under Category D "Vegetation Management and Inspections," Capability 20 "Vegetation treatment."

[202] TD-7102P-01 (https://www.pge.com/pge_global/common/pdfs/safety/emergency-preparedness/natural-disaster/wildfires/wildfire-mitigation-plan/TD-7102P-01-VEGETATION-MANAGEMENT-DISTRIBUTION-INSPECTION-PROCEDURE.pdf, accessed September 7, 2023).

[203] TD-7102P-01, page 6 (https://www.pge.com/pge_global/common/pdfs/safety/emergency-preparedness/natural-disaster/wildfires/wildfire-mitigation-plan/TD-7102P-01-VEGETATION-MANAGEMENT-DISTRIBUTION-INSPECTION-PROCEDURE.pdf, accessed September 7, 2023).

[204] General Order 95, Rule 35 and Public Resources Code section 4293.

of each 2022 area for continued improvement. Notable progress was made in the following selected areas:

- For PGE-22-28, Progression of Effectiveness of Enhanced Clearances Joint Study, the large IOUs hired a third party to establish the data collection standard, create the cross-utility vegetation risk event database, and study the relationship between enhanced vegetation clearances and tree-caused risk events.[205] The third party plans to align approximately 25 variables related to vegetation risk events between the IOUs and warehouse the data by late summer 2023. The third party will then begin its data analysis phase which it expects to complete in March 2024.[206]

8.2.4 Revision Notice Critical Issues

As described in Section 3.4, Energy Safety issued PG&E a Revision Notice in response to its WMP submitted on June 22, 2023. PG&E submitted its Revision Notice Response on August 7, 2023, and submitted its Supplemental Revision Notice Response on September 27, 2023.[207] This section evaluates those responses as it relates to vegetation management.[208]

8.2.4.1 RN-PG&E-23-06: PG&E does not provide targets for seven of its vegetation management inspection programs.

Energy Safety required PG&E to provide projected targets for each year of the 2023-2025 WMP, quarterly, rolling targets for 2023 and 2024, and relevant units for each of its vegetation management inspection programs.

RN-PG&E-23-06: PG&E Response Summary

In PG&E's responses to the Revision Notice, it provided additional vegetation management targets and retained the targets it provided in its initial 2023-2025 WMP submission. As such, PG&E now has targets for each of its vegetation management inspection programs.

[205] SCE's 2023-2025 WMP, page 767.

[206] Data Request OEIS-P-WMP_2023-SDGE-004 (Question 6) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=54144&shareable=true, accessed June 16, 2023).

[207] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice and PG&E's 2023-2025 WMP Response to Revision Notice.

[208] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice and PG&E's 2023-2025 WMP Response to Revision Notice.

RN-PG&E-23-06: Energy Safety Evaluation

With a complete set of vegetaion management targets, PG&E has adequalty "set commitments for specific vegetation management initiatives in its WMP."[209]

PG&E has resolved the critical issue described in RN-PG&E-23-06.

8.2.4.2 RN-PG&E-23-07: PG&E does not adequately address its risk from hazard trees.

Energy Safety required PG&E to revise its 2023-2025 WMP to detail how it will manage risk from hazard trees during the current WMP cycle to "achieve the highest level of safety, reliability, and resilience,"[210] effectively address the vegetation-caused ignition risk that exists in PG&E's service territory,[211] and demonstrate a clear action plan to continue reducing utility-related ignitions[212] attributable to contact from vegetation.

RN-PG&E-23-07: PG&E Response Summary

PG&E responded to each of the 12 required remedies.

In PG&E's responses to the Revision Notice, it notably committed to:

- Completing 1,500 circuit miles of Focused Tree Inspection, including performing Level 2 (360-degree) inspections on all potential strike trees, in 2024 and 2025.[213]
- Enhancing record keeping practices for the Focused Tree Inspection program by creating records of all potential strike trees inspected using a digitized Tree Risk Assessment form by March 31, 2024.[214]
- Enhancing the One VM application for Routine, and Second Patrol to include capability to capture factors for prescribing trees for removal by January 31, 2024.[215]

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[209] Process Guidelines, Section 5, page 9 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53287&shareable=true, accessed September 7, 2023).
[210] Public Utilities Code section 8386(c)(14) (https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=8386.&lawCode=PUC, accessed May 30, 2023).

[211] Process Guidelines, Section 5, Page 9 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53287&shareable=true, accessed May 30, 2023).

[212] Process Guidelines, Section 5, Page 9 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53287&shareable=true, accessed May 30, 2023).

[213] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice, page 104.

[214] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice, Table SRN-PG&E-23-07-4, page 124.

[215] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice, Table SRN-PG&E-23-07-4, page 125.

- Enhancing the application for the Vegetation Management for Operational Mitigations and Tree Removal Inventory programs to include capability to capture factors for prescribing trees for removal by November 15, 2024.[216]
- Standing up a quality assurance and quality control program for Focused Tree Inspections in 2024.[217]
- Hiring 150 Vegetation Management Inspectors by the end of December 2024.[218]
- Annually re-evaluate Areas of Concern based on emerging data.[219]

RN-PG&E-23-07: Energy Safety Evaluation

PG&E's response to this critical issue and its new commitments, summarized above, demonstrate a clearer action plan to continue reducing utility-related ignitions[220] attributable to contact from vegetation.

As mentioned in the Revision Notice, PG&E informed Energy Safety and the CPUC in early 2022 that it would likely discontinue its Enhanced Vegetation Management (EVM) program at the end of 2022. In communicating the planned transition, PG&E indicated that it would incorporate the best aspects of EVM into new (e.g., Focused Tree Inspections) and existing (e.g., Routine) vegetation management programs. PG&E's initial 2023-2025 WMP, however, did not represent a managed transition from EVM to the other programs, but instead effectively represented a complete dissolution of all aspects of EVM.

PG&E's initial 2023-2025 WMP[221] presented a regression of the hazard tree mitigation program and did not present a plan for consistent HFTD-wide hazard tree-related risk reduction by inspection and remediation.[222] In PG&E's responses to the Revision Notice, it applies proactive, high-standard inspections to areas at high-risk of ignitions from vegetation contact and consequence coupled with recordkeeping of those inspections. It should be noted that PG&E's commitments and responses to this critical issue appear limited to the 2023-2025 WMP cycle, and PG&E's long-term plan for consistent hazard tree-related risk reduction remains unclear.

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[216] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice, Table SRN-PG&E-23-07-4, page 125.

[217] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice, page 104.

[218] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice, page 120.

[219] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice, page 104.

[220] Process Guidelines, Section 5, Page 9 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53287&shareable=true, accessed May 30, 2023).

[221] PG&E's 2023-2025 WMP, submitted March 27, 2023 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53547&shareable=true, accessed October 31, 2023).

[222] Revision Notice for PG&E's 2023-2025 WMP, page 28.

Energy Safety finds that PG&E has de-escalated this critical issue to an area for continued improvement.

While PG&E has committed to enhancing record keeping for its vegetation management programs by adding the capability to capture factors for prescribing trees for removal and creating records of all potential strike trees inspected under Focused Tree Inspections, PG&E has not provided details regarding those enhancements. In its 2025 Update, PG&E must describe these enhancements.

Additionally, PG&E has not demonstrated that its Focused Tree Inspections will be performed in the highest-risk areas nor that the described updates to its Areas of Concern,[223] in which Focused Tree Inspections are conducted, will identify the areas at highest-risk of ignitions from vegetation contact and consequence. In its 2025 Update, PG&E must demonstrate that its Focused Tree Inspections will be performed in the highest-risk areas and that its Areas of Concern are generated using up-to-date data.

Lastly, as discussed above, PG&E's long-term plan for consistent hazard tree-related risk reduction remains unclear. In its 2026-2028 Base WMP, PG&E must present its plan for consistent HFTD-wide hazard tree-related risk reduction by inspection and remediation.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 11.

8.2.5 Areas for Continued Improvement

PG&E must continue to improve in the following areas.

8.2.5.1 Updating the Wood Management Procedure

PG&E must update its outdated wood management procedure and justify the limited scope of the program. PG&E reports its Wood Management program addresses (removes, relocates/moves, chips, broadcasts, cuts[224]) woody debris that is greater than four inches in diameter, which includes large diameter logs such as tree trunks; this program only applies to wood generated by post-fire activities and EVM. With the end of PG&E's EVM program, PG&E's Wood Management program now only applies to post-fire activities. With the addition of Focused Tree Inspection to PG&E's portfolio, it is unclear what will be done with large diameter wood felled in the high-risk Areas of Concern. While PG&E states that "crews will

[223] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice, page 105.

[224] TD-7102P-23, page 3 (https://www.pge.com/pge_global/common/pdfs/safety/emergency-preparedness/natural-disaster/wildfires/wildfire-mitigation-plan/standards-and-procedures/td-7102p-26.pdf, accessed September 8, 2023).

address any large wood that poses a potential safety hazard at the time of tree work,"[225] this commitment is not reflected in its WMP, Wood Management Procedure, or its Best Management Practices document.[226]

PG&E's limited scope of its Wood Management program diverges from that of other utilities. SCE strives to remove all wood and material resulting from mitigation activities within 100 feet of a road,[227] and Liberty Utilities offers wood removal and disposal services to all its residential customers. [228] PG&E's current approach does not adequately reflect a recognition of the risk reduction benefits of reducing accumulation of woody debris generated by mitigations activities that could ignite or contribute to fire spread and intensity.

Furthermore, PG&E states that this program "is designed to help alleviate the potential burden caused by the presence of larger diameter wood on customer properties resulting from PG&E activities."[229] Between 2019 and 2022, PG&E removed 1,796,390 trees under the Routine, Second Patrol, and EVM programs;[230] 48 percent of those trees were removed under EVM. The 925,049 trees that were removed as part of Routine and Second Patrol, and therefore not addressed by PG&E's Wood Management program, may remain a potential financial burden and safety concern to property owners. PG&E should consider the customer relations benefits related to wood management in its decision making around its Wood Management program. An example of a potential benefit could be increased willingness of property owners to allow PG&E to remove hazardous vegetation if large wood removal services were offered at no- or low-cost.

8.2.5.2 Consolidation of Vegetation Management Inspections

PG&E's vegetation management program for distribution circuits is complex, resulting in multiple touchpoints for customers and overlapping scopes of work for PG&E's personnel.

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[225] Data Request OEIS-P-WMP_2023-PG&E-001 (Question 5) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53637&shareable=true, accessed September 8, 2023).

[226] Best Management Practices for Vegetation Management Activities (TD-7102P-01-JA01) (https://www.pge.com/pge_global/common/pdfs/safety/emergency-preparedness/natural-disaster/wildfires/wildfire-mitigation-plan/supporting-documents/td-7102p-01-ja01-general-best-management-practices-for-all-vm.pdf, accessed September 8, 2023).

[227] SCE's 2023-2025 WMP, page 411.

[228] Liberty's 2023-2025 WMP, page 212.

[229] PG&E's revised 2023-2025 WMP, page 655.

[230] Data Request GPI-PG&E-2023WMP-02 (Question 1) (https://www.pge.com/pge_global/common/pdfs/safety/emergency-preparedness/natural-disaster/wildfires/wildfire-mitigation-plan/reference-docs/2023/GPI_002.zip, accessed October 16, 2023).

PG&E has changed its distribution vegetation management program in significant ways numerous times over the last five years.

It is imperative that PG&E plan to streamline and stabilize its distribution vegetation management program. As described below, PG&E currently has five vegetation inspections for distribution circuits, SCE has four, and SDG&E has two. However, SCE is consolidating three of its vegetation inspections programs into one: Routine, Dead and Dying, and Hazard Tree Mitigation Program.[231] Consolidation of PG&E's suite of vegetation inspections could result in improved effectiveness and efficiency, reduce customer complaints, and alleviate confusion among government agencies, PG&E's customers, and PG&E's own personnel.

[231] SCE's 2023-2025 WMP, page 392.

The following lists show the vegetation inspection programs for distribution circuits at PG&E, SCE, and SD&GE.[232]

PG&E

1. **Routine** – Annual compliance inspections and trimming. Identify dead, dying, and declining trees that may fail.
2. **Second Patrol** – Patrols six months offset from routine patrol to maintain clearances and to identify dead, dying, and declining trees in the HFTD.
3. **Focused Tree Inspections** – Focused inspections in Areas of Concern to address areas that have experienced higher volumes of vegetation damage.
4. **Vegetation Management for Operational Mitigations** – Reduce outages and ignitions based on historic outage information.
5. **Tree Removal Inventory** – Work down trees identified by the legacy EVM program.

SCE

1. **Routine** – Annual compliance inspections and trimming
2. **Cycle Buster** – Patrol that occurs on a 6-month cycle to identify vegetation that will not remain in compliance until the next annual inspection and identify hazard trees in the HFRA.
3. **Dead and Dying Tree Program** – Patrol and identify dead and dying trees for removal.
4. **Hazard Tree Mitigation Program** – Assess live trees posing a fall-in risk.

SDG&E

1. **Detailed Inspections** - Annual compliance inspections and trimming.
2. **Off-Cycle Patrol** - Second annual inspection activity in the HFTD. Similar to Detailed Inspection Program but focused on the HFTD. Additional off-cycle patrols are also performed for Century plant and bamboo.

[232] These lists are adapted from PG&E's 2023-2025 WMP Revision Notice Response, Table RN-PG&E-23-07-03: Program Structure PG&E, SCE, and SDG&E, page 92.

8.2.5.3 Improving Vegetation Management Inspector Qualifications

In response to RN-PG&E-23-07, PG&E benchmarked its inspector qualifications against those of its peer utilities. This benchmarking demonstrates that SCE and SDG&E have more rigorous minimum qualification requirements for vegetation inspectors than PG&E (See Table 8.22). With PG&E's commitment to hire 150 Vegetation Management Inspectors (VMI) by the end of December 2024,[233] PG&E must ensure that it has qualified personnel for vegetation inspections and that it has trained these personnel to adequately perform vegetation inspections.

Table 8.2-2. PG&E, SCE, and SDG&E Minimum Qualifications for Vegetation Management Inspectors[234]

PG&E	SCE	SDG&E
High School Diploma or GED AND one of the following: • One year of experience • ISA-certified • 2- or 4-year degree in related field	4-year degree in related field with ability to obtain ISA certification in 12 months OR 2-year degree in related field w/ 1 year experience and ability to obtain ISA certification in 12 months OR Two years of experience with ability to obtain ISA certification in 12 months	Bachelor's degree in forestry, biology, environmental science, horticulture, or related field.

8.2.5.4 Continued Progression of Vegetation Management Maturity

In response to RN-PG&E-22-09, PG&E identified six initial steps for further mature vegetation inspection scheduling, procedures and checklists, and development of clearances:[235]

[233] PG&E's 2023-2025 WMP Response to Revision Notice, page 103.

[234] PG&E's 2023-2025 WMP Response to Revision Notice, pages 96-97.

[235] PG&E's 2023-2025 WMP Response to Revision Notice, page 16.

- Identify one or two of the highest risk regions in PG&E's service territory to implement a pilot process for inspections and to guide clearances.
- Develop a collaborative, cross-functional team in creating Areas of Concern and having the cross-functional team develop guidelines to inform inspections.
- Review the process and procedures for collecting and enhancing checklists for field inspections and current clearance guidance.
- Develop a process to guide optimal clearance beyond statutory requirements by species and region.
- Evaluate how mid-cycle inspections sequence can be adjusted to align with Areas of Concerns in highest risk regions.
- Evaluate the feasibility of developing a multi-year historical tree data set.

PG&E-22-24 required PG&E to report on its progress in implementing its initial steps to increase the maturity of its vegetation management program including any resulting plans and timelines.[236] PG&E has sufficiently addressed the required progress for this area for continued improvement. Nevertheless, as PG&E implements these steps, it must report on progress, outcomes, and lessons learned related to the development and implementation of these steps.

8.2.5.5 Reinspection of Trees in the Tree Removal Inventory

Energy Safety is aware that vegetation management personnel may be removing healthy trees under the Tree Removal Inventory program due to a conservative interpretation of the procedure and absence of explicit direction to perform a Level 2 assessment.

PG&E's procedure for its Tree Removal Inventory program[237] gives direction to the TRAQ[238] certified inspector to reinspect trees that have a "Tree Assessment Tool Abate result." These inspectors are instructed by the procedure to come to one of two conclusions (bold added):

> IF the TRAQ VMI inspects a vegetation point and **determines the tree does NOT have the potential to fall into or otherwise impact electrical primary or secondary distribution facilities**, THEN the VMI must CHANGE the following in Field Maps: Prescription: "No Work Needed."

Or

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[236] Final Decision on PG&E's 2022 WMP Update, page 180.

[237] TD-7102P-01-Att06 (https://www.pge.com/pge_global/common/pdfs/safety/emergency-preparedness/natural-disaster/wildfires/wildfire-mitigation-plan/TD-7102P-01-ATT06-ATTACHMENT-6-TREE-REMOVAL-INVENTORY-PROGRAM.pdf, accessed September 21, 2023).

[238] "Tree Risk Assessment Qualification" from the International Society of Arboriculture.

> IF the TRAQ VMI inspects a vegetation point and **determines the tree has the potential to fall into or otherwise impact electrical primary or secondary distribution facilities**, THEN the TRAQ VMI must PERFORM the following steps: UPDATE the Prescription field to the appropriate unified work code… CHANGE the following in Field Maps: VP Status: "Work Identified."

In summary, the threshold for prescribing work, including removal, is for a tree to "have potential to fall into distribution facilities." A conservative interpretation of this threshold would mark healthy[239] trees, tall enough to fall into facilities, for removal.

Furthermore, while the procedure includes language that trees with abate results are subject to "reassessment by a TRAQ VMI,"[240] the procedure does not direct the TRAQ VMI to perform a full risk assessment during this "reassessment," such as a Level 2 inspection using the ISA's TRAQ form.[241] Instead, as described above, the inspector is simply directed to determine if the tree has the potential to fall into electrical facilities.

PG&E must consider updating its procedure to prevent the removal of healthy trees and consult with its TRAQ certified arborists to ensure consistent interpretation of this procedure.

8.2.5.6 Identification of High-Risk Species for Focused Tree Inspections

In the procedure for PG&E's Focused Tree Inspection,[242] PG&E has not demonstrated that the methodology it employs for identifying the species to which inspectors are to "apply increased scrutiny" is effective.

Inspectors are instructed to "[a]pply increased scrutiny to species listed in the pilot [Area of Concern] regional outage breakdown tables below."

There are two species listed for each region. These two species have caused a majority of outages in the region for which they are listed. This methodology may discount less common but higher-risk species that may exist within a region. For example, according to PG&E's procedure, (*Pinus ponderosa*) and Black Oak (*Quercus kelloggii*) cause 53 percent of outages in the Central Valley region. The pilot Area of Concern within that region is a 91-circuit-mile

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[239] Trees absent of defects that may increase the likelihood of imminent failure.

[240] TD-7102P-01-Att07, page 3 (https://www.pge.com/pge_global/common/pdfs/safety/emergency-preparedness/natural-disaster/wildfires/wildfire-mitigation-plan/TD-7102P-01-ATT07-ATTACHMENT-7%20FOCUSED-TREE-INSPECTION-PROCEDURES.pdf, accessed September 21, 2023)

[241] International Society of Arboriculture's Basic Tree Risk Assessment Form (https://www.isa-arbor.com/education/resources/BasicTreeRiskAssessmentForm_Print_2017.pdf, accessed September 29, 2023)

[242] TD-7102P-01-Att07 (https://www.pge.com/pge_global/common/pdfs/safety/emergency-preparedness/natural-disaster/wildfires/wildfire-mitigation-plan/TD-7102P-01-ATT07-ATTACHMENT-7%20FOCUSED-TREE-INSPECTION-PROCEDURES.pdf, accessed September 21, 2023)

area center around the town of West Point in Calaveras County.[243] This area is dominated by Pondarosa Pine and Black Oak, and these two species may have caused a majority of outages simply because they are common in the area.

In comparison, SDG&E has identified five genera that it deems high-risk: palm, eucalyptus, sycamore, pine, and oak. These genera were determined to be high-risk because they may exhibit one or more of the following criteria:[244]

- Fast-growing species.
- Species with known characteristics or propensity for branch failure.
- Species that represent a high outage frequency per year and species that have a high outage rate relative to the total inventory tree population.

Instead of relying only on outage data, PG&E must define criteria for determining which species warrant increased scrutiny during Focused Tree Inspections.

8.2.5.7 Continuation of Effectiveness of Enhanced Clearances Joint Study

The large IOUs, including PG&E, must also continue efforts on the Effectiveness of Enhanced Clearances Joint Study to meet the requirements of PG&E-21-23.[245] In its 2025 Update, PG&E, along with SCE and SDG&E, must report on the progress and outcomes of the third-party contractor's analysis and evaluation of the effectiveness of enhanced clearances. Also, with its next Base WMP, PG&E, along with SCE and SDG&E, must submit a white paper which discusses the IOUs' joint evaluation of the effectiveness of enhanced clearances including, but not limited to, the effectiveness of enhanced clearances in reducing tree-caused outages and ignitions, and the IOUs' joint recommendations for updates and changes to utility vegetation management operations and best management practices for wildfire safety based on this study.

Additionally, as noted above in the area for continued improvement "Cross-Utility Collaboration on Best Practices for Inclusion of Climate Change Forecasts in Consequence Modeling, Inclusion of Community Vulnerability in Consequence Modeling, and Utility Vegetation Management for Wildfire Safety" in Section 7.2, "Risk-Informed Framework," PG&E must make further improvements in the area of cross-utility collaboration on best

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[243] Data Request P-WMP_2023-PG&E-001, Question 3, Attachment 2 (https://www.pge.com/pge_global/common/pdfs/safety/emergency-preparedness/natural-disaster/wildfires/wildfire-mitigation-plan/reference-docs/2023/OEIS_001.zip, accessed September 26, 2023).

[244] SDG&E 2022 WMP Update, Attachment D, page 14.

[245] Final Action Statement on the 2021 Wildfire Mitigation Plan (WMP) Update of Pacific Gas and Electric Company, page 83 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=51745&shareable=true, accessed September 27, 2023).

practices for utility vegetation management for wildfire safety. In their 2025 Updates, the IOUs (not including independent transmission operators) must provide a status update on any collaboration with each other that has taken place in the area of vegetation management best practices for wildfire safety, including a list of any resulting changes made to their WMPs since the 2023-2025 WMP submission.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 11.

8.3 Situational Awareness and Forecasting

In response to Section 8.3 of the Technical Guidelines, PG&E provided information on its situational awareness and forecasting, including environmental monitoring systems, grid monitoring systems, ignition detection systems, weather forecasting, and fire potential index as applicable.[246]

Below is Energy Safety's evaluation regarding the PG&E's objectives and targets, maturity levels, and strengths in these areas. In addition, Energy Safety has identified areas where PG&E must improve, described at the end of this section.

