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

To: Stakeholders for Southern California Edison Company's 2023-2025 Wildfire Mitigation Plan

August 30, 2023

Enclosed is the Draft Decision of the Office of Energy Infrastructure Safety (Energy Safety) presenting its evaluation of Southern California Edison 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 September 19, 2023. Reply comments must be submitted no later than September 29, 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 August 18, 2023).

OFFICE OF ENERGY INFRASTRUCTURE SAFETY

DRAFT DECISION ON 2023-2025 WILDFIRE MITIGATION PLAN

SOUTHERN CALIFORNIA EDISON COMPANY

August 2023

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

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 Southern California Edison Company's (SCE's) 2023-2025 Wildfire Mitigation Plan, submitted on March 27, 2023. Energy Safety's Decision considers comments from the public and other stakeholders.

SCE's Wildfire Mitigation Plan is comparable to, and at times exceeds, the plans of the other large electrical corporations. For example, SCE plans to perform infrared inspections on 5,100 miles of distribution circuits in its High Fire Risk Area annually, with the highest risk circuits inspected every year and all circuits in that area inspected at least every two years. Infrared inspections identify asset failure not visible during visual inspections; SCE's extensive use of infrared inspections on its distribution system surpasses that of its peers. SCE also reports that it expanded its environmental monitoring systems to improve its situational awareness and forecasting. SCE is also integrating machine learning capabilities into existing weather stations to enhance its forecasting accuracy. Among the strengths of SCE's Wildfire Mitigation Plan are the targets it has set for emergency preparedness, which include providing funding for fire agencies to maintain a quick reaction force of firefighting resources year-round. SCE additionally reports that it has improved its data management systems related to Public Safety Power Shutoff events, including use of a consolidated data platform which unifies disparate lines of business required for these events, eliminating the manual hand-offs among different software programs and streamlining operations before, during, and after an event.

Despite its strengths, SCE's Wildfire Mitigation Plan has areas that can be further developed and improved. For example, in the absence of covered conductor installations within its severe risk areas, SCE could better analyze alternative mitigation approaches rather than default to undergrounding. SCE must also prioritize vibration damper installation, which SCE estimates could more than double the lifespan of covered conductor. Additionally, given its improvements to existing inspections and use of technology, SCE should expect to see a continued increase in work orders, including in its High Fire Risk Area, and must plan to address overdue work orders faster than new work orders are accumulating. SCE must also provide more information on its evaluation of the needs of its access and functional needs customer base and its plans to address these needs.

2. Introduction and Background

Southern California Edison Company (SCE) 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. The submission is 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]

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

Energy Safety approves SCE's 2023-2025 WMP. In 2024, SCE must submit a 2025 Update consistent with the 2025 WMP Guidelines. Energy Safety will approve or deny SCE'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. Opening comments on SCE's Base WMP were due on May 26, 2023, and reply comments were due on June 5, 2023. See Appendix C for a list of stakeholders that submitted comments, including comments that Energy Safety concurred with and incorporated into its evaluation.

---

[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."

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 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

---

[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] SCE provided its WMP pre-submission to Energy Safety on February 13, 2023.

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

SCE 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 establishes 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. SCE's results specific to each initiative are discussed in Sections 6 through 9 of this Decision, and overall results for SCE can be found in Appendix E.

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]

Energy Safety did not issue SCE a Revision Notice for its 2023-2025 WMP.

---

[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).

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.[14]

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.

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

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

4. Introductory Sections of the WMP

In response to Sections 1 through 4 of the Technical Guidelines, SCE provided basic information regarding persons responsible for executing the plan and adherence to statutory requirements.[15]

SCE 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).[16] By completing the checklist, the electrical corporation affirms that its WMP addresses each requirement. SCE completed this checklist.
- Section 4: Overview of WMP (Primary Goal; WMP Objectives; Proposed Expenditures; Risk-Informed Framework)

4.1 SCE'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).[17]

SCE 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

---

[15] 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).

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

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

utilities (IOUs). Table 4.1-2 provides the same information but divided by planned expenditures within and outside the 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[18]

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%**

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

Figure 4.1-1. SCE Grid Design, Operations, and Maintenance Projected Expenditures (HFTD)

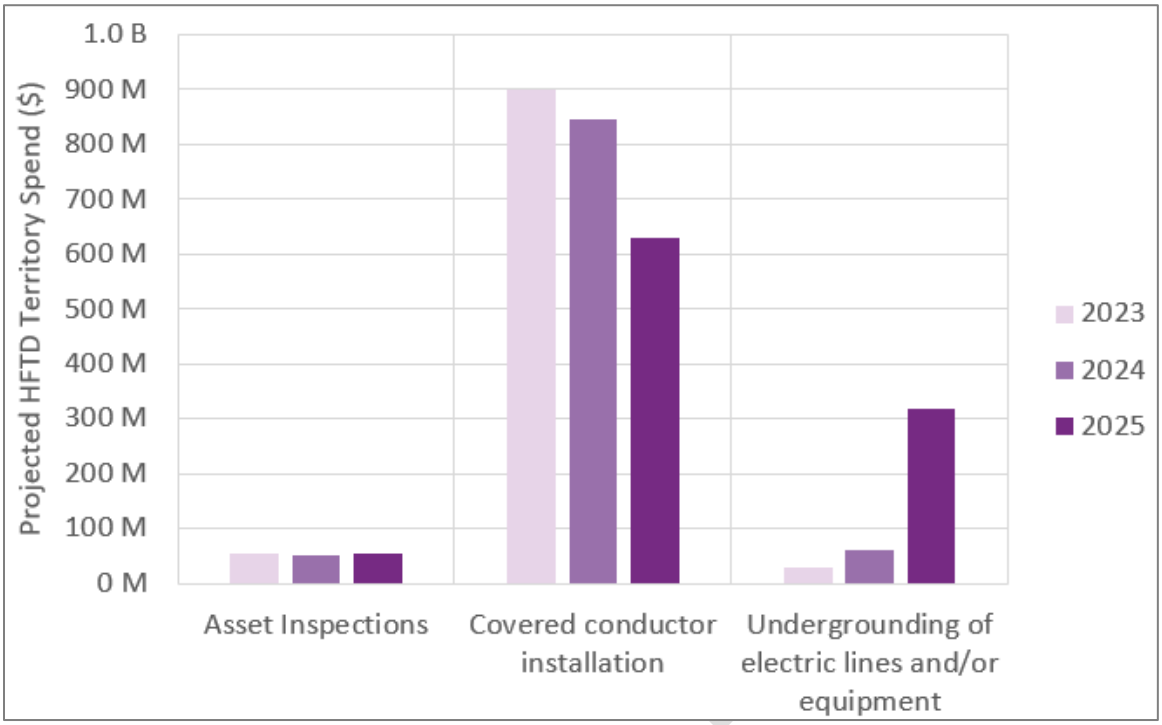
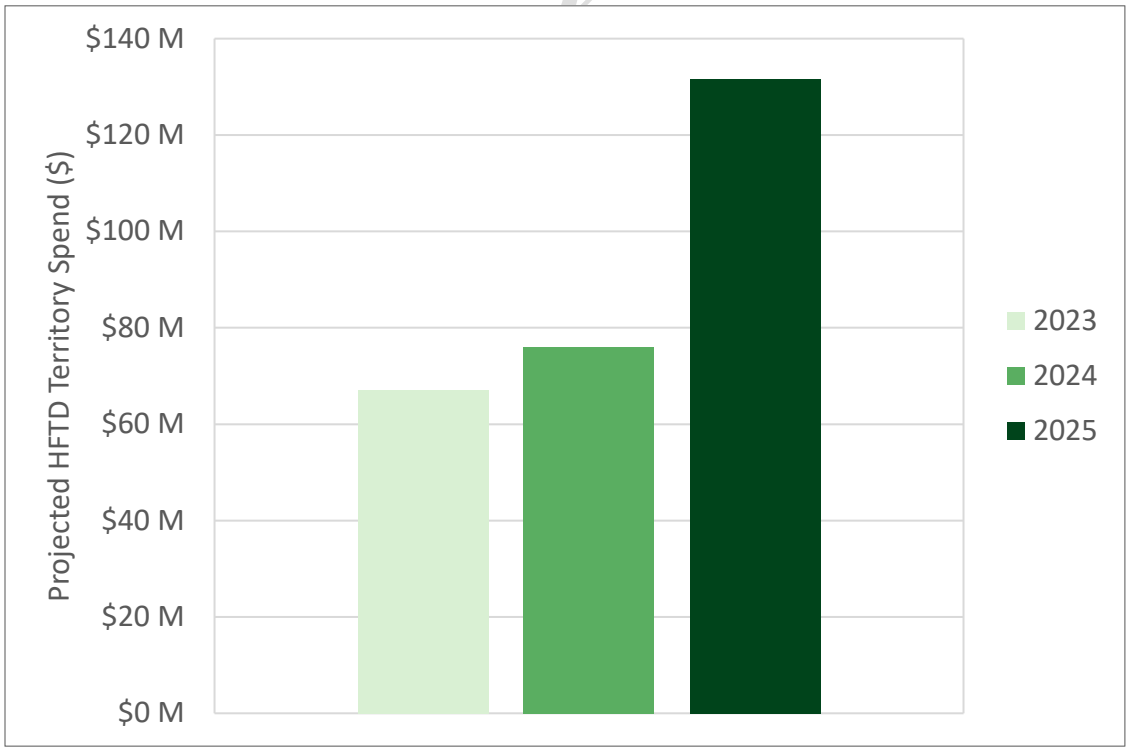


Figure 4.1-2. SCE Vegetation Management and Inspections Projected Expenditures (HFTD)



5. Overview of the Service Territory

In response to Section 5 of the Technical Guidelines, SCE provided a high-level overview of its service territory that includes key characteristics of its electrical infrastructure, environmental settings, and community values at risk.[19]

Below are Energy Safety's summary and findings regarding SCE's reporting on its service territory.

5.1 Service Territory

Section 5.1 of the Technical Guidelines requires SCE to provide a high-level description of its service territory, including areas served, number of customers served, and geospatial maps.[20]

SCE reported that its service territory includes 52,256 square miles and serves roughly 15.5 million people and 5.2 million customer accounts. SCE also stated that 14,206 square miles of its territory are in the CPUC's HFTD Tier 2 and 3 lands, which is 27 percent of its territory. Compared to the peer utilities of Pacific Gas and Electric Company (PG&E) and San Diego Gas & Electric Company (SDG&E), SCE service territory is the second largest in size, serves the second most customers, and encompasses the second 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 SCE, PG&E, and SDG&E service territories.

[19] 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).

[20] 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

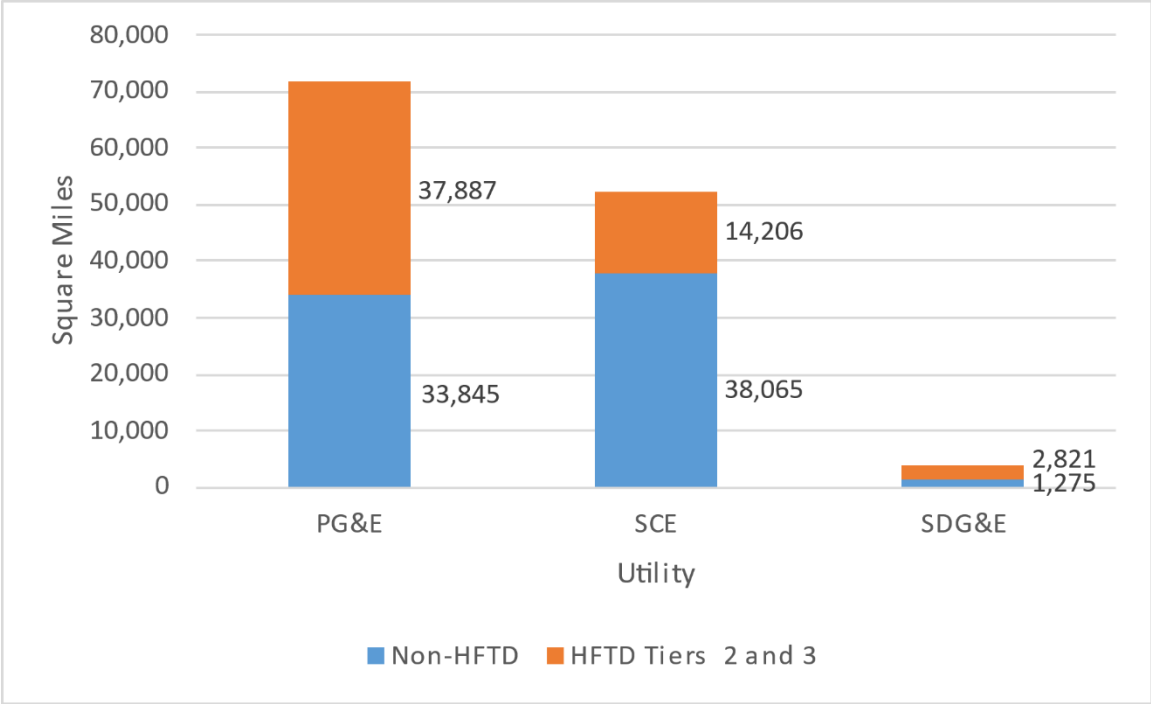
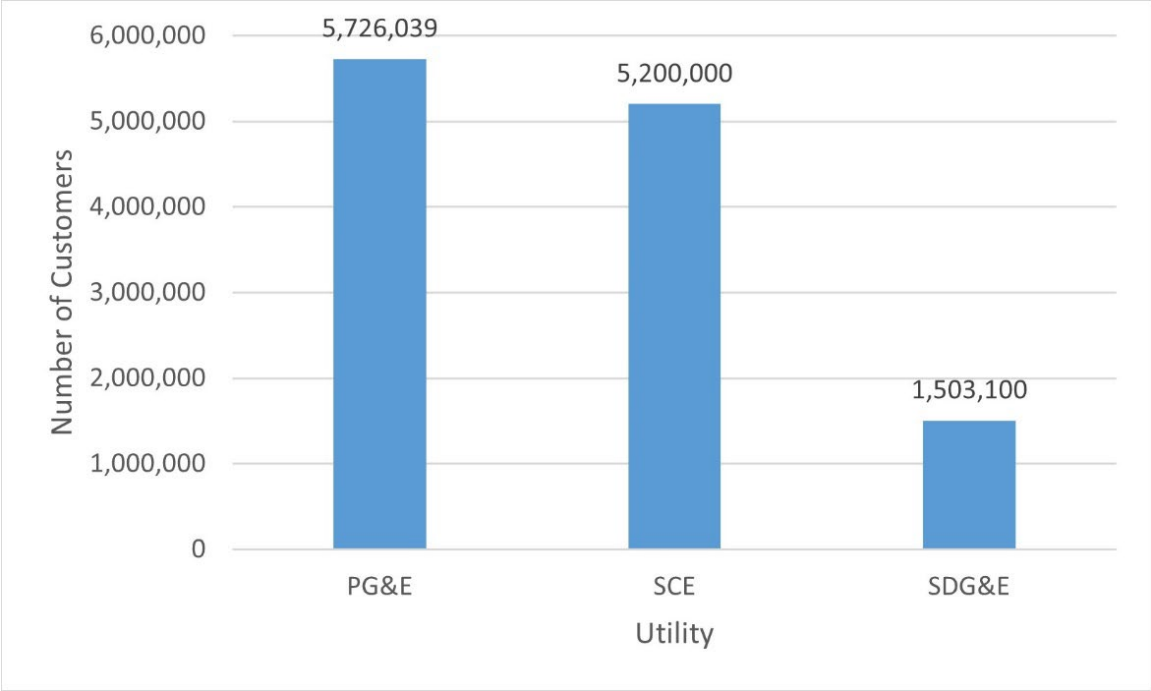


Figure 5.1-2. Cross-Utility Number of Customers Served

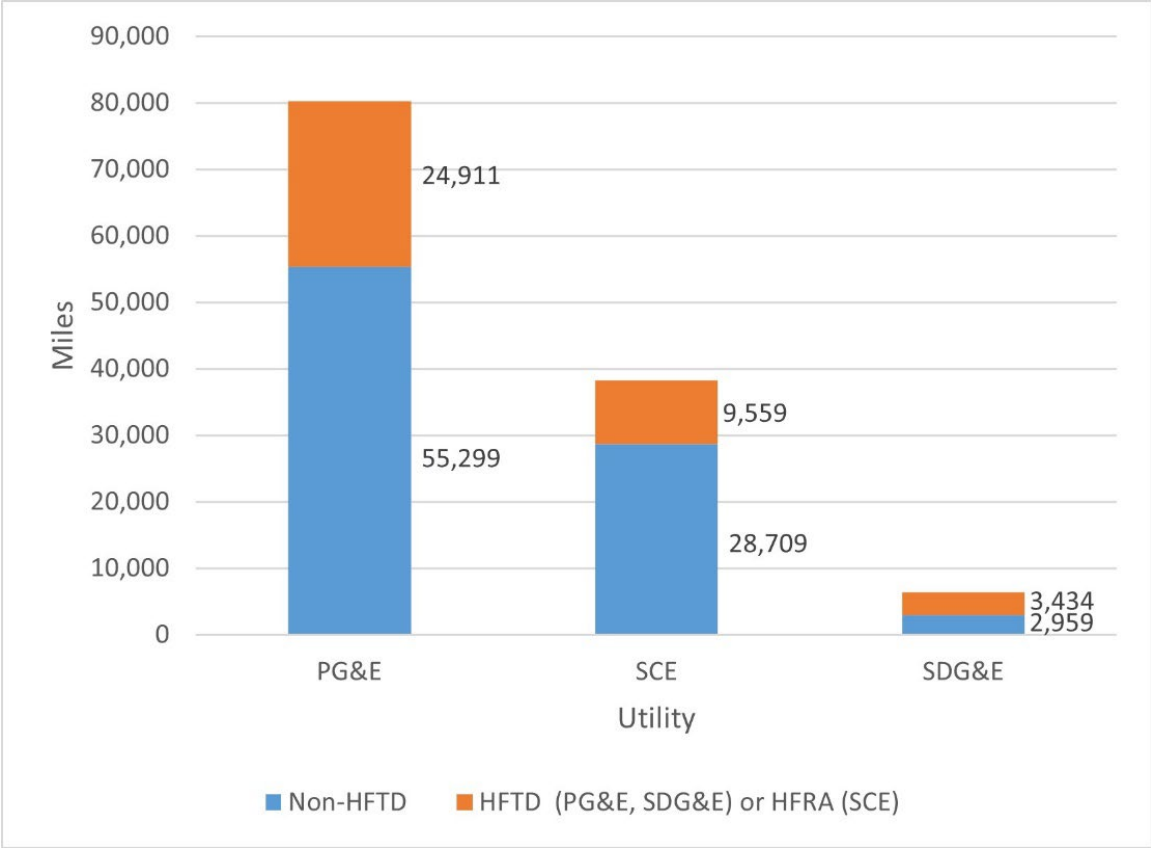


5.2 Electrical Infrastructure

Section 5.2 of the Technical Guidelines requires SCE 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.[21]

SCE 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, and 5.2-3 below summarize conductor line miles presented by SCE in comparison to its peer utilities. [22]

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



[21] 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).

[22] In the legends of Figures 5-3 to 5-5, 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

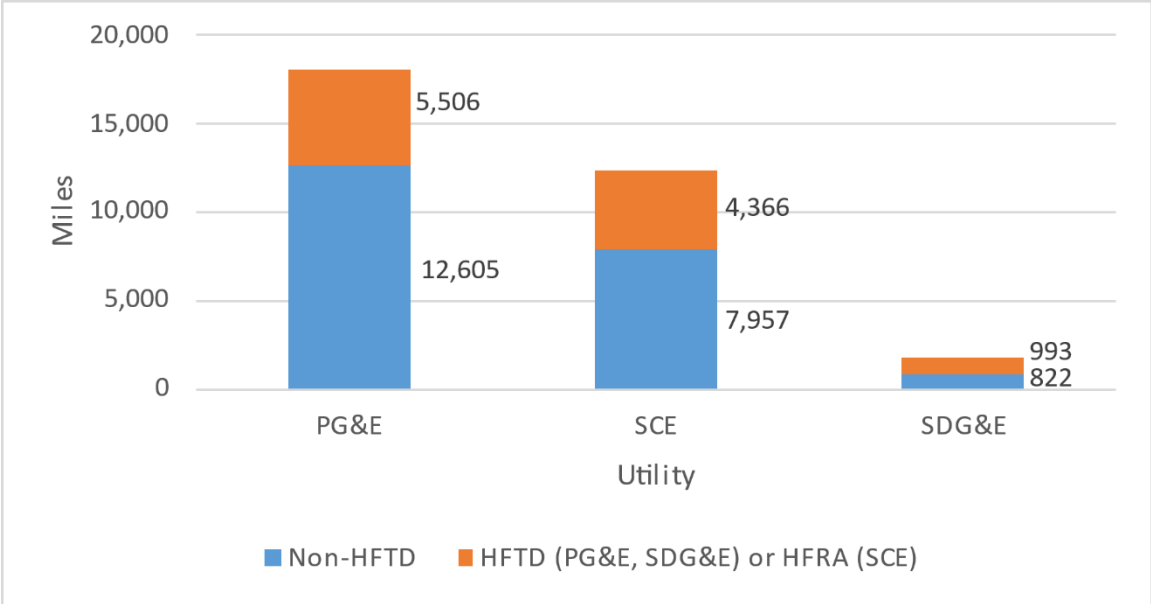
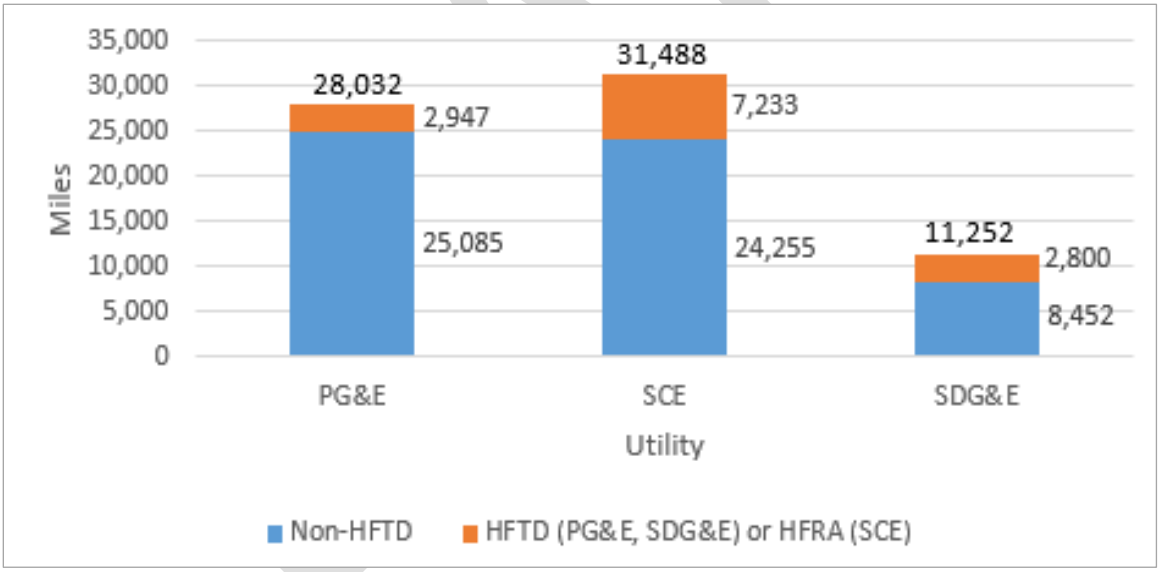


Figure 5.2-3. Cross-Utility Miles of Underground Distribution and Transmission Lines



5.3 Environmental Settings

Section 5.3 of the Technical Guidelines requires SCE to provide a high-level overview of the environmental settings within its service territory.[23]

5.3.1 Fire Ecology

Section 5.3.1 of the Technical Guidelines requires SCE 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.[24]

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

SCE identified approximately 40+ types of vegetation using data from the North American Wildland Fuels Database, Michigan Technical Research Institute, United States Forest Service, and the University of Washington. SCE identified Creosote Bush Desert Scrub as their highest percentage of vegetation in their service territory, covering approximately 6,250,00 acres.[25]

5.3.2 Catastrophic Wildfire History

Section 5.3.2 of the Technical Guidelines requires SCE 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.[26]

SCE reported 10 catastrophic wildfires that were attributed to its facilities or equipment from 2015-2022.[27] 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-

---

[23] 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).

