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 1
1. Summary of Key Findings 5
1.1 Areas of Significant Progress 5
1.2 Revision Notice 6
1.3 Key Areas for Improvement and Remedies 8
1.4 Maturity Model Evaluation 17
2. Wildfire Safety Advisory Board Input 19
3. Public and Stakeholder Comment 22
4. Discussion 24
4.1 Introductory Sections of the WMP 24
4.2 Actual and Planned Spending for the Mitigation Plan 25
4.3 Lessons Learned and Risk Trends 30
4.4 Inputs to the Plan and Directional Vision for the WMP 32
4.5 Metrics and Underlying Data 34
5. Mitigation Initiatives and Maturity Evaluation 37
5.1 Risk Assessment and Mapping 39
5.2 Situational Awareness and Forecasting 44
5.3 Grid Design and System Hardening 49
5.4 Asset Management and Inspections 61
5.5 Vegetation Management and Inspections 66
5.6 Grid Operations and Operating Protocols, Including PSPS 74
5.7 Data Governance 79
5.8 Resource Allocation Methodology 84
5.9 Emergency Planning and Preparedness 95
5.10 Stakeholder Cooperation and Community Engagement 98
6. Public Safety Power Shutoff (PSPS), Including Directional Vision for PSPS 101
7. Next Steps 109
8. Consultation with CAL FIRE 111
9. Comments on Draft Action Statement 112
10. Conclusion 116
11. Appendix 117
10.1 Status of 2020 WMP Deficiencies 117
10.2 Energy Safety Data Request Responses 120
10.3 The Ten Maturity and Mitigation Initiative Categories 127
11. Attachments 129
11.1 Attachment 1: SCE's 2021 Maturity Survey 129
11.2 Attachment 2: Definition of Initiatives by Category 189
11.3 Attachment 3: Glossary of Terms 199

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. 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. 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: 1. Collaboration among utilities; 2. Stakeholder and academic expert input; and 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. A working group to address wildfire risk modeling will allow for: 1. Collaboration among the utilities; 2. Stakeholder and academic expert input; and 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: 1. The effectiveness of covered conductor in the field in comparison to alternative initiatives. 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: 1. Provide an updated Figure 9.01-1 based on SCE's latest risk modeling assessment, including the ignitions shown. 2. Provide the cause of the nine ignitions shown in Figure 9.01-1. 3. For each of the nine ignitions shown, provide an assessment of the likelihood that covered conductor installation would have prevented the ignition. 4. Provide a similar risk buydown curve for all cumulative circuit miles, including historic ignitions and ignition size. 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: 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: 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; ii) Reduction of catastrophic wildfire risk; iii) Reduction of PSPS events; iv) Selecting mitigation initiatives for individual circuit segments based on the specific location, circumstances, and risk of catastrophic wildfire. 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. 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: 1. Establish uniform data collection standards. 2. Create a cross-utility database of tree-caused risk events (i.e., outages and ignitions caused by vegetation contact). 3. Incorporate biotic and abiotic factors[36] into the determination of outage and ignition risk caused by vegetation contact. 4. Assess the effectiveness of enhanced clearances. 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: 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. 2. Add genus and species designation input capabilities into its systems which track vegetation (e.g., vegetation inventory system and vegetation-caused outage reports). 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). 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] 5. Teach tree species identification skills in its VM personnel training programs, both in initial and continuing education. 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: 1. How third-party ignition sources feed into SCE's risk models; 2. How ignition sources impact SCE's mitigation selection process, including: a. How SCE prioritizes ignition sources; 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; 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: 1. Fully demonstrate that its probability of ignition models accurately account for the correlation between wind speed, ignition, and consequence; and 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," b. Specify the data required "to make determinations about correlations between wind speeds and outage rates," and 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: • Pace and quantity of scheduled maintenance; • Pace and quantity of inspections; and • Pace and quantity of vibration dampener installations. If SCE finds that its existing maintenance programs do not provide effective maintenance for covered conductor, SCE shall: 1. Enhance its current operations to provide such maintenance; and 2. Detail the enhancements to its existing programs; 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

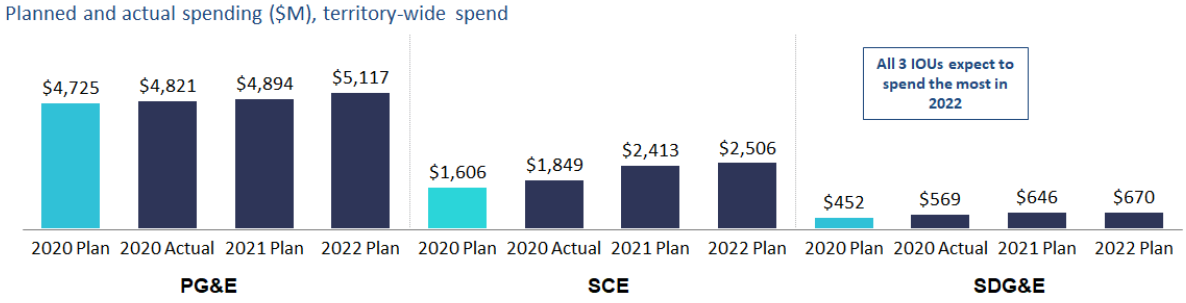
Spending decreased in the following categories:

- 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.



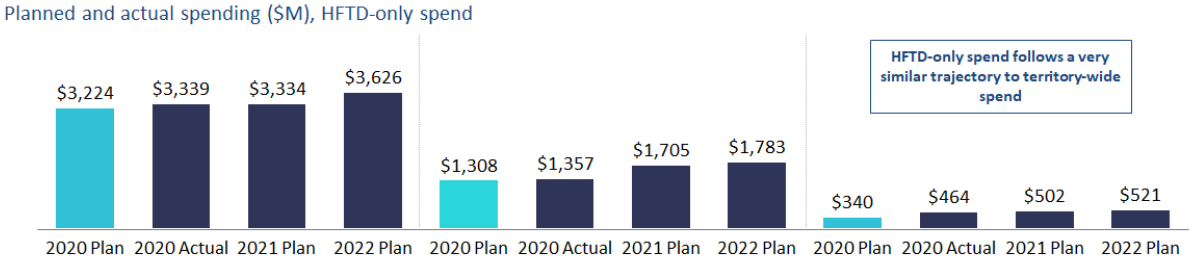
	2020 Plan[1] ($M)	2020 Actual ($M)	2021 Plan ($M)	2022 Plan ($M)	Total WMP Cycle Planned Spend ($M)	Normalized WMP cycle spend per overhead circuit mile ($M)
PG&E	$4,725	$4,821	$4,894	$5,117	$14,832	$.150
SCE	$1,606[2]	$1,849	$2,413	$2,506	$6,768	$.131
SDG&E	$452[3]	$569	$646	$670	$1,886	$.232

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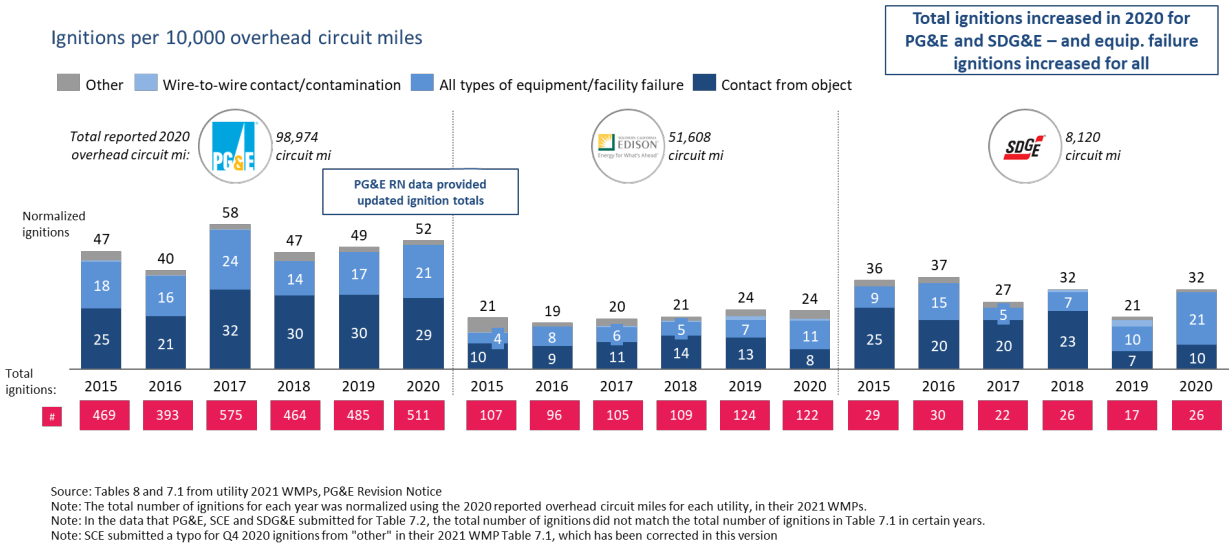
[74] SCE's 2021 WMP Update, p. 141

[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

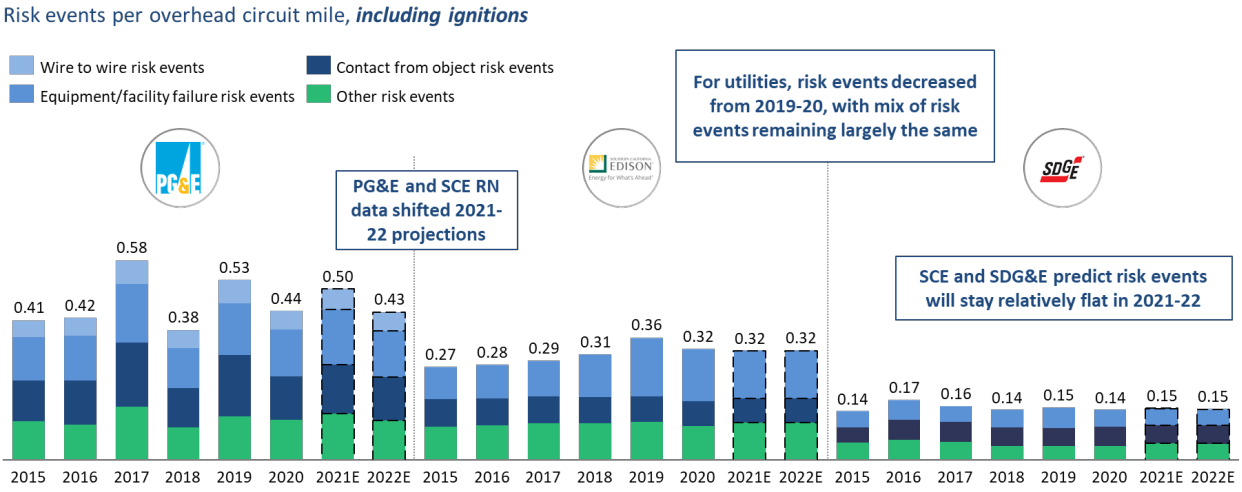
[77] Objectives are unique to each utility and reflect the 1, 3, and 10-year projections of progress toward the WMP goal. See section 5.4 for review of the utility's objectives



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).

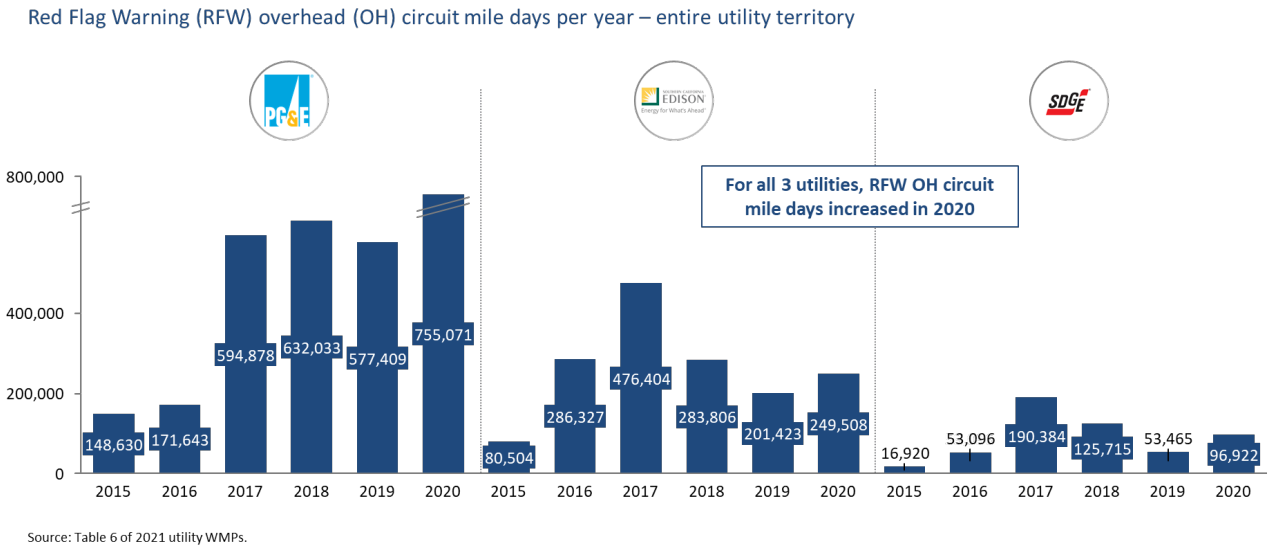


Figure 4.5.c: Red flag warning (RFW) overhead circuit mile days, large utilities.

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.

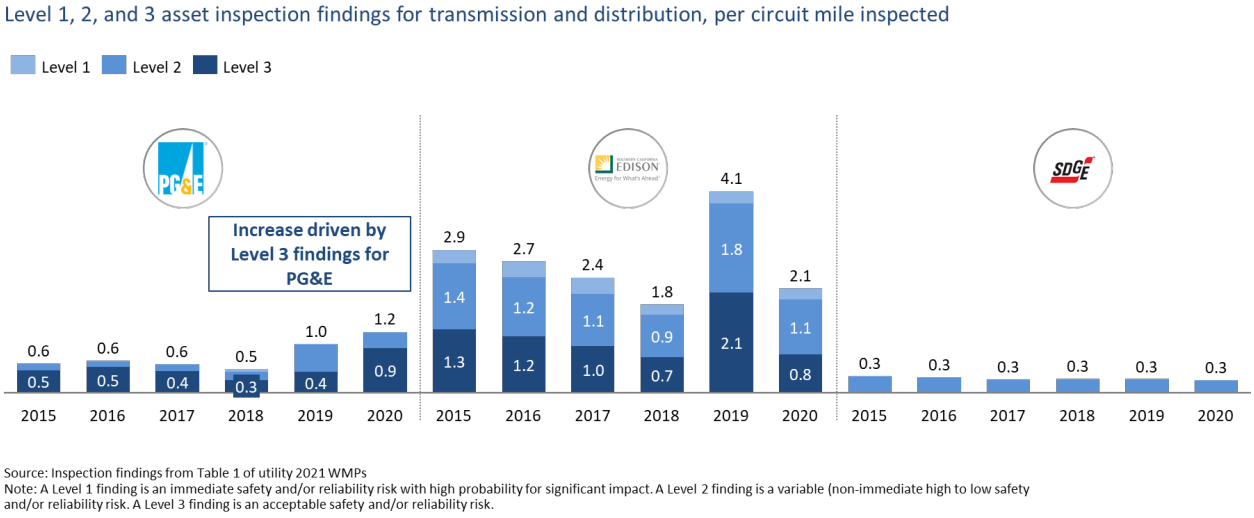


Figure 4.5.d: Asset inspection findings per circuit mile inspected, large utilities.

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

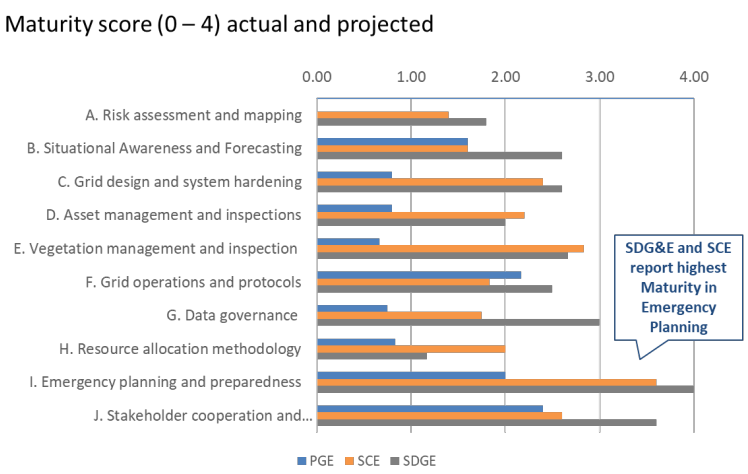
5. Mitigation Initiatives and Maturity Evaluation

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/

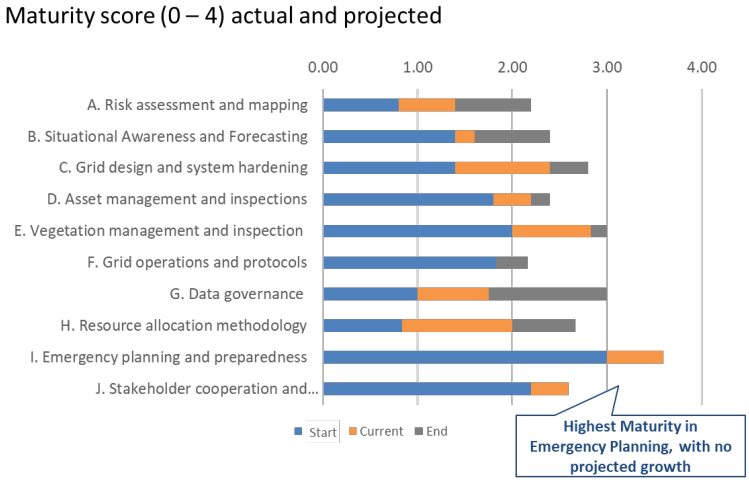


Self-reported Maturity by Category

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. A working group to address wildfire risk modeling will allow for: 1. Collaboration among the utilities; 2. Stakeholder and academic expert input; and 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: 1. How third-party ignition sources feed into SCE's risk models; 2. How ignition sources impact SCE's mitigation selection process, including: a. How SCE prioritizes ignition sources; 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; 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: 1. Fully demonstrate that its probability of ignition models accurately account for the correlation between wind speed, ignition, and consequence; and 2. Explain: a. Why SCE finds that is does not have enough "wind driven outage data at the circuit level," b. Specify the data required "to make determinations about correlations between wind speeds and outage rates," and 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

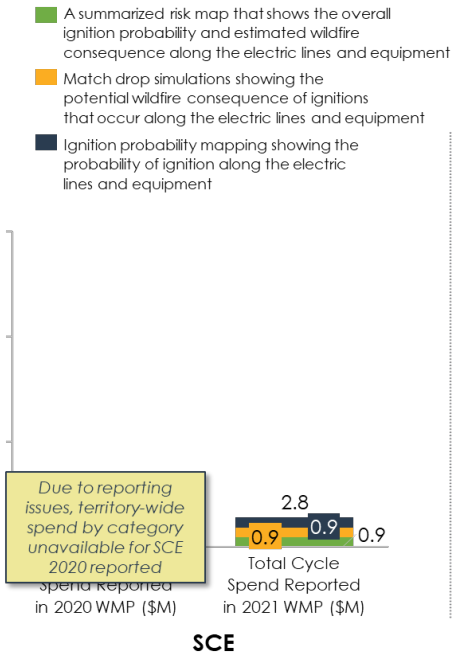
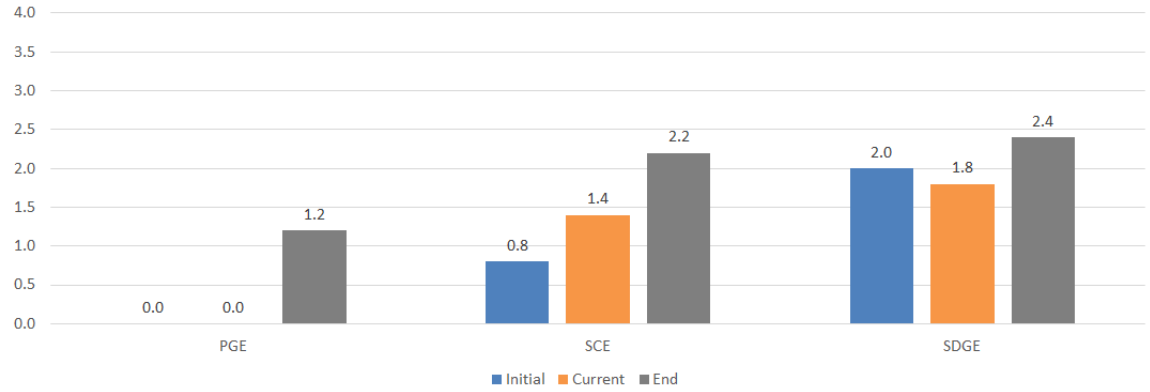
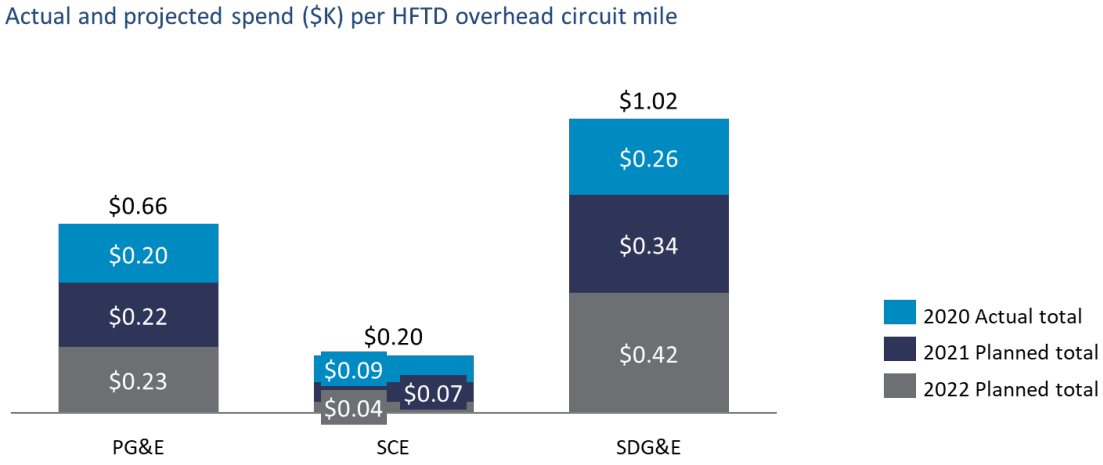


Figure 5.1.a: SCE mapping initiatives.