8.3.1 Objectives and Targets

As part of its Base WMP, PG&E provided 3-year and 10-year objectives for its situational awareness and forecasting programs.[247]

PG&E revised its situational awareness and forecasting objectives in its Revision Notice Responses.[248] The objectives were revised to include four new objectives. For example, PG&E initially intended to develop processes to analyze alarms, and alerts from EFD and DFA sensors to track effectiveness of incipient issue identification by December 31, 2023. In its Revision Notice Responses, it created a new objective which expands its EFD and DFA analysis for its 3-year cycle and creates new targets for deployment of these technologies.

PG&E also defined quantitative targets for initiative activities for its situational awareness and forecasting programs. PG&E's Base WMP includes end-of-year targets for 2023, 2024, and 2025. Selected targets are included in Table 8.3-1 to demonstrate the utility's projected progress in its situational awareness and forecasting section.

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[246] Technical Guidelines, Section 8.3, "Situational Awareness and Forecasting," pages 114-135 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[247] PG&E's 2023-2025 WMP, pages 690-693.

[248] PG&E's 2023-2025 WMP Response to Revision Notice, page 2.

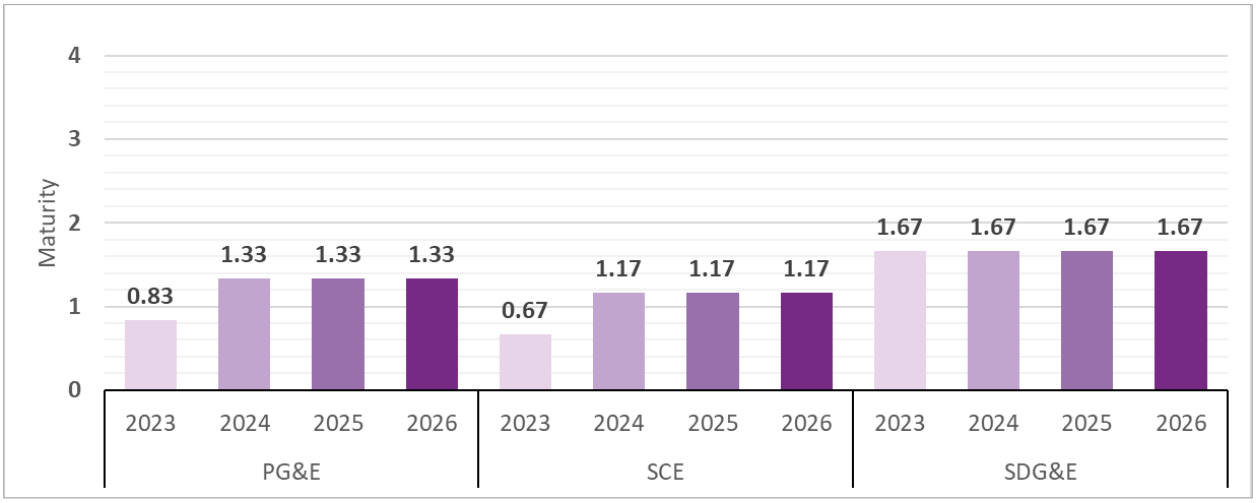
Table 8.3-1. PG&E Situational Awareness and Forecasting – Selected Targets

Initiative Activity	Target Unit	2023 Target	2024 Target	2025 Target
Line sensors	# Circuits installed	40	40	40
Distribution Fault Anticipation (DFA)	# Circuits installed	5	15	15
Early Fault Detection (EFD)	# Circuits installed	2	2	4

8.3.2 Maturity Survey Results

According to its responses to the 2023 Maturity Survey, PG&E has a 2023 maturity level of 0.83 for situational awareness and forecasting. For 2024, PG&E projects to increase in maturity to a level of 1.33. For 2025, PG&E projects the same in maturity to a level of 1.33 (Figure 8.3-1).

Figure 8.3-1. Cross-Utility Maturity for Situational Awareness and Forecasting (Minimum Values)



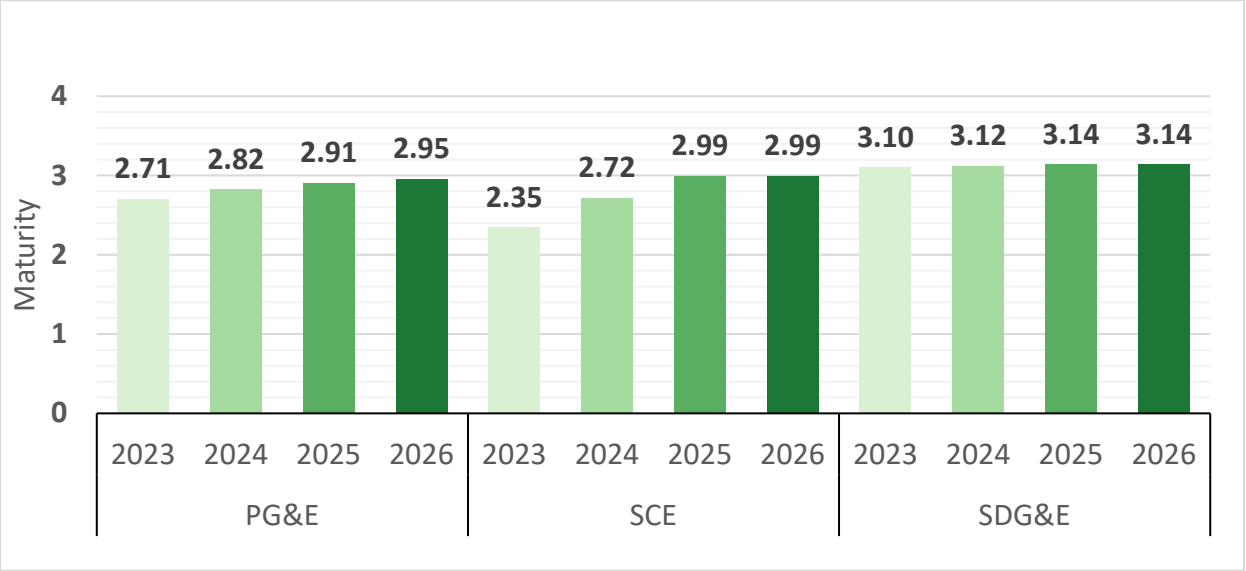
The utility's maturity level for the situational awareness and forecasting category described above is calculated using the minimum value sub-capability of each capability. Using the capability average is another way to look at PG&E's performance in situational awareness and forecasting. The capability average is determined from the average of all component sub-capabilities and is an additional tool to evaluate the utilities' maturity. [249]

When the category maturity is calculated using the capability average (rather than the minimum), PG&E has a maturity level for situational awareness and forecasting of 2.71 for

[249] For further information on maturity level determinations, see Section 4 of the 2023-2025 Electrical Corporation Wildfire Mitigation Maturity Model (second revision), published February 21, 2023.

2023, and projects an increase to 2.82 in 2024, and another increase to 2.91 in 2025 (Figure 8.3-2).

Figure 8.3-2. Cross-Utility Maturity for Situational Awareness and Forecasting (Average Values)



The rest of this section reports on maturity levels considering the average values.

PG&E's current maturity level in this category is around the same as its peers, with SCE and SDG&E reporting at levels 2.35 and 3.10, respectively. See Figure 8.3-2.

Based on its responses to the 2023 Maturity Survey, PG&E reported its highest levels of projected maturity in the following capabilities for 2023 and 2024:

- Wildfire detection and alarm systems. [250]
- Centralized monitoring of real-time conditions.[251]

Based on its responses to the 2023 Maturity Survey, PG&E reported its lowest levels of projected maturity in the following capabilities for 2023 and 2024:

- Ignition likelihood estimation.[252]

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[250] PG&E's responses to questions on the 2023 Maturity Survey under Category B "Situational Awareness and Forecasting," Capability 11 "Wildfire detection and alarm systems."

[251] PG&E's responses to questions on the 2023 Maturity Survey under Category B "Situational Awareness and Forecasting," Capability 12 "Centralized monitoring of real-time conditions."

[252] PG&E's responses to questions on the 2023 Maturity Survey under Category B "Situational Awareness and Forecasting," Capability 7 "Ignition likelihood estimation."

- Weather forecasting ability.[253]

8.3.3 PG&E's WMP Strengths

PG&E projects improvement in situational awareness and forecasting over the WMP cycle in the following areas: environmental monitoring systems and ignition detection systems. Further information is provided below.

PG&E reports having more than 600 wildfire cameras, providing coverage for over 90 percent of its HFTD areas.[254] PG&E has integrated these cameras with Artificial Intelligence software, enabling the automated generation of wildfire notifications across its service territory.[255] This can lead to early wildfire detection, assist in confirmation of wildfires, and provide situational awareness of current and ongoing wildfires that can impact its infrastructure.

In addition to its camera network, PG&E collects live fuel moisture (LFM) data monthly from 30 designated sites within its HFTD areas throughout its service territory.[256] This LFM data serves as a critical component of its Fire Potential Index (FPI) model, a tool used for assessing its risk and operational decision making, such as PSPS.[257] PG&E also contributes this LFM data to the National Fuel Moisture Database,[258] a resource widely used by local, state, and federal agencies to inform their fire danger ratings.

8.3.3.1 2022 Areas for Continued Improvement

Energy Safety evaluated the progress PG&E made toward addressing areas for continued improvement identified in Energy Safety's 2022 WMP Decision. PG&E sufficiently addressed its 2022 area of continued improvement in situational awareness and forecasting. See Appendix B for the status of each 2022 area for continued improvement.

8.3.4 Areas for Continued Improvement

PG&E must continue to improve in the following area.

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[253] PG&E's responses to questions on the 2023 Maturity Survey under Category B "Situational Awareness and Forecasting," Capability 8 "Weather forecasting ability."

[254] PG&E's 2023-2025 WMP, Page 721.

[255] PG&E's 2023-2025 WMP, Page 726.

[256] PG&E's 2023-2025 WMP, Page 702.

[257] PG&E's 2023-2025 WMP, Page 706.

[258] PG&E's 2023-2025 WMP, Page 708.

8.3.4.1 Weather Station Maintenance and Calibration

PG&E operates a large weather network consisting of over 1,400 weathers stations within its service territory.[259] These weather stations play a crucial role in providing near real-time situational awareness of weather conditions and in verifying forecast accuracy. This network is foundational to PG&E's fire potential index, influences its decision-making process for PSPS,[260] and contributes to the assessment of wildfire risk. Managing a large number of weather stations poses challenges related to regular maintenance, addressing repair tags, and ensuring calibration accuracy. Therefore, it is imperative that PG&E include a comprehensive update on the maintenance and calibration of its weather stations in its 2025 Update.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 11.

8.4 Emergency Preparedness

In response to Section 8.4 of the Technical Guidelines, PG&E provided information on its emergency preparedness, including its wildfire and PSPS emergency preparedness plan; collaboration and coordinating with public safety partners; public notification and communications strategy; preparedness and planning for service restoration; customer support in wildfire and PSPS emergencies; and learning after wildfire and PSPS events as applicable.[261]

Below is Energy Safety's evaluation regarding PG&E's objectives and targets, maturity levels, and strengths in these areas.

8.4.1 Objectives and Targets

As part of its Base WMP, PG&E provided 3-year and 10-year objectives for its emergency preparedness programs.[262] PG&E revised its emergency preparedness objectives in its Revision Notice Responses.[263] PG&E substantially revised its 10-year objectives to provide better emergency preparedness activities. These activities include communication with counties and a comprehensive risk assessment.

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[259] PG&E's 2023-2025 WMP, page 84.

[260] PG&E's 2023-2025 WMP, page 703.

[261] Technical Guidelines, Section 8.4, "Emergency Preparedness," pages 135-179 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[262] PG&E's 2023-2025 WMP, pages 626-628.

[263] PG&E's 2023-2025 WMP Response to Revision Notice, page 18-19.

PG&E's original 10-year objectives were:

- Maintain all hazards planning and preparedness program in 2026-2032.
- Expand all hazards planning to include additional threats and scenarios in 2026-2032.

In its responses to the Revision Notice,[264] PG&E provided the following, more detailed, 10-year objectives:

- Develop a Common Operating Picture (COP) using design technology. The COP is a continuously updated overview of an incident compiled throughout that incident's life cycle. The goal of a COP is real-time situational awareness across all levels of incident management and across all jurisdictions.
- Perform a Threats and Hazards Identification and Risk Assessment (THIRA) update every three years to address changes in the hazard landscape. Use information from THIRA to inform changes to the CERP and hazard annexes.
- Hold briefings with 47 counties within PG&E's service territory after every THIRA update which will support integrated planning discussions.

PG&E also defined quantitative targets for initiative activities for its emergency preparedness programs. PG&E's Base WMP includes end-of-year targets for 2023, 2024, and 2025. A selected target is included in Table 8.4.1.[265]

Table 8.4-1. PG&E Emergency Preparedness – Selected Target

Initiative Activity	Target Unit	2023 Target	2024 Target	2025 Target
Review and revise the Company Emergency Response Plan (CERP) and two related annexes (Wildfire Annex and PSPS Annex)	CERP and the Wildfire Annex and the PSPS Annex	Annually review	Annually review	Annually review

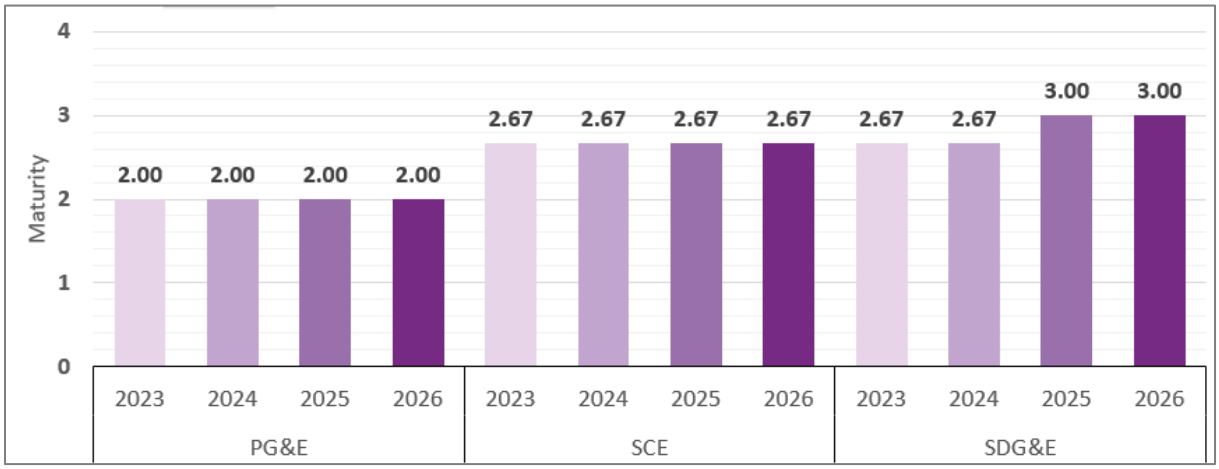
8.4.2 Maturity Survey Results

According to its responses to the 2023 Maturity Survey, PG&E has a 2023 maturity level of 2.00 for emergency preparedness. PG&E projects no maturity level change for 2024 or 2025 (Figure 8.4-1).

[264] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice and PG&E's 2023-2025 WMP Response to Revision Notice.

[265] PG&E's 2023-2025 WMP, page 631.

Figure 8.4-1. Cross-Utility Maturity for Emergency Preparedness (Minimum Values)

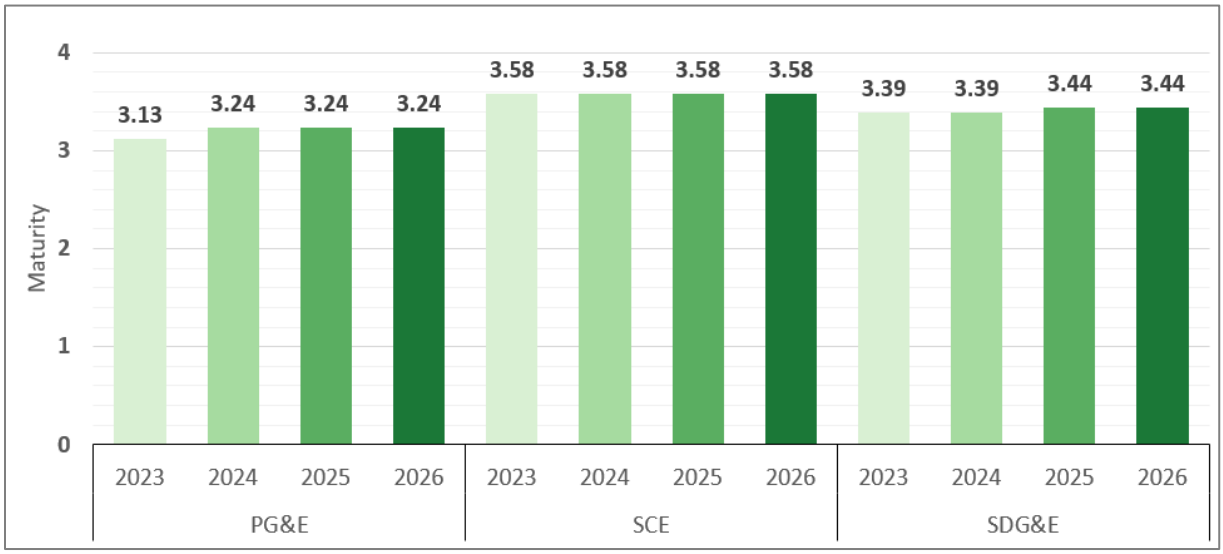


The utility's maturity level for the emergency preparedness category described above is calculated using the minimum value sub-capability of each capability. Using the capability average is another way to look at PG&E's performance in emergency preparedness. The capability average is determined from the average of all components sub-capabilities and is an additional tool to evaluate the utilities' maturity. [266]

When the category maturity is calculated using the capability average (rather than the minimum), PG&E has a maturity level for emergency preparedness of 3.13 for 2023, and projects an increase in maturity to 3.24 in 2024 and 2025 (Figure 8.4-2).

[266] For further information on maturity level determinations, see Section 4 of the 2023-2025 Electrical Corporation Wildfire Mitigation Maturity Model (second revision), published February 21, 2023.

Figure 8.4-2. Cross-Utility Maturity for Emergency Preparedness (Average Values)



The rest of this section reports on maturity levels considering the minimum values.

PG&E's maturity level in this category is limited by its response because it feels the following questions are not related to maturity, but are public safety orientated:

- To mature in this area, PG&E would need to have a more automated safety check process (mostly automated or fully automated). PG&E maintains that automated safety checks are not an accurate measure of maturity. PG&E further states that manual inspections are a safer and more thorough process prior to re-energization.[267]
- To mature in this area, PG&E would need to respond that it does provide support services within one hour of wildfire detection. PG&E maintains that it cannot provide the location of support services for wildfires within one hour of detection. PG&E further states that providing this information is the jurisdiction of the California Governor's Office of Emergency Services.[268]

PG&E's current maturity level in this category is lower than its peers, with SCE and SDG&E both reporting at level 2.67. See Figure 8.4-1.

Based on its responses to the 2023 Maturity Survey, PG&E reported its highest levels of projected maturity in the following capabilities for 2023 and 2024:

- Collaboration and coordination with public safety partners.[269]

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[267] PG&E's 2023 Maturity Survey, response to 6.4.1.Q1.

[268] PG&E's 2023 Maturity Survey, response to 6.3.4.Q6.

[269] PG&E's 2023 Maturity Survey, response to Capability 28

- Customer support in wildfire and PSPS emergencies.[270]

Based on its responses to the 2023 Maturity Survey, PG&E reported its lowest levels of projected maturity in the following capabilities for 2023 and 2024:

- Public emergency communication strategy.[271]
- Preparedness and planning for service restoration.[272]

8.4.3 PG&E's WMP Strengths

PG&E projects improvement in emergency preparedness over the WMP cycle in the following area: key personnel, qualifications, and training.

PG&E uses a progressive exercise approach to train emergency personnel and incorporates Business Continuity and Recovery Planning to test, practice, and strengthen incident preparedness and response. PG&E's approach is described in its Multi-Year Training and Exercise Plan (MYTEP).[273] This plan includes annual training for personnel who have emergency roles on required actions in coordination with internal and external incident and event stakeholders. The training is designed to resolve problems identified during responses to incidents, events, and exercises. MYTEP lays out a combination of progressive exercises and training requirements to validate plans and operational readiness in an all-hazards environment.[274] PG&E is the only large IOU conducting a training planning program like MYTEP. It goes beyond what its peer utilities do in emergency preparedness.

8.4.3.1 2022 Areas for Continued Improvement

There were no areas for continued improvement for PG&E in its emergency preparedness resulting from Energy Safety's evaluation of PG&E's 2022 WMP Update.

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[270] PG&E's 2023 Maturity Survey, response to Capability 31.

[271] PG&E's 2023 Maturity Survey, response to Capability 29.

[272] PG&E's 2023 Maturity Survey, response to Capability 30.

[273] A Multi-Year Training and Exercise Plan (MYTEP) is a plan that might be undertaken by any organization. In some cases, it has been defined as a document that establishes overall exercise program priorities and outlines in a multi-year schedule of training and exercise activities designed to address those priorities and validate core capabilities. Central Virginia Healthcare Coalition (2020) (https://central-region.org/wp-content/uploads/2020/11/MYTEP-V1-.pdf, accessed November 8, 2023); University of Illinois at Chicago (2023) (https://ready.uic.edu/planning/training-exercising/multi-year-training-and-exercise-plan/, accessed November 8, 2023).

[274] PG&E's 2023-2025 WMP, page 623.

8.4.4 Areas for Continued Improvement

Energy Safety has no areas for continued improvement for PG&E under the emergency preparedness section of its Base WMP.

8.5 Community Outreach and Engagement

In response to Section 8.5 of the Technical Guidelines, PG&E provided information on its community outreach and engagement, including its public outreach and educational awareness for wildfires, PSPS, outages, and vegetation management; public engagement in the WMP decision-making process; engagement with populations with access and functional needs (AFN), local governments, and tribal communities; collaboration on local wildfire mitigation and planning; and best practice planning as applicable.[275]

Below is Energy Safety's evaluation regarding the PG&E's objectives and targets, maturity levels, and strengths in these areas. In addition, Energy Safety has identified areas where PG&E must improve, described at the end of this section.

8.5.1 Objectives and Targets

As part of its Base WMP, PG&E provided 3-year and 10-year objectives for its community outreach and engagement programs.[276]

PG&E revised its community outreach and engagement objectives in its Revision Notice Responses.[277] The objectives were substantially revised.