[24] 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).

[25] SCE's 2023-2025 WMP, Table 5-3 "Existing Vegetation Types in the SCE Service Territory," page 42.

[26] 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).

[27] 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.

3 below summarize the reported information on catastrophic wildfires for SCE, PG&E, and SDG&E.

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

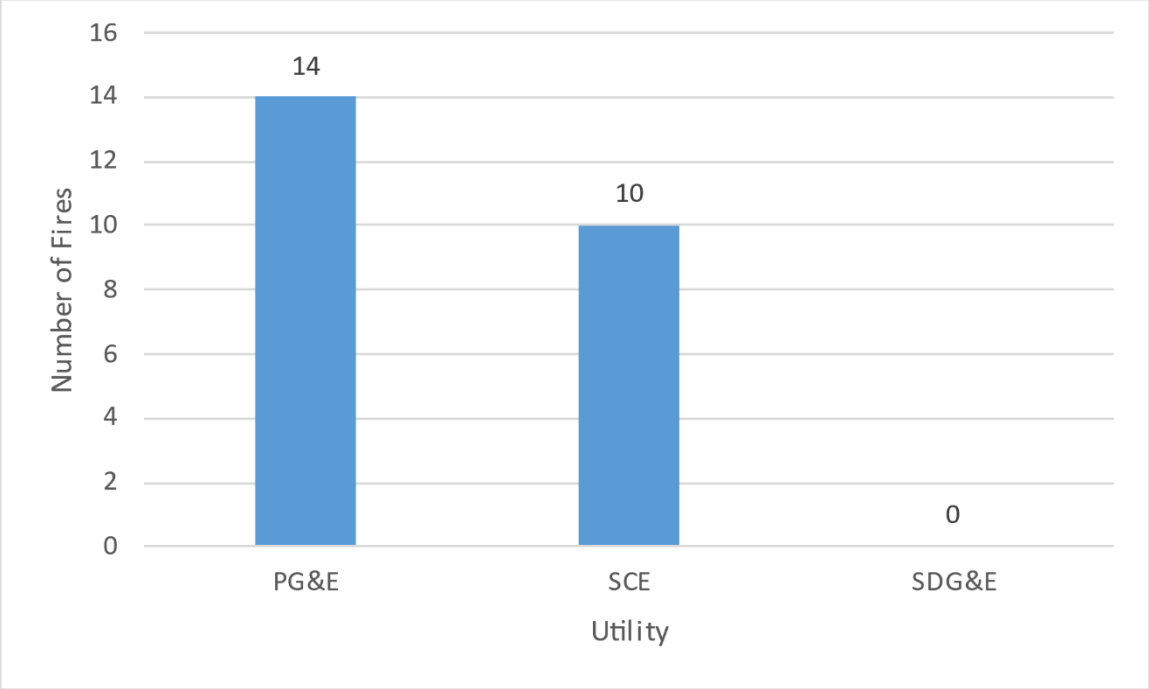


Figure 5.3-2. Cross-Utility Acres Burned by Catastrophic Wildfires (2015-2022)

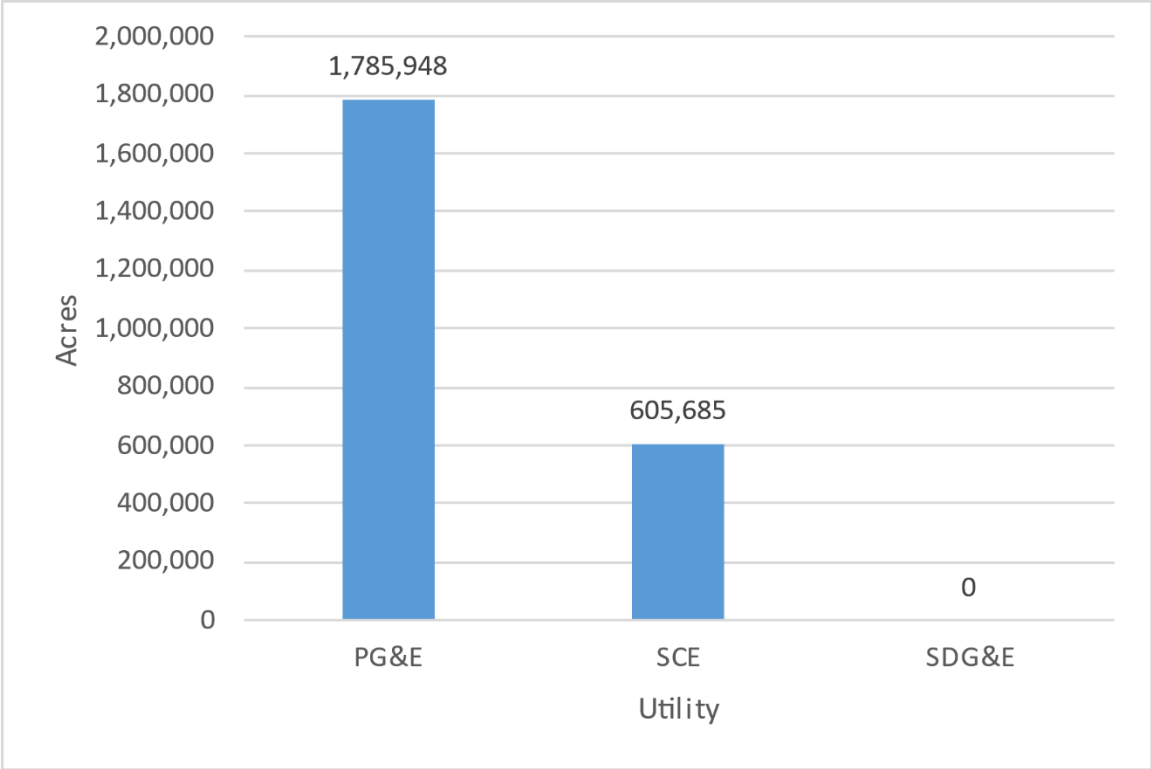
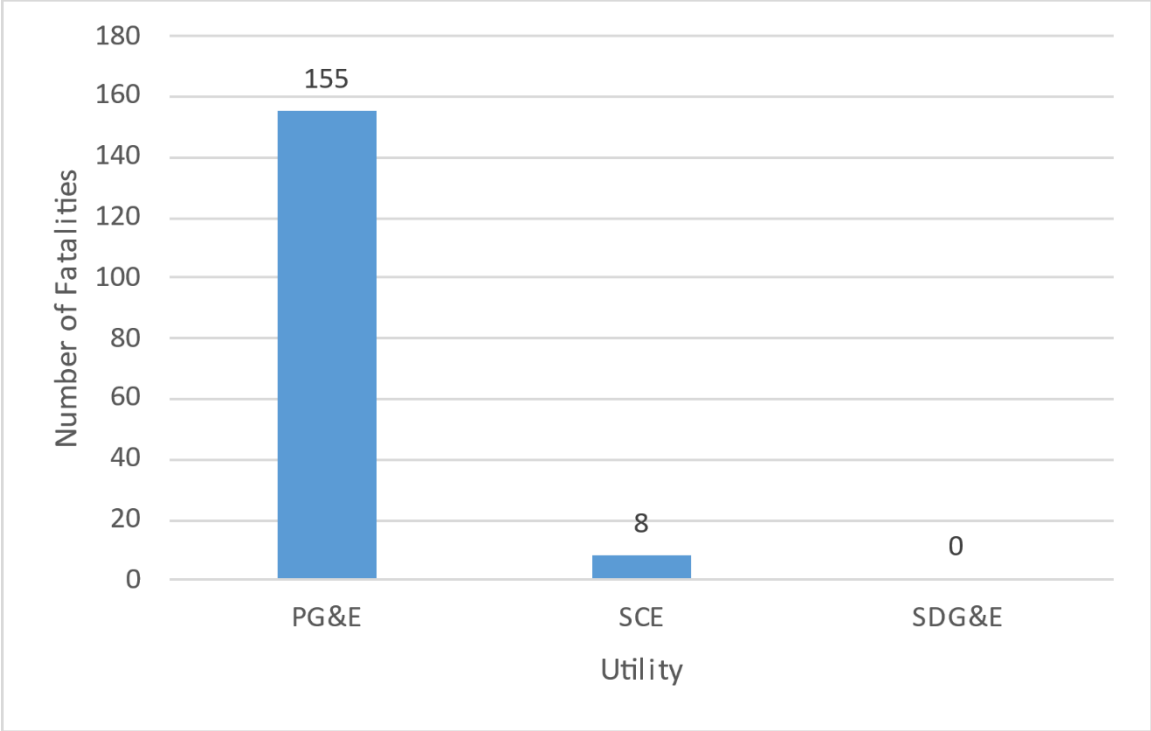


Figure 5.3-3. Cross-Utility Number of Fatalities Caused by Catastrophic Wildfires (2015-2022)



5.4 Community Values at Risk

Section 5.4 of the Technical Guidelines requires SCE 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.[28]

SCE listed the percentages and number of people in its territory located in urban, rural, and highly rural areas and briefly summarized where these areas occur in its territory. SCE provided urban, rural, and highly rural customer distributions across its service territory using data provided by the United States Census Bureau.[29] SCE also described where the WUI occurs in its territory and provided Table 5-01 showing the number of customers and circuit miles. Additionally, SCE provided Figure 5-08 showing the distribution of the WUI and overhead transmission and distribution circuit miles across SCE service territory.

SCE provided a map depicting critical facilities in the HFTD within its territory.

5.4.1 Environmental Compliance and Permitting

Section 5.4.5 of the Technical Guidelines requires SCE 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.[30]

New construction and/or large maintenance projects must comply, as necessary, with the California Environmental Quality Act, the Clean Water Act (sections 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

---

[28] 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).

[29] SCE's 2023-2025 WMP, Figure SCE 5-07 "Urban, Rural, and Highly Rural Customer Distributions across SCE Service Territory," page 68.

[30] 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).

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.

SCE 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 SCE under the service territory overview section of its Base WMP.

6. Risk Methodology and Assessment

In response to Section 6 of the Technical Guidelines, SCE 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.[31]

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

6.1 Methodology

Section 6.1 of the Technical Guidelines requires SCE 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.[32]

This section includes an overview of SCE's risk calculation approach.

SCE quantifies its overall utility risk from wildfires and PSPS using two separate and complimentary risk calculation schemes. SCE uses these risk calculation schemes to consolidate risk starting from fundamental components, such as likelihood and consequence of specific events, then aggregating to intermediate components, and lastly aggregating to a final total.

6.2 Risk Analysis Framework

Section 6.2 of the Technical Guidelines requires SCE to provide a high-level overview of its risk analysis framework, including a summary of key modeling assumptions, input data, and modeling tools used.[33]

This section includes an overview of SCE's risk analysis framework.

---

[31] 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).

[32] 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).

[33] 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).

SCE's risk assessment framework is comprised of the Integrated Wildfire Mitigation Strategy (IWMS) and Multi-Attribute Risk Score Framework (MARS Framework or MARS).[34]

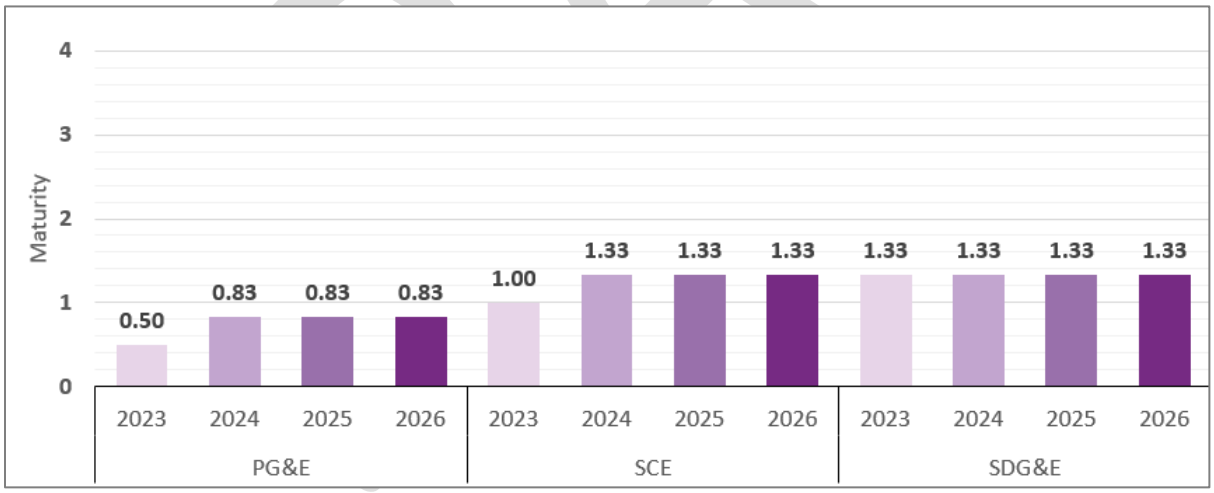
- IWMS calculates overall utility risk from both wildfire and PSPS into three risk severity assessments, or risk "tranches," to differentiate geographic area by risk assessment and to preemptively assign corresponding mitigation options depending on severity.
- MARS defines and evaluates overall utility risk and compares mitigations and alternatives to each ignition driver and sub-driver on risk reduction and cost effectiveness.

These "sub-frameworks" work side-by-side and generate outputs that inform mitigation decisions.

6.3 Maturity Survey Results

According to its responses to the 2023 Maturity Survey, SCE has a 2023 maturity level of 1 for risk assessment and mitigation strategy. For 2024, SCE projects that it will slightly increase in maturity to a level of 1.33. For 2025, SCE projects that it will stay the same (Figure 6.3-1).

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



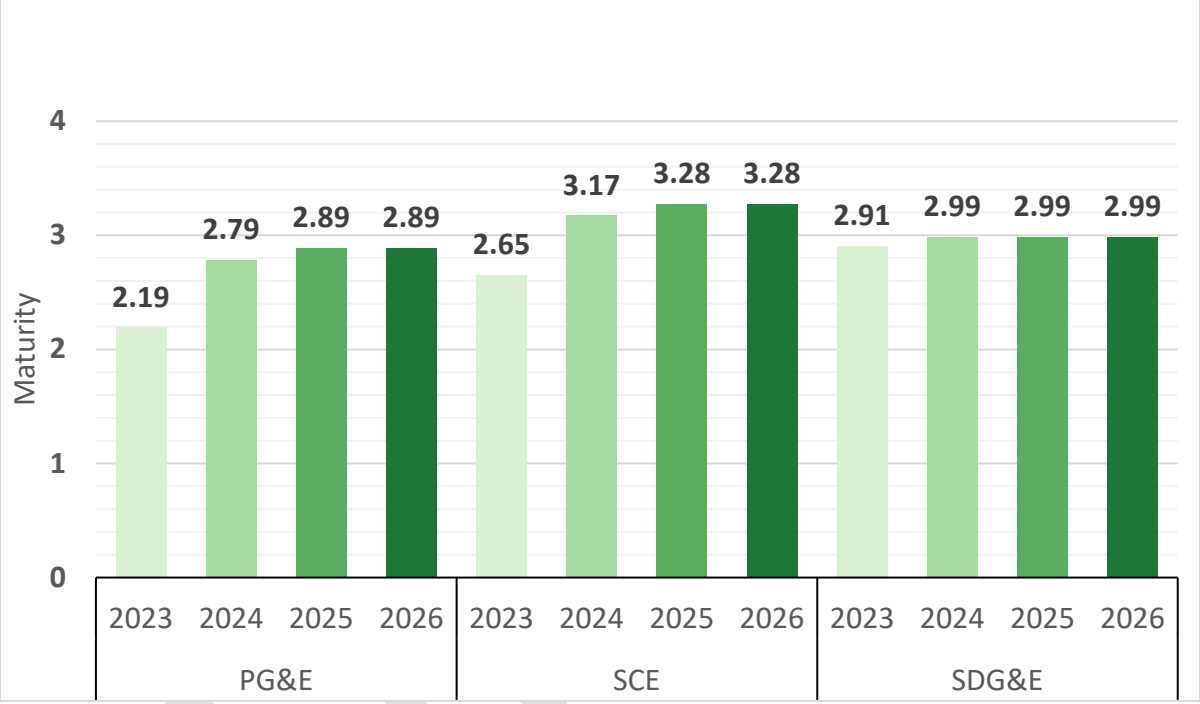
The utility's maturity level for the risk assessment and mitigation strategy category described above is calculated using the minimum value sub-capability of each capability. Using the capability average is another way to look at SCE's performance in risk assessment and

[34] SCE's 2023-2025 WMP, pages 90-91.

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.[35]

When the category maturity is calculated using the capability average (rather than the minimum), SCE has a maturity level for risk assessment and mitigation strategy of 2.65 for 2023, 3.17 in 2024, and 3.28 in 2025 (Figure 6.3-2).

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.

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

- SCE reports it does not provide the basis for its design percentiles used in the model predictions to evaluate downstream models and decision-making processes in the WMP. To increase its maturity level, SCE would need to provide the basis for its design percentiles.[36]

SCE's current maturity level in this category falls between its peers, with PG&E and SDG&E reporting at levels 0.5 and 1.33, respectively. See Figure 6.3-1.

[35] 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.

[36] SCE's 2023 Maturity Survey, response to 1.4.9.Q6.

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

- Calculation of wildfire and PSPS risk exposure for societal values[37]
- Risk event tracking and integration of lessons learned[38]

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

- Risk-informed wildfire mitigation strategy[39]

6.4 SCE's WMP Strengths

SCE projects improvement in risk methodology and assessment over the WMP cycle in the following area: risk identification.

SCE uses four attributes to identify Severe Risk Areas (SRAs): egress constraints, higher projected fire consequence, high winds, and factors leading to smaller and fast-moving fires in populated hard-to-reach areas. These attributes are common to areas with an increased risk of higher-than-average fire consequences. In particular, including egress constraints and factors likely to result in smaller and fast-moving fires in populated hard-to-reach areas in the analysis is a strength.

6.4.1 2022 Areas for Continued Improvement

Energy Safety evaluated the progress SCE made toward addressing areas for continued improvement identified in Energy Safety's 2022 WMP Decision. SCE adequately addressed its 2022 areas for continued improvement related to risk methodology and assessments, including SCE-22-22, Third Party Confirmation of RSE Estimates, and SCE-22-27, Lessons Learned from PSPS Implementation. See Appendix B for the status of each 2022 area for continued improvement.

6.5 Areas for Continued Improvement

SCE must continue to improve in the following areas.

6.5.1 Cross-Utility Collaboration on Risk Model Development

SCE and the other IOUs have participated in past Energy Safety-sponsored risk model working group meetings. The risk model working group meetings facilitate collaboration

[37] SCE's 2023 Maturity Survey, response to 1.2.1.Q1.

[38] SCE's 2023 Maturity Survey, response to 1.5.1.Q1.

[39] SCE's 2023 Maturity Survey, response to 1.6.1.Q1.

among the IOUs on complex technical issues related to risk modeling. The risk model working group meetings are ongoing. SCE and the other IOUs must continue to participate in all Energy Safety-organized risk model working group meetings.

6.5.2 Calculating Risk Scores Using Maximum Consequence Values

SCE's use of maximum consequence values at the asset or circuit level could lead to unrealistically high risk scores at the territory level, and this may affect SCE's ability to optimally prioritize mitigations. Instead, mathematical standards support aggregating consequence values using probability distributions. When this is not possible, a suitable alternative is using average consequence values (also known as expected value). In its 2025 Update, SCE must provide a plan with milestones for transitioning from using maximum consequence values to either probability distributions or averages in its next Base WMP. If SCE is unable to transition to using probability distributions or averages, it must explain the reason and propose an alternative strategy that would produce risk scores closer to what using the probability distributions or average consequences would produce.

Aggregating maximum consequence values may lead to an inaccurate risk assessment at the territory level. Consider the "maximum consequence" of a die roll, which is "6." There is a 1 in 6 chance of this maximum consequence occurring on a single roll. Adding the maximum consequence of ten die rolls would result in a total consequence score of 60. However, the actual probability of rolling a "6" ten times in a row is approximately one in sixty million. In other words, adding maximum risks to determine total territory risk will tend to significantly overstate the risk.

6.5.3 PSPS and Wildfire Risk Trade-Off Transparency

Although SCE provides some insights into its trade-off decisions between wildfire and PSPS risk,[40] SCE does not provide adequate transparency regarding how it makes PSPS and wildfire risk trade-offs, or how it uses risk ranking and risk buy-down to determine risk mitigation selection.

SCE tends to discuss mitigation decisions considering the total risk level. Mitigation impact on PSPS risk is less transparent as a result. In its 2025 Update, SCE must describe how it prioritizes PSPS risk in its risk-based decisions and any trade-offs between wildfire risk and PSPS risk.

[40] SCE's 2023-2025 WMP, Table SCE 7-06 "Efficacy of Mitigation Portfolios," pages 207-208.

The data SCE shares about the efficacy of its mitigation portfolios[41] is more qualitative than quantitative. SCE also explains that its assessment of PSPS impact from each mitigation is based on quantitative data when the data are available[42]; however, SCE may rely on subject matter expert judgment when the quantitative data are not available in sufficient quantity or quality. A quantitative approach would improve SCE's transparency regarding how it makes PSPS and wildfire risk trade-offs.

6.5.4 Incorporation of Extreme Weather Scenarios into Planning Models

SCE relies on 444 historic fire weather scenarios to simulate wildfire risk and consequence in its MARS and IWMS frameworks, which are key inputs to the development of its mitigation initiative portfolio. As part of this analysis, SCE simulates an approximately 1 in 20-year wind event.[43] SCE does not use Wind Load Condition 3, wind gusts with a probability of exceedance of 5 percent over the three-year WMP cycle (i.e., 60-year return interval), for its analysis.[44] In its next Base WMP, SCE must report on its progress developing statistical estimates of potential wind events over at least the maximum asset life for its system and evaluate results from incorporating these into MARS and IWMS when developing its mitigation initiative portfolio or explain why the approach would not serve as an improvement to its mitigation strategy.