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

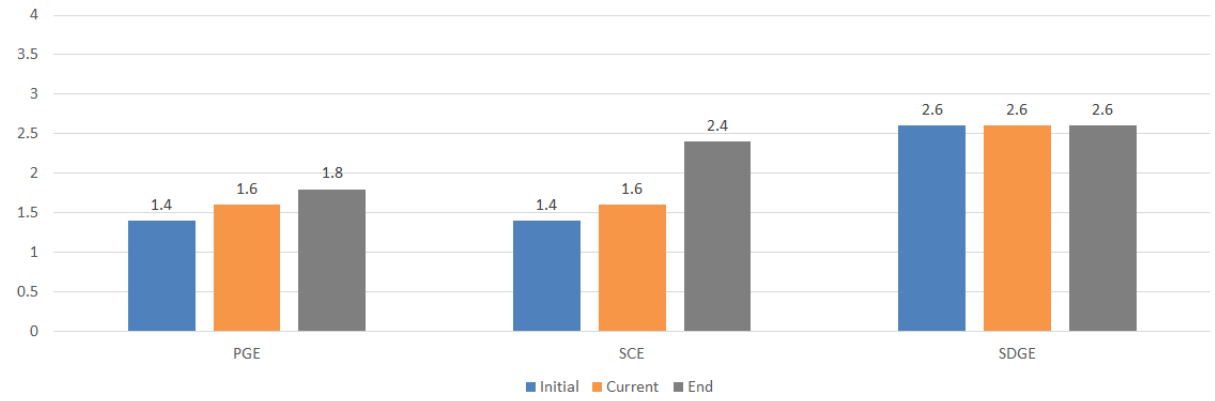
While Energy Safety did not identify key areas for improvement in this competency, Energy Safety finds the following issue and associated remedy. Energy Safety expects SCE to take action to address these issues and report on progress made over the year in its 2022 WMP Update.

- 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

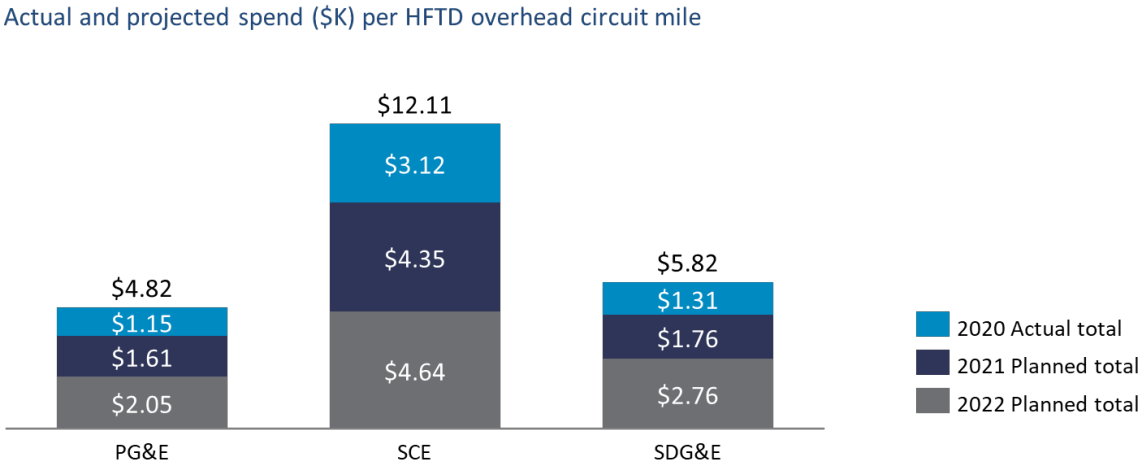
Below are charts, maps, and tables used as part of Energy Safety's review of SCE's risk assessment and mapping section:

[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

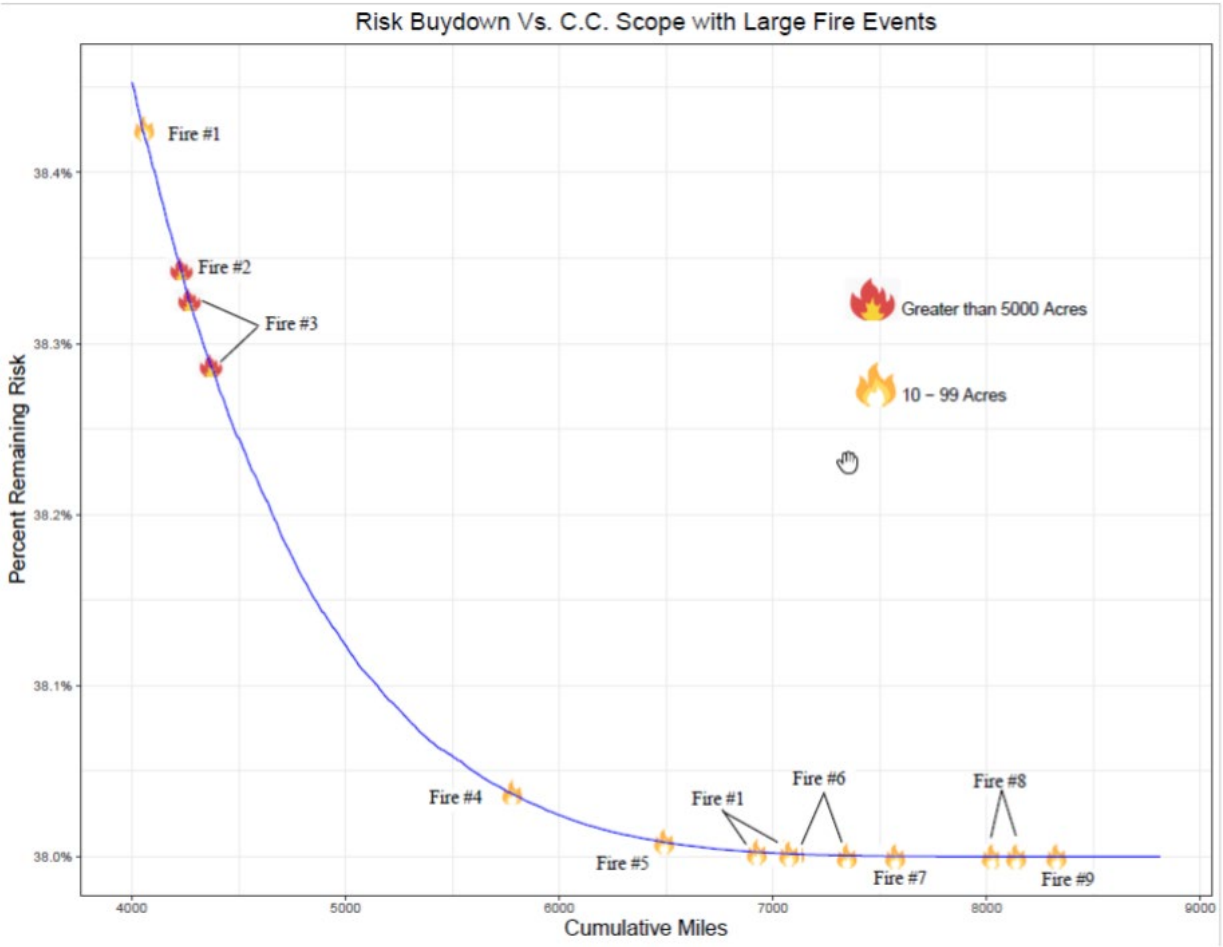
[94] Figure SCE 9.10-1 of SCE's 2021 WMP Update - Redlined shows that two fires greater than 5000 acres and 7 fires 10-99 acres in size occurred beyond the 2,110 cumulative mile risk ranking

[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: 1. The effectiveness of covered conductor in the field in comparison to alternative initiatives. 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: 1. Provide an updated Figure 9.01-1 based on SCE's latest risk modeling assessment, including the ignitions shown. 2. Provide the cause of the 9 ignitions shown in Figure 9.01-1. 3. For each of the nine ignitions shown, provide an assessment of the likelihood that covered conductor installation would have prevented the ignition.

		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. 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: 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: 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; ii) Reduction of catastrophic wildfire risk; iii) Reduction of PSPS events; iv) Selecting mitigation initiatives for individual circuit segments based on the specific location, circumstances, and risk of catastrophic wildfire. 2. Re-evaluate the scope of SCE's covered conductor program based

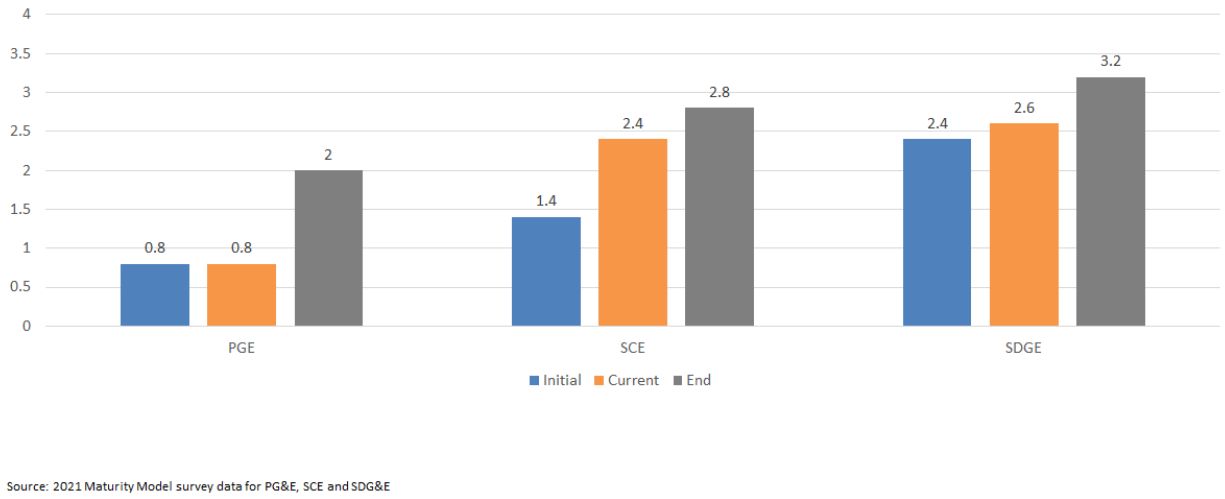
[110] Limited in terms of mileage installed, time elapsed since initial installation, or both

[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.

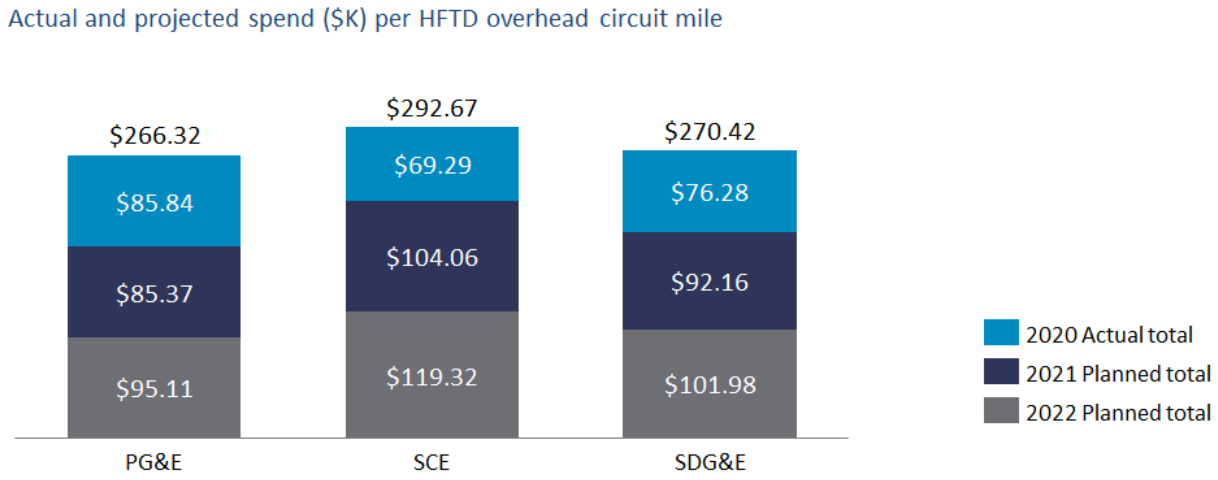
Figures

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

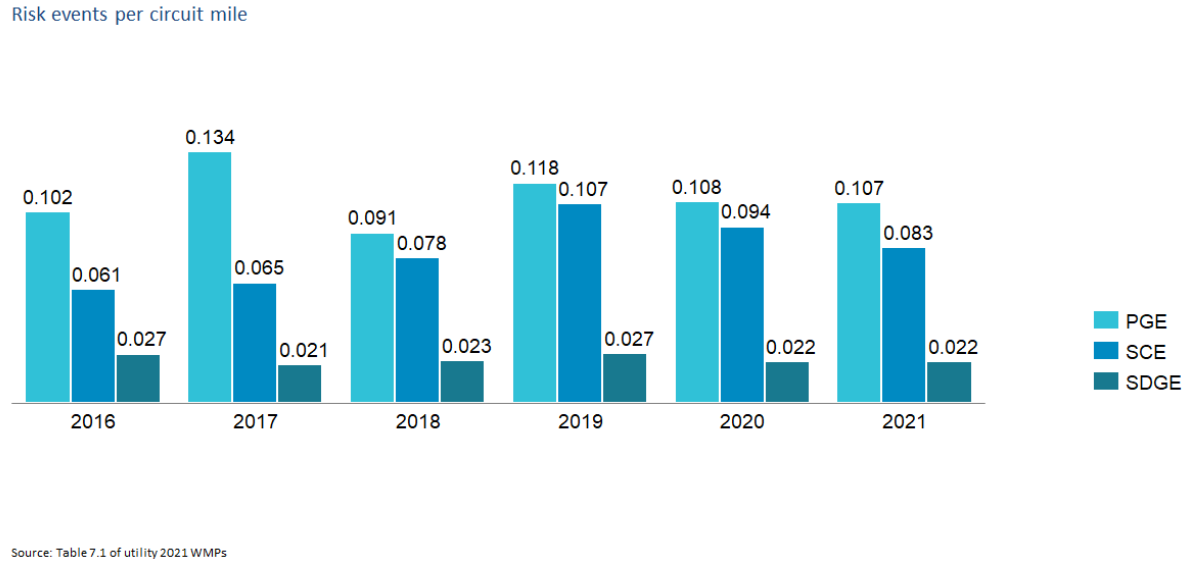
Figure 5.3.a: Grid design & system hardening maturity score progress.



	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: • Pace and quantity of scheduled maintenance; • Pace and quantity of inspections; and • Pace and quantity of vibration dampener installations. If SCE finds that its existing maintenance programs do not provide effective maintenance for covered conductor, SCE shall: 1. Enhance its current operations to provide such maintenance; and 2. Detail the enhancements to its existing programs; 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

priority areas for replacement. C-hooks are difficult to inspect and can cause wildfires when ignored.

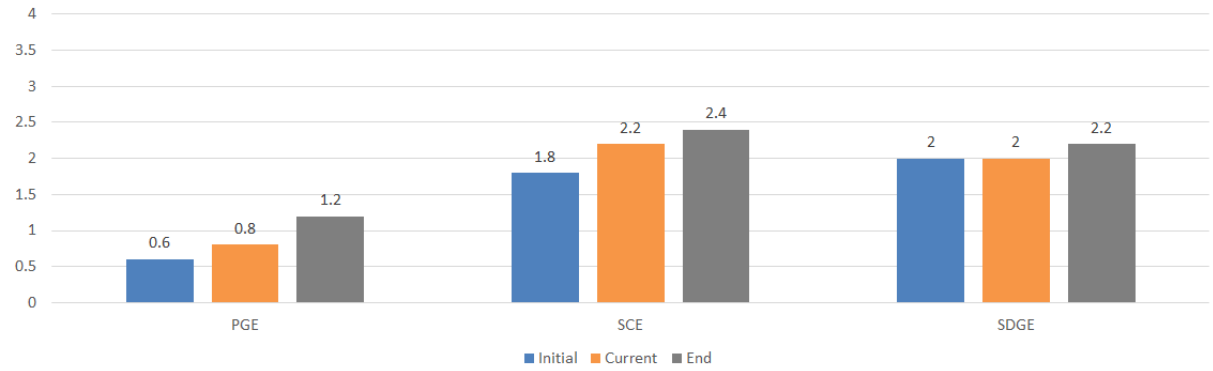
  - REMEDY: SCE must perform inspections of its HFTD territory to identify all C-hooks in HFTD zones, or explain how SCE has already inventoried C-hooks within its territory through field inspections, including any supporting documentation. This inventory can be integrated into SCE's other transmission inspection programs and integrated into SCE's C-hook replacement plans.
  - REMEDY: SCE must detail how it is prioritizing the order in which C-hooks are replaced.
  - REMEDY: SCE must develop a plan for determining the condition of each of its existing C-hooks, or demonstrate that it has an existing plan that addresses C-hook replacements.[114] SCE must provide the details of this plan, including the timeframe for execution.

- ISSUE: SCE's existing drone inspection pilot programs appear to show promising results as an effective and cost-effective method of inspection. However, SCE does not provide details as to how it intends to move forward with its drone inspection programs.
  - REMEDY: SCE should evaluate its drone pilot program and assess the potential for broader use of and investment in drones. SCE should determine whether the results of the pilot program provide support for broader application of drone inspections, continuation of the existing program, or termination of the drone inspection effort.
- ISSUE: In 2020, SCE fell far short of its target for pole loading assessments. SCE forecasted completing 1,205 pole loading assessments but in actuality completed only 29 percent (or 345) of its assessments.
  - REMEDY: SCE should detail how it has addressed or will address each the issues that prevented SCE from completing pole loading assessments.
- ISSUE: As identified in 2021 through the Quarterly Reports, SCE does not have a WMP-specific activity for hotline clamp replacements.
  - REMEDY: SCE shall provide all supporting material to demonstrate that its maintenance programs effectively track, repair, and replace hotline clamps. If its existing maintenance programs do not provide effective maintenance for hotline clamps, SCE shall explain how it will be enhancing its current operations to provide such maintenance and provide supporting material to detail the enhancements to its existing programs.