PG&E's original 10-year objective was:

- Community Engagement – Meetings in 2026-2032.
    - Continue to hold community engagement meetings within the five PG&E regions of service. This work will include, but not be limited to, a mix of webinars, open houses, town halls, and/or answer centers.[278]

In its responses to the Revision Notice, PG&E provided the following, more detailed, 10-year objective:

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[275] Technical Guidelines, Section 8.5, "Community Outreach and Engagement," pages 179-194 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[276] PG&E's Revised 2023-2025 WMP, pages 848-849.

[277] PG&E's 2023-2025 WMP Response to Revision Notice, page 20-26.

[278] PG&E's 2023-2025 WMP, page 721.

- Community Engagement – Outreach to HFRA Infrastructure Customers.
    - PG&E will perform outreach via e-mail and/or phone to assigned Critical Infrastructure customers in the HFRA through Business Energy Solutions (assigned account managers). Outreach will cover the [Community Wildfire Safety Program] CWSP, including potential PSPS and EPSS impacts, and updating contact information for critical accounts in the HFRA.[279]

PG&E removed the original 10-year objective listed above because it was a continuation of its 3-year objective. In its place, PG&E added a new 10-year objective related to non-residential customer outreach.

PG&E also defined quantitative targets for initiative activities for its community outreach and engagement programs. PG&E's Base WMP includes end-of-year targets for 2023, 2024, and 2025. A selected target is included in Table 8.5-1.

Table 8.5-1. PG&E Community Outreach and Engagement – Selected Target

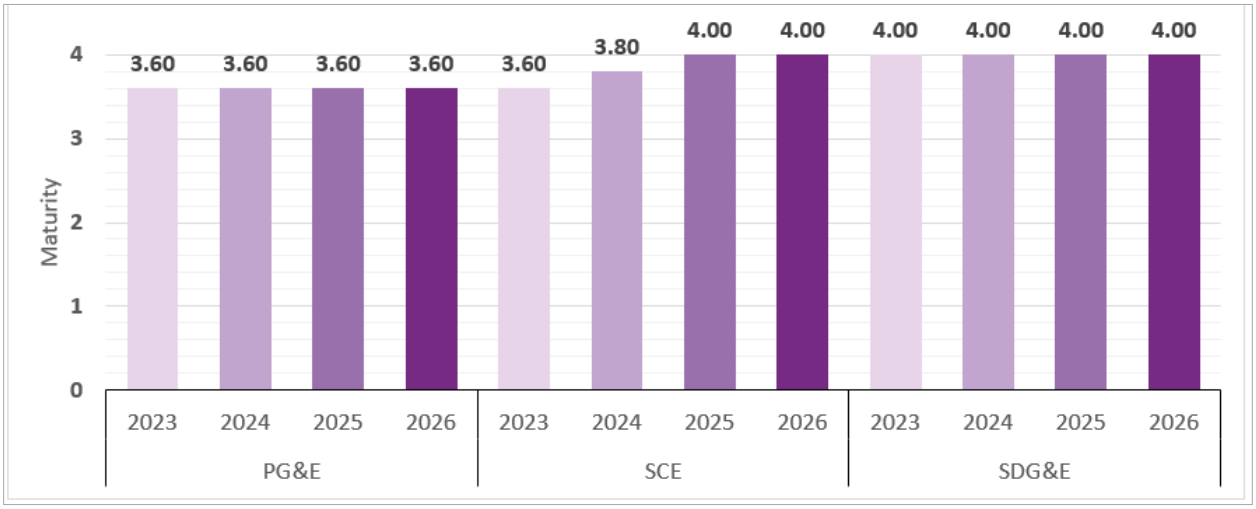
Initiative Activity	Target Unit	2023 Target	2024 Target	2025 Target
Community Engagement – Surveys	Conduct PSPS education and outreach surveys	2	2	2

8.5.2 Maturity Survey Results

According to its responses to the 2023 Maturity Survey, PG&E has a 2023 maturity level of 3.6 for community outreach and engagement. PG&E projects no maturity level change for 2024 or 2025 (Figure 8.5-1).

[279] PG&E's 2023-2025 WMP Revision Notice Response, page 26.

Figure 8.5-1. Cross-Utility Maturity for Community Outreach and Engagement (Minimum Values)

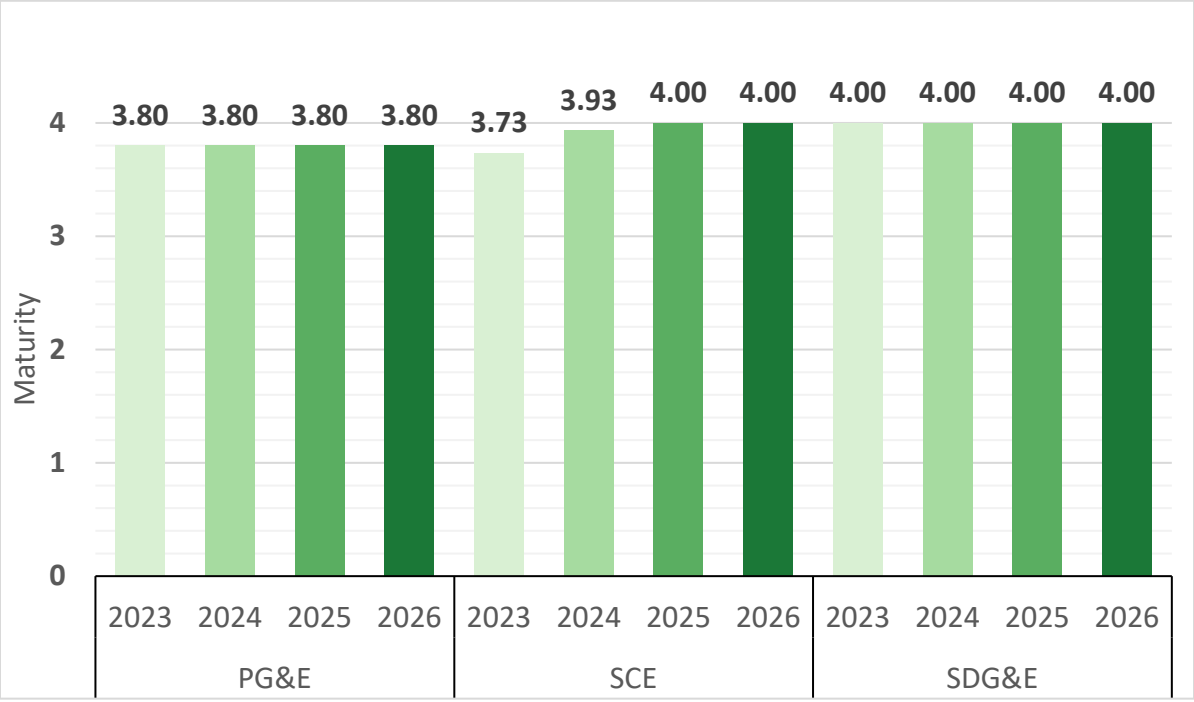


The utility's maturity level for the community outreach and engagement category described above is calculated using the minimum value sub-capability of each capability. Using the capability average is another way to look at PG&E's performance in community outreach and engagement. The capability average is determined from the average of all component sub-capabilities and is an additional tool to evaluate the utilities' maturity. [280]

When the category maturity is calculated using the capability average (rather than the minimum), PG&E has a maturity level for community outreach and engagement of 3.8 for 2023 and projects no change through 2025 (Figure 8.5-2).

[280] For further information on maturity level determinations, see Section 4 of the 2023-2025 Electrical Corporation Wildfire Mitigation Maturity Model (second revision), published February 21, 2023.

Figure 8.5-2. Cross-Utility Maturity for Community Outreach and Engagement (Average Values)



The rest of this section reports on maturity levels considering the minimum values.

PG&E's current maturity level in this category is around the same as its peers, with SCE and SDG&E reporting at levels 3.6 and 4, respectively. See Figure 8.5-1.

Based on its responses to the 2023 Maturity Survey, PG&E reported its highest levels of projected maturity in the following capabilities for 2023 and 2024:

- Public engagement in electrical corporation wildfire mitigation planning.[281]
- Engagement with AFN customers and socially vulnerable populations.[282]
- Cooperation and best practice sharing with other electrical corporations.[283]

Based on its responses to the 2023 Maturity Survey, PG&E reported its lowest levels of projected maturity in the following capabilities for 2023 and 2024:

[281] PG&E's responses to questions on the 2023 Maturity Survey under Category G "Community Outreach and Engagement," Capability 34 "Public engagement in electrical corporation wildfire mitigation planning."

[282] PG&E's responses to questions on the 2023 Maturity Survey under Category G "Community Outreach and Engagement," Capability 35 "Engagement with AFN and socially vulnerable populations."

[283] PG&E's responses to questions on the 2023 Maturity Survey under Category G "Community Outreach and Engagement," Capability 37 "Cooperation and best practice sharing with other electrical corporations."

- Public outreach and education awareness.[284]
- Collaboration on local wildfire mitigation planning.[285]

8.5.3 PG&E's WMP Strengths

PG&E projects improvement in community outreach and engagement over the WMP cycle in the following areas: Public Outreach and Education Awareness Program.

PG&E is growing its public outreach and education awareness program to account for other wildfire mitigation programs, such as EPSS. PG&E states that in 2023 it will focus on integrating awareness and education on its EPSS program into its broader Community Wildfire Safety Program (CWSP).[286] This includes integrating customer messaging on wildfire safety outages resulting from EPSS, as well as updating its direct-to-customer mail, email, and other outreach materials to provide overall awareness of its EPSS program.[287]

8.5.3.1 2022 Areas for Continued Improvement

There were no areas for continued improvement for PG&E in its community outreach and engagement resulting from Energy Safety's evaluation of PG&E's 2022 WMP Update.

8.5.4 Areas for Continued Improvement

PG&E must continue to improve in the following areas.

PG&E does not provide sufficient detail in its 2023-2025 WMP about its evaluation of its AFN customers' specific needs. For example, PG&E provides descriptions of the stakeholder forums and focus groups it works with to identify customer challenges;[288] however, it does not describe any challenges it has identified through these forums and focus groups regarding AFN customer needs during wildfire or PSPS events. While PG&E references its Annual AFN Plan for PSPS Support[289] for descriptions of specific challenges and needs, it is unclear where in this plan PG&E discusses these challenges and needs.[290]

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[284] PG&E's responses to questions on the 2023 Maturity Survey under Category G "Community Outreach and Engagement," Capability 33 "Public outreach and education awareness."

[285] PG&E's responses to questions on the 2023 Maturity Survey under Category G "Community Outreach and Engagement," Capability 36 "Collaboration on local wildfire mitigation planning."

[286] PG&E's 2023-2025 WMP, page 858.

[287] PG&E's 2023-2025 WMP, page 858.

[288] PG&E's 2023-2025 WMP, pages 866-868.

[289] PG&E's 2023-2025 WMP, page 866-867.

[290] PG&E's 2023-2025 WMP, pages 866-867.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 11.

8.6 Cross-Category Observations

8.6.1 Areas for Continued Improvement

PG&E must continue to improve in the following areas.

8.6.1.1 Evaluation and Reporting of Safety Impacts Relating to EPSS

PG&E considers unplanned and sustained outages as the only impact directly resulting from its use of EPSS.[291] However, there are broader impacts, such as reliability and other associated safety impacts that PG&E must also take into consideration. This minimizes the scope and scale of such outages, which has markedly reduced PG&E's reliability and has cascading effects on customers.

In its responses to the Revision Notice, PG&E stated that it has "not experienced significant increases in HFRA outage frequency since the implementation of EPSS."[292] However, PG&E's 2022 Annual Electric Reliability Report states otherwise: according to that report, implementation of EPSS (along with DCD) has resulted in negative reliability impacts, with "customers experiencing more and longer sustained outages."[293] PG&E must accurately describe the reliability and safety impacts of its use of EPSS and fully justify its choice to use EPSS, demonstrating that the benefits of its use of EPSS in reduced wildfire risk outweigh the reliability and safety impacts.

Currently, PG&E implements EPSS on all circuits when its Fire Potential Index (FPI) is at R3 or higher.[294] However, PG&E shows very few destructive fires occurring between R3 and R4 conditions, with only one denoted as destructive.[295] PG&E must provide further analysis to demonstrate how it weighs the impacts of its use of EPSS on reliability and safety against the

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[291] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice Redline, page 43.

[292] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice Redline, page 43.

[293] PG&E's 2022 Annual Electric Reliability Report (D. 16-01-008), page 5 (https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/infrastructure/electric-reliability-reports/2022-pge-annual-electric-reliability-report.pdf, accessed November 9, 2023). As referenced in Cal Advocates' Opening Comments on PG&E's Revised 2023-2025 WMP, page 7: (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=54526&shareable=true), accessed November 9, 2023).

[294] PG&E's 2023-2025 WMP R3, Figure PG&E-8.1.8-2: FPI EPSS Enablement Criteria, page 564.

[295] PG&E's 2023-2025 WMP R3, Figure PG&E-6.2.2-6: Technosylva Simulation and Destructive Fire Relationship, page 172. "Destructive" in this instance is defined as "a fire that destroys 100 or more structures but does not result in a serious injury or fatality" from PG&E's 2023-2025 WMP R3, Table PG&E-A-3: PG&E Glossary of Additional Defined Terms, page 989.

benefits associated with reduced wildfire risk. Additionally, many of PG&E's EPSS outages were outside the HFTD,[296] even though areas outside the HFTD typically have substantially lower wildfire risk.

8.6.1.2 Fire Potential Index (FPI) and Ignition Probability Weather (IPW) Enhancement

PG&E's FPI serves as a critical tool for forecasting the potential for large catastrophic wildfires within its service territory. It drives decisions to communicate wildfire risk to workers,[297] allowing them to take necessary precautions during elevated FPI conditions, and acts as a key input into the decision-making process for the initiation of a PSPS event.[298]

Similarly, PG&E uses the IPW model in evaluating the likelihood of wind-driven outages and the probability of tree overstrikes.[299] PG&E reports that both the FPI and IPW models learn from historical data, which include data about past fires, outages, and ignitions, along with the conditions under which these occurred, in order to forecast future fires, outages, and ignitions.[300]

However, while these models are useful tools, they do not directly factor in specific mitigations that can reduce the risk of a potential PSPS event, such as covered conductor and EPSS. As part of its responses to the Revision Notice,[301] PG&E commits to evaluating enhancements to improve the skill of both its FPI and IPW models, which involves testing new features, model configurations, and the inclusion of covered conductor and EPSS on the system.[302]

PG&E must provide an update on its progress evaluating enhancements of its FPI and IPW models in its 2025 Update.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 11.

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[296] MGRA DR 2 (Question 7), (https://www.pge.com/pge_global/common/pdfs/safety/emergency-preparedness/natural-disaster/wildfires/wildfire-mitigation-plan/reference-docs/2023/MGRA_002.zip\, accessed October 24, 2023).

[297] PG&E's 2023-2025 WMP, page 560.

[298] PG&E's 2023-2025 WMP, page 897.

[299] PG&E's 2023-2025 WMP, page 162.

[300] PG&E's 2023-2025 WMP, page 185.

[301] Critical Issue RN-PG&E-23-01 and Critical Issue RN-PG&E-23-08.

[302] PG&E's 2023-2025 WMP, page 290.

9. Public Safety Power Shutoffs

In response to Section 9 of the Technical Guidelines,[303] PG&E provided its key statistics regarding PSPS; circuits that have been frequently de-energized and measures for how to reduce PSPS implementation on those circuits; how its PSPS program will evolve over the next three and ten years; lessons learned for past PSPS events; and its protocols for PSPS implementation.

Below is Energy Safety's evaluation regarding the PG&E's objectives and targets, maturity levels, and strengths in these areas.

9.1 Objectives and Targets

As part of its Base WMP, PG&E provided 3-year and 10-year objectives for its PSPS programs.[304]

PG&E also defined quantitative targets for the initiative activities for its PSPS programs. PG&E's Base WMP includes end-of-year targets for 2023, 2024, and 2025. A selected target is included in Table 9.1-1 to demonstrate the utility's projected progress.

Table 9.1-1. PG&E Public Safety Power Shutoffs – Selected Target

Initiative Activity	Target Unit	2023 Target	2024 Target	2025 Target
Reduce PSPS customer events by completing mitigation projects	Customer events reduced	15,000	18,000	22,000

9.2 Maturity Survey Results

The Maturity Survey does not measure the maturity of a utility's PSPS operations separately from other mitigation efforts. While it does measure the maturity of PSPS likelihood, exposure potential, and vulnerability, these risk component maturity levels are primarily evaluated in Section 6, Risk Methodology and Assessment, and Section 7, Wildfire Mitigation Strategy Development. Individual maturity capabilities or survey questions related to PSPS are evaluated in the relevant subsection of Section 6.

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[303] Technical Guidelines, Section 9, pages 195-206 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[304] PG&E's 2023-2025 WMP R3, pages 911-914.

9.3 PG&E's WMP Strengths

PG&E projects improvement in PSPS-related initiatives and activities over the WMP cycle. Further information is provided below.

PG&E's PSPS protocols account for open Priority 1 and 2 vegetation maintenance tags or open high-risk asset compliance tags.[305] PG&E states it targets the high-risk open tags in areas of potential severe weather event to avoid PSPS if possible.[306]

PG&E has a wide suite of programs to mitigate the impact of PSPS if an event is imminent, including temporary generation solutions, community resource centers, partnerships with community-based organizations, and proactive communication with public safety partners.[307]

PG&E has quantified its PSPS impact reduction and targets reducing 55,000 customer events through this WMP cycle by implementing wildfire mitigation measures.[308]

9.3.1 2022 Areas for Continued Improvement

Energy Safety evaluated the progress PG&E made toward addressing areas for continued improvement identified in Energy Safety's 2022 WMP Decision. See Appendix B for the status of each 2022 area for continued improvement.

Regarding PGE-22-31, PSPS Wind Speed Threshold Change, PG&E states that it does not use wind speed thresholds to trigger PSPS, and instead uses a risk-based approach.[309] Continued requirements for evaluation of how covered conductors, along with other mitigations, is included into the IPW model and PSPS decision making are also set forth in the area for continued improvement "Fire Potential Index (FPI) and Ignition Probability Weather (IPW) Enhancement," discussed in Section 8.6.

9.4 Revision Notice Critical Issues

As described in Section 3.4, Energy Safety issued PG&E a Revision Notice in response to its WMP submitted on June 22, 2023. PG&E submitted its Revision Notice Response on August 7,

[305] PG&E's 2023-2025 WMP, page 928.

[306] PG&E's 2023-2025 WMP, page 928.

[307] PG&E's 2023-2025 WMP, page 939.

[308] PG&E's 2023-2025 WMP, page 917.

[309] PG&E's 2023-2025 WMP, pages 1115 – 1119.

2023, and submitted its Supplement Revision Notice Response on September 27, 2023.[310] This section evaluates those responses as it relates to PSPS.[311]

9.4.1 RN-PG&E-23-08: PG&E's PSPS decision-making process does not accurately account for EPSS enabled circuits, which could potentially lead to more PSPS events than needed.

Energy Safety required PG&E to revise its WMP to include a detailed plan, including a timeline, on how it will accurately account for EPSS enabled circuits in its PSPS decision-making process.

9.4.1.1 RN-PG&E-23-08: PG&E Response Summary

In PG&E's responses to the Revision Notice, it modified its commitment to the IPW modeling framework improvements to explicilty refer to EPSS. PG&E states that the IPW model is the component of its PSPS protocol that captures the effect of mitigations that reduce ignition probability, including EPSS. PG&E expects its IPW enhancements to be completed in 2024 and incorporated into PSPS protoclols thereafter.[312]

9.4.1.2 RN-PG&E-23-08: Energy Safety Evaluation

Energy Safety looks forward to PG&E's IPW model enhancements in 2024 and expects PG&E to thoroughly examine whether and how EPSS enablement is included in its IPW model, and ultimately, explain how those analyses are incorporated into PSPS decision making.

Energy Safety finds that PG&E has de-escalated this critical issue to an area for continued improvement. Required progress on this topic is captured in area for continued improvement "Fire Potential Index (FPI) and Ignition Probability Weather (IPW) Enhancement," discussed in Section 8.6.

Energy Safety sets forth specific areas for improvement and associated required progress in Section 11.

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[310] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice and PG&E's 2023-2025 WMP Response to Revision Notice.

[311] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice and PG&E's 2023-2025 WMP Response to Revision Notice.

[312] PG&E's 2023-2025 WMP, pages 930-931.

9.5 Areas for Continued Improvement

Energy Safety has no areas for continued improvement for PG&E under the PSPS section of its Base WMP.

10. PG&E's Process for Continuous Improvement

In response to Sections 10, 11, and 12 of the Technical Guidelines,[313] PG&E provided information on its lessons learned, a description of its corrective action program, and information on any Notices of Violation or Notices of Defects it has received.

Below is Energy Safety's evaluation regarding these steps to drive continuous improvement, including any areas where PG&E must improve, which are described at the end of this section.

10.1 Lessons Learned

Section 10 of the Technical Guidelines requires a utility to use lessons learned to drive continuous improvement in its WMP. Lessons learned can be divided into the three main categories: (1) internal monitoring and evaluation, (2) external collaboration with other electrical corporations, and (3) feedback from Energy Safety or other authoritative bodies. This section includes an assessment of PG&E's implementation of lessons learned.

PG&E has developed 13 proposed WMP improvements based on lessons learned from 2020-2022.[314] Highlighted improvements include directly addressing roughly half of the 89 CPUC reportable ignitions through installing system protection equipment with Down Conductor Detection and requiring break-away service connectors in the construction standard for new rebuilds to improve PSPS communication.

Regarding internal monitoring and evaluation, PG&E reinforced and expanded its situational awareness, customer outreach and support, and refined operational practices to reduce wildfire potential and impacts on customers. As one example, PG&E received feedback that customers need more resources to mitigate outage impacts from wildfire mitigation programs (PSPS/EPSS). As a result of this feedback, PG&E enhanced customer education about resources for customers with access and functional needs (AFN) before, during, and after a wildfire or wildfire safety outage.

Using previous feedback from Energy Safety, PG&E enhanced its asset inspections process. PG&E conducted a 12-week quality control field review that involved 3,000-plus field reviews. 43.5 percent of these field reviews achieved a perfect review, which was below the internal target of 65 percent. A separate quality verification of the distribution system inspections was conducted over a 9-week period. PG&E's inspections over this period received a 77.35 percent

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[313] Technical Guidelines, Section 10, pages 207-209; Section 11, pages 210-211; Section 12, pages 212-213 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[314] PG&E's 2023-2025 WMP, Table 10-1 "Lessons Learned," page 790.

pass rate, below the internal target pass rate of 90 percent. During the quality verification process, PG&E found that the most commonly occurring identification failures (which can lead to potential ignitions) related to improper conductor splices, pole damage, missing/loose/damaged guy wires, exposed/broken/damaged grounds, service connections, missing inspection photos, incorrect tap clamp installations, damaged insulators and king-pins, and damaged anchor rods. These findings brought about PG&E's proposed WMP improvement to transition to 1-3 year inspection cycles for plat maps in the HFTD, with frequent assignments based on the wildfire consequence scores from the WDRM v3.