Exclusive reliance on historic fire weather scenarios is limiting because:

- Fire weather scenarios systematically under-sample high consequence/low probability events.
- Many of the mitigation measures SCE is deploying will last longer than 20 years and so are likely to experience an exceedance of the 1-in-20 approach adopted by SCE.
- An exceedance of 1-in-20-year historical wind load conditions may lead to exposure of assets that are not located in the HFTD. Using SCE's current wind load data, SCE may be underestimating risks of ignition and high consequence and therefore not hardening these assets because they are not identified as needing hardening by MARS or IWMS.
- A database of past events, even 20 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.

---

[41] SCE's 2023-2025 WMP, Table SCE 7-06 "Efficacy of Mitigation Portfolios," pages 207-208.

[42] SCE's 2023-2025 WMP, page 207.

[43] SCE's 2023-2025 WMP, page 156.

[44] 2023 WMP Technical Guidelines, 6.3.1 Design Basis Scenarios (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed March 20, 2023).

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

7. Wildfire Mitigation Strategy Development

In response to Section 7 of the Technical Guidelines, SCE 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.[45]

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

7.1 Risk Evaluation

Section 7.1 of the Technical Guidelines requires SCE to describe its approach to risk evaluation based on risk analysis outcomes.[46] The approach should inform the development of a wildfire mitigation strategy that meets WMP goals and objectives.

SCE's IWMS model is used to deploy mitigations that correspond to risk severity at the circuit level.[47] It has six main steps:

1. Initial risk categorization:
    a. SCE categorizes circuit segments into one of three risk severity levels, or risk "tranches."
2. Risk categorization review and revision:
    a. Subject matter experts revise the initial risk categorization considering other data sources and recent changes in local conditions.
    b. The outcome of this step is the final risk tranche assignment.
3. Initial mitigation assignment:
    a. SCE assigns the default mitigation portfolios that correspond to each of three risk tranches.
4. Mitigation assignment review and revision:

[45] 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).

[46] 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).

[47] SCE's 2023-2025 WMP, pages 187-189.

   a. Subject matter experts use the MARS framework to compare mitigation choices by impact.
   b. Subject matter experts revise the initial mitigation portfolios considering feasibility, other data sources, and recent changes in local conditions.
   c. The outcome of this step is the final mitigation or portfolio of mitigations.
5. Mitigation prioritization:
   a. Mitigation order of deployment is determined using risk and operational factors.
6. Mitigation deployment and impact review:
   a. SCE deploys the mitigations and use the MARS framework to assess their impact on wildfire and PSPS risk.

7.1.1 SCE's WMP Strengths

SCE effectively coordinates with internal and external stakeholders and decision makers. For example:

- Internally, SCE briefs its executive leadership monthly on WMP status, including progress toward meeting the mitigation goals set in the WMP.
- Internally, SCE holds wildfire safety meetings weekly—or more frequently as needed—to advance strategic wildfire mitigation and PSPS planning and execution.
- SCE meets with local governments including city councils, county boards and tribal governments to share strategic decisions that will impact the local area and to gather feedback on SCE's wildfire programs and community needs.

7.1.1.1 2022 Areas for Continued Improvement

Energy Safety evaluated the progress SCE made toward addressing areas for continued improvement identified in Energy Safety's 2022 WMP Decision. SCE adequately addressed its 2022 areas for continued improvement related to risk evaluation, including SCE-22-01, Prioritized List of Wildfire Risks and Drivers, and SCE-22-23, RSE Estimates of Emerging Initiatives. See Appendix B for the status of each 2022 area for continued improvement.

7.1.2 Areas for Continued Improvement

SCE must continue to improve in the following areas.

7.1.2.1 PSPS and Wildfire Risk Trade-Off Transparency

As noted above in the area for continued improvement "PSPS and Wildfire Risk Trade-Off Transparency" (Section 6.5.3), SCE's description of how it prioritizes mitigation initiatives can be further developed and improved.

SCE's 2023-2025 WMP does not provide enough detail to understand how SCE uses risk ranking and risk buy-down to determine mitigation selection. In its 2025 Update, SCE 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 SCE to adopt and describe its framework for making risk-informed decisions.[48]

7.2.1 SCE's WMP Strengths

SCE projects improvement in its risk-informed decision making over the WMP cycle in the following area: risk mitigation and management.

SCE's mitigation strategy is driven by its IWMS framework which supports development of mitigations corresponding to each risk and assessed consequences. Subject matter expertise is embedded in the framework at three critical stages: risk categorization, mitigation selection, and deployment prioritization.

7.2.1.1 2022 Areas for Continued Improvement

Energy Safety evaluated the progress SCE made toward addressing areas for continued improvement identified in Energy Safety's 2022 WMP Decision. SCE adequately addressed its 2022 areas for continued improvement related to risk informed framework, including SCE-22-07, Wildfire Consequence Modeling Improvements. See Appendix B for the status of each 2022 area for continued improvement.

7.2.2 Areas for Continued Improvement

SCE must continue to improve in the following area.

7.2.2.1 Cross-Utility Collaboration on Best Practices for Inclusion of Climate Change Forecasts in Consequence Modeling, Inclusion

[48] 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).

of Community Vulnerability in Consequence Modeling, and Utility Vegetation Management for Wildfire Safety

SCE 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 SCE joined the other IOUs in participating in Energy Safety-sponsored scoping meetings in the past, they have 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.

7.3 Wildfire Mitigation Strategy

Section 7.2 of the Technical Guidelines requires SCE to describe its proposed wildfire mitigation strategies based on the evaluation process identified in Section 7.1 of its WMP.[49]

7.3.1 Maturity Survey Results

According to its responses to the 2023 Maturity Survey, SCE has a 2023 maturity level of 3 for risk prioritization. SCE projects no maturity level change for 2024 or 2025.

Note that cross-category themes are calculated by averaging the relevant sub-capability maturity levels.[50]

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

- SCE reports integration of weather data and forecasts into the ignition likelihood model is not currently automated.[26] To increase its maturity level, SCE would need to automate integration of weather data and forecasts into the ignition likelihood model.
- SCE reports ignition likelihood estimation is not linked to ensemble weather forecasts.[27] To increase maturity level, SCE would need to link ignition likelihood estimation to ensemble weather forecasts.

---

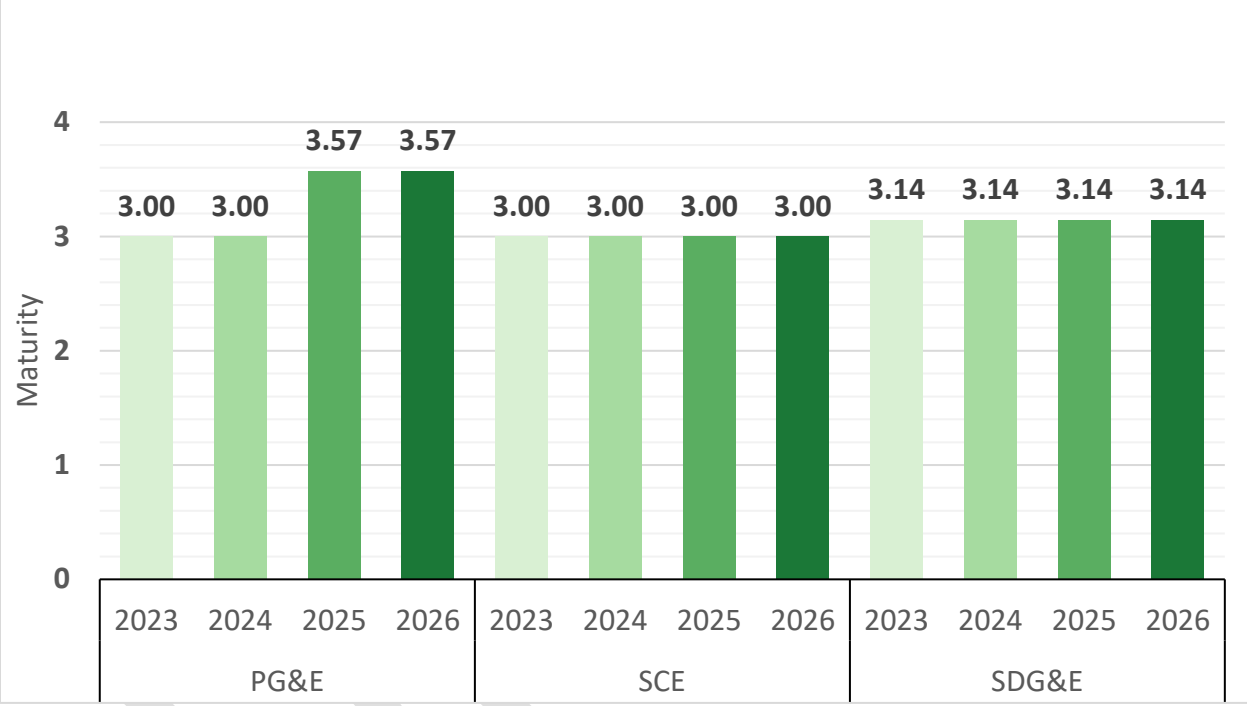
[49] Technical Guidelines, Section 7.2, pages 66-74 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[50] 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).

- SCE reports their ignition likelihood estimation is not linked to a probabilistic real-time risk model.[28] To increase maturity level, SCE would need to link ignition likelihood estimation to a probabilistic real-time risk model.

SCE's current maturity level in this cross-category theme is about the same as its peers, with PG&E and SDG&E reporting at levels 3 and 3.14, respectively. See Figure 7.3-1.

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



7.3.2 SCE's WMP Strengths

SCE projects improvement in its wildfire mitigation strategy over the WMP cycle in the following areas: interim mitigation initiatives.

SCE effectively summarizes its process for mitigation selection in a high-level system diagram (Figure SCE 7-02)[51] that provides the following information about SCE's approach:

- Processes and subprocesses
- Interconnections between processes
- Yes/No decisions made and their impact
- Factors influencing decisions

[51] SCE's 2023-2025 WMP, page 199.

- Aggregated impact of processes, subprocesses, decisions, and interconnections
- Feedback loops that improve the overall process gradually

The diagram demonstrates how SCE leverages its historical mitigation effectiveness data, benchmarks, and best practices, to inform mitigation decisions.

7.3.2.1 2022 Areas for Continued Improvement

Energy Safety evaluated the progress SCE made toward addressing areas for continued improvement identified in Energy Safety's 2022 WMP Decision. SCE adequately addressed its 2022 areas for continued improvement related to wildfire mitigation strategy, including SCE-22-02 Collaboration and Research in Best Practices in Relation to Climate Change Impacts and Wildfire Risk & Consequence Modeling and SCE-22-13 Remaining Severe Risk Areas. See Appendix B for the status of each 2022 area for continued improvement.

7.3.3 Area for Continued Improvement

SCE must continue to improve in the following area.

7.3.3.1 Effect of Fire Suppression on Wildfire Spread and Consequence Modeling

SCE's fire spread modeling does not currently factor fire suppression into its estimation of fire spread and consequence. This will tend to bias consequence models—substantially—toward higher estimates of consequence and hence push toward more aggressive mitigation initiative portfolios than may be needed if SCE took fire suppression into account. Not considering the significant impact fire suppression may have on consequences makes the consequence model outputs inflated and reduces their effectiveness as a mitigation planning tool.

SCE must continue exploring how to incorporate fire suppression into wildfire consequence models to better understand how challenges with initial attack related to objective measures may impact wildfire spread and consequence risk in its territory.

In its 2025 Update, SCE must show progress in research and collaboration with its third-party contractor, fire suppression agencies, and the other large IOUs to develop and test models of fire spread that incorporate metrics related to initial attack difficulty and sensitivity of MARS and IWMS outputs to the integration of wildfire suppression efforts.

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

8. Wildfire Mitigation Initiatives

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

SCE's approach to PSPS is discussed in Section 9. SCE'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,[52] SCE 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 SCE's objectives and targets, maturity levels, and strengths in these areas. In addition, Energy Safety has identified areas where SCE must improve, described at the end of each subsection.

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

8.1.1 Objectives and Targets

As part of its Base WMP, SCE provided 3-year and 10-year objectives for its grid design, operations, and maintenance programs.[53]

SCE revised its grid design and system hardening objectives in its Non-Substantive Errata.[54] The objectives were minimally revised. For example, SCE modified the circuit miles associated with its risk tranches, with the largest change within its High Consequence Areas tranche from 4,275 to approximately 4,400 circuit miles.[55] SCE also adjusted its grid design targets, or percentages of risk impact associated with targets, such as moving from 5,100 to 5,300 infrared inspections in Q3 2023 or covered conductor addressing from 21 percent to 20 percent risk in HFRA.[56]

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

Table 8.1-1. SCE Grid Design, Operations, and Maintenance – Selected Targets[57]

Initiative Activity	Target Unit	2023 Target	2024 Target	2025 Target
Covered Conductor	Circuit Miles	1,100	1,050	700
Undergrounding	Circuit Miles	11	16	48
Circuit Breaker (CB) Relay Hardware for Fast Curve	CB Relay Units	75	10	N/A

[53] SCE's 2023-2025 WMP, Table 8-1 "Grid Design, Operations, and Maintenance Objectives (3-year plan)," page 231, and Table 8-02 [sic] "Grid Design, Operations, and Maintenance Objectives (10-year plan)," page 234.

[54] SCE's Submission of Non-Substantive Errata for the 2023-2025 Wildfire Mitigation Plan, pages 11-14 and 19-21 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53712&shareable=true, accessed June 28, 2023).

[55] SCE's Submission of Non-Substantive Errata for the 2023-2025 Wildfire Mitigation Plan, Table 6-4, page 5.

[56] SCE's Submission of Non-Substantive Errata for the 2023-2025 Wildfire Mitigation Plan, Table 8-3, pages 11 and 12.

[57] SCE's 2023-2025 WMP, Table 8-3 "Grid Design, Operations, and Maintenance Targets by Year," page 238.

Initiative Activity	Target Unit	2023 Target	2024 Target	2025 Target
Tree Attachments Remediation	Tree Attachments Remediated	400	500	Any remaining tree attachments[58]
Long Span Initiative	Spans Remediated	400	1,000	1,000
Vibration Damper Retrofit	Vibration Dampers	300	500	600
Rapid Earth Fault Current Limiters – Ground-Fault Neutralizer	Substations	2	1	4
Rapid Earth Fault Current Limiters – Grounding Conversion	Projects	1	4	4

8.1.2 Grid Design and System Hardening

Section 8.1.2 of the Technical Guidelines requires SCE 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.[59]

8.1.2.1 Maturity Survey Results

According to its responses to the 2023 Maturity Survey, SCE has a 2023 maturity level of 1.00 for grid design and resiliency. SCE projects no maturity level change in 2024 or 2025 (Figures 8.1-1 and 8.1-2).

[58] "Remaining" in this instance referring to remaining tree attachments throughout SCE's service territory, based on completion of targets in 2023 and 2024.

[59] 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[60] (Minimum Values)

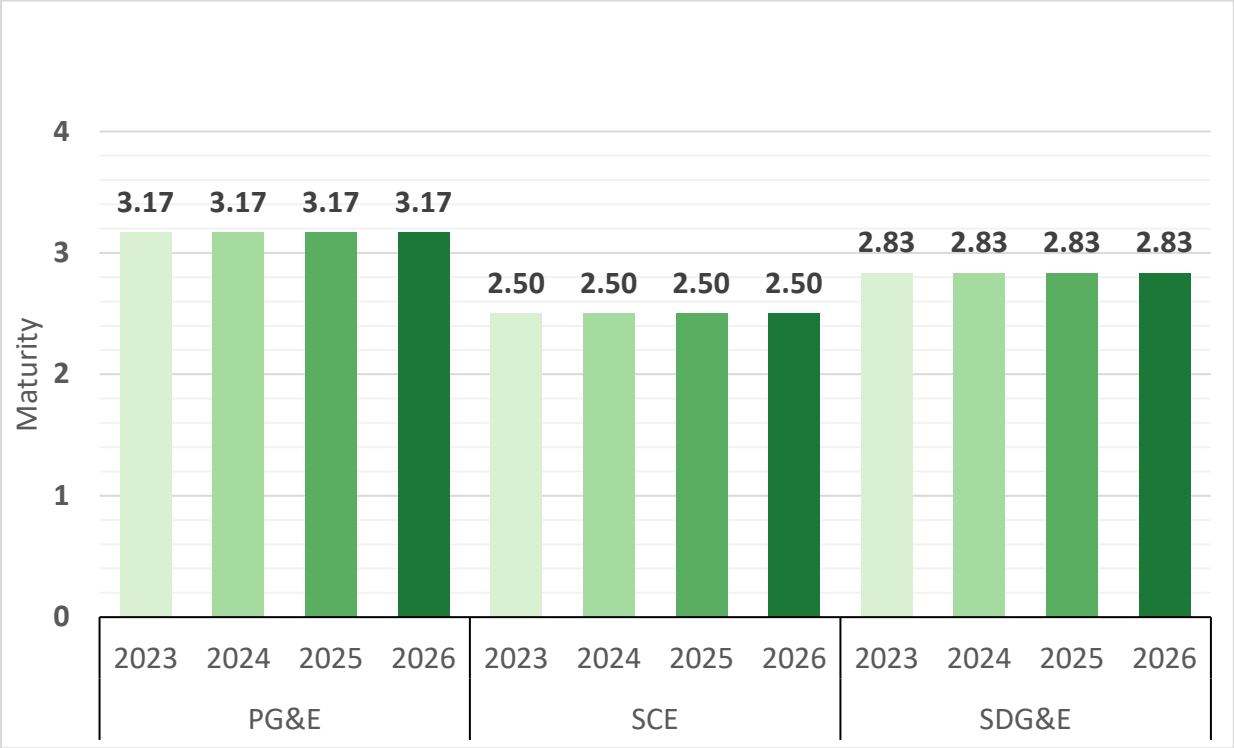
The utility's maturity level for the grid design and resiliency capability described above is calculated using the minimum value of component sub-capabilities. The capability average is another way to look at SCE's performance in grid design and system resiliency. The capability average is determined from the average of all component sub-capabilities and is an additional tool to evaluate the utilities' maturity.[61]

When the capability maturity is calculated using the average (rather than the minimum), SCE has a maturity level for grid design and resiliency of 2.5 for 2023. SCE projects no maturity level change in 2024 or 2025 (Figure 8.1-2).

[60] 2023 Maturity Survey Category C "Grid Design, Inspections, and Maintenance," Capability 16 "Grid design and resiliency."

[61] 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[62] (Average Values)



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

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

- SCE reports that new initiatives pursued by SCE are not validated by independent auditing of grid performance.[63] To increase maturity level, SCE would need to have its new initiatives validated by an independent auditor.
- SCE reports that it evaluates new initiatives risk reduction impact at a circuit level granularity.[64] To increase maturity level, SCE would need to increase granularity to a span or asset level.
- SCE reports that it evaluates its grid design at a segment level, opposed to at an asset level.[65] To increase maturity level, SCE would need to increase granularity to an asset level.

---

[62] 2023 Maturity Survey Category C "Grid Design, Inspections, and Maintenance," Capability 16 "Grid design and resiliency."

[63] SCE's 2023 Maturity Survey, response to 3.4.2.Q7.

[64] SCE's 2023 Maturity Survey, response to 3.4.2.Q9.

[65] SCE's 2023 Maturity Survey, response to 3.4.5.Q6.

SCE's current maturity level in this capability is lower than its peers, with PG&E and SDG&E reporting at levels 3.17 and 2.83, respectively. See Figure 8.1-2.

8.1.2.2 SCE's WMP Strengths

SCE projects improvement in grid design and system hardening over the WMP cycle in the following areas: tree attachment remediation, long span initiative, rapid earth fault current limiters, and completion of targeted fuse installations.

SCE's WMP has strong grid design and system hardening targets, (see Table 8.1-1 "SCE Grid Design, Operations, and Maintenance – Selected Targets"). For example, SCE expects to complete its tree attachment remediation program by the end of the current WMP cycle. Through this program, SCE removes any overhead conductor that uses trees as support and installs fire-resistant poles.

Also, SCE is expanding on its long span initiative (LSI), through which SCE installs line spacers, alternate construction, and covered conductor to remediate long spans. SCE began the LSI program with identification of potential wire-to-wire contact risk in 2020. SCE states that prioritization is based on evaluating spans in its Severe Risk Area (SRA) and High Consequence Areas (HCA) and using an LSI risk model to determine wire-to-wire contact probability.[66]

Additionally, SCE continues to deploy rapid earth fault current limiters (REFCL) through installation of ground-fault neutralizers (GFN) and grounding conversions. As seen in Table 8.1-1, SCE's target for GFN changes from two to one between 2023 and 2024. SCE states that its decrease in target to one GFN in 2024 is due to needing time to "onboard a second equipment supplier"[67] and indicates that it is increasing its target back up to four in 2025 to compensate. In some areas, SCE is using REFCL in combination with covered conductor to remediate risk in its SRA.

By the end of 2023, SCE expects to complete its targets for fuse replacements for all previously identified locations. SCE will then move toward opportunity-based fuse replacements. This means that SCE has completed work in areas "where fuse installation replacements are the primary driver for the scope of work at a given location" and moving toward repairs and installations coupled with other work.[68]

---

[66] SCE's 2023-2025 WMP, pages 263-265, and Data Request OEIS-P-WMP_2023-SCE-003 (Question 4a) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=54061&shareable=true, accessed August 4, 2023).

[67] SCE's 2023-2025 WMP, page 267.

[68] Data Request OEIS-P-WMP_2023-SCE-003 (Question 3) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=54061&shareable=true, accessed August 4, 2023).

2022 Areas for Continued Improvement

Energy Safety evaluated the progress SCE 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 select areas:

- To address SCE-22-12, Residual Risk Reduction Associated with Covered Conductor, SCE provided details on its timelines for implementing REFCL and distribution fault anticipation/early fault detection (DFA/EFD). SCE also provided updates on the effectiveness calculations for initiatives.
- To address SCE-22-13, Remaining Severe Risk Areas, SCE states that it plans on addressing its remaining existing overhead circuit miles in its SRA by 2028.[69]

8.1.2.3 Areas for Continued Improvement

SCE 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.[70] 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, SCE 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, SCE 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, SCE, along with other utilities, must submit a report which discusses continued efforts, including lessons learned.

---

[69] SCE's 2023-2025 WMP, page 752.

[70] As required through SCE-21-04 in the Final Action Statement on SCE's 2021 WMP Update, and SCE-22-09 and SCE-22-11 in the Final Decision on SCE's 2022 WMP Update.

Vibration Dampers Retrofit

Vibration dampers protect and lengthen the expected lifespan of covered conductor.[71] SCE estimates vibration dampers more than double the lifespan of covered conductor from its usual 20 years to 45 years.[72] Given such a drastic change in expected lifespan, SCE must prioritize the installation of vibration dampers to ensure the maximum lifespan for its covered conductor.

As shown in Table 8.1-1, SCE is still working to complete retrofits and expects to continue the work through 2025. SCE states that it has been facing delays for installations due to supply chain issues.[73] SCE is prioritizing these retrofits in areas of high and medium Aeolian vibration susceptibility, which is based on terrain and wind conditions.[74] However, while SCE provided more details on the analysis performed for determining and prioritizing vibration damper installation, SCE has not provided adequate details on the scope of its vibration damper retrofit. For instance, SCE has not provided the locations used in SCE's analysis for Aeolian vibration susceptibility, as well as the total impact of supply chain issues—including any cascading effects this has on the remaining scope.