[114] PG&E has a C-hook inspection program that may help to inform the development of a similar program by SCE. SCE may therefore want to reach out to PG&E to gain an insight into PG&E's approach before developing its own plan for determining the condition of its existing C-hooks

Figures

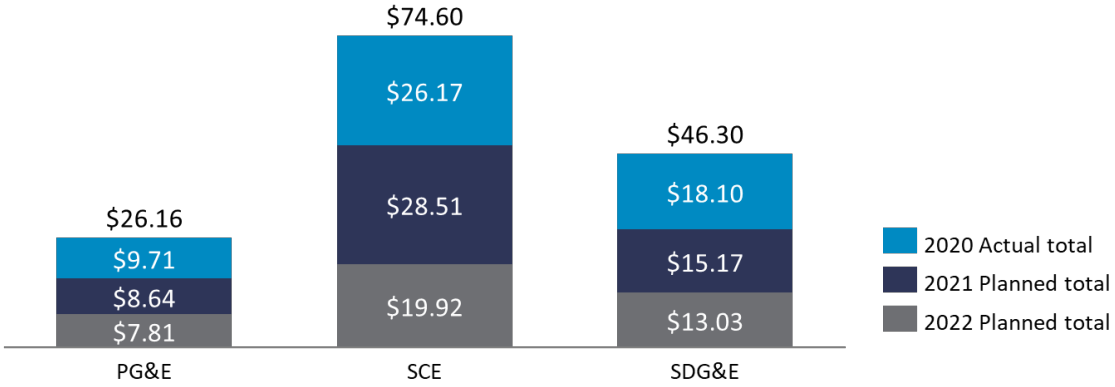
Below are charts, maps, and tables used as part of Energy Safety's review of SCE's risk assessment and mapping section:



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

Figure 5.4.a: Asset management & inspections maturity score progress.

Actual and projected spend ($K) per HFTD overhead circuit mile



	PG&E ($K)	SCE ($K)	SDG&E ($K)
2020 Actual Total	$9.71	$26.17	$18.10
2021 Planned Total	$8.64	$28.51	$15.17
2022 Planned Total	$7.81	$19.92	$13.03

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

Figure 5.4.b: Asset management & inspections spend per HFTD overhead circuit mile, large utilities, 2020-2022.

5.5 Vegetation Management and Inspections

Introduction

This section of the WMP Guidelines[115] requires utilities to discuss vegetation management inspections, including inspections that go beyond existing regulation, as well as infrared, light detection and ranging (LiDAR), and patrol inspections of vegetation around distribution and transmission lines/equipment, quality control of those inspections, and limitations on the availability of workers. The utility must also discuss collaborative efforts with local land managers, including efforts to maximize benefit from fuel treatment activities and fire break creation as well as the collaborative development of methods for identifying at-risk vegetation, determining trim clearances beyond minimum regulations, and identifying and mitigating impacts from tree trimming and removal (erosion, flooding, etc.).

Overview

Energy Safety finds that SCE has made progress in Vegetation Management and Inspections. SCE has instituted specific remediation protocols for palm species; SCE's focus on palms as "at-risk" species demonstrates integration of risk-informed mitigations. Additionally, SCE is expanding its International Society of Arboriculture (ISA)-certified workforce; in 2020 it contracted with 27 ISA-certified assessors and in 2021 it intends to increase the number contracted ISA-certified arborist to 40 to perform hazard tree assessments. In the 2021 WMP, SCE increased its expected 2020- 2022 WMP cycle spend for VM in its entire territory form $646.7 million (as reported in the 2020 WMP) to $1.11 billion. In a data request (See Appendix 10.2). SCE stated a significant portion of this increase was due to Senate Bill (SB) 247 (2019) which required prevailing wages for qualified line clearance tree trimmers.[116] In similar data requests, PG&E and SDG&E indicated that comparable increases in VM spend due to the conditions of SB 247 were included as part of their 2020 WMPs.[117] [118]

Progress over the past year

Energy Safety finds that SCE has made the following progress:

- SCE has instituted specific remediation protocols for palm species.

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[115] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, p. 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

[116] SCE: WSD-SCE-003 Q. 003

[117] PG&E: WildfireMitigationPlans_DR_WSD_010-Q18

[118] SDG&E: 2021 WMP WSD-SDGE-04 Question 3

- SCE reported it mitigated 95% of the active inventory[119] of its Dead & Dying Tree initiative in 2020.
- SCE has increased the number of spans it inspected for vegetation clearance compliance in 2020 and found a smaller percentage of non-compliant spans as compared to 2019. (see Table 5.5.a)
- Since 2018, SCE has seen a steady reduction in risk events associated with vegetation contact. (Figure 5.5.d)
- In 2022, SCE plans to transition to using new risk consequence modeling software in its WRRM to prioritize vegetation work. Several VM initiatives will use this new modeling including summer readiness verifications, Hazard Tree Management Program (HTMP), and inspections.
- SCE has expanded its pole clearing initiative to include all distribution poles in its high fire risk area (HFRA) regardless of Public Resources Code Section 4292 exemption status. Pole brushing reduces the risk of ignition from pole mounted equipment/hardware and provides defensible space for poles, regardless of the ignition source. In 2020, SCE reported it cleared approximately 230,000 poles, meeting its projected target.
- SCE uses a risk-based approach to determine where to perform quality control (QC) audits.
- SCE is making progress toward "consolidat[ing] the various digital tools into an integrated vegetation management [software] platform."[120]
- SCE is using LiDAR on select transmission lines circuits to inspect vegetation clearance. Flights are "prioritized based on the potential for ground inspection inaccuracy."[121] Forty-five LiDAR transmission circuit inspections were reported flown in 2020, accounting for approximately 1,700 miles. Approximately 80 transmission circuits are expected to be flown in 2021.
- SCE contracted with 27 ISA-certified assessors in 2020 and intends to increase the number contracted ISA-certified arborist to 40 to perform hazard tree assessments in 2021. Several SCE initiatives, including HTMP, quality control, and Contractor Guidance Activities,[122] are staffed by ISA certified arborists. For line clearing, SCE requires any person supervising be ISA certified.

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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[119] "Active inventory reflects trees for which SCE has both access and authorization to perform the removal." SCE 2021 WMP Update Revision – Clean, p. 270

[120] SCE 2021 WMP Update Revision – Clean, p. 281

[121] SCE 2021 WMP Update Revision – Clean, p. 269

[122] SCE 2021 WMP Update Revision – Clean, p. 275

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: 1. Establish uniform data collection standards. 2. Create a cross-utility database of tree-caused risk events (i.e., outages and ignitions caused by vegetation contact). 3. Incorporate biotic and abiotic factors[125] into the determination of outage and ignition risk caused by vegetation contact. 4. Assess the effectiveness of enhanced clearances. 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. 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: 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. 2. Add genus and species designation input capabilities into its systems which track vegetation (e.g., vegetation inventory system and vegetation-caused outage reports). 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). 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
			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.).[129] 5. Teach tree species identification skills in its VM personnel training programs, both in initial and continuing education. 6. Encourage all VM personnel identify trees to species in all VM activities and reporting, where possible.
SCE-21-09	Need for quantified VM compliance targets	In Table 12, SCE 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;[130] 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.

[129] 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

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

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 inspects and manages the vegetation at substations "outside the fence line for potential encroachment"[131] in its HFRA. However, it is unclear what standards or guidelines it adheres to ensure consistent VM at all HFRA substations.
    - REMEDY: SCE must describe the standards and/or guidelines SCE uses to manage vegetation around substations (e.g., radial zones).
- ISSUE: SCE adequately details future capabilities, research, and improvements under the reoccurring SCE's 2021 WMP Update header "5) Future improvements to initiative." However, SCE does not provide a timeline for the implementation or exploration of these improvements.
    - REMEDY: When discussing future improvement to VM initiatives in SCE's 2021 WMP Update header "5) Future improvements to initiative," SCE must provide expected timelines for exploration, development, and implantation of the improvement(s).
- ISSUE: In Section 7.3.5.13, SCE's description in reoccurring SCE's 2021 WMP Update header "1) Risk to be mitigated" is narrower in scope as compared to its peer utilities, PG&E and SDG&E. SCE states that quality control and quality assurance audits mitigate risk when "Trimming crews may not prune enough of a tree to maintain the minimum clearance distance;"[132] SCE does not include auditing for other standards beyond attaining minimum clearance distance.
    - REMEDY: In its 2022 WMP Update, SCE must broaden its SCE's 2021 WMP Update header "1) Risk to be mitigated" considerations in Section 7.3.5.13 (or similar).
- ISSUE: SCE's 2020 QC audit target was 3,000 circuit miles; SCE exceeded this target, completing over 6,000 circuit miles. However, SCE's 2021 QC target is 5000 circuit miles. It is apparent that SCE has the resources and ability to complete over 6,000 miles of QC audit per year.
    - REMEDY: Energy Safety encourages SCE to adjust targets for QC audits based on known, demonstrated capabilities.
- ISSUE: In Section 7.3.5.1, SCE does not provide detail regarding it customer, agency, and government VM notification process.
    - REMEDY: Provide a visual description (e.g., flow chart, decision tree,[133] etc.) of customer, agency, and government notifications for VM activities and

[131] SCE 2021 WMP Update Revision – Clean, p. 281

[132] SCE 2021 WMP Update Revision – Clean, p. 272

[133] For an example of a decision tree visit: https://hbr.org/1964/07/decision-trees-for-decision-making

emergency work. Include the methods of notification(s) (e.g. phone calls, emails, door hangers, etc.) and sequences of notification(s).

- ISSUE: QR Action-SCE-28 required SCE to provide a copy of its study to "determine the best use of fuel reduction."[134] However SCE inadvertently stated in its First Quarterly Report that the study would be complete by year-end 2020; SCE intends to complete by year-end 2021.[135]
    - REMEDY: SCE shall provide a copy of its study to "determine the best use of fuel reduction" [136] as an attachment to the 2022 WMP Update.

Figures

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

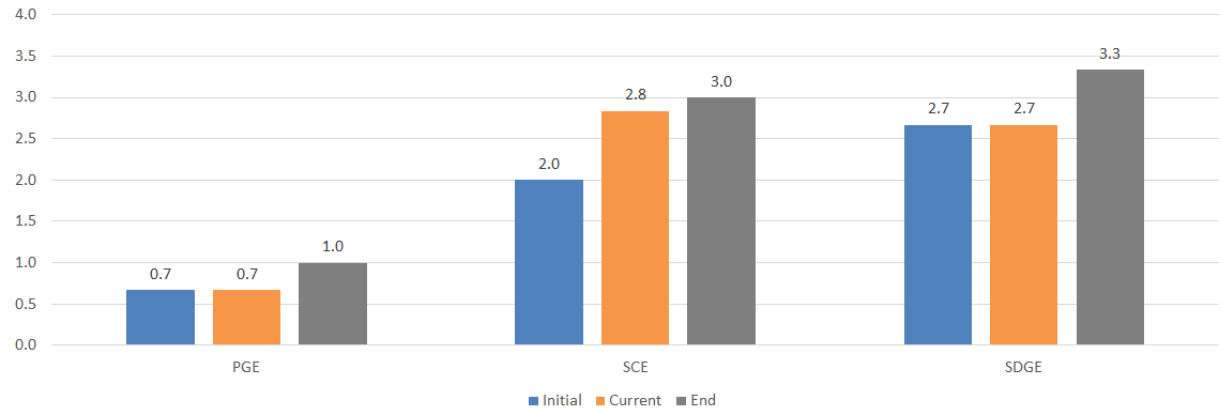
Table 5.5.a: Data from SCE's 2021 WMP Update, Table 1

		2019	2020
Vegetation clearance findings from inspection - total	Number of spans inspected where at least some vegetation was found in non-compliant condition - total	801	950
	Number of spans inspected for vegetation compliance - total	39,638	72,563
	Percentage of spans inspected where at least some vegetation was found in non-complaint condition	2.02%	1.31%
Vegetation clearance findings from inspection - in HFTD	Number of spans inspected where at least some vegetation was found in non-compliant condition in HFTD	530	715
	Number of spans inspected for vegetation compliance in HFTD	25,479	53,123
	Percentage of spans inspected where at least some vegetation was found in non-complaint condition in HFTD	2.08%	1.35%

[134] Southern California Edison First Quarterly Report, September 9, 2020, p. 284

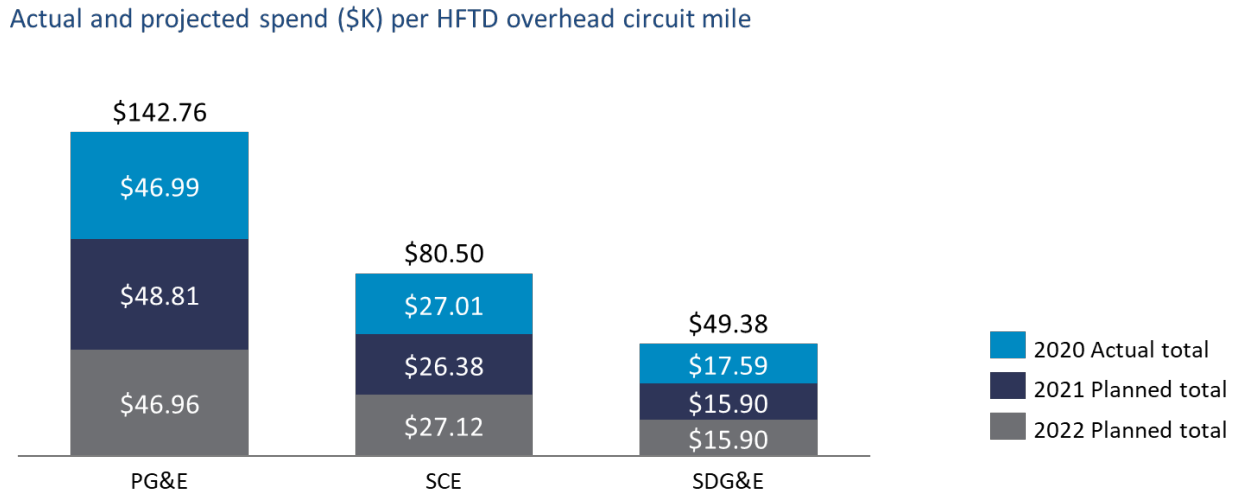
[135] SCE 2021 WMP Update Revision – Clean, p. 529

[136] SCE First Quarterly Report, September 9, 2020, p. 284



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

Figure 5.5.b: Vegetation management & inspections maturity score progress.



	PG&E ($K)	SCE ($K)	SDG&E ($K)
2020 Actual Total	$46.99	$27.01	$17.59
2021 Planned Total	$48.81	$26.38	$15.90
2022 Planned Total	$46.96	$27.12	$15.90

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

Figure 5.5.c: Vegetation management & inspections spend per HFTD overhead circuit mile, large utilities, 2020-2022.

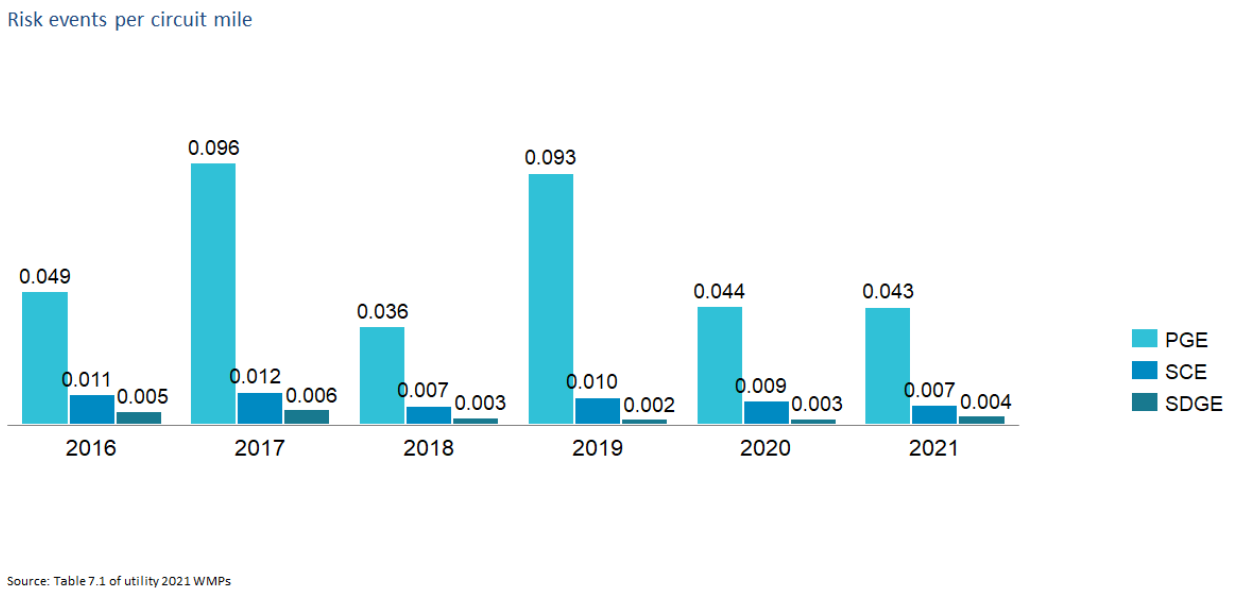


Figure 5.5.d: Risk events per circuit mile due to vegetation contact, large utilities.

5.6 Grid Operations and Operating Protocols, Including PSPS

Introduction

The grid operations and operating protocols section of the WMP Guidelines[137] requires discussion of ways the utility operates its system to reduce wildfire risk. For example, disabling the reclosing function of automatic reclosers[138] during periods of high fire danger (e.g., during Red Flag Warning conditions) can reduce utility ignition potential by minimizing the duration and amount of energy released when there is a fault. This section also requires discussion of work procedures in elevated fire risk conditions and protocols to reduce the frequency and scope of de-energization including PSPS events (e.g., through sectionalization, etc.). This section also requires the utility to report whether it has stationed and/or on-call ignition prevention and suppression resources and services.

Overview

[137] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, p. 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

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

Energy Safety finds that SCE has made progress in Grid Operations and Operating Protocols, including PSPS, 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 updated its System Operating Bulletin (SOB) 322 to reflect lessons learned from past elevated fire weather threats and PSPS events. SCE's updates included parameters 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.[139] SCE plans to implement a Hazard Event Restriction and Management Emergency System for more automation surrounding recloser settings in 2021.
- SCE revised its HFRA Hot Work Restriction and Mitigation Measures program to restrict "hot work"[140] within HFRAs and ensure that field personnel are equipped with suppression equipment in the event that an ignition is caused while performing work.
- SCE implemented a program that restricts or delays field work during elevated fire conditions.[141]
- SCE provided training to field personnel (both employees and contractors) performing patrols and live field observations prior to 2020 wildfire season. SCE plans to refresh this training for all field personnel performing the same types of patrols in 2021.
- SCE performed 424 patrols on lines within the HFRA that were affected in a PSPS event before restoring power to those lines, and staffed its Electric Services Incident Management Team (ES IMT) for larger PSPS events. In 2021, SCE plans to develop a fully dedicated IMT instead of pooling from existing company-wide resources. It plans to increase its Wildfire Infrastructure Protection Team by 18 employees.
- SCE developed a PSPS IMT Customer Care Team specific to mitigating customer impact during a PSPS event. The PSPS IMT was activated 12 times. SCE activated Community Resource Centers (CRCs) 58 times and Community Crew Vehicles (CCVs) 88 times in multiple counties to support of community members during PSPS events. Approximately 6,000 customers visited the CRCs and CCVs during the months of May through December 2020 during PSPS activations. In 2021, SCE plans on offering community resource centers, community resiliency programs, and customer resiliency equipment.

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

[140] "Hot work is defined as any activity that is capable of initiating a fire or generating potential ignition sources." SCE's 2021 WMP Update, p. 284

[141] SCE's "Work Restrictions During Elevated Fire Conditions" Program

- SCE made progress in two of its customer resiliency programs. For its Resiliency Zones Pilot, which provides in-front-of-the-meter and behind-the-meter temporary generation during PSPS events, SCE completed four resiliency sites and reached agreements for implanting two more. For its Customer Resiliency Equipment Incentive, which provides a financial incentive towards the installation cost of a microgrid control system for customers willing to allow the use of their facility as a CRC during PSPS events, SCE funded a pilot to add a microgrid control system to an existing resiliency system to create an emergency shelter for the community.