PG&E is also continuing to collaborate with peer California electrical corporations by participating in workshops to address remedies, fuse replacements, covered conductor effectiveness, EPSS settings, and to share other best practices. As an example, since its 2022 WMP Update, PG&E learned from SDG&E that including EPSS specific buffer zones in the enablement criteria increased overall safety. As a result of this information, PG&E updated the EPSS enablement criteria based on SDG&E's criteria for fast trip activation on Red Flag Warning days only.

In addition to the above, PG&E also provided lessons learned from each of the past PG&E equipment-related catastrophic fires.[315] This section of PG&E's Base WMP provides a narrative of 25 fires and breaks down the cause of the fire, lessons learned, measures to mitigate the identified cause, and how lessons learned will be integrated into PG&E's overall wildfire strategy. Of those 25 instances, PG&E most frequently identifies lessons learned that involve improving training, mitigating vegetation contact, and enhancing asset inspection and maintenance.

10.2 Corrective Action Program

Section 11 of the Technical Guidelines requires a utility to describe its corrective action program and a summary of the relevant portions of its existing procedures. This section includes an assessment of PG&E's implementation of its Corrective Action Program (CAP) relative to wildfire safety, including how it prevents recurrence of risk events; addresses findings from wildfire investigations; addresses findings from Energy Safety Compliance Assurance Division; and addresses areas for continued improvement identified by Energy Safety as applicable.

PG&E describes its CAP[316] and reports on how its CAP activities are designed to prevent the recurrence of risk events, address findings from internal and external wildfire investigations,

[315] PG&E's 2023-2025 WMP, Table PG&E-22-08-1 "Lessons Learned from Utility-Caused Catastrophic Fires," page 870.

[316] PG&E's 2023-2025 WMP, pages 798-806.

address findings from Energy Safety's Compliance Assurance Division, and address areas for continued improvement identified by Energy Safety.

PG&E reports that it uses its CAP to assign a risk level for internal issues, chooses a relevant evaluation based on this risk level, and then develops a corrective action and assigns an action owner until the CAP issue can be marked complete. PG&E states that it meets quarterly with other IOUs and participates in various joint utility workshops to ensure the appropriate mitigations are in place to address the risk of wildfire.

PG&E explains that as it identifies and/or receives areas to improve, it reviews and vets those opportunities through its CAP. PG&E provides several examples, such as identifying new training programs or revising standards/procedures to prevent issues from reoccurring, tracking areas for continued improvement from the 2022 WMP, and improving external communication regarding findings from internal and external wildfire investigations.

10.3 Areas for Continued Improvement

Energy Safety has no areas for continued improvement for PG&E in these areas of its Base WMP.

11. Required Areas for Continued Improvement

Energy Safety's evaluation of the 2023-2025 WMPs focused on each utility's strategies for reducing the risk of utility-related ignitions. The evaluation included assessing the utility's progress implementing wildfire mitigation initiatives, evaluating the feasibility of its strategies, and measuring year-to-year trends. As a result of this evaluation, Energy Safety identified areas where the utility should continue to improve its wildfire mitigation capabilities in future plans. The complete list of all PG&E's areas for continued improvement follows below.

11.1 Risk Methodology and Assessment

- **PG&E-23-01. Cross-Utility Collaboration on Risk Model Development**
  - Description: PG&E and the other IOUs have participated in past Energy Safety-led risk modeling working group meetings. The risk model working group meetings facilitate collaboration among the IOUs on complex technical issues related to risk modeling. The risk modeling working group meetings are ongoing.
  - Required Progress: PG&E and the other IOUs must continue to participate in all Energy Safety-led risk modeling working group meetings.
  - Discussed in Section 6, "Risk Methodology and Assessment."

- **PG&E-23-02. PSPS and Wildfire Risk Trade-Off Transparency**
  - Description: PG&E does not provide adequate transparency regarding PSPS and wildfire risk trade-offs, or how it uses risk ranking and risk buy-down to determine risk mitigation selection.
  - Required Progress: In its 2025 Update, PG&E must describe:
    - How it prioritizes PSPS risk in its risk-based decisions, including trade-offs between wildfire risk and PSPS risk.
    - How the rank order of its planned mitigation initiatives compares to the rank order of mitigation initiatives ranked by risk buy-down estimate, along with an explanation for any instances where the order differs.
  - Discussed in Section 6, "Risk Methodology and Assessment"; Section 7, "Wildfire Mitigation Strategy Development."

- **PG&E-23-03. Incorporation of Extreme Weather Scenarios into Planning Models**
  - Description: PG&E currently relies on wind conditions data collected over the past 30 years that does not consider rare but foreseeable and significant risks. PG&E does not directly evaluate the risk of extreme wind events in its service territory to prioritize its wildfire mitigations using the WTRM Planning model.
  - Required Progress: In its 2026-2028 Base WMP, PG&E must report on its progress developing statistical estimates of potential wind events over at least the maximum asset life for its system. PG&E must evaluate results from incorporating these into WTRM-Planning when developing its mitigation initiative portfolio or explain why the approach would not serve as an improvement to its mitigation strategy.
  - Discussed in Section 6, "Risk Methodology and Assessment."

11.2 Wildfire Mitigation Strategy Development

- **PG&E-23-04. Cross-Utility Collaboration on Best Practices for Inclusion of Climate Change Forecasts in Consequence Modeling, Inclusion of Community Vulnerability in Consequence Modeling, and Utility Vegetation Management for Wildfire Safety**
  - Description: PG&E and the other IOUs have participated in past Energy Safety-sponsored scoping meetings on these topics but have not reported other collaboration efforts.
  - Required Progress: PG&E and the other IOUs must participate in all Energy Safety-organized activities related to best practices for:
    - Inclusion of climate change forecasts in consequence modeling.
    - Inclusion of community vulnerability in consequence modeling.
    - Utility vegetation management for wildfire safety.

    PG&E must collaborate with the other IOUs on the above-mentioned best practices. In their 2025 Updates, the IOUs (not including independent transmission operators) must provide a status update on any collaboration with each other that has taken place, including a list of any resulting changes made to their WMPs since the 2023-2025 WMP submission.
  - Discussed in Section 7, "Wildfire Mitigation Strategy Development"; Section 8.2, "Vegetation Management and Inspections."

11.3 Grid Design, Operations, and Maintenance

- **PG&E-23-05. Updating Grid Hardening Decision Making**
  - Description: PG&E's current methodology does not appropriately account for various factors needed for grid hardening decision making.
  - Required Progress: In its 2025 Update, PG&E must:
    - Provide more accurate effectiveness estimates for its hardening efforts when calculating WBCA. The estimates must include:
      - Details on effectiveness calculations for mitigations, including justification based on observed in-field effectiveness.
      - Analysis based on ignition and wildfire risk reduction.
      - Location-specific undergrounding effectiveness compared to combinations of mitigations, including any new mitigations being deployed from pilot stages (such as covered conductor, distributed fault anticipation, early fault detection, falling conductor protection, other advanced protection, and EPSS).
      - An estimate of the cumulative risk exposure of its mitigation initiative portfolio taking into account the time value of risk as part of mitigation comparisons.
      - Details on any projects driven by reliability risk as opposed to wildfire risk. This consists of projects with the largest percentage of monetary risk within the WBCA coming from the summation of reliability-related risks. Details must include:
        - A list of these projects.
        - The breakdown of WBCA scores for such projects.
        - Whether or not the projects are within the HFTD or HFRA.
        - An explanation as to why the project was included for prioritization within the WMP for hardening.
        - If applicable, adjustments to PG&E's hardening scope to account for the above evaluation. If PG&E is not adjusting its hardening scope, it must provide an explanation as to why adjustments are not necessary.
  - Discussed in Section 8.1, "Grid Design, Operations, and Maintenance" (8.1.2 "Grid Design and System Hardening").

- **PG&E-23-06. Continuation of Grid Hardening Joint Studies**
  - Description: The utilities have jointly made progress addressing the continued Joint IOU Covered Conductor Working Group area for continued improvement

(PGE-22-09 and PGE-22-10). Energy Safety expects the utilities to continue these efforts and meet the requirements of this ongoing area for continued improvement.

- Required Progress: In its 2025 Update, PG&E, along with all other IOUs (not including independent transmission operators), must continue the relevant studies and meetings and report on the progress and outcomes of these studies and meetings in the Joint IOU Covered Conductor Working Group Report. This must include:
  - Progress made on any next steps included in the report.
  - A description of any lessons learned PG&E has applied to its WMP, including a list of applicable changes and a timeline for expected implementation.
  - A summary of any completed workshops, including a list of topics and dates, and takeaways.
  - A list of additional workshops and proposed dates.

  Additionally, PG&E must continue to collaborate with other utilities on efforts relating to grid hardening. In its 2026-2028 Base WMP, PG&E, along with other utilities, must submit a report which discusses continued efforts including:
  - The IOUs' joint evaluation of the effectiveness of undergrounding. This must account for any remaining risk from secondary or service lines, analysis on in-field observations from potential failure points of underground equipment, and ignition risk as well as PSPS risk.
  - The IOUs' joint lessons learned on undergrounding applications. This must include the use of resources to accommodate undergrounding programs, any new technologies being applied to undergrounding, and cost or deployment maximization efforts being used.
  - The IOUs' joint evaluation of various approaches to implementation of protective equipment and device settings. This must include analysis of the effectiveness of various settings, lessons learned on how to minimize reliability and associated safety impacts (including use of downed conductor detection and partial voltage detection devices), variations on settings being used including thresholds of enablement, and equipment types in which such settings are being adjusted.
  - The IOUs' continued efforts to evaluate new technologies being piloted and deployed. This must include, but not be limited to: REFCL, EFD, DFA, falling conductor protection, use of smart meter data, open phase detection, remote grids, and microgrids.
  - The IOUs' joint evaluation of the effectiveness of mitigations in combination with one another, including, but not limited to overhead

system hardening, maintenance and replacement, and situational awareness mitigations.

- Discussed in Section 8.1, "Grid Design, Operations, and Maintenance" (8.1.2 "Grid Design and System Hardening").

- **PG&E-23-07. Deployment of New Technologies**
  - Description: PG&E is behind its peers when it comes to the deployment of new technologies and has not provided active plans to meet the same levels of implementation.
  - Required Progress: In its 2025 Update, PG&E must:
    - Report on the progress of its pilots for new technologies. This must include, but not be limited to, EFD, DFA, FCP, and REFCL.
    - Adjust any targets associated with new technologies if pilots prove to be successful and PG&E is moving toward deployment.
    - Account for new technologies when evaluating mitigations in combination as part of its decision-making process.
  - Discussed in Section 8.1, "Grid Design, Operations, and Maintenance" (8.1.2 "Grid Design and System Hardening").

- **PG&E-23-08. Covered Conductor Inspection and Maintenance**
  - Description: PG&E has not shown that its current inspection and maintenance programs have been updated to sufficiently address covered conductor. While PG&E has adjusted its inspection practices to address some of the failure modes related to covered conductor, it does not account for the water intrusion failure mode.
  - Required Progress: In its 2025 Update, PG&E must:
    - Discuss how the water intrusion failure mode unique to covered conductor will be accounted for in its inspections.
    - If PG&E determines no changes are necessary, PG&E must discuss and show how the current inspection and maintenance processes comprehensively address covered conductor failure modes.
    - If PG&E determines changes are necessary, PG&E must provide its inspection checklists and procedures demonstrating changes tailored to addressing covered conductor, as identified through the utility covered conductor joint studies.
  - Discussed in Section 8.1, "Grid Design, Operations, and Maintenance" (8.1.3 "Asset Inspections").

- **PG&E-23-09. Decrease in Detailed Distribution Inspections**
  - Description: PG&E is adjusting its detailed distribution program inspection frequency to be based on plat maps instead of the HFTD. Under the new approach, PG&E will significantly reduce the number of distribution detailed inspections it performs each year. PG&E has not demonstrated that its proposed approach will mitigate risk more effectively than alternatives.
  - Required Progress: In its 2025 Update, PG&E must:
    - Provide analysis supporting its decision to inspect the "high" risk plat map every two years, as opposed to annually. This analysis must include the find rate of priority A and B conditions in the HFTD Tier 3 that overlap with "high" risk plat map, and a risk cost comparison of the currently proposed approach to an approach inspecting "extreme," "severe," and "high" risk plat maps annually.
    - Provide analysis supporting its decision to inspect the "medium" risk plat map every three years, instead of every two years.
    - Discuss how it will monitor risk in the "high," "medium," and "low" risk plat maps given less frequent detailed distribution inspections.
    - Discuss if any alternatives to distribution detailed inspections will be implemented covering the structures that will experience less frequent detailed inspections.
  - Discussed in Section 8.1, "Grid Design, Operations, and Maintenance" (8.1.3 "Asset Inspections").

- **PG&E-23-10. Current Limiting Fuse Replacement**
  - Description: PG&E has experienced an increase in current limiting fuse failures and identified the root cause to be an internal weld separation associated with certain models. PG&E has stopped the installation of the affected current limiting fuses but does not provide a plan to address the inventory that has already been installed.
  - Required Progress: In its 2025 Update, PG&E must provide a plan that outlines specific steps and measures PG&E will take to reduce the risk of the affected fuses installed in its service territory.
  - Discussed in Section 8.1, "Grid Design, Operations, and Maintenance" (8.1.4 "Equipment Maintenance and Repair").

- **PG&E-23-11. Transformer Predictive Maintenance**
  - Description: PG&E states it has developed a modeling tool that can identify distribution transformers with a high probability of failure but does not commit

to leveraging this model to proactively replace transformers in areas of high fire risk.[317]

- Required Progress: In its 2025 Update, PG&E must:
  - Provide a timeline for the evaluation and production roll out of Electric Program Investment Charge (EPIC) 3.20 Data Analytics for Predictive Maintenance, Part 1- Distribution Transformers.
  - Describe how the model will be incorporated into PG&E's existing maintenance and/or inspection programs.
- Discussed in Section 8.1, "Grid Design, Operations, and Maintenance" (8.1.4 "Equipment Maintenance and Repair").

- **PG&E-23-12. Distribution Backlog Open Tag Reduction Targets**
  - Description: In its Supplemental Revision Notice Response, PG&E provided a revised plan to address its distribution tag backlog that it stated will address distribution ignition tags at a faster pace than its original submission. PG&E expects this approach to enable closure of 66,200 ignition tags in 2024 and 59,000 ignition tags in 2025, as opposed to the original submission's 46,000 in 2024 and 55,000 in 2025. The targets PG&E committed to only reflect the original submission's 46,000 in 2024 and 55,000 in 2025.
  - Required Progress: PG&E's targets must reflect the pace of its revised plan for addressing tags over the 2024-2025 period. In its 2025 Update, PG&E must provide an update to its distribution backlog targets in Tables 7-3-2, 8-3, and RN-PG&E-23-04-2 to reflect distribution ignition backlog tag closures of 79,200 in 2025, as stated in the revised plan narrative. The number 79,200 includes the 59,000 target for 2025 plus an additional 20,200 tags. The balance of the additional tags PG&E expects to complete in 2024 is 20,200 under its revised plan, but this is not reflected in its 2024 target. If PG&E completes the additional 20,200 tag closures in 2024 as projected, PG&E must only meet its stated 59,000 target in 2025.[318]
  - Discussed in Section 8.1, "Grid Design, Operations, and Maintenance" (8.1.4 "Equipment Maintenance and Repair").

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[317] PG&E'S 2023-2025 WMP Revision 3, page 513.

[318] If PG&E completes more than 46,000 distribution backlog tags in 2024, PG&E will only be expected to complete the difference subtracted from 79,200 in 2025.

$$T_e = 79{,}200 - (T_a - 46{,}000)$$

Where T_e is the expected number of backlog distribution tags closed in 2025 and T_a is the actual number of backlog distribution tags closed in 2024.

- **PG&E-23-13. Workforce Planning and Resource Allocation to Respond to EPSS Events**
  - Description: PG&E does not provide an adequate demonstration of plans for operational resources to respond to outages that occur when EPSS is enabled, particularly given that historically PG&E's use of EPSS was either at a smaller scale or during a year with a low number of high wind events.
  - Required Progress: In its 2025 Update, PG&E must provide:
    - PG&E's workplan for resourcing EPSS-enabled outages. The workplan must include discussion of how PG&E plans to obtain additional workforce resources, additional training, how PG&E plans to develop additional resources, and how PG&E intends to balance its existing workforce.
    - An analysis showing proper workforce coverage and planning to respond to both EPSS-enabled outages as well as potential ignitions during high-risk weather events.
  - Discussed in Section 8.1, "Grid Design, Operations, and Maintenance" (8.1.5 "Grid Operations and Procedures").

- **PG&E-23-14. Effectiveness Analysis for EPSS Including Implementation of DCD**
  - Description: PG&E currently includes downed conductor detection (DCD) within its mitigations but has not provided adequate analysis demonstrating effectiveness of DCD, particularly in comparison to potential reliability impacts when combined with EPSS.
  - Required Progress: In its 2025 Update, PG&E must provide an updated analysis of the potential reliability impacts and mitigation effectiveness of implementing EPSS based on observed data from implementation in 2023, particularly in combination with DCD. This must include:
    - Evaluation of effectiveness based on EPSS outage causes in relation to avoided ignitions.
    - Number of outages and outage frequency that occurs on circuits with DCD implemented.
    - PG&E's methodology for determining effectiveness for DCD, including ignitions that have occurred when each is implemented.
    - Measures to alleviate any associated reliability and safety impacts PG&E has observed since implementation of DCD.
  - Discussed in Section 8.1, "Grid Design, Operations, and Maintenance" (8.1.5 "Grid Operations and Procedures").

11.4 Vegetation Management and Inspections

- **PG&E-23-15. Implementation of Focused Tree Inspections and Addressing the Risk from Hazard Trees**
  - Description: PG&E has committed to further implementing Focused Trees Inspections and to addressing the risk from hazard trees but details regarding recordkeeping, refinement of the Areas of Concerns, and long-term planning remain unclear.
  - Required Progress: In its 2025 Update, PG&E must:
    - Describe the enhancements it has made and will make to its vegetation management recordkeeping, by, in part, providing:
      - A list of the information that will be digitally recorded during Focused Tree Inspections, Routine, Second Patrol, Vegetation Management for Operational Mitigations, and Tree Removal Inventory that capture factors for prescribing trees for removal.
      - A list of the information PG&E will collect during Focused Tree Inspections on all potential strike trees inspected using a digitized Tree Risk Assessment form.[319]
        - Describe how it has updated the Areas of Concern for 2024 Focused Tree Inspections including, but not limited to, what inputs were used to create the polygons and how those polygons are ranked by risk.
        - Describe its decision-making process for selecting Areas of Concern for 2024 Focused Tree Inspections.
        - Describe its plan to update the Areas of Concern for 2025 Focused Tree Inspections including, but not limited to, what inputs were used to create the polygons and how those polygons will be ranked by risk.
        - Describe how it has or will select Areas of Concern for 2025 Focused Tree Inspections.

    Additionally, in its 2026-2028 Base WMP, PG&E must present its plan for consistent HFTD-wide hazard tree-related risk reduction by inspection and remediation. In its development of this plan, PG&E must continue its dialogue with its peer electrical corporations and Energy Safety and remain abreast of hazard tree inspection and remediation strategies, including, but not limited to, tools for risk assessment, recordkeeping

[319] PG&E's 2023-2025 WMP, Revision 3, page 290.

practices, and frameworks for risk-informed inspections (i.e., when, where, and how often to inspect for hazard trees based on risk).

- Discussed in Section 8.2, "Vegetation Management and Inspections."

- **PG&E-23-16. Updating the Wood Management Procedure**
  - Description: PG&E's Wood Management program only addresses large wood generated by post-fire activities and EVM, does not consider wildfire and safety risks associated with leaving wood on site, and may not sufficiently take into consideration potential benefits to the program from improved customer relations.
  - Required Progress: In its 2026-2028 Base WMP, PG&E must:
    - Benchmark the scope of its Wood Management program with, at minimum, SCE and Liberty Utilities, and justify the differences in scope.
    - Provide a response detailing whether PG&E has considered how offering wood removal and disposal services to customers may reduce refusals related to vegetation management and how that consideration has informed any updates to PG&E's Wood Management program for the 2026-2028 WMP Base WMP.
    - Attach an updated version of its Wood Management Procedure (TD-7102P-26) that:
      - Reflects its current portfolio of vegetation management programs (e.g., FTI, TRI, VMOM).
      - Considers the wildfire risk related to accumulated fuels generated by PG&E's vegetation management activities.
      - Considers the risk and safety impact of leaving large woody debris onsite including, but not limited to:
        - Blocking, hindering, or potentially blocking (e.g., roll or blow into) ingress or egress (roads, driveways, walkways, etc.).
        - Violating defensible space laws or ordinances such as Public Resources Code section 4291 and Government Code section 51182.
        - Impede watercourses and drainages.
        - Otherwise create a hazard.
  - Discussed in Section 8.2, "Vegetation Management and Inspections."

- **PG&E-23-17. Consolidation of Vegetation Inspection Programs**
  - Description: PG&E's vegetation management program for distribution circuits is complex, resulting in multiple touchpoints for customers and overlapping scopes of work for PG&E's personnel.
  - Required Progress: In its 2026-2028 Base WMP, PG&E must present a plan to consolidate its vegetation inspection programs for distribution circuits in the HFTD with the following objectives:
    - Reduce the number of annual touchpoints from inspectors and tree crews due to overlapping scopes of work.
    - Streamline the distribution inspection procedure, including reduction and/or consolidation of its attachments, to reduce confusion among government agencies, PG&E's customers, and vegetation personnel.
    - Address the risk from vegetation contact through vegetation inspection, trimming, and removal while complying with applicable laws and regulations.
  - Discussed in Section 8.2, "Vegetation Management and Inspections."

- **PG&E-23-18. Improving Vegetation Management Inspector Qualifications**
  - Description: It is essential that PG&E ensure it has qualified personnel for vegetation inspections and has trained these personnel to adequately perform vegetation inspections.
  - Required Progress: In its 2026-2028 Base WMP, PG&E must:
    - Present a plan to improve the level of qualifications and training of its current Vegetation Management Inspectors (both contract and employee).
    - Explain and provide the decision-making process for its consideration of updates to the minimum qualification and training requirements for its Vegetation Management Inspectors.
  - Discussed in Section 8.2, "Vegetation Management and Inspections."