In its 2025 Update, SCE must provide its progress on its vibration dampers retrofit, including any supporting materials showing such progress.

Hardening the Remaining Severe Risk Areas

SCE states that it is prioritizing undergrounding projects within its SRA. SCE explains that it has scoped its remaining unhardened lines after 2024 within its SRA for undergrounding in 2025-2028. While SCE is undertaking vegetation management and inspection measures as interim mitigations, these actions leave unaddressed wildfire risk in its SRA. SCE has not demonstrated that it accounted for alternative solutions that take less time to implement, such as covered conductor in combination with other mitigations, as seen in Table 8.1-2 below.

Additionally, SCE has not developed a robust mitigation selection process for system hardening and instead defaults to undergrounding for its SRA. Mitigation selection should consider a variety of location-specific factors, such as how long it takes to deploy the solution, effectiveness at mitigating particular ignition drivers in a given location, feasibility given terrain and access challenges, and the cost-benefit analysis.

---

[71] SCE's 2023-2025 WMP, p. 201.

[72] SCE's 2023-2025 WMP, page 254.

[73] SCE Bulletin HL-1921 "Interim Deviation from Standards on Vibration Dampers for Covered Conductor," submitted to Energy Safety's Compliance Team on November 19, 2021.

[74] SCE's 2023-2025 WMP, Table ACI 14-02 "Aeolian Vibration Susceptibility Categories," page 755.

In addition to not considering location-specific factors, by defaulting to undergrounding, SCE is missing an opportunity to gain mitigation efficacy by combining mitigation activities (e.g., REFLC with CC++[75]). See Table 8.1-2 for SCE's mitigation portfolio efficacy, noting how combined mitigations could achieve the same efficacy as undergrounding alone with faster deployment and lower cost.

In its 2025 Update, SCE must provide plans for how it will address remaining risk in its SRA demonstrating careful consideration of mitigation options through transparent decision-making.

Table 8.1-2. SCE's Mitigation Portfolio Comparison[76]

Attribute	Undergrounding	CC++/REFCL	CC++
Approx. Avg. lifetime cost/mile (million)	$2.9 - $4.5+	$1.1 - $2.3	$1.1 - $1.3
Deployment speed (months)	25-48+	18-36+	16-24+
Phase-to-phase mitigation efficacy	High	High	High
Phase-to-ground mitigation efficacy	High	High	High
Wire-down mitigation efficacy	High	High	High
Equipment failure mitigation efficacy	High	High	Medium

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 SCE to provide an overview of its procedures for inspecting its assets.[77]

[75] CC++ consists of covered conductor, fast curve, vegetation management, fusing, and asset inspections.

[76] SCE's 2023-2025 WMP, Table SCE 7-06 "Efficacy of Mitigation Portfolios," pages 207-208.

[77] 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).

8.1.3.1 Maturity Survey Results

According to its responses to the 2023 Maturity Survey, SCE has a 2023 maturity level of 3.00 for asset inspections. SCE projects no maturity level change in 2024 or 2025 (Figure 8.1-3).

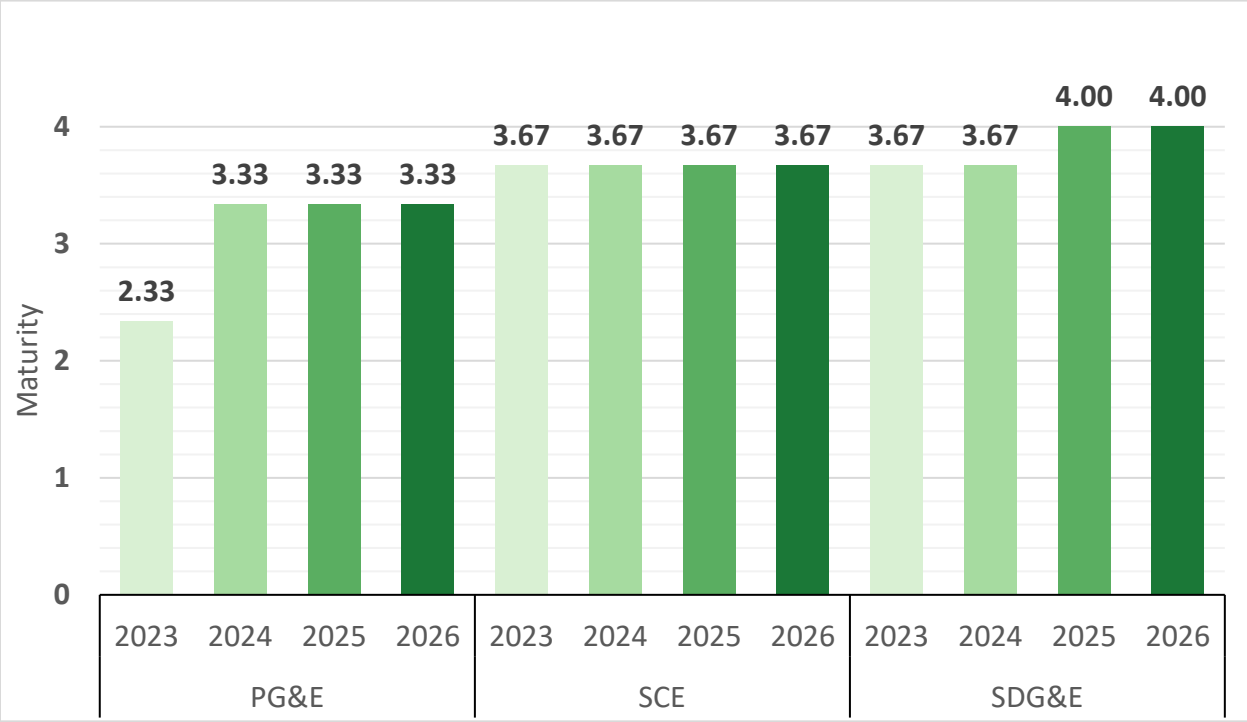
Figure 8.1-3. Cross-Utility Maturity for Asset Inspections[78] (Minimum Values)

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 SCE'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.[44]

When the capability maturity is calculated using the average (rather than the minimum), SCE has a maturity level for asset inspections of 3.67 for 2023. SCE projects no maturity level change in 2024 or 2025 (Figure 8.1-4).

[78] 2023 Maturity Survey Category C "Grid Design, Inspections, and Maintenance," Capability 14 "Asset inspections."

Figure 8.1-4. Cross-Utility Maturity for Asset Inspections[79] (Average Values)



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

SCE's current maturity level in this capability is around the same as its peers, with PG&E and SDG&E reporting at levels 2.33 and 3.67 respectively. See Figure 8.1-4.

8.1.3.2 SCE's WMP Strengths

SCE projects improvement in asset inspections over the current WMP cycle in the following areas: distribution detailed inspections, distribution infrared inspections, transmission conductor and splice assessment, and use of System Applications and Products (SAP) to record asset inventory and condition.

One of SCE's strengths is that it prioritizes structures for inspection based on risk. SCE states that from 2023 onward it will use purely risk-based inspections and perform inspections more frequently than General Order (GO) 165 requires in the HFRA. Specifically, SCE performs distribution detailed inspections in the HFRA at least once every three years, which exceeds the five-year minimum requirement prescribed by GO 165.[80] SCE also states that it will shift to risk-based inspections for all assets over the next five years.[81] In 2023, SCE will begin

[79] 2023 Maturity Survey Category C "Grid Design, Inspections, and Maintenance," Capability 14 "Asset inspections."

[80] SCE's 2023-2025 WMP, page 286.

[81] SCE's 2023-2025 WMP, page 288.

implementing a LiDAR software platform and developing LiDAR inspection surveys to supplement distribution detailed inspections.[82]

SCE's WMP also demonstrates that it will perform infrared inspections to identify asset failure not visible during visual inspections. SCE will perform infrared inspections on 5,100 miles of distribution circuits in the HFRA annually, with the highest risk circuits inspected every year and all HFRA circuits inspected at least every two years. In 2023, SCE explains that it will improve the scheduling of infrared inspections to increase the number of inspections that take place from May through September, which will increase the data collected during periods of higher electrical loading.[83]

SCE began performing transmission conductor splice assessments using the automated inspection tool LineVue and X-ray in response to wire-down events. These inspections are prioritized using a risk methodology. SCE identified Priority 1 (P1) or Priority 2 (P2)[84] issues on 24 of the 63 splices X-rayed in 2022.[85] SCE's findings demonstrate the importance of it implementing this process improvement.

Furthermore, SCE demonstrates a strength in its use of System Applications and Products (SAP) to record asset inventory and condition. There are four wildfire mitigation software platforms that interface with SAP: a wildfire data repository and portal, an unstructured data consolidation program, an inspection execution and planning tool, and remediation work tracking tool. SCE states that it has planned improvements for three of the four systems in 2023 and plans to develop a new data warehouse and repository for wildfire data, as well as a wildfire data portal.[86]

SCE will centralize LiDAR data and associate it with high-definition images and video: these data will be used to train artificial intelligence/machine learning models.[87] SCE states it will pilot the use of machine learning models to augment inspections. SCE states that it will complete the design of an assisted-reality camera intended to improve the quality of data collected by inspectors.[88]

---

[82] SCE's 2023-2025 WMP, page 289.

[83] SCE's 2023-2025 WMP, page 299.

[84] Priority 1 issues are emergency conditions that must be addressed within 72 hours. Priority 2 issues are lower risk than Priority 1 and must be addressed within six months (Tier 3) to 12 months (Tier 2). Priority 3 issues do not present material safety, reliability, or fire risk and must be repaired within 60 months.

[85] SCE's 2023-2025 WMP, pages 307-309.

[86] SCE's 2023-2025 WMP, page 321.

[87] SCE's 2023-2025 WMP, page 322.

[88] SCE's 2023-2025 WMP, page 324.

2022 Areas for Continued Improvement

Energy Safety evaluated the progress SCE made toward addressing areas for continued improvement identified in Energy Safety's 2022 WMP Decision. SCE adequately addressed its 2022 areas for continued improvement related to asset inspections. See Appendix B for the status of each 2022 area for continued improvement.

8.1.3.3 Areas for Continued Improvement

SCE must continue to improve in the following areas.

Transmission Conductor Splice Assessment

SCE reports that in 2022 it X-rayed 63 splices as part of its transmission conductor and splice assessment project. The X-rays resulted in the discovery of 34 issues classified as priority categories P1 (4 issues), P2 (20 issues), and P3 (10 issues).[89] SCE found Category P1 and P2 issues on 38 percent of the splices that were X-rayed. SCE pledges to "monitor the find rate, and should it remain high, more proactive mitigations will be considered in the future."[90] SCE also commits to investigating how to align the splice assessment risk methodology with its Integrated Wildfire Mitigation Strategy (IWMS). In its 2025 Update, SCE must provide further analysis on the failing splices to identify root causes and potential underlying systemic issues.

Covered Conductor Inspections and Maintenance

Although SCE states that it will continue to participate in covered conductor meetings and workshops with other utilities in 2023 and lists inspection practices as a topic to be discussed,[91] SCE has not adequately updated its inspection and maintenance procedures to properly cover potential failure modes for covered conductor. In its 2025 Update, SCE must discuss how failure modes unique to covered conductor will be accounted for in its inspections. For example, one failure mode identified during the covered conductor joint workshops is corrosion caused by water intrusion.[92] In the case of covered conductor, a visual inspection is unlikely to discover this failure, necessitating a different approach. SCE must apply lessons learned from the joint covered conductor sessions regarding failure modes specific to covered conductor, such as the preceding example, to its inspection and maintenance programs. If SCE determines no changes to its inspection and maintenance

[89] SCE's 2023-2025 WMP, page 309.

[90] SCE's 2023-2025 WMP, page 309.

[91] SCE's 2023-2025 WMP, page 885.

[92] Exponent (2022). Effectiveness and Implementation Considerations of Covered Conductors: Testing and Analysis, pages 42-79 (https://www.pge.com/pge_global/common/pdfs/safety/emergency-preparedness/natural-disaster/wildfires/wildfire-mitigation-plan/supporting-documents/effectiveness-and-implementations-considerations-of-covered-conductors-testing-and-analysis.pdf, accessed July 17, 2023).

procedures are necessary, then it must discuss how its current inspection and maintenance procedures adequately address covered conductor failure modes.

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

8.1.4 Equipment Maintenance and Repair

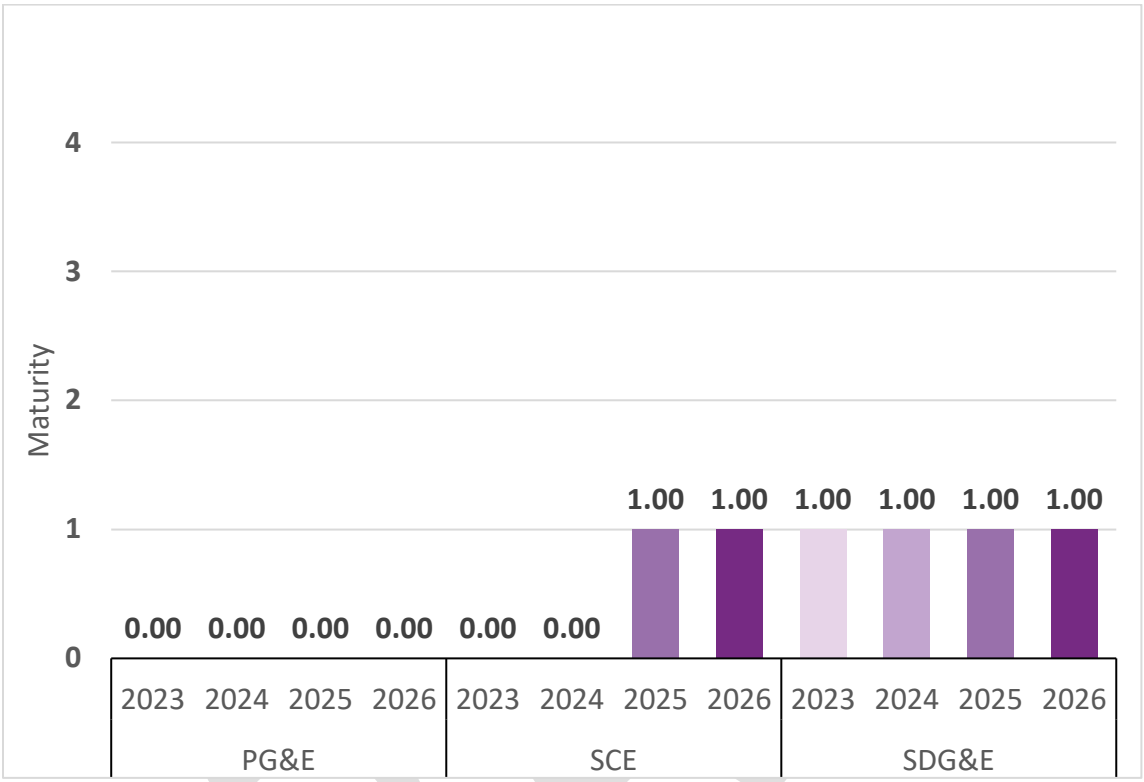
Section 8.1.4 of the Technical Guidelines requires SCE to provide a narrative of its maintenance programs, including its strategy for replacing/upgrading and for specific equipment types.[93]

8.1.4.1 Maturity Survey Results

According to its responses to the 2023 Maturity Survey, SCE has a 2023 maturity level of 0.00 for asset maintenance and repair. For 2024, SCE projects the same. For 2025, SCE projects that it will slightly increase in maturity to a level of 1.00 (Figure 8.1-5).

[93] 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[94] (Minimum Values)

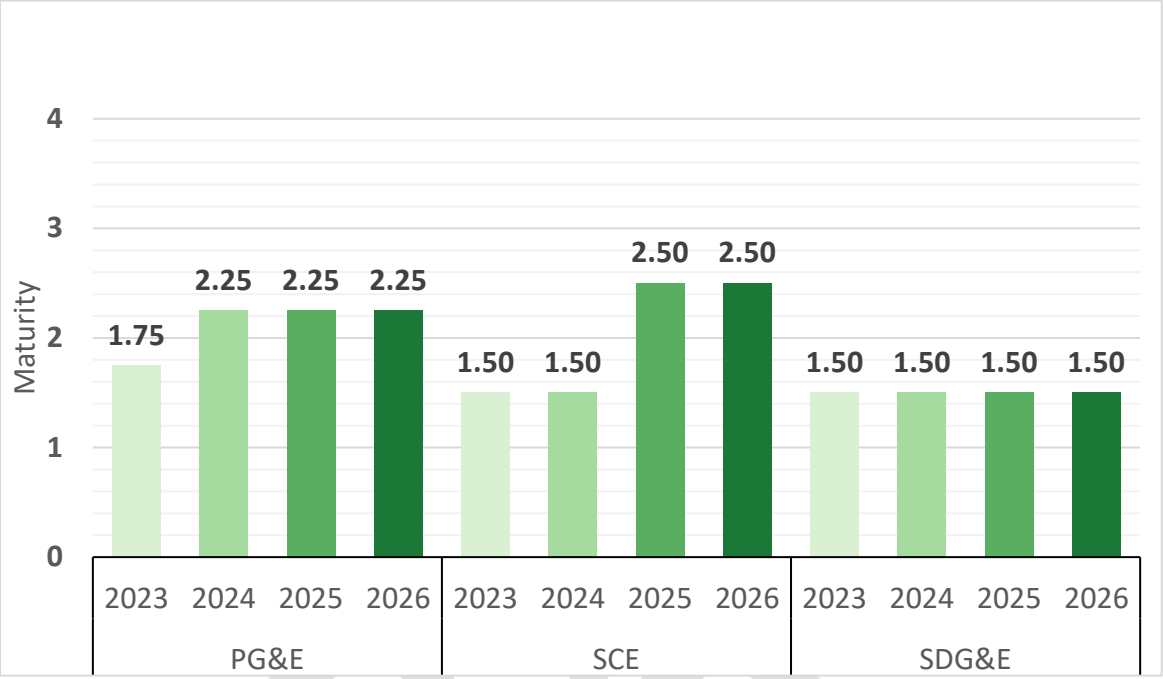


The utility's maturity level for the asset maintenance and repair capability described above is calculated using the minimum value of component sub-capabilities. The capability average is another way to look at SCE's performance in asset maintenance and repair. The capability average is determined from the average of all component sub-capabilities and is an additional tool to evaluate the utilities' maturity.[46]

When the capability maturity is calculated using the average (rather than the minimum), SCE has a maturity level for asset maintenance and repair of 1.5 for 2023, 1.5 in 2024, and 2.5 in 2025 (Figure 8.1-6).

[94] 2023 Maturity Survey Category C "Grid Design, Inspections, and Maintenance," Capability 15 "Asset maintenance and repair."

Figure 8.1-6. Cross-Utility Maturity for Asset Maintenance and Repair[95] (Average Values)



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

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

- SCE reports that PSPS risk is not considered when establishing maintenance frequency.[96] SCE would need to do so to increase its maturity level.
- SCE reports that local equipment usage is not considered when establishing maintenance frequency.[97] SCE would need to do so to increase its maturity level.
- SCE reports that other electrical corporations and government do not participate in the equipment maintenance and repair auditing process.[98] SCE would need to involve other electrical corporations and government in its maintenance auditing process to increase in maturity.

SCE's current maturity level in this capability is around the same as its peers, with PG&E and SDG&E reporting at levels 1.75 and 1.5, respectively. See Figure 8.1-6.

[95] 2023 Maturity Survey Category C "Grid Design, Inspections, and Maintenance," Capability 15 "Asset maintenance and repair."

[96] SCE's 2023 Maturity Survey, response to 3.3.1.Q2.

[97] SCE's 2023 Maturity Survey, response to 3.3.1.Q3.

[98] SCE's 2023 Maturity Survey, response to 3.3.3.Q3.

8.1.4.2 SCE's WMP Strengths

SCE projects improvement in equipment maintenance and repair over the WMP cycle in the following areas: substation circuit breaker maintenance, distribution recloser maintenance, and distribution transformer maintenance.

In its 2023-2025 WMP, SCE states it implements two proactive circuit breaker replacement programs: the Substation Infrastructure Replacement Program (SIRP) and the Substation Equipment Replacement Program (SERP). The SIRP proactively replaces circuit breakers before they reach their end of life, and the SERP program proactively replaces highly stressed circuit breakers.[99]

Additionally, SCE reports that its distribution automatic recloser replacement program identifies and replaces obsolete and unreliable automatic reclosers. This program replaces aging and obsolete vacuum automatic reclosers, vacuum fault interrupters, and oil-filled automatic reclosers. [100]

Another strength is SCE's statement that its Polychlorinated Biphenyls (PCB) Transformer Replacement Program actively replaces transformers believed to be contaminated with PCB oils greater than 50 parts per million. SCE also provides that it is proposing an active replacement program for distribution transformers that are exposed to high amounts of heat stress.[101]

2022 Areas for Continued Improvement

Energy Safety evaluated the progress SCE 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 select areas:

- To address SCE-22-15, Targets Relating to Addressing Inspection Findings, SCE provided an explanation of its plan to prevent backlog growth and additional details demonstrating its strength in this area. SCE states that it prioritizes backlogged work orders based on its risk consequence score, how long past due the work order is, the probability of ignition, and the problem statement score.[102] SCE indicates that it was able to complete 75 percent of its unconstrained overdue work orders from 2022 by

[99] SCE's 2023-2025 WMP, page 314.

[100] SCE's 2023-2025 WMP, page 317.

[101] SCE's 2023-2025 WMP, page 318.

[102] SCE's 2023-2025 WMP, page 759.

January 2023 and that it will implement new processes and resources to mitigate the occurrence of overdue work orders.[103]

- To address SCE-22-17, Address Secondary Conductor Issues, SCE performed additional training for inspections, inspected and trimmed vegetation around secondary structures specifically,[104] and decreased its QC findings for secondary/service conductor from 2021 to 2022 by 57 percent. SCE states it modified its inspection form to address open and aged conductor, animal contact, tree abrasion, overloading due to illegal growth, and overloading due to heat.[105] SCE is also working on risk modeling that includes considerations of risk from secondary and service lines.

8.1.4.3 Areas for Continued Improvement

SCE must continue to improve in the following areas.

Asset Maintenance and Repair Maturity Level Growth

In both its 2023 Maturity Survey responses and its 2023-2025 WMP, SCE indicates it will consider both PSPS risk and equipment usage when establishing maintenance frequency by 2025.[106, 107] However, in its WMP, SCE does not outline a plan or set any targets that indicate how it will accomplish this. In its 2025 Update, SCE must discuss how its maintenance programs will account for both PSPS risk and asset usage.

Addressing Backlogged Work Orders

While SCE indicates that it has worked to address its overdue work orders as stated above, SCE continues to experience growth in overdue work orders, indicating that it has 20,235 open work orders that are over 181 days past due.[108] While the majority of these work orders are outside the HFTD, and many are GO 95 exceptions, SCE indicates that it had an increase of 3,159 additional overdue work orders in the HFTD from February 1, 2022, to December 31, 2022.[109] Given that the number of SCE's work orders generated annually has continually

[103] SCE's 2023-2025 WMP, pages 760-761.

