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

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Caroline Thomas Jacobs, Director

August 18, 2021

To Wildfire Mitigation Plan stakeholders:

Enclosed is the Final Action Statement on the 2021 Wildfire Mitigation Plan (WMP) Update of Southern California Edison Company (SCE).

The evaluation of 2021 WMP Updates began at the California Public Utilities Commission's (CPUC) Wildfire Safety Division (WSD). Consistent with statute, the WSD, along with all its functions, transitioned to the Office of Energy Infrastructure Safety (Energy Safety) under the California Natural Resources Agency on July 1, 2021.[1]

On July 16, 2021, a draft of this Action Statement was filed in the 2021 WMPs Docket (#2021-WMPs) and served to the service list of the CPUC's Rulemaking 18-10-007 for public review and comment. Comments on the Draft Action Statement were due on August 5, 2021 and considered in the final evaluation.

This Action Statement is the Office of Energy Infrastructure Safety's approval of SCE's 2021 WMP Update.

Sincerely,

Lucy Morgans

Lucy Morgans
Acting Program Manager, Safety Policy Division
Office of Energy Infrastructure Safety

[1] See Assembly Bill 111, Stats. of 2019, Ch 81, Sec. 7.

OFFICE OF ENERGY INFRASTRUCTURE SAFETY'S

# FINAL EVALUATION OF 2021 WILDFIRE MITIGATION PLAN UPDATE

## SOUTHERN CALIFORNIA EDISON

## Introduction and Background

This Action Statement represents the assessment of the Office of Energy Infrastructure Safety (Energy Safety)[1] on the 2021 Wildfire Mitigation Plan (WMP or Plan) of Southern California Edison Company (SCE or the utility). This Plan is an update for the comprehensive 2020-2022 plan submitted by SCE in 2020. SCE submitted its 2021 WMP Update on February 5, 2021 in response to guidelines provided by the California Public Utilities Commission's (CPUC) Wildfire Safety Division (WSD).[2] Assembly Bill (AB) 1054[3] mandates that Energy Safety complete its evaluation of WMPs within three months of submission, unless Energy Safety issues an extension.[4]

SCE's 2021 WMP Update is approved.

1. Legal Authority

In 2018, following the devastating wildfires in 2016 and 2017, the California Legislature passed several bills increasing oversight of the electrical corporations' efforts to reduce utility-related wildfires.[5] AB 1054 created the WSD at the CPUC and tasked it with reviewing annual WMPs submitted by electrical corporations under the CPUC's jurisdiction.

As of July 2021, the Wildfire Safety Division (WSD) became the Office of Energy Infrastructure Safety (Energy Safety) within the California Natural Resources Agency (CNRA).[6] "WSD" is used to describe the work of the WSD prior to July 1, 2021 and "Energy Safety" is used to describe the work of Energy Safety beginning on July 1, 2021. Any references to WSD action post July 1, 2021 or to Energy Safety action prior to July 1, 2021 are inadvertent and should be interpreted

[1] Pursuant to Public Utilities Code Section 326(b), on July 1, 2021, the Wildfire Safety Division (WSD) transitioned from the Commission into the Office of Energy Infrastructure Safety (Energy Safety) under the California Natural Resources Agency. Energy Safety "is the successor to" and "is vested with all of the duties, powers, and responsibilities of the Wildfire Safety Division,"(Government Code Section 15475) including, but not limited to, jurisdiction for evaluating and approving or denying electrical corporations' WMPs and evaluating compliance with regulations related to the WMPs. The Commission and the newly formed Energy Safety will adhere to all statutory requirements pertaining to the WMP process. WSD is used to describe the work of the WSD prior to July 1, 2021. Energy Safety is used to describe the work of Energy Safety beginning on July 1, 2021. Any references to WSD action post July 1, 2021 or to Energy Safety action prior to July 1, 2021 are inadvertent and should be interpreted as the actions of WSD or Energy Safety as appropriate

[2] The Commission approved 2021 WMP guidelines in Resolution WSD-011

[3] Stats. of 2019, Ch. 79

[4] Public Utilities Code Section 8386.3(a)

[5] In this document "utility" should be understood to mean "electrical corporation"

[6] See AB 111, Stats. of 2019, Ch. 81

as the actions of WSD or Energy Safety as appropriate. Any references herein to WSD actions that post-date this transition should be interpreted as actions taken by Energy Safety.

The main regulatory vehicle for Energy Safety to evaluate electrical corporations' wildfire risk reduction efforts is the WMP, which was first introduced in Senate Bill (SB) 1028[7] and further defined in SB 901,[8] AB 1054, and AB 111. Investor-owned electrical corporations (hereafter referred to as "utilities") are required to submit WMPs assessing their level of wildfire risk and providing plans for wildfire risk reduction. The CPUC evaluated the utilities' first WMPs under the SB 901 framework in 2019.[9]

AB 1054 and AB 111 transferred responsibility for evaluation and approval or denial of WMPs to Energy Safety; AB 1054 provides, "After approval by the division, the commission shall ratify the action of the division." Energy Safety must ensure utility wildfire mitigation efforts sufficiently address increasing utility wildfire risk. To support its efforts, Energy Safety developed a long-term strategic roadmap, Reducing Utility-Related Wildfire Risk (2020).[10] This strategic roadmap informs Energy Safety's work in updating the WMP process and guidelines and Energy Safety's evaluation of the WMPs.

2. Multi-Year Plan Process

In February of 2020, the utilities[11] submitted their three-year 2020-2022 WMPs. The WSD conducted its evaluation and either approved, conditionally approved, or denied the Plans. In the case of conditional approval, the WSD identified items missing or incomplete in the Plans on a scale of severity, with Class A Deficiencies representing issues that required resolution through a Remedial Compliance Plan (RCP).[12] The 2020 Class B Deficiencies required resolution through Quarterly Reports,[13] and Class C Deficiencies were to be resolved in the 2021 WMP Update.

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[7] Stats. of 2016, Ch. 598

[8] Stats. of 2018, Ch. 626

[9] See Rulemaking (R.) 18-10-007

[10] The Office of Energy Infrastructure Safety's strategic roadmap Reducing Utility-Related Wildfire Risk (2020) (accessed July 12, 2021): https://energysafety.ca.gov/who-we-are/strategic-roadmap/

[11] Here we refer to all utilities that submitted a WMP in 2020: Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), San Diego Gas & Electric Company (SDG&E), PacifiCorp, Bear Valley Electric Service, Inc. (BVES), Liberty Utilities, Trans Bay Cable, LLC, and Horizon West Transmission, LLC; hereafter in this Action Statement "utilities" refers to the three large utilities, SDG&E, PG&E, and SCE, unless otherwise specified

[12] An RCP "must present all missing information and/or articulate the electrical corporation's plan, including proposed timeline, to bring the electrical corporation's WMP into compliance." *See* Resolution WSD-002 at 17

[13] "Class B issues are of moderate concern and require reporting on a quarterly basis by the electrical corporation to provide missing data or update its progress in a quarterly report." *See* Resolution WSD-002 at 18

In 2020, the WSD issued a conditional approval of SCE's WMP. SCE submitted its RCP[14] to resolve Class A Deficiencies on July 27, 2020. WSD released its evaluation[15] of SCE's RCP on December 30, 2020 and provided direction to address "insufficient" responses in SCE's updated 2021 Plan. SCE submitted its first Quarterly Report on September 9, 2020 to resolve 2020 Class B Deficiencies.[16] The WSD released its evaluation of SCE's Quarterly Report on January 8, 2021 and also issued direction to address "insufficient" responses in its 2021 WMP Update.[17]

3. 2021 Evaluation Process

On November 16, 2020, the CPUC adopted updated WMP requirements (Guidelines) and procedures for the 2021 WMP Plan Year pursuant to Public Utilities Code Section 8389(d).[18] The updates to the 2021 WMP Guidelines are intended to streamline the reporting and evaluation process. Pursuant to the adopted Guidelines, large utilities submitted 2021 WMP Updates on February 5, 2021; small and multi-jurisdictional utilities (SMJUs) and independent transmission operators (ITOs) submitted 2021 WMP Updates on March 5, 2021.

The 2021 WMP submissions are updates of the 2020-2022 WMPs and are intended to show progress since 2020 and report changes from the 2020 WMP. Importantly for 2021, Energy Safety amended its review process and will no longer issue conditional approvals. Instead, where Energy Safety found critical issues with 2021 submissions, a Revision Notice was issued requiring the utility to remedy such issues prior to completion of the 2021 WMP Update evaluation. Upon receipt of the utility's response to the Revision Notice, Energy Safety could determine that the response was sufficient to warrant approval, although additional ongoing reporting or other conditions may be required, or the response was insufficient such that denial of the WMP is warranted due to the utility inadequately reducing wildfire risk and its potential impact to public safety.

Energy Safety evaluated 2021 WMP Updates according to the following factors:

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[14] https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2020/sce-wmp-remedial-compliance-plan-07-27-20-r.18-10-007.pdf

[15] https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2020/sce-rcp-action-statement-20201230.pdf

[16] https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2020/sce-first-quarterly-report-on-2020-wmp-9-9-2020.pdf

[17] https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2020/sce-qr-action-statement.pdf The WSD issued an extension to the large investor-owned utilities to respond to insufficient Quarterly Reports until February 26, 2021.

[18] See https://energysafety.ca.gov/what-we-do/wildfire-mitigation-and-safety/wildfire-mitigation-plans/ for adopted 2021 WMP Guidelines

- Completeness: The WMP is complete and comprehensively responds to the WMP statutory requirements and WMP Guidelines.
- Technical feasibility and effectiveness: Initiatives proposed in the WMP are technically feasible and are effective in addressing the risks that exist in the utility's service territory.
- Resource use efficiency: Initiatives are an efficient use of utility resources and focus on achieving the greatest risk reduction at the lowest cost.
- Demonstrated year-over-year progress: The utility has demonstrated sufficient progress on objectives and program targets reported in the prior annual WMP.
- Forward-looking growth: The utility demonstrates a clear action plan to continue reducing utility-related wildfires and the scale, scope, and frequency of Public Safety Power Shutoff (PSPS) events. [19] In addition, the utility is sufficiently focused on long-term strategies to build the overall maturity of its wildfire mitigation capabilities while reducing reliance on shorter-term strategies such as PSPS and vegetation management.

To conduct its assessment, Energy Safety relied upon SCE's WMP submission and subsequent updates, responses to Revision Notices, if any, input from California Department of Forestry and Fire Protection (CAL FIRE), input from the Wildfire Safety Advisory Board (WSAB), public comments, responses to data requests, utility-reported data, and utility responses to the Utility Maturity Survey.

Upon completion of its review, Energy Safety determined whether each utility's 2021 WMP Update should either be:

- Approved (approval may include the requirement to address certain issues in the utility's subsequent WMP and/or through existing ongoing reporting processes), or,
- Denied (the utility does not have an approved WMP for 2021 and must reapply for approval in 2022).

4. Cost Recovery

This document does not approve costs attributable to WMPs, as statute requires electrical corporations to seek cost recovery and prove all expenditures are just and reasonable at a future time in their General Rate Cases (GRC) or an appropriate application. Nothing in this

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

Action Statement nor CPUC's Resolution should be construed as approval of any WMP-related costs.[20]

## 1. Summary of Key Findings

Pursuant to Public Utilities Code (Pub. Util. Code) Section 8386.3(a), this Action Statement is the totality of Energy Safety's review of SCE's 2021 WMP Update. SCE's 2021 WMP Update is approved.

### 1.1 Areas of Significant Progress

Overall, SCE is making advancements in modeling approaches to understand its wildfire and PSPS risk and includes initiative activities that are intended to reduce the risk of wildfires. Energy Safety finds that SCE has made significant progress over the past year and/or has matured in its mitigation strategies for future years in the following areas:

- In 2020 SCE transitioned to its Wildfire Risk Reduction Model (WRRM) which provides consequence modeling and allows larger data sets and finer granularity to support mitigation initiatives. While the WRRM uses the same software technology as the risk models used by PG&E and SDG&E, SCE's version includes a component to calculate the risk of PSPS based on probability and consequence of PSPS events at the circuit level.
- SCE exceeded its 2020 WMP program targets for covered conductor installation, for replacing existing poles with fire resistant poles (FRP), and indicates it is moving to a circuit segment basis for covered conductor deployment in order to raise thresholds for PSPS. SCE is transitioning to using PSPS risk as a criterion when installing covered conductor, thereby targeting select areas of the grid expected to be frequently impacted by PSPS.
- SCE is broadening the scope of its Hazard Tree Mitigation Program (HTMP) which includes increasing the number of contracted tree assessors and has instituted specific remediation protocols for palm species.
- In 2020 SCE updated its System Operating Bulletin (SOB) 322 to make reclosures non-automated and instead apply fast curve settings by fire climate zone. This allows SCE to identify certain fire climate zones where wildfire risk is especially high and alter the recloser operations.[21]
- SCE made improvements in its asset-specific machine learning models to quantify the probability of ignition (POI) caused by equipment and facility failure (EFF) and contact with foreign objects (CFO).

[20] Energy Safety's approval and the Commission's ratification do not relieve the electrical corporation from any and all otherwise applicable permitting, ratemaking, or other legal and regulatory obligations

[21] SCE's 2021 WMP Update Revision - Redlined, p. 288

- In 2020, SCE staffed an Incident Management Team (IMT), with a portion of this team dedicated specifically for customer support. In 2021, SCE intends to fully dedicate this team to PSPS. SCE is launching a new public safety partner portal in June 2021 to improve situational awareness during PSPS events for first responders and operators of critical facilities and communications systems.
- In 2020 and continuing in 2021 SCE is developing programs[22] for areas impacted frequently by PSPS events. It is making changes in its notification cadence, content, and process to improve the timing and clarity of information to its customers.

### 1.2 Revision Notice

The WSD issued a Revision Notice to SCE on May 4, 2021. SCE responded to the Revision Notice on June 3, 2021. Table 1 below lists the critical issues contained in the Revision Notice, a brief overview of the utility's response, and whether Energy Safety deems the response to be sufficient to support approval of the 2021 WMP Update.

*Table 1: Critical Issues.*

| Critical issue | Description | Utility response | Energy Safety evaluation |
|---|---|---|---|
| RN-SCE-01 Regression of Reported Risk-Spend Efficiency (RSE) estimates for Mitigation Initiatives Compared With 2020 WMP Submission | SCE provides nine fewer RSE estimates for mitigation initiatives compared to its 2020 WMP submission. Furthermore, SCE only provides one RSE estimate for mitigation initiatives located in non-High Fire Threat District (HFTD) and Zone 1 territory. | In its response, SCE provided an overview of the RSE differences in the 2020 WMP compared to the 2021 WMP Update and identified additional RSEs calculated for the Revised WMP. SCE stated that the number of unique RSEs (excluding the additions for the Revised WMP) actually increased from the 2020 WMP to the 2021 WMP Update. SCE also explained that the majority of its mitigations are solely deployed in Tier 2 and Tier 3, thus very few RSEs are | SCE's response included additional RSE estimates but did not fully resolve this critical issue. See Key Areas for Improvement, SCE-21-01 and SCE-21-14, for remedies addressing this critical issue and additional discussion as indicated, below this table. |

[22] Southern California Edison 2021 Wildfire Mitigation Plan Update p. 292, February 5, 2021 - The Resiliency Zones program allows customers to have temporary generation during PSPS events by providing in-front-of-the-meter temporary generation during PSPS events or financial incentive towards the installation cost of a microgrid control system at customer sites willing to provide temporary shelter to surrounding communities

| Critical issue | Description | Utility response | Energy Safety evaluation |
|---|---|---|---|
| | | calculated outside of those two tiers. | |
| RN-SCE-02 Inadequate Alternatives Analysis | SCE lacks detailed alternative analysis for mitigation initiative selection by not calculating the RSE estimates for alternative mitigation initiatives. | SCE's response included an overview of our risk-informed decision-making framework with a detailed flowchart. SCE explained the specific steps and key considerations in its decision-making process. SCE then explained how this generalized decision-making process was applied to help select five particular wildfire mitigation initiatives. | SCE adequately addressed all parts of this critical issue by providing a flowchart of the utility's decision-making framework and explaining each part of the framework with initiative selection examples. See additional discussion as indicated, below this table. |
| RN-SCE-03 Inadequate justification for extensive utilization of covered conductor | SCE fails to provide adequate justification to support its selection of covered conductor in the mitigation initiative selection process. SCE does not provide RSE estimates for alternative mitigation initiatives, precluding a meaningful comparison between initiatives and resulting in a lack of evidence to support SCE's selection of covered conductor. Additionally, SCE attempts to justify its plan for extensive, expedited covered conductor installation with the unsupported assertion that covered conductor installation is the sole mitigation alternative that will allow SCE to increase wind speed thresholds for Public Safety Power Shutoffs (PSPS). SCE fails justify this assertion and fails to commit to PSPS | SCE provided an overview of its covered conductor justification. The response also detailed its covered conductor deployment prioritization based on highest risk circuit segments, how its deployment prioritization takes into account frequent PSPS events, how covered conductor effectiveness compares to alternatives, and how covered conductor is effective at reducing frequency and scope of PSPS events. | SCE's response provided additional justification but did not fully resolve this issue.<br>See additional discussion as indicated, below this table as well as Key Areas for Improvement, SCE-21-02, SCE-21-04, SCE-21-05, SCE-21-06, SCE-21-10, and SCE-21-13, for remedies addressing this critical issue. |

| Critical issue | Description | Utility response | Energy Safety evaluation |
|---|---|---|---|
| | reductions post-covered conductor installation. | | |
| RN-SCE-04 Insufficient detail on SCE's Public Safety Power Shut-Off (PSPS) Corrective Action Plan (CAP) is included within its 2021 WMP Update | SCE published a PSPS CAP on February 12, 2021. This CAP provides more detailed information on SCE's PSPS plans and targets than SCE's 2021 WMP Update filed a week earlier on February 5, 2021. The PSPS chapter (Chapter 8) of SCE's 2021 WMP Update is therefore out of date and does not reflect the latest PSPS commitments from SCE. | SCE's response included additional narrative in Chapter 8 describing the Action Plan in terms of deliverables and projected milestones and how the CAP will reduce PSPS scope, scale, and frequency. Additionally, and because of the overlap of the Action Plan with some mitigations, SCE also included revisions in certain Chapter 7 sections. | SCE addressed the critical issue, incorporating explanatory detail on the elements requested from the CAP, resolving the issue of sufficiently informing the 2021 WMP Update. See additional discussion as indicated, below this table. |

**Additional discussion of the WDS's Revision Notice Response evaluation as follows:**

On Revision Notice Issue RN-SCE-01: Section 5.8
On Revision Notice Issue RN-SCE-02: Section 5.8
On Revision Notice Issue RN-SCE-03: Section 5.3
On Revision Notice Issue RN-SCE-04: Section 6.0

### 1.3 Key Areas for Improvement and Remedies

Energy Safety evaluated 2021 WMP Updates with a particular focus on how the utility's chosen mitigations and strategies will drive down the risk of utility-related wildfires as well as the scale, scope, and frequency of PSPS events. Energy Safety approves SCE's 2021 WMP Update; however, Energy Safety finds that SCE must focus over the next year on the following areas set forth in Table 2 below. While continued progress toward maturity is important in all areas of a utility's WMP, Energy Safety finds these areas to be key for SCE to continue to drive down utility-related wildfire risk. Energy Safety expects SCE to take action to address these key areas and report on progress made over the year in a Progress Report due by 5:00 p.m. on November 1, 2021, and in its 2022 WMP Update. Energy Safety will closely monitor progress in each of these areas over the coming year.

In addition to the table below summarizing key areas for improvement, each key focus area and any required follow-up are denoted by a table in the respective detailed evaluation section.

*Table 2: Key areas for improvement and remedies.*

| Utility-# | Issue title | Issue description | Remedies required and alternative timeline if applicable |
|---|---|---|---|
| SCE-21-01 | RSE estimates not provided for all PSPS-related mitigation initiatives | SCE justifies its lack of RSE estimates for PSPS-related initiatives by quoting Resolution WSD-002, "… electrical corporations shall not use RSE as a means of justifying or evaluating the efficacy of PSPS as a mitigation measure." However, the WSD guidance is clear that the prohibition of RSE calculation is directed at PSPS as a mitigation activity only and does not extend to PSPS-related activities. RSE estimates enable the quantitative comparison of cost-effectiveness between various mitigation initiatives, and brings rigor to the decision-making process. | SCE must provide RSE estimates for PSPS-related activities[23,24] and include a clear description to explain how these were developed and what assumptions were used. If the RSE estimates are zero or unattainable, SCE must explain why and provide qualitative and quantitative information to demonstrate how the PSPS-related activities inform PSPS decision-making. |
| SCE-21-02 | RSE values vary across utilities | Energy Safety is concerned by the stark variances in RSE estimates, sometimes on several orders of magnitude, for the same initiatives calculated by different utilities. For example, PGE's RSE for covered conductor installation was 4.08,[25] SDGE's RSE was 76.73,[26] and SCE's RSE was | The utilities[28] must collaborate through a working group facilitated by Energy Safety[29] to develop a more standardized approach to the inputs and assumptions used for RSE calculations. After Energy Safety completes its evaluation of the 2021 WMP Updates, it will provide |

[23] Here, PSPS-related activities are defined as mitigation initiatives that "supports the analysis and decision-making process that informs whether or not to call a PSPS event." SCE's 2021 WMP Update Revision – Redlined, p. 574

[24] A comprehensive list of PSPS-related activities can be found in SCE's 2021 Wildfire Mitiation Plan Update Revision - Redlined, June 3, 2021, Table 9.8-1, Category B, p. 570

[25] Value from PG&E's Errata (dated March 17, 2021, accessed May 19, 2021: https://www.pge.com/pge_global/common/pdfs/safety/emergency-preparedness/natural-disaster/wildfires/wildfire-mitigation-plan/2021-Wildfire-Safety-Plan-Errata.pdf

[26] Value from Table 12 of SDGE's 2021 WMP Update submissions under the "Estimated RSE for HFTD Tier 3" column for "Covered Conductor Installation"

[28] Here "utilities" refers to SDG&E, Pacific Gas and Electric Company (PG&E), and Southern California Edison Company (SCE); although this may not be the case every time "utilities" is used through the document

[29] The WSD is transitioning to the Office of Energy Infrastructure Safety (Energy Safety) on July 1, 2021

| Utility-# | Issue title | Issue description | Remedies required and alternative timeline if applicable |
|---|---|---|---|
| | | 4,192.[27] These drastic differences reveal that there are significant discrepancies between the utilities' inputs and assumptions, which further support the need for exploration and alignment of these calculations. | additional detail on the specifics of this working group.<br><br>This working group will focus on addressing the inconsistencies between the inputs and assumptions used by the utilities for their RSE calculations, which will allow for:<br>1. Collaboration among utilities;<br>2. Stakeholder and academic expert input; and<br>3. Increased transparency. |
| SCE-21-03 | Lack of consistency in approach to wildfire risk modeling across utilities | The utilities do not have a consistent approach to wildfire risk modeling. For example, in their wildfire risk models, utilities use different types of data, use their individual data sets in different ways, and use different third-party vendors. Energy Safety recognizes that the utilities have differing service territory characteristics, differing data availability, and are at different stages in developing their wildfire risk models. However, the utilities face similar enough circumstances that there should be some level of consistency in statewide approaches to wildfire risk modeling. | The utilities[30] must collaborate through a working group facilitated by Energy Safety[31] to develop a more consistent statewide approach to wildfire risk modeling. After Energy Safety completes its evaluation of all the utilities' 2021 WMP Updates, it will provide additional detail on the specifics of this working group.<br><br>A working group to address wildfire risk modeling will allow for:<br>1. Collaboration among the utilities;<br>2. Stakeholder and academic expert input; and<br>3. Increased transparency. |
| SCE-21-04 | Limited evidence to support the | The rationale to support the selection of covered conductor as a preferred initiative to mitigate | The utilities[33] must coordinate to develop a consistent approach to evaluating the long-term risk |

[27] Value from Table 12 of SCE's 2021 WMP Update submissions under the "Estimated RSE for HFTD Tier 3" column for "Covered Conductor Installation"

[30] Here "utilities" refers to SDG&E and PG&E, SCE, PacifiCorp, Bear Valley Electric Service, Inc. (BVES), and Liberty Utilities; although this may not be the case every time "utilities" is used through the document

[31] The WSD is transitioning to the Office of Energy Infrastructure Safety (Energy Safety) on July 1, 2021

[33] Here "utilities" refers to SDG&E and PG&E, SCE, PacifiCorp, BVES, and Liberty Utilities; although this may not be the case every time "utilities" is used through the document

| Utility-# | Issue title | Issue description | Remedies required and alternative timeline if applicable |
|---|---|---|---|
| | effectiveness of covered conductor | wildfire risk lacks consistency among the utilities, leading some utilities to potentially expedite covered conductor deployment without first demonstrating a full understanding of its long-term risk reduction and cost-effectiveness. The utilities' current covered conductor pilot efforts are limited in scope[32] and therefore fail to provide a full basis for understanding how covered conductor will perform in the field. Additionally, utilities justify covered conductor installation by alluding to reduced PSPS risk but fail to provide adequate comparison to other initiatives' ability to reduce PSPS risk. | reduction and cost-effectiveness of covered conductor deployment, including:<br>1. The effectiveness of covered conductor in the field in comparison to alternative initiatives.<br>2. How covered conductor installation compares to other initiatives in its potential to reduce PSPS risk. |
| SCE-21-05 | Out-dated risk assessment used to justify the selection and scope of covered conductor as a mitigation initiative | SCE provides a risk buydown curve based on its old modeling efforts to justify the need for covered conductor. SCE acknowledges that its current models provide different and more accurate results but does not provide an updated risk buydown curve. SCE should not use outdated information to justify its covered conductor program scope. Additionally, if an updated risk buydown curve shows historic catastrophic ignitions on the low end of the curve, it raises doubts regarding the accuracy of SCE's wildfire risk models. | SCE must:<br>1. Provide an updated Figure 9.01-1 based on SCE's latest risk modeling assessment, including the ignitions shown.<br>2. Provide the cause of the nine ignitions shown in Figure 9.01-1.<br>3. For each of the nine ignitions shown, provide an assessment of the likelihood that covered conductor installation would have prevented the ignition.<br>4. Provide a similar risk buydown curve for all cumulative circuit miles, including historic ignitions and ignition size.<br>5. If the updated risk buydown curves provided in response to the above continue to show historic catastrophic ignitions on the low end of the risk buy down curve, then provide the calculated |

[32] Limited in terms of mileage installed, time elapsed since initial installation, or both. For example, SDG&E's pilot consisted of installing 1.9 miles of covered conductor, which has only been in place for one year

| Utility-# | Issue title | Issue description | Remedies required and alternative timeline if applicable |
|---|---|---|---|
| | | | accuracy of SCE's current risk model. |
| SCE-21-06 | Inadequate justification for scope and pace of its covered conductor program | As described in Sections 1.1, 5.1, and 5.8, SCE does not provide adequate justification for the scope and pace of its covered conductor program. This is a recurring issue that was discussed in the WSD Action Statement for SCE's 2020 WMP and in the WSD Revision Notice for SCE's 2021 WMP Update. SCE's justification is not based on up-to-date circuit segment prioritization and risk calculations. Additionally, in SCE's justification for its covered conductor program, it does not discuss evaluating individual circuit segments to determine the most appropriate mitigation measure for that segment. Instead SCE proposes to deploy covered conductor regardless of the location, circumstances, and risk of catastrophic wildfire for that circuit segment. | SCE must:<br>1. Re-evaluate the scope, and pace of its future covered conductor program using the outputs of its updated Wildfire Risk Models with an emphasis on:<br>i) The explicit consideration of all possible alternative mitigation initiatives along with a justification for why the preferred mitigation initiative was selected over and above the alternatives considered;<br>ii) Reduction of catastrophic wildfire risk;<br>iii) Reduction of PSPS events;<br>iv) Selecting mitigation initiatives for individual circuit segments based on the specific location, circumstances, and risk of catastrophic wildfire.<br>2. Re-evaluate the scope of SCE's covered conductor program based on the re-evaluation in part (1) as well as following remedies for other key issues identified within the Action Statement to specifically and effectively target risk of catastrophic wildfire and PSPS. |
| SCE-21-07 | Inadequate joint plan to | RCP Action-SCE-18 (Class A)[34] required SCE, PG&E, and SDG&E | SCE, PG&E, and SDG&E will participate in a multi-year |