- **PG&E-23-19. Continued Progression of Vegetation Management Maturity**
  - Description: In response to RN-PG&E-22-09, PG&E identified several initial steps to mature in certain capabilities in its vegetation management program.
  - Required Progress: In its 2025 Update, PG&E must report on progress, outcomes, and lessons learned related to the development and implementation of these steps, including any resulting plans and timelines for implementation.

- Discussed in Section 8.2, "Vegetation Management and Inspections."

- **PG&E-23-20. Reinspection of Trees in the Tree Removal Inventory**
  - Description: PG&E's vegetation management personnel may be removing healthy trees under the Tree Removal Inventory program due to a conservative interpretation of the procedure.
  - Required Progress: In its 2025 Update, PG&E must:
    - Consider updating the Tree Removal Inventory procedure to prevent the removal of healthy trees, requiring TRAQ VMI to perform a Level 2 inspection of trees with a TAT Abate result, and assigning thresholds for removal using the results of the "Risk Rating Matrix" of the ISA TRAQ form.[320]
    - Explain and provide the decision-making process on the above considerations.
    - Provide evidence of how it has ensured its TRAQ certified arborists consistently interpret the current procedure, and any modifications to the procedure (e.g., training module or memo).
  - Discussed in Section 8.2, "Vegetation Management and Inspections."

- **PG&E-23-21. Identification of High-Risk Species for Focused Tree Inspections**
  - Description: In the procedure for PG&E's Focused Tree Inspection, the methodology for identifying species for which inspectors are to "apply increase scrutiny" relies exclusively on outage rates.
  - Required Progress: In its 2026-2028 Base WMP, PG&E must define criteria for determining which species warrant increased scrutiny during Focused Tree Inspections and other inspections. PG&E must detail its methodologies for determining these species.
  - Discussed in Section 8.2, "Vegetation Management and Inspections."

[320] For example, if the likelihood of failure and impact is "high" or "extreme," the tree is removed. If it is "low," the tree is left standing. If it is "moderate," removal is the discretion of the TRAQ VMI.

- **PG&E-23-22. Continuation of Effectiveness of Enhanced Clearances Joint Study**
    - Description: The large IOUs have jointly made progress addressing the Progression of Effectiveness of Enhanced Clearances Joint Study 2022 area for continued improvement (SDGE-22-20, PGE-22-28, and SCE-22-18). Energy Safety expects the large IOUs and their contracted third party to continue their efforts and meet the requirements of this ongoing area for continued improvement.[321]
    - Required Progress: In its 2025 Update, PG&E, along with SCE and SDG&E, must report on the progress and outcomes of the third-party contractor's analysis and evaluation of the effectiveness of enhanced clearances. This must include:
        - A list of the aligned variables related to vegetation risk events.
        - A description of the chosen database type and architecture to warehouse the data.
        - A description of how the third-party contractor incorporated biotic and abiotic factors into its analysis.[322]
        - The third-party contractor's assessment of the effectiveness of enhanced clearances including, but not limited to, the effectiveness of enhanced clearances in reducing tree-caused outages and ignitions.[323]

      Additionally, PG&E-22-28 established the expectation that the large IOUs make incremental progress and update their analyses with each WMP submission through at least 2025. With its 2026-2028 Base WMP, PG&E, along with SCE and SDG&E, must attach a white paper which discusses:
        - The IOUs' joint evaluation of the effectiveness of enhanced clearances including, but not limited to, the effectiveness of enhanced clearances in reducing tree-caused outages and ignitions.
        - The IOUs' joint recommendations for updates and changes to utility vegetation management operations and best management practices for wildfire safety based on this study. This may include the IOUs'

[321] The objectives for the Enhanced Clearances Joint Study were defined in SCE-21-07, Action Statement on 2021 Wildfire Mitigation Plan Update – Southen California Edison, page App68 (https://energysafety.ca.gov/wp-content/uploads/sce_2021wmp_finalactionstmt.pdf, accessed August 14, 2023).

[322] Biotic factors include all living things (e.g., an animal or plant) that influence or affect an ecosystem and the organisms in it; abiotic factors include all nonliving conditions or things (e.g., climate or habitat) that influence or affect an ecosystem and the organisms in it.

[323] The projected conclusion of the third party's assessment in March 2024 may coincide with the submission of SCE's 2025 Update. If the third party's assessment is not prepared by the time of the 2025 Update submission, the IOUs must provide the third party's assessment as soon as its finalized.

recommendations for updates to regulations related to clearance distances.

- Discussed in Section 8.2, "Vegetation Management and Inspections."

11.5 Situational Awareness and Forecasting

- **PG&E-23-23. Weather Station Maintenance and Calibration**
  - Description: PG&E reports having over 1,400 weather stations in its network that collect weather data.[324] Frequent calibration and maintenance of weather stations is crucial for ensuring accurate, reliable, and high-quality data. As PG&E performs its annual weather station maintenance and calibration, Energy Safety will need PG&E to report on the following to verify the integrity of the data collected from its weather station network.
  - Required Progress: PG&E must:
    - Continue to maintain and keep a log of all the annual maintenance and calibration for each weather station, including the station name, location, and conducted maintenance, in compliance with PG&E's weather station calibration training document. The log must include the length of time from initiation of a repair ticket to completion and the corrective maintenance performed to bring the station back into functioning condition.
    - In its 2025 Update, provide documentation indicating the number of weather stations that received its annual calibration and the number of stations that were unable to undergo annual maintenance and/or calibration due to factors such as remote location, weather conditions, customer refusals, environmental concerns, and safety issues. This documentation must include:
      - The station name and location.
      - The reason for the inability to conduct maintenance and calibration.
      - The length of time since the last maintenance and calibration.
      - The number of attempted but incomplete maintenance or calibration events for these stations in each calendar year.
  - Discussed in Section 8.3, "Situational Awareness and Forecasting."

[324] PG&E's 2023-2025 WMP, page 84.

11.6 Community Outreach and Engagement

- **PG&E-23-24. Evaluation of and Plan to Address of AFN Customers**
  - Description: PG&E does not provide sufficient detail about its evaluation of the needs of its AFN customer base, including the specific challenges the customer base faces.
  - Required Progress: In its 2025 Update, PG&E must provide details on its evaluation of the specific needs of its AFN customer base identified through stakeholder forums and focus groups, as well as any other methods of evaluation. PG&E must also describe the AFN needs of AFN customers it has identified as a result of this evaluation.
  - Discussed in Section 8.5, "Community Outreach and Engagement."

11.7 Cross-Category

- **PG&E-23-25. Fire Potential Index (FPI) and Ignition Probability Weather (IPW) Enhancements**
  - Description: PG&E reports that both the FPI and IPW models operate by learning from historical data, which includes past fires, outages, and ignitions, along with the conditions under which they occurred to forecast future fires, outages, and ignitions.[325] As part of its responses to the Revision Notice,[326] PG&E commits to evaluating enhancements to improve model skill for both its FPI and IPW models that involves testing new features, model configurations, and the inclusion of covered conductor and EPSS on the system.[327]
  - Required Progress: In its 2025 Update, PG&E must provide an update on its assessment of potential enhancements to its FPI and IPW model. In particular, it must:
    - Provide information on the new features that were tested, and criteria used to evaluate the new features, including the findings and results.
    - Provide information regarding different model configurations that were tested, the outcomes of these tests, and any insights gained.
    - Discuss the methodology for evaluating the inclusion of other mitigation measures, such as covered conductor and EPSS, into the

[325] PG&E's 2023-2025 WMP, Page 185.

[326] PG&E's 2023-2025 WMP Supplemental Response to Revision Notice and PG&E's 2023-2025 WMP Response to Revision Notice.

[327] PG&E's 2023-2025 WMP, Page 290.

modeling process. This should include any testing and evaluation conducted to incorporate these mitigations.

- Identify any challenges or unforeseen issues encountered during the evaluations of all enhancements and a description of any adjustments or refinements made to address these challenges.

- Discussed in Section 8.6, "Cross Category Observations"; Section 9, "Public Safety Power Shutoffs."

- **PG&E-23-26. Evaluation and Reporting of Safety Impacts Relating to EPSS**
  - Description: PG&E does not fully analyze and justify safety impacts relating to EPSS, including demonstrating benefits outweigh potential risks associated with EPSS.
  - Required Progress: In its 2025 Update, PG&E must provide:
    - Continued reporting of its EPSS-related outages, which must include via spreadsheet:
      - Number of outages.
      - CPZ in which an outage occurred.
      - Whether or not the outage was in the HFTD.
      - Duration of outage.
      - Number of customers impacted.
      - Number of impacted customers belonging to vulnerable populations (such as customers with access and functional needs, Medical Baseline customers, and customers identified as vulnerable by the Social Vulnerability Index).
      - Impact on community values, including intangibles (e.g., livelihood) and how PG&E is tracking these.
      - Response time for outages.
      - Asset health (open work tags, asset age, etc.).
      - Vegetation data.
      - Resource constraints (access issues, staffing numbers, etc.).
    - Analysis pertaining to EPSS outages, which should include the following for each CPZ in which EPSS has been enabled:
      - Number of outages that have occurred.
      - Whether or not the CPZ is in the HFTD.
      - Cumulative number of customers impacted by those outages.
      - Cumulative customer minutes interrupted during those outages.

        - Cumulative outage time in minutes and
        - Percentage of time in which EPSS was enabled.
    - A re-evaluation of its EPSS-enablement thresholds. This must include demonstration of trade-offs between reliability and wildfire risk mitigation effectiveness for each FPI level, as well as inclusion of areas outside the HFTD.
- Discussed in Section 8.1, "Grid Design, Operations, and Maintenance" (8.1.5 "Grid Operations and Procedures"); Section 4.1, "PG&E Revision Notice General Critical Issues"; Section 8.6 "Cross-Category Observations."

12. Conclusion

PG&E's 2023-2025 Wildfire Mitigation Plan is approved.

Catastrophic wildfires remain a serious threat to the health and safety of Californians. Electrical corporations, including PG&E, must continue to make progress toward reducing utility-related ignition risk. Energy Safety expects PG&E to effectively implement its wildfire mitigation activities to reduce the risk of utility-related ignitions and the potential catastrophic consequences if an ignition occurs, as well as to reduce the scale, scope, and frequency of PSPS events. PG&E must meet the commitments in its WMP and fully address areas for continued improvement identified within this Decision to ensure it meaningfully reduces utility-related ignition and PSPS risk within its service territory over the plan cycle.

Shannon O'Rourke
Deputy Director | Electrical Infrastructure Directorate
Office of Energy Infrastructure Safety

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715 P Street, 20th Floor
Sacramento, CA 95814
916.902.6000

APPENDICES

APPENDICES

LIST OF APPENDICES

Appendix A. Glossary of Terms

Term	Definition
AFN	Access and functional needs
BVES	Bear Valley Electric Service
CAISO	California Independent System Operator
Cal Advocates	The Public Advocates Office at the California Public Utilities Commission
CAL FIRE	California Department of Forestry and Fire Protection
Cal OES	California Office of Emergency Services
CAP	Corrective Action Program
CBO	Community-based organization
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEJA	California Environmental Justice Alliance
CNRA	California Natural Resources Agency
CPUC	California Public Utilities Commission
D.	CPUC decision
DR	Data request
DWR	Department of Water Resources
EBMUD	East Bay Municipal Utility District
EFD	Early fault detection

Term	Definition
EPUC	Energy Producers and Users Coalition
EVM	Enhanced vegetation management
FERC	Federal Energy Regulatory Commission
FPI	Fire potential index
FWI	Fire weather index
GFN	Ground-fault neutralizers
GIS	Geographic information systems
GO	General order
GPI	The Green Power Institute
GRC	General rate case
HD	High definition
HFRA	High Fire Risk Area
HFTD	High fire threat district
HWT or Horizon West	Horizon West Transmission
I.	CPUC Investigation
ICS	Incident command system or structure
IOU	Investor-owned utility
IR	Infrared
ISA	International Society of Arboriculture
ITO	Independent transmission operator
kV	Kilovolt
Liberty	Liberty Utilities

Term	Definition
LiDAR	Light detection and ranging
Maturity Model	Electrical Corporation Wildfire Mitigation Maturity Model
Maturity Survey	Electrical Corporation Wildfire Mitigation Maturity Survey
MAVF	Multi-attribute value function
MBL	Medical Baseline
MGRA	Mussey Grade Road Alliance
ML	Machine learning
NDVI	Normalized difference vegetation index
NERC	North American Electric Reliability Corporation
NFDRS	National Fire Danger Rating System
NOD	Notice of defect
NOV	Notice of violation
OCM	Overhead circuit miles
OEIS or Energy Safety	Office of Energy Infrastructure Safety
PG&E	Pacific Gas and Electric Company
PoF	Probability of failure
PoI	Probability of ignition
PRC	Public Resources Code
PSPS	Public Safety Power Shutoff
Pub. Util. Code or PU Code	Public Utilities Code

Term	Definition
QA	Quality assurance
QC	Quality control
QDR	Quarterly Data Report
R.	CPUC rulemaking
RAMP	Risk Assessment and Management Phase
RCRC	Rural County Representatives of California
REFCL	Rapid earth fault current limiter
RFW	Red Flag Warning
RSE	Risk-spend efficiency
SAWTI	Santa Ana Wildfire Threat Index
SCADA	Supervisory control and data acquisition
SCE	Southern California Edison Company
SDG&E	San Diego Gas & Electric Company
S-MAP	Safety Model Assessment Proceeding, now the Risk-Based Decision-Making Framework Proceeding
SMJU	Small and multijurisdictional utility
TAT	Tree Assessment Tool
TBC	Trans Bay Cable
TURN	The Utility Reform Network
USFS	United States Forest Service
VM	Vegetation management
VRI	Vegetation risk index
WMP	Wildfire Mitigation Plan

Term	Definition
WRRM	Wildfire Risk Reduction Model
WSAB	Wildfire Safety Advisory Board
WSD	Wildfire Safety Division
WUI	Wildland-urban interface

Appendix B. Status of 2022 Areas for Continued Improvement

Energy Safety's 2022 Decision[1] for each utility identified areas for continued improvement and associated required progress. Areas for continued improvement are where the utility must continue to improve its wildfire mitigation capabilities. As part of the 2023 WMP evaluation process, Energy Safety has reviewed the progress reported by PG&E. Energy Safety is satisfied that PG&E has made sufficient progress on 34 of the total 35 identified areas for continued improvement.

Areas for continued improvement identified in 2022 either have been addressed or any outstanding matters are incorporated in the 2023 areas for continued improvement. PG&E's 2022 areas for continued improvement are listed in Table A-1. The status column indicates whether each has been fully addressed. If not, the column notes where to find more information in this Decision.

[1] Final Decision on PG&E's 2022 WMP Update.

Table A-1. PG&E 2022 Areas for Continued Improvement

Area ID	Title	Status
PG&E-22-01	Prioritized List of Wildfire Risks and Drivers	PG&E has sufficiently addressed the required remedy.
PG&E-22-02	Collaboration and Research in Best Practices in Integrating Climate Change Impacts and Wildfire Risk and Consequence Modeling	PG&E has sufficiently addressed the required remedy.
PG&E-22-03	Inclusion of Community Vulnerability in Consequence Modeling	PG&E has sufficiently addressed the required remedy.
PG&E-22-04	Fire Suppression Considerations	PG&E has sufficiently addressed the required remedy.
PG&E-22-05	8-Hour Fire Spread Simulations	PG&E has sufficiently addressed the required remedy.
PG&E-22-06	Addressing Increase in Risk Events	PG&E has sufficiently addressed the required remedy.
PG&E-22-07	Applying Modeling Lessons – Learned from Third-Party Review	PG&E has sufficiently addressed the required remedy.
PG&E-22-08	Better Application of Specific Lessons Learned From Utility-Caused Fires	PG&E has sufficiently addressed the required remedy.
PG&E-22-09	Evaluation of Model Reprioritization and Fire Rebuild in High-Risk Areas	PG&E has sufficiently addressed the required remedy.
PG&E-22-10	Justification of Weather Station Network Density	PG&E has sufficiently addressed the required remedy.
PG&E-22-11	Covered Conductor Effectiveness Lessons Learned	PG&E has sufficiently addressed the required remedy.

Area ID	Title	Status
PG&E-22-12	Covered Conductor Inspection and Maintenance	PG&E has sufficiently addressed the required progress. For related areas for continued improvement, see Sections 8.1.3 and 11 of this Decision.
PG&E-22-13	New Technologies Evaluation and Implementation	PG&E has sufficiently addressed the required remedy. For related areas for continued improvement, see Sections 8.1.2 and 11 of this Decision.
PG&E-22-14	Decreased Transmission Hardening Targets	PG&E has sufficiently addressed the required progress.
PG&E-22-15	Decreased Transmission/Distribution Sectionalization Device Targets	PG&E has sufficiently addressed the required progress.
PG&E-22-16	Progress and Updates on Undergrounding and Risk Prioritization	PG&E has sufficiently addressed the required remedy. For related areas for continued improvement, see Sections 8.1.2 and 11 of this Decision.
PG&E-22-17	Future Quantitative Targets to Reduce the Backlog of Repairs	PG&E has sufficiently addressed the required progress. For related areas for continued improvement, see Sections 8.1.4 and 11 of this Decision.
PG&E-22-18	Retainment of Inspectors and Internal Workforce Development	PG&E has sufficiently addressed the required progress.
PG&E-22-19	Benchmarking With Other Utilities on Inspector Qualifications	PG&E has sufficiently addressed the required progress.
PG&E-22-20	Asset Inspection Drone Program Pilot	PG&E has sufficiently addressed the required progress
PG&E-22-21	Asset Inspections QA/QC	PG&E has sufficiently addressed the required progress.
PG&E-22-22	Progress on Meeting Asset Inspection Regulatory Requirements	PG&E has sufficiently addressed the required progress.
PG&E-22-23	Reduce Necessity for the Utility Defensible Space Program	PG&E has sufficiently addressed the required progress.

Area ID	Title	Status
PG&E-22-24	Progression of Vegetation Management Maturity	PG&E has sufficiently addressed the required progress. For related areas for continued improvement, see Sections 8.2.4 and 11 of this Decision.
PG&E-22-25	External Engagement for Vegetation Management	PG&E has sufficiently addressed the required progress.
PG&E-22-26	Auditing of Internal Pre-Inspectors	PG&E has sufficiently addressed the required progress.
PG&E-22-27	Vegetation Management Wildfire Inspection Guide – Stakeholder Engagement	PG&E has sufficiently addressed the required progress.
PG&E-22-28	Progression of Effectiveness of Enhanced Clearances Joint Study	PG&E has sufficiently addressed the required progress. For related areas for continued improvement, see Sections 8.2.4 and 11 of this Decision.
PG&E-22-29	Participation in Vegetation Management Best Management Practices Scoping Meeting	PG&E has sufficiently addressed the required progress. For related areas for continued improvement, see Sections 7.2.2 and 11 of this Decision.
PG&E-22-30	Response Operations for Potential Fault/Outages in its Highest Risk Areas	PG&E has sufficiently addressed the required progress.
PG&E-22-31	PSPS Wind Threshold Change Evaluations	PG&E has sufficiently addressed the required progress. For related areas for continued improvement, please see Section 9 of this Decision.
PG&E-22-32	Updates on EPSS Reliability Study	PG&E has sufficiently addressed the required progress. For related areas for continued improvement, see Sections 8.1.5 and 11 of this Decision.
PG&E-22-33	Progress on Filling Asset Inventory Data Gaps	PG&E has sufficiently addressed the required progress
PG&E-22-34	Revise Process of Prioritizing Wildfire Mitigations	PG&E has sufficiently addressed the required progress. For related areas for continued improvement, see Sections 8.1.2 and 11 of this Decision.

Area ID	Title	Status
PG&E-22-35	Quantify Mitigation Benefits of Reducing PSPS Scale, Scope, and Frequency	PG&E has not sufficiently addressed the required progress. For more information, please see Section 9 of this Decision.

Appendix C. PG&E 2023 Revision Notice Critical Issues

As discussed in Section 3.4 of this Decision, Energy Safety issued PG&E a Revision Notice on June 22, 2023. The Revision Notice required PG&E to remedy eight critical issues identified by Energy Safety during evaluation of PG&E's 2023-2025 Wildfire Mitigation Plan. Each critical issue is discussed in detail under the respective Decision section; Table A-2 below lists all eight critical issues and provides the status of each issue.

Table A-2. PG&E 2023 Critical Issues

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
RN-PG&E-23-01: **Many of PG&E's 3- and 10-year initiative objectives do not meet Energy Safety requirements as outlined in the Technical Guidelines.**	PG&E's 3- and 10-year initiative objectives (objectives) do not adequately demonstrate "a clear action plan to continue reducing utility-related ignitions and the scale, scope, and frequency of Public Safety Power Shutoff (PSPS) events" nor do they "[focus] sufficiently on long-term strategies." Throughout Sections 8 and 9 of its WMP, PG&E describes how it will implement and improve various wildfire mitigations but does not commit to these improvements through its summarization of objectives. Per the Technical Guidelines, objectives must be: "Specific, measurable, achievable, realistic, and timely outcomes...." Although PG&E provides 3- and 10-year objectives for each subsection in Section 8 and Section 9, PG&E's 3- and 10-year objectives do not meet the stated requirements. Energy Safety finds critical issues associated with PG&E's objectives in the following sections:	PG&E must revise its 3- and 10-year objectives to address the specific issues that Energy Safety identifies above. PG&E may add, modify, and/or remove objectives, as needed, with the overall goal of strengthening its 3- and 10-year objectives so they are "specific, measurable, achievable, realistic, and timely." PG&E may also add new or amend existing targets for any new or modified objectives.	PG&E has resolved the critical issue and has satisfied the required remedy for [RN-PG&r-23-01.]