[104] SCE's 2023-2025 WMP, page 764.

[105] SCE's 2023-2025 WMP, page 655.

[106] SCE's 2023 Maturity Survey, responses to questions 3.3.1.Q2 and 3.3.1.Q3.

[107] SCE's 2023-2025 WMP, page 373.

[108] SCE's 2023-2025WMP, Table 8-8a "Number of Past Due Asset Work Orders Number of Past Due Asset Work Orders Categorized by Age as of 12/31/2022 – All (HFRA & Non-HFRA)," page 330.

[109] SCE's Q1 2023 QDR, Table 13, evaluating column F for any work orders that fall between February 1, 2022, and December 31, 2022.

increased from 2020 through 2022,[110] SCE should expect a continued growth in work orders, particularly given improvements made to existing inspections and use of new technologies such as infrared cameras and drones. In its 2025 Update, SCE must provide a detailed plan, including associated resource and workforce plans, to address overdue work orders faster than new work orders are accumulating.

Modification of Work Order Due Dates Based on Risk Assessment

In SCE's procedures document Distribution Inspection and Maintenance Program (DIMP), reference is made to a "Gatekeeper" who can reassess timeframes on E1P2[111] notifications.[112] In 2022, out of the 24,269 distribution notifications evaluated by Gatekeepers, they extended the due date on 5,248 notifications, or 21.6 percent.[113] Gatekeepers also accelerated the due dates for 2,505 notifications, or 10.3 percent. The total modification rate is 31.9 percent.

This high rate of modification suggests inconsistencies between the risk analyses performed by Gatekeepers and inspectors. While performing an inspection, the inspector assigns a timeframe for the remediation of issues discovered using a risk assessment matrix that considers reliability and safety.[114] When a Gatekeeper extends the due date, the issue is not addressed within the inspector's recommended timeframe and the potential for unnecessary risk remains. When a Gatekeeper moves the due date forward, it suggests that the inspector underestimated risk during the inspection. In its 2025 Update, SCE must analyze risk assessment disparity between Gatekeepers and inspectors.

8.1.5 Grid Operations and Procedures

Section 8.1.8 of the Technical Guidelines requires SCE 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.[115]

---

[110] SCE's Q1 2023 QDR, Table 3.

[111] E1P2: SCE defines E1P2 notifications as posing a moderate risk to safety or reliability and requiring corrective action anywhere from same day up to 36 months.

[112] Southern California Edison (2022). Distribution Inspection and Maintenance Program (DIMP), pages 1-10 to 1-12 (https://www.sce.com/sites/default/files/AEM/Supporting%20Documents/2023-2025/Distribution%20Inspection%20and%20Maintenance%20Program%20(DIMP).pdf, accessed August 11, 2023). SCE defines Gatekeeper as a supervisor with qualified electrical worker knowledge in DIMP.

[113] Data Request OEIS-P-WMP_2023-SCE-009 (Question 3).

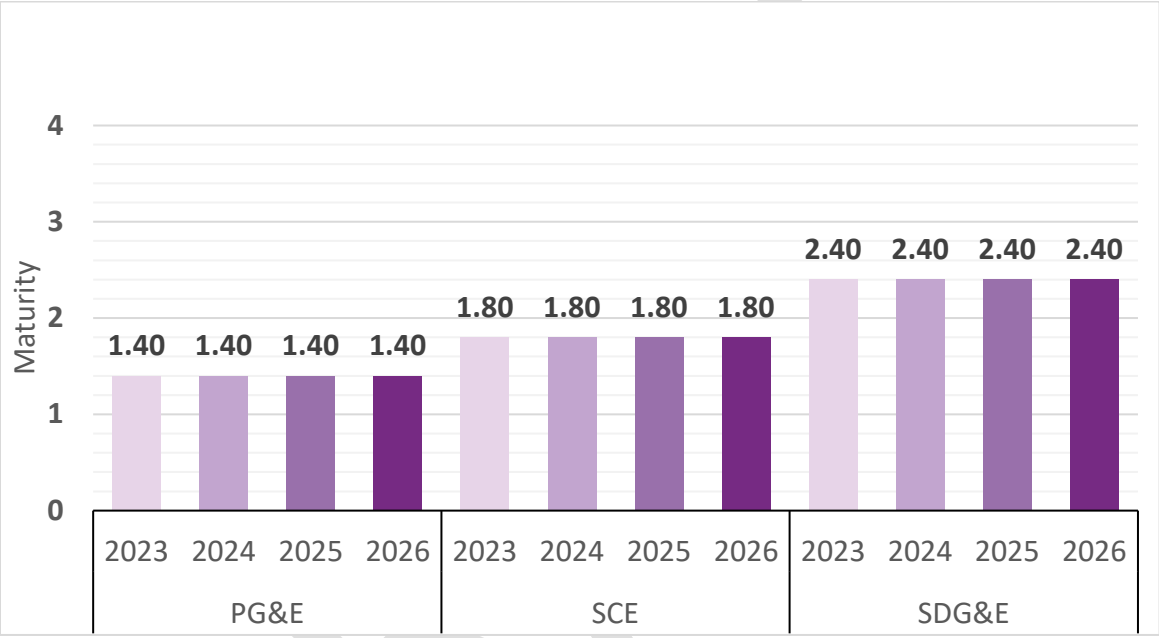
[114] Southern California Edison (2022). Distribution Inspection and Maintenance Program (DIMP), page 1-17 (https://www.sce.com/sites/default/files/AEM/Supporting%20Documents/2023-2025/Distribution%20Inspection%20and%20Maintenance%20Program%20(DIMP).pdf, accessed August 11, 2023).

[115] 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).

8.1.5.1 Maturity Survey Results

According to its responses to the 2023 Maturity Survey, SCE has a 2023 maturity level of 1.8 for grid operations and protocols. SCE projects no maturity level change in 2024 or 2025 (Figures 8.1-7 and 8.1-8).

Figure 8.1-7. Cross-Utility Maturity for Grid Operations and Protocols[116] (Minimum Values)

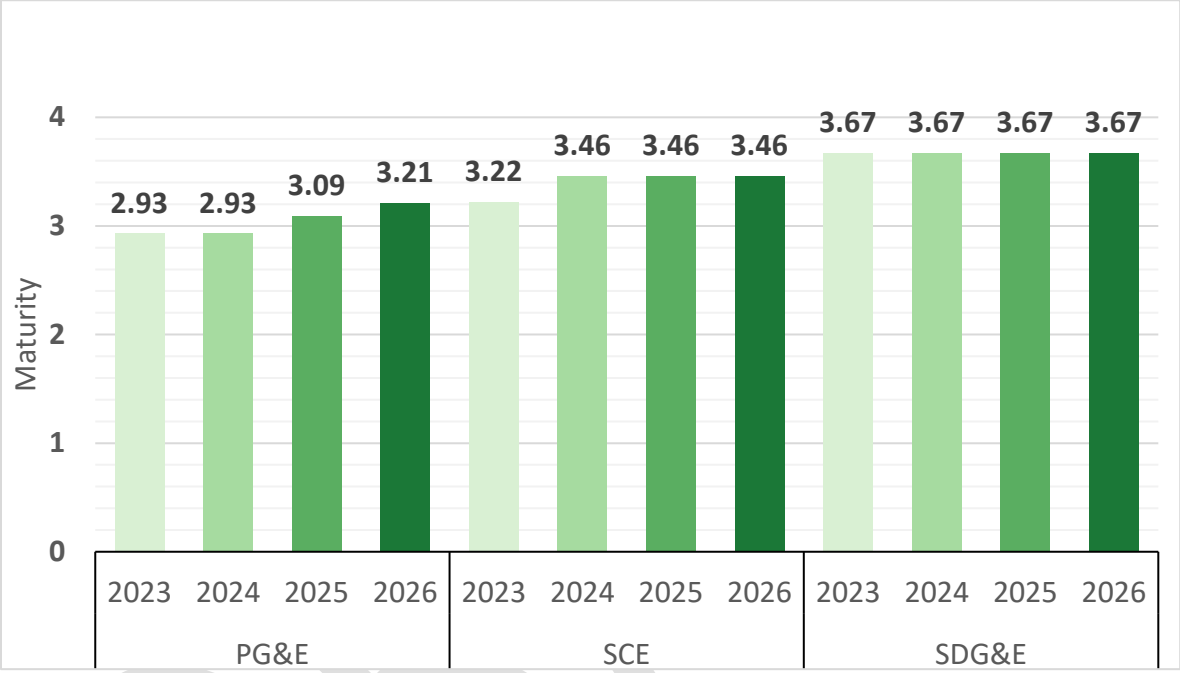


The utility's maturity level for the grid operations and protocols category described above is calculated using the minimum value sub-capability of each capability. Using the capability average is another way to look at SCE's performance in grid operations and protocols. The capability average is determined from the average of all component sub-capabilities and is an additional tool to evaluate the utilities' maturity.[48]

[116] 2023 Maturity Survey Category E "Grid Operations and Protocols."

When the category maturity is calculated using the capability average (rather than the minimum), SCE has a maturity level for grid operations and protocols of 3.22 for 2023, 3.46 in 2024, and 3.46 in 2025 (Figure 8.1-8).

Figure 8.1-8. Cross-Utility Maturity for Grid Operations and Protocols[117] (Average Values)



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

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

- SCE reports that sensitivities for grid elements and protective equipment are determined manually.[118] In order to increase its maturity level, SCE would need to determine sensitivities automatically.
- SCE reports that it does not use predictive modeling to understand the lifespan of equipment based on documented grid operating history.[119] In order to increase its maturity level, SCE would need to use predictive modeling in such a way.

SCE's current maturity level in this category is higher than PG&E while lower than SDG&E, with PG&E and SDG&E reporting at levels 2.93 and 3.67, respectively. See Figure 8.1-7.

---

[117] 2023 Maturity Survey Category E "Grid Operations and Protocols."

[118] SCE's 2023 Maturity Survey, response to 5.1.6.Q2.

[119] SCE's 2023 Maturity Survey, response to 5.2.1.Q1.

8.1.5.2 SCE's WMP Strengths

SCE projects improvement in grid operations and procedures over the WMP cycle in the following areas: fast curve settings coverage, high impedance relays, and open phase detection.

SCE reports that its fast curve settings are enabled on approximately 900 of 1075 circuits, with all HFRA miles capable of fast curve settings.[120] Moving forward, SCE is working to update relays on the remaining circuits to also have fast curve capability by 2024. Thus far, SCE reports seeing a 54 percent reduction in ignition-to-fault ratio when using fast curve settings.[121]

Additionally, SCE is evaluating implementing additional high impedance relay settings, or Hi-Z, which will detect additional fault types on top of fast curve settings. SCE is still piloting these settings and validating lab testing results.

SCE also reports piloting Transmission Open Phase Detection (TOPD) and Distribution Open Phase Detection (DOPD). Both technologies aim to detect open phase conditions and isolate lines prior to them contacting ground. SCE is still evaluating the success of such technologies before deploying further, including rate of false positives and potential reliability impacts.

2022 Areas for Continued Improvement

Energy Safety evaluated the progress SCE made toward addressing areas for continued improvement identified in Energy Safety's 2022 WMP Decision. SCE adequately addressed its 2022 areas for continued improvement related to grid operations and procedures. See Appendix B for the status of each 2022 area for continued improvement.

8.1.5.3 Areas for Continued Improvement

Continued Monitoring of Fast Curve Settings Impact

SCE reports that it has not observed any reliability impacts from use of fast curve settings, as it did not observe an increase in outages since deployment of fast curve settings in 2017.[122] SCE reports that it only experienced five outages while fast curve settings were enabled, with a total of 464,720 customer minutes interrupted.[123] While observed outages due to enablement of fast curve settings have been low for SCE, SCE should continue to assess potential impacts moving forward, particularly given the low number of wind events in 2022.

---

[120] SCE's 2023-2025 WMP, page 332.

[121] SCE's 2023-2025 WMP, page 333.

[122] Data Request OEIS-P-WMP_2023-SCE-003 (Question 7).

[123] Data Request OEIS-P-WMP_2023-SCE-003 (Question 7, Attachment).

By its 2025 Update, SCE must provide information from monitoring potential reliability impacts for 2023 outages that occurred while fast curve settings were enabled.

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, SCE 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.[124]

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

8.2.1 Objectives and Targets

As part of its Base WMP, SCE provided 3-year and 10-year objectives for its vegetation management programs.[125]

SCE also defined quantitative targets the initiative activities for its vegetation management programs. SCE's Base WMP includes end-of-year targets for 2023, 2024, and 2025. Selected targets are included in Table 8.2-1 to demonstrate the utility's commitment to mitigating ignition risk from vegetation contact.

Table 8.2-1. SCE Vegetation Management – Selected Targets

Initiative Activity	Target Unit	2023 Target	2024 Target	2025 Target
Hazard Tree Mitigation Program[126]	Inspect **grids** and prescribe mitigation for hazardous trees with strike potential within those grids in SCE's HFRA	412	408	440

[124] 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).

[125] SCE's 2023-2025 WMP, pages 375-376.

[126] These targets were updated from SCE's initial March 27, 2023, submission in SCE's Submission of Errata for the 2023-2025 Wildfire Mitigation Plan, dated April 6, 2023 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53613&shareable=true, accessed June 27, 2023).

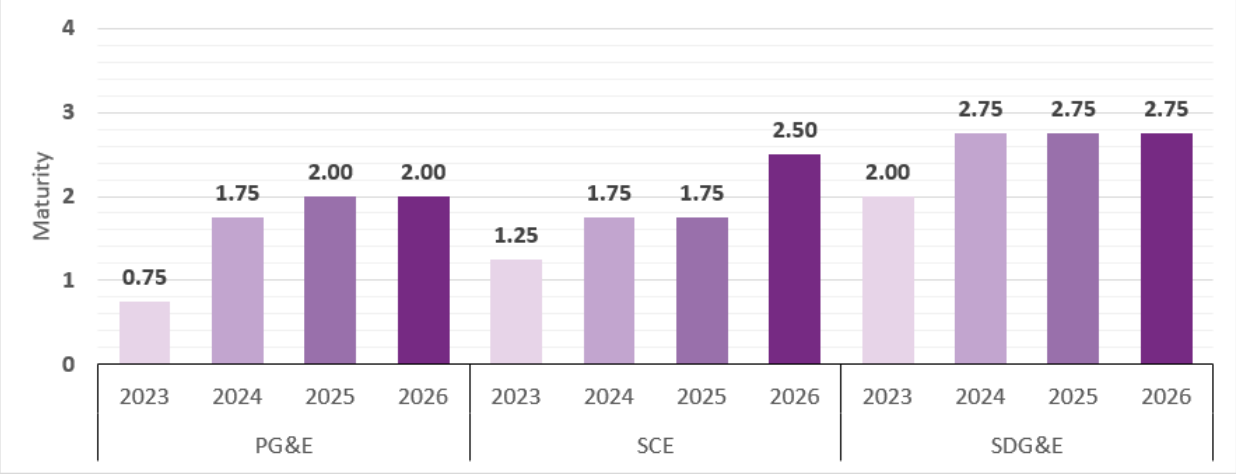
Initiative Activity	Target Unit	2023 Target	2024 Target	2025 Target
Detailed Inspections for the Prescription of Expanded Vegetation Clearances from Distribution Lines in HFRA[127]	Inspect **grids** within SCE's HFRA	770	770	770
LiDAR Distribution Vegetation Inspections	Inspect HFRA **circuit miles**	1,020	1,020	1,020
Structure Brushing	Inspect and clear (where clearance is needed) **structures** (these structures are in addition to poles subject to Public Resources Code 4292)	63,700	63,700	63,700

8.2.2 Maturity Survey Results

According to its responses to the 2023 Maturity Survey, SCE has a 2023 maturity level of 1.25 for vegetation management and inspections. For 2024, SCE projects that it will slightly increase in maturity to a level of 1.75. For 2025, SCE projects the same maturity level of 1.75 (Figure 8.2-1).

[127] These targets were updated from SCE's initial March 27, 2023, submission in SCE's Submission of Additional Errata for the 2023-2025 Wildfire Mitigation Plan, dated August 14, 2023 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=54504&shareable=true, accessed August 14, 2023).

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

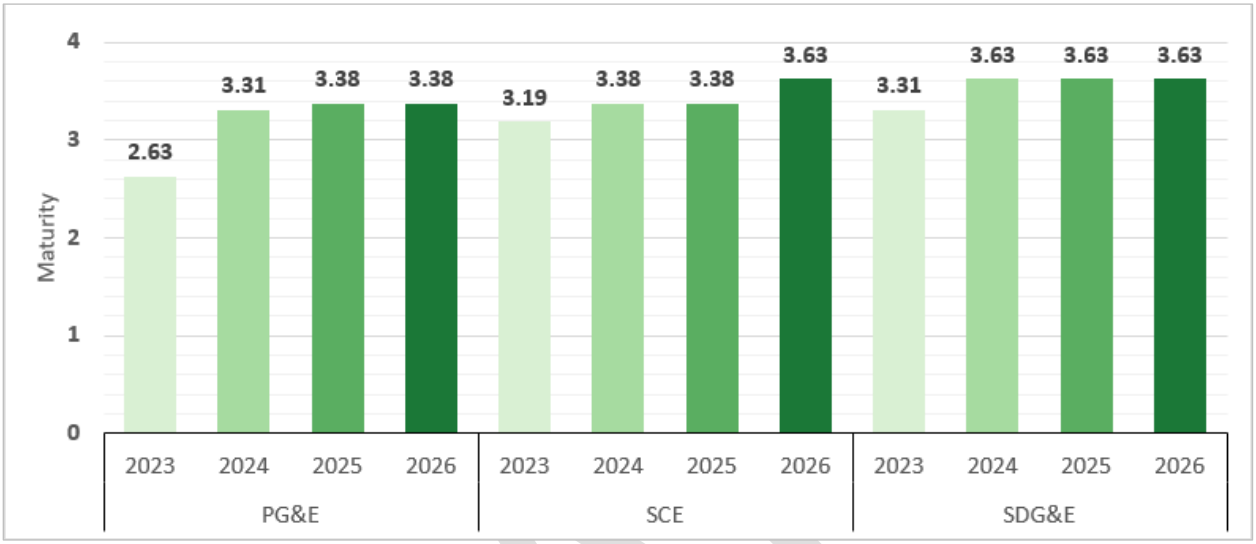


The utility's maturity level for the vegetation management and inspections category described above is calculated using the minimum value sub-capability of each capability. Using the capability average is another way to look at SCE's performance in vegetation management and inspections. The capability average is determined from the average of all component sub-capabilities and is an additional tool to evaluate the utilities' maturity.[128]

When the category maturity is calculated using the capability average (rather than the minimum), SCE has a maturity level for vegetation management and inspections of 3.19 for 2023, 3.38 in 2024, and 3.38 in 2025 (Figure 8.2-2).

[128] 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 8.2-2. Cross-Utility Maturity for Vegetation Management and Inspections (Average Values)



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

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

- SCE reports that the time between routine vegetation inspection and treatment (i.e., trimming or removal) of non-urgent vegetation inspection findings is greater than 30 days.[129] To mature in this capability, SCE would have to reduce that time to less than 30 days.

SCE's current maturity level in this category is between its peers, with PG&E and SDG&E reporting at levels 0.75 and 2.0, respectively. See Figure 8.2-1.

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

- Vegetation inventory and condition database[130]

Based on its responses to the 2023 Maturity Survey, SCE reported its lowest levels of projected maturity in the following capability for 2023 and 2024:

- Vegetation treatment[131]

[129] SCE's 2023 Maturity Survey, response to 4.3.2 Q3.

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

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

8.2.3 SCE's WMP Strengths

SCE projects improvement in vegetation management over the WMP cycle in the following areas: vegetation management inspections, vegetation treatment, and vegetation management enterprise systems.

One of SCE's 2023-2025 WMP's strengths is SCE's plan to consolidate and update its vegetation management inspections. In 2023, SCE is consolidating its tree inspection schedule for Routine Line Clearing, its Hazard Tree Mitigation Program, and Dead and Dying Tree Removal, and will be using the same contractor for these inspections. Contractors will be assigned designated districts and will perform these three inspections concurrently within the district. This is a notable change and improvement, as SCE previously had separate contracts and schedules for each inspection program.[132]

SCE is using its "Tree Risk Index" to determine the scope and frequency of its Hazard Tree Mitigation Program inspections. SCE will inspect areas with a higher Tree Risk Index score more often than areas with lower scores.[133] Previously, SCE's Hazard Tree Mitigation Program did not use this risk-based schedule. Also, SCE has updated its Tree Risk Calculator for use during its hazard tree inspections.[134] Continuous improvement of a tool, such as the Tree Risk Calculator, ensures that the tool remains relevant and capable of delivering improved outcomes over time.

Another strength in SCE's 2023-2025 WMP is that SCE exceeds pole brushing requirements in certain areas. SCE performs pole and structure brushing that meet the requirements of Public Resource Code section 4292 on an additional 63,700 distribution poles that are outside the State Responsibility Areas, but within its HFRA.[135]

Lastly, SCE plans to centralize its vegetation management systems. SCE reports that throughout 2023 and 2024 it will transition all its legacy vegetation-related work management systems to a centralized system named "Arbora"[136] to optimize operations and improve data accuracy.

8.2.3.1 2022 Areas for Continued Improvement

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

---

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

[133] SCE's 2023-2025 WMP, page 395.

[134] SCE's 2023-2025 WMP, page 419.

[135] SCE's 2023-2025 WMP, page 408.

[136] SCE's 2023-2025 WMP, pages 426-427.

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

- For SCE-22-18, 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.[137] 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.[138]

8.2.4 Areas for Continued Improvement

SCE must continue to improve in the following areas.

8.2.4.1 Implementation of SCE's Consolidated Inspection Strategy, Use of its Tree Index, and its Satellite-Based Inspection Pilot

As discussed above, Energy Safety considers the SCE's inspection consolidation and use of its Tree Risk Index to be some of the strengths of SCE's WMP. Nonetheless, to evaluate the quality and execution of inspection consolidation and use of the Tree Risk Index, SCE must report in its next Base WMP on progress, outcomes, and lessons learned related to its consolidated inspection strategy and its use of its Tree Risk Index.

In its 2023-2025 WMP, SCE discusses the possibility for satellite technology to drive inspections, replace inspections, and to assist LiDAR. To foster collaborative learning and improvement across the industry, SCE must report on progress, outcomes, and lessons learned related to the development and implementation of its satellite-based inspection pilot.[139]

8.2.4.2 Continuation of Effectiveness of Enhanced Clearances Joint Study

The large IOUs, including SCE, must also continue efforts on the Effectiveness of Enhanced Clearances Joint Study to meet the requirements of SCE-21-07. [140] In its 2025 Update, SCE, along with PG&E and SDG&E, must report on the progress and outcomes of the third-party

---

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

[138] 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).

[139] SCE's 2023-2025 WMP, pages 403-406.