SCE has room for improvement in the following areas:

- SCE does not provide specificity regarding how increased grid hardening will change system operations, change PSPS thresholds, and reduce PSPS events.
- SCE's SOB 322, as referenced when discussing recloser procedures, was not supplied as part of SCE's WMP filing.
- While SCE briefly mentions its Work Restrictions During Elevated Fire Conditions Program, details on the modifications made to work as well as the qualifiers for "Elevated Fire Conditions" are not provided. SCE needs to provide details of such moving forward in order to determine sufficiency of the program itself.

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-21-13	Lack of specificity regarding how increased grid hardening will change system operations, change PSPS thresholds, and reduce PSPS events	SCE does not commit to changes in its PSPS thresholds for increased grid hardening, except for increasing wind speed thresholds specifically for circuits mitigated with covered conductor.[142] SCE provides a table showing how six of its mitigation alternatives may impact PSPS frequency, duration, and number of customers impacted,[143] but provides no quantitative analysis of impacts.	For each mitigation alternative, including pilot program initiatives, SCE must provide quantitative analysis on: 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.

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.

[142] 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

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

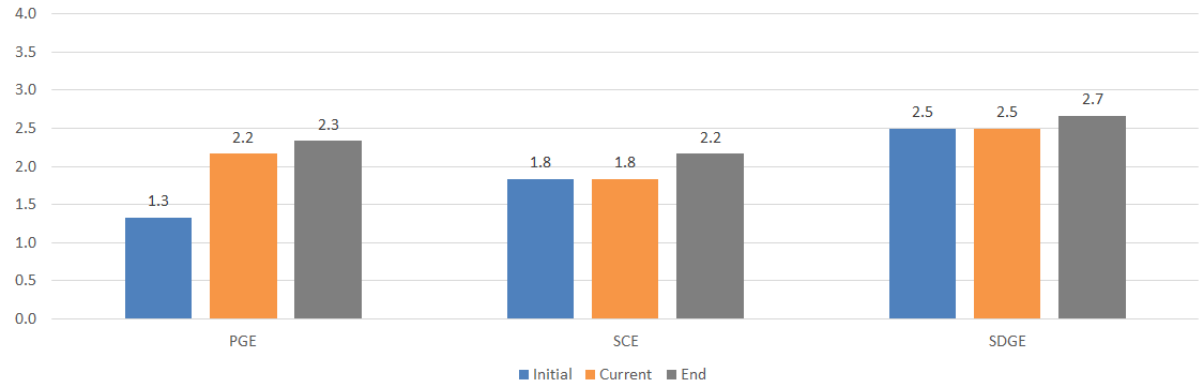
- ISSUE: SCE failed to provide all supporting documents referenced within its WMP, and while SOB 322 was discussed in Section 7.3.6.1, SCE did not provide the actual procedures.
    - REMEDY: Include attachments on SCE's WMP website for all documents and procedures referenced within SCE's WMP, including (but not limited to) SOB 322.
- ISSUE: SCE failed to provide details on its Work Restrictions During Elevated Fire Conditions Program.
    - REMEDY: Include a) all procedures affected as a result of the Program, b) a description of how such procedures are affected, c) the threshold(s) used to determine elevated fire conditions, and d) define and provide the criteria for a "PSPS Proximity Threat."[144]
- ISSUE: SCE does not have on-call ignition prevention and suppression resources, instead relying on fire agency partners for fire suppression activities.
    - REMEDY: In 2020, a lesson learned was that more collaboration is needed with fire agencies to enhance fire suppression efforts for protecting electrical infrastructure during fires for service reliability and resilience, and SCE partnered with Orange County Fire Authority several times (see also Section 5.10).[145] SCE must describe how it plans to continue or expand on its program of partnering with fire agencies.

Figures

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

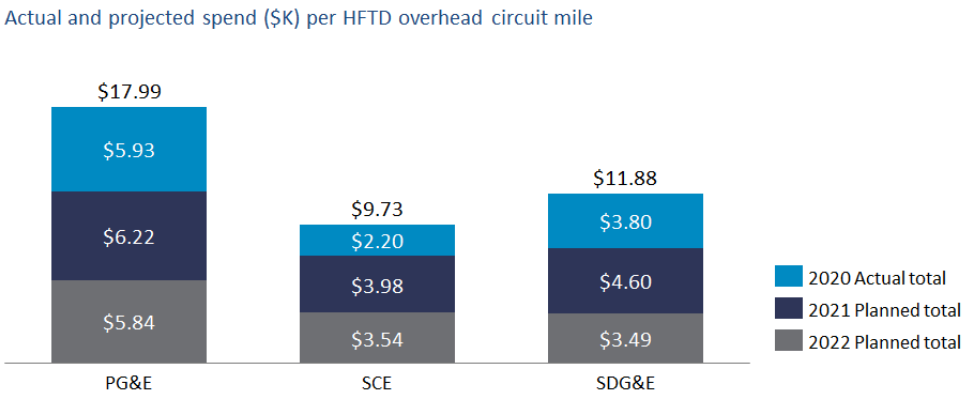
[144] As stated in SCE's 2021 WMP Update, p. 283

[145] SCE's 2021 WMP Update Revision – Redlined, p. 132 and p. 339



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

Figure 5.6.a: Grid operations and protocols maturity score progress.



	PG&E ($K)	SCE ($K)	SDG&E ($K)
2020 Actual Total	$5.93	$2.20	$3.80
2021 Planned Total	$6.22	$3.98	$4.60
2022 Planned Total	$5.84	$3.54	$3.49

Source: Table 12 of utility 2021 WMPs and subsequent data requests

Figure 5.6.b: Grid operations & protocols spend per HFTD overhead circuit mile, large utilities, 2020-2022.

5.7 Data Governance

Introduction

The data governance section of the WMP Guidelines[146] require information on the utility's initiatives to create a centralized wildfire-related data repository, conduct collaborative

[146] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, p. 45 (accessed July 12, 2021):

Footnote continued on next page.

research on utility ignition and wildfire, document and share wildfire-related data and algorithms, and track and analyze near-miss data. In addition, this section discusses the quality and completeness of Quarterly Data Reports (QDR), consisting of spatial and non-spatial data submitted as required by condition Guidance-10 in resolution WSD-002. Initial submissions of data were received in September 2020, and QA/QC reports were issued for the spatial data component of those submissions in December 2020. Since those initial QA/QC reports, two more QDRs were received in December 2020 and in February or March 2021 (submitted with the utility's 2021 WMP Update). The spatial data are subject to the WSD GIS Data Reporting Standard (GIS Standard), the first version of which was published by the WSD on August 21, 2020, and which was updated on February 4, 2021.[147] The analysis of spatial data in this section focuses on specific areas where the data SCE submitted with its 2021 WMP Update do not meet the GIS Standard.

Overview

Energy Safety finds that SCE has made progress in Data Governance 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 has set up foundational infrastructure for a cloud data platform to centralize data storage.[148] This includes:
    - Implementation of a wildfire safety portal: centralized repository of wildfire datasets to support analysis, data utilization across wildfire programs, and wildfire data portal for reporting and secure data sharing.[149]
    - Implementation of a cloud data and artificial intelligence platform: this will enable SCE to (a) ingest, organize, store, analyze, and visualize remote sensing data collected for wildfire mitigation initiatives and (b) enable SCE's data

https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf

[147] The most recent version of the standard, version 2, can be downloaded here: https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2020/wsd-gis-data-reporting-requirements_draft_20200821.pdf and https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2020/wsd-gis-data-preparation-_-submittal-guidance_20200821.pdf

[148] SCE's 2021 WMP Update, p. 300

[149] SCE's 2021 WMP Update, p. 298

scientists to develop, train, test, and deploy machine learning models within business processes.[150]

- SCE is supporting several research projects, including the
  - San Jose State University wind profile project
  - Electric Power Research Institute fuel removal assessment
  - University of California Los Angeles microgrid study
  - University of Colorado Boulder vegetation regrowth model and fuels potential model
- SCE continued documentation and analysis of ignition events through its Fire Incident Preliminary Analysis (FIPA) database, and is conducting a pilot program of using the same framework process for collecting information on wire down events. Currently, the latter are monitored separately in a Wire Down Database, so combining these processes will help to centralize risk-event documentation.
- SCE completed implementation of an image visualization application to automatically detect and organize over six million images collected during the year for Aerial Inspections. This enabled inspectors to easily search and retrieve structure-specific images needed for desktop electric system inspections.[151]
- SCE conducted workshops to gather information on existing processes and tools that are used to manage and report out on the following wildfire datasets: assets, wildfire mitigation initiatives (vegetation management inspections, vegetation management projects, asset inspections, and grid hardening), PSPS events, and risk events (e.g., wire-down events, ignitions and unplanned outages).[152]
- Established a manual reporting process for spatial (GIS) and non-spatial data delivery in support of the WSD's QDR, with delivery of data for the two QDRs in 2020 and the QDR contemporaneously submitted with the 2021 WMP Update.[153]

SCE has room for improvement in the following areas:

- Spatial data in the Quarterly Data Report (QDR) submission: SCE has not made significant progress compared to the previous quarterly data submission. The data submitted for Q4 2020 have several fundamental issues which negatively affect the useability of the data and do not meet the February 2021 Updated WSD GIS Data Standards. Many of the issues indicate a lack of internal quality control review of data which may have been converted from other formats or systems. Some of the more significant problems were:

[150] SCE's 2021 WMP Update, p. 298

[151] SCE's 2021 WMP Update, p. 300

[152] SCE's 2021 WMP Update, p. 300

[153] SCE's 2021 WMP Update, p. 300

- Submission of two separate databases: SCE submitted its data in separate "confidential" and "non-confidential" databases. This is not necessary or productive and complicated the review of submitted data for completeness and processing of data. Confidentiality is to be specified in the ("WSD GIS Data Schema Status Report" as stated in the GIS Standard section 2.6.7.).
- Missing data: SCE did not submit some important attribute data for many of the features, which reduces the usefulness of the data. For example, SCE did not provide age data for any of its point assets. This includes even estimated age ranges, which are requested if more specific age data are not available. SCE also did not submit data on the type of any of its fuses, or on whether submitted transformer locations represent one or multiple transformers.
- Domain values not used: the WSD specified coded-value domains for 196 fields in the data schema in order to receive data with universally understood values which can be compared across utilities. In several cases, SCE submitted data that did not conform to the domains specified. Some of these values were essentially the same as the correct domain values, but with different punctuation or capitalization or misspellings (e.g., "Completed" instead of "Complete"). In other cases, records were given the "Other – See comment" value, but no comment was add (see Critical Facility Points, "Facility Category" field, for example) or the comment was a value that is included in the domain of the original field (see Wire Down points, "Suspected Wire Down Cause" field).

Issues and Remedies

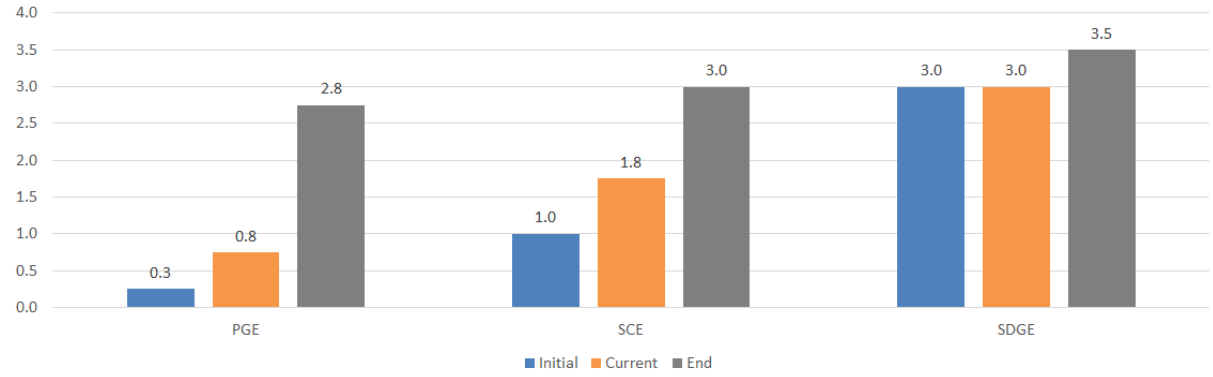
While the WSD did not identify key areas for improvement in this initiative category, the WSD finds the following issues and associated remedies. The WSD expects SCE to take action to address these issues and report on progress made over the year in its 2022 WMP Update.

- ISSUE: In section 7.3.7.3 SCE states that it "created predictive models for its transmission and sub transmission systems and updated its existing models for the distribution asset risk models." It is not clear what is being modeled.
  - REMEDY: Provide information on what is being modeled, specific to the asset type if necessary.
- ISSUE: In section 7.3.7.1 SCE describes several products or platforms which are in development to further its goal of having centralized data repositories. No specific dates are proposed for implementation of any of these products/platforms. Furthermore, SCE reported considerably lower Data Governance spend compared to PG&E and SDG&E (Figure 5.7.b). The WSD suggest that SCE could do more to prioritize its centralized data capabilities.
  - REMEDY: Provide a timeline for implementation of centralized data repositories.
- ISSUE: SCE's non-spatial data (Tables 1-12) were received in accordance with WSD templates. Several inconsistencies in spend, as reported in Table 12, were noted, particularly concerning the breakdown of spend in HFTD and non-HFTD. These

inconsistencies were the subject of data requests in spring of 2021 (see Appendix 10.2). All spend on activities that mitigate wildfires must be included in Table 12, regardless of whether that spend goes to projects inside or outside the HFTD.
    - REMEDY: As in 2021, and moving forward, this spend must be broken out by HFTD and non-HFTD projects. Table rows may be added as needed to list all of SCE's wildfire mitigation activities, provided each has a unique Activity Code number that fits within the WSD category scheme.
- ISSUE: SCE's spatial QDR data submissions have shortcomings that must be remedied. SCE lacks internal quality control on its data submissions. Data are sometimes incomplete.
    - REMEDY: SCE must submit complete age data and primary and foreign keys.
    - REMEDY: SCE must use domain values.
    - REMEDY: SCE must provide the location of all assets specified in the data standard, or explain the lack of information on these locations, what it is doing to remedy the missing data, and when it anticipates they will be provided.

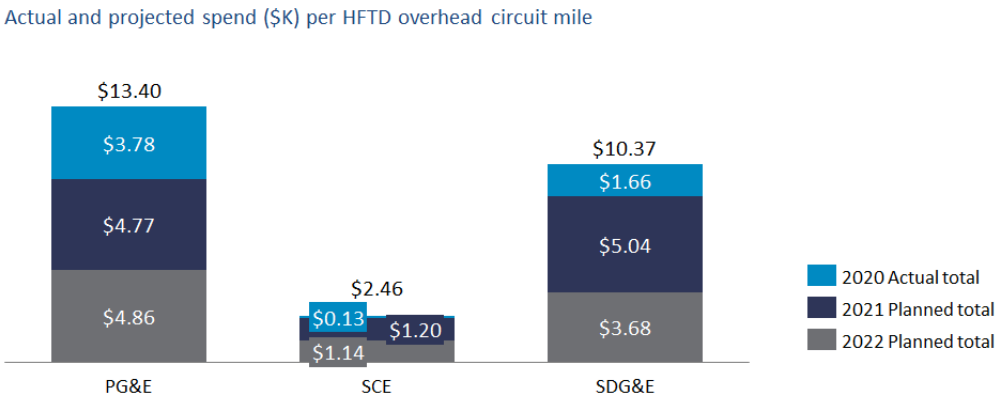
Figures

Below are charts, maps, and tables used as part of the WSD's review of SCE's data governance section:



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

Figure 5.7.a: Data governance maturity score progress.



	PG&E ($K)	SCE ($K)	SDG&E ($K)
2020 Actual Total	$3.78	$0.13	$1.66
2021 Planned Total	$4.77	$1.20	$5.04
2022 Planned Total	$4.86	$1.14	$3.68

Source: Table 12 of utility 2021 WMPs and subsequent data requests

Figure 5.7.b: Data governance spend per HFTD overhead circuit mile, large utilities, 2020-2022.

5.8 Resource Allocation Methodology

Introduction

The resource allocation methodology section of the WMP Guidelines[154] requires the utility to describe its methodology for prioritizing programs by cost-efficiency. This section requires utilities to discuss risk reduction scenario analysis and provide an RSE analysis for each aspect of the plan.

Overview

Energy Safety finds the Resource Allocation Methodology portion of SCE's 2021 WMP Update to be sufficient subject to remedies. Since the 2020 WMP, SCE has made progress in its risk-informed decision-making framework. Specifically, SCE has developed a methodology to quantify PSPS risk based on the probability and consequences of those events. However, Energy Safety finds that SCE does not provide RSE estimates for the majority of PSPS-related

[154] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, p. 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

activities,[155,156] despite a Revision Notice highlighting this as a critical issue. 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 updated its Wildfire Risk Reduction Model (WRRM) to include a component that calculates the risk of PSPS based on probability and consequence of those PSPS events (safety, reliability and financial) at the circuit level.
- SCE improved its risk-informed inspections methodology by creating a more refined risk scoring system for both transmission and distribution at the structure level.
- SCE's WRRM consequence modeling tool uses larger and more recent weather, fuel, and census data compared to its previous risk model. The expanded data sets are expected to better inform the risk-based decision-making process.
- SCE updated its advanced fire propagation modeling to include urban encroachment and is better able to integrate with the utility's probability of ignition (POI)

SCE has room for improvement in the following areas:

- Throughout its 2021 WMP, SCE continues to use equivocating language to describe future improvements. Per Condition iii of Section 5.4.4 of Resolution WSD-002, "[c]ontinued use of equivocating language may result in denial of future WMPs."[157] In Table 7.1.2.3.3.3 of its 2021 WMP Update, SCE lists "[c]alculating RSE for all potential initiatives"[158] 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.
- SCE's RSE estimate for covered conductor installation is vastly different from the other large electrical utilities, as shown in Table 3 below.

[155] Here, PSPS-related activities are defined as mitigation initiatives that "support 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

[156] 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

[157] "Condition (Guidance-8, Class C): In its 2021 WMP update, each electrical corporation shall: […] iii) Dispense with empty rhetoric and not use terms that are ambiguous, misleading, or otherwise have the result of diluting commitments. Continued use of equivocating language may result in denial of future WMPs" (p. 24)

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

Table 3: Covered conductor values from the large electrical utilities.

Utility	2020-2022 Circuit Miles[159]	2020-2022 Cost Per Mile[160]	Risk Reduction Efficiency[161]	RSE[162]
PG&E	918	$1,498,188	62%	4.08
SDG&E	81.9	$1,883,977	70%	76.73
SCE	3,965	$550,725	64%	4,192

The reason for the discrepancy between RSE estimates is not clear at this time, with differences potentially stemming from the comparatively much lower cost per mile given by SCE while maintaining a comparatively similar risk reduction efficiency, as seen in Table 3. More evaluation is needed to determine why SCE's RSE value differs from the other two large electrical utilities. RSE values for covered conductor should be more standardized in future WMP updates.

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-01 Regression of Reported Risk-Spend Efficiency (RSE) estimates for Mitigation	SCE provides nine fewer RSE estimates for mitigation initiatives compared to its 2020 WMP submission. Furthermore, SCE only provides one RSE estimate for mitigation	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	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.

[159] Comments of The Utility Reform Network on 2021 Wildfire Mitigation Plan Updates, p. 35

[160] Ibid

[161] Values from PG&E's response to WSD-PGE-010 Q011, provided on March 18, 2021; SDG&E 2021 WMP, p. 192; and SCE's response to TURN-SCE-006 Q004, provided on March 17, 2021

[162] Values from Table 12 of the WMP Update submissions under the "Estimated RSE for HFTD Tier 3" column for "Covered Conductor Installation"; PG&E's RSE value comes from the utility'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)

Critical issue	Description	Utility response	Energy Safety evaluation
Initiatives Compared With 2020 WMP Submission	initiatives located in non-High Fire Threat District (HFTD) and Zone 1 territory.	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 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.

Additional Discussion on Revision Notice Issue SCE-01

In response to critical issue RN-SCE-01 of the Revision Notice,[163] SCE provided RSE estimates for the following initiatives: aerial inspections for distribution (IN-1.1), aerial inspections for transmission (IN-1.2), WCCP fire resistant poles (SH-1), weather stations (SA-1), and remote controlled automatic recloser settings update (SH-5). While SCE calculated five additional RSE estimates, Energy Safety finds that SCE still does not demonstrate adequate alternatives analysis for mitigation selection because RSE estimates have not been provided for control and PSPS-related mitigation initiatives. SCE provided one additional RSE for PSPS-related mitigation initiative (weather stations) out of twelve.