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
	Situational Awareness and Forecasting • Of PG&E's four 3-year objectives, three are targeted for completion by the end of 2023 and, as such, do not sufficiently demonstrate a long-term plan for situational awareness and forecasting. The one remaining 3-year objective, with the application initiative tracking ID "SA-05," is the only objective in this section with a completion date beyond 2023. **Emergency Preparedness** • PG&E lists three 3-year objectives and two 10-year objectives in this section. The 10-year objectives are the same as two of the 3-year objectives and do not sufficiently demonstrate a long-term plan for emergency preparedness. **Community Outreach and Engagement** • PG&E provides one 3-year objective and one 10-year objective in this section. The objectives for both are the same and do not sufficiently demonstrate a long-term plan for community outreach and engagement. PG&E's one objective for this section is to "hold community engagement meetings"; however, there are no specific number of meetings or frequency of meetings listed within the		

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
	objectives, and PG&E included no other measurable objectives within the section. **Public Safety Power Shutoff (PSPS)** • PG&E provides two 3-year objectives and three 10-year objectives in this section. Two of the 10-year objectives are the same as the 3-year objectives and do not sufficiently demonstrate a long-term plan for reducing PSPS. • PG&E's PSPS objectives fail to demonstrate its commitment to reducing PSPS scale, scope, and frequency.		
RN-PG&E-23-02: **PG&E does not provide sample sizes and target pass rates for certain asset and vegetation management quality assurance and control programs as required by the Technical Guidelines.**	PG&E has not provided sample sizes and yearly target pass rates for the 2023-2025 WMP cycle for some of its quality assurance (QA) and quality control (QC) activities, as required by the 2023-2025 WMP Technical Guidelines. Additionally, PG&E has not met Energy Safety's requirements relating to a continued area for improvement (PG&E-22-21). In PG&E's 2022 Update, Energy Safety found that PG&E was falling behind on its asset inspection QA/QC goals and did not have goals for 2023. As such, Energy Safety required PG&E, in its 2023-2025 WMP, to "[p]rovide quantitative targets, including Acceptable Quality Levels (AQL), for asset	PG&E must define yearly target pass rates for 2023 through 2025 for its asset management and inspections QA and QC programs in Tables 8-7-1 and 8-7-2, without adding in any qualifiers such as "Critical Pass Rates." In accordance with PG&E-22-21, the target pass rate for asset QA and QC programs must be no less than 95 percent for 2023 and 2024; however, if PG&E believes this target is infeasible for any of its programs, it must provide a plan to achieve a 95 percent pass rate for 2025, including	PG&E has resolved the critical issue and has satisfied the required remedy for [RN-PG&r-23-02.]

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
	inspection QA/QC for 2023 and 2024. The AQL target(s) for performance must be no less than 95 percent." In Section 8.1.6.1 of its WMP, Table 8-7-1: Grid Design and Maintenance System Inspection QA Program, PG&E does not provide target pass rates beyond 2023, stating "N/A. Target pass rates will be evaluated for 2024 based on the results of our work in 2023." In accordance with PG&E-22-21, the pass rate target for this QA program must be no less than 95 percent for 2023 and 2024. Additionally, PG&E qualifies the target pass rate column with "Critical Pass Rate," which PG&E defines as "the number of assets reviewed by QC that did not have a Critical Attribute (as defined by Asset Strategy) failure or miss divided by the number of assets reviewed by QC." PG&E cannot qualify the required "yearly target pass rate for the 2023-2025 WMP cycle" by re-defining pass rate as "critical pass rate." In Section 8.1.6.2 of its WMP, Table 8-7-2: Grid Design and Maintenance System Inspection QC Program, PG&E does not provide target pass rates, stating "To be determined. Pass rates will be determined each year based on	progressively increasing pass rate targets for 2023 and 2024. PG&E must provide sample sizes for the 2023-2025 WMP cycle for its vegetation management QV and QC programs in Tables 8-18-1 and 8-18-2. PG&E must provide yearly target pass rates for 2023 through 2025 for its vegetation management QC programs in Table 8-18-2.	

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
	improving performance year over year." In accordance with PG&E-22-21, the pass rate target for this QC program must be at minimum 95 percent. Again, PG&E inappropriately qualifies target pass rate column with "Critical Pass Rate." In Section 8.2.5.1 of its WMP, Table 8-18-1: Vegetation Management QV Program, PG&E does not provide a sample size for the quality verification (QV) audits it intends to perform during the current WMP cycle; PG&E instead provides a sample size for the 2022 QV audits it performed. In Section 8.2.5.2, Table 8-18-2: Vegetation Management QC Metrics Report, PG&E does not provide a sample size for the QC audits it intends to perform during the current plan cycle; PG&E instead provides a sample size for the 2022 QC audits it performed. Additionally, PG&E does not provide pass rate targets for these QC audits.		
RN-PG&E-23-03: **PG&E has not adequately demonstrated workforce planning**	Throughout the WMP, PG&E does not "focus sufficiently on long-term strategies to build the overall maturity of its wildfire mitigation capabilities while reducing reliance on shorter-term strategies." Instead, PG&E focuses on	PG&E must provide: a. Analysis demonstrating PG&E's understanding of safety impacts due to EPSS, including how PG&E considers safety	PG&E has resolved the critical issue described in RN-PGE-23-03 regarding resource allocations; however, Energy Safety finds that PG&E has de-escalated the critical issue regarding

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and resource allocation to address both EPSS risk and wildfire risk.	EPSS as an interim mitigation for many Circuit Protection Zones (CPZs), without providing a long-term mitigation plan, and PG&E has shifted some of its mitigation priorities to address EPSS risk potential at the expense of reducing wildfire risk. Additionally, PG&E has not demonstrated that this shift towards reducing EPSS risk is an "efficient use of [its] resources" and fails to "[focus] on achieving the greatest risk reduction with the most efficient use of funds and workforce resources." As part of its analysis of EPSS impacts, PG&E provides its 2022 EPSS Reliability Impact Study, which includes additional safety impacts, such as the number of customers belonging to vulnerable populations and impact on community values. While PG&E provides an updated study, PG&E does not include these additional safety impacts when determining the areas of highest EPSS risk, and only uses the number of outages to determine EPSS risk (i.e., PG&E defines areas of highest EPSS risk as those where customers experienced 10 or more outages). PG&E has not performed an analysis to fully understand the associated safety impacts associated	impacts in its analysis and prioritization of mitigations around reducing EPSS risk. b. PG&E's workplan for resourcing EPSS-directed mitigation measures, including ratios and work hours shifted from wildfire risk mitigations. Ratios should be provided in the form of estimated percentage of personnel and work hours that would otherwise have been dedicated directly to the same mitigation used to address wildfire risk opposed to EPSS risk. This should be broken down by each mitigation type, including, but not limited to: i. Vegetation management ii. Asset repair and replacement iii. Additional asset inspections c. Details on how PG&E uses EPSS risk to inform the prioritization of its mitigations in comparison to wildfire risk for all subparts listed in (b). For example, PG&E must provide details on how EPSS risk informs	evaluation of EPSS safety impacts to an area for continued improvement. Energy Safety sets forth specific areas for improvement and associated required progress in Section 11**.**

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	with EPSS, despite the very limited notice customers receive prior to an outage. PG&E defines CPZs with a high risk of EPSS as those which have experienced a high number of outages. These high EPSS risk CPZs do not correlate with high risk CPZs for wildfire based on risk model output. As such, the CPZs identified as a high EPSS risk do not necessarily correlate with areas of high wildfire risk. (Table 1 in Appendix A). Only three out of the 21 high EPSS risk CPZs identified by PG&E fall within the top 20 percent highest wildfire risk CPZs based on risk model output, and three other CPZs out of the 21 are not even within the high fire threat district and high fire risk area (HFTD and HFRA). Instead of directly addressing highest known wildfire risk, PG&E is allocating resources for a new vegetation management program focused on areas of high EPSS risk, and to repair equipment prioritized based on EPSS risk instead of wildfire risk. About 11 percent of PG&E's 2022 EPSS outages were caused by vegetation (Table 2 in Appendix A). In 2023, PG&E is debuting "VM for Operation Mitigations," which "is intended to help reduce outages and potential ignitions using a	its asset repair and replacement program and may impact prioritization of work as a result. D. Justification for reallocating resources towards EPSS risk, as opposed to high wildfire risk. This should include using the analysis performed in parts (a) and (b) in conjunction with detailed mitigation effectiveness calculations.	

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	risk-informed, targeted plan to mitigate potential vegetation contacts based on historic vegetation outages on EPSS-enabled circuits." Although PG&E states that the scope of work for this program will, in part, be developed using PG&E's risk model, or Wildfire Distribution Risk Model Version 3 (WDRMv3), Energy Safety is concerned that this program focuses too heavily on mitigating risk to reliability from EPSS at the expense of reducing wildfire ignitions and consequence risk related to contact from vegetation. About 12 percent of PG&E's 2022 EPSS outages were caused by equipment failures (Table 2). In its 2022 WMP, PG&E included targeted equipment repairs as part of its package for reducing EPSS risk. While not listed as an EPSS-specific mitigation within its 2023-2025 WMP, PG&E states that it is still using targeted equipment repairs as a mitigation for EPSS. PG&E states that it is following the same protocol for its backlog for EPSS targeted circuits but does not describe to what extent it is implementing asset management mitigations to reduce EPSS impacts. PG&E lists the cause of nearly 46 percent of its EPSS outages in 2022 as "unknown"		

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	(Table 2). Each of these outages requires personnel response to investigate the cause, with no discernable cause present. While Energy Safety does not want to discourage PG&E from reducing reliability impacts and any associated safety impacts from EPSS implementation, PG&E has not adequately shown that it has properly obtained and planned resources to also balance and prioritize wildfire risk reduction.		
RN-PG&E-23-04: **PG&E does not demonstrate how it will address its growing backlog of asset repairs.**	PG&E continues to have a significant backlog of repairs, which has grown throughout 2022; with the backlog increasing by 41,869 distribution tags within the HFTD and HFRA in 2022. While PG&E has provided its plans for prioritizing tags based on ignition risk via an "ignition-risk" classification, PG&E has not been able to show that it has adequate resources or proper planning to address its backlog given the continual increase. PG&E has not demonstrated that its asset repair program satisfies section 5.1 of the Technical Guidelines, which requires PG&E to show that its plan is programmatically feasible and aims to achieve the highest level of safety, reliability, and resilience. Specifically, PG&E has postponed the completion of	PG&E must provide: a. In relation to ignition-risk targets: i. A workplan for monitoring and mitigating existing highest risk ignition-tags until PG&E is able to address such tags, particularly for any ignition-tags that PG&E has delayed since the 2022 WMP. ii. A revised and complete Table 8-3 with concrete numeric targets for addressing the backlog of work orders, in addition to the risk-reduction percentage targets already provided.	Energy Safety finds that PG&E has de-escalated this critical issue to an area for continued improvement. Energy Safety sets forth specific areas for improvement and associated required progress in Section 11.

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
	high ignition risk tags, it has fallen behind on its 2022 closure of tags in 2022 and 2023, continues to use Field Safety Reassessments (FSRs) to extend tag completion deadlines, and does not account for future increases of tags from higher findings rates and additional inspections. **Ignition-Risk Targets** PG&E has significantly postponed the completion of ignition-risk tags in its 2023-2025 WMP and regressed compared to those commitments detailed within its 2022 WMP (Table 3 in Appendix A). Instead of addressing the majority of its non-pole ignition-risk tags in 2023 as set out in PG&E's 2022 WMP, PG&E has now postponed this work, with the majority now targeted for 2025. This has resulted in an increase in work scheduled for 2025, with PG&E's 2025 target for non-pole ignition-risk tags now 449 percent higher than the same target included within PG&E's approved 2022 WMP. Similarly, PG&E has delayed many of its pole ignition-risk tags. This postponement of work has resulted in a significant increase in PG&E's 2029 targets for pole ignition-risk tags increasing by 275 percent compared to those included within	b. In relation to the closure of 2022 tags and status of 2023 tags: i. Its procedures and documentation for determination of ignition-risk tags. This should include, but not be limited to: 1. Any criteria used by PG&E for determining ignition risk, such as modeling output (including both ignition and consequence risk), equipment type, and equipment age. 2. The process for prioritizing the closure of tags based on the calculated ignition risk. ii. A status update on the number of backlog work orders since the start of 2023. This should include the same information as provided in Table 13 of the Quarterly Data Report (QDR) for both open and closed tags, along with the following additional columns: 1. GO 95 Rule 18 Priority Level	

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	PG&E's 2022 WMP. PG&E states that it is delaying this work described above to prioritize addressing distribution tags with a known high ignition risk; however, the delay results in a higher level of risk remaining on PG&E's system for a longer period of time as compared to the commitments made in PG&E's approved 2022 WMP. In addition, PG&E did not provide sufficient detail to explain how ignition and consequence risk are taken into account in the prioritization process for addressing its repair backlog nor did it explain how it will accomplish closing out its highest ignition-risk tags first. PG&E divides open tags into isolation zones in 2024, and calculates Risk Spend Efficiency (RSE) scores to determine prioritization of repairs. However, it is not clear if PG&E is including interim risk left on the system when determining RSE scores, nor does PG&E state how it will mitigate the risk on the system resulting from the backlog given repair delays. Finally, PG&E is required to "set quantitative targets to set commitments for specific initiatives in its WMP." In Table 8-3 of PG&E's 2023 WMP, PG&E provides target values for its distribution	2. PG&E Priority Level (if such differs from GO 95 Rule 18) 3. Whether or not the finding qualifies as an "Ignition-Risk HFTD/HFRA" tag 4. Whether the infraction is Non-Pole or Pole c. In relation to Field Safety Reassessments (FSRs): i. PG&E must show that its existing procedures adequately address open work orders within the initially set repair time frame and that PG&E is not using FSR to delay the closure of work order tags. This could be through updating its procedures to clarify and require inspectors performing FSRs to change due dates only if the tag priority increases. As part of its response, as applicable, PG&E must provide any updated procedures demonstrating changes made, including redlines from previous procedures and any necessary	

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
	backlog in units of reduction of wildfire risk for 2023, 2024, and 2025 respectively. PG&E does not provide a concrete numeric value associated with this backlog within Table 8-3. However, as shown in Table 3 in Appendix A, PG&E does have estimates broken down by year and notification type in Section 8.1.7.2. Closure of 2022 Tags and Status of 2023 Tags Of the tags PG&E closed in 2022, about 53 percent were overdue at the time of closure, not accounting for any changed due dates from re-inspections. Of those overdue tags that PG&E closed in 2022, 63 percent were designated as "ignition-risk" meaning PG&E has determined that the tags present a higher risk of ignition. As of May 9, 2023, within the HFTD, PG&E had three open overdue Priority A tags and 1,247 open overdue Priority B tags. The 2022 WMP Decision required PG&E to "come into compliance with and eliminate its maintenance backlog pursuant to the relevant, overdue General Order (GO) 95 work order backlog requirements by the end of 2023." Energy Safety is concerned that	screenshots of applications used by inspectors. D. Analysis examining the causes of increased find rates: i. PG&E's analysis on the specific causes of increased find rates. This should include the estimated percentages, clarifying any overlap, from increases due to, but not limited to: 1. Improved checklist 2. Improved training 3. Continued degradation of infrastructure due to aging 4. Continued degradation of infrastructure due to weather ii. An estimated expected find rate per quarter broken down by priority level for the remainder of 2023 through 2025. iii. PG&E's plan to timely address the potential increase in work order tags resulting from additional inspections as part of	

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	PG&E's 2023-2025 WMP continues to lack planning for and a commitment to addressing these overdue backlog requirements. PG&E's plan even fails to address its self-identified ignition-risk tags of highest priority. **Field Safety Reassessments (FSRs)** PG&E states that FSRs are used primarily to elevate tag priority to an A-tag or a B-tag if the condition has degraded, and that an FSR is performed annually on time-dependent tags to confirm that Priority E tags have not escalated to Priority A or B." In PG&E's response to the 2022 Revision Notice, PG&E states that "[going] forward, FSRs will be used primarily to elevate tag priority to an A-tag or a B-tag if the condition has degraded." However, PG&E continues to use FSR as a means to extend the deadline for completing work orders. Energy Safety recognizes the importance of reassessing priority as a result of reinspection due to changing risks and supports the use of FSRs in order to do so. However, Energy Safety is concerned that PG&E is using re-inspections to extend or reset due dates in perpetuity.	its plan to address its backlog. This must include: 1. Estimates on the number of new work orders broken down by additional inspection type. 2. A revised Table PG&E-8.1.7-2 with any updated estimates based on additional work orders for each inspection type, if applicable. 3. How PG&E will integrate additional inspection findings into its prioritization. 4. Resource allocation plans in order to timely close tags.	

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	Increased Find Rates PG&E's find rates (i.e., PG&E finds an issue and opens a new work order for a given structure) from inspections has continued to increase, with a 17 percent increase in find rates from 2021 to 2022. PG&E states that the increase is in part due to improvements made to the inspection process, such as training, skill assessment, and its inspection checklist. However, given the age and current outstanding number of work tags, it is likely that some of the increased number of findings are due to continued degradation of its aging distribution system. PG&E currently has not shown any analysis on the contribution aging infrastructure has had on the increase in findings. As part of improvements made to inspections, PG&E states that it plans to "see more A and B tags during this WMP cycle because [it] will be conducting more advanced inspections including Aerial Inspections, LiDAR, Pole Loading, and Intrusive Pole Inspections." PG&E states that "redirecting resources to work on A and B tags could require an offset to the number of backlog notifications closed," although PG&E provides no		

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	details on the expected scale of this offset. In particular, PG&E reports its new pilot drone inspection program had a find rate of 47 percent, which is a 16 percent increase from ground inspections. Additionally, PG&E observed that findings from drone and ground inspections had little overlap, meaning new tags from drone inspections will likely be in addition to traditional ground inspection findings. Given the success of the pilot program, PG&E is planning on expanding its use of drones for inspections, increasing its drone inspections to cover from around 3,000 to 38,000 structures. If PG&E's find rate of 47 percent is accurate, this would lead to an estimated additional 17,860 tags over 2023, assuming no structures have more than one tag. PG&E has not demonstrated that this tag increase is factored into its strategy for addressing the current backlog and stopping it from increasing.		
RN-PG&E-23-05: **PG&E's undergrounding plan may leave wildfire risk**	PG&E has not demonstrated that its undergrounding program satisfies section 5.1 of the Technical Guidelines, which requires PG&E to achieve the highest level of safety, reliability, and	PG&E must provide: a. Regarding scaled back targets: i. Analysis on the remaining miles originally scoped for	Energy Safety finds that PG&E has de-escalated this critical issue to an area for continued improvement. Energy Safety sets forth specific areas for

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unaddressed in highest risk areas.	resilience because PG&E's undergrounding plan does not adequately address its highest risk areas. Further, PG&E's scaled back undergrounding targets leave some high risk areas without any planned mitigation initiatives. PG&E does not fully explain its process for identifying and prioritizing undergrounding sites within its mitigation selection decision- making process. PG&E does not clearly factor in the wildfire risk reduction effectiveness of undergrounding when comparing this mitigation against other mitigations in its decision-making process, therefore potentially skewing the priority of undergrounding over other more efficient mitigations. **Inadequate Targets** From 2022 to 2023, PG&E reduced its undergrounding targets, with a 19 percent decrease of planned undergrounding miles in 2023 and a 30 percent decrease of circuit mileage in 2024 through 2026 (Table 4 in Appendix A). PG&E states that this is due to PG&E's reevaluation of the initial undergrounding proposal through the 2023 General Rate Case (GRC) process. PG&E decided to reduce costs and	undergrounding in 2022 but now no longer scoped for undergrounding within PG&E's 2023-2025 plan. This should include risk-ranking of those miles, interim mitigations if these miles are scoped for undergrounding in the future, or alternative mitigations, particularly grid hardening, if the miles are no longer scoped for undergrounding. ii. A list of CPZs that PG&E is not scoping for undergrounding in its 2023-2025 plan due to feasibility constraints but that are included within the top 20 percent highest risk CPZs. For each of these CPZs PG&E's must provide its alternative mitigation or hardening plans. b. Regarding the mitigation selection decision-making process: i. Justification for the use of WFE as opposed to standard cost-benefit analysis when comparing mitigations,	improvement and associated required progress in Section 11.

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	associated undergrounding targets based on "intervenors' concerns, as well as considering the execution challenges of ramping up the program and the potential benefits to ramping up more slowly." PG&E also increased the number of miles categorized as fire rebuild projects within the scope of undergrounding from 2024 through 2026 from 16 to 107 miles (Table 4). PG&E states that it still has a long-term plan for undergrounding 10,000 miles despite these delays in its undergrounding targets. However, PG&E has not adequately demonstrated how it will mitigate the risk associated with the delayed or removed undergrounding projects. It is not clear if PG&E will implement interim mitigation measures to manage these risks until projects can be undergrounded or what other mitigations PG&E may use in place of undergrounding. In PG&E's current undergrounding scope, the top 5 percent highest risk is comprised of 41 CPZs. Of these 41 CPZs, PG&E has only scoped ten for undergrounding from 2023 through 2025, with an additional eleven planned for 2026. There remains 20 CPZs in the top 5 precent of risk that PG&E does not plan to	particularly in regard to feasibility. ii. An updated estimation of risk reduction effectiveness for undergrounding accounting for the remaining risk associated with secondary and service lines. iii. An updated analysis on any cost/benefit impacts for mitigation selection based on such updated undergrounding effectiveness calculation. This must include discussion of any changes in potential mitigation selection or project prioritization.	

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	underground during its 2023-2026 workplan. Of these 20, nine were not included within undergrounding scope due to a lower Wildfire Feasibility Efficiency (WFE) score, which takes into account the feasibility for undergrounding project. PG&E's use of feasibility within the WFE accounts for the difficulty of execution and associated costs for undergrounding. It does not mean that a project would be infeasible but instead deemed unfavorable by PG&E. It is not clear if these 20 CPZs are planned future undergrounding or other system hardening beyond 2026. Based on PG&E's 2023-25 WMP, none of these CPZs are planned to undergo other methods of hardening, such as traditional hardening or covered conductor. Some interim mitigations are in place for these CPZs, including EPSS, asset inspections, and vegetation management. There are also some more permanent non-hardening mitigations in place, such as addressing the work order backlog and expulsion fuse replacements.		