[34] A note about the numbered conditions referenced in this document: "RCP Action-SCE-[#]" here refers to one of the actions required by the WSD in its evaluation of SCE's Remedial Compliance Plan of 2020, issued Dec. 30, 2020. The WSD issued 20 such orders (RCP Action-SCE-1 through RCP Action-SCE-20). There are two other related sets of references in this document: "SCE-[#]" refers to one of the actions required by the WSD in its evaluation of SCE's 2020 WMP issued June 11, 2020 (SCE-1 through SCE-22). "QR Action-SCE-[#]" refers to one of the actions required by the WSD in its evaluation of SCE's first quarterly report issued Jan. 8, 2021 (QR Action-SCE-1 through Action-SCE-28). Additionally, there are conditions that may be referenced by "Guidance-[#]", which refer to the

*Footnote continued on next page.*

| Utility-# | Issue title | Issue description | Remedies required and alternative timeline if applicable |
|---|---|---|---|
| | study the effectiveness of enhanced clearances | to "submit a joint, unified plan" to begin a study of the effectiveness of extended vegetation clearances.[35] SCE, PG&E, and SDG&E presented the "joint, unified" plan to the WSD on February 18, 2021. While it was apparent the three large utilities had discussed a unified approach, each utility presented differing analyses that would be performed to measure the effectiveness of enhanced clearances. This presentation's content was not included in the February 26, 2021 Supplemental Filing. Instead, SCE submitted its own plan to study the effectiveness of extended vegetation clearance as part of its February 26, 2021 Supplemental Filing.<br><br>Energy Safety acknowledges the complexity of this issue; any study performed assessing the effectiveness of enhanced clearances will take years of data collection and rigorous analysis. | vegetation clearance study. Energy Safety will confirm the details of this study in due course. The objectives of this study are to:<br>1. Establish uniform data collection standards.<br>2. Create a cross-utility database of tree-caused risk events (i.e., outages and ignitions caused by vegetation contact).<br>3. Incorporate biotic and abiotic factors[36] into the determination of outage and ignition risk caused by vegetation contact.<br>4. Assess the effectiveness of enhanced clearances.<br><br>In preparation for this study and the eventual analysis, SCE must collect the relevant data; the required data are currently defined by the WSD Geographic Information System (GIS Data Reporting Standard for California Electrical Corporations - V2). Table 2 outlines the feature classes which Energy Safety believes will be most relevant to the study. Energy Safety will also be updating the GIS Reporting Standards in 2021, which may include additional data attributes for vegetation-related risk events. |

requirements made of PG&E, SCE, SDG&E, Bear Valley Electric Service, Liberty Utilities, and PacifiCorp, addressing key areas of weakness across all six WMPs in Resolution WSD-002 "Guidance Resolution on 2020 Wildfire Mitigation Plans" issued June 19, 2020 (Guidance-1 through Guidance-12)

[35] Wildfire Safety Division Evaluation of Southern California Edison's Remedial Compliance Plan, December 30, 2020, p. 10

[36] 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

| Utility-# | Issue title | Issue description | Remedies required and alternative timeline if applicable |
|---|---|---|---|
| SCE-21-08 | Incomplete identification of vegetation species and record keeping | SCE needs to ensure proper identification of trees to the species level. In response to RCP Action-SCE-20, SCE submitted "Action SCE-20 SRVP.xlsx": a list of all remediations required from the 2020 Canyon Patrols and Summer Readiness inspections.[37] Under the column labeled "tree_species," values include oak, pine, maple, etc. However, these are not tree species, but tree genera. | SCE must:<br>1. Use scientific names in its reporting (as opposed to common names). This change will be reflected in the upcoming updates to the WSD GIS Reporting Standard.<br>2. Add genus and species designation input capabilities into its systems which track vegetation (e.g., vegetation inventory system and vegetation-caused outage reports).<br>3. Identify the genus and species of a tree that has caused an outage[38] or ignition[39] in the Quarterly Data Reports (QDRs) (in these cases, an unknown "sp." designation is not acceptable).<br>4. If the tree's species designation is unknown (i.e., if the inspector knows the tree as "Quercus" but is unsure whether the tree is, for example, Quercus kelloggii, Quercus lobata, or Quercus agrifolia), it must be recorded as such. Instead of simply "Quercus," use "Quercus sp." If referencing multiple species within a genus use "spp." (e.g., Quercus spp.).[40]<br>5. Teach tree species identification skills in its VM personnel training programs, both in initial and continuing education.<br>6. Encourage all VM personnel identify trees to species in all VM |

[37] SCE's 2021 WMP Update Revision – Clean, p. 517

[38] WSD GIS Data Reporting Standard Version 2, Transmission Vegetation Caused Unplanned Outage (Feature Class), Section 3.4.5 & Distribution Vegetation Caused Unplanned Outage (Feature Class), Section 3.4.7

[39] WSD GIS Data Reporting Standard Version 2, Ignition (Feature Class), Section 3.4.3.

[40] Jenks, Matthew A. (undated, from 2012 archived copy), "Plant Nomenclature," Department of Horticulture and Landscape Architecture, Purdue University, accessed May 18, 2021: https://archive.ph/20121211140110/http:/www.hort.purdue.edu/hort/courses/hort217/Nomenclature/description.htm

| Utility-# | Issue title | Issue description | Remedies required and alternative timeline if applicable |
|---|---|---|---|
| | | | activities and reporting, where possible. |
| SCE-21-09 | Need for quantified vegetation management (VM) compliance targets | In Table 12, SCE only defines quantitative targets for eight of 20 VM initiatives. Energy Safety is statutorily required to audit SCE when a "substantial portion" of SCE's VM work is complete;[41] without quantifiable targets in the WMP and subsequent reporting on those targets in the Quarterly Data Report (QDR) and Quarterly Initiative Update (QIU), Energy Safety cannot fully realize its statutory obligations. | SCE must define quantitative targets for all VM initiatives in Table 12. If quantitative targets are not applicable to an initiative, SCE must fully justify this, define goals within that initiative, and include a timeline in which it expects to achieve those goals. |
| SCE-21-10 | Inadequate transparency in accounting for ignition sources in risk modeling and mitigation selection | SCE's justification for high levels of covered conductor deployment is partially due to the high number of ignitions due to contact. However, many of such ignitions are from third-party contact, and do not necessarily occur in the High Fire-Threat District (HFTD) and/or during wildfire season. Additionally, SCE does not provide sufficient detail as to how it accounts for third-party ignition sources in its risk models. | SCE must fully explain:<br>1. How third-party ignition sources feed into SCE's risk models;<br>2. How ignition sources impact SCE's mitigation selection process, including:<br>a. How SCE prioritizes ignition sources;<br>b. If SCE treats third-party ignition sources that are not under SCE's direct control differently than other ignition sources, and if so, how;<br>c. How SCE targets its mitigations efforts to reduce ignitions that are more likely to result in catastrophic wildfire conditions. |
| SCE-21-11 | Unclear how SCE's ignition models account for correlations in wind speeds, ignitions, and consequence | Despite an observed correlation between some ignition causes and high wind speed, SCE states that it "does not have enough wind-driven outage data at the circuit level to make determinations about correlations between wind | SCE must:<br>1. Fully demonstrate that its probability of ignition models accurately account for the correlation between wind speed, ignition, and consequence; and<br>2. Explain: |

[41] Public Utilities Code Section 8386.3(c)(5)(A)

| Utility-# | Issue title | Issue description | Remedies required and alternative timeline if applicable |
|---|---|---|---|
| | | speeds and outage rates."[42] It is unclear how SCE accounts for this correlation between wind speed and ignitions in its probability of ignition models. | a. Why SCE finds that is does not have enough "wind driven outage data at the circuit level,"<br>b. Specify the data required "to make determinations about correlations between wind speeds and outage rates," and<br>c. Explain how and when SCE plans to obtain such data moving forward. |
| SCE-21-12 | Insufficient evidence of effective covered conductor maintenance program | SCE does not have a separate covered conductor maintenance program. On-going covered conductor inspection and maintenance is included in HFRI inspections and remediations and follow the same approach, schedule, and prioritization. Given SCE's plan for rapid deployment of covered conductor, it is particularly important that SCE has a comprehensive and effective plan for maintaining its covered conductor once installed. Additionally, SCE did not initially include vibration dampeners in its covered conductor installations, and states that it is now retrofitting its existing covered conductor with vibration dampeners. | SCE must provide all supporting material to demonstrate that its maintenance programs effectively maintain its covered conductor, including the following information:<br>• Pace and quantity of scheduled maintenance;<br>• Pace and quantity of inspections; and<br>• Pace and quantity of vibration dampener installations.<br><br>If SCE finds that its existing maintenance programs do not provide effective maintenance for covered conductor, SCE shall:<br>1. Enhance its current operations to provide such maintenance; and<br>2. Detail the enhancements to its existing programs;<br>3. Provide all supporting material for the enhancements to its existing program, including the information listed above. |
| SCE-21-13 | Lack of specificity regarding how increased grid hardening will | SCE does not commit to changes in its PSPS thresholds for increased grid hardening, except for increasing wind speed thresholds specifically for circuits | For each mitigation alternative, including pilot program initiatives, SCE must provide quantitative analysis on: |

[42] SCE Data Request Response MGRA-SCE-006-Q005

| Utility-# | Issue title | Issue description | Remedies required and alternative timeline if applicable |
|---|---|---|---|
| | change system operations, change PSPS thresholds, and reduce PSPS events | mitigated with covered conductor.[43] SCE provides a table showing how six of its mitigation alternatives may impact PSPS frequency, duration, and number of customers impacted,[44] but provides no quantitative analysis of impacts. | 1. Changes in system operations; 2. Changes in PSPS thresholds; and 3. Estimated changes in the frequency, duration, and number of customers impacted by PSPS events. |
| SCE-21-14 | Equivocating language used to describe RSE calculation improvements | SCE reports "[c]alculating RSE for all potential initiatives"[45] as a potential future focus between 2023-2030, but does not provide any measurable, quantifiable, and verifiable commitments. | SCE must make measurable, quantifiable, and verifiable commitments to calculate RSE estimates for all potential initiatives in Non-HFTD, Zone 1, HFTD Tier 2, and HFTD Tier 3 territory. |

In addition to the key areas for improvement listed in Table 2 above, Energy Safety lists additional issues for continued improvement to increase the maturity of SCE's wildfire mitigation capabilities in the evaluation sections below. These additional issues are denoted by bullet points. Energy Safety expects SCE to take action to address these issues and report on progress made over the year in its 2022 WMP Update.

### 1.4 Maturity Model Evaluation

The Wildfire Safety Division introduced a maturity model (the Utility Wildfire Mitigation Maturity Model) in 2020, providing a method to assess utility wildfire risk reduction capabilities and examine the relative maturity of individual wildfire mitigation programs. In 2020, the utilities completed a survey setting a baseline for maturity as well as anticipated progress over the three-year plan period. In 2021, the utilities again completed the survey, enabling Energy

[43] SCE states that it will be raising wind thresholds for fully hardened circuit segments from 31 mph sustained wind speed and 46 mph gust wind speed, stated in SCE's 2021 WMP Update on p. 341, to 40 mph sustained winds and 58 mph gusts, provided in SCE's response to CalAdvocates-SCE-2021WMP-08 Q005, provided on March 3, 2021. However, in SCE's response to WSD-SCE-004 Q019, provided on March 17, 2021, SCE states that "[there] is no one point in time for completing this work because the process to determine whether circuits or circuit-segments that have been covered are fully hardened is a continuous effort"

[44] SCE's 2021 WMP Update Revision - Redlined, p. 644 Table SCE 9.10-6

[45] Table 7.1.2.3.3.3 of SCE's 2021 WMP Update Revision, p. 172

Safety to monitor progress and ascertain potential improvements to maturity based on progress to date.[46]

The ten maturity and mitigation initiative categories are listed below in Section 5, with further details in Appendix 10.3.

Energy Safety makes the following key findings regarding SCE's maturity progress in 2021:

- SCE plans to increase its maturity across the most mitigation initiative categories for the 3-year WMP cycle when compared to its peers, as measured by the Utility Wildfire Mitigation Maturity Survey (maturity survey) (See Attachment 11.1). However, this is not consistent throughout its maturity survey, with some areas remaining stagnant or not projecting growth until later in the 3-year plan cycle.
    - According to its maturity survey responses, SCE indicates the most growth between 2020 and 2021 when averaged across initiatives in the following categories:
        - Resource Allocation Methodology (from 0 to 2; average growth of 1.2)
        - Grid Design and System Hardening (from 1 to 2; average growth of 1.0)
        - Vegetation Management and Inspections (from 1 to 2; average growth of 0.8)
        - Data Governance (from 0 to 1; average growth of 0.8)
    - SCE rates itself highest in the category of Emergency Planning and Preparedness (3.0 to start) with continued growth over 2020 (to 3.6) and no growth thereafter, through 2023. Similarly, PG&E and SDG&E rate highest in this category.
    - SCE rates itself lowest in Risk Assessment and Mapping with a current score of 1.4, and only projects a 2.2 maturity score by the end of the WMP cycle. This aligns with SCE's spend in this category, which only makes up 0.04% of its total cycle spend (territory-wide) and is SCE's lowest spend category.
- For more than half of the questions on the survey the utility is at and plans to stay at the top of the maturity scale.
    - The utility rates itself at either the next-best or best possible maturity level on 60% of the questions (148 of 247) in 2021 and 2023 (projected).
- For 5% of the questions on the survey the utility started, has stayed, and plans to stay at the top level on the maturity scale.
    - The utility rates itself at the best possible maturity level (per the scale in the survey) on 5% of the Maturity Survey questions (14 of 247 questions) for 2020, 2021, and 2023 (projected).
- The utility rates itself on the low or low-middle end of maturity on 21% of the questions (or 52 of 247 questions).

[46] See SCE's 2021 response to the Maturity Survey (accessed July 12, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/sce-2021-survey.pdf

- There were no instances where the utility reports a regression in maturity to individual questions from the current year and by the start of 2023.
- There are inconsistencies between maturity scores and spend in SCE's Vegetation Management and Inspections and Stakeholder Cooperation and Community Engagement categories.
    - As reported in February 2020 versus February 2021, SCE's Vegetation Management spend in HFTD areas over the total WMP cycle increased significantly (by 123%).[47] However, SCE only projects a slight increase in maturity in this category with a current score of 2.8 and an end score of 3.0.
    - For Stakeholder Cooperation and Community Engagement, there is also an increase in HFTD spend (by 58%), but no projected increase in maturity (current and end scores of 2.6) and minimal growth from SCE's initial score of 2.2 in 2020.

## 2. Wildfire Safety Advisory Board Input

The Wildfire Safety Advisory Board (WSAB) provided recommendations on the WMP Updates of Pacific Gas and Electric Company, Southern California Edison Company (SCE), and San Diego Gas & Electric Company (SDG&E) on April 16, 2021. Energy Safety has considered the WSAB's recommendations and incorporates its input throughout this Action Statement. The WSAB's recommendations focused on the following areas:

Risk Assessment, Mapping & Resource Allocation

- All three utilities are now creating their own in-house models and using models created by other vendors. The Board is concerned that the assumptions, algorithms, and outcomes of the models are not being closely and transparently reviewed by independent experts to ensure they meet scientific standards.
- The WMPs of all three utilities would benefit from specific examples of how mitigation measures were prioritized based on these models.[48]
- Without undergoing a transparent peer review process, neither the WSD nor the public can verify the accuracy of these models. Verifying the accuracy of the models is an essential step in reviewing the rationale for determining priorities. Further, these models must be vetted to ensure the prudent use of ratepayer funds.
- The utilities should not maintain confidential modeling methods or implementation because the public safety of Californians depends upon our ability to reduce or eliminate utility-caused ignitions and wildfires.
- While the WSAB appreciates the sensitive and confidential nature of the data collected, there are ways to anonymize data so that it may be shared with the scientific

[47] Source: Table 12 of 2021 utility WMPs and subsequent data requests; 2021 Maturity Model Survey Data; SCE's 2021 WMP Update Revision - Clean

[48] SCE's 2021 WMP Update, pp. 83-86

community for peer review. Further, the utilities should not maintain confidential modeling methods or implementation because this information may be considered proprietary.[49]

Vegetation Management: Inspections, Strategies, and Pilots

- Energy Safety should consider the impact of the utilities vegetation management and tree removal practices on the environment, climate change, and wildfire risk. The WSD should consider whether the utilities have a tree replacement program and have consulted with ecologists regarding each tree removal
- PG&E, SCE, and SDG&E should explore creating a statewide database so all incidents can be recorded, with the information to benefit all. This database could also track how species characteristics vary along different environmental gradients. Plants and trees are still being referred to by their genus, of which there are hundreds of species contained within. This database could serve as a repository to start narrowing the information and traits of these species.

System Design and Management: Grid Hardening, Operations, Inspections, and Emerging Technology

- The WSAB is impressed with new technologies that are being piloted and deployed including SCE's fault current limiters, ground fault neutralizers, resonant grounding with arc suppression, and coil and resonant grounded transformers.
- SCE favors covered conductors as the hardening measure of choice. Although covered conductors have advantages in eliminating arcs that have the potential to initiate a fire, in areas where access is limited, covered conductors can create some safety challenges to the workforce assigned to perform work on them. For example, the removal and repair of covered conductor insulation can be hazardous if the wire is energized.
- The danger to the workforce further increases if the line being installed, repaired, or removed is located in a rural area and the workers do not have access to bucket trucks. However, none of the utilities' WMP Updates describe their protocols to ensure the safety of their workforce when introducing new technologies or equipment, implementing new work practices, or during the removal, installation, and repair of equipment.

[49] For example, see SCE 2021 WMP Update, p. 58, for a description of the proprietary implementation of fire modeling methods

Public Safety Power Shutoffs: Reducing the Scale, Scope and Frequency

- During the August 11, 2020 WSD workshop, the WSAB presented the System Hardening for Electric Utility Resiliency (SHEUR) threshold.[50] The utilities should develop a methodology (such as the SHEUR threshold) for reducing the risk of both wildfires and PSPS events, and systematically prioritizing grid hardening measures through risk spend efficiency calculations that treat wildfires and PSPS events as risks for the utilities to reduce the scale, scope, and frequency of PSPS.
- Both SCE and PG&E are in the process of developing more robust and adaptive predictive-models in this area.
- SCE indicates it is working on a methodology for evaluating the change in risk profile at specific locations that result from the potential allocation of mitigation resources. SCE is evaluating mostly hardening and vegetation management activities. It is attempting to determine if sufficient risk reduction results in, under certain conditions, the ability to exclude some circuits or circuit sections from PSPS events.
- This combined with risk spend efficiency calculations of wildfire risk avoidance and PSPS event risk is likely to drive transparent engineering decisions that will reduce undesirable conditions.

Emergency Planning and Communication: Emergency Preparedness, Stakeholder Cooperation, and Community Engagement

- SCE's stakeholder engagement has been refined but its PSPS actions are being reviewed in a CPUC proceeding[51] and may need to be more proactive.
- The WSAB acknowledges the increased maturity level of the utilities in the capabilities of emergency planning and preparedness, stakeholder cooperation, and community engagement.
- Each utility offers data to quantify its outreach efforts and how it interacts with the affected populations e.g., social media outreach, PSPS information workshops, specific customer contacts.[52]

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[50] The WSAB presented recommendations to the WSD during the August 11, 2021, WSD Workshop. A recording of the presentation is available at https://energysafety.ca.gov/events-and-meetings/workshops/; See also, WSAB Recommendations on the 2021 WMP Guidelines (June 24, 2020), available at https://energysafety.ca.gov/who-we-are/wildfire-safety-advisory-board/

[51] As part of its ongoing action to reduce the impacts PSPS, the CPUC called upon SCE to publicly address the mistakes and operational gaps identified in its execution of its 2020 PSPS events and to provide lessons learned to ensure they are not repeated. Top SCE executives made presentations to the CPUC on January 26, 2021. SCE presented its Corrective Action Plan to the CPUC on February 25, 2021. Recordings of these meetings are available at www.adminmonitor.com/ca/cpuc

[52] SCE's 2021 WMP Update describes its regional prioritization and its monthly survey to capture awareness and perception metrics across a sample of its customers. See SCE's 2021 WMP Update, pp. 326-327

## 3. Public and Stakeholder Comment

The following individuals and organizations submitted comments by March 29, 2021, and reply comments by April 13, 2021, on SCE's 2021 WMP Update, as well as comments by June 10, 2021 on SCE's 2021 WMP Update Revision:

- Acton Town Council (ATC)
- Public Advocates Office at the California Public Utilities Commission (Cal Advocates)
- Green Power Institute (GPI)
- Kevin Collins
- Los Angeles County
- Mussey Grade Road Alliance (MGRA)
- Rural County Representatives of California (RCRC)
- Small Business Utility Advocates (SBUA)
- The Utility Reform Network (TURN)
- William B. Abrams
- Other members of the public

Energy Safety has evaluated comments and concurs with the following stakeholder input on SCE's 2021 WMP Update and SCE's 2021 WMP Revision, as reflected in this Action Statement:

Risk Modeling and Resource Allocation

- There should be a coordinated approach to the calculation of risk-spend efficiency values across the utilities. In particular to looking at the costs and risk-spend efficiency of covered conductor installation across the utilities (MGRA, TURN, Cal Advocates).
- There should also be a coordinated approach to the utilities' risk modeling efforts, supported by a Energy Safety-led technical working group (Cal Advocates). The risk models should be subject to independent peer review and verification (MGRA, GPI).
- SCE should consider expanding its drone inspection program. Video quality is high enough to issue PSPS all-clear designations through drones and no issues with controlling drones have been reported. SCE should continue to expand drone usage where feasible and effective (Cal Advocates).
- SCE should demonstrate that programs account for foreseeable obstacles. For instance, SCE fell short of pole loading assessments target due to foreseeable obstacles such as 1) customer denying access to property or unavailable to give access, 2) access issues due to COVID-19 and 3) weather risk issues. SCE should report targets with an expectation of predictable obstacles and plans to mitigate them (Cal Advocates).

Grid Hardening

- Across utilities there is a wide variance in covered conductor scope, RSE and cost (MGRA, Cal Advocates, TURN, RCRC).
- SCE needs to justify its aggressive allocation to covered conductor installation and should prioritize high-risk circuits. A high percent (90%) of grid hardening expenditures in the HFTD is on covered conductor with limited justification or prioritization (Cal Advocates, TURN, MGRA, ATC).
- SCE has substantially higher allocation of spend to covered conductors over its peers (MGRA, Cal Advocates, TURN, PCF, RCRC).

Grid Operations

- The utilities should prioritize wildfire mitigation measures that address ignitions that have external drivers (like high wind) and are likely to occur under the worst possible conditions (i.e., likely to lead to catastrophic fires) that also can better inform PSPS decisions. (MGRA, ATC)
- Utilities should accelerate Rapid Earth Fault Current Limiter (REFCL) pilot programs, as they have provided promising initial results (MGRA, TURN).
- SCE should inventory all C-hooks in HFTD areas to ensure aged C-hooks are replaced (Cal Advocates).

Vegetation Management

- The utilities need to make more progress on their joint plan to begin a study of the effectiveness of extended vegetation clearances (MGRA).
- There is concern about the environmental impacts of utilities' vegetation management pilots (e.g., flame retardants) (RCRC, CFBF, JLG, Cal Advocates).
- SCE should align practices with county guidance and coordinate with permitting agencies to reduce environmental impact and improve transparency (LA County).
- SCE should standardize its training programs for its contract workforce and improve QA/QC of contracted landscaping firms for vegetation management work (LA County).

PSPS

- A long-term goal of utilities should be to eliminate PSPS entirely (MGRA, RCRC, GPI, ATC).
- Weather forecasting and monitoring supports short-term PSPS reduction but does not address long-term grid issues. Utilities need to prioritize targeting grid hardening that reduces PSPS in the long-term (GPI, RCRC).
- The utilities should explain how post-PSPS reviews inform lessons learned (ATC, GPI, RCRC).
- The utilities provide limited analyses of pilot programs' impacts on PSPS (SBUA).

- The utilities should continue working to contact hard-to-reach and access and functional needs (AFN) customers (SBUA).
- SCE's frequent 2020 PSPS events had a significant impact on the community and it needs to justify its use of lower windspeed thresholds and commit to raising them post-grid hardening (ATC).
- SCE should leverage field observer input in PSPS decisions (Cal Advocates).
- SCE needs to report on quantitative impact to PSPS from covered conductor (ATC).

## 4. Discussion

The following sections discuss in detail SCE's 2021 WMP Update, including progress over the past year, issues, and remedies to address by the next annual submission.

### 4.1 Introductory Sections of the WMP

The first two sections of the WMP Guidelines[53] require the utility to report basic information regarding persons responsible for executing the plan and adherence to statutory requirements. Section 1 requires contact information (telephone and email) for the executive with overall responsibility and the specific program owners. In addition, all experts consulted in preparation of the WMP must be cited by name and include their relevant background/credentials. Contact information and names may be submitted in a redacted file.

Section 2 requires the utility to specify where each of the 22 requirements from Section 8386(c) of the Public Utilities Code are satisfied. Each utility shall both affirm that the WMP addresses each requirement AND cite the section and page number where it is more fully described.

SCE minimally satisfied all 22 requirements from Section 8386(c) of the Public Utilities Code.

**Issues and Remedies**

While Energy Safety did not identify key areas for improvement in the introductory sections of SCE's 2021 WMP Update, Energy Safety finds the following issues and associated remedies. Energy Safety expects SCE to take action to address these issues and report on progress made over the year in its 2022 WMP Update.

Five of the statutory WMP requirements pursuant to Pub. Util. Code 8386(c) SCE could have been met more completely.

[53] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 14-21 (accessed July 12, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf

- ISSUE: (All requirements.) The requested intent of Table 2-1 was to direct readers of the WMP to the section and page where the requirement was addressed. SCE provided only the section reference.
    - REMEDY: Provide section *and* page number(s) in this table.
- ISSUE: (Requirement 6) "Protocols for disabling reclosers" not addressed in 7.3.6.1, rather references Standard/System Operating System, and discussed (but not pointed to from 7.3.6.1) in WMP Section 8.1.3 "Description of the utility's protocols and thresholds for PSPS implementation."[54]
    - REMEDY: Provide requested information in the correct section in the WMP.
- ISSUE: (Requirement 10) SCE did not always provide information in the correct sections as specified by the WMP Guidelines. For example, SCE provided its PSPS Directional Vision in Section 8.1.3, as opposed to Section 8.3, provided information in Section 7.0 that should have been included in Section 8.0, and referenced information outside the WMP (i.e., PSPS Corrective Action Report).
    - REMEDY: Provide information where requested, instead of pointing to information provided elsewhere, even if this means repeating information.
- ISSUE: (Requirement 11) According to the WMP Guidelines, SCE must provide a "list that identifies, describes, and prioritizes all wildfire risks, and drivers for those risks." SCE did not provide this list and instead included a footnote that referenced a list. This list was later provided via a data request (see Appendix 10.2).
    - REMEDY: Provide a table with a prioritized list of wildfire risks and drivers and the rationale for prioritization.
- ISSUE: (Requirement 14) SCE provided vague information regarding "where the electrical corporation considered undergrounding electrical distribution lines within those areas of its service territory identified to have the highest wildfire risk in a commission fire threat map."
    - REMEDY: Provide specific, locational information as requested in the Guidelines, including spatial data on underground distribution lines.

### 4.2 Actual and Planned Spending for the Mitigation Plan

The WMP Guidelines[55] require utilities to report a summary of WMP expenditures, planned and actual, for the current WMP cycle. This also includes an estimated annual increase in costs to the ratepayer due to utility-related wildfires and wildfire mitigation activities. The WMP

[54] SCE's 2021 WMP Update, p. 342

[55] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 22-24 (accessed July 12, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf

Guidelines require that ratepayer impact calculations are clearly shown to demonstrate how each value was derived. Nothing in the request for such information should be construed as approval of any such expenditure, which is left to the CPUC pursuant to Pub. Util. Code Section 8386.4(b).