[140] Final Action Statement on the 2021 Wildfire Mitigation Plan (WMP) Update of Southern California Edison Company, page App68 (https://energysafety.ca.gov/wp-content/uploads/sce_2021wmp_finalactionstmt.pdf, accessed July 5, 2023).

contractor's analysis and evaluation of the effectiveness of enhanced clearances. Also, with its next Base WMP, SCE, along with PG&E 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," SCE must make further improvements in the area of cross-utility collaboration on best 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, SCE 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.[141]

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

8.3.1 Objectives and Targets

As part of its Base WMP, SCE provided 3-year and 10-year objectives for its situational awareness and forecasting programs.[142]

SCE also defined quantitative targets for initiative activities for its situational awareness and forecasting programs. SCE's Base WMP includes end-of-year targets for 2023, 2024, and 2025.

---

[141] 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).

[142] SCE's 2023-2025 WMP, pages 449-450.

Select targets are included in Table 8.3-1 to demonstrate the utility's projected progress in its situational awareness and forecasting initiatives.

Table 8.3-1. SCE Situational Awareness and Forecasting – Select Targets

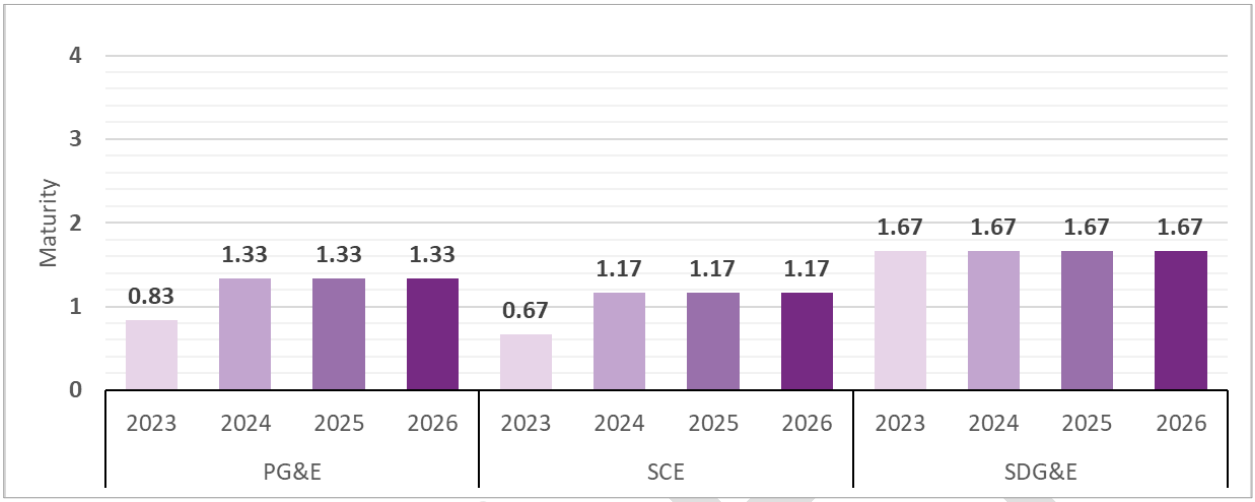
Initiative Activity	Target Unit	2023 Target	2024 Target	2025 Target
Weather Stations (SA-1)	Installed weather stations	85	50	15
Weather and Fuels Modeling (SA-3)	Weather stations integrated with machine learning capabilities	500	200	Remaining weather station locations[143]
High Definition (HD) Cameras (SA-10)	Installed HD Cameras	10	10	0
Early Fault Detection (EFD) (SA-11)	Installed EFD locations	50	50	200

8.3.2 Maturity Survey Results

According to its responses to the 2023 Maturity Survey, SCE has a 2023 maturity level of 0.67 for situational awareness and forecasting. For 2024, SCE projects that it will slightly increase in maturity to a level of 1.17. SCE projects no maturity level change for 2025.

[143] "Implement machine learning at remaining weather station locations that meet eligible criteria, and for additional variables deemed necessary to improve PSPS planning," SCE's 2023-2025 WMP, Table 8-23 "Situational Awareness Initiative Targets by Year," page 449.

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

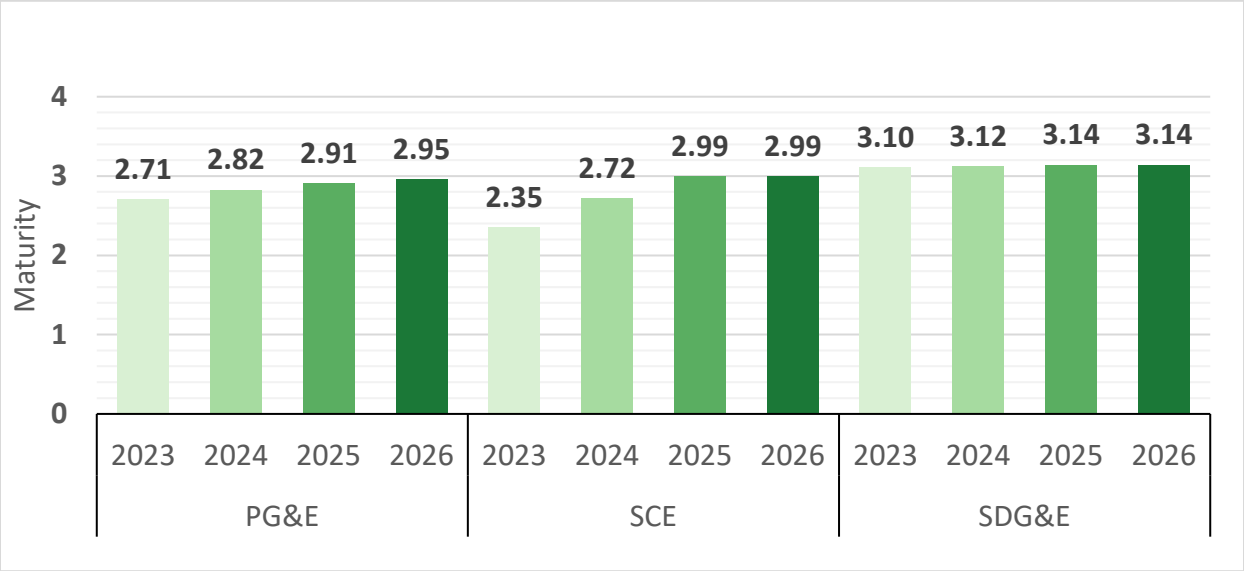


The utility's maturity level for the situational awareness and forecasting category described above is calculated using the minimum value sub-capability of each capability. Using the capability average is another way to look at SCE's performance in situational awareness and forecasting. The capability average is determined from the average of all components sub-capabilities and is an additional tool to evaluate the utilities' maturity. [144]

When the category maturity is calculated using the capability average (rather than the minimum) value, SCE has a maturity level for situational awareness and forecasting of 2.35 for 2023, 2.72 in 2024, and 2.99 in 2025 (Figure 8.3-2).

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



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

SCE's current maturity level in this category, 2.35, is lower than its peers, with PG&E and SDG&E reporting at levels 2.71 and 3.10, respectively. See Figure 8.3-2.

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

- Data collection for near-real-time conditions[145]
- Centralized monitoring of real-time conditions[146]

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

- Wildfire spread forecasting[147]
- Ignition likelihood estimation[148]

[145] SCE's responses to questions on the 2023 Maturity Survey under Category B "Situational Awareness and Forecasting," Capability 10 "Data collection for near-real-time conditions."

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

[147] SCE's responses to questions on the 2023 Maturity Survey under Category B "Situational Awareness and Forecasting," Capability 9 "Wildfire spread forecasting."

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

- Wildfire detection and alarm systems[149]

8.3.3 SCE's WMP Strengths

SCE projects improvement in situational awareness and forecasting over the WMP cycle in the following areas: environmental monitoring systems, grid monitoring systems, ignition detection systems, weather forecasting, fire potential index.

SCE has been actively expanding its environmental monitoring systems to improve its situational awareness and forecasting. Currently operating over 1,600 weather stations,[150] SCE exceeds the number of weather stations deployed by its peers. SCE also has ambitious plans to further expand their network by adding 150 to 175 weather stations by 2025.[151] Additionally, SCE is committed to integrating machine learning (ML) capabilities into 700 existing weather stations by the end of 2024, aiming to enhance forecasting accuracy.[152]

To complement these efforts, SCE intends to increase installation of EFD sensors and HD cameras across its network. SCE plans to install 50 EFD sensors annually in both 2023 and 2024, and in 2025 the goal is to add 200 additional sensors on sub-transmission and transmission circuits.[153] Additionally, SCE will deploy 20 HD cameras in 2023 and 2024 to improve coverage in areas where timely identification and response to wildfires are essential.[154]

SCE seeks to improve its weather modeling and forecasting capabilities. This involves expanding the number of ML model locations and evaluating a new ML model approach for more accurate wind forecast. Furthermore, SCE plans to collaborate with the University of California at San Diego and its peer utilities to assess a new 200-member ensemble forecast, demonstrating its commitment to innovative wildfire management strategies.[155]

8.3.3.1 2022 Areas for Continued Improvement

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

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

[150] SCE's 2023-2025 WMP, Table SCE 1-01 "Summary of 2020-2022 WMP Achievements," page 2.

[151] SCE's 2023-2025 WMP, Table 8-23 "Situational Awareness Initiative Targets by Year," page 449.

[152] SCE's 2023-2025 WMP, Table 8-23 "Situational Awareness Initiative Targets by Year," page 449.

[153] SCE's 2023-2025 WMP, Table 8-23 "Situational Awareness Initiative Targets by Year," page 449.

[154] SCE's 2023-2025 WMP, Table 8-23 "Situational Awareness Initiative Targets by Year," page 449.

[155] SCE's 2023-2025 WMP, page 510.

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

- In relation to SCE-22-08, Weather Station Improvements, SCE began upgrading its weather stations where feasible to be able to report weather observations every 30 seconds, compared to the previous interval of 10 minutes, in alignment with its peer utilities. This will allow SCE to explore the potential benefits of more frequent real-time weather observations during PSPS events.

8.3.4 Areas for Continued Improvement

SCE must continue to improve in the following areas.

8.3.4.1 Weather Station Maintenance and Calibration

SCE has a robust weather station network and continues to expand it with the installation of additional weather stations. This expansion aims to improve the accuracy, resolution, and predictive ability of its weather forecasting and provide more localized and detailed weather data, which is a foundational input for its fire potential index, and PSPS decision-making process. However, this expansion presents the challenge of conducting regular maintenance and calibration for a large number of weather stations on an annual basis. SCE must provide an update on the maintenance and calibration of its weather stations in its 2025 Update.

8.3.4.2 Early Fault Detection Implementation

SCE plans to install additional early fault detection sensors on circuits identified through its risk assessments and where covered conductor has been deployed, which can assist in detecting potential incipient faults before they become problematic. In its 2025 Update, SCE must report on progress, outcomes, and lessons learned regarding the installation and usage of this technology. Additionally, SCE must provide additional details on any maintenance requirements related to EFD.

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, SCE 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.[156]

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

8.4.1 Objectives and Targets

As part of its Base WMP, SCE provided 3-year and 10-year objectives for its emergency preparedness programs.[157]

SCE also defined quantitative targets for initiative activities for its emergency preparedness programs. SCE's Base WMP includes end-of-year targets for 2023, 2024, and 2025.

Selected targets are included in Table 8.4-1 to demonstrate the utility's projected progress.

Table 8.4-1. SCE Emergency Preparedness – Selected Targets

Initiative Activity	Target Unit	2023 Target	2024 Target	2025 Target
SCE Emergency Response Training	Qualifications of PSPS response teams	Response teams fully qualified by July 1	Response teams fully qualified by July 1	Response teams fully qualified by July 1
Aerial Suppression	Funding local fire agencies Quick Reaction Force (QRF)	Provide funding for 2023 QRFs	Reassess available funds for QRF strategy	Reassess available funds for QRF strategy
Customer Care Programs (Critical Care Backup)	Battery Deliveries	Deliver batteries to 85% of eligible customers within 30 days of enrollment.	Deliver batteries to 85% of eligible customers within 30 days of enrollment.	Deliver batteries to 85% of eligible customers within 30 days of enrollment.
Customer Care Programs (Portable Power Station and	Rebate Claims	Process 85% of all rebate claims within	Process 85% of all rebate claims within	Process 85% of all rebate claims within

[156] 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).

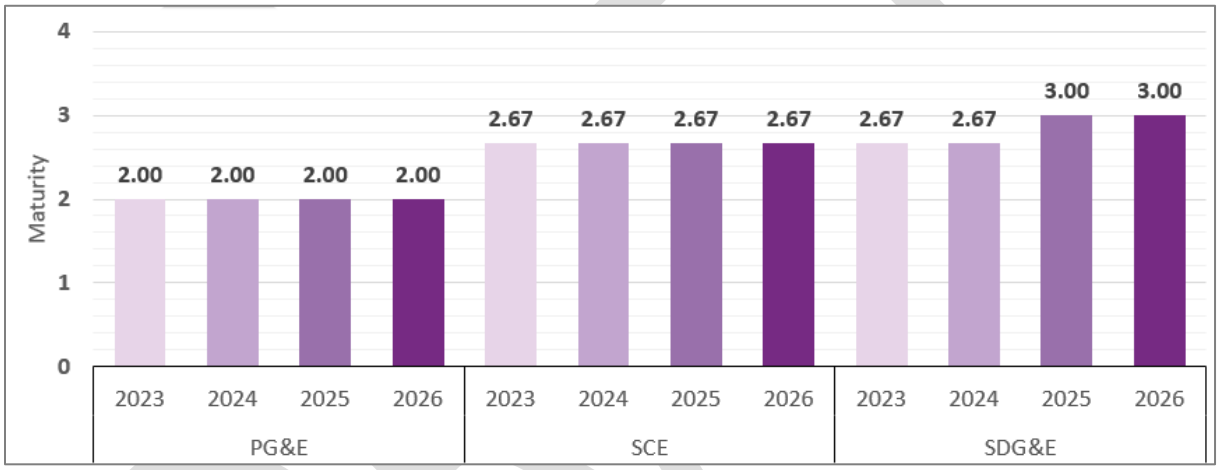
[157] SCE's 2023-2025 WMP, pages 520-521.

Initiative Activity	Target Unit	2023 Target	2024 Target	2025 Target
Generator or Rebates)		30 business days.	30 business days.	30 business days.

8.4.2 Maturity Survey Results

According to its responses to the 2023 Maturity Survey, SCE has a 2023 maturity level of 2.67 for emergency preparedness. SCE projects no maturity level change for 2024 or 2025. (Figure 8.4-1).

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

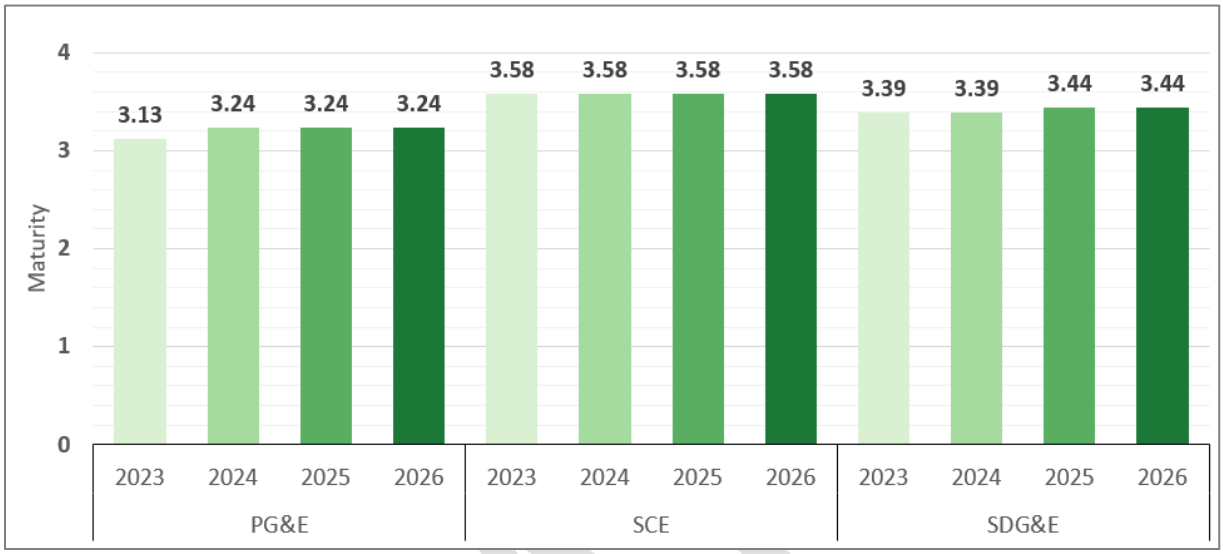


The utility's maturity level for the emergency preparedness category described above is calculated using the minimum value sub-capability of each capability. Using the capability average is another way to look at SCE's performance in emergency preparedness. The capability average is determined from the average of all component sub-capabilities and is an additional tool to evaluate the utilities' maturity. [158]

When the category maturity is calculated using the capability average (rather than the minimum), SCE has a maturity level for emergency preparedness of 3.58 for 2023, 3.58 in 2024, and 3.58 in 2025 (Figure 8.4-2).

[158] 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.

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

- SCE indicates that it performs annual maintenance, testing, and inspection of the physical systems that provide detection, alarm, notification, central monitoring, and transmission of "approved" reporting information.[159] To mature in this area, SCE would have to indicate that it performs these actions more frequently (twice annually, monthly, or weekly).
    - In an explanatory comment on this question, SCE added that "failures and other breakdowns are addressed immediately."[160]
- SCE indicates that its safety checks prior to re-energization are partially but less than halfway automated.[161] To mature in this area, SCE would need to have a more automated safety check process (mostly automated or fully automated).
    - In an explanatory comment on this question, SCE adds that it "uses drones in limited circumstances for Public Safety Power Shutoff (PSPS) restoration patrols. SCE noted that fully automated safety checks are not desired and are not more mature. SCE will likely not increase in maturity because safety checks should not be fully automated for safety reasons." [162]

[159] SCE's 2023 Maturity Survey, response to 6.3.5.Q1.

[160] SCE's 2023 Maturity Survey, response to 6.3.5.Q1.

[161] SCE's 2023 Maturity Survey, response to 6.4.1.Q1.

[162] SCE's 2023 Maturity Survey, response to 6.4.1.Q1.

SCE's current maturity level in this category is the same as SDG&E, with both reporting at a level of 2.67. Both are slightly higher than PG&E's level of 2.00. See Figure 8.4-1.

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

- Wildfire and PSPS emergency and disaster preparedness plan[163]
- Collaboration and coordination with public safety partners[164]
- Customer support in wildfire and PSPS emergencies[165]

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

- Public emergency communication strategy[166]
- Preparedness and planning for service restoration[167]

8.4.3 SCE's WMP Strengths

SCE projects improvement in emergency preparedness over the WMP cycle in the following area: emergency preparedness targets and communication.

SCE sets strong targets for itself related to emergency preparedness. SCE's targets demonstrate strong commitment to enhance its emergency preparedness. One of SCE's targets includes providing funding to fire agencies to share aerial firefighting resources.

Also, SCE began to fully implement a consolidated data platform (CDP) in 2022 for PSPS events. The CDP should enable SCE to be more effective in the current WMP cycle in sending PSPS notifications to customers. SCE reports that the CDP also aids in the consistency of PSPS outage data and notification status updates through SCE's Public Safety Partner Portal.[168]

---

[163] SCE's responses to questions on the 2023 Maturity Survey under Category F "Emergency Preparedness," Capability 27 "Wildfire and PSPS emergency and disaster preparedness plan."

[164] SCE's responses to questions on the 2023 Maturity Survey under Category F "Emergency Preparedness," Capability 28 "Collaboration and coordination with public safety partners."

[165] SCE's responses to questions on the 2023 Maturity Survey under Category F "Emergency Preparedness," Capability 31 "Customer support in wildfire and PSPS emergencies."

[166] SCE's 2023 Maturity Survey, response to 6.3.5.Q1.

[167] SCE's 2023 Maturity Survey, response to 6.4.1.Q1.

[168] Data Request OEIS-P-WMP_2023-SCE-009 (Question 1) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=54290&shareable=true, accessed July 5, 2023).

8.4.3.1 2022 Areas for Continued Improvement

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

8.4.4 Areas for Continued Improvement

Energy Safety has no areas for continued improvement for SCE 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, SCE 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.[169]

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

8.5.1 Objectives and Targets

As part of its Base WMP, SCE provided 3-year and 10-year objectives for its community outreach and engagement programs.[170]

SCE also defined quantitative targets for initiative activities for its community outreach and engagement programs. SCE's Base WMP includes end-of-year targets for 2023, 2024, and 2025. Selected targets are included in Table 8.5-1 to demonstrate the utility's projected progress.

[169] 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).

[170] SCE's 2023-2025 WMP, pages 574-580.

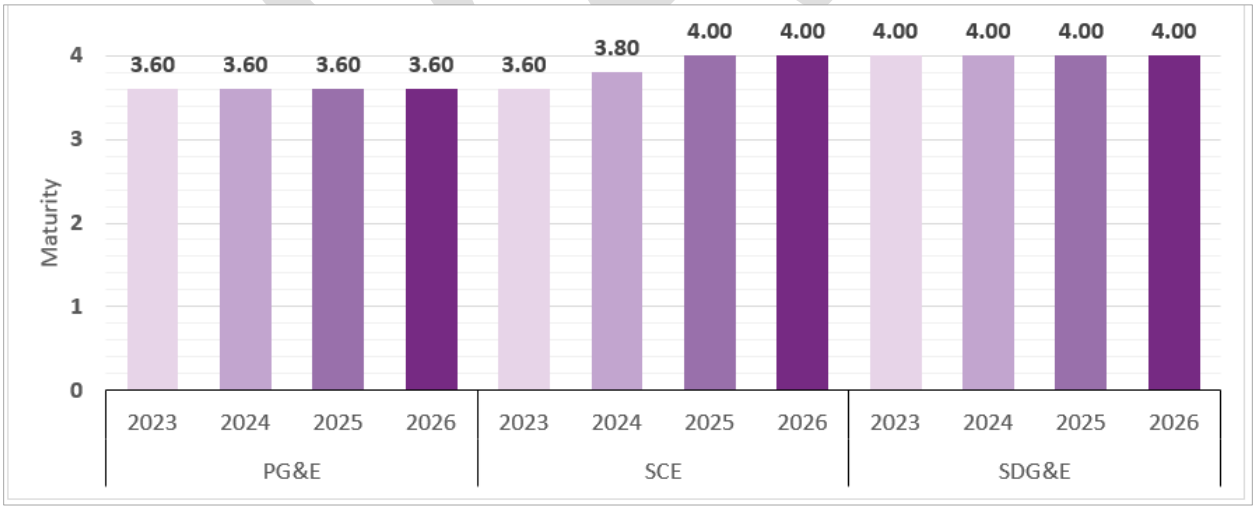
Table 8.5-1. SCE Community Outreach and Engagement – Selected Targets

Initiative Activity	Target Unit	2023 Target	2024 Target	2025 Target
Wildfire Safety Community Meetings	Meetings	≥ 4	Continue or revise[171]	Continue or revise
Customer Research and Education	PSPS-related customer studies	≥ 5	≥ 3	≥ 3

8.5.2 Maturity Survey Results

According to its responses to the 2023 Maturity Survey, SCE has a 2023 maturity level of 3.6 for community outreach and engagement. For 2024, SCE projects that it will slightly increase in maturity to a level of 3.8. For 2025, SCE projects that it will slightly increase in maturity to a level of 4.0 (Figure 8.5-1).