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	Inadequate Decision-Making Process for Mitigation and Undergrounding Location Selection PG&E describes how it considers feasibility constraints when selecting mitigation measures for CPZs, including a description of how it calculates its Simplified Wildfire Risk Spend Efficiency (SWRSE) and Wildfire Feasibility Efficiency (WFE) scores. While these both take feasibility into consideration, PG&E does not provide adequate details on how these constraints impact PG&E's decisions on its portfolio of measures. PG&E states that its risk ranking, and thus decision-making regarding prioritization and mitigation selection, is based on WFE scores rather than risk model output. Energy Safety finds that this WFE-based risk ranking does not properly prioritize undergrounding based on highest wildfire risk. For example, a WFE-based ranking may prioritize areas easier or more feasible to underground, while a risk model-based approach would prioritize highest risk areas or circuits. PG&E's 2023 through 2026 undergrounding workplan includes only 70 percent of undergrounding sites in the top 20 percent risk ranked circuits based		

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	on model output, as opposed to 87 percent in the top 20 percent WFE scores (Table 5 in Appendix A). PG&E calculates undergrounding effectiveness to be 99 percent; however, this does not account for remaining risk associated with secondary and service lines. PG&E's undergrounding procedures are to "overhead harden remaining secondary and service lines by replacing open-wire secondary, gray services, and tree-connects with the current standard covered aerial conductor" as opposed to undergrounding as well. Approximately 12 percent of PG&E's CPUC-reportable ignitions from 2019 to 2022 were caused by secondary or service lines in the HFTD. According to PG&E, "[most], if not all, of PG&E's undergrounding projects have associated secondary and service lines." This means that PG&E's current calculation of 99 percent effectiveness does not reflect the remaining risk associated with secondary and service lines, despite observed ignitions from those sources. PG&E does not consider mitigation effectiveness, including effectiveness of combined mitigations, in its decision-making when selecting and prioritizing		

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	mitigations to deploy. Specific to undergrounding decision-making, PG&E's Simplified Wildfire Risk Spend Efficiency (SWRSE) calculation, which it uses for selecting undergrounding for projects, also does not consider mitigation effectiveness. PG&E does include accurate effectiveness calculations (such as a cost/benefit analysis) to determine the most suitable mitigation selection, potentially including a combination of various mitigations, for a given area.		
RN-PG&E-23-06: **PG&E does not provide targets for seven of its vegetation management inspection programs.**	For Vegetation Management and Inspection, PG&E does not adequately "list all targets it will use to track progress on its vegetation management and inspections for the three years of the Base WMP" and as such does not adequately "set commitments for specific [vegetation management] initiatives in its WMP." In its 2023-2025 WMP, PG&E describes 11 vegetation inspection programs: Routine Transmission – LiDAR, Routine Transmission – Ground, Transmission Second Patrol, Integrated Vegetation Management, Distribution Routine Patrol, Distribution Second Patrol, VM for	PG&E must provide projected targets for each year of the 2023-2025 WMP, quarterly, rolling targets for 2023 and 2024, and relevant units, in the format prescribed in the 2023-2025 WMP Technical Guidelines Table 8-15: Example of Vegetation Inspection Targets by Year, for each of the following vegetation management inspection programs: • Routine Transmission – LiDAR • Routine Transmission – Ground	PG&E has resolved the critical issue and has satisfied the required remedy for [RN-PG&E-23-06.]

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	Operational Mitigations, Tree Removal Inventory, Focused Tree Inspections, Substation Defensible Space Inspections, and Pole Clearing. PG&E did not provided targets for seven of the 11 programs: Routine Transmission – Ground, Transmission Second Patrol, Integrated Vegetation Management, Distribution Routine Patrol, Distribution Second Patrol, VM for Operational Mitigations, and Focused Tree Inspections. In its 2021 WMP Update PG&E set targets for only six of 20 vegetation management initiatives. After providing sufficient targets in its 2022 WMP Update, PG&E has now regressed, again providing incomplete vegetation management-related targets. Within its 2023-2025 WMP and data request responses, PG&E provides some internal targets but does not commit to them as WMP targets. For example, PG&E states its "VM distribution program inspects approximately 80,000 miles of overhead distribution electric facilities on a recurring annual cycle" and that its Focused Tree Inspection pilot consists of 300 miles with "plan[s] to inspect up to 3000 miles… by the end of 2024."	• Transmission Second Patrol • Integrated Vegetation Management • Distribution Routine Patrol • Distribution Second Patrol • VM for Operational Mitigations • Tree Removal Inventory • Focused Tree Inspections • Substation Defensible Space Inspections • Pole Clearing PG&E must retain existing targets reported in its 2023-2025 WMP, dated March 27, 2023. For inspection programs with existing end-of-year targets but not the quarterly, rolling targets (i.e., Tree Removal Inventory), PG&E must provide quarterly, rolling targets for 2023 and 2024 without modifying its end-of-year targets.	

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	PG&E's lack of vegetation-management targets and presentation of internal rather than WMP targets reveals incomplete planning for the next three years.		
RN-PG&E-23-07: **PG&E does not adequately address its risk from hazard trees.**	PG&E's plan to address risk from hazard trees does not "achieve the highest level of safety, reliability, and resilience," effectively address the risk that exists in PG&E's service territory, nor demonstrate a clear action plan to continue reducing utility-related ignitions81 attributable to contact from vegetation. **Background – Enhanced Vegetation Management** Of the 14 utility-related catastrophic wildfires listed in WMP Table 5-4, nine were caused by vegetation or vegetation-related work: Butte, Railroad, Cherokee, Nuns, La Porte, Atlas, Pocket, Zogg, and Dixie Fires. A rigorous hazard tree mitigation program is essential to preventing contact with vegetation and any resulting outages and ignitions. From 2015-2022, "Tree – fell into line" and "Tree – branch fell on line" caused 50% and 32%, of vegetation-caused outages, respectively,	PG&E must revise its 2023-2025 WMP to detail how it will manage risk from hazard trees during the current WMP cycle to "achieve the highest level of safety, reliability, and resilience,"134 effectively address the vegetation-caused ignition risk that exists in PG&E's service territory,135 and demonstrate a clear action plan to continue reducing utility-related ignitions136 attributable to contact from vegetation. This must include: a. A clear description in the WMP and evidence of direction to inspectors under the Distribution Routine Patrol, Distribution Second Patrol, Tree Removal Inventory, and Focused Tree Inspections programs as to what factors and circumstances trigger a Level 2 (360-degree)	Energy Safety finds that PG&E has de-escalated this critical issue to an area for continued improvement. Energy Safety sets forth specific areas for improvement and associated required progress in Section 11.

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	in PG&E's service territory (Table 7 in Appendix A). Inspections, even the most detailed, may not catch every tree failure before it happens. Nonetheless, a rigorous hazard tree mitigation program is essential to preventing these outages, and the possible, subsequent ignitions. PG&E's Enhanced Vegetation Management (EVM) program, which ran from 2019 through 2022, included an evaluation of all overstrike trees (i.e., potential hazard trees). PG&E performed this assessment using PG&E's Tree Assessment Tool (TAT) which was "designed to evaluate a tree's risk of striking the electrical equipment" and was "developed by a team of ISA Certified Utility Arborists." In practice, the TAT required an inspector to examine a subject tree from all angles, performing a 360-degree inspection known in the industry as a Level 2 inspection. As of 2023, PG&E's is no longer executing its EVM program, and its new and updated vegetation management programs do not include the same detailed evaluation of all overstrike trees. PG&E once expected to perform at least 2,450 miles of EVM per year, with the goal of finishing EVM on all HFTD circuits by	inspection of an overstrike tree. PG&E may prescribe different factors and circumstances for each program. While PG&E should not rely solely on inspector judgement, PG&E should consider, in addition to these factors and circumstances, allowing an inspector to perform a Level 2 inspections whenever they deem it prudent and/or necessary. b. A plan to fully implement (beyond the pilot) and mature Focused Tree Inspections during the WMP cycle, including defined milestones and a timeline for achieving those milestones. As part of this plan PG&E must include how and when it will update the Areas of Concern (e.g., recalculating inclusion criteria across the HFTD) and mature their development (e.g., adding soil type and stand density as risk factors). c. Commitment to quantitative targets for Focused Tree Inspections during the WMP cycle (see RN-PG&E-23-06,	

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
	the end of 2026. 88 But after 2019, PG&E's annual targets decreased to 1,800 miles. PG&E fulfilled that initial 2,450 mile-commitment in 2019 and the following 1,800 mile-commitments in each year 2020, 2021, and 2022, for a program total of 8,279 miles. With PG&E's decision to conclude its EVM program, overstrike trees located along ~66% of PG&E's HFTD distribution circuit miles have not received detailed 360-degree (Level 2) inspections nor been assessed by the TAT. **Concerns with New and Updated Programs with Hazard Tree Mitigation Elements** With the end of EVM, PG&E has split hazard tree mitigation into several programs: • Routine and Second Patrol, which will address risk from obviously dead, dying, and declining trees. • The Tree Removal Inventory program, which will remove or re-inspect trees identified under the EVM program. • The Focused Tree Inspection pilot, which will use ISA TRAQ certified arborists to inspect vegetation in high-	above). If PG&E commits to performing Focused Tree Inspections on fewer circuit miles than are currently encompassed by the Areas of Concern (4,812 circuit miles) by the end of 2024, it must justify why it has chosen to do so and how it will prioritize certain Areas of Concern for inspection over others. D. An inspection procedure for Focused Tree Inspections. e. Justification as to why PG&E does not plan to perform regularly scheduled detailed inspections (as opposed to patrols), inclusive of Level 2, of overstrike trees adjacent to overhead circuit miles in the HFTD outside of Areas of Concern using TRAQ qualified ISA arborists. f. Benchmarking with SCE and SDG&E with respect to hazard tree mitigation practices. PG&E then must report in its Revision Notice Response on the similarities and differences	

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
	risk areas known as "Areas of Concern" but does not yet have an established inspection procedure. None of these programs, alone or in combination, maintain or replace the detailed approach to hazard tree mitigation conducted under EVM. Specifically, Energy Safety is concerned that: • The scope of Focused Tree Inspections is limited compared to EVM and will not inspect for hazard trees at the same scale or pace as EVM. • PG&E's Areas of Concern, in which Focused Tree Inspections will be performed, do not accurately represent the scale of PG&E's hazard tree risk profile. • Focused Tree Inspections, nor any other program, uses the TAT or the TAT's key elements. • Focused Tree Inspections, Routine, and Second Patrol do not adequately instruct inspectors when to perform 360-degree, Level 2 inspections of overstrike trees.	between the three electrical corporations' hazard tree mitigation practices. Where these practices differ, PG&E must explain why its practices differ from those of its peers. PG&E must also describe any changes it plans to make because of this exercise and a timeline to implement those changes. g. Justification of why PG&E ended the use of its TAT in favor of the ISA's TRAQ Form, and demonstration of the effectiveness of the ISA's TRAQ Form versus PG&E's most recent version of its TAT. h. A description of how PG&E will incorporate the following tree risk factors into Focused Tree Inspections, and any Level 2 inspection performed during Distribution Routine Patrol, Distribution Second Patrol, and Tree Removal Inventory as guidance to inspectors or otherwise. If PG&E will not incorporate one or more of these factors, it must explain why for	

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
	• The pace of work for Tree Removal Inventory leaves known hazards on the landscape for extended durations. Further details on each of these concerns is outlined below. **Scope, Scale, and Pace of Focused Tree Inspections Compared to EVM** As mentioned above, EVM's evaluation of potential hazard trees occurred along 1,800 to 2,450 overhead circuit miles per year with the original intention of treating all overhead distribution circuit miles in the HFTD. In contrast, the potential scope of Focused Tree Inspections is limited to the Areas of Concern, which contains 4,816 overhead distribution circuit miles, about 19% of PG&E's HFTD. The Focused Tree Inspections pilot will consist of 300 miles with additional plans to inspect up to 3,000 miles by the end of 2024, assuming the pilot is a success. Under the Focused Tree Inspections, PG&E will not inspect the other 1,816 miles in the Areas of Concern and without commitments to WMP targets related to Focused Tree Inspections, the scale (how many miles will be inspected) and pace of	each factor it will not incorporate. i. Regional Species Fire Risk Rating aggregated at EPA Level III Ecoregions. ii. Height: Diameter at breast height (HT:DBH) for selected species. iii. Wind, from the "Comprehensive Wind" model created with PG&E's meteorology data as proposed in the Targeted Tree Species Study. iv. Fire-related damage. v. Insect presence and damage. vi. Defects (e.g., conks, co-dominant tops, cracks, shallow roots, open wounds, cat-face, etc.) vii. Lean towards facilities. viii. Fall path to facilities (e.g., clear, partially blocked, fully blocked). i. A list of the information that will be digitally recorded (into	

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
	Focused Tree Inspections execution (miles per year) remains unknown. Energy Safety is concerned the scope, scale, and pace of execution for Focused Tree Inspections inadequately addresses the risk from hazard trees. The Federal Monitor documented similar concerns regarding the pace of EVM: "Given the threat of wildfires in California… the Monitor team respectfully believes that PG&E should not limit its EVM targets to 1,800 miles per year…." PG&E provided that Focused Tree Inspections is a transitional96 and pilot program, PG&E's 2023-2025 WMP is intended to cover the next three years and provide a vision for wildfire mitigation up to 10 years in the future. As such, Energy Safety is concerned that PG&E does not have a short- or long-term plan to mature its hazard tree mitigation program. **Development of Areas of Concern for Focused Tree Inspections** PG&E's Areas of Concern may not accurately capture PG&E's overstrike and hazard tree risk profile.	OneVM or another system) during Focused Tree Inspections and any Level 2 inspection performed during Distribution Routine Patrol, Distribution Second Patrol, and Tree Removal Inventory. PG&E must also report when this information will start being digitally recorded by inspectors in the field. PG&E should consider digitally documenting all relevant factors that contributed to an inspector's designation of a tree as a hazard, or not a hazard, and any resulting abatement prescription. j. An assessment of the residual risk posed by the Tree Removal Inventory trees and, while considering this residual risk assessment, demonstration that the proposed reinspection pace adequately address risk from these trees. k. A quantitative analysis of the expected risk reduction over the 2023-2025 WMP period due to its new vegetation programs (i.e.,	

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
	As mentioned above, PG&E's Focused Tree Inspections will be conducted in Areas of Concern. PG&E developed the Areas of Concern using various inputs including weather/meteorology, PSPS data, vegetation-caused outages, and vegetation-caused ignitions. PG&E then analyzed the polygons created with these inputs against the WDRMv3 model, which informed the prioritization of Areas of Concern-polygons and selection for the pilot. Energy Safety asked PG&E whether it had used any data related to the density/presence of overstrike trees to create the Areas of Concern and determine prioritization of inspection. PG&E responded that base layer satellite imagery and 2019-2020 LiDAR data was used to "help" and "aid development of [Areas of Concern] polygons." Base layer satellite imagery is a visual tool used to present context, like land use (e.g., urban vs forest), to geospatial features (e.g., the Areas of Concern-polygons); it does not accurately depict or give the user the ability to analyze the presence and density of overstrike trees at a granularity that would reliably and accurately inform a risk-based inspection program like Focused Tree Inspections. PG&E's LiDAR data collected in 2019-	Focused Tree Inspections, Tree Removal Inventory, and VM for Operational Mitigations) compared to its legacy EVM program. l. A quantitative analysis of the expected risk reduction over the 2023-2025 WMP period due to its updated Routine Patrol and Second Patrol procedure compared to its former Routine and Second Patrol procedure. 137 As a result of the above, PG&E may add, delete, or revise its 3- and 10-year vegetation management and inspection objectives in accordance with Section 8.2.1.1 of the 2023-2025 WMP Technical Guidelines.	

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
	2020, while very granular, is out of date, particularly considering that between the time PG&E collected that LiDAR data and the operationalization of the Areas of Concern, PG&E had completed ~5,785 miles of EVM and worked ~899,741 trees under EVM. The derivation of individual tree height and stand density from remote sensing data is an evolving science, but PG&E's use of proxies for calculating overstrike risk, namely vegetation-caused outages and ignitions, likely does not capture the true scale of PG&E's overstrike risk profile. Energy Safety similarly asked if PG&E used data related to tree mortality for Areas of Concern creation. PG&E responded that it has used Second Patrol VM review of tree mortality populations and "local knowledge of regional tree mortality trends." In contrast to individual tree height and stand density, forest health measures derived from remote sensing are more well established and PG&E could have incorporated relevant, public, forest health data sets. PG&E, however, has not done so. As such Energy Safety is concerned that PG&E is relying too heavily on subjective local knowledge, rather than comprehensive,		

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
	objective data sets to assess risk factors such as forest density, height, and health. PG&E's Areas of Concern development, like its risk model, also relies heavily on historical vegetation-caused outages and ignitions to determine risk from overstrike trees. SCE and SDG&E also use outage and ignition data sets in determining vegetation-related risk, but additionally include their respective tree inventories to further refine models. PG&E lacks such a comprehensive inventory. Energy Safety is concerned that PG&E's approach to identifying and prioritizing Areas of Concern is not sufficiently robust and does not take into account the full range of data and information available. **Non-Use of PG&E's Tree Assessment Tool or its Key Elements** PG&E is no longer using its TAT for any vegetation management program and will instead rely on other standards. In its 2020 WMP, PG&E stated that in its EVM program "Pre-inspectors are identifying these [hazard] trees using PG&E's tree assessment tool which is designed to evaluate a tree's risk of		

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
	striking the electrical equipment. The tool was developed by a team of ISA Certified Utility Arborists and uses PG&E data regarding regional vegetation-caused outages and ignitions during fire season, tree species height and distance to the electrical equipment, lean, health, and the terrain, and among other factors." The TAT weighed and scored a standard set of risk factors, providing inspectors with a calculated abatement determination for each tree. PG&E used its TAT for overstrike tree risk assessments throughout the life of the EVM program and regularly made updates to TAT. Most recently, Formation Environmental completed the Targeted Tree Species Study in March 2022 and recommended several improvements to PG&E's TAT. PG&E took action on all of the recommendations and made the following improvements to the TAT based on those recommendations: revised the weighting of observation defects, aggregated the Regional Species Fire Risk Rating scores at EPA Level III Ecoregions, replaced the wind scoring method, and added Height: Diameter at breast height (HT:DBH) as a scored parameter.		

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
	After four years of development, use, and refinement, PG&E does not mention the TAT in its 2023-2025 WMP. When asked how PG&E is planning on using the TAT, PG&E responded, "The TAT was developed for the EVM program. The TAT will no longer be utilized as the EVM program concluded at the end of 2022. There are no current plans to utilize TAT to support other VM programs." Instead, for FTI, PG&E will utilize the ANSI A-300 tree risk assessment standard and the International Society of Arboriculture (ISA) Basic Tree Risk Assessment Form (TRAQ Form), the latter of which "will be used as a guide." For those inspectors performing FTI using ANSI A-300 and the ISA Form, minimum qualifications include a Tree Risk Assessment Qualification (TRAQ) through the ISA. Further, unlike the TAT, "the TRAQ Form will not be digitized." Although some unknown information regarding the inspection will be recorded in OneVM, PG&E has no clear plan to document tree risk assessments, either by paper or digitally. The discarding of digitally recorded tree risk assessments inclusive of the considered tree risk attributes is a regressive recording-keeping practice that will hinder PG&E's own quality		

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
	assurance/quality control programs and regulatory efforts to hold PG&E accountable for performing high-quality tree risk assessments. The TAT provided an objective calculation of a tree's risk that incorporated PG&E specific data such as outage rates by species (i.e., Regional Species Fire Risk Rating scores) and wind modeling. While the TRAQ Form includes space for an inspector to consider local weather patterns, and PG&E claims that the "inspection will also be informed by historical vegetation caused outage trends," these parameters are no longer calculated but instead will be subjectively observed during the tree risk assessment and similarly, subjectively factored into the tree risk assessment. PG&E states that it "considered enhancing the TAT by incorporating additional elements of the ISA [TRAQ] Form in 2022," "informally compare[d] the outcomes of the TAT and ISA [TRAQ] form," and "as part of the TAT improvement efforts in 2022 … met on a recurring basis with counterparts from SCE and SDG&E." From these statements, it seems that PG&E did not readily end the use of its TAT and the years of		

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
	development and improvements but ultimately decided to discontinue its use, thereby changing its approach to tree risk assessment without adequate documentation or justification. PG&E may have gained tree risk assessment thoroughness and professionalism with the ANSI A-300, the TRAQ Form, and TRAQ qualified arborists, but lost digital record keeping maturity and an objective scoring tool with the abandonment of its TAT. PG&E made a binary choice, choosing one tree-risk assessment standard for another, without providing adequate justification nor demonstrating that the newly adopted standard would equally or more effectively address risk in its service territory. **Level of Inspection for Focused Tree Inspections, Routine Patrol, and Second Patrol** PG&E does not have objective standards as to when to elevate a Level 1 inspection to Level 2 and instead relies on inspector discretion. In a November 2021 report from the Federal Monitor, the Monitor states "PG&E recently informed the monitor		

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
	team that it soon will require 360-degree tree assessment in all HFTD areas by augmenting its Routine pre-inspection program…" Despite this prior plan to perform 360-degree inspections in all HFTD areas, the 2023 WMP contains only vague commitments to execute 360-degree/Level 2 tree assessments during Focused Tree Inspections, Routine, and Second Patrol only on trees that the inspector believes warrant a Level 2. Given the lack of clarity in the WMP regarding level of inspection during Focused Tree Inspections, Energy Safety asked PG&E "what overstrike trees are inspected and how is the level of inspection determined?" PG&E responded: "Level 1 inspections are performed on all trees within the Areas of Concern. If a Level 1 assessment cannot sufficiently determine the severity of conditions or defects, a Level 2 inspection is performed." The way PG&E describes this decision regarding level of inspection is equivocal; this uncertainty is compounded by the fact that PG&E does not have a finalized inspection procedure for Focused Tree Inspections. As such PG&E is relying heavily on inspector discretion to choose whether or not to		

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
	perform a Level 2 inspection during Focused Tree Inspections. Routine and Second Patrol primarily focus on clearance and the identification of dead and dying trees. According to PG&E's Distribution Routine Patrol Procedure, which governs both Routine and Second Patrol, PG&E directs personnel to perform Level 1 assessments to look "for trees that may fall into or may contact the line" and then perform a Level 2 only "If (while performing the level 1 inspection) the VMI [(vegetation management inspector)] identifies a tree or trees with conditions found in Hazard Trees/Vegetation clearance section of the 'California Power Line Fire Prevention Field Guide'… OR, if the VMI suspects a tree may have one or more of those conditions." The underlying assumption is that dead and dying trees do not require a 360-degree/Level 2 assessment because they can be identified as obviously dead or dying through a Level 1 assessment. Energy Safety is concerned that if PG&E does not have objective standards as to when to perform a Level 2 inspection, its inspectors will miss defects on the opposite side of a tree from the angle of		

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
	the Level 1 inspection (e.g., from a road or the center of the right-of-way) that could lead to tree failure before the next inspection. **Pace of Tree Removal Inventory** The pace of work for Tree Removal Inventory leaves known hazard trees on the landscape for extended durations. The tree work left over from the EVM program was moved into PG&E's Tree Removal Inventory), which contains 385,000 trees. PG&E says it will "address all trees in the inventory in a multi-year program" which will take nine years to complete. PG&E targets removing 15,000 trees associated with this inventory in 2023; 20,000 in 2024; and 25,000 in 2025, but until the work is complete in nine years, these trees will continue to stand on the landscape representing known-risk for ignitions. PG&E states that its nine-year plan is based on a "realistically achievable average pace." However, in the past two years, PG&E worked over 700,000 trees through its EVM program and it is therefore unclear why PG&E requires nine		

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
	years to address its remaining EVM inventory. Energy Safety is concerned that at the proposed pace of inspection and remediation these trees, which are known hazards to PG&E, will fail before they are remediated and cause an ignition. **Conclusion** PG&E informed Energy Safety and the CPUC in early 2022 that it would likely discontinue its EVM program at the end of 2022. As such, PG&E had at least a year with the knowledge of lessons learned from EVM to design a hazard tree mitigation program that would achieve the highest level of safety, reliability, and resilience, effectively address risk from hazard trees, and demonstrate a clear action plan to continue reducing hazard tree-related risk events and ignitions. Instead, PG&E's hazard tree mitigation program is regressing and inadequate, with no plan for consistent HFTD-wide hazard tree-related risk reduction by inspection and remediation.		
RN-PG&E-23-08:	PG&E uses its Probability Weather (IPW) model to inform its PSPS decision-	PG&E must revise its WMP with a detailed plan and timeline on	Energy Safety finds that PG&E has de-escalated this critical

Critical Issue ID & Title	Critical Issue Description	Required Remedy	Critical Issue Status
PG&E's PSPS decision-making process does not accurately account for EPSS enabled circuits, which could potentially lead to more PSPS events than needed.	making. The IPW model uses data to determine the likelihood of an outage and analyzes the potential for that outage to be the source of an ignition. The IPW model does not differentiate between circuits that had or have EPSS enabled and those that do not. Outages may be an appropriate proxy for ignitions in analysis of most wildfire mitigations, but EPSS reduces ignition risk while not necessarily reducing outage risk. PG&E also states that EPSS is "not expected to create additional outages" and "faults that cause an EPSS enabled device to operate typically would have caused either a sustained or momentary outage without EPSS enabled." However, in PSPS decision-making, the concern is not whether EPSS causes more outages, but that EPSS enabled circuits are not accurately captured in PG&E's methodology for determining whether a PSPS event is necessary, potentially leading to more or larger PSPS events than needed. To minimize PSPS and set appropriate risk thresholds, PG&E's PSPS decision-making must account for EPSS-enabled circuits.	how it will accurately account for EPSS enabled circuits in its PSPS decision-making process.	issue to an area for continued improvement. Energy Safety sets forth specific areas for improvement and associated required progress in Section 11.