SCE provided all required information regarding expenditures.

See Figure 4.2a for the comparison of the total WMP actual and planned spends of the three large electrical utilities.

- Comparing the planned spend of the three utilities, SCE plans to spend the least per overhead circuit mile, territory-wide.
- Comparing the planned spend of the three utilities, SCE plans to spend the most per overhead circuit mile in the high fire threat district (HFTD).
- Ninety percent (90%) of SCE's grid hardening expenditure allocation in the HFTD is on covered conductor, compared to less than 20% of PGE's or SDGE's grid hardening spending in the HFTD. SCE indicates the lowest cost for covered conductor among the utilities.[56]
- Like the other large utilities, SCE plans to spend the most in 2022 among the three year WMP plan cycle, including about 26% more than 2021 projected spending (or $2.506 billion).
- SCE shows an increase between its 2020 planned spend and 2020 actual spend ($1.606 billion to $1.849 billion). As detailed below in Section 5.5, SCE claims that much of this increase results from Senate Bill 247 (2019), which required prevailing wages for qualified line clearance tree trimmers. SCE was the only utility to make this claim.

SCE's net changes in spend at the WMP Category level show that initiatives were added, removed, and had expenditures reallocated. Planned cycle spend as reported 2020 WMP vs. 2021 WMP ($M) shows the following:[57]

Spending increased in the following categories:

- Vegetation Management and Inspections by $656.1M
- Grid Design and System Hardening by $184M
- Asset Management and Inspections by $115.0M
- Grid Operations and Operating Protocols by $77.6M
- Data Governance by $34.5M
- Stakeholder Cooperation and Community Engagement by $18.6M
- Situational Awareness and Forecasting by $15.95M

[56] SCE's and PG&E's 2021 WMP Update Revision, Table 12 and SDG&E's 2021 WMP Update Table 12

[57] Source: Table 12 of SCE's 2021 WMP Update, Tables 21-30 of SCE's 2020 WMP, SCE's 2021 WMP Update Revision and subsequent data requests

- Risk Assessment and Mapping by $2.8M

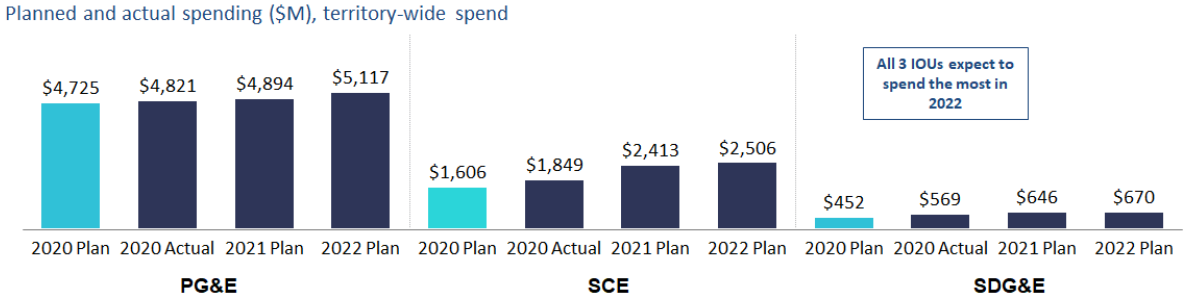
Spending decreased in the following categories:

- Resource Allocation Methodology decreased by $74.1M
- Emergency Planning and Preparedness decreased by $6.6M

SCE's planned total WMP 3-year cycle expenditures allocation by category in the 2021 WMP Update are ($M and % of total):[58]

- Grid Design and System Hardening $4,097M (61%)
- Vegetation Management and Inspections $1,127M (17%)
- Asset Management and Inspections $1,044M (15%)
- Situational Awareness and Forecasting $170M (3%)
- Grid Operations and Operating Protocols $136M (2%)
- Stakeholder Cooperation and Community Engagement $51M (1%)
- Resource Allocation Methodology $59M (1%)
- Emergency Planning and Preparedness $35M (1%)
- Data Governance $35M (0.5%)
- Risk Assessment and Mapping $3M (0.04%)

Energy Safety requested additional information and clarification from SCE as described below, under "Issues and Remedies" for this section.



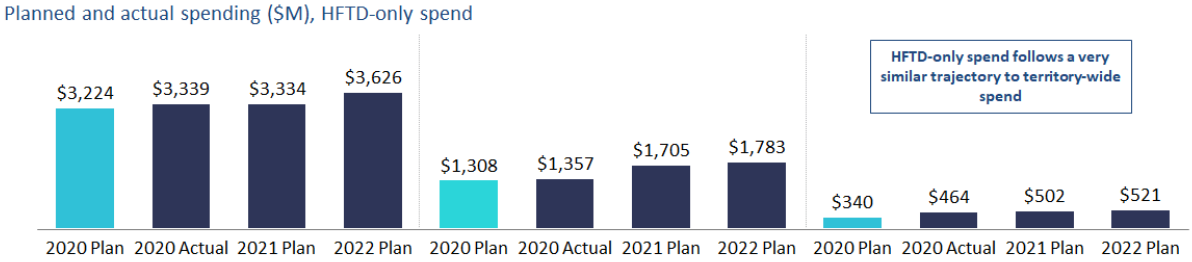

| | 2020 Plan[1] ($M) | 2020 Actual ($M) | 2021 Plan ($M) | 2022 Plan ($M) | Total WMP Cycle Planned Spend ($M) | Normalized WMP cycle spend per overhead circuit mile ($M) |
|---|---|---|---|---|---|---|
| PG&E | $4,725 | $4,821 | $4,894 | $5,117 | $14,832 | $.150 |
| SCE | $1,606[2] | $1,849 | $2,413 | $2,506 | $6,768 | $.131 |
| SDG&E | $452[3] | $569 | $646 | $670 | $1,886 | $.232 |

SDG&E plans to spend the most per overhead circuit mile

Source: Tables 8 and 12 of utility 2021 WMPs, Tables 21-30 of utility 2020 WMPs, subsequent data requests and SCE and PGE Revision Notices
1. SCE had initiatives that were reported in the 2020 WMP but not in the 2021 WMP; those initiatives are included in its 2020 plan totals.
2. In SCE's most recent data request response on 3/09/2021, SCE provided total territory spend but not annual territory-wide cycle spend as reported in 2020. The 2020 planned spend (1.6B) is calculated from SCE's 2020 WMP submission
3. SDG&E did not provide 2020-reported spend data for certain initiatives in their Feb 18 data request, as HFTD vs non HFTD split was not possible for those initiatives. Thus spend numbers from SDG&E's 2020 WMP were used for those specific initiatives.

*Figure 4.2.a: Overview of total WMP spend, territory-wide, large utilities.*

[58] SCE's totals were taken from Table 12 of its 2021 WMP Update as Table 3-1 only reported spend in HFRAs




| | 2020 Plan[1] ($M) | 2020 Actual ($M) | 2021 Plan ($M) | 2022 Plan ($M) | Total WMP Cycle Planned Spend ($M) | Normalized WMP cycle spend per overhead HFTD circuit mile ($M) |
|---|---|---|---|---|---|---|
| PG&E | $3,224 | $3,339 | $3,334 | $3,626 | $10,299 | $.334 |
| SCE | $1,308 | $1,357 | $1,705 | $1,783 | $4,845 | $.346 |
| SDG&E | $340[2] | $464 | $502 | $521 | $1,487 | $.330 |

SCE plans to spend the most per overhead HFTD circuit mile

Source: Tables8 and 12 of utility 2021 WMPs, Tables 21-30 of utility 2020 WMPs, subsequent data requests, SCE and PGE Revision Notices
1. PG&E and SCE had initiatives that were reported in the 2020 WMP but not in the 2021 WMP; those initiatives are included in their 2020 plan totals.
2. SDG&E did not provide 2020-reported spend data for certain initiatives in their Feb 18 data request, as HFTD vs non HFTD split was not possible for those initiatives. Thus spend numbers from SDG&E's 2020 WMP were used for those specific initiatives.

*Figure 4.2.b: Overview of total WMP spend, HFTD-only, large utilities.*

**Issues and Remedies**

Energy Safety finds the following additional issues and associated remedies. Energy Safety expects SCE to take action to address these issues and report on progress made over the year in its 2022 WMP Update.

SCE's reported 2020-2022 cycle spend conflicted across submissions. Energy Safety requested additional information and clarification from SCE through data requests and phone conversations regarding reported spending as described below (see also Appendix 10.2). In 2022, Energy Safety expects to see more clarity and adherence to templates in the initial 2022 WMP Update filing to prevent multiple changes in accounting reporting, which slows the evaluation process and makes it significantly more difficult to compare SCE to other utilities. Improvements in reporting must be made in spending in broad mitigation categories, individual initiatives, and geographically defined risk areas, as described below. Energy Safety will provide templates and instructions to assist with reporting for evaluating spending.

- ISSUE: Report spending by HFTD (or high fire threat area [HFRA]) and Territory-wide (Past year planned/actual, Future years Planned; category; initiative)[59]

  In the 2021 WMP Update, Energy Safety asked for reporting territory-wide as well as HFTD-only. However, SCE did not split up spend in this way for activities it deemed to be "non-WMP programs."

[59] Source: Tables 3-1, 3-2 and 12 of 2021 WMP Updates, and subsequent data requests. SCE's totals were taken from Table 12 of its 2021 WMP Update as Table 3-1 only reported spend in HFRA

Energy Safety found SCE's explanation of this designation unclear and inadequate.

Examples of "non-WMP initiatives" include *23-2.1: Circuit breaker maintenance and installation to de-energize lines upon detecting a fault: maintenance, 23-17: Updates to grid topology to minimize risk of ignition in HFTDs,* and *25- 16: Removal and remediation of trees with strike potential to electric lines and equipment.* These are ostensibly wildfire mitigation initiatives, and warrant inclusion within the WMP.

Spend data reported via data request and content calls resulted in data being reported in multiple forms requiring extensive cross-referencing and additional explanations to determine if the new numbers correctly aligned with the original tables informing the WMP.

- REMEDY: Final confirmation of spend numbers needs clarification using the original WMP formats. Furthermore, SCE must report all of its wildfire mitigation activity spend, by year, capital expenditure/operational expenditure, and HFTD/non-HFTD.

- ISSUE: SCE reported zero spend in Risk Assessment and Mapping Activities, which resulted from aggregation of those activities into "General operations" and "Situational awareness."

SCE responded on February 23, 2021 with "Please see attached spreadsheet, entitled 'WSD-SCE-001 Q1 Data request SCE 2021 Table 12_v02 20210223.'" This spreadsheet contained the answer to the narrow question regarding $0 in "Risk Assessment and Mapping" spend:

7.3.1.1. A summarized risk map that shows the overall ignition probability and estimated wildfire consequence along the electric lines and equipment (880K for 2020; 350K for 2021; 350K for 2022; and 1,580K Total Cycle)

7.3.1.3. Ignition probability mapping showing the probability of ignition along the electric lines and equipment (880K for 2020; 350K for 2021; 350K for 2022; and 1,580K Total Cycle)

7.3.1.5. Match drop simulations showing the potential wildfire consequence of ignitions that occur along the electric lines and equipment (880K for 2020; 350K for 2021; 350K for 2022; and 1,580K Total Cycle)

Overall Category Total: $4,740,000 (Situational Awareness)

Columns U-AR (Projected spend, HFTD and territory-wide) were left blank, resulting in a subsequent data request WSD-SCE-003.
    - REMEDY: SCE must report all wildfire mitigation related activity spend in its 2022 and subsequent WMP updates, using Energy Safety's classification scheme.

- ISSUE: Explanations and amounts of large expenditure shifts in mitigation categories and individual initiatives (2020 actual vs. 2021 planned) were difficult to pin down across a number of phone conversations and data requests (See Appendix 10.1 Data Request Appendix).
    - REMEDY: SCE must report all wildfire mitigation related activity spend in its 2022 and subsequent WMP updates, using Energy Safety's classification scheme.

### 4.3 Lessons Learned and Risk Trends

This section of the WMP Guidelines[60] requires utilities to report how their plans have evolved since 2020 based on lessons learned, current risk trends, and research conducted. This section also requires utilities to report on potential future learnings through proposed and ongoing research.

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

1. Describe how it monitors and accounts for the contribution of weather and fuel to ignition probability and wildfire consequence.
2. Identify any areas where the Commission's HFTD should be modified.
3. Explain any "high fire threat" areas the utility considers that differ from Commission-adopted HFTD, and why such areas are so classified.
4. Rank trends anticipated to have the greatest impact on ignition probability and wildfire consequence.

[60] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 24-29 (accessed July 12, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf

SCE provided all required information on lessons learned, current risk trends, and research conducted.

- Historically, SCE used the Santa Ana Winds Threat Index (SAWTi) to assess fuel and weather conditions and gauge the overall severity of forecasted or ongoing Santa Ana wind events across affected SCE districts. SCE has since developed new fuel and weather modeling and tools that, along with its Fire Potential Index (FPI), have replaced the use of SAWTi in forecasting the severity of fire-weather conditions. SCE also conducts bi-weekly fuel sampling as part of its fuel sampling program, launched in 2019, to determine the dryness and combustibility of vegetation within its service territory.[61] Finally, SCE states that it intends to increasingly use its Wildfire Risk Reduction Model (WRRM) as a primary resource in assessing ignition probability and wildfire consequence in 2021.[62]
- SCE identifies areas of the Commission's HFTD for modification. On December 17, 2020, the Commission approved SCE's modification request, which included an expansion of the HFTD to include areas in SCE's service territory that pose "unacceptable risk to customers and communities".[63] The modifications included removing six areas from SCE's non-CPUC HFRA, re-classifying one area as Tier 3 (versus Tier 2 in the original submittal), and incorporating the remaining, with slight adjustments to better align with the HFTD boundary, into Tier 2.[64]
- SCE discusses and categorizes macro trends by greatest impact on ignition probability and wildfire consequence within its HFRA. Among the factors that SCE categorizes as "impacting ignition probability and estimated wildfire consequence" are climate change and other drivers of change in weather, fuel density, and fuel moisture, as well as invasive species (e.g., bark beetles).[65] SCE also discusses factors "minimally impacting" ignition probability and wildfire consequence, which SCE states "have yet to demonstrate or be proven to have material impact […] in its HFRA".[66] These include population changes, including those in HFTD and Wildland-Urban Interface (WUI) areas, as well as utility infrastructure location (i.e., HFTD vs. non-HFTD, urban vs. rural vs. highly rural).[67]
- SCE provides lessons learned in 2020 and corresponding changes in Table SCE 4-1 of its 2021 WMP Update.

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[61] SCE's 2021 WMP Update, p. 42

[62] SCE's 2021 WMP Update, p. 46

[63] SCE's 2021 WMP Update, p. 43

[64] D.20-12-030[E4]

[65] SCE's 2021 WMP Update, pp. 46-49

[66] SCE's 2021 WMP Update, p. 49

[67] SCE's 2021 WMP Update, pp. 49-50

### 4.4 Inputs to the Plan and Directional Vision for the WMP

This section of the WMP Guidelines[68] requires the utility to rank and discuss trends anticipated to exhibit the greatest impact on ignition probability and wildfire consequence within the utility's service territory over the next 10 years. First, utilities must set forth objectives over the following timeframes: before the upcoming wildfire season, before the next annual update, within the next 3 years, and within the next 10 years. Second and more practically, utilities must report the current and planned qualifications of their workforce they expect in order to meet these objectives.

***Goal, objectives, and program targets:***

The goal of the WMP is shared across Energy Safety and all utilities: documented reductions in the number of ignitions caused by utility actions or equipment and minimization of the societal consequences (with specific consideration of the impact on Access and Functional Needs populations and marginalized communities) of both wildfires and the mitigations employed to reduce them, including PSPS.

The WMP Guidelines[69] require utilities to provide their objectives which are unique to each utility and reflect its 1, 3, and 10-year projections of progress toward the WMP goal. The WMP Guidelines also require utilities to report their unique program targets, which are quantifiable measurements of activity identified in WMPs and subsequent updates used to show progress toward reaching the objectives, such as number of trees trimmed or miles of power lines hardened.

SCE provides all required information on its overall objectives and WMP program targets in Tables 5.3-1 and 5-2. SCE referenced its objectives and program targets which were described extensively in its first quarterly report.

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[68] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 29-31(accessed July 12, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf

[69] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 29-30 (accessed July 12, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf

***Workforce planning:***

This subsection of the WMP Guidelines[70] requires utilities to report their worker qualifications and training practices regarding utility-related wildfire and PSPS mitigation for workers in mitigation-related roles including:

1. Vegetation inspections
2. Vegetation management projects
3. Asset inspections
4. Grid hardening
5. Risk event inspection

SCE provides all required information regarding worker qualifications within each listed role. For each target role, SCE provides worker qualifications, their corresponding contractor qualifications, and a clear percentage of its workforce that meets listed qualification

- Vegetation Inspections: To grow the pool of International Society of Arboriculture (ISA)-certified arborists, SCE plans to continue to hire Specialists who do not yet have an ISA-certification but who will, under the guidance of Senior Specialists, acquire the VM-related experience necessary to meet the experience requirement for an ISA-certification.[71]
- Vegetation Management Projects: As part of continuing education and improvement of the VM program, SCE updates its training programs based on lessons learned. SCE also provides refresher trainings and relevant communications to workers on updated guidelines, as there are typically changes in protocols that occur each year.[72]
- Asset Inspections: SCE has developed an extensive training program for its own employees and contract employees.[73]
    - SCE requires all new Electrical System Inspectors to take the comprehensive training comprised of multiple modules.
    - This technical training prepares workers to perform their jobs safely, comply with regulatory requirements and laws, maintain system reliability, and meet the demands of new technology.
    - Separately, SCE is developing a dashboard to analyze responses to certain inspection survey questions to identify where more focused training may be needed.
- Grid Hardening: To facilitate grid hardening work, SCE implements training for SCE workers. This includes core technical training for working on the electric system, as well

[70] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 30-31 (accessed July 12, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf

[71] SCE's 2021 WMP Update, p. 131

[72] SCE's 2021 WMP Update, p. 133

[73] SCE's 2021 WMP Update, p. 139

as specialized training on PSPS, HFRA, grid hardening, etc., and prepares workers to perform their jobs safely, comply with regulatory requirements and laws, maintain system reliability, and meet the demands of new technology.[74]

- Risk Event Inspection: As it relates to wildfire and PSPS, SCE has implemented several training courses to educate and train field workers on proper practices and procedures. These training efforts are described in Table SCE 5-12.[75]

### 4.5 Metrics and Underlying Data

The WMP Guidelines[76] require utilities to report metrics and program targets as follows:

- *Progress metrics* that track how much utility wildfire mitigation activity has managed to change the conditions of a utility's wildfire risk exposure in terms of drivers of ignition probability.
- *Outcome metrics* that measure the performance of a utility and its service territory in terms of both leading and lagging indicators of wildfire risk, PSPS risk, and other direct and indirect consequences of wildfire and PSPS, including the potential unintended consequences of wildfire mitigation work.
- *Program targets* measure tracking of proposed wildfire mitigation activities used to show progress toward a utility's specific objectives.[77] Program targets track the utility's pace of completing activities as laid out in the WMPs but do not track the efficacy of those activities. The primary use of these program targets in 2021 will be to gauge utility follow-through on existing WMPs.

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

See the Data Governance section for a review of the utility's progress and shortcomings in its Quarterly Data Reports.

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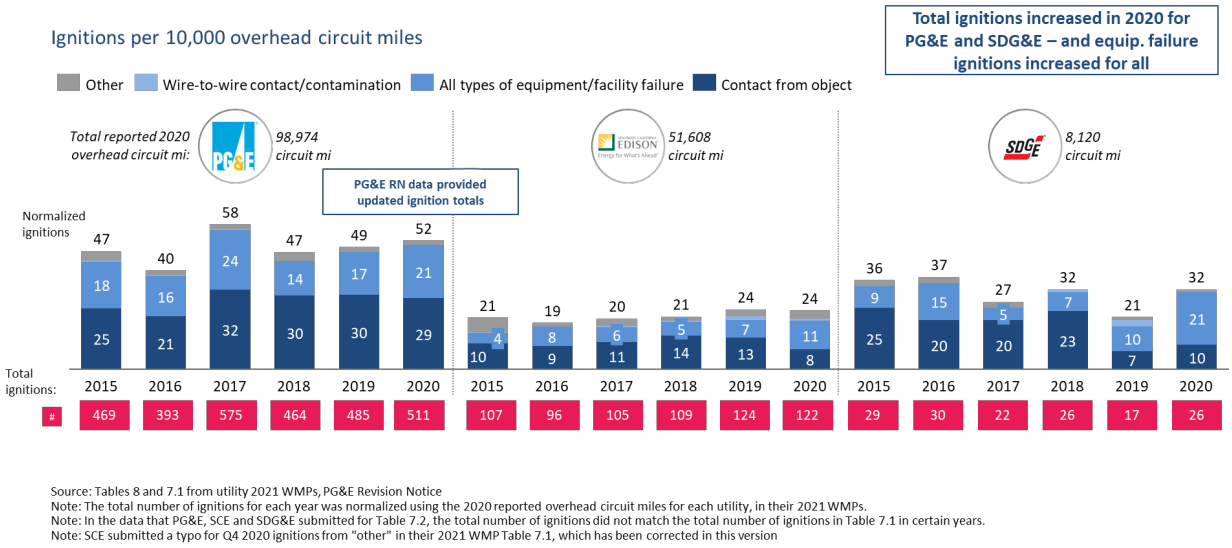
[74] SCE's 2021 WMP Update, p. 141

[75] SCE's 2021 WMP Update, p. 145

[76] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 32-41 (accessed July 12, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf

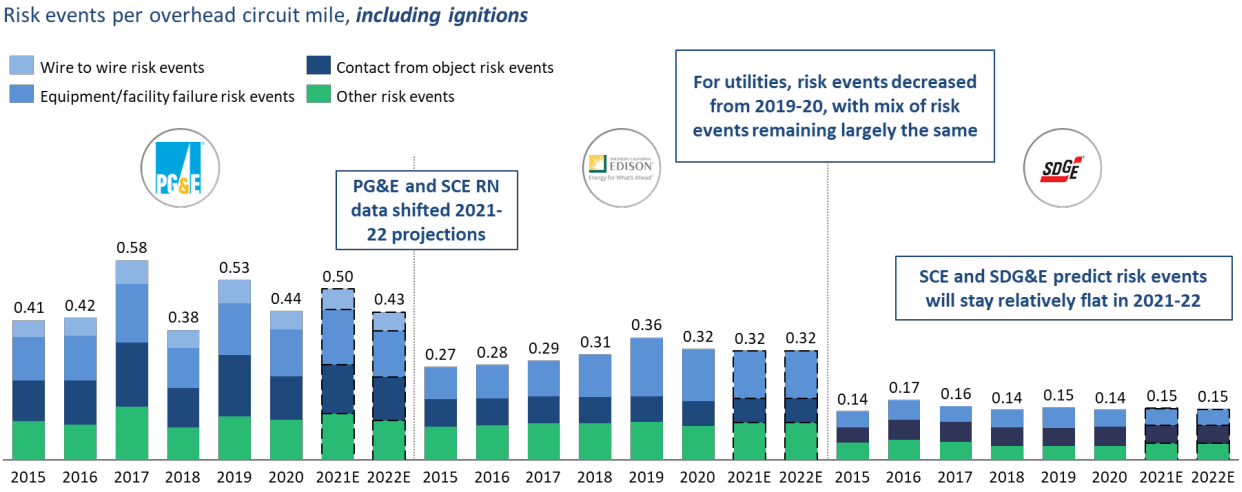
[77] Objectives are unique to each utility and reflect the 1, 3, and 10-year projections of progress toward the WMP goal. See section 5.4 for review of the utility's objectives




Source: Tables 8 and 7.1 from utility 2021 WMPs, PG&E Revision Notice
Note: The total number of ignitions for each year was normalized using the 2020 reported overhead circuit miles for each utility, in their 2021 WMPs.
Note: In the data that PG&E, SCE and SDG&E submitted for Table 7.2, the total number of ignitions did not match the total number of ignitions in Table 7.1 in certain years.
Note: SCE submitted a typo for Q4 2020 ignitions from "other" in their 2021 WMP Table 7.1, which has been corrected in this version

*Figure 4.5.a: Number of ignitions per 10,000 overhead circuit miles, large utilities.*

SCE generally has fewer ignitions, per overhead circuit mile, compared to PG&E and SDGE&E (Figure 4.5.a). However, normalized ignitions have seen a steady rise since 2016, and SCE had more ignitions per circuit mile than SDG&E in 2019. Ignitions are generally dominated by contact from objects, with equipment failure also representing a considerable fraction.




Source: Risk events from Table 7.1 of utility 2021 WMPs, overhead circuit miles from Table 8 of utility 2021 WMPs, PG&E Revision Notice
Note: A risk event is defined as an event with probability of ignition, including wires down, contacts with objects, line slap, events with evidence of heat generation, and other events that cause sparking or have the potential to cause ignition.

*Figure 4.5.b: Actual and projected risk events per overhead circuit mile, large utilities.*

SCE generally has fewer risk events per overhead circuit mile, including ignitions (Figure 4.5.b) compared to PG&E, but more than SDG&E. SCE projects a steady risk event frequency through

the current WMP cycle. Consistent with this trend, SCE experiences fewer red flag warning overhead circuit mile days per year than PG&E does, but more than SDG&E does (Figure 4.5.c).

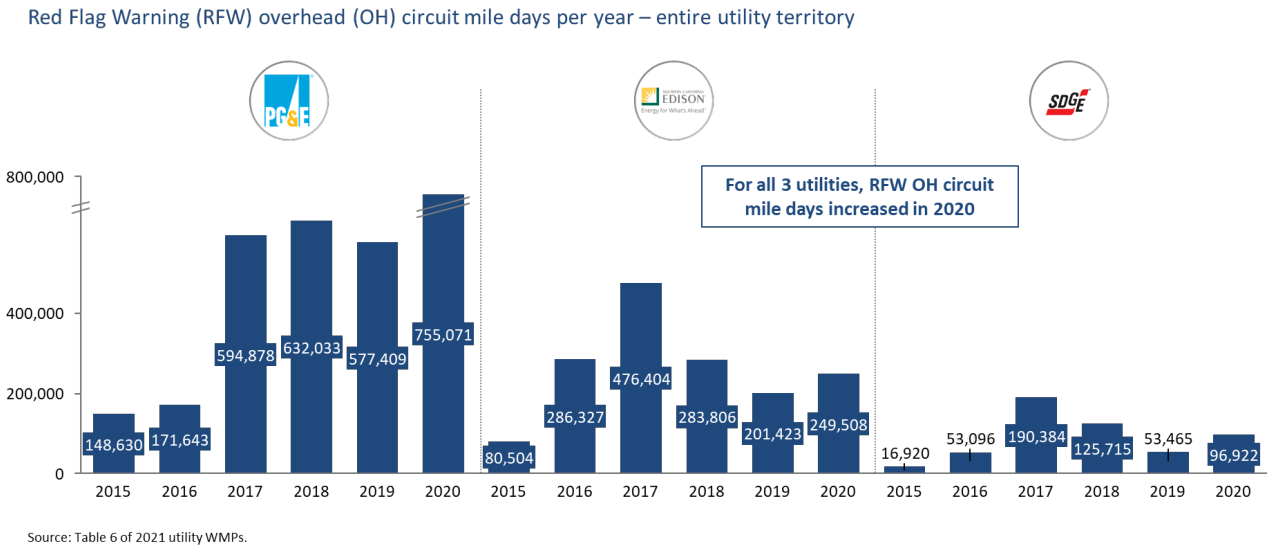



*Figure 4.5.c: Red flag warning (RFW) overhead circuit mile days, large utilities.*

SCE has considerably more asset inspection findings, compared to both PG&E and SDG&E (Figure 4.5.d). 2019 had a particularly large number of findings, but that number returned to trend in 2020.