SCE defends its position of not calculating RSEs for PSPS-related activities by stating "SCE did not score PSPS-related activities as a wildfire risk reduction mitigation activity pursuant to WSD's guidance."[164] Resolution WSD-002 specifies that "electrical corporations shall not use RSE as a means of justifying or evaluating the efficacy of PSPS as a mitigation measure."[165] The WSD's guidance is to avoid using RSE estimates to justify the use of PSPS as a mitigation initiative because "[w]hen calculating RSE for PSPS, electrical corporations generally assume 100 percent wildfire risk mitigation and very low implementation costs because societal costs and impact are not included. When calculated this way, PSPS will always rise to the top as a wildfire mitigation tool, but it will always fail to account for its true cost to customers."[166] The limitation of RSE calculations is unequivocally directed at PSPS as a mitigation initiative only and does not extend to PSPS-related initiatives. Cal Advocates supports[167] Energy Safety's notion that activities such as fire science enhancements (SA-8), remote sensing/satellite fuel moisture (SA-7), fuel sampling program (SA-5), high performing computer cluster weather modeling (SA-3), and others on the list,[168] must have associated RSE estimates to further mature SCE's risk-informed decision-making process and deliver quantified comparability between initiatives. This is further addressed in SCE-21-01 in Section 5.8 of this Action Statement.

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[163] The Wildfire Safety Division Issuance of Revision Notice for Southern California Edison Company's 2021 Wildfire Mitigation Plan Update and Notice of Extension of WSD Determination Per Public Utilities Code 8389.3(a)

[164] Southern California Edison's 2021 Wildfire Mitiation Plan Update Revision - Clean, June 3, 2021, p. 563

[165] Resolution WSD-002, p. 38

[166] Resolution WSD-011, Attachment 2.1, p. 9

[167] Comments of the Public Advocates Office on Southern California Edison Company's (SCE) June 3, 2021 Revision of its 2021 Wildfire Mitigation Plan Update, p. 4

[168] Southern California Edison's 2021 Wildfire Mitiation Plan Update Revision - Redlined, June 3, 2021, Table 9.8-1, Category B, p. 570

As set forth in the Safety Model Assessment Proceeding (S-MAP) Settlement Agreement, "[f]or each of the mitigations, the utility will calculate the associated Risk Spend Efficiency (RSE), by dividing the mitigation risk reduction benefit by the mitigation cost estimate."[169] This requirement enables the quantitative comparison of cost-effectiveness of various mitigation initiatives. Energy Safety acknowledges that SCE "…welcomes opportunities to align with other stakeholders on how to appropriately score these activities…"[170,171] Energy Safety recognizes the need for RSE alignment among utilities and stakeholders.

Additional Discussion on Revision Notice Issue SCE-02

SCE adequately addresses critical issue RN-SCE-02 by providing a flowchart of the initiative-selection process. The flowchart is broken down into four main parts:

1. Evaluation and prioritization of wildfire/PSPS risk
2. Identification of possible mitigations
3. Selection of initiatives
4. Deployment of initiatives

SCE further explains the four main parts by detailing the steps and considerations behind the decision-making process. Notably, Figure SCE 9.9-5 ranks and categorizes the various decision-making factors into: critical factors, additional critical factors, and overarching factors. This brings clarity to the decision-making process by illustrating factors such as "risk reduced" and "RSE" are weighted more heavily than "operational feasibility" and "compliance requirement". SCE shall continue to improve its initiative-selection process and report new findings in future iterations of the WMP.

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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[169] Resolution WSD-004, p. 7

[170] Here "activities" means "enabling activities that do not directly reduce risk" (Southern California Edison Company's Reply Comments Regarding the Wildfire Safety Division's Revision Notice, p. 3)

[171] Southern California Edison Company's Reply Comments Regarding the Wildfire Safety Division's Revision Notice, p. 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. This working group will focus on addressing the inconsistencies between the inputs and assumptions used by the utilities

		exploration and alignment of these calculations.	for their RSE calculations, which will allow for: 1. Collaboration among utilities; 2. Stakeholder and academic expert input; and 3. Increased transparency.
SCE-21-14	Equivocating language used to describe RSE improvements	SCE reports "[c]alculating RSE for all potential initiatives"[177] 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.

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: For Capability 41c of the 2021 maturity survey, SCE selected "RSE estimates are verified by historical or experimental pilot data and confirmed by independent experts or other utilities in CA" starting 2023. However, SCE does not detail who the independent experts or other utilities in CA are to verify the RSE estimations.
    - REMEDY: SCE shall: 1) detail its RSE verification methodology, 2) specify who the independent experts and other utilities in California are, and 3) their roles in the RSE verification process.

[172] 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/wildfiremitigation-plan/2021-Wildfire-Safety-Plan-Errata.pdf

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

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

[175] 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

[176] The WSD transitioned to the Office of Energy Infrastructure Safety (Energy Safety) on July 1, 2021.

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

Figures

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

Top 5 Initiative Activities by Planned Spend – SCE ($M)

SCE RN data shifted spend for several initiatives in top 5

32% of total WMP spend on covered conductor

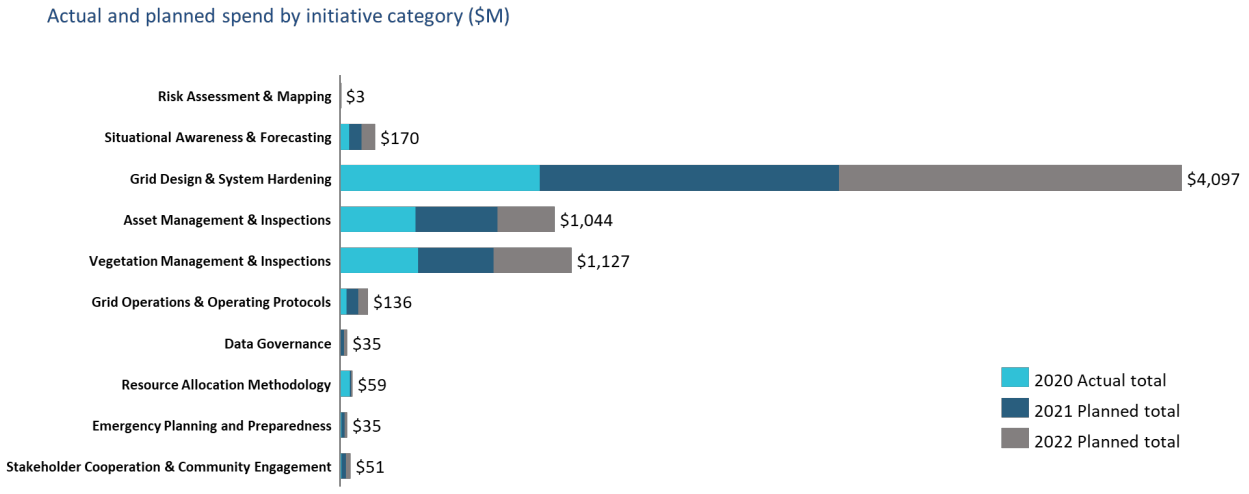
	Initiative Activity	Category	2020 Plan *From 2020 WMP*	2020 Actual *From 2021 WMP*	2021 Plan	2022 Plan	Total WMP Cycle Planned Spend	Initiative Spend as % of Total Planned Spend[1]
1	7.3.3.3.1 Covered conductor installation	Grid Design & System Hardening		$546	$754	$884	$2,184	32%
2	7.3.3.6 Distribution pole replacement and reinforcement, including with composite poles	Grid Design & System Hardening	*Due to reporting issues, territory-wide spend by activity unavailable for SCE 2020 reported*	$182	$307	$219	$708	10%
3	7.3.4.9.1 Other discretionary inspection of distribution electric lines and equipment	Asset Management & Inspections		$191	$252	$180	$623	9%
4	7.3.3.13. Pole loading infrastructure hardening and replacement program based on pole loading assessment program	Grid Design & System Hardening		$97	$210	$308	$615	9%
5	7.3.5.20 Vegetation management to achieve clearances around electric lines and equipment	Vegetation Management & Inspections		$234	$183	$188	$604	9%
	Total spend for top 5 initiatives			**$1,250**	**$1,705**	**$1,779**	**$4,734**	**70%**

7.3.3.3 in top 5 for all utilities

Top 5 initiatives make up 70% of total plan spend

1. SCE's total planned spend for WMP cycle includes the addition of initiative 7.1.D – Alternative Technologies, which does not belong to a WMP category
Source: Table 12 of 2021 utility WMPs, SCE Revision Notice, and subsequent data requests

Figure 5.8.a: Resource allocation detail for top five initiative activities by planned spend, SCE.



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

Figure 5.8.b: Overview of spend by initiative category, SCE.

Total WMP Cycle Planned Spend ($M and %)

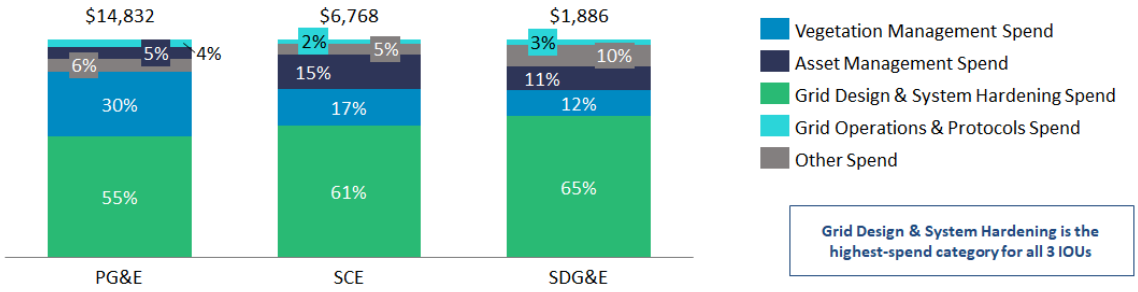
Top 3 spend categories the same across all utilities

	PG&E Plan Total	SCE Plan Total	SDG&E Plan Total
Grid Design & System Hardening	$8,225 M (56%)	$4,097 M (61%)	$1,219 M (65%)
Veg Mgmt. & Inspections	$4,409 M (30%)	$1,127 M (17%)	$223 M (12%)
Asset Mgmt. & Inspections	$808 M (5%)	$1,044 M (15%)	$209 M (11%)
Grid Operations & Protocols	$556 M (4%)	$136 M (2%)	$54 M (3%)
Data Governance	$414 M (3%)	$35 M (0.5%)	$47 M (2%)
Situational Awareness & Forecasting	$149 M (1%)	$170 M (3%)	$26 M (1%)
Emergency Planning & Preparedness	$76 M (0.5%)	$35 M (1%)	$47 M (3%)
Stakeholder Cooperation & Community Engagement	$155 M (1%)	$51 M (1%)	$39 M (2%)
Resource Allocation & Methodology	$21 M (0.1%)	$59 M (1%)	$18 M (1%)
Risk Assessment & Mapping	$20 M (0.1%)	$ 3 (0.04%)	$5 M (0.2%)
Total Planned Spend for WMP cycle	**$14,832 M**	**$6,768 M[1]**	**$1,886 M**

Source: Tables 3-1, 3-2 and 12 of 2021 utility WMPs, subsequent data requests, SCE and PGE Revision Notices
1. SCE's total planned spend for WMP cycle includes the addition of initiative 7.1.D – Alternative Technologies, which does not belong to a WMP category

Figure 5.8.c: Breakdown of planned spend by category, large utilities.

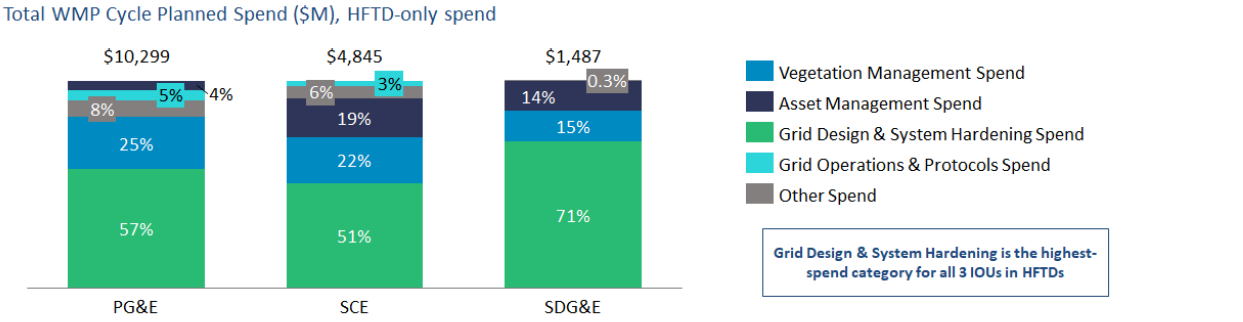
Total WMP Cycle Planned Spend ($M), territory-wide



	PG&E ($M)	SCE ($M)	SDG&E ($M)
Grid Design & System Hardening	$8,225	$4,097	$1,219
Veg. Mgmt. & Inspections	$4,409	$1,127	$223
Asset Mgmt. & Inspections	$808	$1,044	$209
Grid Operations & Protocols	$556	$136	$54
Other	$835	$363	$182

Source: Table 12 of utility 2021 WMPs, SCE and PGE Revision Notices, and subsequent data requests.

Figure 5.8.d: Overview of total planned spend, territory-wide, large utilities.



	PG&E ($M)	SCE ($M)	SDG&E ($M)
Grid Design & System Hardening	$5,920	$2,457	$1,050
Veg. Mgmt. & Inspections	$2,569	$1,063	$223
Asset Mgmt. & Inspections	$457	$899	$210
Grid Operations & Protocols	$555	$136	$0
Other	$798	$289	$4

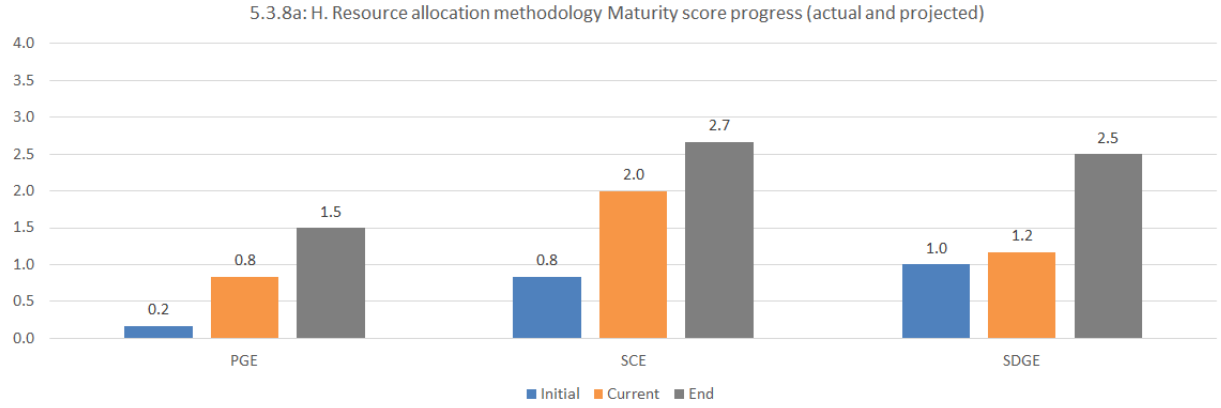
SDG&E did not report HFTD / non-HFTD split for Grid. Ops

Source: Table 12 of utility 2021 WMPs, PG&E and SCE Revision Notices, and subsequent data requests

Figure 5.8.e: Overview of total planned spend, HFTD-only, large utilities.

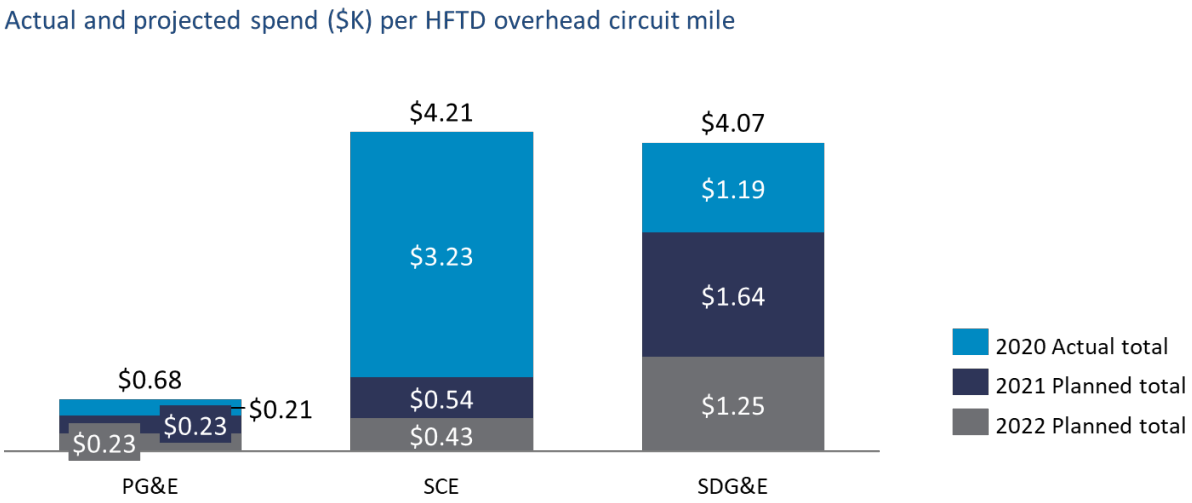
5.3.8a: H. Resource allocation methodology Maturity score progress

Note: Once comparable spend across IOUs is received, analysis will connect spend and Maturity Model scores/growth



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

Figure 5.8.f: Resource allocation methodology maturity score progress.



	PG&E ($K)	SCE ($K)	SDG&E ($K)
2020 Actual Total	$0.21	$3.23	$1.19
2021 Planned Total	$0.23	$0.54	$1.64
2022 Planned Total	$0.23	$0.43	$1.25

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

Figure 5.8.g: Resource allocation methodology spend per HFTD overhead circuit mile, large utilities, 2020-2022.

5.9 Emergency Planning and Preparedness

Introduction

This section of the WMP Guidelines[178] requires a general description of the utility's overall emergency preparedness and response plan, including discussion of how the plan is consistent with legal requirements for customer support before, during, and after a wildfire, including support for low-income customers, billing adjustments, deposit waivers, extended payment plans, suspension of disconnection and nonpayment fees, and repairs. Utilities are also required to describe emergency communications before, during, and after a wildfire in languages deemed prevalent in a utility's territory (D.19-05-036, supplemented by D.20-03-004),[179] and other languages required by the Commission.

[178] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, p. 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

[179] A language is prevalent if it is spoken by 1,000 or more persons in the utility's territory or if it is spoken by 5% or more of the population within a "public safety answering point" in the utility territory. See California Government Code Section 53112 for more information

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

Overview

Energy Safety finds that SCE has made progress in Emergency Planning and Preparedness and finds this portion of SCE's 2021 WMP Update to be sufficient.

Progress over the past year

Energy Safety finds that SCE has made the following progress:

- SCE increased its focus on PSPS emergency response capability and determined that in 2021 it would need a dedicated PSPS Incident Management Team (IMT).
- SCE increased training and resource allocation toward a dedicated customer support teams to help impacted customers before, during and after wildfire or PSPS events.
- SCE has continued enhanced workforce training and processes to improve communication and service restoration. Specifically, SCE is training employees to operate Unmanned Aircraft Systems (UAS).
- SCE's website increased access to a broader audience and now provides information in all prevalent languages, where a translation service supports 150 languages for online customer inquiries. To advance communication provision to all audiences, SCE also set up a resource library for customers to find wildfire-related outreach in all prevalent languages.
- SCE self-reports its highest maturity within the Emergency Planning and Preparedness category, currently at a 3.6 (up from a 3.0 in 2020) (see Section 1.4).