Appendix D. Stakeholder Data Request Responses Used in WMP Evaluation

Energy Safety appreciates stakeholder involvement in the WMP evaluation process. The following stakeholder data requests and utility responses were reviewed, used, and cited in this Decision.

GREEN POWER INSTITUTE DATA REQUEST:
GPI-PGE-2023WMP-02[2]
PG&E RESPONSE
Date Received: May 11, 2023
Date Submitted: May 16, 2023

Question 001
Please provide:
a. The number of trees removed in each year from 2019-2022 and the program under which the removals occurred.
b. The number of planned tree removals for 2023, 2024, and 2025, and the program under which the removals will occur.
c. The number of remaining trees in PG&Es tree inventory that are listed for removal.

Answer 001
a.

Year	Routine	Second Patrol	EVM
2019	187,357	45,600	116,491
2020	191,728	65,402	120,979
2021	179,908	22,416	278,336
2022	191,538	41,100	346,535

[2] Data Request GPI-PG&E-2023WMP-02 (Question 1) (https://www.pge.com/pge_global/common/pdfs/safety/emergency-preparedness/natural-disaster/wildfires/wildfire-mitigation-plan/reference-docs/2023/GPI_002.zip, accessed October 16, 2023).

b. As of February 2022, our forecast for Distribution program tree removals is approximately 332,000 trees in 2023, 331,000 trees in 2024, and 329,000 trees in 2025.
For our Tree Removal Inventory Program, we are planning to remove 15,000 trees in 2023, 20,000 trees in 2024, and 25,000 trees in 2025.

c. Please see table below for the count of trees in PG&E tree inventory that are listed for removal:

VM Program	Trees Marked for Removal
Capital	13,307
CEMA	17,162
Tree Removal Inventory	385,428
Maintenance	77,579
Orchard	9,836
Other	54
Reliability	200
TROW	150,110
VC	2
AWRR (Legacy VM program)	198,378
Fuels Reduction (Legacy VM program)	1,515
Work Verification tags from Routine	7,926
Grand Total	**861,497**

MUSSEY GRADE ROAD ALLIANCE (MGRA)
MGRA-PGE-2023WMP-02[3]
PG&E RESPONSE
Date Received: April 20, 2023
Date Submitted: April 25, 2023

QUESTION 007
Please provide a GIS file of 2022 outages occurring on circuits where EPSS was enabled.

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[3] MGRA DR 2 (Question 7) (https://www.pge.com/pge_global/common/pdfs/safety/emergency-preparedness/natural-disaster/wildfires/wildfire-mitigation-plan/reference-docs/2023/MGRA_002.zip, accessed October 24, 2023).

ANSWER 007
The method of providing a geospatial file with the location of 2022 outages on EPSS enabled circuits would require the disclosure of device location and therefore the geospatial representation of outage location that would be provided in this response to this data request involves the identification of Critical Energy Infrastructure Information (CEII), which we are required by law to maintain as confidential and cannot produce without the requesting party agreeing to protect the information through a non-disclosure agreement.

[Redacted attachment files for Question 007 are in the corresponding data request footnote.]

Appendix E. Stakeholder Comments on 2023-2025 Wildfire Mitigation Plans

Energy Safety invited stakeholders, including members of the public, to provide comments on the utilities' 2023-2025 WMPs. Opening WMP comments were due on May 26, 2023, and reply comments were due on June 5, 2023. The following individuals and organizations submitted comments:

- California Department of Fish and Wildlife (CDFW)
- The Public Advocates Office at the California Public Utilities Commission (Cal Advocates)
- City of Moorpark
- City of Oakland
- Counties of Marin, Napa, San Luis Obispo, and Sonoma, and the City of Santa Rosa (Joint Local Governments)
- Marin Clean Energy, Sonoma Clean Power Authority, Pioneer Community Energy, and East Bay Community Energy (Joint CCAs)
- Mussey Grade Road Alliance (MGRA)
- Rural County Representatives of California (RCRC)
- The Green Power Institute (GPI)
- The Utility Reform Network (TURN)
- Julia and David Allenby
- Cynthia Barbera
- Richard Buckingham
- Beverly Christenson
- Curren Meechem Family
- Maureen Isola
- Janani Ramachandran, Oakland City Council
- Brenda So
- Southard

- George Troy

Comments received on the 2023-2025 WMPs can be viewed in the 2023-2025 Wildfire Mitigation Plan (2023-2025-WMPs) docket log.

Energy Safety evaluated these comments and concurred with and in some instances incorporated stakeholder input on PG&E's 2023-2025 WMP.

Energy Safety found the following stakeholder comments to concur with topics already included in Energy Safety's findings:

- Cal Advocates
  - Decrease EPSS risk.
  - Hardening decision-making.
  - Improve asset inspection QA/QC.
  - Improve asset inspections.
  - Improve work order backlog.
  - Recommended that PG&E revise its WMP to provide an assessment of the residual risk posed by the Tree Removal Inventory trees.
  - Recommended that PG&E revise its WMP to include quantitative analyses of the expected risk reduction of PG&E new vegetation management programs vs its legacy programs.
  - Undergrounding resourcing.
- CDFW
  - Scant information on environmental permitting related to WMP.
- GPI
  - Accounting for mitigations in PSPS decision-making process.
  - Hardening decision-making process.
- Joint Local Governments
  - Risk and mitigation transparency.
- MGRA
  - Consequence model values.
  - Hardening decision-making process.
  - Mitigation selection process.
- RCRC
  - Need to update its Wood Management procedures with new and modified programs.
  - Covered conductor as PSPS alternative.

    - EPSS Risk Analysis.
- TURN
    - Hardening decision-making process.
    - Undergrounding secondary.
    - Undergrounding top risk.

The following stakeholder comments introduced new information that influenced Energy Safety's findings:

- Cal Advocates
    - QA/QC targets are inadequate, inspection practices are poor, and inspection scope is decreasing.
    - Planned pace to address open ignition risk work orders is too slow.
    - PG&E must adjust its plan to meet asset management needs.
    - PG&E must adjust its resources to meet asset management needs.
    - Recommended that PG&E revise its WMP to provide an assessment of the residual risk posed by the Tree Removal Inventory trees.
    - Recommended that PG&E revise its WMP to include quantitative analyses of the expected risk reduction of PG&E new vegetation management programs vs its legacy programs.
- GPI
    - Informed area for continued improvement on the continuation of effectiveness of enhanced clearances joint study.
    - PG&E's work order backlog plan must be revised.
- MGRA
    - Evaluate other mitigations in comparison to undergrounding (helped inform argument on undergrounding-related areas for continued improvement).
    - Helped inform EFD-related areas for continued improvement on tracking progress.
    - Recommended the inclusion of falling conductor protection in the area for continued improvement on undergrounding.
    - Helped inform area for continued improvement to calculate effectiveness of downed conductor detection.
    - Include REFCL as part of covered conductor package - included in joint study and undergrounding decision-making area for continued improvements.

- Will be used to continue obtaining data on PG&E EPSS outages, used for area for continued improvement on calculating effectiveness.

In addition to the above, Energy Safety's evaluation of the utilities' 2023-2025 WMPs benefited from the discovery materials generated by data requests submitted to PG&E by the some of the stakeholders named above, in particular Green Power Institute (GPI) and Mussey Grade Road Alliance (MGRA), see Appendix D for associated stakeholder data requests.

Appendix F. Stakeholder Comments on the Revision Notice Response & Supplement Revision Notice Response

Energy Safety invited stakeholders, including members of the public, to provide comments on PG&E's Revision Notice Response and Supplemental Revision Notice Response. Opening comments on PG&E's Revision Notice Response were due on August 22, 2023, and reply comments were due on September 1, 2023. Opening comments on PG&E's Supplemental Revision Notice Response were due on October 13, 2023, and reply comments were due on October 20, 2023. The following individuals and organizations submitted comments:

- The Green Power Institute (GPI).
- The Utility Reform Network (TURN).
- Marin Clean Energy, Sonoma Clean Power Authority, Pioneer Community Energy, and East Bay Community Energy (Joint CCAs).
- The Public Advocates Office at the California Public Utilities Commission (Cal Advocates).
- Mussey Grade Road Alliance (MGRA).
- Rural County Representatives of California (RCRC).
- Allison and Ryan Falk.
- Amanda Bereny.
- Andrew Cohen.
- Joseph Holmes.
- Kevin Collins.
- William Abrams.
- Susan Tonus.
- Charles Klinedinst.
- Brenda So.

Comments received on PG&E's Revision Notice Response and Supplemental Revision Notice Response can be viewed in the 2023-2025 Wildfire Mitigation Plan (2023-2025-WMPs) docket log.

Energy Safety evaluated these comments and concurred with stakeholder input on PG&E's Revision Notice Response and Supplemental Revision Notice Response.

Energy Safety found the following stakeholder comments to concur with topics already included in Energy Safety's findings:

- MGRA
    - PSPS decision-making.
    - Improving understanding of EPSS.

- RCRC
    - Considering the customer experience within its wood management program and procedure.
- TURN
    - PSPS analysis.

Appendix G. Stakeholder Comments on Energy Safety's Draft Decision on PG&E's 2023-2025 Wildfire Mitigation Plans

Placeholder appendix to be replaced after the draft Decision is published and stakeholder comments are received.

Appendix H. Maturity Survey Results

Energy Safety's 2023-2025 Electrical Corporation Wildfire Mitigation Maturity Model[4] (Maturity Model) and 2023 Electrical Corporation Wildfire Mitigation Maturity Survey[5] (Maturity Survey) together provided a quantitative method to assess the maturity of each utility's wildfire risk mitigation program.

The Maturity Model consists of 37 individual capabilities describing the ability of electrical corporations to mitigate wildfire risk within their service territory. The 37 capabilities are aggregated into seven categories. The seven mitigation categories are:

A. Risk Assessment and Mitigation Selection.
B. Situational Awareness and Forecasting.
C. Grid Design, Inspections, and Maintenance.
D. Vegetation Management and Inspections.
E. Grid Operations and Protocols.
F. Emergency Preparedness.
G. Community Outreach and Engagement.

Maturity levels range from 0 (below minimum requirements) to 4 (beyond best practice). Electrical corporations' responses to the Maturity Survey, listed by mitigation category, are depicted in the figures and tables below.

Tables A-3 and A-4 compare Large IOUs maturity levels across mitigation categories showing minimum values and average values. Figure A-1 shows PG&E's projected maturity growth throughout the WMP cycle. Figure A-2 provides a one-page look at all PG&E's maturity levels for the WMP cycle, including at the capability and sub-capability levels, showing both minimum and average calculations.

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[4] 2023-2025 Electrical Corporation Wildfire Mitigation Maturity Model (Second Revised Final, Feb. 2023) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53394&shareable=true, accessed May 5, 2023).

[5] 2023 Electrical Corporation Wildfire Mitigation Maturity Survey Revised Final, April 2023) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53708&shareable=true, accessed May 5, 2023). This is the version used by Energy Safety when scoring the survey.

Table A-3. Cross-Utility Maturity Level by Category[6] (Minimum Values)

Maturity Category	PG&E		SCE		SDG&E	
	2023	2026	2023	2026	2023	2026
A. Risk Assessment and Mitigation Selection	0.50	0.83	1.00	1.33	1.33	1.33
B. Situational Awareness and Forecasting	0.83	1.33	0.67	1.17	1.67	1.67
C. Grid Design, Inspections, and Maintenance	0.40	1.20	2.00	2.20	2.40	2.60
D. Vegetation Management and Inspections	0.75	2.00	1.25	2.50	2.00	2.75
E. Grid Operations and Protocols	1.40	1.40	1.80	1.80	2.40	2.40
F. Emergency Preparedness	2.00	2.00	2.67	2.67	2.67	3.00
G. Community Outreach and Engagement	3.60	3.60	3.60	4.00	4.00	4.00

[6] Table A-3 displays the utilities maturity level at the start of the current WMP cycle (2023) and their level at the end of the cycle (2026).

Table A-4. Cross-Utility Maturity Level by Category[7] (Average Values)

Maturity Category	PG&E		SCE		SDG&E	
	2023	2026	2023	2026	2023	2026
A. Risk Assessment and Mitigation Selection	2.19	2.89	2.65	3.28	2.91	2.99
B. Situational Awareness and Forecasting	2.61	2.85	2.25	2.89	3.00	3.04
C. Grid Design, Inspections, and Maintenance	2.30	3.10	2.98	3.18	3.10	3.17
D. Vegetation Management and Inspections	2.63	3.38	3.19	3.63	3.31	3.63
E. Grid Operations and Protocols	2.93	3.21	3.22	3.46	3.67	3.67
F. Emergency Preparedness	3.13	3.24	3.58	3.58	3.39	3.44
G. Community Outreach and Engagement	3.80	3.80	3.73	4.00	4.00	4.00

[7] Table A-4 displays the utilities maturity level at the start of the current WMP cycle (2023) and their level at the end of the cycle (2026).

Figure A-1. PG&E's Projected Growth in Maturity throughout Current WMP Cycle by Category

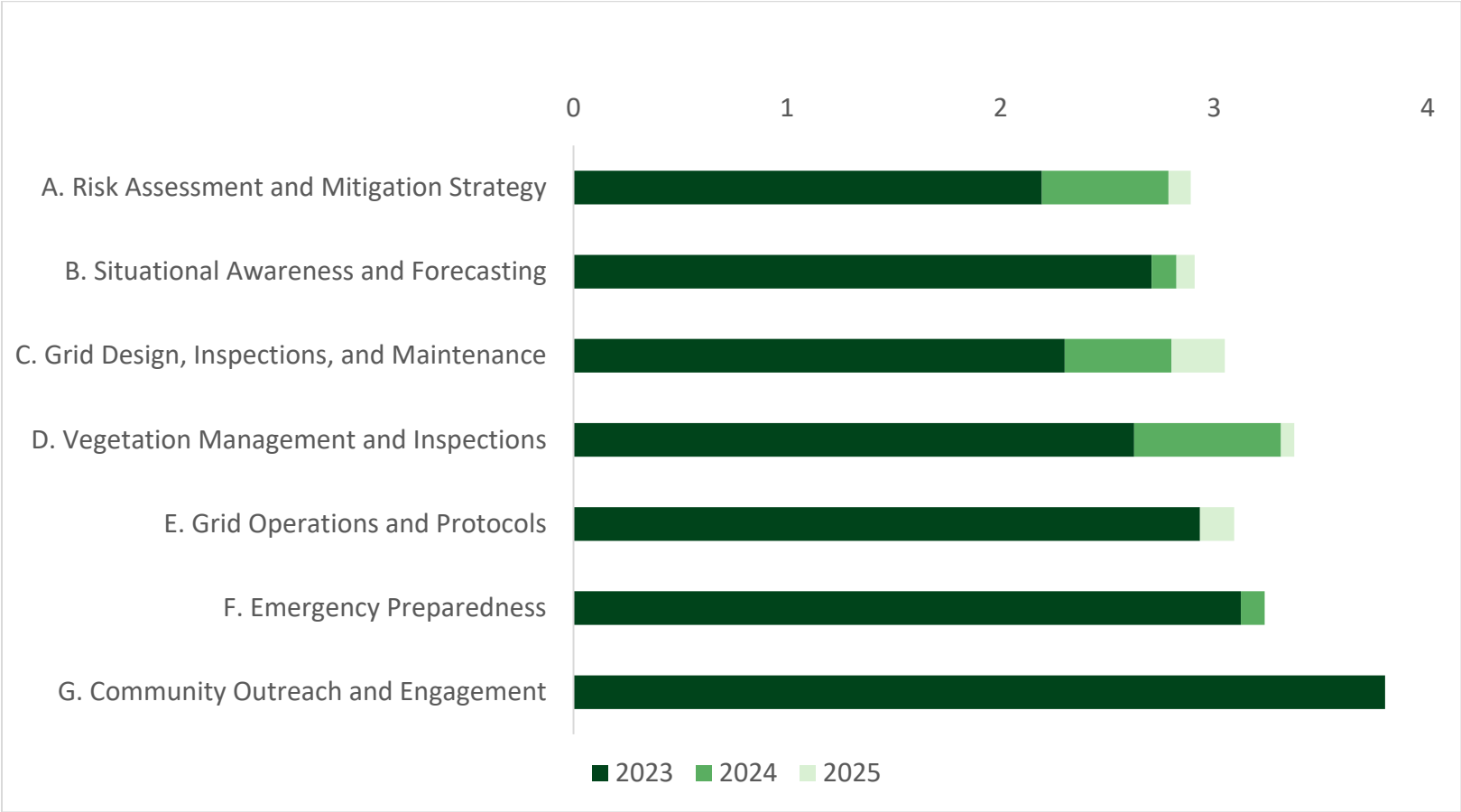

Figure A-2. PG&E Comprehensive Maturity Survey Results

		1. Capability				2. Capability				3. Capability				4. Capability				5. Capability				6. Capability			
		2023	2024	2025	2026	2023	2024	2025	2026	2023	2024	2025	2026	2023	2024	2025	2026	2023	2024	2025	2026	2023	2024	2025	2026
A. Risk Assessment and Mitigation Strategy		1. Statistical weather, climate, and wildfire modeling				2. Calculation of wildfire and PSPS risk exposure for societal values				3. Calculation of community vulnerability to wildfire and Public Safety Power Shutoffs (PSPS)				4. Calculation of risk and risk components				5. Risk event tracking and integration of lessons learned				6. Risk-informed wildfire mitigation strategy			
	Minimum of Sub-Cap.	0.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0
	Average of Sub-Cap.	2.5	2.6	2.6	2.6	3.3	3.6	3.6	3.6	0.5	3.3	3.3	3.3	2.4	2.8	2.8	2.8	2.7	2.7	2.7	2.7	1.8	1.8	2.4	2.4
B. Situational Awareness and Forecasting		7. Ignition likelihood estimation				8. Weather forecasting ability				9. Wildfire spread forecasting				10. Data collection for near-real-time conditions				11. Wildfire detection and alarm systems				12. Centralized monitoring of real-time conditions			
	Minimum of Sub-Cap.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	4.0	4.0	4.0	1.0	4.0	4.0	4.0
	Average of Sub-Cap.	1.9	2.0	2.4	2.4	1.9	1.9	1.9	2.2	2.9	2.9	3.0	3.0	2.1	2.1	2.1	2.1	4.0	4.0	4.0	4.0	3.4	4.0	4.0	4.0
C. Grid Design, Inspections, and Maintenance		13. Asset inventory and condition database				14. Asset inspections				15. Asset maintenance and repair				16. Grid design and resiliency				17. Asset and grid personnel training and quality							
	Minimum of Sub-Cap.	0.0	1.0	2.0	3.0	1.0	2.0	2.0	2.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0				
	Average of Sub-Cap.	2.3	3.3	3.5	3.8	2.3	3.3	3.3	3.3	1.8	2.3	2.3	2.3	3.2	3.2	3.2	3.2	2.0	2.0	3.0	3.0				
D. Vegetation Management and Inspections		18. Vegetation inventory and condition database				19. Vegetation inspections				20. Vegetation treatment				21. Vegetation personnel training and quality											
	Minimum of Sub-Cap.	1.0	3.0	4.0	4.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	2.0	2.0	2.0								
	Average of Sub-Cap.	3.0	3.8	4.0	4.0	2.5	3.3	3.3	3.3	2.5	2.8	2.8	2.8	2.5	3.5	3.5	3.5								
E. Grid Operations and Protocols		22. Protective equipment and device settings				23. Incorporation of ignition risk factors in grid control				24. PSPS operating model				25. Protocols for PSPS re-energization				26. Ignition prevention and suppression							
	Minimum of Sub-Cap.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	2.0	2.0	1.0	1.0	1.0	1.0	4.0	4.0	4.0	4.0				
	Average of Sub-Cap.	2.8	2.8	2.8	2.8	1.0	1.0	1.8	2.4	3.7	3.7	3.7	3.7	3.2	3.2	3.2	3.2	4.0	4.0	4.0	4.0				
F. Emergency Preparedness		27. Wildfire and PSPS emergency and disaster preparedness plan				28. Collaboration and coordination with public safety partners				29. Public emergency communication strategy				30. Preparedness and planning for service restoration				31. Customer support in wildfire and PSPS emergencies				32. Learning after wildfires and PSPS incidents			
	Minimum of Sub-Cap.	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	4.0	4.0	4.0	1.0	1.0	1.0	1.0
	Average of Sub-Cap.	3.8	3.8	3.8	3.8	4.0	4.0	4.0	4.0	2.8	2.8	2.8	2.8	2.7	3.3	3.3	3.3	4.0	4.0	4.0	4.0	1.5	1.5	1.5	1.5
G. Community Outreach and Engagement		33. Public outreach and education awareness				34. Public engagement in electrical corporation wildfire mitigation planning				35. Engagement with AFN and socially vulnerable populations				36. Collaboration on local wildfire mitigation planning				37. Cooperation and best practice sharing with other electrical corporations							
	Minimum of Sub-Cap.	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0				
	Average of Sub-Cap.	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0				