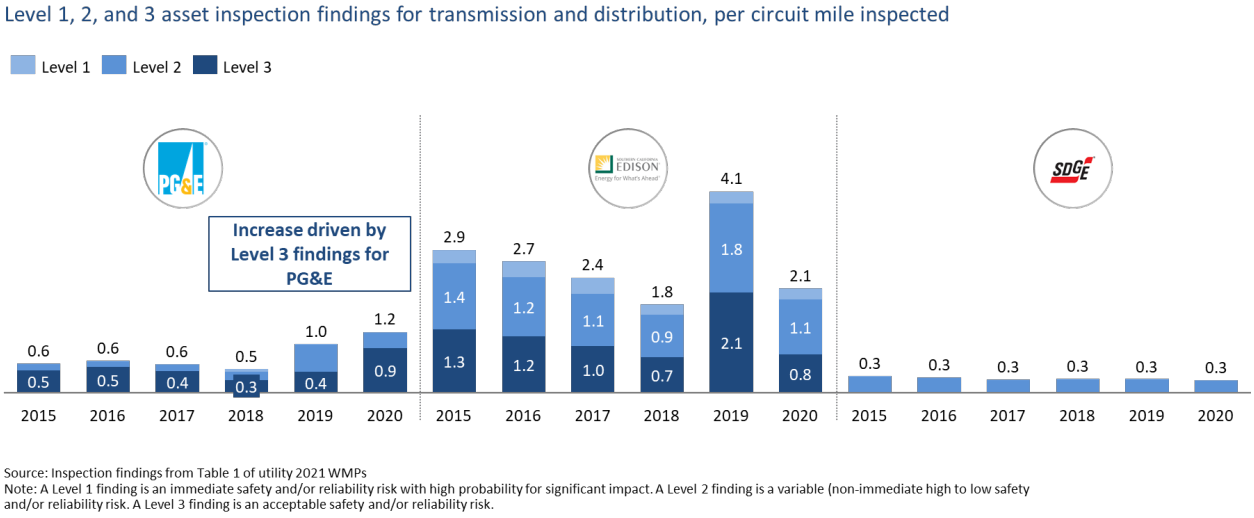



*Figure 4.5.d: Asset inspection findings per circuit mile inspected, large utilities.*

A summary of SCE's spatial data submission is included in the Data Governance section (Section 5.7).

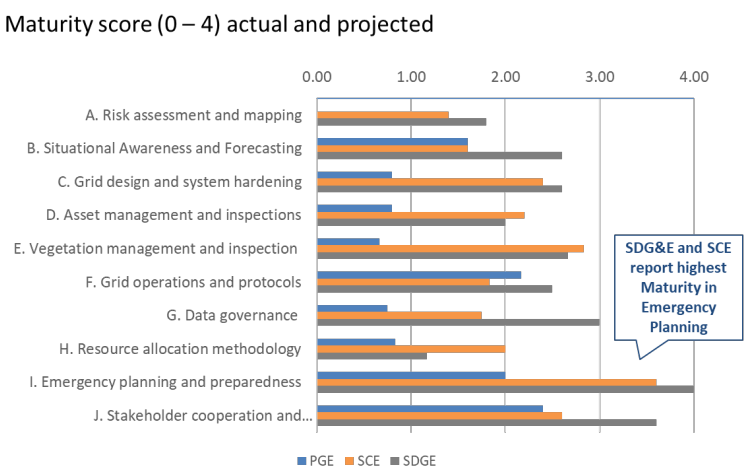
## 5. Mitigation Initiatives and Maturity Evaluation

This section of the WMP Guidelines[78] is the heart of the plan and requires the utility to describe each mitigation initiative it will undertake to reduce the risk of catastrophic wildfire. The utility is also required to self-report its current and projected progress to mitigate wildfire risk effectively,[79] a capability referred to in this document as "maturity" and measured by the WSD Utility Wildfire Mitigation Maturity Model ("Maturity Model"). Utility maturity is measured across the same categories used to report mitigation initiatives listed below, allowing Energy Safety to evaluate a utility's reported and projected maturity in wildfire mitigation in the context of its corresponding current and planned initiatives. The ten maturity and mitigation initiative categories are listed below, with further details in Appendix 11.1:

1) Risk assessment and mapping
2) Situational awareness and forecasting
3) Grid design and system hardening
4) Asset management and inspections
5) Vegetation management and inspections
6) Grid operations and operating protocols
7) Data governance
8) Resource allocation methodology
9) Emergency planning and preparedness
10) Stakeholder cooperation and community engagement

[78] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 42-46 (accessed July 12, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf

[79] Utilities that submitted a WMP were required to complete a survey in which they answered specific questions which assessed their existing and future wildfire mitigation practices across 52 capabilities at the time of submission and at the end of the three-year plan horizon. The 52 capabilities are mapped to the same ten categories identified for mitigation initiatives. The results of the survey can be found in Attachment 11.1 The most recent survey for each utility can be found on the Energy Safety website here: https://energysafety.ca.gov/what-we-do/wildfire-mitigation-and-safety/wildfire-mitigation-plans/

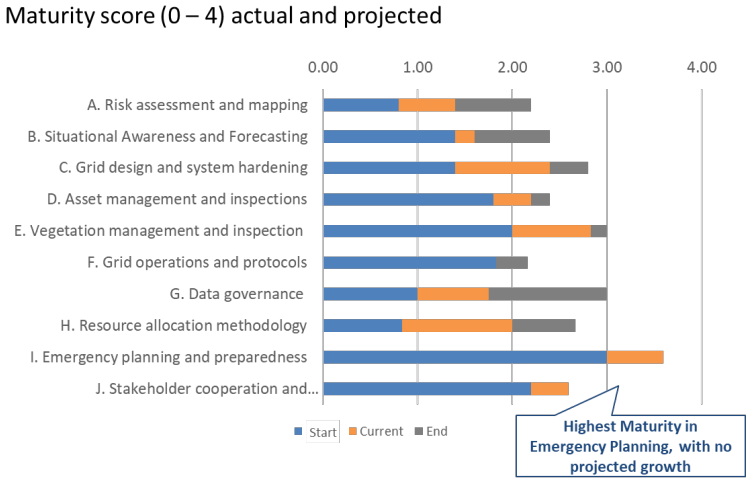



**Self-reported Maturity by Category**

| Category | PGE | SCE | SDGE |
|---|---|---|---|
| A. Risk assessment and mapping | 0.00 | 1.40 | 1.80 |
| B. Situational Awareness and Forecasting | 1.60 | 1.60 | 2.60 |
| C. Grid design and system hardening | 0.80 | 2.40 | 2.60 |
| D. Asset management and inspections | 0.80 | 2.20 | 2.00 |
| E. Vegetation management and inspection | 0.67 | 2.83 | 2.67 |
| F. Grid operations and protocols | 2.17 | 1.83 | 2.50 |
| G. Data governance | 0.75 | 1.75 | 3.00 |
| H. Resource allocation methodology | 0.83 | 2.00 | 1.17 |
| I. Emergency planning and preparedness | 2.00 | 3.60 | 4.00 |
| J. Stakeholder cooperation and community engagement | 2.40 | 2.60 | 3.60 |

Source: 2021 Maturity Model survey data for PG&E, SCE and SDG&E

*Figure 5.a: Self-reported maturity by category, large utilities.*




**Projected growth through WMP cycle in Maturity by Category: SCE**

| Category | Scores Start | Current | End |
|---|---|---|---|
| A. Risk assessment and mapping | 0.8 | 1.4 | 2.2 |
| B. Situational Awareness and Forecasting | 1.4 | 1.6 | 2.4 |
| C. Grid design and system hardening | 1.4 | 2.4 | 2.8 |
| D. Asset management and inspections | 1.8 | 2.2 | 2.4 |
| E. Vegetation management and inspection | 2.0 | 2.8 | 3.0 |
| F. Grid operations and protocols | 1.8 | 1.8 | 2.2 |
| G. Data governance | 1.0 | 1.8 | 3.0 |
| H. Resource allocation methodology | 0.8 | 2 | 2.7 |
| I. Emergency planning and preparedness | 3.0 | 3.6 | 3.6 |
| J. Stakeholder cooperation and community engagement | 2.2 | 2.6 | 2.6 |

Source: 2021 Maturity Model survey data for PG&E, SCE and SDG&E

*Figure 5.b: Projected growth through WMP cycle in maturity by category, SCE.*

Below, Energy Safety evaluates SCE's initiatives across the ten categories in the context of its maturity model survey scores.

## 5.1 Risk Assessment and Mapping

### Introduction

This section of the WMP Guidelines[80] requires the utility to discuss the risk assessment and mapping initiatives implemented to minimize the risk of its causing wildfires. Utilities must describe initiatives related to equipment maps and modelling of overall wildfire risk, ignition probability, wildfire consequence, risk-reduction impact, match-drop simulations,[81] and climate/weather-driven risks. This section also requires the utility to provide data on spending, miles of infrastructure treated, spend per treated line mile, ignition probability drivers targeted, projected risk reduction achieved from implementing the initiative, and other (i.e., non-ignition) risk drivers addressed by the initiative.

The parameters of risk assessment (discussed here) and resource allocation (discussed later in the "Resource Allocation Methodology" section) to reduce wildfire risk derive from the S-MAP and RAMP proceedings for the utility GRC (D.18-12-014).

Each large investor-owned utility is at a different stage in using the S-MAP/RAMP methodology approved in D.18-12-014. Going forward, each is supposed to employ uniform processes and scoring methods to assess current risk and estimate risk reduction attributable to its proposed mitigations.

The risk modelling conducted should ultimately inform the RSE analyses discussed in category 8, resource allocation methodology.

### Overview

Energy Safety finds that SCE has made progress in Risk Assessment and Mapping and finds this portion of SCE's 2021 WMP Update to be sufficient, subject to remedies. SCE is expected to provide updates on its progress on identified issues in its ongoing required submissions with Energy Safety.

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[80] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 43-44 (accessed July 12, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf

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

**Progress over the past year**

Energy Safety finds that SCE has made the following progress:

- SCE transitioned to its Wildfire Risk Reduction Model (WRRM) consequence modeling. The software on which this product is based is also used by PGE and SDGE. The previously used modeling tool had several limitations which prevented SCE from improving risk assessments to keep pace with the other large utilities. This transition will allow larger data sets and finer granularity to support several mitigation initiatives by using an up-to-date consequence program.
- In addition to consequence modeling, SCE also achieved improvements in asset-specific probability of ignition (POI). SCE has a collection of models that are used to calculate risk, probability and PSPS modeling. SCE uses the WRRM for the total risks for wildfire and PSPS.

SCE has room for improvement in the following areas:

- At this time, all three large utilities approach risk modeling differently. Although all three are using the same third-party vendor's modeling tool as part of their consequence risk modeling approach, the extent to which consequence risk and ignition risk are modeled seems to vary widely. While Energy Safety understands that each territory presents differing environments and ignition risks, modeling across the utilities should be more consistent.
- Inadequate transparency in accounting for ignition sources in risk modeling and mitigation selection. SCE should focus less on third-party contact as ignition sources given that they are independent of how SCE maintains and operates its system. Ignition occurrence is also not dependent on higher risk weather conditions or whether ignition sources are in higher consequence areas. This is especially true given that vehicle and balloon contact tend to happen in higher concentrations of urban areas, less prone to catastrophic fire spread.
- SCE did not show improvement in the maturity model in the areas of 1) ignition risk estimation, or 2) risk maps and simulation algorithms.
- SCE does not use the RSE score as a standalone driver for mitigation efforts. For example, a vertical switch program was initiated when evidence of sparking was discovered though routine inspections. Given the low POI, this effort would not have been identified by using subject matter experts.

**Key Areas for Improvement and Remedies**

Energy Safety finds that SCE must focus on the following areas as significant to reducing utility-related wildfire risk:

| Utility-# | Issue title | Issue description | Remedies required |
|---|---|---|---|
| SCE-21-03 | Lack of consistency in approach to wildfire risk modeling across utilities | The utilities do not have a consistent approach to wildfire risk modeling. For example, in their wildfire risk models, utilities use different types of data, use their individual data sets in different ways, and use different third-party vendors. Energy Safety recognizes that the utilities have differing service territory characteristics, differing data availability, and are at different stages in developing their wildfire risk models. However, the utilities face similar enough circumstances that there should be some level of consistency in statewide approaches to wildfire risk modeling. | The utilities[82] must collaborate through a working group facilitated by Energy Safety[83] to develop a more consistent statewide approach to wildfire risk modeling. After Energy Safety completes its evaluation of all the utilities' 2021 WMP Updates, it will provide additional detail on the specifics of this working group.<br><br>A working group to address wildfire risk modeling will allow for:<br>1. Collaboration among the utilities;<br>2. Stakeholder and academic expert input; and<br>3. Increased transparency. |
| SCE-21-10 | Inadequate transparency in accounting for ignition sources in risk modeling and mitigation selection | SCE's justification for high levels of covered conductor deployment is partially due to the high number of ignitions due to contact. However, many of such ignitions are from third-party contact, and do not necessarily occur in the HFTD and/or during wildfire season. Additionally, SCE does not provide sufficient detail as to how it accounts for third-party ignition sources in its risk models. | SCE must fully explain:<br>1. How third-party ignition sources feed into SCE's risk models;<br>2. How ignition sources impact SCE's mitigation selection process, including:<br>a. How SCE prioritizes ignition sources;<br>b. If SCE treats third-party ignition sources that are not under SCE's direct control differently than other ignition sources, and if so, how;<br>c. How SCE targets its mitigation efforts to reduce ignitions that are |

| | | | |
|---|---|---|---|
| | | | more likely to result in catastrophic wildfire conditions. |
| SCE-21-11 | Unclear how SCE's ignition models account for correlations in wind speeds, ignitions, and consequence | Despite an observed correlation between some ignition causes and high wind speed, SCE states that it "does not have enough wind-driven outage data at the circuit level to make determinations about correlations between wind speeds and outage rates."[84] It is unclear how SCE accounts for this correlation between wind speed and ignitions in its probability of ignition models. | SCE must:<br>1. Fully demonstrate that its probability of ignition models accurately account for the correlation between wind speed, ignition, and consequence; and<br>2. Explain:<br>a. Why SCE finds that is does not have enough "wind driven outage data at the circuit level,"<br>b. Specify the data required "to make determinations about correlations between wind speeds and outage rates," and<br>c. Explain how and when SCE plans to obtain such data moving forward. |

**Additional Issues and Remedies**

In addition to the key areas listed above, Energy Safety finds the following additional issues and associated remedies. Energy Safety expects SCE to take action to address these issues and report on progress made over the year in its 2022 WMP Update.

- ISSUE: SCE indicates historical climatology was used in its risk modeling and intends to develop forward looking climate scenarios into the 2022 modeling process. However, the maturity matrix model indicates progress in 2021.
    - REMEDY: Though SCE achieved several key milestones in 2020 which enhance risk analytics, evidence of maturity is unclear for historical climatology. SCE must demonstrate the improvements that have been implemented to support the corresponding progress indicated by its maturity matrix model.

[82] Here "utilities" refers to SCE, Pacific Gas and Electric Company (PG&E), San Diego Gas and Electric Company (SDG&E), PacifiCorp, Bear Valley Electric Service, Inc. (BVES), and Liberty Utilities; although this may not be the case every time "utilities" is used through the document

[83] The WSD is transitioning to the Office of Energy Infrastructure Safety (Energy Safety) on July 1, 2021.

[84] SCE Data Request Response MGRA-SCE-006-Q005

- ISSUE: SCE did not show improvement in the maturity matrix model in the areas of: 1) ignition risk estimation, and 2) risk maps and simulation algorithms. SCE predicts improvement in 2021 due to WRRM consequence modeling.
    - REMEDY: SCE must evaluate and report on whether it achieved its anticipated capability improvements in: 1) ignition risk estimation, and 2) risk maps and simulation algorithms. SCE must provide quantitative advancement results.

**Figures**

Below are charts, maps, and tables used as part of Energy Safety's review of SCE's risk assessment and mapping section:

SCE plans to spend $2.8 million in 2021 in non-initiative investments across three mapping activities. Chart inserted below

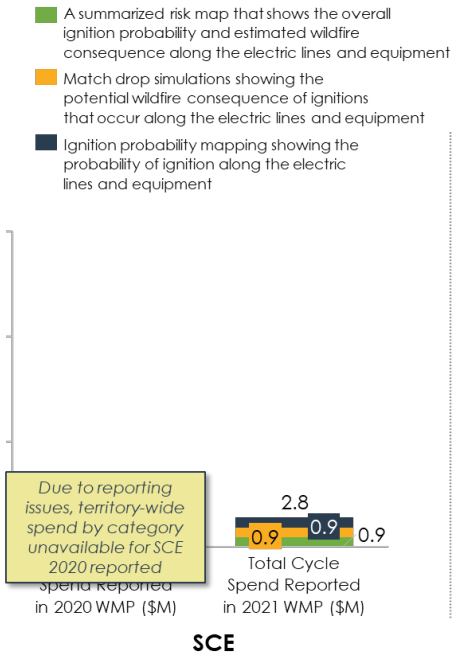
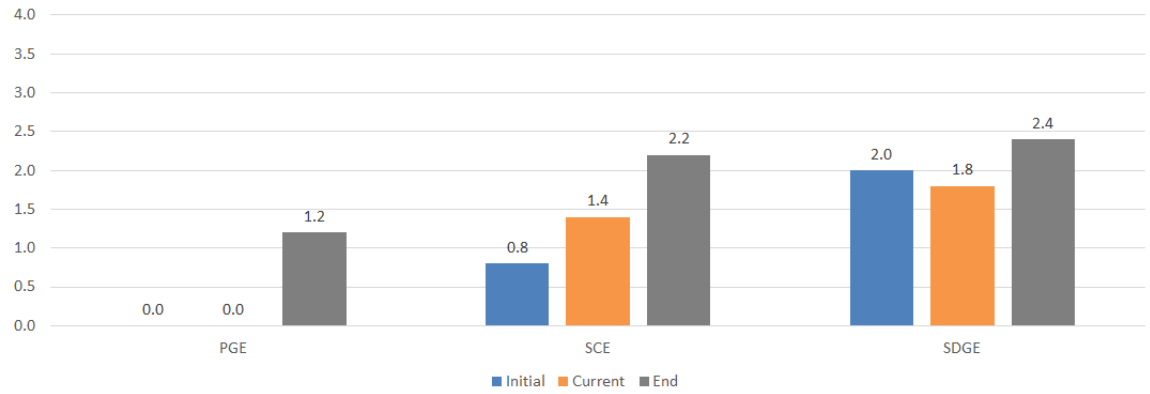
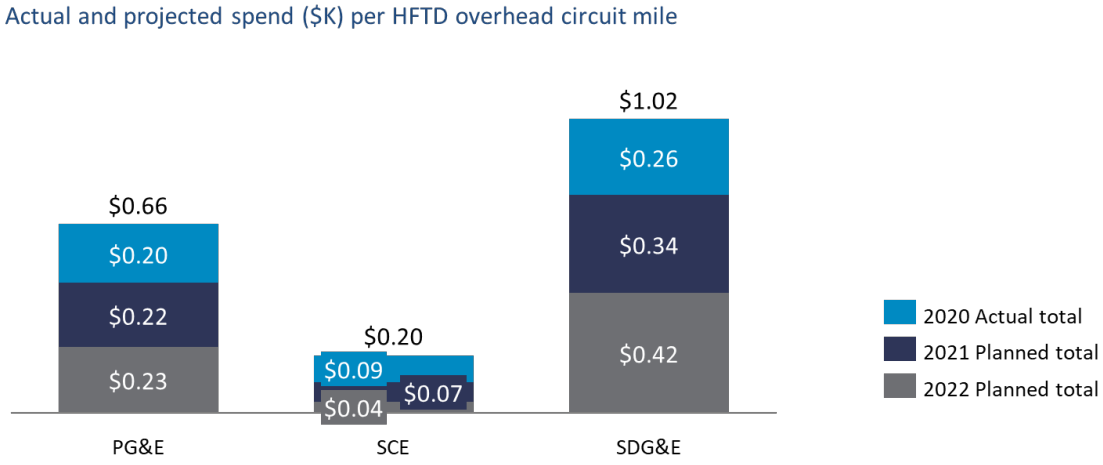



*Figure 5.1.a: SCE mapping initiatives.*




Source: 2021 Maturity Model survey data for PG&E, SCE and SDG&E

*Figure 5.1.b: Risk assessment & mapping maturity score progress.*




| | PG&E ($K) | SCE ($K) | SDG&E ($K) |
|---|---|---|---|
| **2020 Actual Total** | $0.20 | $0.09 | $0.26 |
| **2021 Planned Total** | $0.22 | $0.07 | $0.34 |
| **2022 Planned Total** | $0.23 | $0.04 | $0.42 |

Source: Table 12 of utility 2021 WMPs and subsequent data requests; PG&E and SCE Revision Notice Data

*Figure 5.1.c: Risk assessment & mapping spend per HFTD overhead circuit mile, large utilities, 2020-2022.*

## 5.2 Situational Awareness and Forecasting

### Introduction

A strong weather monitoring and situational awareness system is an essential fire prevention/mitigation risk reduction strategy because it effectively alerts a utility's preparation and response to potentially dangerous fire weather conditions that can inform its decisions on

PSPS implementation, grid design, and system hardening. It is also one of the most inexpensive strategies.

The situational awareness and forecasting section of the WMP Guidelines[85] requires the utility to discuss its use of cameras, weather stations, weather forecasting and modeling tools, grid monitoring sensors, fault indicators, and equipment monitoring. Situational awareness requires the utility to be aware of actual ignitions in real time and to understand the likelihood of utility ignitions based on grid and asset conditions, wind, fuel conditions, temperature, and other factors.

The WMP Guidelines refer to key situational awareness measures, including:

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

**Overview**

Energy Safety finds that SCE has made progress in situational awareness and forecasting and finds this portion of SCE's 2021 WMP update to be sufficient subject to remedies. SCE continues to enhance its situational awareness tools such as adding additional weather stations, improving its fire potential index (FPI), installing distribution fault anticipation (DFA) and early fault detection (EFD) technology, implementing high performance computing clusters to enhance weather and fuels modeling, and piloting remote sensing Lidar technology to collect wind observations above ground level, subject to remedies. SCE is expected to provide updates on its progress on identified issues in its ongoing required submissions with Energy Safety.

**Progress over the past year**

Energy Safety finds that SCE has made the following progress:

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[85] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, p. 44 (accessed July 12, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf

- In 2020, SCE reported it installed 593 additional weather stations, surpassing its program targeted goal of 375. This increased the utilities total weather station network to 1,050.[86] This should improve the level of granularity at the circuit level and should account for spatial gaps in its weather data. SCE intends to use this weather data in the future to help build machine learning models for better forecasting, which is in alignment with to SCE's maturity survey assessment.
- SCE has piloted and reported installing continuous monitoring sensors of DFA technology to 60 circuits and EFD technology to 33 circuits in 2020. SCE is planning to expand installations for 2021 to include 150 additional units of DFA technology and 117 units of EFD technology. This technology could proactively detect incipient failures prior to complete failure and reduce ignitions.[87] SCE is piloting an atmospheric wind profiler as a remote sensing technology project with San Jose State University (SJSU), which will use Lidar technology to collect wind observations above ground level. This will provide the ability to measure winds above the ground at a higher frequency interval during PSPS events. This is in alignment with the reported advancement in SCE's maturity survey assessment.
- SCE continues to improve its Fire Potential Index (FPI), which is an input into SCE's PSPS decision-making. This enhancement of FPI measurement could improve the accuracy of SCE's fire potential forecasting, in turn improving inputs into PSPS. Similar to peer utilities, SCE intends to recalibrate its FPI to include refreshed historical fire data. In addition, it will be evaluating a newly formulated FPI, which puts more emphasis on wind speeds, as well as incorporating a new fuels component calculated at a circuit segment level, which could potentially represent a more accurate FPI measurement capability.[88]
- SCE reported it trained 2,103 qualified personnel to monitor electric lines in 2020 to perform line patrols and live field observations for PSPS Events. This is an important element for situational awareness to capture real time field observations and provide line patrols before and after a PSPS event. SCE is exploring the use of Unmanned Aircraft Systems (UAS) and use of remote sensing technologies to supplement in-person patrols in the future.[89]
- In 2020, SCE reported it installed two High Performance Computing Clusters (HPCCs) to assist with the 2021 implementation of its NGWMS weather and fuels modeling. In 2021, SCE intends to procure and install two additional HPCCs to help operationalize the NGWMS by providing faster computing times, higher output resolution, and more

[86] SCE's 2021 WMP Update, p. 193

[87] SCE's 2021 WMP Update, p. 195

[88] SCE's 2021 WMP Update, pp. 197-198

[89] SCE's 2021 WMP Update, p. 203

accurate forecasting capabilities, with the goal of increasing its ability to make more targeted PSPS decisions.[90]

SCE has room for improvement in the following areas:

- None of SCE's "Progress on Initiative" sections in 7.3.2 include information on amount spent (or planned spend) in implementing and/or procuring technology and programs.
- There are no specifics included in SCE's plan on how it plans to fully automate its forecast process and incorporate automatic field calibration measurements for collected weather data by 2022.

**Issues and Remedies**

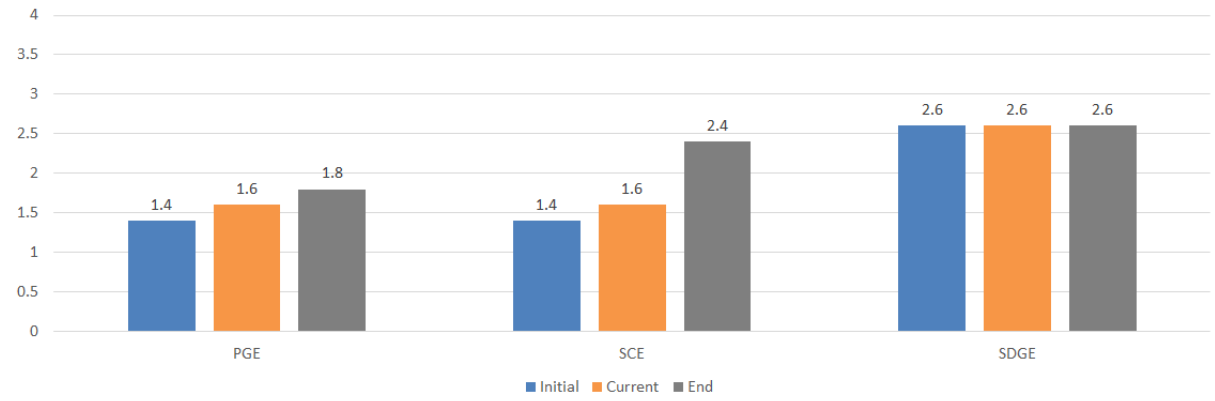
While Energy Safety did not identify key areas for improvement in this competency, Energy Safety finds the following issue and associated remedy. Energy Safety expects SCE to take action to address these issues and report on progress made over the year in its 2022 WMP Update.

- ISSUE: SCE is not moving forward with continuous monitoring pilots at the same installation pace as other utilities. Regarding continuous monitoring technology, at this point, SCE is not working towards greater coverage until the technology is proven to be beneficial.
    - REMEDY: SCE must: 1) Provide an update on the status of its continuous monitoring sensor pilots, including any intentions on expanding projects.
- ISSUE: SCE answered the questions related to its 2020 Class B Deficiencies (SCE-6, Actions SCE-14, and SCE-15; see Appendix 10.1), but there is no indication that SCE will be installing weather stations in locations requested in SCE-6 Class B Deficiency. It is unclear on whether SCE will be able to track predicted weather conditions away from its assets prior to them materializing in its service territory as well as its peer utilities.
    - REMEDY: SCE must discuss
      1) how the present and future effects of climate change are potentially informing weather station outputs and placement
      2) how SCE's weather station network is being used in its operations beyond PSPS deenergization related decision-making.
      3) progress and locations of weather stations derived from any partnerships with or applications to the USFS to install weather stations and "meteorological sample sites" as it relates to 36.2 CFR 220.6.