SCE has room for improvement in the following areas:

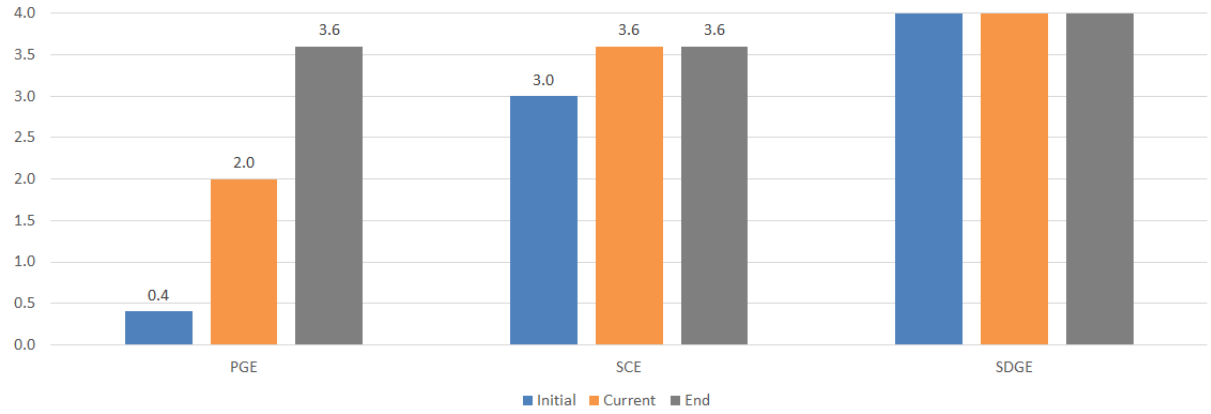
- SCE projects no growth between its current and end (2022) maturity scores (see Section 1.4).
- While SCE determined that in 2021 it needed a dedicated PSPS Incident Management Team (IMT), it fails to provide specifics on what it describes as a "large" workforce. SCE states that it has trained over 500 employees as IMT or Incident Support Team (IST) members but does not quantify how many are currently in its employment.[180]

[180] SCE's 2021 WMP Update, p. 308

- Under initiative 7.3.9.1, SCE mentions "just in time" training for PSPS field personnel but provides no specifics on what "just in time" means.
- SCE estimates UAS operations can potentially reduce patrol times by 50% but provides no details on how this estimate was calculated.

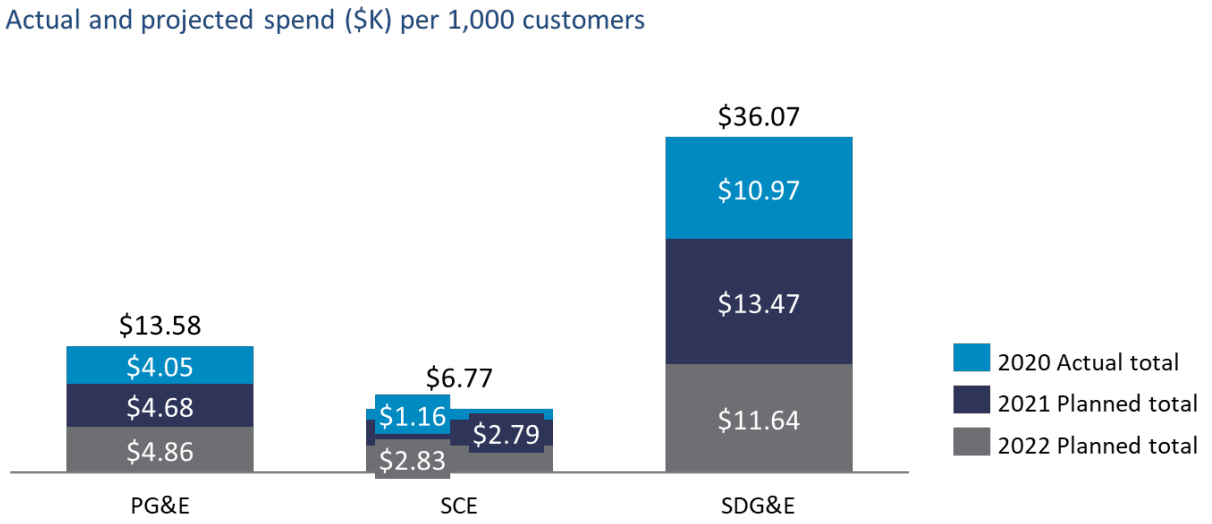
Figures

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 5.9.a: Emergency planning & preparedness maturity score progress.



	PG&E ($K)	SCE ($K)	SDG&E ($K)
2020 Actual Total	$4.05	$1.16	$10.97
2021 Planned Total	$4.68	$2.79	$13.47
2022 Planned Total	$4.86	$2.83	$11.64

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

Figure 5.9.b: Emergency planning & preparedness spend per 1,000 customers, large utilities, 2020-2022.

5.10 Stakeholder Cooperation and Community Engagement

Introduction

The final initiative category in the WMP Guidelines[181] requires the utility to report on the extent to which it will engage the communities it serves and cooperate and share best practices with community members, agencies outside California, fire suppression agencies, forest service entities and others engaged in vegetation management or fuel reduction.

Overview

Energy Safety finds that SCE has made progress in Stakeholder Cooperation and Community Engagement and finds this portion of SCE's 2021 WMP Update to be sufficient.

[181] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, p. 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

Progress over the past year

Energy Safety finds that SCE has made the following progress:

- SCE reported it held nine virtual community meetings in 2020, briefed 149 cities, counties, and tribes, and engaged in 45 Power Talks. SCE plans to continue to make improvements and refine where it hosts community meetings based on impact of previous PSPS events and grid hardening activities.
- Based on customer tracking, SCE met its marketing campaign goal of 40% awareness about PSPS program in approximate 5 million customers reached. SCE added more languages to its web page, it ran emergency preparedness messages in nine additional languages and will continue to improve on results of monthly tracking to prioritize additional targeted outreach.
- SCE holds PSPS Working Groups and PSPS Advisory Board meetings to expand opportunities available to share lessons between utilities and communities impacted by de-energization protocols to develop best practices. Energy Safety finds it positive that following SCE's quarterly working groups, it surveys participants and uses feedback to develop and refine how meetings should be conducted and address stakeholder concerns.
- Through initiative (7.3.10.4) SCE coordinates with the United States Forest Service (USFS) through a joint roadmap to reduce fuels in and around powerlines. This includes a cost recovery agreement with the USFS.
    - SCE is working on several activities that reduce fuel within and near existing and adjacent fire prone corridors including USFS land.
    - SCE is working in partnership with a contractor to study identifying global practices for fuel management. USFS will develop joint plan by 2021 to scale up vegetation treatment to one million acres of forest and wildland annually by 2025. SCE did not develop an RSE for this activity.

SCE has room for improvement in the following areas:

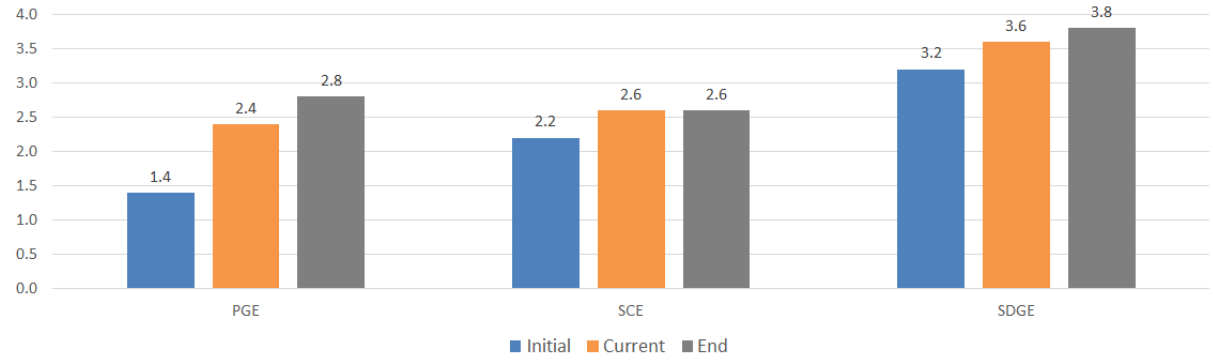
- In 2020, a lesson learned was that more collaboration is needed with fire agencies to enhance fire suppression efforts for protecting electrical infrastructure during fires for service reliability and resilience, and SCE partnered with Orange County Fire Authority several times (see Section 5.6 for related and remedy).
- Although SCE reports a significant increase in planned spend within this category, it projects no increase in maturity between its current and end scores, both at a 2.6, and reports minimal growth from its initial score of a 2.2 in 2020 (see Section 1.4).[182]

[182] Source: Table 12 of 2021 utility WMPs and subsequent data requests; 2021 Maturity Model Survey Data; SCE Revision Notice

- As described, SCE sends its effectiveness surveys out too late in the year to have their responses improve current and pre fire season protocol, stating "In 2020, SCE's In-Language Wildfire Mitigation Communications Effectiveness surveys were administered pre-wildfire season (August 18-October 14) and post-wildfire season."

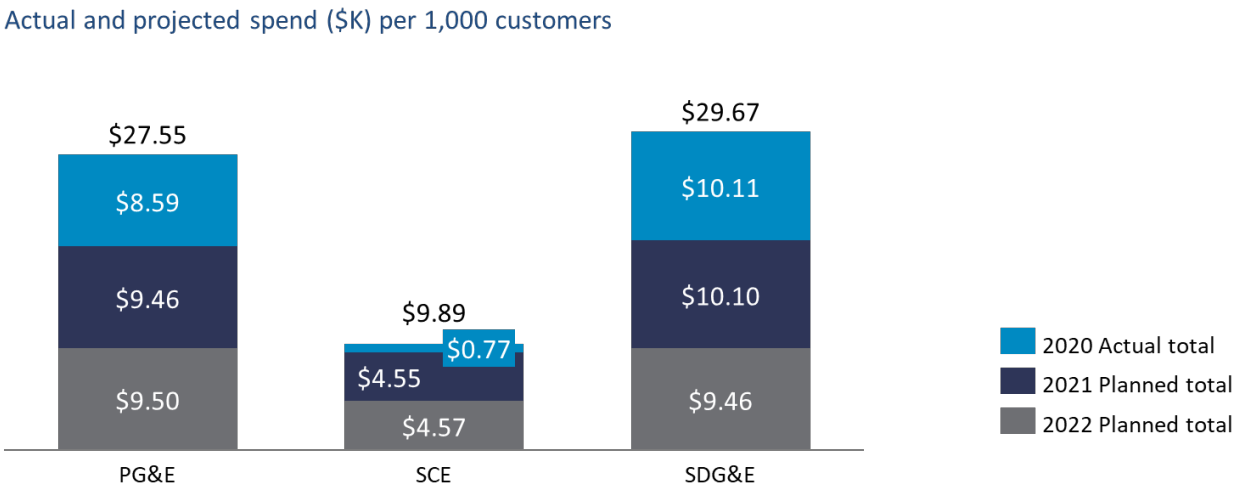
Figures

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 5.10.a: Stakeholder cooperation & community engagement maturity score progress.



	PG&E ($K)	SCE ($K)	SDG&E ($K)
2020 Actual Total	$8.59	$0.77	$10.11
2021 Planned Total	$9.46	$4.55	$10.10
2022 Planned Total	$9.50	$4.57	$9.46

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

Figure 5.10.b: Stakeholder cooperation & community engagement spend per 1,000 customers, large utilities, 2020-2022.

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

Introduction

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

For 2021, the reporting of PSPS was separated from the reporting of mitigations and progress metrics to reflect the definition of PSPS as a last resort rather than a mitigation option (pursuant to Guidance Resolution WSD-002 and PSPS decisions D.19-05-036 and D.20-03-

004).[183] This section of the WMP Guidelines[184] requires utilities to report their current and projected progress in PSPS mitigation, including lessons learned from the prior year, de-energization and re-energization protocols, PSPS outcome metrics, plans to reduce future PSPS impacts, and community engagement.

Overview

Energy Safety finds that SCE has made progress in addressing PSPS, including directional vision for PSPS and finds this portion of SCE's 2021 WMP Update to be sufficient subject to remedies. SCE provides an extensive discussion of its achievements over the last year and future plans to implement progress toward reducing PSPS scope, scale, and frequency in the areas requested by the WMP guidelines, including lessons learned, system hardening to diminish need for PSPS, mitigation of PSPS impacts to customers, better coordination with public safety partners, and improvement to protocols, including notifications. As requested through a Revision Notice, SCE included additional information from its 2021 PSPS Corrective Action Plan within the PSPS chapter of its 2021 WMP Update Revision, as discussed in this section and section 1.2 of this document. SCE is expected to provide updates on its progress on identified deficiencies in its ongoing required filings with Energy Safety.

Progress over the past year

Energy Safety finds that SCE has made the following progress:

- SCE determined that in 2021 it would implement a fully dedicated PSPS Incident Management Team (IMT) as it would be required to improve its PSPS readiness capabilities.[185]
- In 2020, SCE formed a PSPS customer support team with primary responsibility of mitigating customer de-energization impacts during a PSPS events.
- SCE incorporated PSPS consequences into its Wildfire Risk Reduction Modeling (WRRM) something the other utilities have yet to do. Energy Safety notes this is a capability that has potential to inform mitigation projects that will reduce future PSPS by removing sections of the system prone to future de-energization. This is a capability where SCE appears ahead of PG&E as well as SDG&E.

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

[184] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 46-49 (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

[185] SCE's 2021 WMP Update, p. 288

- 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

populations and to collaborate on initiatives that will advance communications, resources, and support aimed at PSPS impact mitigation.
- In 2020 and continuing in 2021 SCE developed Resiliency Zone[190] programs for areas hit frequently with PSPS events.

SCE has room for improvement in the following areas:
- SCE stated it learned important lessons from its execution of 2020 PSPS events demonstrating that it must do more to reduce the need for PSPS going forward, execute PSPS protocols more effectively, improve customer notifications and public safety partner coordination, and communicate its wildfire and PSPS-related plans, process improvements, and support programs to the public in a clear and useful manner. It was required to submit a Corrective Action Plan to explain how it will improve on its overall 2020 PSPS execution in 2021, and this information was later incorporated into SCE's 2021 WMP Update Revision, as discussed in Section 1.2.
- SCE states that circuits targeted for removal from scope of PSPS (e.g. because of a covered conductor being installed on that circuit) may still be subject to PSPS. SCE indicates where covered conductor is fully installed it will allow for higher windspeed thresholds to be used "later into a PSPS event, if at all."[191] Saying "if at all" leaves open the potential for not raising windspeed threshold protocols at all. Therefore, the full benefits of covered conductor installation may not be realized in full and SCE has not provided an explanation for why this might be the case.
- In application of WRRM modeling capability, discussion was primarily regarding mitigation prioritization. No info regarding applying modeling capability toward PSPS forecasting was provided. SCE must also estimate potential impacts based on number of customers on a circuit.
- In describing protocols for re-energizing SCE was vague and did not provide new information or targets for improvement.
- During a January 26, 2021 CPUC public meeting about SCE's recent PSPS events, SCE was criticized for the narrow reach and slow uptake of its Critical Care Battery Backup (CCBB) program.[192]
- SCE indicated PSPS-related activities *will evolve.* It states that *over time* grid hardening measures will reduce reliance on PSPS as well as the scale of PSPS events when they are necessary. All utilities have been called out for use of non-committal, equivocal language. SCE must be more specific in reporting on its plans, providing specific time

[190] SCE's 2021 WMP Update p. 292 - 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

[191] SCE's 2021 WMP Update, p. 340

[192] http://www.adminmonitor.com/ca/cpuc/other/20210126/

and measurement targets in answer to instead of repeating words from the guidance, including “will evolve” and “over time.”

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-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 on Revision Notice SCE-04

In January 2021 the CPUC requested that SCE file a 2021 PSPS Corrective Action Plan (CAP) to provide detailed information on SCE’s PSPS plans and targets for 2021. This CAP was filed a week after SCE’s 2021 WMP Update and, as such, the PSPS chapter of SCE’s 2021 WMP Update did not reflect this new information. Energy Safety issued a Revision Notice requesting that SCE include key updates, information, and targets to reflect the latest PSPS commitments from SCE within its Revision Notice Response.

In SCE's 2021 WMP Update Revision it provided this information, including explicit clarifications of various aspects of its previously submitted plan with defined scope and timeline targets. This included how focused measures in the CAP are expected to reduce impacts of PSPS. SCE describes the steps being taken as part of its PSPS Action Plan to address lessons learned:

- Do more to reduce the need for PSPS going forward (Section 8.1.3)
- Execute PSPS protocols more effectively when it is necessary including customer notifications and Public Safety Partner coordination (Section 8.2)
- Communicate its wildfire and PSPS-related plans, process improvements, and support programs to the public in a clear and useful manner (Section 8.2.2)
- Target grid hardening and adjust protocols to reduce the number and scope of PSPS de-energizations (Section 8.1.3)
- Provide more transparency around de-energization decision-making criteria (Section 8.2.2)
- Improve customer notification cadence and content to mitigate communication fatigue and confusion (Section 8.2.4)
- Strengthen coordination with Public Safety Partners. (Section 8.2.5)
- Reduce PSPS notification redundancies (Section 8.2.4)

Energy Safety expects SCE to comprehensively describe whether it met its PSPS targets in its 2022 WMP Update.

Issues and Remedies

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

- ISSUE: In the 2021 WMP Update Revision, SCE focused on how it will mitigate historically de-energized circuits, but not all circuits subject to PSPS. SCE frames its discussion of mitigating circuits on those frequently de-energized saying "[c]ertain customers and communities were particularly hard hit, with nearly 12,000 customers being de-energized five or more times" and appears to focus recent achievements and future improvements primarily on those circuits indicating "only 54 percent of the circuits de-energized in 2019 were de-energized again in 2020" and "[s]ome of the improvements related to expedited grid hardening include installing covered conductor on approximately 700 miles on our 72 most frequently impacted circuits."[193]

  On frequently de-energized circuits SCE says in 2021 it will be able to reduce PSPS scope (# of customers de-energized) by 30%, frequency (# of circuits de-energized) by 25%,

[193] SCE's 2021 WMP Update Revision – Redlined, pp. 355-356

and duration (total customer minutes of disruption) by 50%, assuming the same weather and fuel conditions as 2020.[194]

The discussion in section 8.1.4 appears to provide a narrow plan for how SCE plans to achieve reductions and appears to report only on mitigated circuits and resulting PSPS scope, frequency, and duration reductions without seeming to explain this in the full context of broader impacts to all customers, for instance, those on non-mitigated circuits (previously de-energized or not).

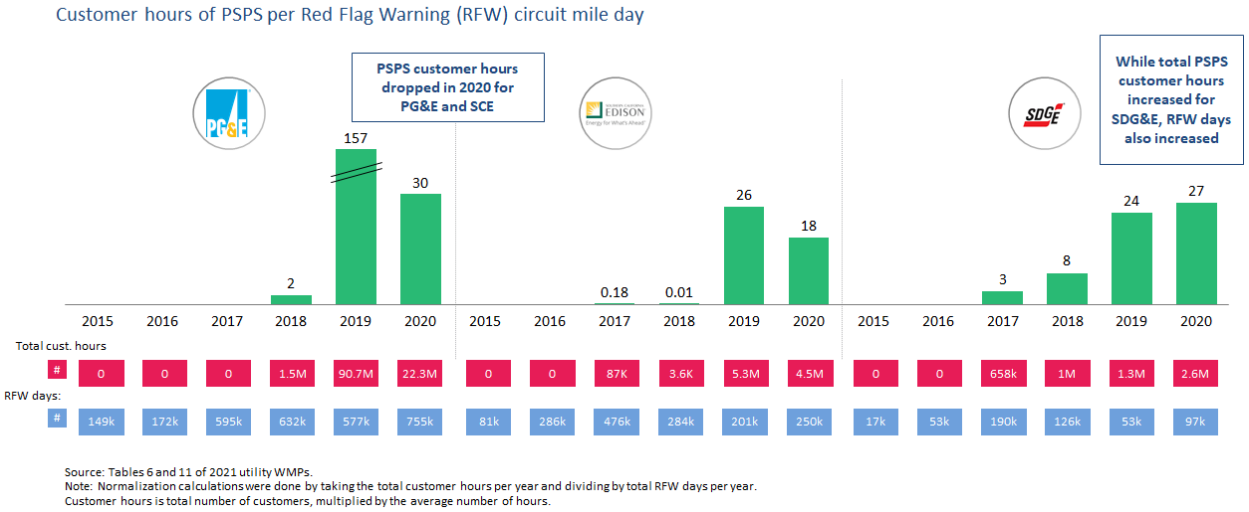
Energy Safety is not convinced on whether these targets apply to all customers or only those benefitting from circuits mitigated during 2021. It is unclear what the plan is for remaining circuits outside the 72 circuits targeted for mitigation, discussed in Section 8.1.4 or what customers dependent on those circuits may experience. For next year, Energy Safety expects the discussion of "8.1.4 Customers Impacted by PSPS" to describe the broader plan of all circuits at risk for PSPS, including non-mitigated circuits, and resulting impacts.