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



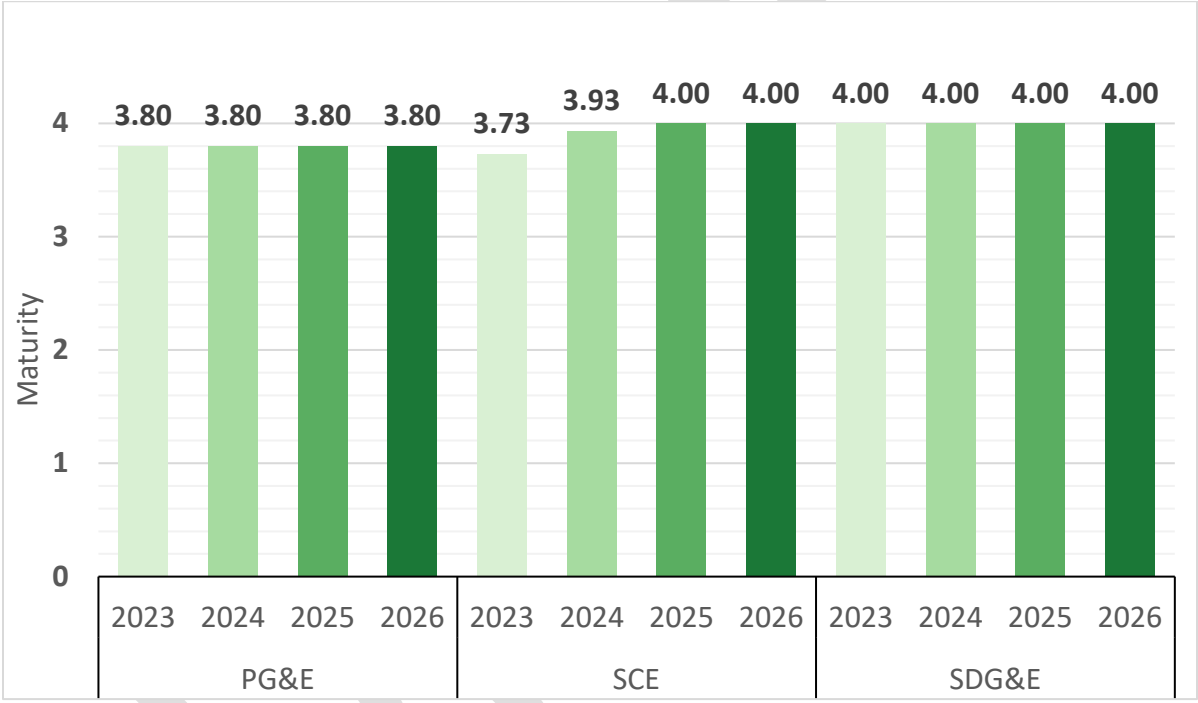
The utility's maturity level for the community outreach and engagement category described above is calculated using the minimum value sub-capability of each capability. Using the capability average is another way to look at SCE's performance in community outreach and

[171] Annual target is based on the impact PSPS events of the prior year(s) and ongoing wildfire mitigation activities (see SCE's 2023-2025 WMP, p. 579).

engagement. The capability average is determined from the average of all component sub-capabilities and is an additional tool to evaluate the utilities' maturity.[172]

When the category maturity is calculated using the capability average (rather than the minimum), SCE has a maturity level for community outreach and engagement of 3.73 for 2023, 3.93 in 2024, and 4.00 in 2025 (Figure 8.5-2).

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.

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

- SCE indicates that it does expect to have a working relationship with at least one community partner for each of the key vulnerable ratepayer groups (AFN, Medical Baseline, and socially vulnerable groups) at the county and/or city level by 2025 and 2026 but lacks these relationships presently and doesn't expect to have them in 2024.[173] To grow in maturity, SCE would need to indicate that it has these relationships.

[172] 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.

[173] SCE's 2023 Maturity Survey, response to 7.3.1.Q12.

SCE's current maturity level in this category is around the same as its peers, with PG&E 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, SCE reported its highest levels of projected maturity in the following capabilities for 2023 and 2024:

- Public outreach and education awareness[174]
- Public engagement in electrical corporation wildfire mitigation planning[175]
- Collaboration on local wildfire mitigation planning[176]
- Cooperation and best practice sharing with other electrical corporations[177]

Based on its responses to the 2023 Maturity Survey, SCE reported its lowest levels of projected maturity in the following capability for 2023 and 2024:

- Engagement with AFN and socially vulnerable populations[178]

8.5.3 SCE's WMP Strengths

SCE projects improvement in community outreach and engagement over the WMP cycle in the following areas: public outreach and education awareness program and engagement with access and functional needs populations.

8.5.3.1 Public Outreach and Education Awareness Program

SCE noted several methods of providing public outreach and education awareness for its wildfire mitigation and PSPS activities. SCE uses advertisements, social media and direct customer mailings aimed at educating customers and members of the public on PSPS, preparing for emergencies, resources for impacted customers, as well as what SCE is doing to mitigate its wildfire risk. SCE states that in 2023 it will create new digital advertisements available in 20 languages.[179] Specifically, the new advertisements will focus on its wildfire

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

[175] SCE'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."

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

[177] SCE'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."

[178] SCE'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."

[179] SCE's 2023-2025 WMP, page 585.

mitigation efforts and emergency preparedness tips for customers. SCE plans to run its advertisements territory-wide.[180]

SCE is further expanding its public outreach by planning to implement a "customer-centric, integrated communications strategy" to provide consistent and cohesive messaging across its traditional and digital channels.[181] SCE explains it will achieve this by grouping customers into five segments[182] relevant to communications before, during, and after a PSPS outage. SCE is exploring this approach to improve coordination between its PSPS notification system and its standard customer communications system, ensuring customers do not receive conflicting messaging.[183]

8.5.3.2 Engagement with Access and Functional Needs Populations

SCE plans to improve its engagement with populations with access and functional needs (AFN). In 2022, SCE launched its AFN Self-Identification Pilot to identify AFN customers and households beyond those enrolled in the Medical Baseline (MBL) Allowance Program. The pilot included all SCE customers on circuits frequently impacted by PSPS. In 2023, SCE plans to expand the pilot to reach all customers in its high fire risk areas (HFRAs).[184] SCE explains it will use a survey to gather customer information and will provide additional tailored support to customers who rely on electrically powered medical equipment, assistive technology, accessible transportation, among others access and functional needs.[185]

SCE projects that it will increase maturity in this area[186, 187] due to its plans to: host meetings with AFN and MBL groups to discuss the effectiveness of its engagements; update program activities based on feedback received; and establish working relationships with at least one community partner for each AFN, MBL, and socially vulnerable group at the county level.

Though this is an acceptable plan to move forward with, by its 2025 Update, SCE must provide further details on the specific challenges of its AFN customer base and its plans to address those needs in future planning (see Section 8.5.4 "Areas for Continued Improvement" below).

---

[180] SCE's 2023-2025 WMP, page 586.

[181] SCE's 2023-2025 WMP, page 585.

[182] SCE's 2023-2025 WMP, page 586, The five segments break out customer groups as those not notified but de-energized, notified and de-energize, not notified and not de-energized, and do not live in the HFRA.

[183] SCE's 2023-2025 WMP, page 585.

[184] SCE's 2023-2025 WMP, page 601.

[185] SCE's 2023-2025 WMP, pages 601-602.

[186] SCE'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."

[187] SCE's 2023-2025 WMP, page 609.

8.5.3.3 2022 Areas for Continued Improvement

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

8.5.4 Areas for Continued Improvement

SCE must continue to improve in the following areas.

8.5.4.1 Evaluation of and Plan to Address AFN Needs

SCE does not provide sufficient detail in its 2023-2025 WMP about its evaluation of its AFN customers' specific needs or its plans to address these needs.[188] For example, regarding AFN customer needs during wildfire or PSPS events, SCE lists two needs identified in its 2022 PSPS Tracker Survey but provides no further evaluation. SCE also does not state how it intends to address these specific needs. While SCE references its 2023 AFN Plan[189] for further details, it is unclear where in this plan SCE discusses how it will address these needs.[190]

8.5.4.2 Community Outreach 3- and 10-Year Objectives – Verification Methods

Some of SCE's 3-year and 10-year community outreach objective verification methods are vague.[191] For example, one of SCE's 3-year objectives pointed to Tables 8-44 and 8-59[192] as the method of verification.[193] These tables list the names of government and community partners with minimal reference to planned actions. SCE gives no specificity on how these lists of names directly tie to the objective. It is ambiguous how these methods will in fact verify SCE's progress as it relates to this objective.

---

[188] Comments of the Public Advocates Office on the 2023 to 2025 Wildfire Mitigation Plans of the Large Investor-Owned Utilities (May 26, 2023), pages 63-65 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53966&shareable=true, accessed July 28, 2023).

[189] Southern California Edison Company's (U 338-E) Access and Functional Needs Plan for Public Safety Power Shutoff Support Pursuant to Commission Decision in Phase Two and Phase Three of R.18-12-00 (January 30, 2023).

(https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M501/K654/501654066.PDF, accessed July 21, 2023).

[190] SCE's 2023-2025 WMP, pages 602-603.

[191] SCE's 2023-2025 WMP, pages 574-580.

[192] SCE's 2023-2025 WMP, Table 8-44, "State and Local Agency Collaboration(s)," page 552; Table 8-59, "List of Community Partners," page 597.

[193] SCE's 2023-2025 WMP, page 576.

Energy Safety asked SCE to provide clarification via a data request.[194] SCE provided some clarification and further information on additional verification methods, such as survey results. SCE must include this information in future WMPs and WMP Updates starting with the 2025 Update.

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

[194] Data Request OEIS-P-WMP_2023-SCE-005 (Question 06) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=54068&shareable=true, accessed June 18, 2023).

9. Public Safety Power Shutoffs

In response to Section 9 of the Technical Guidelines,[195] SCE 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 SCE's objectives and targets, maturity levels, and strengths in these areas. In addition, Energy Safety has identified areas where SCE must improve, described at the end of this section.

9.1 Objectives and Targets

As part of its Base WMP, SCE provided 3-year and 10-year objectives for its PSPS programs.[196]

SCE also defined quantitative targets for initiative activities for its PSPS programs. SCE's Base WMP includes end-of-year targets for 2023, 2024, and 2025. SCE's PSPS target that is most relevant to the reduction of PSPS scope, scale, and frequency is shown in Table 9.1-1 to demonstrate the utility's projected progress.

Table 9.1-1. SCE Public Safety Power Shutoffs – Selected Target[197]

Initiative Activity	Target Unit	2023 Target	2024 Target	2025 Target
PSPS	Minutes of PSPS customer interruption reduced	14.9M	14.9M	14.9M

The other targets SCE provides[198] are for activities in the wildfire mitigation initiatives section of the WMP (e.g., miles of covered conductor installed, number of weather stations installed). These targets do not track progress in reduction of PSPS scope, scale, and frequency. For more discussion of these targets, see Section 8, "Wildfire Mitigation Initiatives."

[195] Technical Guidelines, Section 9, pages 195-206 (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53286&shareable=true, accessed May 5, 2023).

[196] SCE's 2023-2025 WMP, pages 615-616.

[197] SCE's 2023-2025 WMP, page 619.

[198] SCE's 2023-2025 WMP, Table 9-5 "PSPS Targets," page 618.

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.

9.3 SCE's WMP Strengths

SCE projects improvement in PSPS-related initiatives and activities over the WMP cycle.

SCE has improved its data management systems related to PSPS. SCE reports that it currently uses its consolidated data platform (CDP) to manage PSPS data. The CDP unifies disparate lines of business required for PSPS, including event management, weather forecasting, customer messaging, and GIS data. The CDP has eliminated manual hand-offs between different software programs and streamlined operations before, during, and after a PSPS event.

9.3.1 2022 Areas for Continued Improvement

Energy Safety evaluated the progress SCE 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 relation to SCE-22-25, Increasing PSPS Thresholds on Hardened Circuits, SCE raised PSPS wind thresholds on part or all of 69 circuits.[199] Additionally, SCE is going beyond raising thresholds due to hardening and is exploring new modeling criteria that may affect how PSPS thresholds are set.[200] See the discussion of SCE's response to SCE-22-2-6 below for more information on its new modeling approach and associated reporting.
- In relation to SCE-22-26, PSPS Damage in Consequence Modeling, SCE conducted a study of 46 incidents of post-PSPS wind damage in 2021 to better understand the trade-offs of PSPS and wildfire consequences, simulating possible outcomes from an ignition at select damage locations.[201] This analysis is a first step to understanding

[199] SCE's 2023-2025 WMP, page 784.

[200] SCE's 2023-2025 WMP, page 784.

[201] Data Request OEIS-P-WMP-2023-SCE-010 (Question 1); (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=54367&shareable=true, accessed July 21, 2023).

how to incorporate PSPS event damage information into the PSPS decision-making process. SCE's ongoing process for considering post-PSPS damage information in modeling is discussed in Section 9.4, "Areas for Continued Improvement," below.

9.4 Areas for Continued Improvement

SCE must continue to improve in the following areas.

9.4.1 Consideration of PSPS Damage in Consequence Modeling

In response to SCE-22-26, SCE reports that it is at the early stages of improving its modeling methodology. SCE is soliciting proposals from technical firms to develop an improved modeling methodology that can derive PSPS wind speed thresholds down to the circuit segment. SCE states that it intends to incorporate information about historical damage in its PSPS consequence models.[202] SCE is early in the scoping process and therefore has not made significant reportable progress on incorporating PSPS event damage information into its PSPS decision-making. SCE must continue to report on its incorporation of PSPS event damage information into its PSPS consequence models.

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

[202] SCE's 2023-2025 WMP, page 787.

10. SCE's Process for Continuous Improvement

In response to Sections 10, 11, and 12 of the Technical Guidelines,[203] SCE 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.

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 SCE's implementation of lessons learned.

SCE has developed 26 proposed WMP improvements based on lessons learned from 2019-2022.[204] These improvements range from specific process improvements to ongoing engagements with research partners and benchmarking with other IOUs to identify best practices. For example, one of the most significant lessons learned and resulting changes is SCE's continued improvement in customer communications concerning PSPS. Some customers in the HFRA did not receive notifications during a PSPS due to not enrolling in, or having opted out of, SCE's PSPS alerts; other customers were not notified before restoration due to circuit re-energization being completed faster than anticipated, before notifications could be sent.[205] Internal monitoring and evaluating initiatives originating from PSPS after-action reviews have spurred a set of improvements to PSPS notifications to ensure that all customers living in the HFRA receive targeted event alerts. These improvements include, but are not limited to, auto-enrolling all customers that live in the HFRA but are not currently enrolled to ensure they receive PSPS alerts and evaluating ways to reduce processing time when sending imminent restoration notifications.[206] SCE is also collaborating with PG&E and

[203] 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).

[204] SCE's 2023-2025 WMP, Table 10-1 "Lessons Learned," page 639.

[205] Data Request OEIS-P-WMP_2023-SCE-009 (Question 2) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=54298&shareable=true, accessed July 12, 2023).

[206] SCE's 2023-2025 WMP, Table 10-1 "Lessons Learned," page 640.

SDG&E to enhance the process for identifying and notifying shared customers during PSPS events.[207]

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 SCE'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.

SCE describes its CAP[208] and reports on how it maintains the CAP to track formal actions and activities. SCE describes several actions it takes to identify issues, address findings, and evaluate efforts to prevent recurrence of those issues. SCE reports that it evaluates its repair orders and considers opportunities to prevent the recurrence of risk events. SCE investigates ignitions, reviews findings from external wildfire investigations, and considers opportunities to improve mitigation strategies. Furthermore, SCE tracks and addresses findings from Energy Safety's Compliance Assurance Division (i.e., audits and notices of defect and violation). SCE assesses WMP implementation independent of the responsible operating unit, conducts risk-informed audits of wildfire mitigation programs, and develops quality assurance (QA) and quality control (QC) processes.

10.3 Areas for Continued Improvement

Energy Safety has no areas for continued improvement for SCE in these areas of its Base WMP.

[207] SCE's 2023-2025 WMP, Table 10-1 "Lessons Learned," pages 644.

[208] SCE's 2023-2025 WMP, pages 650-657.

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 SCE's areas for continued improvement follows below.

11.1 Risk Methodology and Assessment

- **SCE-23-01. Cross-Utility Collaboration on Risk Model Development**
  - Description: SCE 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. The risk model working group meetings are ongoing.
  - Required Progress: SCE and the other IOUs must continue to participate in all Energy Safety-organized risk model working group meetings.
  - Discussed in Section 6, "Risk Methodology and Assessment."

- **SCE-23-02. Calculating Risk Scores Using Maximum Consequence Values**
  - Description: SCE's use of maximum consequence values, as opposed to probability distributions or averages, to aggregate risk scores is not aligned with fundamental mathematical standards and could lead to suboptimal mitigation prioritization decisions.
  - Required Progress: In its 2025 Update, SCE must:
    - Provide a plan with milestones for transitioning from using maximum consequence values to either probability distributions or averages in its 2026-2028 Base WMP.
    - If SCE is unable to transition to using probability distributions or averages, it must explain the reason and propose an alternative strategy that would produce risk scores closer to what using the probability distributions or average consequence would produce.
  - Discussed in Section 6, "Risk Methodology and Assessment."

- **SCE-23-03. PSPS and Wildfire Risk Trade-Off Transparency**
  - Description: SCE 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, SCE 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."

- **SCE-23-04. Incorporation of Extreme Weather Scenarios into Planning Models**
  - Description: SCE currently relies on wind conditions data representing the past 20 years that does not consider rare but foreseeable and significant risks. It does not evaluate the risk of extreme wind events in its service territory to prioritize its wildfire mitigations using MARS and IWMS.
  - Required Progress: In its 2026-2028 Base WMP, SCE must report on its progress developing statistical estimates of potential wind events over at least the maximum asset life for its system and evaluate results from incorporating these into MARS and IWMS 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

- **SCE-23-05. 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: SCE 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: SCE 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.

  SCE 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"; 8.2, "Vegetation Management and Inspections."

- **SCE-23-06. Effect of Fire Suppression on Wildfire Spread and Consequence Modeling**
  - Description: SCE's wildfire spread and wildfire consequence modeling does not currently incorporate the effect of fire suppression. This biases its modeling toward greater spread and consequence resulting in a larger and more aggressive mitigation initiative portfolio.
  - Required Progress: In its 2025 update, SCE must show progress in research and collaboration with its third-party contractor, fire suppression agencies, and the other large IOUs to develop and test models of fire spread that incorporate:
    - Metrics related to initial attack difficulty.
    - Sensitivity of MARS and IWMS outputs to the integration of wildfire suppression efforts.
  - Discussed in Section 7, "Wildfire Mitigation Strategy Development."

11.3 Grid Design, Operations, Maintenance

- **SCE-23-07. 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 (SCE-22-09 and SCE-22-11). 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, SCE, along with all other IOUs (not including independent transmission operators), must report on the progress

and outcomes of the studies and meetings discussed 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 SCE has applied to its WMP, including a list of applicable changes.
- A summary of any completed workshops, including a list of topics and dates, and takeaways.
- A list of additional workshops and proposed dates.

Additionally, SCE must continue to collaborate with other utilities on efforts relating to grid hardening. In its 2026-2028 Base WMP, SCE, 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 use of resources to accommodate applicable expansion of 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.

  - Discussed in Section 8.1, "Grid Design, Operations, and Maintenance" (8.1.2 "Grid Design and System Hardening").

- **SCE-23-08. Vibration Dampers Retrofit**
  - Description: SCE's current targets for its vibration damper retrofit have been extended through at least 2025. SCE's original procedures were to include

vibration dampers during initial installation, therefore leaving some areas without vibration dampers for many years.

- Required Progress: In its 2025 Update, SCE must:
  - Provide an update on any remaining vibration dampers within the retrofit scope, including any planned for installation after 2025. This must include an analysis on resource availability constraints due to supply chain issues.
  - Provide additional analysis demonstrating prioritization of vibration damper retrofits and installations in areas of highest susceptibility to Aeolian vibrations. This must include, at a minimum:
    - A list of locations where vibration damper installation has been delayed due to supply chain issues.
    - A map designating areas as high, medium, or low Aeolian vibration susceptibility categories.
- Discussed in Section 8.1, "Grid Design, Operations, and Maintenance" (8.1.2 "Grid Design and System Hardening").

- **SCE-23-09. Hardening Severe Risk Areas**
  - Description: For facilities in its SRA that have not undergone covered conductor installation, SCE does not perform adequate analysis of alternative mitigation plans and instead defaults to undergrounding.
  - Required Progress: In its 2025 Update, SCE must:
    - Demonstrate adequate risk reduction for any areas planned for undergrounding after 2025 via interim mitigation strategies, accounting for all ignition risk drivers.
    - Provide an analysis of alternative mitigations for circuit miles within the SRA scoped for undergrounding, including mitigations used in combination (such as REFCL and covered conductor). This must include but not be limited to:
      - Location-specific ignition drivers.
      - Time required for deployment.
      - Feasibility, including access and terrain challenges.
      - Cost-benefit analysis.
    - If applicable, adjust SCE's hardening scope to account for the above evaluation given more effective mitigation options are apparent. If SCE is not adjusting scope, it must provide explanation as to why the above evaluation proved such is not necessary.

- Discussed in Section 8.1, "Grid Design, Operations, and Maintenance" (8.1.2 "Grid Design and System Hardening").

- **SCE-23-10. Transmission Conductor Splice Assessment**
  - Description: SCE has identified a high rate of high and medium priority issues during its X-rays of splices performed in 2022 and created notifications to correct these issues. SCE commits to more proactive mitigations if rates remain high. Energy Safety expects SCE to closely monitor and report splice assessment rates/findings, and to conduct further analysis on root cause of splice issues.[209]
  - Required Progress: In its 2025 Update, SCE must commit to extending this program beyond 2023 and consider increasing the sample size. SCE must provide further analysis on its splice issues including:
    - ID number and age of splice.
    - Date of X-ray.
    - Date of most recent detailed inspection prior to X-ray.
    - Date of most recent infrared inspection prior to X-ray.
    - Circuit.
    - Issue category.
    - Failure mode (why the P1, P2, or P3 notification was generated).
    - Root cause.
    - Potential systemic causes.
  - Discussed in Section 8.1, "Grid Design, Operations, and Maintenance" (8.1.3 "Asset Inspections").

- **SCE-23-11. Covered Conductor Inspection and Maintenance**
  - Description: Although SCE has incorporated some checks into its inspection and maintenance procedures to address failures specific to covered conductor, such as identifying areas with exposed conductor, it has not adequately updated its inspection and maintenance procedures to properly cover potential failure modes for covered conductor.

[209] SCE's 2023-2025 WMP, page 309.

- Required Progress: In its 2025 Update, SCE must discuss how failure modes unique to covered conductor will be accounted for in its inspections, including:
  - Water intrusion.
  - Splice covers.
  - Surface damage.