**Figures**

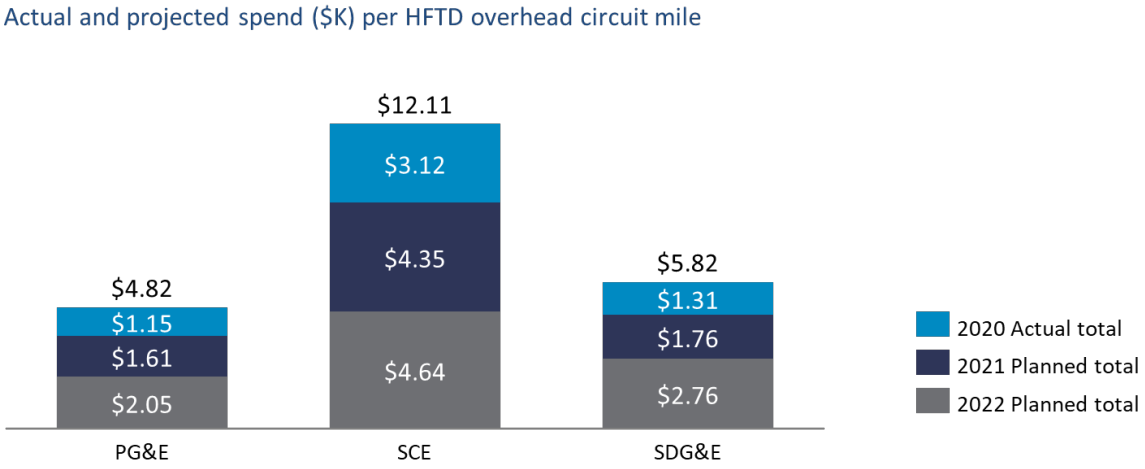
Below are charts, maps, and tables used as part of Energy Safety's review of SCE's risk assessment and mapping section:

[90] SCE's 2021 WMP Update, p. 204




Source: 2021 Maturity Model survey data for PG&E, SCE and SDG&E

*Figure 5.2.a: Situational awareness & forecasting maturity score progress.*




| | PG&E ($K) | SCE ($K) | SDG&E ($K) |
|---|---|---|---|
| **2020 Actual Total** | $1.15 | $3.12 | $1.31 |
| **2021 Planned Total** | $1.61 | $4.35 | $1.76 |
| **2022 Planned Total** | $2.05 | $4.64 | $2.76 |

Source: Table 12 of utility 2021 WMPs and subsequent data requests; PG&E and SCE Revision Notice Data

*Figure 5.2.b: Situational awareness & forecasting spend per HFTD overhead circuit mile, large utilities, 2020-2022.*

## 5.3 Grid Design and System Hardening

### Introduction

The grid design and system hardening section of the WMP Guidelines[91] examines how the utility is designing its system to reduce ignition risk and what it is doing to strengthen its distribution, transmission, and substation infrastructure to prevent causing catastrophic wildfires. This section also requires discussion of routine and non-routine maintenance programs, including whether the utility replaces or upgrades infrastructure proactively rather than running facilities to failure. Programs in this category, which often cover the most expensive aspects of a WMP, include initiatives such as the installation of covered conductors to replace bare overhead wires, undergrounding of distribution or transmission lines, and pole replacement programs. The utility is required, at a minimum, to discuss grid design and system hardening in each of the following areas:

1. Capacitor maintenance and replacement,
2. Circuit breaker maintenance and installation to de-energize lines upon detecting a fault,
3. Covered conductor installation,
4. Covered conductor maintenance,
5. Crossarm maintenance, repair, and replacement,
6. Distribution pole replacement and reinforcement, including with composite poles,
7. Expulsion fuse replacement,
8. Grid topology improvements to mitigate or reduce PSPS events,
9. Installation of system automation equipment,
10. Maintenance, repair, and replacement of connectors, including hotline clamps,
11. Mitigation of impact on customers and other residents affected during PSPS event,
12. Other corrective action,
13. Pole loading infrastructure hardening and replacement program based on pole loading assessment program,
14. Transformer maintenance and replacement,
15. Transmission tower maintenance and replacement,
16. Undergrounding of electric lines and/or equipment,
17. Updates to grid topology to minimize risk of ignition in HFTDs, and,
18. Other/not listed items if an initiative cannot feasibly be classified within those listed above.

[91] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, p. 44 (accessed May 27, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M352/K460/352460864.pdf

**Overview**

Energy Safety finds the Grid Design and System Hardening portion of SCE's 2021 WMP Update to be sufficient subject to remedies. SCE evaluated alternatives such as reconductoring with heavier gauge wire that would be less prone to faults and undergrounding that would eliminate most fault conditions. The RSE that SCE provides for covered conductor installation is among the highest of all WMP activities analyzed. However, despite Energy Safety identifying this as a critical issue within SCE's Revision Notice, Energy Safety finds that SCE still does not adequately justify the scope of its covered conductor program in its Revision Notice Response (as described below). SCE is expected to provide updates on its progress on identified issues in its ongoing required submissions with Energy Safety.

**Progress over the past year**

Energy Safety finds that SCE has made the following progress:

- SCE reported it installed Fast Curve (FC) settings on 109 relays and associated FC settings, exceeding its target of 55 relays.
- For Covered Conductor Installation:
    - SCE reported it completed 372 circuit miles in 2019 and 965 circuit miles in 2020, exceeding its WMP program target of 700 circuit miles for 2020. SCE plans on installing 1,000-1,400 circuit miles of covered conductor in 2021, and 1,600 circuit miles in 2022, for a total of more than 4,000 cumulative miles from 2018 to 2022.
    - SCE reported it replaced approximately 6,090 existing poles with Fire Resistant Poles (FRP) in the HFRA, exceeding its WMP program target of replacing 5,200 poles.
    - SCE reported it remediated 405 tree attachments, exceeding its 2020 WMP target of 325.
    - SCE is moving to a circuit segment basis for covered conductor deployment in order to raise thresholds for PSPS.
- SCE reported it achieved its target of installing/replacing fuses at 3,025 locations. This comprised 393 new installations and 2,632 replacements.
- SCE reported it completed its program target of reviewing 50% of circuits in the HFRA, including circuits impacted by PSPS in 2019. Analysis from 2020 resulted in SCE identifying mitigations/projects that could be implemented in other system hardening activities.
- SCE reported it completed all identified scope and met its WMP goal of installing 45 Remote Controlled Automatic Reclosers/Remote Controlled Switches (RAR/RCS) by installing 49 devices.

- SCE reported it met all milestones identified for SH-11 (Legacy Systems: updates to grid topology to minimize risk of ignition in HFTDs), including evaluating risk, scope, and alternatives for identified circuits, and evaluation of additional system hardening mitigation for wildlife fault protection and grounding/lightning arrestors.
- SCE documented performance of installed pilot next generation vertical switches to optimize design for each subsequent installation.

SCE has room for improvement in the following area:

- SCE does not provide sufficient justification to support its selection of covered conductor in the mitigation initiative selection process.
- SCE's rationale to support the selection of covered conductor as a preferred initiative to mitigate wildfire risk lacks consistency with other utilities.
- SCE does not provide sufficient evidence to demonstrate the effectiveness of covered conductor.
- SCE does not provide adequate justification for the scope and pace of its covered conductor installation program.
- SCE does not provide a risk buy-down curve with the information from its most updated wildfire risk models.

**Additional Discussion of Revision Notice Critical Issues**

As described in Section 1.2, Energy Safety issued a Revision Notice to SCE on May 4, 2021. SCE responded to the Revision Notice on June 3, 2021. The table below lists the critical issues contained in the Revision Notice specific to this section of the Action Statement followed by discussion.

| Critical issue | Description | Utility response | Energy Safety evaluation |
|---|---|---|---|
| RN-SCE-03 Inadequate justification for extensive utilization of covered conductor | SCE fails to provide adequate justification to support its selection of covered conductor in the mitigation initiative selection process. SCE does not provide RSE estimates for alternative mitigation initiatives, | SCE provided an overview of its covered conductor justification. The response also detailed its covered conductor deployment prioritization based on highest risk circuit | SCE's response provided additional justification but did not fully resolve this issue. See additional discussion below this table and the Key Areas for Improvement, SCE-21-02, SCE-21-04, SCE-21-05, SCE-21-06, SCE-21-10, and SCE-21-13, for remedies |

| Critical issue | Description | Utility response | Energy Safety evaluation |
|---|---|---|---|
| | precluding a meaningful comparison between initiatives and resulting in a lack of evidence to support SCE's selection of covered conductor. Additionally, SCE attempts to justify its plan for extensive, expedited covered conductor installation with the unsupported assertion that covered conductor installation is the sole mitigation alternative that will allow SCE to increase wind speed thresholds for Public Safety Power Shutoffs (PSPS). SCE fails justify this assertion and fails to commit to PSPS reductions post-covered conductor installation. | segments, how its deployment prioritization takes into account frequent PSPS events, how covered conductor effectiveness compares to alternatives, and how covered conductor is effective at reducing frequency and scope of PSPS events. | addressing this critical issue. See additional discussion as indicated, below this table. |

**Additional Discussion on Revision Notice Issue SCE-03**

While SCE provides a justification for choosing covered conductor as a preferred mitigation alternative, Energy Safety finds that SCE still does not adequately justify the scope of its covered conductor program. SCE does not sufficiently account for ignition drivers in mitigating risk, ineffectively accounts for third-party causes for contact ignitions, does not provide the most up-to-date risk assessment analysis for cumulative circuit segment risk, does not adequately allow for pilot programs to be considered as alternatives, and does not provide full analysis of all initiatives in reducing PSPS risk. Additionally, SCE's costs for covered conductor

are significantly lower than those of PG&E and SDG&E and SCE's RSE estimate for covered conductor is significantly higher than those of PG&E and SDG&E, both for unknown reasons.[92]

SCE justifies its extensive plan for covered conductor with a graph (see Figure 1 below) showing that destructive wildfires have recently occurred in SCE's service area on circuit-segments located in areas "further down the risk buydown curve that would remain uncovered under a more limited deployment scenario." [93,94] However, SCE does not provide enough information to adequately demonstrate the need for covered conductor for circuits ranked as lower risk by SCE's own risk ranking. For one, SCE does not identify the cause of each ignition, thereby making it impossible to determine if covered conductor would have prevented or reduced the likelihood of the ignition from occurring. This omission is particularly relevant given that SCE calculates that covered conductor installation reduces risk by only 64% and does not account for all ignition drivers.[95] SCE also fails to acknowledge that the majority of ignitions within SCE's service territory are caused by third-party contacts,[96] as covered by SCE-21-10 in Section 5.1. Lastly, the graph is based on SCE's previous risk model, used in 2020. While SCE states that "the concepts remain unchanged and valid,"[97] SCE must reassess risk based on its current risk assessment model including consequence, introduced in 2021, and reflect upon the accuracy of model outputs if actual risk is occurring beyond its own cumulative risk mile assessment. This is addressed in SCE-21-05 in Section 5.3.

[92] Key Area for Improvement SCE-21-04 addresses the cross-utility issue of developing a consistent approach to evaluating the long-term risk reduction and cost-effectiveness of covered conductor deployment

[93] SCE's 2021 WMP Update Revision – Redlined, p. 627

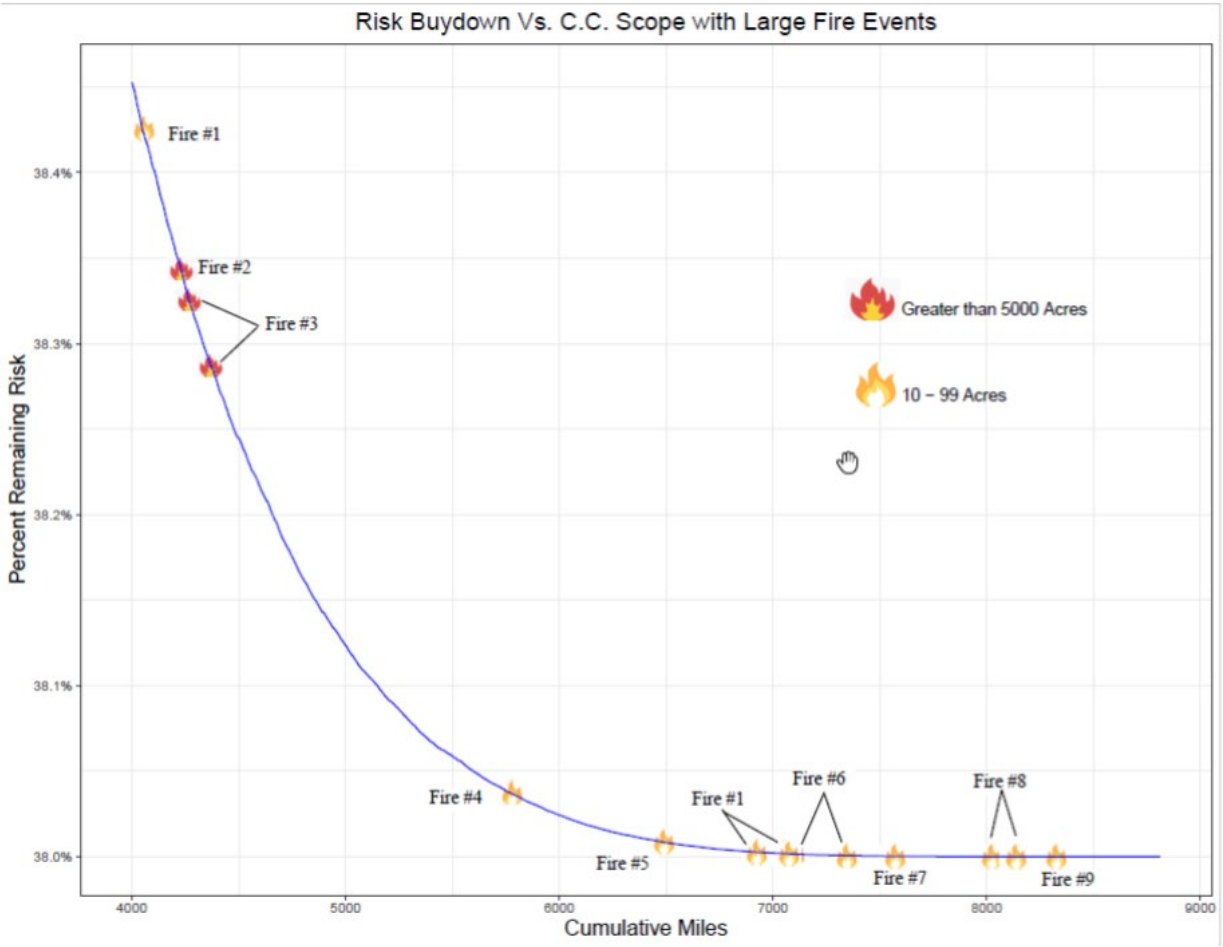
[94] Figure SCE 9.10-1 of SCE's 2021 WMP Update - Redlined shows that two fires greater than 5000 acres and 7 fires 10-99 acres in size occurred beyond the 2,110 cumulative mile risk ranking

[95] SCE's 2021 WMP Update Revision - Redlined, Table SCE 9.10-1, p. 624

[96] Based on the values provided in SCE's 2021 WMP Update, Table 7.2; "third-party" accounts for vehicle, balloon, and animal ignitions, which consist of 52, 102, and 75 ignitions at the distribution level respectively from 2015-2020; compared to 80 for vegetation ignitions. "Third-party" accounts for 69% of total contact ignitions at the distribution level from 2015-2020

[97] SCE's 2021 WMP Update Revision - Redlined, p. 627

Figure 1: SCE's Ignitions Against Risk Buydown[98]




SCE also fails to adequately account for how its existing pilot initiatives can be used as system-wide alternatives to covered conductor for reducing ignition risk. SCE states that some of these programs "are expected to reduce ignition risk for sections of circuits where covered conductors have not been deployed and equipment/poles have not been hardened."[99] However, SCE does not clarify which of its pilot programs fall under this designation. Regarding Rapid Earth Fault Current Limiter (REFCL), SCE states:

> *REFCL could potentially provide great benefit on the mitigation of ignition drivers, however, as stated earlier is still an on-going limited pilot and not ready for systemwide deployment. In addition, newer technologies such as REFCL are showing promise,*

[98] SCE's 2021 WMP Update Revision – Redlined, Figure SCE 9.10-1 Overlay of Historical Large Fire Events on SCE's Relative Risk Buydown Curve p. 628

[99] SCE's 2021 WMP Update Revision - Redlined, p. 639

*however, SCE is still evaluating results of the pilot to determine the ability to deploy at scale across SCE's service area.* [100]

Regarding Distribution Fault Anticipation (DFA), in Figure SCE 9.9-6,[101] SCE shows that DFA has a high RSE value, a shorter lead time than other alternatives, and high resource availability (that is, minimal constraints that would prevent near-term implementation). While SCE's internal analysis shows covered conductor to have a comparatively high ranking for addressing risk drivers and reducing risk, SCE should not discount promising pilot program alternatives. SCE claims that these pilot programs are not currently deployable at a system-wide scale. However, SCE's rapid pace for covered conductor installation does not allow consideration for deploying these programs in the future to potentially effectively reduce both risk and costs. Further analysis of pilot programs moving forward is covered in Section 5.2.

Within Table SCE 9.10-6 of SCE's 2021 WMP Update Revision,[102] SCE does not provide alternatives currently in pilot programs as part of its comparison.[103] Additionally, SCE only compares grid hardening alternatives, instead of expanding across all initiatives for a better understanding of how its full sweep of mitigations could affect and reduce PSPS risk. In order to capture how initiatives other than covered conductor can reduce PSPS thresholds, SCE needs to demonstrate that it has an understanding of how each initiative affects PSPS. This is covered by SCE-21-13 in Section 5.6 below.

SCE states that covered conductor is the primary grid hardening initiative utilized since "[compared] to viable alternatives with significant risk reduction benefits, specifically undergrounding and PSPS, covered conductor has proven to be more cost-effective (versus the former) with less societal impacts (versus the latter)."[104] However, Figure SCE 9.9-8 shows that covered conductor has a higher cost impact to customers.[105] Figure SCE 9.9-8 demonstrates that covered conductor has a high RSE value, which informed SCE's decision for further selection and deployment. However, SCE's costs for covered conductor are significantly lower than those of SDG&E and PG&E, and SCE's RSE value for covered conductor is significantly higher, as seen in Table 3 in Section 5.8 below. Since the cause for the differences is unknown

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[100] SCE's 2021 WMP Update Revision - Redlined, p. 640

[101] SCE's 2021 WMP Update Revision – Redlined, p. 596

[102] SCE's 2021 WMP Update Revision – Redlined, p. 644

[103] Table 9.10-6: Comparison of Expedited Grid Hardening Mitigation Measures only includes analysis on covered conductor, circuit segment exceptions, automated switches, updated switching and load rolling plans, temporary generators, and undergrounding. Notably, REFCL and DFA are excluded, despite SCE's proof of potential benefit

[104] SCE's 2021 WMP Update Revision - Redlined, p. 638

[105] SCE's 2021 WMP Update Revision – Redlined, p. 602

at this time, it is unclear whether SCE's estimates are accurate. Differences in RSE values and cost estimates are addressed in SCE-21-02 in Section 5.8 below. Additionally, SCE does not provide enough additional RSE values in response to Revision Notice SCE-01 (RN-SCE-01), as discussed above, therefore failing to provide a robust comparison of covered conductor with other alternatives.

SCE relies heavily on the CPUC's designation of Tier 2 and Tier 3 HFTDs to justify its extensive use of covered conductor, stating that "the Commission has already decided that the areas SCE will protect with covered conductor are inherently risky."[106] However, HFTDs were developed to identify "where there is an elevated hazard for the ignition and rapid spread of powerline fires due to strong winds, abundant dry vegetation, and other environmental conditions" in which "utility infrastructure and operations will be subject to stricter fire-safety regulations."[107] While the designation of HFTDs delineates increased wildfire risk, the designation does not inherently require covered conductor installation, and do not justify SCE's eventual plan for implementing covered conductor throughout the HFTD.[108] Currently, SCE is planning on installing up to 4,500 circuit miles of covered conductor from 2020 to 2022. SCE should scope and target its covered conductor program to effectively address risk as identified accurately through its risk models. SCE quotes TURN within its 2021 WMP Update Revision stating "if targeted properly, covered conductor can be an important and extremely effective wildfire risk mitigation tool"[109] but does not acknowledge that its current approach is not targeted in scope.

It is essential that SCE revisits the scope of its covered conductor program. SCE must clearly explain how it is prioritizing the covered conductor installation program based on wildfire and PSPS risk and consider the full range of alternative mitigation measures discussed above. If this shows that alternative measures are more appropriate, SCE must rescope its covered conductor program accordingly, as covered in SCE-21-06 in Section 5.3 below. To support this approach, SCE must further evaluate effectiveness of covered conductor jointly with other utilities, as covered in SCE-21-04 in section 5.3 below, and implement the required remedies listed below.

**Key Areas for Improvement and Remedies**

Energy Safety finds that SCE must focus on the following areas as significant to reducing utility-related wildfire risk:

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[106] SCE's 2021 WMP Update Revision - Redlined, p. 630

[107] https://www.cpuc.ca.gov/industries-and-topics/wildfires/fire-threat-maps-and-fire-safety-rulemaking

[108] SCE's 2021 WMP Update, p. 210

[109] SCE's 2021 WMP Update Revision - Redlined, p. 638

| Utility-# | Issue title | Issue description | Remedies required |
|---|---|---|---|
| SCE-21-04 | Limited evidence to support the effectiveness of covered conductor | The rationale to support the selection of covered conductor as a preferred initiative to mitigate wildfire risk lacks consistency among the utilities, leading some utilities to potentially expedite covered conductor deployment without first demonstrating a full understanding of its long-term risk reduction and cost-effectiveness. The utilities' current covered conductor pilot efforts are limited in scope[110] and therefore fail to provide a full basis for understanding how covered conductor will perform in the field. Additionally, utilities justify covered conductor installation by alluding to reduced PSPS risk but fail to provide adequate comparison to other initiatives' ability to reduce PSPS risk. | The utilities[111] must coordinate to develop a consistent approach to evaluating the long-term risk reduction and cost-effectiveness of covered conductor deployment, including:<br>1. The effectiveness of covered conductor in the field in comparison to alternative initiatives.<br>2. How covered conductor installation compares to other initiatives in its potential to reduce PSPS risk. |
| SCE-21-05 | Out-dated risk assessment used to justify the selection and scope of covered conductor as a mitigation initiative | SCE provides a risk buydown curve based on its old modeling efforts to justify the need for covered conductor. SCE acknowledges that its current models provide different and more accurate results but does not provide an updated risk buydown curve. SCE should not use outdated information to justify its covered conductor program scope. Additionally, if an updated risk buydown curve | SCE must:<br>1. Provide an updated Figure 9.01-1 based on SCE's latest risk modeling assessment, including the ignitions shown.<br>2. Provide the cause of the 9 ignitions shown in Figure 9.01-1.<br>3. For each of the nine ignitions shown, provide an assessment of the likelihood that covered conductor installation would have prevented the ignition. |

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|---|---|---|---|
| | | shows historic catstrophic ignitions on the low end of the curve, it raises doubts regarding the accuracy of SCE's wildfire risk models. | 4. Provide a similar risk buydown curve for all cumulative circuit miles, including historic ignitions and ignition size.<br>5. If the updated risk buydown curves provided in response to the above continue to show historic catastrophic ignitions on the low end of the risk buy down curve, then provide the calculated accuracy of SCE's current risk model. |
| SCE-21-06 | Inadequate justification for scope and pace of its covered conductor program | As described in Sections 1.1, 5.1, and 5.8, SCE does not provide adequate justification for the scope and pace of its covered conductor program. This is a recurring issue that was discussed in the WSD Action Statement for SCE's 2020 WMP and in the WSD Revision Notice for SCE's 2021 WMP Update. SCE's justification is not based on up-to-date circuit segment prioritization and risk calculations. Additionally, in SCE's justification for its covered conductor program, it does not discuss evaluating individual circuit segments to determine the most appropriate mitigation measure for that segment. Instead SCE proposes to deploy covered conductor regardless of the location, circumstances, | SCE must:<br>1. Re-evaluate the scope, and pace of its future covered conductor program using the outputs of its updated Wildfire Risk Models with an emphasis on:<br>i) The explicit consideration of all possible alternative mitigation initiatives along with a justification for why the preferred mitigation initiative was selected over and above the alternatives considered;<br>ii) Reduction of catastrophic wildfire risk;<br>iii) Reduction of PSPS events;<br>iv) Selecting mitigation initiatives for individual circuit segments based on the specific location, circumstances, and risk of catastrophic wildfire.<br>2. Re-evaluate the scope of SCE's covered conductor program based |

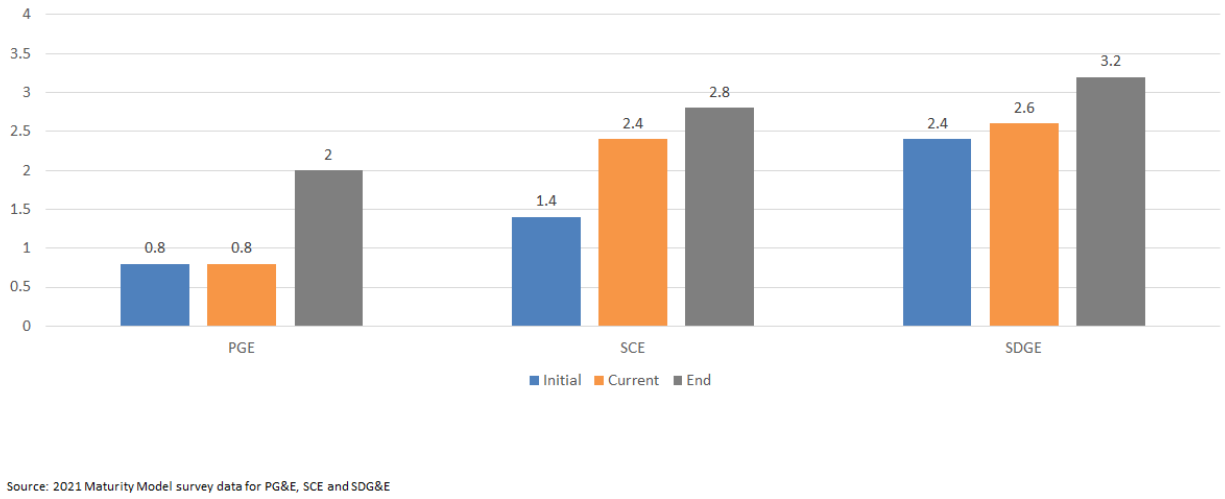
[110] Limited in terms of mileage installed, time elapsed since initial installation, or both

[111] Here "utilities" refers to SCE, Pacific Gas and Electric Company (PG&E), San Diego Gas and Electric Company (SDG&E), PacifiCorp, Bear Valley Electric Service, Inc. (BVES), and Liberty Utilities; although this may not be the case every time "utilities" is used through the document

| | | | |
|---|---|---|---|
| | | and risk of catastrophic wildfire for that circuit segment. | on the re-evaluation in part (1) as well as following remedies for other key issues identified within the Action Statement to specifically and effectively target risk of catastrophic wildfire and PSPS. |