- REMEDY: SCE must in its 2022 WMP Update describe its narrative and PSPS planning strategy and metrics in the context of all circuits, rather than focusing solely on historically de-energized circuits prioritized for mitigations in 2021. The narrative should relate directly to the metrics provided in Table 11.
- REMEDY: SCE must in its 2022 WMP Update describe in detail, how calculations were made for Table 11. Explain how the risk model was employed, if at all, in achieving PSPS reductions.
- REMEDY: SCE must in its 2022 WMP Update describe whether it met targets of the 2021 PSPS CAP and describe if/how expedited/enhanced mitigation measures reduced PSPS. If PSPS reduction targets were not met identify lessons learned and corrective actions for next year.

Figures

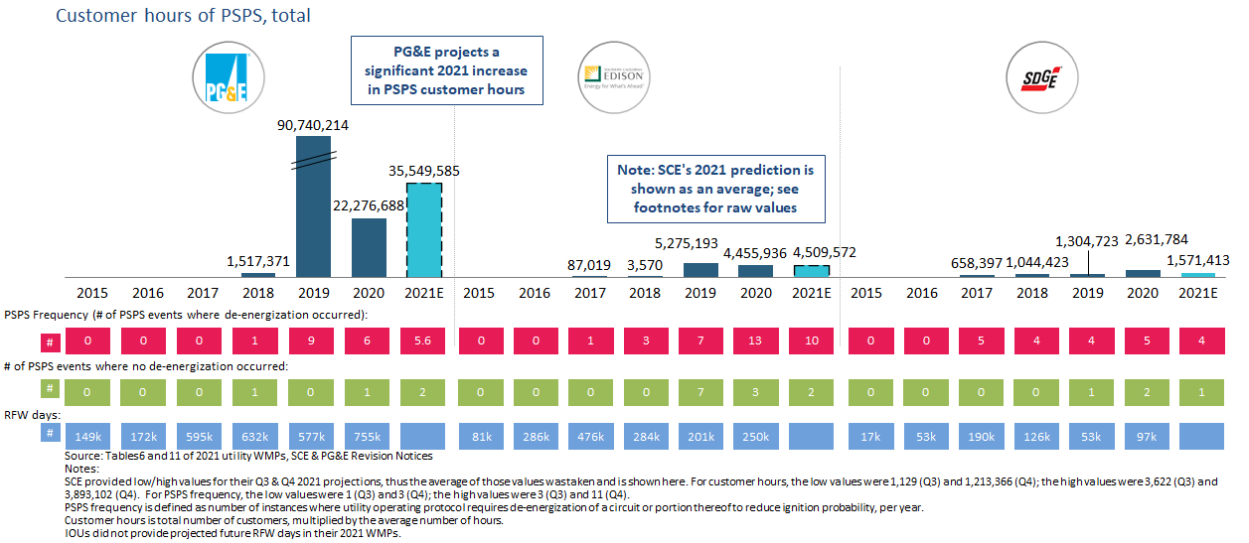
Below are charts, maps, and tables used as part of Energy Safety's review of SCE's risk assessment and mapping section:

[194] SCE's 2021 WMP Update Revision – Redlined, p. 356



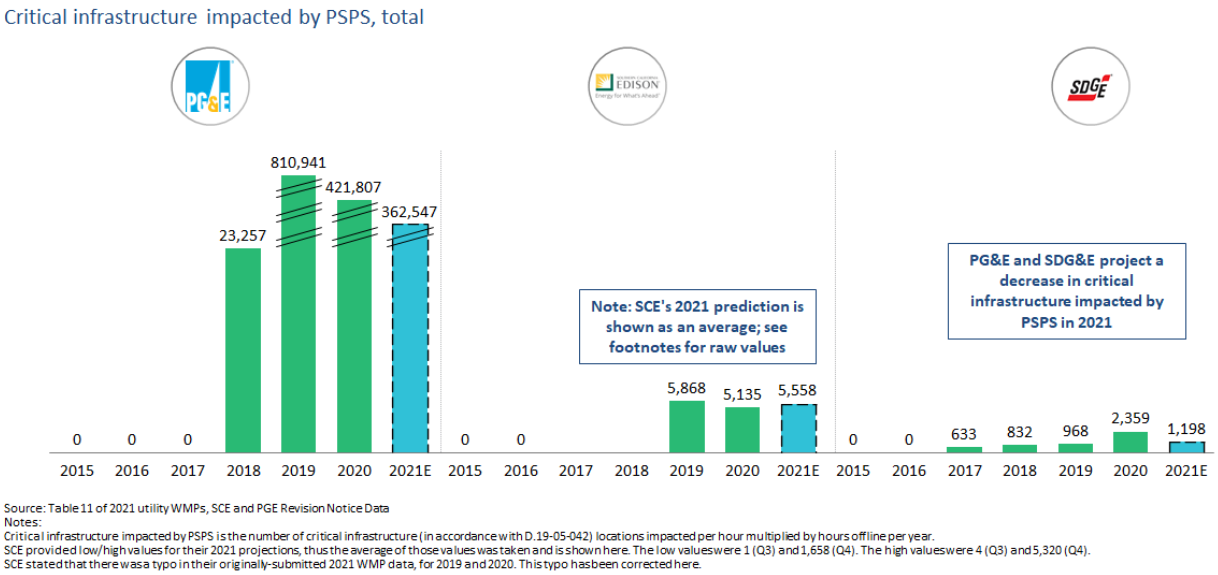
Source: Tables 6 and 11 of 2021 utility WMPs.
Note: Normalization calculations were done by taking the total customer hours per year and dividing by total RFW days per year.
Customer hours is total number of customers, multiplied by the average number of hours.

Figure 6.a: PSPS duration in customer hours per red flag warning (RFW) overhead circuit mile day.



Source: Tables6 and 11 of 2021 utility WMPs, SCE & PG&E Revision Notices
Notes:
SCE provided low/high values for their Q3 & Q4 2021 projections, thus the average of those values was taken and is shown here. For customer hours, the low values were 1,129 (Q3) and 1,213,366 (Q4); the high values were 3,622 (Q3) and 3,893,102 (Q4). For PSPS frequency, the low values were 1 (Q3) and 3 (Q4); the high values were 3 (Q3) and 11 (Q4).
PSPS frequency is defined as number of instances where utility operating protocol requires de-energization of a circuit or portion thereof to reduce ignition probability, per year.
Customer hours is total number of customers, multiplied by the average number of hours.
IOUs did not provide projected future RFW days in their 2021 WMPs.

Figure 6.b: PSPS duration in customer hours



Source: Table 11 of 2021 utility WMPs, SCE and PGE Revision Notice Data
Notes:
Critical infrastructure impacted by PSPS is the number of critical infrastructure (in accordance with D.19-05-042) locations impacted per hour multiplied by hours offline per year.
SCE provided low/high values for their 2021 projections, thus the average of those values was taken and is shown here. The low values were 1 (Q3) and 1,658 (Q4). The high values were 4 (Q3) and 5,320 (Q4).
SCE stated that there was a typo in their originally-submitted 2021 WMP data, for 2019 and 2020. This typo has been corrected here.

Figure 6.e: PSPS impacts on critical infrastructure

7. Next Steps

SCE must address the issues identified in Energy Safety's review of SCE's 2021 WMP Update over the course of the next year. SCE must place particular focus on the key areas for improvement described above. SCE must report progress on these key areas in the Progress Reports, as described in Section 1.3 of this Action Statement.

Change Orders

If SCE seeks to significantly modify (i.e., reduce, increase, or end) WMP mitigation measures in response to data and results on electrical corporation ignition risk reduction impacts, SCE must submit a Change Order Report. At a high level, the objective of the change order process is to ensure the electrical corporation continues to follow the most effective and efficient approach to mitigating its wildfire risk. This could change as new information becomes available and as the electrical corporation gains experience and measures the outcomes of its initiatives.

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

A "significant" change to a utility's WMP that would trigger the change order process is defined below:

- A change falls into the following initiative categories, i) risk assessment and mapping, ii) vegetation management and inspections, iv) grid design and system hardening, or v) asset management and inspections.

or

- A change to the utility's PSPS strategy, protocols and/or decision-making criteria.

and

- Meets one or more of the following criteria:
  - A change that would result in an increase, decrease, or reallocation of more than $5 million constituting a greater than 10% change in spend allocation.
  - A change that reduces or increases the estimated risk reduction value of an initiative more than 25%.
  - A change that results in a radical shift of either the strategic direction or purpose of an initiative (e.g., introducing use of a novel risk model that reverses the risk profile of the utility's circuits).

If an electrical corporation is unsure whether a change is significant, the corporation is encouraged to submit an advance inquiry on the matter. The change order process is not intended to provide electrical corporations with a pass to unilaterally change their WMP initiatives and program targets; rather, its purpose is to provide a mechanism for refining certain elements of WMP initiatives when there is demonstrable quantitative and qualitative justification for doing so.

Utilities shall submit any Change Order Reports by 5:00 p.m. on November 1, 2021. Energy Safety will review change orders and may issue either an approval or a denial if proposed changes are deemed to be materially out of alignment with Energy Safety's goals.

At a minimum, each proposed change order shall provide the following information:

i. The proposed change
   a. The initiative being altered with reference to where in the WMP the initiative is discussed
   b. The planned budget of that initiative, including:
      i. Planned spend in the 2020 WMP of the initiative being altered
      ii. Of the planned spend identified in i. above, how much has already been spent
      iii. Planned spend for the remainder of the WMP plan period
      iv. If spend is being redeployed, how much is being redeployed and to/from which budget
   c. The type of change being proposed, reported as one of the following:

i. Increase in scale
ii. Decrease in scale
iii. Change in prioritization
iv. Change in deployment timing
v. Change in work being done
vi. Other change (described)

d. A detailed description of the proposed change

ii. Justification for the proposed change

a. In what way, if any, does the change address or improve:
i. Completeness
ii. Technical feasibility of the initiative
iii. Effectiveness of the initiative
iv. Resource use efficiency over portfolio of WMP initiatives

iii. Change in expected outcomes from the proposed change

a. What outcomes, including quantitative ignition probability and PSPS risk reduction, was the changed initiative expected to achieve in the 2021 WMP Update?

b. What outcomes, including quantitative ignition probability and PSPS risk reduction, will the initiative deliver with the proposed adjustment?

Submission of Change Order Reports shall be through Energy Safety's e-filing system. Change orders must be submitted to the 2021 WMPs Docket (docket #2021-WMPs). Utilities shall concurrently serve all reports on the Department of Forestry and Fire Protection at CALFIREUtilityFireMitigationUnit@fire.ca.gov.

Stakeholders may comment on Change Order Reports within fifteen days of submission following the submission instructions above but may not otherwise seek change orders through this process. Energy Safety may modify the process for submitting or reviewing change orders at its discretion with written notice.

8. Consultation with CAL FIRE

Pub. Util. Code Section 8386.3(a) requires Energy Safety to consult with CAL FIRE in reviewing electrical corporations' 2021 WMP Updates. The Commission and CAL FIRE have a memorandum of understanding in place to facilitate this consultation (Pub. Util. Code Section 8386.5). The Commission and Energy Safety have met these requirements, but this Action Statement does not purport to speak for CAL FIRE.

9. Comments on Draft Action Statement

On August 5, 2021, SCE, Green Power Institute (GPI), and the Public Advocates Office at the California Public Utilities Commission (Cal Advocates) timely submitted comments on the draft SCE Resolution and Action Statement.

While SCE's comments indicate support and a willingness to participate and provide information on a number of required remedies, the utility expressed the following concerns on Energy Safety's draft evaluation findings.

In relation to Grid Design and System Hardening, SCE states that a number of Energy Safety's findings related to the scope and pace of its covered conductor program are incorrect or should be modified or removed from the Action Statement.[195] In particular, SCE did not agree with Energy Safety's finding that, "SCE does not sufficiently account for ignition drivers in mitigating risk, ineffectively accounts for third-party causes for contact ignitions," and "does not adequately allow for pilot programs to be considered as alternatives".[196] SCE states that it does account for each of these factors through its Contact Foreign Object (CFO) model as well as its consideration of pilot technologies to complement covered conductor.[197] However, Energy Safety would like to clarify that the intent of these recommendations is to provide further transparency between the alignment of ignition drivers and mitigation selection on a circuit segment basis. In regard to ignition drivers, particulary third-party drivers, SCE must provide further analysis demonstrating that ignition causes directly impact decision-making at a more granular level than programmatic. In addition, SCE must demonstrate that different ignition drivers are weighed differently as part of that decision-making process due to the nature of ignition causes. For its pilot programs, SCE must demonstrate that it is evaluating pilots as an alternative at a circuit segment level, and not only as complementary to existing initiatives.

SCE commented on the Energy Safety finding that, "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."[198] SCE asserts that it has appropriately demonstrated this need in both its 2021 WMP Update and subsequent Revision Notice Response.[199] However, Energy Safety finds that SCE has not provided adequate justification for the scope of its covered conductor program outside of SCE's self-identified high-risk circuits and this is described in some detail in Section 5.3. SCE must address the requirements in SCE-21-02, SCE-21-04, SCE-21-05, SCE-21-06,

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[195] SCE's Comments on Draft Resolution WSD-020, pp. 2-3, 5-6.

[196] Final Action Statement on Southern California Edison's 2021 Wildfire Mitigation Plan Update, p. 51.

[197] SCE's Comments on Draft Resolution WSD-020, p. 2.

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

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

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.

(Section 3). This comment recommended that all utilities' risk models be subject to verification. Energy Safety has updated this section in the final Action Statement to reflect this recommendation and give GPI credit.[220]

Cal Advocates' comments provided support for the draft Action Statement, including several remedies proposed by Energy Safety. Specifically, Cal Advocates supports the requirement for SCE to coordinate with other utilities in developing more consistent approaches to risk modeling and risk-spend efficiency (RSE).[221] Additionally, Cal Advocates supports several "additional issue" remedies that align with its earlier comments on SCE's 2021 WMP Update.[222]

Energy Safety appreciates SCE, GPI, and Cal Advocates' comments and suggestions.

10. Conclusion

SCE's 2021 WMP Update is approved.

Catastrophic wildfires remain a serious threat to the health and safety of Californians. Electrical corporations, including SCE, must continue to make progress toward reducing utility-related wildfire risk. Through the approval of SCE's 2021 WMP submission, Energy Safety expects SCE to effectively implement its wildfire mitigation activities to reduce the risk of utility-related ignitions and the potential catastrophic consequences if an ignition occurs as well as to reduce the scale, scope, and frequency of PSPS events. The SCE must meet the commitments in its 2020 WMP and fully comply with the conditions listed in this Action Statement to ensure it is achieving a meaningful reduction of utility-related wildfire and PSPS risk within its service territory.

/S/ LUCY MORGANS

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

[220] Final Action Statement on Southern California Edison's 2021 Wildfire Mitigation Plan Update, p. 22.

[221] The Public Advocates Office's Comments on Draft Resolution WSD-020, pp. 3-4.

[222] The Public Advocates Office's Comments on Draft Resolution WSD-020, p. 4.

11. Appendix

10.1 Status of 2020 WMP Deficiencies

The 2020 WMP Resolutions for each utility contained a set of "Deficiencies" and associated "Conditions" to remedy those issues. Each issue was categorized into one of the following classes, with Class A being the most serious:

Class A – aspects of the WMP are lacking or flawed;
Class B – insufficient detail or justification provided in the WMP;
Class C – gaps in baseline or historical data, as required in the 2020 WMP Guidelines.

Class A deficiencies were of the highest concern and required a utility to develop and submit to the WSD a Remedial Compliance Plan (RCP) to resolve the identified issue within 45 days of Commission ratification of the Resolution. Class B deficiencies were of medium concern and required reporting by the utility to provide missing data or a progress update in its Quarterly Report. Such reporting was either on a one-time basis or ongoing as set forth in each condition. Class C deficiencies required the utility to submit additional detail and information or otherwise come into compliance in its following annual WMP Update. Detailed descriptions of the RCP and quarterly reports are contained in Resolution WSD-002, the Guidance Resolution on Wildfire Mitigation Plans.[223]

Deficiencies have either been resolved or are folded into 2021 issues, as detailed in the table below.

Deficiency	Description	RCP/QR Determination	Status
Guidance-1, (Class B)	**Lack of risk spend efficiency (RSE) information**	Insufficient (QR) QR Action SCE-1 QR Action SCE-2	Wrapped into new key issues for 2021
Guidance-2, (Class B)	**Lack of Alternatives analysis for chosen initiatives**	Sufficient (QR)	Conditions met, resolved
Guidance-3, (Class A)	**Lack of risk modeling to inform decision-making**	Insufficient (RCP) RCP Action SCE-1 RCP Action SCE-2 RCP Action SCE-3 RCP Action SCE-4	Conditions not met, progress being monitored
Guidance-4, (Class B)	**Lack of discussion on PSPS impacts**	Insufficient (QR) QR Action SCE-3	Conditions not met, progress being monitored

[223] Guidance Resolution WSD-002 can be found here (accessed July 12, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2020/docs/340859823.pdf

Deficiency	Description	RCP/QR Determination	Status
		QR Action SCE-4	
Guidance-5, (Class B)	**Aggregation of initiatives into programs**	Sufficient (QR) QR Action SCE-5	Conditions not met, progress being monitored
Guidance-6, (Class B)	**Failure to disaggregate WMP initiatives from standard operations**	Sufficient (QR)	Conditions met, resolved
Guidance-7, (Class B)	**Lack of detail on effectiveness of "enhanced" inspection programs**	Insufficient (QR) QR Action SCE-6 QR Action SCE-7	Conditions met, resolved
Guidance-8, (Class C)	**Prevalence of equivocating language – failure of commitment**	Include objectives and targets for each of its initiatives that are measurable, quantifiable, and verifiable by the WSD.	Wrapped into a new key issue for 2021
Guidance-9, (Class B)	**Insufficient discussion of pilot programs**	Insufficient (QR) QR Action SCE-8	Wrapped into a new issue for 2021
Guidance-10, (Class B)	**Data issues - general**	Deferred (RCP; QC)	Conditions met, resolved
Guidance-11, (Class B)	**Lack of detail on plans to address personnel shortages**	Sufficient (QR)	Conditions met, resolved
Guidance-12, (Class B)	**Lack of detail on long-term planning**	Sufficient (QR) QR Action SCE-9	Conditions met, resolved
SCE-1, (Class B)	**Lessons learned not sufficiently described**	Insufficient (QR) QR Action SCE-10	Conditions met, resolved
SCE-2, (Class A)	**Determining Cause of Near Misses**	Insufficient (RCP) RCP Action SCE-5 RCP Action SCE-6 RCP Action SCE-7 RCP Action SCE-8 RCP Action SCE-9 RCP Action SCE-10 RCP Action SCE-11 RCP Action SCE-12 RCP Action SCE-13 RCP Action SCE-14 RCP Action SCE-15	Conditions met, resolved
SCE-3, (Class B)	**Failure of commitment** (PSPS Reduction)	Insufficient (QR) QR Action SCE-11	Conditions not met, progress being monitored

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) QR Action SCE-12 QR Action SCE-13	Conditions met, resolved
SCE-6, (Class B)	**SCE lacks sufficient weather station coverage**	Insufficient (QR) QR Action SCE-14 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) 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) 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) QR Action SCE-18 QR Action SCE-19	Conditions met, resolved
SCE-12, (Class A)	**SCE Does Not Provide Evidence of Effectiveness of Increased Vegetation Clearances**	Insufficient (RCP) RCP Action SCE-16 RCP Action SCE-17 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) RCP Action SCE-19 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) QR Action SCE-20 QR Action SCE-21	Conditions met, resolved
SCE-15, (Class B)	**Lack of detail on how SCE addresses fast-growing species.**	Insufficient (QR) QR Action SCE-22 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

Deficiency	Description	RCP/QR Determination	Status
		or subcontracting additional ISAs	
SCE-17, (Class B)	**Details not provided for collaborative research programs.**	Insufficient (QR) QR Action SCE-24	Conditions met, resolved;
SCE-18, (Class B)	**Discussion of centralized data repository lacks detail.**	Sufficient (QR) QR Action SCE-25	Conditions met, resolved
SCE-19, (Class B)	**SCE does not sufficiently justify the relative resource allocation of its WMP initiatives to its covered conductor program.**	Insufficient (QR) QR Action SCE-26	Wrapped into a new Key Issue for 2021
SCE-20, (Class B)	**Potential notification fatigue from frequency of PSPS communications.**	Sufficient (QR) QR Action SCE-27	Conditions not met, progress being monitored
SCE-21, (Class B)	**Lack of sufficient detail on sharing of best practices.**	Sufficient (QR)	Conditions met, resolved
SCE-22, (Class B)	**SCE does not describe resources needed on fuel reduction efforts.**	Sufficient (QR) QR Action SCE-28	Wrapped into a new issue for 2021

10.2 Energy Safety Data Request Responses

The following are data requests and their responses from SCE referenced in the Action Statement above.