  If SCE determines no changes to its inspection and maintenance procedures are necessary, then it must discuss how its current inspection and maintenance procedures adequately address covered conductor failure modes.
- Discussed in Section 8.1, "Grid Design, Operations, and Maintenance" (8.1.3 "Asset Inspections").

- **SCE-23-12. Asset Maintenance and Repair Maturity Level Growth**
  - Description: SCE does not outline a plan or set any targets that indicate how it will consider both PSPS risk and equipment utilization when establishing maintenance frequency by 2025.
  - Required Progress: In its 2025 Update, SCE must:
    - Discuss how its maintenance programs will account for PSPS risk, including how the PSPS risk assessment will alter the frequency of maintenance.
    - Discuss how its maintenance programs will account for asset usage, including how increased usage will alter the frequency of maintenance.
  - Discussed in Section 8.1, "Grid Design, Operations, and Maintenance" (8.1.4 "Equipment Maintenance and Repair").

- **SCE-23-13. Addressing Backlogged Work Orders**
  - Description: SCE does not have a detailed plan to address its current and growing backlogged work orders in a timely manner.
  - Required Progress: In its 2025 Update, SCE must provide a detailed plan, including associated resource and workforce plans, to address overdue work orders at a speed greater than work orders being added. This must include at a minimum:
    - How SCE plans to prioritize and address its existing backlog, particularly work orders that have been open for longer than five years.
    - How SCE plans to allocate workforce resources to address its backlog.

- SCE's procedures and documentation for determination of ignition-risk tags. This should include, but not be limited to:
  - Any criteria used by SCE for determining ignition risk, such as modeling output (including both ignition and consequence risk), equipment type, and equipment age.
  - The process for prioritizing the closure of tags based on the calculated ignition risk.
- How SCE plans to timely address the potential increase in work order tags resulting from improvement to routine inspections as well as additional inspections[210] as part of its plan to address its backlog. This must include:
  - Estimates on the number of new work orders broken down by additional inspection type.
  - How SCE will integrate additional inspection findings into its prioritization.
  - Resource allocation plans in order to timely close tags.

  - Discussed in Section 8.1, "Grid Design, Operations, and Maintenance" (8.1.4 "Equipment Maintenance and Repair").

- **SCE-23-14. Modification of Work Order Due Dates Based on Risk Assessment**
  - Description: SCE Gatekeepers[211] disagreed with the risk assessments performed by field inspectors in 31.9 percent of evaluated Priority 2 notifications in 2022.[212] The root cause of the difference in risk determination should be identified.
  - Required Progress: In its 2025 Update, SCE must analyze risk assessment disparity between Gatekeepers and inspectors. This analysis must include:

[210] "Additional inspections" in this instance are any inspections in addition to routine patrol or detailed inspections as outlined in GO 165. This includes drone, LiDAR, pole loading, and intrusive pole inspections.

[211] Southern California Edison (2022). Distribution Inspection and Maintenance Program (DIMP), pages 1-17 (https://www.sce.com/sites/default/files/AEM/Supporting%20Documents/2023-2025/Distribution%20Inspection%20and%20Maintenance%20Program%20(DIMP).pdf, accessed August 16, 2023).

[212] Data Request OEIS-P-WMP_2023-SCE-009 (Question 3) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=54290&shareable=true, accessed August 16, 2023). Disagreement rate was calculated by dividing the number of notifications with dates that were modified by the total number of notifications evaluated. Given that due dates were assigned based on a risk matrix, this calculation assumes that dates were modified due to disagreement on the risk.

- Evaluating the consistency of any risk assessment training provided to Gatekeepers and inspectors.
- Auditing inspector risk assessments on notifications with modified due dates.
- Auditing Gatekeeper due date modifications (both extensions and advances).
- Conclusions regarding root cause.

SCE must also clarify if incorrect due date assignment is evaluated in the QA/QC process for distribution detailed inspections, and, if it is, why the QA/QC pass rates for distribution detailed inspections do not appear to align with the percentage of due dates modified by Gatekeepers.

- Discussed in Section 8.1, "Grid Design, Operations, and Maintenance" (8.1.4 "Equipment Maintenance and Repair").

- **SCE-23-15. Continued Monitoring of Fast Curve Settings Impact**
  - Description: SCE needs to continue monitoring potential reliability impacts from use of fast curve settings.
  - Required Progress: In its 2025 Update, SCE must provide the following information for 2023 outages that occurred while fast curve settings were enabled:
    - Circuit impacted by outage.
    - Circuit segment impacted by outage.
    - Cause of outage (in line with Quarterly Data Report (QDR) Table 6 drivers).
    - Number of customers impacted.
    - Number of customers belonging to vulnerable populations (such as customers with access and functional needs and Medical Baseline customers[213]) impacted.
    - Duration of outage.
    - Response time to outage.
    - Customer minutes of interruption.
  - Discussed in Section 8.1, "Grid Design, Operations, and Maintenance" (8.1.5 "Grid Operations and Procedures").

[213] "Medical Baseline" as defined by the CPUC (https://www.cpuc.ca.gov/consumer-support/financial-assistance-savings-and-discounts/medical-baseline, accessed August 18, 2023).

11.4 Vegetation Management and Inspections

- **SCE-23-16. Implementation of SCE's Consolidated Inspection Strategy, Use of Its Tree Risk Index, and its Satellite-Based Inspection Pilot**
  - Description: SCE is developing these programs and pilot over the course of the 2023-2025 WMP cycle. As these programs and pilot mature, Energy Safety will evaluate their quality and execution.
  - Required Progress: In its 2026-2028 Base WMP, SCE must report on progress, outcomes, and lessons learned related to the development, implementation, and use of its:
    - Consolidated Inspection Strategy.
    - Tree Risk Index.
    - Satellite-based inspection pilot.
  - Discussed in Section 8.2, "Vegetation Management and Inspections."

- **SCE-23-17. 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.[214]
  - Required Progress: In its 2025 Update, SCE, along with PG&E 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.

[214] 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).

- A description of how the third-party contractor incorporated biotic and abiotic factors into its analysis.[215]
- 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.[216]

Additionally, SCE-22-18 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, SCE, along with PG&E 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' recommendations for updates to regulations related to clearance distances.

- Discussed in Section 8.2, "Vegetation Management and Inspections."

11.5 Situational Awareness and Forecasting

- **SCE-23-18. Weather Station Maintenance and Calibration**
  - Description: SCE reports having over 1600 weather stations in its network that collect weather data.[217] Frequent calibration and maintenance of weather stations is crucial for ensuring accurate, reliable, and high-quality data. As SCE's performs its annual weather station maintenance and calibration, Energy Safety will need SCE to report on the following to verify the integrity of the data collected from its weather station network.
  - Required Progress: SCE must:

[215] 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.

[216] 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.

[217] SCE's 2023-2025 WMP, page 454.

- Continue to maintain and keep a log of all the annual maintenance calibration for each weather station, including the station name, location, conducted maintenance, in compliance with SCE Weather Stations Calibration Checklist.[218] 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 their 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/or 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."

- **SCE-23-19. Early Fault Detection Implementation**
  - Description: SCE plans to expand its early fault detection technology at 300 locations during the WMP cycle.[219] As SCE's EFD deployment program matures, Energy Safety needs SCE to report on its performance and effectiveness.
  - Required Progress: In its 2025 Update, SCE must:
    - Provide an overview of the installation progress, including the number of circuits equipped with early fault detection.
    - Provide analysis of using EFD in combination with other hardening efforts, such as covered conductor and traditional hardening to maximize possible risk reduction.

[218] Data Request OEIS-P-WMP_2023-SCE-002 (Question 3): Attachment "Weather Station Maintenance & Calibration" (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=54053&shareable=true, accessed August 16, 2023).

[219] SCE's 2023-2025 WMP, Table 8-23 "Situational Awareness Initiative Targets by Year," page 449.

        - Document the performance of deployed EFD in identifying incipient faults, including the number of potential incipient faults detected and their accuracy.
        - Document any instances where the EFD successfully prevented or mitigated a potential ignition.
        - Provide additional details on any maintenance requirements related to EFD.
        - Provide any lessons learned or recommendations for improving EFD installations, maintenance, installation challenges, or any other aspects based on the experiences described above.
    - Discussed in Section 8.3, "Situational Awareness and Forecasting."

11.6 Community Outreach and Engagement

- **SCE-23-20. Evaluation of and Plan to Address AFN Needs**
    - Description: SCE should provide more information on its evaluation of the needs of its AFN customer base and its plans to address them.
    - Required Progress: In its 2025 Update, SCE must provide details on its evaluation of the specific needs of its AFN customer base identified through its annual PSPS Tracker Survey. In addition to describing any challenges identified, SCE must also provide detailed plans and a narrative on how the plans will be implemented to address these specific needs. These details must be provided within the 2025 Update.
    - Discussed in Section 8.5, "Community Outreach and Engagement."

- **SCE-23-21. Community Outreach 3- and 10-Year Objectives – Verification Methods.**
    - Description: SCE's verification methods for some its community outreach objectives are vague and do not readily demonstrate what specifically will be used to verify progress on and achievement of the objective.
    - Required Progress: In its 2026-2028 Base WMP, SCE must include all methods used to verify progress on objectives within the tables describing its 3-year and 10-year community outreach objectives. SCE must clearly articulate its verification methods to demonstrate the effectiveness in verifying progress on and achievement of each objective.
    - Discussed in Section 8.5, "Community Outreach and Engagement."

11.7 Public Safety Power Shutoffs

- **SCE-23-22. Consideration of PSPS Damage in Consequence Modeling**
  - Description: SCE is in the early stages of improving its modeling methodology and has not fully evaluated whether and/or how PSPS event damage information is considered in PSPS decision-making.
  - Required Progress: In its 2026-2028 Base WMP, SCE must report on progress it has made in incorporating observed PSPS event damage information into its PSPS consequence modeling. If SCE has come to a conclusion on whether and/or how PSPS event damage information is considered in its PSPS decision making by its 2026-2028 Base WMP submission, SCE must include an explanation of findings that led to the conclusion.
  - Discussed in Section 9, "Public Safety Power Shutoffs."

12. Conclusion

SCE's 2023-2025 Wildfire Mitigation Plan is approved.

Catastrophic wildfires remain a serious threat to the health and safety of Californians. Electrical corporations, including SCE, must continue to make progress toward reducing utility-related ignition risk. Energy Safety expects SCE 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. SCE 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

DATA DRIVEN
FORWARD-THINKING
INNOVATIVE
SAFETY FOCUSED

OFFICE OF ENERGY INFRASTRUCTURE SAFETY
A California Natural Resources Agency
www.energysafety.ca.gov

715 P Street, 20th Floor
Sacramento, CA 95814
916.902.6000

APPENDICES

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
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
LiDAR	Light detection and ranging

Term	Definition
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
PCB	Polychlorinated Biphenyls
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
QRF	Quick Reaction Force
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

Term	Definition
VRI	Vegetation risk index
WMP	Wildfire Mitigation Plan
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[220] 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 SCE and is satisfied that SCE has made sufficient progress in all the 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. SCE's 2022 areas for continued improvement are listed in Table B-1. The status column indicates whether each has been fully addressed. If not, the column notes where to find more information in this Decision.

[220] Final Decision on SCE's 2022 Wildfire Mitigation Plan Update (August 2022) (https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=52887&shareable=true, accessed August 15, 2023)

Table B-1. SCE's 2022 Areas for Continued Improvement

Area ID	Title	Status
SCE-22-01	SCE's Prioritized List of Wildfire Risks and Drivers	SCE has sufficiently addressed the required progress.
SCE-22-02	SCE's Collaboration and Research in Best Practices in Relation to Climate Change Impacts and Wildfire Risk and Consequence Modeling	SCE has sufficiently addressed the required progress thus far; Energy Safety will continue to monitor progress.
SCE-22-03	Three-Year Objectives and Supporting Programs' Performance Targets	SCE has sufficiently addressed the required progress.
SCE-22-04	Inclusion of Community Vulnerability in Consequence Modeling	SCE has sufficiently addressed the required progress thus far; Energy Safety will continue to monitor progress.
SCE-22-05	Fire Suppression Considerations	SCE has sufficiently addressed the required progress thus far; Energy Safety will continue to monitor progress.
SCE-22-06	Ignition Risk Reduction	SCE has sufficiently addressed the required progress.
SCE-22-07	Wildfire Consequence Modeling Improvements	SCE has sufficiently addressed the required progress.
SCE-22-08	Weather Station Improvements	SCE has sufficiently addressed the required progress.

Area ID	Title	Status
SCE-22-09	Joint Covered Conductor Lessons Learned	SCE has not sufficiently addressed the required progress. For related areas for continued improvement, see Sections 8.1 and 11 of this Decision.
SCE-22-10	Covered Conductor Inspection and Maintenance	SCE has not sufficiently addressed the required progress. For related areas for continued improvement, see Sections 8.1 and 11 of this Decision.
SCE-22-11	New Technologies Evaluation and Implementation	SCE has sufficiently addressed the required progress thus far; Energy Safety will continue to monitor progress.
SCE-22-12	Residual Risk Reduction Associated with Covered Conductor	SCE has sufficiently addressed the required progress.
SCE-22-13	Remaining Severe Risk Areas	SCE has sufficiently addressed the required progress. For related areas for continued improvement, see Sections 8.1 and 11 of this Decision.
SCE-22-14	Evaluation of Vibration Dampers	SCE has sufficiently addressed the required progress. For related areas for continued improvement, see Sections 8.1 and 11 of this Decision.

Area ID	Title	Status
SCE-22-15	Targets Relating to Addressing Inspection Findings	SCE has sufficiently addressed the required progress thus far; Energy Safety will continue to monitor progress.
SCE-22-16	Increases in Equipment Related Ignitions	SCE has sufficiently addressed the required progress thus far; Energy Safety will continue to monitor progress.
SCE-22-17	Address Secondary Conductor Issues	SCE has sufficiently addressed the required progress. For related areas for continued improvement, see Sections 8.1 and 11 of this Decision.
SCE-22-18	Progression of Joint Effectiveness of Enhanced Clearances Study	SCE has sufficiently addressed the required progress. For related areas for continued improvement, see Sections 8.2.4 and 11 of this Decision.
SCE-22-19	Participation in Vegetation Management Best Management Practices Scoping Meeting	SCE has sufficiently addressed the required progress.
SCE-22-20	Protective Device Settings Sensitivity Impacts	SCE has sufficiently addressed the required progress thus far; Energy Safety will continue to monitor progress.
SCE-22-21	4.6.7.3 Documentation of Models	SCE has sufficiently addressed the required progress.

Area ID	Title	Status
SCE-22-22	Third Party Confirmation of RSE Estimates	SCE has sufficiently addressed the required progress.
SCE-22-23	RSE Estimates of Emerging Initiatives	SCE has sufficiently addressed the required progress.
SCE-22-24	RSE Estimates used for Capital Allocation	SCE has sufficiently addressed the required progress.
SCE-22-25	Increasing PSPS Thresholds on Hardened Circuits	SCE has sufficiently addressed the required progress.
SCE-22-26	PSPS System Damage in Consequence Modeling	SCE has sufficiently addressed the required progress thus far; Energy Safety will continue to monitor progress. For related areas for continued improvement, see Sections 9 and 11 of this Decision.
SCE-22-27	Lessons Learned from PSPS Implementation	SCE has sufficiently addressed the required progress.

Appendix C. Stakeholder Comments on the 2023–2025 Wildfire Mitigation Plans

Energy Safety invited stakeholders, including members of the public, to provide comments on the utilities' 2023–2025 WMPs. Opening comments on the large IOU WMPs 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)
- City of Moorpark
- Mussey Grade Road Alliance (MGRA)
- Rural County Representatives of California (RCRC)
- The Green Power Institute (GPI)
- The Public Advocates Office at the California Public Utilities Commission (Cal Advocates)
- Julia and David Allenby
- Cynthia Barbera
- Curren Meechem Family
- Maureen Isola
- Brenda So
- Southard

Comments received on the 2023-2025 WMPs can be viewed in the 2023-2025 Wildfire Mitigation Plan (2023-2025-WMPs) docket log.

Energy Safety found the following stakeholder comments to concur with topics already included in Energy Safety's findings:

- Cal Advocates
  - Undergrounding resourcing
  - Replacement of secondary conductors
  - Transmission conductor splice assessment
  - Addressing backlogged work orders
  - Secondary modeling
  - Consolidating inspections is a significant improvement

  - Evaluation of AFN population challenges/needs
  - Objectives (verification methods)
  - Mitigation methodology transparency
- Mussey Grade Road Alliance
  - Hardening decision-making
- The Utility Reform Network
  - Undergrounding top risk
  - Hardening decision-making
  - Undergrounding secondary

Appendix D. Stakeholder Comments on the Draft Decision

This appendix will contain Energy Safety's summary of stakeholder comments on Energy Safety's Draft Decision on SCE's 2023–2025 Wildfire Mitigation Plan.

Appendix E. Maturity Survey Results

Energy Safety's 2023-2025 Electrical Corporation Wildfire Mitigation Maturity Model[221] (Maturity Model) and 2023 Electrical Corporation Wildfire Mitigation Maturity Survey[222] (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 E-1 and E-2 compare the large IOUs' maturity levels across mitigation categories showing minimum values and average values. Figure E-1 and Table E-3 show SCE's projected maturity growth throughout the WMP cycle. Figure E-2 provides a one-page look at all SCE's maturity levels for the WMP cycle, including at the capability and sub-capability levels, showing both minimum and average calculations.

---

[221] 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).

[222] 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 E-1: Cross-Utility Maturity Level by Category[223] (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	0.83	0.17	0.67	1.17	1.17
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

[223] Table E-1 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 E-2: Cross-Utility Maturity Level by Category[224] (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

[224] Table E-2 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 E-1. SCE Projected Growth in Maturity throughout Current WMP Cycle by Category

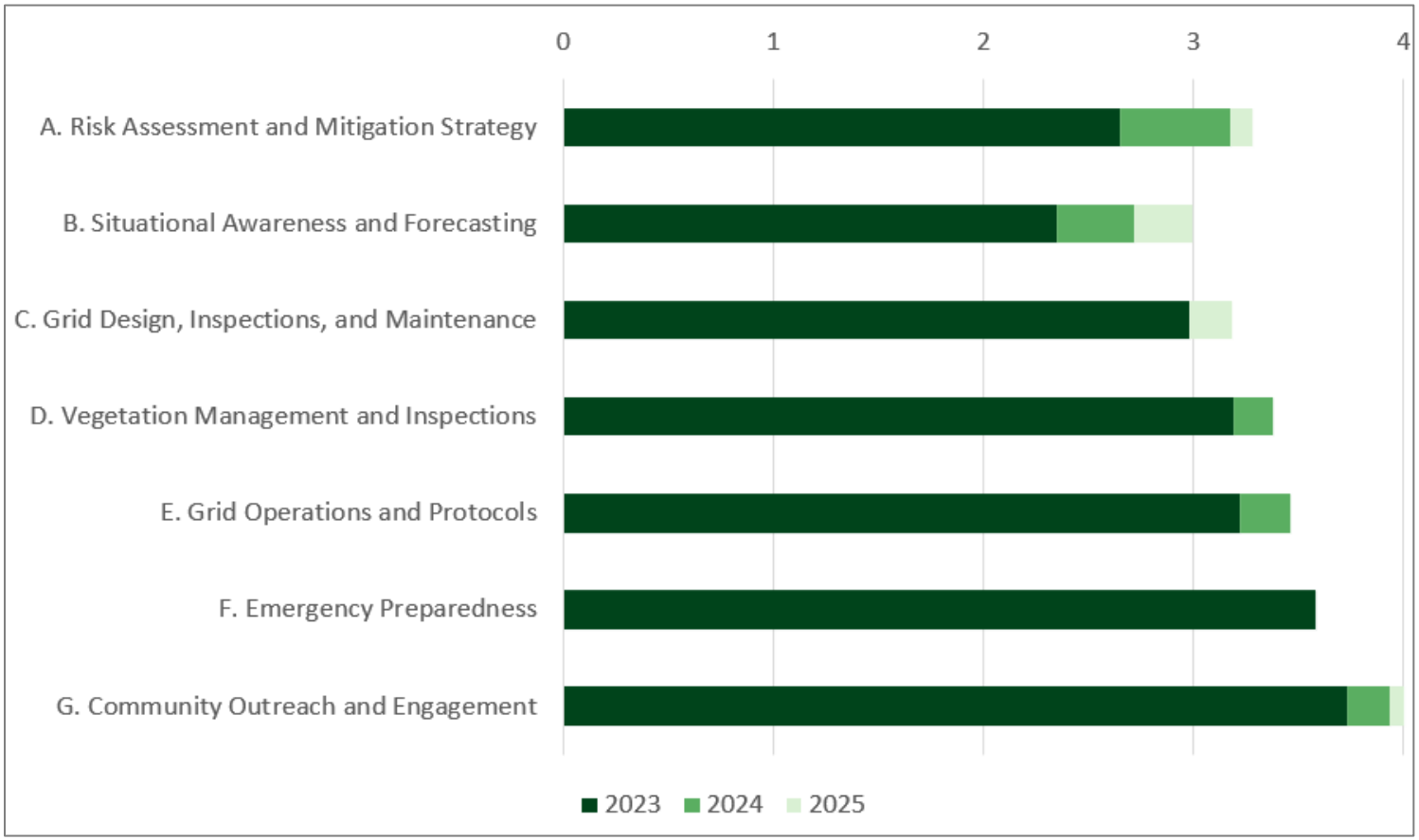


Figure E-2. SCE Comprehensive Maturity Survey Results

		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.	1.0	1.0	1.0	1.0	2.0	2.0	2.0	2.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	3.0	3.0	3.0	3.0	0.0	0.0	0.0	0.0
	Average of Sub-Cap.	2.7	2.7	3.1	3.1	3.6	3.6	3.6	3.6	2.4	3.3	3.3	3.3	2.1	3.1	3.3	3.3	3.9	3.9	3.9	3.9	1.3	2.5	2.5	2.5
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	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	0.0	0.0	4.0	4.0	4.0	4.0
	Average of Sub-Cap.	1.7	2.1	3.2	3.2	2.2	2.8	3.3	3.3	2.8	2.8	2.9	2.9	2.4	3.4	3.4	3.4	1.0	1.2	1.2	1.2	4.0	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.	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	3.0	3.0	3.0	3.0				
	Average of Sub-Cap.	3.5	3.5	3.5	3.5	3.7	3.7	3.7	3.7	1.5	1.5	2.5	2.5	2.5	2.5	2.5	2.5	3.8	3.8	3.8	3.8				
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	3.0	4.0	2.0	2.0	2.0	4.0	0.0	0.0	0.0	0.0	2.0	2.0	2.0	2.0								
	Average of Sub-Cap.	3.3	3.8	3.8	4.0	3.3	3.3	3.3	4.0	3.0	3.0	3.0	3.0	3.3	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.	1.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	4.0	4.0	4.0	4.0				
	Average of Sub-Cap.	3.3	3.3	3.3	3.3	1.6	2.8	2.8	2.8	3.5	3.5	3.5	3.5	3.7	3.7	3.7	3.7	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.	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0
	Average of Sub-Cap.	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5
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.	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
	Average of Sub-Cap.	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.7	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				