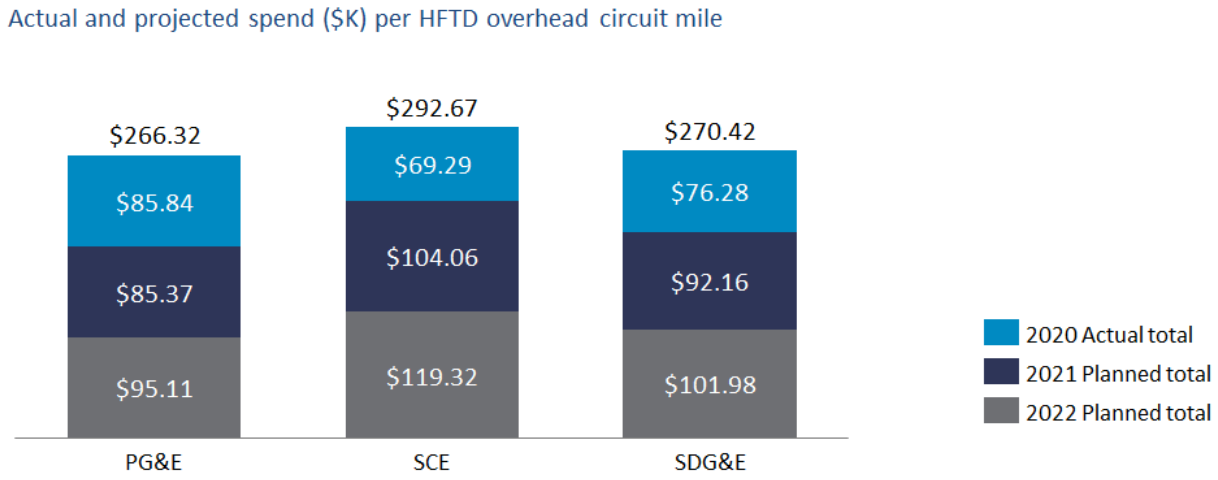
**Figures**

Below are charts, maps, and tables used as part of Energy Safety's review of SCE's risk assessment and mapping section:




Source: 2021 Maturity Model survey data for PG&E, SCE and SDG&E

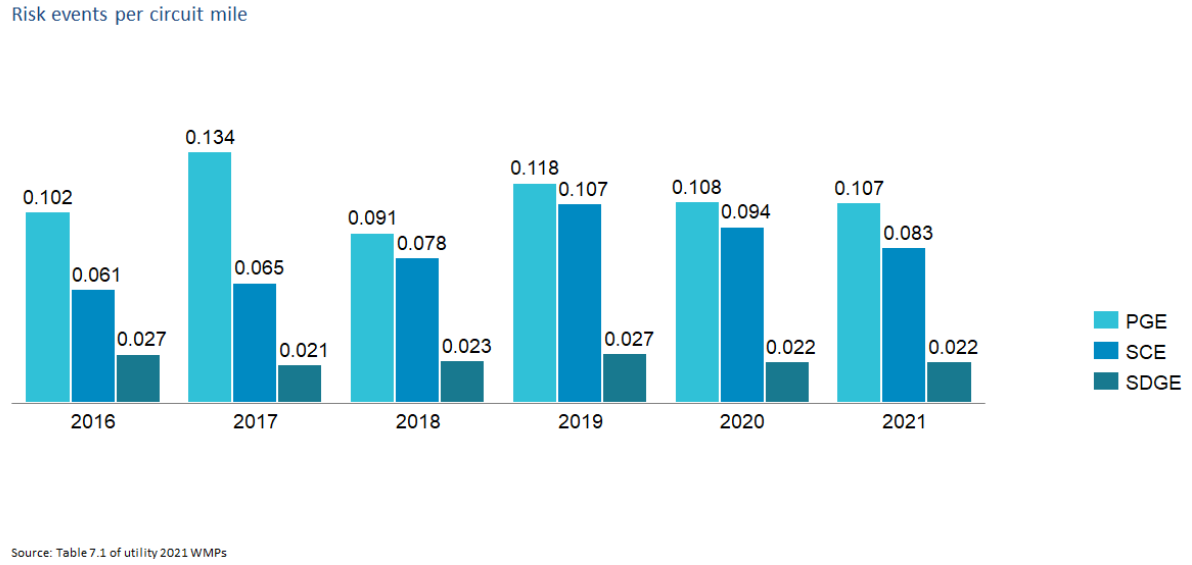
*Figure 5.3.a: Grid design & system hardening maturity score progress.*




| | PG&E ($K) | SCE ($K) | SDG&E ($K) |
|---|---|---|---|
| **2020 Actual Total** | $85.84 | $69.29 | $76.28 |
| **2021 Planned Total** | $85.37 | $104.06 | $92.16 |
| **2022 Planned Total** | $95.11 | $119.32 | $101.98 |

Source: Table 12 of utility 2021 WMPs and subsequent data requests; PG&E and SCE Revision Notice Data

*Figure 5.3.b: Grid design & system hardening spend per HFTD overhead circuit mile, large utilities, 2020-2022.*




Source: Table 7.1 of utility 2021 WMPs

*Figure 5.3.c: Risk events per circuit mile due to equipment/facility failure, large utilities.*

## 5.4 Asset Management and Inspections

### Introduction

The asset management and inspections section of the WMP Guidelines[112] requires the utility to discuss power line/infrastructure inspections for distribution and transmission assets within the HFTD, including infrared, light detection and ranging (LiDAR), substation, patrol, and detailed inspections, designed to minimize the risk of its facilities or equipment causing wildfires. The utility must describe its protocols relating to maintenance of any electric lines or equipment that could, directly or indirectly, relate to wildfire ignition. The utility must also describe how it ensures inspections are done properly through a program of quality control.

### Overview

Energy Safety finds that SCE has made progress in Asset Management and Inspections and finds this portion of SCE's 2021 WMP Update to be sufficient subject to remedies. SCE is expected to provide updates on its progress on identified issues in its ongoing required submissions with Energy Safety.

### Progress over the past year

Energy Safety finds that SCE has made the following progress:

- SCE's Overhead Detail Inspection (ODI) program reported conducting 56,895 inspections within its HFRA using the same inspection process as its risk-informed inspections. The compliance-due inspections identified 80 Priority 1 conditions requiring remediation and 5,362 Priority 2 conditions requiring remediation.
- SCE reported it inspected 9,717 HFRA transmission assets using the same inspection process as its risk informed inspection.
- SCE reported it completed infrared inspections of 5,900 circuit miles of its distribution lines.
- SCE's transmission infrared and corona inspection program reported inspecting 1,178 circuit miles in and around SCE's HFRA.
- SCE reported it performed 146,621 transmission and distribution intrusive inspections.

[112] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 44-45 (accessed July 12, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf

- SCE completed annual grid patrol of the required grids for its distribution and transmission lines.
- SCE reported performing approximately 1,200 pole loading assessments in its HFRA.
- SCE reported it performed more than 17,000 quality inspections in HFRA, exceeding its target of 5,000 inspections.
- The Failure Modes and Effects Analysis for Substation Failures[113] initiative (7.3.4.15 Substation Inspections) was finalized and found the following failure risks:
    - Foreign object contact was found to be the highest risk failure mode, of which animal contact comprised the majority of this risk, with mylar balloons and vegetation also accounting for substantial equipment failure.
    - Other risks which scored highly include failures of oil circuit breakers and failures of DC systems which disable the substation protection.
    - The total level of risk from these failures is substantially lower than for distribution and sub transmission assets.

**Key Areas for Improvement and Remedies**

Energy Safety finds that SCE must focus on the following areas as significant to reducing utility-related wildfire risk:

[113] From SCE's 2021 Update WMP, p. 252: The Substation FMEA initiative was discussed as WMP activity IN-7 in SCE's 2020 WMP. This activity concluded at the end of 2020 and will no longer be an activity in the 2021 WMP

| Utility-# | Issue title | Issue description | Remedies required |
|---|---|---|---|
| SCE-21-12 | Insufficient evidence of effective covered conductor maintenance program | SCE does not have a separate covered conductor maintenance program. On-going covered conductor inspection and maintenance is included in HFRI inspections and remediations and follow the same approach, schedule, and prioritization. Given SCE's plan for rapid deployment of covered conductor, it is particularly important that SCE has a comprehensive and effective plan for maintaining its covered conductor once installed. Additionally, SCE did not initially include vibration dampeners in its covered conductor installations, and states that it is now retrofitting its existing covered conductor with vibration dampeners. | SCE shall provide all supporting material to demonstrate that its maintenance programs effectively maintain its covered conductor, including the following information:<br>• Pace and quantity of scheduled maintenance;<br>• Pace and quantity of inspections; and<br>• Pace and quantity of vibration dampener installations.<br><br>If SCE finds that its existing maintenance programs do not provide effective maintenance for covered conductor, SCE shall:<br>1. Enhance its current operations to provide such maintenance; and<br>2. Detail the enhancements to its existing programs;<br>3. Provide all supporting material for the enhancements to its existing program, including the information listed above. |

**Additional Issues and Remedies**

In addition to the key areas listed above, Energy Safety finds the following additional issues and associated remedies. Energy Safety expects SCE to take action to address these issues and report on progress made over the year in its 2022 WMP Update.

- ISSUE: SCE plans to replace all C-hooks in its service territory over the next two years. However, SCE's current estimate of C-hooks in its HFTD areas is based on statistical modeling, not inspections. Additionally, SCE does not detail how it is determining the order in which C-hooks are replaced. Therefore, it is not possible to determine if SCE is appropriately considering the condition of each of its C-hooks in determining the highest

| Utility-# | Issue title | Issue description | Remedies required |
|---|---|---|---|
| SCE-21-07 | Inadequate joint plan to study the effectiveness of enhanced clearances | RCP Action-SCE-18 (Class A)[123] required SCE, PG&E, and SDG&E to "submit a joint, unified plan" to begin a study of the effectiveness of extended vegetation clearances.[124] SCE, PG&E, and SDG&E presented the "joint, unified" plan to Energy Safety on February 18, 2021. While it was apparent the three large utilities had discussed a unified approach, each utility presented differing analyses that would be performed to measure the effectiveness of enhanced clearances. This presentation's content was not included in the February 26, 2021 Supplemental Filing. Instead, SCE submitted its own plan to study the effectiveness of extended vegetation clearance as part of its | SCE, PG&E, and SDG&E will participate in a multi-year vegetation clearance study. Energy Safety will confirm the details of this study in due course. The objectives of this study are to:<br>1. Establish uniform data collection standards.<br>2. Create a cross-utility database of tree-caused risk events (i.e., outages and ignitions caused by vegetation contact).<br>3. Incorporate biotic and abiotic factors[125] into the determination of outage and ignition risk caused by vegetation contact.<br>4. Assess the effectiveness of enhanced clearances.<br><br>In preparation for this study and the eventual analysis, SCE must collect the relevant data; the required data are currently |

[123] A note about the numbered conditions referenced in this document: "RCP Action-SCE-[#]" here refers to one of the actions required by the WSD in its evaluation of SCE's Remedial Compliance Plan of 2020, issued Dec. 30, 2020. The WSD issued 20 such orders (RCP Action-SCE-1 through RCP Action-SCE-20). There are two other related sets of references in this document: "SCE-[#]" refers to one of the actions required by the WSD in its evaluation of SCE's 2020 WMP issued June 11, 2020 (SCE-1 through SCE-22). "QR Action-SCE-[#]" refers to one of the actions required by the WSD in its evaluation of SCE's first quarterly report issued Jan. 8, 2021 (QR Action-SCE-1 through Action-SCE-28). Additionally, there are conditions that may be referenced by "Guidance-[#]", which refer to the requirements made of PG&E, SCE, SDG&E, Bear Valley Electric Service, Liberty Utilities, and PacifiCorp, addressing key areas of weakness across all six WMPs in Resolution WSD-002 "Guidance Resolution on 2020 Wildfire Mitigation Plans" issued June 19, 2020 (Guidance-1 through Guidance-12)

[124] Wildfire Safety Division Evaluation of Southern California Edison's Remedial Compliance Plan, December 30, 2020, p. 10

[125] 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

| Utility-# | Issue title | Issue description | Remedies required |
|---|---|---|---|
| | | February 26, 2021 Supplemental Filing.<br><br>Energy Safety acknowledges the complexity of this issue; any study performed assessing the effectiveness of enhanced clearances will take years of data collection and rigorous analysis. | defined by the WSD Geographic Information System (GIS Data Reporting Standard for California Electrical Corporations - V2). Table 2 outlines the feature classes which Energy Safety believes will be most relevant to the study. Energy Safety will also be updating the GIS Reporting Standards in 2021, which may include additional data attributes for vegetation-related risk events. |
| SCE-21-08 | Incomplete identification of vegetation species and record keeping | SCE needs to ensure proper identification of trees to the species level. In response to RCP Action-SCE-20, SCE submitted "Action SCE-20 SRVP.xlsx": a list of all remediations required from the 2020 Canyon Patrols and Summer Readiness inspections.[126] Under the column labeled "tree_species," values include oak, pine, maple, etc. However, these are not tree species, but tree genera. | SCE must:<br>1. Use scientific names in its reporting (as opposed to common names). This change will be reflected in the upcoming updates to the WSD GIS Reporting Standard by Energy Safety.<br>2. Add genus and species designation input capabilities into its systems which track vegetation (e.g., vegetation inventory system and vegetation-caused outage reports).<br>3. Identify the genus and species of a tree that has caused an outage[127] or ignition[128] in the Quarterly Data Reports (QDRs) (in these cases, an unknown "sp." designation is not acceptable).<br>4. If the tree's species designation is unknown (i.e., if the inspector |

[126] SCE 2021 WMP Update Revision – Clean, p. 517

[127] WSD GIS Data Reporting Standard Version 2, Transmission Vegetation Caused Unplanned Outage (Feature Class), Section 3.4.5 & Distribution Vegetation Caused Unplanned Outage (Feature Class), Section 3.4.7

[128] WSD GIS Data Reporting Standard Version 2, Ignition (Feature Class), Section 3.4.3

| Utility-# | Issue title | Issue description | Remedies required |
|---|---|---|---|
| SCE-21-01 | RSE estimates not provided for all PSPS-related mitigation initiatives | SCE justifies its lack of RSE estimates for PSPS-related initiatives by quoting Resolution WSD-002, "… electrical corporations shall not use RSE as a means of justifying or evaluating the efficacy of PSPS as a mitigation measure." However, the WSD guidance is clear that the prohibition of RSE calculation is directed at PSPS as a mitigation activity only and does not extend to PSPS-related activities. RSE estimates enable the quantitative comparison of cost-effectiveness between various mitigation initiatives, and brings rigor to the decision-making process. | SCE must provide RSE estimates for PSPS-related activities and include a clear description to explain how these were developed and what assumptions were used. If the RSE estimates are zero or unattainable, SCE must explain why and provide qualitative and quantitative information to demonstrate how the PSPS-related activities inform PSPS decision-making. |
| SCE-21-02 | RSE values vary across utilities | Energy Safety is concerned by the stark variances in RSE estimates, sometimes on several orders of magnitude, for the same initiatives calculated by different utilities. For example, PGE's RSE for covered conductor installation was 4.08,[172] SDGE's RSE was 76.73,[173] and SCE's RSE was 4,192.[174] These drastic differences reveal that there are significant discrepancies between the utilities' inputs and assumptions, which further support the need for | The utilities[175] must collaborate through a working group facilitated by Energy Safety[176] to develop a more standardized approach to the inputs and assumptions used for RSE calculations. After Energy Safety completes its evaluation of the 2021 WMP Updates, it will provide additional detail on the specifics of this working group.<br><br>This working group will focus on addressing the inconsistencies between the inputs and assumptions used by the utilities |

- SCE is transitioning to using PSPS risk as a criterion when installing covered conductor, thereby targeting select areas of the grid expected to be frequently impacted by PSPS. It is also installing new switches allowing increased segmentation/isolation of mitigated circuits and circuit segments. In response to a critical issue included within SCE's Revision Notice SCE provided new information that 52 of the 72 circuits targeted for expedited assessment would have covered conductor installed in 2021.[186]
- SCE has invested in tools, technologies, and practices to better forecast potential wildfire conditions need for PSPS. These include: a situational awareness center staffed with meteorologists and GIS professionals, Installing additional weather stations increasing resolution of weather and fire potential predictions, accelerating modeling enhancements, and using fire spread predictions for PSPS, and fire monitoring cameras
- In 2021 SCE is implementing a new PSPS public safety partner portal, modeled after PG&E's, sharing similar outage, customer impact, and situational awareness update information through mapping and reporting.
- On frequently de-energized circuits SCE states in 2021 it will be able to reduce PSPS scope, frequency, and duration, assuming the same weather and fuel conditions as 2020. This anticipates benefits driven by three PSPS mitigations: circuit threshold adjustments, SCE's circuit exception process (i.e., burn scar areas taken out of scope due to low ignition risk), and deployment of backup power.[187]
- SCE indicates is expects to raise windspeed thresholds triggering PSPS implementation on circuits and circuit segments hardened by covered conductor installation, pending "circuit health" reviews.[188]
- In 2021, SCE is expanding its outreach support capability to better support Medical Baseline (MBL) customers by providing backup power during PSPS events through its Critical Care Battery Backup (CCBB) program to all eligible MBL customers that are enrolled. This will increase eligibility of the program from 2,500 to 13,000 customers in the HFTD.[189] In 2020 MBL 8,533 customers were affected by PSPS; while the projected impact for 2021 is 7,849.
- Additional program enhancements include a customer resiliency equipment incentive program, expansion of the number of Community Resource Centers (CRC), and in 2020, SCE enhanced customer care portions of its website
- SCE co-launched the California statewide Access and Functional Needs (AFN) Advisory Council with other utilities in 2020 to raise awareness of the needs of its AFN

[186] SCE's 2021 WMP Update Revision – Redlined, p. 353

[187] SCE's 2021 WMP Update Revision – Redlined, p. 356 - 30% reduction of customers de-energized in 2021; 25% reduction in number of circuits de-energized in 2021; 50% reduction in total customer minutes of disruption (CMI)

[188] SCE's 2021 WMP Update Revision – Redlined, p. 353 - Beginning with the 2021 wildfire season, the PSPS activation thresholds and de-energization thresholds for circuits where covered conductor has been installed on complete circuit segments will be increased to up to 40 mph sustained wind speed and 58 mph gust wind speed

[189] SCE's 2021 WMP Update Revision – Redlined, p. 346

SCE-21-10, and SCE-21-13 to further provide justification or potentially re-scope its covered conductor program based on the evaluations performed.

Further related to its discussion on RN-SCE-03, Energy Safety finds that SCE, "does not identify the cause of each ignition, thereby making it impossible to determine if covered conductor would have prevented or reduced the likelihood of the ignition from occurring."[200] SCE argues that this is incorrect and asserts that it does identify ignition causes through its Fire Incident Preliminary Analysis (FIPA) process.[201] While Energy Safety recognizes that SCE properly identifies ignition causes, the intent of this requirement is for SCE to provide analysis on the direct relation between ignition drivers and mitigation through the use of covered conductor at a specific circuit segment level.

In response to Energy Safety finding that SCE "relies heavily on the CPUC's designation of Tier 2 and Tier 3 HFTDs to justify its extensive use of covered conductor"[202] SCE maintains that the CPUC's Tier 2 and 3 designations support the deployment of covered conductor.[203] While Energy Safety recognizes that HFTD designations highlight areas of higher fire risk, SCE's mitigation deployment should primarily rely on its self-identified areas of highest risk.

SCE expresses concern in relation to SCE-21-06, which requires SCE to re-scope its covered conductor program. SCE notes that it plans to insert newly-identified high risk circuit segments into its scope once its risk models are updated. SCE then provides alternatives to re-scoping the entirety of its covered conductor program by adding any additional miles identified to the current scope.[204] However, this does not address the intent of the requirement, which is to ensure that SCE is implementing covered conductor effectively in areas that would provide the most benefit. Energy Safety does not expect SCE to rescope its entire covered conductor program, but instead re-evaluate its current scope and adjust, as possible and necessary. Energy Safety understands that some projects within the scope are too far along in progress to be reconsidered. However, SCE should still be re-evaluating any projects that are in earlier phases and for which alternative hardening methods may be more effective in reducing risk based on SCE's changing risk analysis, as well as, meeting requirements set throughout this Action Statement. Changes are reflected in the Action Statement above to provide better

[200] Final Action Statement on Southern California Edison's 2021 Wildfire Mitigation Plan Update, p. 52.

[201] SCE's Comments on Draft Resolution WSD-020, p. 3.

[202] Final Action Statement on Southern California Edison's 2021 Wildfire Mitigation Plan Update, p. 55.

[203] SCE's Comments on Draft Resolution WSD-020, p. 4.

[204] SCE's Comments on Draft Resolution WSD-020, pp. 5-6.

clarification of Energy Safety's expectations,[205] as well as further clarity on the mileage covered by SCE's 2021 WMP Update to be included as part of the re-evaluation.[206]

In its comments, SCE also expresses concerns in relation to Vegetation Management and Inspections findings. SCE recommends, citing previous comments from SDG&E,[207] that Energy Safety remove the requirements set forth in the SCE-21-08 remedy.[208] Energy Safety modified this remedy in response to SDG&E's comments, clarifying that identification to species is only required for vegetation that caused an outage or ignition and removing a requirement that would have asked SCE to "where possible…remedy any unknown species designations made in the field by the time [SCE] submits each Quarterly Data Report."[209] As such, Energy Safety has not removed or modified the remedy further based on SCE's comments.

In response to an Additional Issue and Remedy where Energy Safety required SCE to document all inspections of "exception trees",[210] SCE argues that this requirement should be removed, given that SCE "documents the geographic areas where supplemental inspections were performed."[211] As SCE has clarified how it documents supplemental vegetation inspections of "exception trees", Energy Safety has removed this Additional Issue and Remedy from the Final Action Statement.

SCE also commented that the Action Statement mischaracterized SCE's current process for inspecting, inventorying, and replacing C-hooks.[212] Instead of removing the associated Remedies from the Action Statement as proposed by SCE, the Remedies in this final Action Statement have been modified to include the possibility for SCE to prove that its current efforts are sufficient for properly identifying, tracking, and replacing C-hooks based on in-field observations.[213]

SCE expresses concern with Energy Safety's finding that, "SCE did not initially include vibration dampeners in its covered conductor installations, and states that it is now retrofitting its

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[205] Final Action Statement on Southern California Edison's 2021 Wildfire Mitigation Plan Update, p. 57.

[206] Final Action Statement on Southern California Edison's 2021 Wildfire Mitigation Plan Update, p. 49.

[207] SDG&E Comments to Draft Resolution Ratifying the Wildfire Safety Division's Approval of SDG&E's 2021 Wildfire Mitigation Plan Update, pp. 4-5.

[208] SCE's Comments on Draft Resolution WSD-020, p. 8.

[209] Draft Action Statement on San Diego Gas & Electric Company's 2021 Wildfire Mitigation Plan Update, p. 56.

[210] Draft Action Statement on Southern California Edison's 2021 Wildfire Mitigation Plan Update, pp. 71-72.

[211] SCE's Comments on Draft Resolution WSD-020, p. 8.

[212] SCE's Comments on Draft Resolution WSD-020, p. 10.

[213] Final Action Statement on Southern California Edison's 2021 Wildfire Mitigation Plan Update, p. 63.

existing covered conductor with vibration dampeners" (SCE-21-12).[214] SCE commented on vibrational dampeners not being an accurate reflection of covered conductor maintenance.[215] SCE has mis-understood the purpose of this statement, which is to emphasize that installation of vibrational dampeners post-reconductoring demonstrates the speed of changes to covered conductor installation, and possible changes moving forward. With that, it is an example for the need to understand changing maintenance needs, not a reflection of SCE's conduct.

SCE commented on an Issue and Remedy in the Situational Awareness and Forecasting category, which requires SCE to discuss how the present and future effects of climate change are potentially informing weather station outputs and placement.[216] SCE states that the impact of climate change on local wind speeds is very uncertain and cannot be used reasonably as a factor for weather station placement. Thus, SCE requests that this requirement be removed from the Action Statement.[217] Given that this remedy does not require SCE to place weather stations in specific areas based on climate change effects, but rather, to consider and discuss these potentials, Energy Safety will not be removing this requirement.

Finally, while noting its general support for the Change Order process set out in Section 7 of the Action Statement, SCE recommends that the criteria that would trigger a change order be modified or removed.[218] Energy Safety declines to make any changes at this time; however, after the issuance of all utility Action Statements, we will take all change order-related suggestions into consideration.

GPI's comments generally support Energy Safety's identified Key Areas for Improvement and associated Remedies, as well as many of the Additional Issues and Remedies.

GPI requested an additional requirement of SCE to undergo a vetting process of its modeling efforts similar to PG&E as part of its WMP Revision.[219] Energy Safety agrees that the vetting process of modeling proved beneficial in the overall analysis of utilities' modeling efforts and intends to consider implementing similar criteria as part of the modeling working group established in SCE-21-02.

GPI requested that its recommendation from its opening comments on SCE's 2021 WMP Update be included in the Public and Stakeholder Comment section of this Action Statement

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[214] Final Action Statement on Southern California Edison's 2021 Wildfire Mitigation Plan Update, pp. 16 and 62.

[215] SCE's Comments on Draft Resolution WSD-020, pp. 11-12.

[216] Final Action Statement on Southern California Edison's 2021 Wildfire Mitigation Plan Update, p. 46.

[217] SCE's Comments on Draft Resolution WSD-020, p. 12.

[218] SCE's Comments on Draft Resolution WSD-020, pp. 12-13.

[219] Comments of the Green Power Institute on Draft Resolution WSD-020, p. 2.

| Deficiency | Description | RCP/QR Determination | Status |
|---|---|---|---|
| **SCE-4,** (Class B) | **SCE risk reduction estimation requires further detail** | Sufficient (QR) | Conditions met, resolved |
| **SCE-5,** (Class B) | **Detailed timeline of Wildfire Risk Reduction Model (WRRM) implementation not provided** | Insufficient (QR)<br>QR Action SCE-12<br>QR Action SCE-13 | Conditions met, resolved |
| **SCE-6,** (Class B) | **SCE lacks sufficient weather station coverage** | Insufficient (QR)<br>QR Action SCE-14<br>QR Action SCE-15 | Conditions not met, progress being monitored |
| **SCE-7,** (Class B) | **Does not describe whether fire-resistant poles were factored into risk analysis** | Sufficient (QR) | Conditions met, resolved |
| **SCE-8,** (Class B) | **Lack of detail on hotline clamp replacement program** | Insufficient (QR)<br>QR Action SCE-16 | Wrapped into a new issue for 2021 |
| **SCE-9,** (Class B) | **Lack of detail regarding Pole Loading Assessment Program** | Sufficient (QR)<br>QR Action SCE-17 | Conditions not met, Progress being monitored (for GIS data for planned inspections) |
| **SCE-10,** (Class B) | **Lack of detail on effectiveness of inspection program QA/QC** | Insufficient (QR)<br>QR Action SCE-18<br>QR Action SCE-19 | Conditions met, resolved |
| **SCE-12,** (Class A) | **SCE Does Not Provide Evidence of Effectiveness of Increased Vegetation Clearances** | Insufficient (RCP)<br>RCP Action SCE-16<br>RCP Action SCE-17<br>RCP Action SCE-18 | Wrapped into a new key issue for 2021, specific to RCP Action SCE-18 |
| **SCE-13,** (Class A) | **Lack of Advancement in Vegetation Management and Inspections** | Insufficient (RCP)<br>RCP Action SCE-19<br>RCP Action SCE-20 | Conditions met, resolved |
| **SCE-14,** (Class B) | **SCE relies only on growth rate to identify "at-risk" tree species** | Insufficient (QR)<br>QR Action SCE-20<br>QR Action SCE-21 | Conditions met, resolved |
| **SCE-15,** (Class B) | **Lack of detail on how SCE addresses fast-growing species.** | Insufficient (QR)<br>QR Action SCE-22<br>QR Action SCE-23 | Wrapped into a new issue for 2021 |
| **SCE-16,** (Class C) | **Lack of ISA-Certified Assessors** | Provide an analysis of the expected incremental cost and incremental risk reduction benefit of hiring, training, | Wrapped into a new key issue for 2021 |

# 11. Attachments

## 11.1 Attachment 1: SCE's 2021 Maturity Survey

### 11.1.1. SCE: Description of Data Sources

Data related to the Maturity Model is based on the latest submitted versions of 2021 Utility Wildfire Mitigation Maturity Survey ("Survey") as of May 5, 2021. Data for the Maturity Model is pulled from Survey responses unless stated otherwise.

All source data (the WMP and the Survey responses) are available at: https://energysafety.ca.gov/what-we-do/wildfire-mitigation-and-safety/wildfire-mitigation-plans/.

All the analysis and corresponding tables presented in this appendix rely upon data that is self-reported by the utilities. By utilizing and presenting this self-reported data in this appendix, Energy Safety is not independently validating that all data elements submitted by utilities are accurate. Energy Safety will continue to evaluate utility data, conduct data requests, and conduct additional compliance activities to ensure that data provided is accurate.

### 11.1.2. SCE: Introduction to Maturity Model Scoring[224]

In order to determine "maturity" in any one capability, Energy Safety assigned levels to each aspect of the electrical corporations' wildfire mitigation efforts. Each capability was assigned a level, from 0 – 4 range, with 0 being the lowest and 4 the highest. Energy Safety calculated a maturity level, in accordance with the required elements to achieve each level, as outlined in the maturity model rubric.

The levels were calculated using an "all or nothing" binary approach. That is, levels are reported as whole numbers only.[225] Thus, in order to reach a specific maturity level, an electrical corporation would have to meet 100 percent of the threshold requirements for that level, as detailed in the maturity model rubric. In general, the maturity model rubric outlines numerous elements that are required to be met to achieve a given level, and the sophistication of requirements to reach a level typically increases with each successively higher maturity level.

[224] From WSD-002 p. 10-11

[225] Note: The category averages shown in 11.1.3 (below) average the capability scores and may include decimals

| Capability 14. Risk-based grid hardening and cost efficiency | | | |
|---|---|---|---|
| **Capability maturity level based on Maturity Rubric (0 - 4)** | Start of cycle: 1 | By end of year 1 (current): 2 | Planned state by end of cycle: 2 (projected) |
| **Responses to survey questions**<br>Survey questions and the utility's responses are shown below | | | |
| **Question** | **Start of cycle** | **By end of year 1 (current)** | **Planned state by end of cycle** |
| 14a: Does the utility have an understanding of the risk spend efficiency of hardening initiatives? | ii. Utility has an accurate understanding of the relative cost and effectiveness of different initiatives | iii. Utility has an accurate understanding of the relative cost and effectiveness of different initiatives, tailored to the circumstances of different locations on its grid | iii. Utility has an accurate understanding of the relative cost and effectiveness of different initiatives, tailored to the circumstances of different locations on its grid |
| 14b: At what level can estimates be prepared? | ii. Regional | iii. Circuit-based | v. Asset-based |
| 14c: How frequently are estimates updated? | iii. Annually or more frequently | iii. Annually or more frequently | iii. Annually or more frequently |
| 14d: What grid hardening initiatives does the utility include within its evaluation? | iii. Most | iii. Most | iii. Most |
| 14e: Can the utility evaluate risk reduction synergies from combination of various initiatives? | i. No | i. No | ii. Yes |

| Capability 15. Grid design and asset innovation | | | |
|---|---|---|---|
| **Capability maturity level based on Maturity Rubric (0 - 4)** | Start of cycle: 2 | By end of year 1 (current): 2 | Planned state by end of cycle: 2 (projected) |
| **Responses to survey questions**<br>Survey questions and the utility's responses are shown below | | | |
| **Question** | **Start of cycle** | **By end of year 1 (current)** | **Planned state by end of cycle** |
| 15 : How are new hardening solution initiatives evaluated? | iii. New initiatives evaluated based on installation into grid and measuring direct reduction in ignition events, and measuring reduction impact on near-miss metrics | iii. New initiatives evaluated based on installation into grid and measuring direct reduction in ignition events, and measuring reduction impact on near-miss metrics | iii. New initiatives evaluated based on installation into grid and measuring direct reduction in ignition events, and measuring reduction impact on near-miss metrics |
| 15b: Are results of pilot and commercial deployments, including project performance, project cost, geography, climate, vegetation etc. shared in sufficient detail to inform decision making at other utilities? | ii. Yes, with a limited set of partners | iii. Yes, extensively with industry, academia, and other utilities | iii. Yes, extensively with industry, academia, and other utilities |
| 15 : Is performance of new initiatives independently audited? | i. No | i. No | i. No |
| | | | |

# Category D. Asset management and inspections

| | Avg cycle start maturity: 1.8 | Avg current maturity: 2.2 | Avg projected cycle end maturity: 2.4 |
|---|---|---|---|
| **Capability 16. Asset inventory and condition assessments** | | | |
| **Capability maturity level based on Maturity Rubric (0 - 4)** | Start of cycle: 2 | By end of year 1 (current): 2 | Planned state by end of cycle: 2 (projected) |
| **Responses to survey questions**<br>Survey questions and the utility's responses are shown below | | | |
| **Question** | **Start of cycle** | **By end of year 1 (current)** | **Planned state by end of cycle** |
| 16a: What information is captured in the equipment inventory database? | iii. There is an accurate inventory of equipment that may contribute to wildfire risk, including age, state of wear, and expected lifecycle, including records of all inspections and repairs | iii. There is an accurate inventory of equipment that may contribute to wildfire risk, including age, state of wear, and expected lifecycle, including records of all inspections and repairs | iv. There is an accurate inventory of equipment that may contribute to wildfire risk, including age, state of wear, and expected lifecycle, including records of all inspections and repairs and up-to-date work plans on expected future repairs and replacements |
| 16 : How frequently is the condition assessment updated? | iv. Monthly | iv. Monthly | iv. Monthly |
| 16c: Does all equipment in HFTD areas have the ability to detect and respond to malfunctions? | ii. A system and approach are in place to reliably detect incipient malfunctions likely to cause ignition | ii. A system and approach are in place to reliably detect incipient malfunctions likely to cause ignition | iii. Sensorized, continuous monitoring equipment is in place to determine the state of equipment and reliably detect incipient malfunctions likely to cause ignition |
| 16 : How granular is the inventory? | iii. At the asset level | iii. At the asset level | iii. At the asset level |

| Capability 17. Asset inspection cycle | | | |
|---|---|---|---|
| **Capability maturity level based on Maturity Rubric (0 - 4)** | Start of cycle: 1 | By end of year 1 (current): 2 | Planned state by end of cycle: 3 (projected) |
| **Responses to survey questions**<br>Survey questions and the utility's responses are shown below | | | |
| **Question** | **Start of cycle** | **By end of year 1 (current)** | **Planned state by end of cycle** |
| 17a: How frequent are your patrol inspections? | iii. Above minimum regulatory requirements, with more frequent inspections for highest risk equipment | iii. Above minimum regulatory requirements, with more frequent inspections for highest risk equipment | iii. Above minimum regulatory requirements, with more frequent inspections for highest risk equipment |
| 17b: How are patrol inspections scheduled? | i. Based on annual or periodic schedules | ii. Based on up-to-date static maps of equipment types and environment | iii. Risk, as determined by predictive modeling of equipment failure probability and risk causing ignition |
| 17c: What are the inputs to scheduling patrol inspections? | i. At least annually updated or verified static maps of equipment and environment | i. At least annually updated or verified static maps of equipment and environment | ii. Predictive modeling of equipment failure probability and risk |
| 17d: How frequent are detailed inspections? | iii. Above minimum regulatory requirements, with more frequent inspections for highest risk equipment | iii. Above minimum regulatory requirements, with more frequent inspections for highest risk equipment | iii. Above minimum regulatory requirements, with more frequent inspections for highest risk equipment |
| 17e: How are detailed inspections scheduled? | iii. Risk, as determined by predictive modeling of equipment failure probability and risk causing ignition | iii. Risk, as determined by predictive modeling of equipment failure probability and risk causing ignition | iii. Risk, as determined by predictive modeling of equipment failure probability and risk causing ignition |
| 17f: What are the inputs to scheduling detailed inspections? | ii. Predictive modeling of equipment failure probability and risk | ii. Predictive modeling of equipment failure probability and risk | ii. Predictive modeling of equipment failure probability and risk |
| 17g: How frequent are your other inspections? | iii. Above minimum regulatory requirements, with more frequent inspections for highest risk equipment | iii. Above minimum regulatory requirements, with more frequent inspections for highest risk equipment | iii. Above minimum regulatory requirements, with more frequent inspections for highest risk equipment |

| | | | |
|---|---|---|---|
| 17h: How are other inspections scheduled? | i. Based on annual or periodic schedules | iii. Risk, as determined by predictive modeling of equipment failure probability and risk causing ignition | iii. Risk, as determined by predictive modeling of equipment failure probability and risk causing ignition |
| 17i: What are the inputs to scheduling other inspections? | i. At least annually updated or verified static maps of equipment and environment | ii. Predictive modeling of equipment failure probability and risk | ii. Predictive modeling of equipment failure probability and risk |

| Capability 18. Asset inspection effectiveness | | | |
|---|---|---|---|
| **Capability maturity level based on Maturity Rubric (0 - 4)** | Start of cycle: 1 | By end of year 1 (current): 2 | Planned state by end of cycle: 2 (projected) |
| **Responses to survey questions**<br>Survey questions and the utility's responses are shown below | | | |
| **Question** | **Start of cycle** | **By end of year 1 (current)** | **Planned state by end of cycle** |
| 18a: What items are captured within inspection procedures and checklists? | iii. Patrol, detailed, enhanced, and other inspection procedures and checklists include all items required by statute and regulations, and includes lines and equipment typically responsible for ignitions and near misses | iii. Patrol, detailed, enhanced, and other inspection procedures and checklists include all items required by statute and regulations, and includes lines and equipment typically responsible for ignitions and near misses | iii. Patrol, detailed, enhanced, and other inspection procedures and checklists include all items required by statute and regulations, and includes lines and equipment typically responsible for ignitions and near misses |
| 18b: How are procedures and checklists determined? | ii. Based on predictive modeling based on vegetation and equipment type, age, and condition | ii. Based on predictive modeling based on vegetation and equipment type, age, and condition | ii. Based on predictive modeling based on vegetation and equipment type, age, and condition |
| 18c: At what level of granularity are the depth of checklists, training, and procedures customized? | i. Across the service territory | v. At the asset level | v. At the asset level |

| Capability 19. Asset maintenance and repair | | | |
|---|---|---|---|
| **Capability maturity level based on Maturity Rubric (0 - 4)** | Start of cycle: 3 | By end of year 1 (current): 3 | Planned state by end of cycle: 3 (projected) |
| **Responses to survey questions**<br>Survey questions and the utility's responses are shown below | | | |
| **Question** | **Start of cycle** | **By end of year 1 (current)** | **Planned state by end of cycle** |
| 19a: What level are electrical lines and equipment maintained at? | iii. Electrical lines and equipment maintained as required by regulation, and additional maintenance done in areas of grid at highest wildfire risk based on detailed risk mapping | iii. Electrical lines and equipment maintained as required by regulation, and additional maintenance done in areas of grid at highest wildfire risk based on detailed risk mapping | iii. Electrical lines and equipment maintained as required by regulation, and additional maintenance done in areas of grid at highest wildfire risk based on detailed risk mapping |
| 19b: How are service intervals set? | i. Based on wildfire risk in relevant area | ii. Based on wildfire risk in relevant circuit | ii. Based on wildfire risk in relevant circuit |
| 19c: What do maintenance and repair procedures take into account? | ii. Wildfire risk, performance history, and past operating conditions | ii. Wildfire risk, performance history, and past operating conditions | ii. Wildfire risk, performance history, and past operating conditions |

| Capability 20. QA/QC for asset management | | | |
|---|---|---|---|
| **Capability maturity level based on Maturity Rubric (0 - 4)** | Start of cycle: 2 | By end of year 1 (current): 2 | Planned state by end of cycle: 2 (projected) |
| **Responses to survey questions**<br>Survey questions and the utility's responses are shown below | | | |
| **Question** | **Start of cycle** | **By end of year 1 (current)** | **Planned state by end of cycle** |
| 20a: How is contractor activity audited? | ii. Through an established and functioning audit process to manage and confirm work completed by subcontractors | ii. Through an established and functioning audit process to manage and confirm work completed by subcontractors | ii. Through an established and functioning audit process to manage and confirm work completed by subcontractors |
| 20b: Do contractors follow the same processes and standards as utility's own employees? | ii. Yes | ii. Yes | ii. Yes |
| 20c: How frequently is QA/QC information used to identify deficiencies in quality of work performance and inspections performance? | iv. Regularly | iv. Regularly | iv. Regularly |
| 20d: How are work and inspections that do not meet utility-prescribed standards remediated? | ii. QA/QC information is used to identify systemic deficiencies in quality of work and inspections | ii. QA/QC information is used to identify systemic deficiencies in quality of work and inspections | iii. QA/QC information is used to identify systemic deficiencies in quality of work and inspections, and recommend training based on weaknesses |
| 20e: Are workforce management software tools used to manage and confirm work completed by subcontractors? | ii. Yes | ii. Yes | ii. Yes |

# Category E. Vegetation management and inspections

| | Avg cycle start maturity: 2 | Avg current maturity: 2.8 | Avg projected cycle end maturity: 3 |
|---|---|---|---|
| **Capability 21. Vegetation inventory and condition assessments** | | | |
| **Capability maturity level based on Maturity Rubric (0 - 4)** | Start of cycle: 3 | By end of year 1 (current): 3 | Planned state by end of cycle: 3 (projected) |
| **Responses to survey questions**<br>Survey questions and the utility's responses are shown below | | | |
| **Question** | **Start of cycle** | **By end of year 1 (current)** | **Planned state by end of cycle** |
| 21a: What information is captured in the inventory? | iv. Centralized inventory of vegetation clearances, including individual vegetation species and their expected growth rate, as well as individual high risk-trees across grid | iv. Centralized inventory of vegetation clearances, including individual vegetation species and their expected growth rate, as well as individual high risk-trees across grid | iv. Centralized inventory of vegetation clearances, including individual vegetation species and their expected growth rate, as well as individual high risk-trees across grid |
| 21b: How frequently is inventory updated? | v. Within 1 day of collection | v. Within 1 day of collection | v. Within 1 day of collection |
| 21c: Are inspections independently verified by third party experts? | ii. Yes | ii. Yes | ii. Yes |
| 21d: How granular is the inventory? | iv. Asset-based | iv. Asset-based | iv. Asset-based |

| Capability maturity level based on Maturity Rubric (0 - 4) | Start of cycle: 1 | By end of year 1 (current): 4 | Planned state by end of cycle: 4 (projected) |
|---|---|---|---|
| **Responses to survey questions**<br>Survey questions and the utility's responses are shown below | | | |
| **Question** | **Start of cycle** | **By end of year 1 (current)** | **Planned state by end of cycle** |
| 45a: Does the utility provide clear and substantially complete communication of available information relevant to affected customers? | ii. Yes | iii. Yes, along with referrals to other agencies | iii. Yes, along with referrals to other agencies |
| 45b: What percent of affected customers receive complete details of available information? | v. >99.9% of medical baseline customers | v. >99.9% of medical baseline customers | v. >99.9% of medical baseline customers |
| 45c: What percent of affected medical baseline customers receive complete details of available information? | v. >99.9% of medical baseline customers | v. >99.9% of medical baseline customers | v. >99.9% of medical baseline customers |
| 45d: How does the utility assist where helpful with communication of information related to power outages to customers? | ii. Through availability of relevant evacuation information and links on website and toll-free telephone number, and assisting disaster response professionals as requested | ii. Through availability of relevant evacuation information and links on website and toll-free telephone number, and assisting disaster response professionals as requested | ii. Through availability of relevant evacuation information and links on website and toll-free telephone number, and assisting disaster response professionals as requested |
| 45e: How does the utility with engage other emergency management agencies during emergency situations? | iii. Utility has detailed and actionable established protocols for engaging with emergency management organizations | iii. Utility has detailed and actionable established protocols for engaging with emergency management organizations | iii. Utility has detailed and actionable established protocols for engaging with emergency management organizations |
| 45f: Does the utility communicate and coordinate resources to communities during emergencies (e.g., shelters, supplies, transportation etc.)? | ii. Yes | ii. Yes | ii. Yes |

| Capability 46. Protocols in place to learn from wildfire events | | | |
|---|---|---|---|
| **Capability maturity level based on Maturity Rubric (0 - 4)** | Start of cycle: 4 | By end of year 1 (current): 4 | Planned state by end of cycle: 4 (projected) |
| **Responses to survey questions**<br>Survey questions and the utility's responses are shown below | | | |
| **Question** | **Start of cycle** | **By end of year 1 (current)** | **Planned state by end of cycle** |
| 46a: Is there a protocol in place to record the outcome of emergency events and to clearly and actionably document learnings and potential process improvements? | ii. Yes | ii. Yes | ii. Yes |
| 46b: Is there a defined process and staff responsible for incorporating learnings into emergency plan? | ii. Yes | ii. Yes | ii. Yes |
| 46c: Once updated based on learnings and improvements, is the updated plan tested using "dry runs" to confirm its effectiveness? | ii. Yes | ii. Yes | ii. Yes |
| 46d: Is there a defined process to solicit input from a variety of other stakeholders and incorporate learnings from other stakeholders into the emergency plan? | ii. Yes | ii. Yes | ii. Yes |

| Capability 47. Processes for continuous improvement after wildfire and PSPS |
|---|

| Capability maturity level based on Maturity Rubric (0 - 4) | Start of cycle: 2 | By end of year 1 (current): 2 | Planned state by end of cycle: 2 (projected) |
|---|---|---|---|
| **Responses to survey questions**<br>Survey questions and the utility's responses are shown below | | | |
| **Question** | **Start of cycle** | **By end of year 1 (current)** | **Planned state by end of cycle** |
| 47a: Does the utility conduct an evaluation or debrief process after a wildfire? | ii. Yes | ii. Yes | ii. Yes |
| 47b: Does the utility conduct a customer survey and utilize partners to disseminate requests for stakeholder engagement? | iii. Both | iii. Both | iii. Both |
| 47c: In what other activities does the utility engage? | iv. Public listening sessions, debriefs with partners, and others | iv. Public listening sessions, debriefs with partners, and others | iv. Public listening sessions, debriefs with partners, and others |
| 47d: Does the utility share with partners findings about what can be improved? | ii. Yes | ii. Yes | ii. Yes |
| 47e: Are feedback and recommendations on potential improvements made public? | ii. Yes | ii. Yes | ii. Yes |
| 47f: Does the utility conduct proactive outreach to local agencies and organizations to solicit additional feedback on what can be improved? | ii. Yes | ii. Yes | ii. Yes |
| 47g: Does the utility have a clear plan for post-event listening and incorporating lessons learned from all stakeholders? | ii. Yes | ii. Yes | ii. Yes |
| 47h: Does the utility track the implementation of recommendations and report upon their impact? | i. No | i. No | i. No |

| | | | |
|---|---|---|---|
| 47i: Does the utility have a process to conduct reviews after wildfires in other the territory of other utilities and states to identify and address areas of improvement? | ii. Yes | ii. Yes | ii. Yes |

# Category J. Stakeholder cooperation and community engagement

| | Avg cycle start maturity: 2.2 | Avg current maturity: 2.6 | Avg projected cycle end maturity: 2.6 |
|---|---|---|---|
| **Capability 48. Cooperation and best practice sharing with other utilities** | | | |
| **Capability maturity level based on Maturity Rubric (0 - 4)** | Start of cycle: 3 | By end of year 1 (current): 4 | Planned state by end of cycle: 4 (projected) |
| **Responses to survey questions** Survey questions and the utility's responses are shown below | | | |
| **Question** | **Start of cycle** | **By end of year 1 (current)** | **Planned state by end of cycle** |
| 48a: Does the utility actively work to identify best practices from other utilities through a clearly defined operational process? | iii. Yes, from other global utilities | iii. Yes, from other global utilities | iii. Yes, from other global utilities |
| 48b: Does the utility successfully adopt and implement best practices identified from other utilities? | ii. Yes | ii. Yes | ii. Yes |
| 48c: Does the utility seek to share best practices and lessons learned in a consistent format? | ii. Yes | ii. Yes | ii. Yes |
| 48d: Does the utility share best practices and lessons via a consistent and predictable set of venues/media? | ii. Yes | ii. Yes | ii. Yes |

| | | | |
|---|---|---|---|
| 48e: Does the utility participate in annual benchmarking exercises with other utilities to find areas for improvement? | ii. Yes | ii. Yes | ii. Yes |
| 48f: Has the utility implemented a defined process for testing lessons learned from other utilities to ensure local applicability? | i. No | ii. Yes | ii. Yes |

| Capability 49. Engagement with communities on utility wildfire mitigation initiatives | | | |
|---|---|---|---|
| **Capability maturity level based on Maturity Rubric (0 - 4)** | Start of cycle: 1 | By end of year 1 (current): 1 | Planned state by end of cycle: 1 (projected) |
| **Responses to survey questions**<br>Survey questions and the utility's responses are shown below | | | |
| **Question** | **Start of cycle** | **By end of year 1 (current)** | **Planned state by end of cycle** |
| 49a: Does the utility have a clear and actionable plan to develop or maintain a collaborative relationship with local communities? | ii. Yes | ii. Yes | ii. Yes |
| 49b: Are there communities in HFTD areas where meaningful resistance is expected in response to efforts to mitigate fire risk (e.g. vegetation clearance)? | ii. Yes | ii. Yes | ii. Yes |
| 49c: What percent of landowners are non-compliant with utility initiatives (e.g., vegetation management)? | i. More than 5% | i. More than 5% | i. More than 5% |

| | | | |
|---|---|---|---|
| 49d: What percent of landowners complain about utility initiatives (e.g., vegetation management)? | iv. Less than 1 % | iv. Less than 1 % | iv. Less than 1 % |
| 49e: Does the utility have a demonstratively cooperative relationship with communities containing >90% of the population in HFTD areas (e.g. by being recognized by other agencies as having a cooperative relationship with those communities in HFTD areas)? | ii. Yes | ii. Yes | ii. Yes |
| 49f: Does utility have records of landowners throughout communities containing >90% of the population in HFTD areas reaching out to notify of risks, dangers or issues in the past year? | ii. Yes | ii. Yes | ii. Yes |

| **Capability 50. Engagement with LEP and AFN populations** | | | |
|---|---|---|---|
| **Capability maturity level based on Maturity Rubric (0 - 4)** | Start of cycle: 3 | By end of year 1 (current): 4 | Planned state by end of cycle: 4 (projected) |
| **Responses to survey questions**<br>Survey questions and the utility's responses are shown below | | | |
| **Question** | **Start of cycle** | **By end of year 1 (current)** | **Planned state by end of cycle** |

| | | | |
|---|---|---|---|
| 50a: Can the utility provide a plan to partner with organizations representing Limited English Proficiency (LEP) and Access & Functional Needs (AFN) communities? | ii. Yes | ii. Yes | ii. Yes |
| 50b: Can the utility outline how these partnerships create pathways for implementing suggested activities to address the needs of these communities? | ii. Yes | ii. Yes | ii. Yes |
| 50c: Can the utility point to clear examples of how those relationships have driven the utility's ability to interact with and prepare LEP & AFN communities for wildfire mitigation activities? | ii. Yes | ii. Yes | ii. Yes |
| 50d: Does the utility have a specific annually-updated action plan further reduce wildfire and PSPS risk to LEP & AFN communities? | i. No | ii. Yes | ii. Yes |

| Capability 51. Collaboration with emergency response agencies | | | |
|---|---|---|---|
| **Capability maturity level based on Maturity Rubric (0 - 4)** | Start of cycle: 2 | By end of year 1 (current): 2 | Planned state by end of cycle: 2 (projected) |
| **Responses to survey questions**<br>Survey questions and the utility's responses are shown below | | | |
| **Question** | **Start of cycle** | **By end of year 1 (current)** | **Planned state by end of cycle** |
| 51a: What is the cooperative model between the utility and suppression agencies? | ii. Utility cooperates with suppression agencies by notifying them of ignitions | ii. Utility cooperates with suppression agencies by notifying them of ignitions | ii. Utility cooperates with suppression agencies by notifying them of ignitions |
| 51b: In what areas is the utility cooperating with suppression agencies | iii. Throughout utility service areas | iii. Throughout utility service areas | iii. Throughout utility service areas |
| 51c: Does the utility accurately predict and communicate the forecasted fire propagation path using available analytics resources and weather data? | i. No | ii. Yes | ii. Yes |
| 51d: Does the utility communicate fire paths to the community as requested? | i. No | i. No | i. No |
| 51e: Does the utility work to assist suppression crews logistically, where possible? | ii. Yes | ii. Yes | ii. Yes |

| Capability 52. Collaboration on wildfire mitigation planning with stakeholders | | | |
|---|---|---|---|
| **Capability maturity level based on Maturity Rubric (0 - 4)** | Start of cycle: 2 | By end of year 1 (current): 2 | Planned state by end of cycle: 2 (projected) |
| **Responses to survey questions**<br>Survey questions and the utility's responses are shown below | | | |
| **Question** | **Start of cycle** | **By end of year 1 (current)** | **Planned state by end of cycle** |
| 52a: Where does the utility conduct substantial fuel management? | ii. Utility conducts fuel management along rights of way | ii. Utility conducts fuel management along rights of way | ii. Utility conducts fuel management along rights of way |
| 52b: Does the utility engage with other stakeholders as part of its fuel management efforts? | iii. Utility shares fuel management plans with other stakeholders and works with other stakeholders conducting fuel management concurrently | iii. Utility shares fuel management plans with other stakeholders and works with other stakeholders conducting fuel management concurrently | iii. Utility shares fuel management plans with other stakeholders and works with other stakeholders conducting fuel management concurrently |
| 52c: Does the utility cultivate a native vegetative ecosystem across territory that is consistent with lower fire risk? | i. No | i. No | i. No |
| 52d: Does the utility fund local groups (e.g., fire safe councils) to support fuel management? | ii. Yes | ii. Yes | ii. Yes |

### 11.1.4. SCE: Numerical maturity summary

Please reference the Guidance Resolution for the Maturity Rubric and for necessary context to interpret the levels shown below. **All levels are based solely on the Maturity Rubric and on SCE's responses to the Utility Wildfire Mitigation Maturity Survey ("Survey").**

**Start:** Score reported in February 2020; **Current:** Score reported in February 2021; **End:** Score reported in February 2021 projected for February 2023

| Category | Capability 1 | Capability 2 | Capability 3 | Capability 4 | Capability 5 | Capability 6 |
|---|---|---|---|---|---|---|
| A. Risk Assessment and Mapping | 1. Climate scenario modeling | 2. Ignition risk estimation | 3. Estimation of wildfire consequences for communities | 4. Estimation of wildfire and PSPS risk-reduction impact | 5. Risk maps and simulation algorithms | |
| | Start: 1 Current: 2 End: 2 | Start: 1 Current: 1 End: 2 | Start: 0 Current: 1 End: 2 | Start: 1 Current: 2 End: 3 | Start: 1 Current: 1 End: 2 | |
| B. Situational Awareness and Forecasting | 6. Weather variables collected | 7. Weather data resolution | 8. Weather forecasting ability | 9. External sources used in weather forecasting | 10. Wildfire detection processes and capabilities | |
| | Start: 2 Current: 2 End: 2 | Start: 1 Current: 2 End: 3 | Start: 1 Current: 1 End: 3 | Start: 2 Current: 2 End: 2 | Start: 1 Current: 1 End: 2 | |
| C. Grid design and system hardening | 11. Approach to prioritizing initiatives across territory | 12. Grid design for minimizing ignition risk | 13. Grid design for resiliency and minimizing PSPS | 14. Risk-based grid hardening and cost efficiency | 15. Grid design and asset innovation | |
| | Start: 3 Current: 3 End: 4 | Start: 0 Current: 4 End: 4 | Start: 1 Current: 1 End: 2 | Start: 1 Current: 2 End: 2 | Start: 2 Current: 2 End: 2 | |
| D. Asset management and inspections | 16. Asset inventory and condition assessments | 17. Asset inspection cycle | 18. Asset inspection effectiveness | 19. Asset maintenance and repair | 20. QA/QC for asset management | |
| | Start: 2 Current: 2 End: 2 | Start: 1 Current: 2 End: 3 | Start: 1 Current: 2 End: 2 | Start: 3 Current: 3 End: 3 | Start: 2 Current: 2 End: 2 | |
| E. Vegetation management and inspections | 21. Vegetation inventory and condition assessments | 22. Vegetation inspection cycle | 23. Vegetation inspection effectiveness | 24. Vegetation grow-in mitigation | 25. Vegetation fall-in mitigation | 26. QA/QC for vegetation management |
| | Start: 3 Current: 3 End: 3 | Start: 2 Current: 2 End: 2 | Start: 1 Current: 2 End: 2 | Start: 1 Current: 4 End: 4 | Start: 3 Current: 4 End: 4 | Start: 2 Current: 2 End: 3 |
| F. Grid operations and protocols | 27. Protective equipment and device settings | 28. Incorporating ignition risk factors in grid control | 29. PSPS op. model and consequence mitigation | 30. Protocols for PSPS initiation | 31. Protocols for PSPS re-energization | 32. Ignition prevention and suppression |
| | Start: 3 Current: 3 End: 3 | Start: 2 Current: 2 End: 2 | Start: 1 Current: 1 End: 2 | Start: 2 Current: 2 End: 2 | Start: 1 Current: 1 End: 2 | Start: 2 Current: 2 End: 2 |
| G. Data governance | 33. Data collection and curation | 34. Data transparency and analytics | 35. Near-miss tracking | 36. Data sharing with research community | | |
| | Start: 0 Current: 0 End: 2 | Start: 0 Current: 0 End: 2 | Start: 0 Current: 3 End: 4 | Start: 4 Current: 4 End: 4 | | |
| H. Resource allocation methodology | 37. Scenario analysis across different risk levels | 38. Presentation of relative risk spend efficiency for portfolio of initiatives | 39. Process for determining risk spend efficiency of vegetation management initiatives | 40. Process for determining risk spend efficiency of system hardening initiatives | 41. Portfolio-wide initiative allocation methodology | 42. Portfolio-wide innovation in new wildfire initiatives |
| | Start: 1 Current: 3 End: 3 | Start: 1 Current: 2 End: 2 | Start: 1 Current: 2 End: 2 | Start: 1 Current: 3 End: 3 | Start: 0 Current: 1 End: 4 | Start: 1 Current: 1 End: 2 |
| I. Emergency planning and preparedness | 43. Wildfire plan integrated with overall disaster/ emergency plan | 44. Plan to restore service after wildfire related outage | 45. Emergency community engagement during and after wildfire | 46. Protocols in place to learn from wildfire events | 47. Processes for continuous improvement after wildfire and PSPS | |
| | Start: 4 Current: 4 End: 4 | Start: 4 Current: 4 End: 4 | Start: 1 Current: 4 End: 4 | Start: 4 Current: 4 End: 4 | Start: 2 Current: 2 End: 2 | |
| J. Stakeholder cooperation and community engagement | 48. Cooperation and best practice sharing with other utilities | 49. Engagement with communities on utility wildfire mitigation initiatives | 50. Engagement with LEP and AFN populations | 51. Collaboration with emergency response agencies | 52. Collaboration on wildfire mitigation planning with stakeholders | |
| | Start: 3 Current: 4 End: 4 | Start: 1 Current: 1 End: 1 | Start: 3 Current: 4 End: 4 | Start: 2 Current: 2 End: 2 | Start: 2 Current: 2 End: 2 | |

## 11.2 Attachment 2: Definition of Initiatives by Category

| Category | Initiative activity | Definition |
|---|---|---|
| **A. Risk mapping and simulation** | A summarized risk map that shows the overall ignition probability and estimated wildfire consequence along the electric lines and equipment | Development and use of tools and processes to develop and update risk map and simulations and to estimate risk reduction potential of initiatives for a given portion of the grid (or more granularly, e.g., circuit, span, or asset). May include verification efforts, independent assessment by experts, and updates. |
| | Climate-driven risk map and modelling based on various relevant weather scenarios | Development and use of tools and processes to estimate incremental risk of foreseeable climate scenarios, such as drought, across a given portion of the grid (or more granularly, e.g., circuit, span, or asset). May include verification efforts, independent assessment by experts, and updates. |
| | Ignition probability mapping showing the probability of ignition along the electric lines and equipment | Development and use of tools and processes to assess the risk of ignition across regions of the grid (or more granularly, e.g., circuits, spans, or assets). |
| | Initiative mapping and estimation of wildfire and PSPS risk-reduction impact | Development of a tool to estimate the risk reduction efficacy (for both wildfire and PSPS risk) and risk-spend efficiency of various initiatives. |
| | Match drop simulations showing the potential wildfire consequence of ignitions that occur along the electric lines and equipment | Development and use of tools and processes to assess the impact of potential ignition and risk to communities (e.g., in terms of potential fatalities, structures burned, monetary damages, area burned, impact on air quality and greenhouse gas, or GHG, reduction goals, etc.). |
| **B. Situational awareness and forecasting** | Advanced weather monitoring and weather stations | Purchase, installation, maintenance, and operation of weather stations. Collection, recording, and analysis of weather data from weather stations and from external sources. |
| | Continuous monitoring sensors | Installation, maintenance, and monitoring of sensors and sensorized equipment used to monitor the condition of electric lines and equipment. |
| | Fault indicators for detecting faults on electric lines and equipment | Installation and maintenance of fault indicators. |
| | Forecast of a fire risk index, fire potential index, or similar | Index that uses a combination of weather parameters (such as wind speed, humidity, and temperature), vegetation and/or fuel conditions, and other factors to judge current fire risk and to create a forecast indicative of fire risk. A sufficiently |

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| | | granular index shall inform operational decision-making. |
| | Personnel monitoring areas of electric lines and equipment in elevated fire risk conditions | Personnel position within utility service territory to monitor system conditions and weather on site. Field observations shall inform operational decisions. |
| | Weather forecasting and estimating impacts on electric lines and equipment | Development methodology for forecast of weather conditions relevant to utility operations, forecasting weather conditions and conducting analysis to incorporate into utility decision-making, learning and updates to reduce false positives and false negatives of forecast PSPS conditions. |
| **C. Grid design and system hardening** | Capacitor maintenance and replacement program | Remediation, adjustments, or installations of new equipment to improve or replace existing capacitor equipment. |
| | Circuit breaker maintenance and installation to de-energize lines upon detecting a fault | Remediation, adjustments, or installations of new equipment to improve or replace existing fast switching circuit breaker equipment to improve the ability to protect electrical circuits from damage caused by overload of electricity or short circuit. |
| | Covered conductor installation | Installation of covered or insulated conductors to replace standard bare or unprotected conductors (defined in accordance with GO 95 as supply conductors, including but not limited to lead wires, not enclosed in a grounded metal pole or not covered by: a "suitable protective covering" (in accordance with Rule 22.8 ), grounded metal conduit, or grounded metal sheath or shield). In accordance with GO 95, conductor is defined as a material suitable for: (1) carrying electric current, usually in the form of a wire, cable or bus bar, or (2) transmitting light in the case of fiber optics; insulated conductors as those which are surrounded by an insulating material (in accordance with Rule 21.6), the dielectric strength of which is sufficient to withstand the maximum difference of potential at normal operating voltages of the circuit without breakdown or puncture; and suitable protective covering as a covering of wood or other non-conductive material having the electrical insulating efficiency (12kV/in. dry) and impact strength (20ft.-lbs) of 1.5 inches of redwood or other material meeting the requirements of Rule 22.8-A, 22.8-B, 22.8-C or 22.8-D. |
| | Covered conductor maintenance | Remediation and adjustments to installed covered or insulated conductors. In accordance with GO 95, conductor is defined as a material suitable for: (1) |

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| | | carrying electric current, usually in the form of a wire, cable or bus bar, or (2) transmitting light in the case of fiber optics; insulated conductors as those which are surrounded by an insulating material (in accordance with Rule 21.6), the dielectric strength of which is sufficient to withstand the maximum difference of potential at normal operating voltages of the circuit without breakdown or puncture; and suitable protective covering as a covering of wood or other non-conductive material having the electrical insulating efficiency (12kV/in. dry) and impact strength (20ft.-lbs) of 1.5 inches of redwood or other material meeting the requirements of Rule 22.8-A, 22.8-B, 22.8-C or 22.8-D. |
| | Crossarm maintenance, repair, and replacement | Remediation, adjustments, or installations of new equipment to improve or replace existing crossarms, defined as horizontal support attached to poles or structures generally at right angles to the conductor supported in accordance with GO 95. |
| | Distribution pole replacement and reinforcement, including with composite poles | Remediation, adjustments, or installations of new equipment to improve or replace existing distribution poles (i.e., those supporting lines under 65kV), including with equipment such as composite poles manufactured with materials reduce ignition probability by increasing pole lifespan and resilience against failure from object contact and other events. |
| | Expulsion fuse replacement | Installations of new and CAL FIRE-approved power fuses to replace existing expulsion fuse equipment. |
| | Grid topology improvements to mitigate or reduce PSPS events | Plan to support and actions taken to mitigate or reduce PSPS events in terms of geographic scope and number of customers affected, such as installation and operation of electrical equipment to sectionalize or island portions of the grid, microgrids, or local generation. |
| | Installation of system automation equipment | Installation of electric equipment that increases the ability of the utility to automate system operation and monitoring, including equipment that can be adjusted remotely such as automatic reclosers (switching devices designed to detect and interrupt momentary faults that can reclose automatically and detect if a fault remains, remaining open if so). |
| | Maintenance, repair, and replacement of connectors, including hotline clamps | Remediation, adjustments, or installations of new equipment to improve or replace existing connector equipment, such as hotline clamps. |

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| | Mitigation of impact on customers and other residents affected during PSPS event | Actions taken to improve access to electricity for customers and other residents during PSPS events, such as installation and operation of local generation equipment (at the community, household, or other level). |
| | Other corrective action | Other maintenance, repair, or replacement of utility equipment and structures so that they function properly and safely, including remediation activities (such as insulator washing) of other electric equipment deficiencies that may increase ignition probability due to potential equipment failure or other drivers. |
| | Pole loading infrastructure hardening and replacement program based on pole loading assessment program | Actions taken to remediate, adjust, or install replacement equipment for poles that the utility has identified as failing to meet safety factor requirements in accordance with GO 95 or additional utility standards in the utility's pole loading assessment program. |
| | Transformers maintenance and replacement | Remediation, adjustments, or installations of new equipment to improve or replace existing transformer equipment. |
| | Transmission tower maintenance and replacement | Remediation, adjustments, or installations of new equipment to improve or replace existing transmission towers (e.g., structures such as lattice steel towers or tubular steel poles that support lines at or above 65kV). |
| | Undergrounding of electric lines and/or equipment | Actions taken to convert overhead electric lines and/or equipment to underground electric lines and/or equipment (i.e., located underground and in accordance with GO 128). |
| | Updates to grid topology to minimize risk of ignition in HFTDs | Changes in the plan, installation, construction, removal, and/or undergrounding to minimize the risk of ignition due to the design, location, or configuration of utility electric equipment in HFTDs. |
| **D. Asset management and inspections** | Detailed inspections of distribution electric lines and equipment | In accordance with GO 165, careful visual inspections of overhead electric distribution lines and equipment where individual pieces of equipment and structures are carefully examined, visually and through use of routine diagnostic test, as appropriate, and (if practical and if useful information can be so gathered) opened, and the condition of each rated and recorded. |
| | Detailed inspections of transmission electric lines and equipment | Careful visual inspections of overhead electric transmission lines and equipment where individual pieces of equipment and structures are carefully examined, visually and through use of routine diagnostic test, as appropriate, and (if practical and |

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| | | if useful information can be so gathered) opened, and the condition of each rated and recorded. |
| | Improvement of inspections | Identifying and addressing deficiencies in inspections protocols and implementation by improving training and the evaluation of inspectors. |
| | Infrared inspections of distribution electric lines and equipment | Inspections of overhead electric distribution lines, equipment, and right-of-way using infrared (heat-sensing) technology and cameras that can identify "hot spots", or conditions that indicate deterioration or potential equipment failures, of electrical equipment. |
| | Infrared inspections of transmission electric lines and equipment | Inspections of overhead electric transmission lines, equipment, and right-of-way using infrared (heat-sensing) technology and cameras that can identify "hot spots", or conditions that indicate deterioration or potential equipment failures, of electrical equipment. |
| | Intrusive pole inspections | In accordance with GO 165, intrusive inspections involve movement of soil, taking samples for analysis, and/or using more sophisticated diagnostic tools beyond visual inspections or instrument reading. |
| | LiDAR inspections of distribution electric lines and equipment | Inspections of overhead electric distribution lines, equipment, and right-of-way using LiDAR (Light Detection and Ranging, a remote sensing method that uses light in the form of a pulsed laser to measure variable distances). |
| | LiDAR inspections of transmission electric lines and equipment | Inspections of overhead electric transmission lines, equipment, and right-of-way using LiDAR (Light Detection and Ranging, a remote sensing method that uses light in the form of a pulsed laser to measure variable distances). |
| | Other discretionary inspection of distribution electric lines and equipment, beyond inspections mandated by rules and regulations | Inspections of overhead electric distribution lines, equipment, and right-of-way that exceed or otherwise go beyond those mandated by rules and regulations, including GO 165, in terms of frequency, inspection checklist requirements or detail, analysis of and response to problems identified, or other aspects of inspection or records kept. |
| | Other discretionary inspection of transmission electric lines and equipment, beyond inspections mandated by rules and regulations | Inspections of overhead electric transmission lines, equipment, and right-of-way that exceed or otherwise go beyond those mandated by rules and regulations, including GO 165, in terms of frequency, inspection checklist requirements or detail, analysis of and response to problems |

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| | | identified, or other aspects of inspection or records kept. |
| | Patrol inspections of distribution electric lines and equipment | In accordance with GO 165, simple visual inspections of overhead electric distribution lines and equipment that is designed to identify obvious structural problems and hazards. Patrol inspections may be carried out in the course of other company business. |
| | Patrol inspections of transmission electric lines and equipment | Simple visual inspections of overhead electric transmission lines and equipment that is designed to identify obvious structural problems and hazards. Patrol inspections may be carried out in the course of other company business. |
| | Pole loading assessment program to determine safety factor | Calculations to determine whether a pole meets pole loading safety factor requirements of GO 95, including planning and information collection needed to support said calculations. Calculations shall consider many factors including the size, location, and type of pole; types of attachments; length of conductors attached; and number and design of supporting guys, per D.15-11-021. |
| | Quality assurance / quality control of inspections | Establishment and function of audit process to manage and confirm work completed by employees or subcontractors, including packaging QA/QC information for input to decision-making and related integrated workforce management processes. |
| | Substation inspections | In accordance with GO 175, inspection of substations performed by qualified persons and according to the frequency established by the utility, including record-keeping. |
| **E. Vegetation management and inspection** | Additional efforts to manage community and environmental impacts | Plan and execution of strategy to mitigate negative impacts from utility vegetation management to local communities and the environment, such as coordination with communities to plan and execute vegetation management work or promotion of fire-resistant planting practices |
| | Detailed inspections of vegetation around distribution electric lines and equipment | Careful visual inspections of vegetation around the right-of-way, where individual trees are carefully examined, visually, and the condition of each rated and recorded. |
| | Detailed inspections of vegetation around transmission electric lines and equipment | Careful visual inspections of vegetation around the right-of-way, where individual trees are carefully examined, visually, and the condition of each rated and recorded. |
| | Emergency response vegetation management | Plan and execution of vegetation management activities, such as trimming or removal, executed |

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| | due to red flag warning or other urgent conditions | based upon and in advance of forecast weather conditions that indicate high fire threat in terms of ignition probability and wildfire consequence. |
| | Fuel management and reduction of “slash” from vegetation management activities | Plan and execution of fuel management activities that reduce the availability of fuel in proximity to potential sources of ignition, including both reduction or adjustment of live fuel (in terms of species or otherwise) and of dead fuel, including "slash" from vegetation management activities that produce vegetation material such as branch trimmings and felled trees. |
| | Improvement of inspections | Identifying and addressing deficiencies in inspections protocols and implementation by improving training and the evaluation of inspectors. |
| | LiDAR inspections of vegetation around distribution electric lines and equipment | Inspections of right-of-way using LiDAR (Light Detection and Ranging, a remote sensing method that uses light in the form of a pulsed laser to measure variable distances). |
| | LiDAR inspections of vegetation around transmission electric lines and equipment | Inspections of right-of-way using LiDAR (Light Detection and Ranging, a remote sensing method that uses light in the form of a pulsed laser to measure variable distances). |
| | Other discretionary inspections of vegetation around distribution electric lines and equipment | Inspections of rights-of-way and adjacent vegetation that may be hazardous, which exceeds or otherwise go beyond those mandated by rules and regulations, in terms of frequency, inspection checklist requirements or detail, analysis of and response to problems identified, or other aspects of inspection or records kept. |
| | Other discretionary inspections of vegetation around transmission electric lines and equipment | Inspections of rights-of-way and adjacent vegetation that may be hazardous, which exceeds or otherwise go beyond those mandated by rules and regulations, in terms of frequency, inspection checklist requirements or detail, analysis of and response to problems identified, or other aspects of inspection or records kept. |
| | Patrol inspections of vegetation around distribution electric lines and equipment | Visual inspections of vegetation along rights-of-way that is designed to identify obvious hazards. Patrol inspections may be carried out in the course of other company business. |
| | Patrol inspections of vegetation around transmission electric lines and equipment | Visual inspections of vegetation along rights-of-way that is designed to identify obvious hazards. Patrol inspections may be carried out in the course of other company business. |
| | Quality assurance / quality control of vegetation inspections | Establishment and function of audit process to manage and confirm work completed by employees or subcontractors, including packaging |

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| | | QA/QC information for input to decision-making and related integrated workforce management processes. |
| | Recruiting and training of vegetation management personnel | Programs to ensure that the utility is able to identify and hire qualified vegetation management personnel and to ensure that both full-time employees and contractors tasked with vegetation management responsibilities are adequately trained to perform vegetation management work, according to the utility's wildfire mitigation plan, in addition to rules and regulations for safety. |
| | Remediation of at-risk species | Actions taken to reduce the ignition probability and wildfire consequence attributable to at-risk vegetation species, such as trimming, removal, and replacement. |
| | Removal and remediation of trees with strike potential to electric lines and equipment | Actions taken to remove or otherwise remediate trees that could potentially strike electrical equipment, if adverse events such as failure at the ground-level of the tree or branch breakout within the canopy of the tree, occur. |
| | Substation inspection | Inspection of vegetation surrounding substations, performed by qualified persons and according to the frequency established by the utility, including record-keeping. |
| | Substation vegetation management | Based on location and risk to substation equipment only, actions taken to reduce the ignition probability and wildfire consequence attributable to contact from vegetation to substation equipment. |
| | Vegetation inventory system | Inputs, operation, and support for centralized inventory of vegetation clearances updated based upon inspection results, including (1) inventory of species, (2) forecasting of growth, (3) forecasting of when growth threatens minimum right-of-way clearances (“grow-in” risk) or creates fall-in/fly-in risk. |
| | Vegetation management to achieve clearances around electric lines and equipment | Actions taken to ensure that vegetation does not encroach upon the minimum clearances set forth in Table 1 of GO 95, measured between line conductors and vegetation, such as trimming adjacent or overhanging tree limbs. |
| **F. Grid operations and protocols** | Automatic recloser operations | Designing and executing protocols to deactivate automatic reclosers based on local conditions for ignition probability and wildfire consequence. |
| | Crew-accompanying ignition prevention and | Those firefighting staff and equipment (such as fire suppression engines and trailers, firefighting hose, valves, and water) that are deployed with |

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| | suppression resources and services | construction crews and other electric workers to provide site-specific fire prevention and ignition mitigation during on-site work |
| | Personnel work procedures and training in conditions of elevated fire risk | Work activity guidelines that designate what type of work can be performed during operating conditions of different levels of wildfire risk. Training for personnel on these guidelines and the procedures they prescribe, from normal operating procedures to increased mitigation measures to constraints on work performed. |
| | Protocols for PSPS re-energization | Designing and executing procedures that accelerate the restoration of electric service in areas that were de-energized, while maintaining safety and reliability standards. |
| | PSPS events and mitigation of PSPS impacts | Designing, executing, and improving upon protocols to conduct PSPS events, including development of advanced methodologies to determine when to use PSPS, and to mitigate the impact of PSPS events on affected customers and local residents. |
| | Stationed and on-call ignition prevention and suppression resources and services | Firefighting staff and equipment (such as fire suppression engines and trailers, firefighting hose, valves, firefighting foam, chemical extinguishing agent, and water) stationed at utility facilities and/or standing by to respond to calls for fire suppression assistance. |
| **G. Data governance** | Centralized repository for data | Designing, maintaining, hosting, and upgrading a platform that supports storage, processing, and utilization of all utility proprietary data and data compiled by the utility from other sources. |
| | Collaborative research on utility ignition and/or wildfire | Developing and executing research work on utility ignition and/or wildfire topics in collaboration with other non-utility partners, such as academic institutions and research groups, to include data-sharing and funding as applicable. |
| | Documentation and disclosure of wildfire-related data and algorithms | Design and execution of processes to document and disclose wildfire-related data and algorithms to accord with rules and regulations, including use of scenarios for forecasting and stress testing. |
| | Tracking and analysis of near miss data | Tools and procedures to monitor, record, and conduct analysis of data on near miss events. |
| **H. Resource allocation methodology** | Allocation methodology development and application | Development of prioritization methodology for human and financial resources, including application of said methodology to utility decision-making. |
| | Risk reduction scenario development and analysis | Development of modelling capabilities for different risk reduction scenarios based on wildfire |

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| | | mitigation initiative implementation; analysis and application to utility decision-making. |
| | Risk-spend efficiency analysis | Tools, procedures, and expertise to support analysis of wildfire mitigation initiative risk-spend efficiency, in terms of MAVF and/ or MARS methodologies. |
| **I. Emergency planning and preparedness** | Adequate and trained workforce for service restoration | Actions taken to identify, hire, retain, and train qualified workforce to conduct service restoration in response to emergencies, including short-term contracting strategy and implementation. |
| | Community outreach, public awareness, and communications efforts | Actions to identify and contact key community stakeholders; increase public awareness of emergency planning and preparedness information; and design, translate, distribute, and evaluate effectiveness of communications taken before, during, and after a wildfire, including Access and Functional Needs populations and Limited English Proficiency populations in particular. |
| | Customer support in emergencies | Resources dedicated to customer support during emergencies, such as website pages and other digital resources, dedicated phone lines, etc. |
| | Disaster and emergency preparedness plan | Development of plan to deploy resources according to prioritization methodology for disaster and emergency preparedness of utility and within utility service territory (such as considerations for critical facilities and infrastructure), including strategy for collaboration with Public Safety Partners and communities. |
| | Preparedness and planning for service restoration | Development of plans to prepare the utility to restore service after emergencies, such as developing employee and staff trainings, and to conduct inspections and remediation necessary to re-energize lines and restore service to customers. |
| | Protocols in place to learn from wildfire events | Tools and procedures to monitor effectiveness of strategy and actions taken to prepare for emergencies and of strategy and actions taken during and after emergencies, including based on an accounting of the outcomes of wildfire events. |
| **J. Stakeholder cooperation and community engagement** | Community engagement | Strategy and actions taken to identify and contact key community stakeholders; increase public awareness and support of utility wildfire mitigation activity; and design, translate, distribute, and evaluate effectiveness of related communications. Includes specific strategies and actions taken to address concerns and serve needs of Access and |

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| | | Functional Needs populations and Limited English Proficiency populations in particular. |
| | Cooperation and best practice sharing with agencies outside CA | Strategy and actions taken to engage with agencies outside of California to exchange best practices both for utility wildfire mitigation and for stakeholder cooperation to mitigate and respond to wildfires. |
| | Cooperation with suppression agencies | Coordination with CAL FIRE, federal fire authorities, county fire authorities, and local fire authorities to support planning and operations, including support of aerial and ground firefighting in real-time, including information-sharing, dispatch of resources, and dedicated staff. |
| | Forest service and fuel reduction cooperation and joint roadmap | Strategy and actions taken to engage with local, state, and federal entities responsible for or participating in forest management and fuel reduction activities; and design utility cooperation strategy and joint stakeholder roadmap (plan for coordinating stakeholder efforts for forest management and fuel reduction activities). |

## 11.3 Attachment 3: Glossary of Terms

| Term | Definition |
|---|---|
| AB | Assembly Bill |
| AFN | Access and Functional Needs |
| ALJ | Administrative Law Judge |
| ATC | Acton Town Council |
| BVES | Bear Valley Electric Service |
| CAISO | California Independent System Operator |
| Cal Advocates | Public Advocate's Office |
| CAL FIRE | California Department of Forestry and Fire Protection |
| CEJA | California Environmental Justice Alliance |
| CNRA | California Natural Resources Agency |
| D. | Decision |
| DFA | Distribution Fault Attribution |
| DR | Data Request |
| EBMUD | East Bay Municipal Utility District |

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| EFD | Early Fault Detection |
| EPIC | Electric Program Investment Charge |
| EPUC | Energy Producers and Users Coalition |
| EVM | Enhanced Vegetation Management |
| FERC | Federal Energy Regulatory Commission |
| FGDC | Federal Geographic Data Committee |
| FIRIS | Fire Integrated Real Time Intelligence System |
| FMEA | Failure Modes and Effects Analysis |
| FPI | Fire Potential Index |
| GIS | Geographic Information Systems |
| GO | General Order |
| GPI | Green Power Institute |
| GRC | General Rate Case |
| HFRA | High Fire Risk Area |
| HFTD | High Fire Threat District |
| Horizon West | Horizon West Transmission |
| HWT | Horizon West Transmission |
| I. | Investigation |
| ICS | Incident Command System |
| ICS | Incident Command Structure |
| IOU | Investor Owned Utility |
| ISA | International Society of Arboriculture |
| ITO | Independent Transmission Operator |
| IVM | Integrated Vegetation Management Plan |
| IVR | Interactive Voice Response |
| JIS | Joint Information System |
| kV | Kilovolt |
| Liberty | Liberty Utilities / CalPeco Electric |
| LiDAR | Light Detection and Ranging |
| LTE | Long-Term Evolution |

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| Maturity Model | Utility Wildfire Mitigation Maturity Model |
| MAVF | Multi-Attribute Value Function |
| MGRA | Mussey Grade Road Alliance |
| MMAA | Mountain Mutual Aid Association |
| NERC | North American Electric Reliability Corporation |
| NFDRS | National Fire Danger Rating System |
| OCFA | Orange County Fire Authority |
| OEIS (Energy Safety) | Office of Energy Infrastructure Safety |
| OP | Ordering Paragraph |
| OPW | Outage Producing Winds |
| PG&E | Pacific Gas and Electric Company |
| PLP | Pole Loading Assessment Program |
| PMO (PacifiCorp) | Project Management Office |
| PMO (SCE) | Public Safety Program Management Office |
| PMU | Phasor Measurement Unit |
| POC | Protect Our Communities Foundation |
| PRC | Public Resources Code |
| PSPS | Public Safety Power Shutoff |
| QA | Quality Assurance |
| QC | Quality Control |
| R. | Rulemaking |
| RAMP | Risk Assessment and Management Phase |
| RAR | Remote Automatic Reclosers |
| RBDM | Risk-Based Decision Making |
| RCRC | Rural County Representatives of California |
| RCP | Remedial Compliance Plan |
| RCRC | Rural County Representatives of California |
| REFCL | Rapid Earth Fault Current Limiter |
| RFW | Red Flag Warning |
| RSE | Risk-Spend Efficiency |

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| SB | Senate Bill |
| SBUA | Small Business Utility Advocates |
| SCADA | Supervisory Control and Data Acquisition |
| SCE | Southern California Edison Company |
| SDG&E | San Diego Gas & Electric Company |
| S-MAP | Safety Model Assessment Proceeding |
| SMJU | Small and Multijurisdictional Utility |
| SUI | Wildland-Urban Interface |
| SWATI | Santa Ana Wildfire Threat Index |
| TAT | Tree Assessment Tool |
| TBC | Trans Bay Cable |
| TURN | The Utility Reform Network |
| USFS | United States Forest Service |
| WMP | Wildfire Mitigation Plan |
| WRRM | Wildfire Risk Reduction Model |
| WSAB | Wildfire Safety Advisory Board |
| WSD | Wildfire Safety Division |
| WSIP | Wildfire Safety Inspection Program |