Regarding Requirement 11, provision of a "list that identifies, describes, and prioritizes all wildfire risks, and drivers for those risks."
DATA REQUEST SET WSD-SCE-004
Received: 3/12/2021
Question 10: Provide a list that ranks all wildfire risks or point to where it is in the Wildfire Mitigation Plan.
Response to Question 010:
SCE interprets this question to request a ranking of risk drivers from highest to lowest risk. Below are the drivers ranked from highest to lowest ignition rates. Drivers without ignitions have been left out for clarity. This analysis does not consider consequences of ignitions.

Category is the major category – Equipment Facility Failure (EFF) or Contact from Foreign Object (CFO), for Transmission (T) or Distribution (D).
Sub-cause category is the reason for the outage.

Average Outage is the average number of outages per year from 2015 through 2020.

Ignition Rate is the average Rate of Ignitions per year calculated from 2015 through 2020.

Adjusted Risk is the product of Average Outage * Ignition Rate.

Ignition Rank is the ranking of adjusted risk.

Category	Sub-cause category	Average Outage 2015-2020	Ignition Rate 2015-2020	Adjusted Risk	Ignition Rank
D-CFO	Balloon contact- Distribution	866	0.0157	13.6000	1
D-CFO	Veg. contact- Distribution	469	0.0227	10.6667	2
D-EFF	Conductor damage or failure Distribution	725	0.0142	10.2667	3
D-CFO	Animal contact- Distribution	644	0.0155	10.0000	4
D-CFO	Vehicle contact- Distribution	550	0.0126	6.9333	5

Category	Sub-cause category	Average Outage 2015-2020	Ignition Rate 2015-2020	Adjusted Risk	Ignition Rank
D-EFF	Unknown - Distribution	2036	0.0031	6.4000	6
D-EFF	Transformer damage or failure - Distribution	2334	0.0017	4.0000	7
D-EFF	Other - Distribution	660	0.0055	3.6000	8
D-CFO	Other contact from object - Distribution	120	0.0278	3.3333	9
D-EFF	Connection device damage or failure - Distribution	450	0.0065	2.9333	10
D-EFF	Wire-to-wire contact / contamination- Distribution	45	0.0627	2.8000	11
D-EFF	All Other- Distribution	2865	0.0007	2.1333	13
D-EFF	Vandalism / Theft - Distribution	87	0.0246	2.1333	13
D-EFF	Insulator and brushing damage or failure - Distribution	89	0.0224	2.0000	14
T-CFO	Animal contact- Transmission	60	0.0223	1.3333	15
D-EFF	Pole damage or failure - Distribution	211	0.0051	1.0667	17
D-EFF	Switch damage or failure- Distribution	58	0.0183	1.0667	17
D-EFF	Lightning arrestor damage or failure- Distribution	125	0.0075	0.9333	18
T-CFO	Balloon contact- Transmission	34	0.0234	0.8000	22
D-EFF	Crossarm damage or failure - Distribution	302	0.0026	0.8000	22
D-EFF	Fuse damage or failure - Distribution	542	0.0015	0.8000	22
T-CFO	Veg. contact- Transmission	10	0.0787	0.8000	22
D-EFF	Contamination - Distribution	1	1.0667	0.5333	24
T-EFF	Unknown - Transmission	270	0.0020	0.5333	24
D-EFF	Capacitor bank damage or failure- Distribution	382	0.0010	0.4000	26
T-CFO	Other contact from object - Transmission	9	0.0471	0.4000	26
T-EFF	Connection device damage or failure - Transmission	1	0.2000	0.2667	28
T-CFO	Vehicle contact- Transmission	29	0.0091	0.2667	28
T-EFF	All Other- Transmission	249	0.0005	0.1333	33
T-EFF	Insulator and brushing damage or failure - Transmission	11	0.0125	0.1333	33
T-EFF	Lightning arrestor damage or failure- Transmission	3	0.0500	0.1333	33
T-EFF	Other - Transmission	23	0.0059	0.1333	33

Category	Sub-cause category	Average Outage 2015-2020	Ignition Rate 2015-2020	Adjusted Risk	Ignition Rank
T-EFF	Vandalism / Theft - Transmission	5	0.0296	0.1333	33

Regarding Section 4.2: Actual and Planned Spending reporting inquiries
DATA REQUEST SET WSD-SCE-003
Received: 3/9/2021
Question 002:
SCE's reported cycle spend has conflicted across submissions, and WSD requires SCE to remedy this issue as detailed below. Provided that the WSD has attempted to obtain this information for several weeks, if SCE fails to provide the WSD with accurate and consistent information, or explanations for any discrepancies, the WSD will factor this into its review of SCE's 2021 WMP and pursue further action as necessary. Context - The following outlines the timeline of data collection efforts for SCE spend data from the most recent reporting in 2020 (WMP revision 02) to the most recent reporting in 2021.

- In its 2020 WMP submission (second revision), SCE reported a total 2020-22 planned cycle spend of 4.512B, calculated by summing all rows titled "2020-2022 plan total" in column C of tables 21-30 from the 2020 WMP.
- In its 2021 WMP submission on February 5th, SCE reported a total 2020-2022 cycle planned spend of $6.751B, calculated by summing columns (U+V+Y+Z+AC+AD) as reported in table 12 " SCE Tables 1-12.xlsx"
- In the first utility call on 2/10/2021, SCE explained that the $6.751B reported spend in the 2021 WMP included all initiative spend, both within and outside of "high fire risk areas" or "HFRA" (referred to as 2021 cycle reported). This reporting method differed from the $4.512B spend SCE reported in 2020, which SCE only included spend in HFRA (referred to as 2020 cycle reported).
- To obtain comparable data across submissions, the WSD submitted a follow-on data request on 2/18/2021, requesting SCE to split the 2021 cycle reported $6.751B into HFTD and non-HFTD, and provide the non-HFTD portion of the 2020 cycle reported. o On 2/23/2021 SCE responded to the data request by providing "WSD-SCE-001 Q1 Data request SCE 2021 Table 12_v02 20210223.xlsx", which split 2021 cycle reported into HFTD and non-HFTD in columns AS - BP. However, SCE did not provide 2020 cycle reported in HFTD or non-HFTD, as required in columns U-AR
- Summing columns (AU+AV+BC+BD+BK+BL) in "WSD-SCE-001 Q1 Data request SCE 2021 Table 12_v02 20210223.xlsx" SCE's 2021 cycle reported spend was $6.753B, which is slightly inconsistent with the $6.751B reported Issue
- On 3/1/2021, after still not receiving data requested on 2/18/2021, the WSD found what it believes to be SCE's 2020 cycle reported in HFTD and non-HFTD on SCE's website in a file titled "002_Data request SCE 2021 Table 12_20210223.xlsx"

    - In "002_Data request SCE 2021 Table 12_20210223.xlsx" SCE provided a territory-wide (HFTD WSD-SCE-003: 002 and non-HFTD) 2020 cycle reported of $4.473B, which was calculated by summing columns (W+X+AE+AF+AM+AN)
- This is less than the HFRA-only 2020 cycle reported of $4.512B, as reported in SCE's 2020 WMP (second revision), despite including spend across SCE's entire territory o In "002_Data request SCE 2021 Table 12_20210223.xlsx" SCE provided an HFTD 2020 cycle reported of $3.824B, which was calculated by summing columns (AL+AK+AD+AC+V+U)
- This is $0.688B less in WMP cycle spend than was reported in SCE's 2020 WMP for HFRA spend (4.512B). However, SCE stated during 2/17 utility content call that HFTD was equivalent to HFRA
- Additionally, on the 2/26/2021 utility call, SCE stated its reported cycle spend for Category C – "Grid design and system hardening" had increased by $100M from its 2020 cycle reported to 2021 cycle reported. However, WSD finds a $700M decrease in planned cycle spend from 2020 cycle reported to 2021 cycle reported. 2020 cycle reported spend in Grid Design and system hardening was calculated by summing all rows titled "2020-2022 plan total" in column C of table 23 from the 2020 WMP. 2021 cycle reported spend in Grid design and system hardening was calculated by summing columns (U+V+Y+Z+AC+AD) for all rows labeled "Grid Design & System Hardening" in column C as reported in table 12 " SCE Tables 1-12.xlsx"

Below is WSD's understanding of SCE's total cycle spend and Grid design and system hardening cycle spend prior to 3/1. The WSD requests SCE to confirm whether these values are correct. If these values are incorrect, indicate which submission of 2020 reported spend the WSD should use (by providing the appropriate file name) and how to calculate the correct values (with reference to appropriate rows/columns in the identified file), as requested in the table below. Provided that the WSD has attempted to obtain this information for several weeks, SCE is requested to provide the above information by 3/9/2021. If SCE fails to provide the WSD with accurate and consistent information, or explanations for any discrepancies, the WSD will factor this into its review of SCE's 2021 WMP and pursue further action as necessary.

Response to Question 002:
For SCE's response to this data request, please see Excel file entitled "WSD-SCE-003-002_20210309.xlsx." The following tabs can be found within file "WSD-SCE-003-002_20210309.xlsx:"
WSD-SCE-003: 002

- Summary – States the total cycle spend reported in the 2020 WMP and the 2021 WMP by region of SCE territory and by WMP activities and non-WMP programs
- WMP Forecast Comparison – Compares the forecast between the 2020 WMP (revision 2) and the 2021 WMP and provides variance explanations at the WMP Activity level

- WMP Program Reconciliation – Reconciles the WMP Activities in the 2020 WMP with the 2021 WMP
- Grid Hardening Reconciliation – Reconciles the WMP Activities related to Grid Design and System Hardening in the 2020 WMP with the 2021 WMP (similar to WMP Program Reconciliation tab, but focused on Grid Design and System Hardening)
- DATA_Tables 21-30 Rev2 – Consolidates tables 21-30 from the 2020 WMP (revision 2) into a single tab
- Tables 21-30 – These tabs are from the 2020 WMP (revision 2) and are for reference

Regarding Section 5.5: Vegetation Management spending increases from 2020-2021, and questions about Labor Costs
DATA REQUEST SET W S D - S C E - 0 0 1
Received: 2/18/2021
Question 003:
For all activities listed under "Vegetation Management and Inspections" (i.e., rows 61-82), which incurred programmatic cost increases (i.e., not attributable to increases form reporting non-HFTD area spend) from those reported in the 2020 WMP, provide the following:

- An explanation for the cost increase
- A breakdown of the increased amount attributed to changes in activity scope, labor costs, etc.

Response to Question 003:
Vegetation Management program cost increases from 2020 WMP to 2021 WMP include:
- Technology Solutions: Increase due to new Arbora Technology Tool investment, emergent program post-2020 WMP ($16M).
- Hazard Tree Removal: Increase in forecast driven by inclusion of SB 247 and related rate increases, inclusion of Palm Program ($10M).
- Veg Mgmt: Line Clearing: Increase in forecast driven by:

- Inclusion of SB 247 and related rate increases ($135M annually) unknown at the time of filing of the 2020 WMP.
- Inclusion of the Dead & Dying Tree Removal Program ($45M annually), for which costs were not included in SCE's 2020 WMP wildfire initiatives. SCE's Dead & Dying Tree Removal Program has been in existence since 2014. It was initiated as a result of Governor Brown's declaration of a state of emergency regarding drought mitigation in Resolution ESRB-4. SCE began taking measures to increase vegetation inspections and remove hazardous, dead, and sick trees and other vegetation near our power lines and poles.
- Cost increases for more first-time expanded clearances (estimated at $15M annually) initiated as part of D.17-12-024 to increase recommended clearance distances at the time of trimming in HFRA.

DATA REQUEST SET WSD-SCE-003
Received: 3/4/2021
Question 003: Regarding your response in a data request received from SCE on 2/23/21: "Veg Mgmt: Line Clearing: Increase in forecast driven by: Inclusion of SB 247 and related rate increases ($135M annually) unknown at the time of filing of the 2020 WMP." (Data Request WSD-SCE-001, Q. 003)
a. Provide where in the 2021 SCE WMP the $135M annual costs can be found?
b. Identify which initiatives, with section and page number references, that these annual costs apply to.
c. Break down the costs within the above identified initiatives which total $135M annually.
d. Clarify which years (2020, 2021, or 2022) are included in the "$135M annually."
e. Identify where in its 2021 WMP SCE explains its rationale and justification for the vegetation management cost increases associated with SB 247.

Response to Question 003:
The estimated SB 247 $135M annual impact figure that SCE provided in response to WSD-SCE-001, Question 1 and in oral explanations to the WSD during our weekly meetings was based on a previous estimated figure regarding the annual impact of the vegetation management cost increases due to SB 247 in total (systemwide). SB 247 went into effect beginning January 1, 2020. As a result, SCE was required to adjust the contract rates for its vegetation management contracts which didn't occur until January / February 2020 and had to pro-rate these increases back to January 1, 2020. Because these analyses and adjustments were ongoing at the time SCE finalized its 2020 WMP, the SB 247 contract rate cost increase was not accounted for in its 2020 WMP. These adjustments resulted in various contract rate increases across various types of work, e.g., pre- and post-SB 247 contract rate increases were different for different types of work and vendors. The SB 247 $135M annual increase was based on a previous simplified analysis of the total, systemwide SB 247 cost impact. SCE has since re-assessed the vegetation management cost forecasts included in its 2020 WMP and 2021 WMP Update and was able to estimate the SB 247 contract rate cost increase for its Vegetation Clearance (7.3.5.20) initiative for HFRA. In the attached file, SCE explains the variances for each Vegetation Management initiative in the 2020 and 2021 WMPs. This analysis includes some remapping of Vegetation Management costs in order to explain the variances. Additionally, SCE has identified a few errors that are described and for which SCE will revise through a subsequent 2021 WMP Update revision submission. The analysis is attached (See "WSD-SCE-003_Q3_VM Cost Reconciliation.xlsx") and is the basis of our responses below.
a) Table 12 of the Q4 2020 Quarterly Data Report (QDR) includes recorded costs for 2020 and forecast costs for 2021 and 2022 for SCE's wildfire and non-wildfire initiatives. Vegetation Management recorded and forecast costs are included in Table 12. SB 247 contract cost

increases impacted three Vegetation Management initiatives: Vegetation Clearances (7.3.5.20), Hazard Tree Mitigation Program (7.3.5.16.1), and Dead and Dying Tree Removal (formerly DRI) (7.3.5.16.2). The attached file includes an estimated SB 247 contract rate cost increase for Vegetation Clearances in HFRA of $83M for 2020, $66M for 2021, and $68M for 2022. The impact of the SB 247 contract rate increase for HTMP and Dead and Dying Tree Removal was not estimated.

b) As noted above, the SB 247 contract rate cost increase impacts the following initiatives:

- Vegetation Clearances (7.3.5.20)
- HTMP (7.3.5.16.1)
- Dead and Dying Tree Removal (7.3.5.16.1)

c) Please see the attached Vegetation Management Reconciliation Excel file that includes the SB 247 contractor rate cost impact for Vegetation Clearances in HFRA.

d) Please see the attached Vegetation Management Reconciliation Excel file that includes the 2020, 2021, and 2022 breakout for the SB 247 contractor rate cost increase for Vegetation Clearances in HFRA.

e) SCE's 2021 WMP Update, similar to its 2019 and 2020 WMP, does not describe cost details nor include cost justification for its wildfire initiatives consistent with the statutory, CPUC, and WSD requirements for WMPs. Cost recovery will occur in a utilities' General Rate Case or other application. Furthermore, WSD-011 does not include any requirement to justify cost increases of WMP initiatives. However, we are providing the cost details in the attached file with explanations of the changes.

10.3 The Ten Maturity and Mitigation Initiative Categories

The following table presents the ten categories of questions on the Maturity Survey, and, where relevant, the version of the category name used in the 2021 WMP Guidelines or Action Statements. All mitigation programs and initiatives should fit into one or more of the following categories. Some examples of activities or data products that fit under each category are listed

Maturity and mitigation categories	Examples of activities
1. Risk mapping and simulation; WMP Guidelines/ Action Statement: Risk assessment and mapping	Risk and ignition probability mapping; match drop simulations; consequence mapping
2. Situational awareness and forecasting	Weather monitoring; weather station installation; fault indicator technology implementation; fire potential index

3. Grid design and system hardening	Capacitor maintenance and replacement; covered conductor installation and maintenance; expulsion fuse replacement; pole loading infrastructure hardening and replacement
4. Asset management and inspections	Infrared, LiDAR, or drone inspections and routine or detailed patrol inspections of distribution/transmission electric lines and equipment; intrusive pole inspections; pole loading assessments; quality assurance and quality control of inspections
5. Vegetation management and inspections	Fuel management and reduction of "slash"; LiDAR or drone inspections and routine or detailed patrol inspections of vegetation around distribution/transmission electric lines and equipment; inventory, remediation, or removal of hazardous vegetation; quality assurance and quality control of vegetation management inspections
6. Grid operations and protocols; Action Statement: Grid operations and operating protocols, including PSPS	Automatic recloser operations; protocols for re-energization after PSPS; mitigation of PSPS impacts; work procedures and training in conditions of elevated fire risk
7. Data governance	Centralized data repository; ignition/wildfire collaborative research; documentation/disclosure of wildfire-related data and algorithms; risk event data tracking and analysis
8. Resource allocation methodology	Method of allocation of resources; method of calculating the risk-spend efficiency of initiatives (not including PSPS, which is not considered a mitigation initiative within WMPs); risk reduction scenario development and analysis
9. Emergency planning and preparedness	Ensuring the utility has an adequate and trained workforce for service restoration; community outreach, public awareness, and communications efforts; customer support during emergencies
10. Stakeholder cooperation and community engagement	Cooperation with suppression agencies; community engagement efforts; sharing best practices and cooperating with agencies outside California; coordinating fuel management with the U.S Forest Service

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

For example, to obtain a level of 1 in Capability 24 of the 52 total capabilities, titled “Vegetation grow-in mitigation,” the electrical corporation (or utility) must demonstrate the following: “[u]tility maintains vegetation around lines and equipment according to minimum statutory and regulatory clearances. Utility: i) removes vegetation waste along right of ways and ii) within 1 week of cutting vegetation across entire grid.”

Thus, in order to receive a maturity level of 1 for Capability 24, an electrical corporation would not only have to maintain minimum regulatory clearances around its overhead lines but also remove the vegetation waste along its right of ways within one week of conducting vegetation clearance work. If an electrical corporation meets only one of these requirements, then it would be assigned the next lowest level. In this example, a level of 0 would be assigned and the electrical corporation would not receive “partial credit” toward a level of 1.

11.1.3. SCE: Maturity detail by capability

Legend: *Maturity Model Scores*



Category A. Risk Assessment and Mapping

	Avg cycle start maturity: 0.8	Avg current maturity: 1.4	Avg projected cycle end maturity: 2.2
Capability 1. Climate scenario modeling			
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 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**
1a: How sophisticated is utility's ability to estimate the risk of weather scenarios?	ii. Wildfire risk can be reliably determined based on weather and its impacts	iv. Risk for various weather scenarios can be reliably estimated	iv. Risk for various weather scenarios can be reliably estimated
1b: How are scenarios assessed?	iii. Independent expert assessment, supported by historical data of incidents and near misses	iii. Independent expert assessment, supported by historical data of incidents and near misses	iii. Independent expert assessment, supported by historical data of incidents and near misses
1c: How granular is utility's ability to model scenarios?	iii. Circuit-based	iii. Circuit-based	iii. Circuit-based
1d: How automated is the tool?	i. Not automated	ii. Partially (<50%)	ii. Partially (<50%)
1e: What additional information is used to estimate model weather scenarios and their risk?	iv. Weather measured at the circuit level, how weather effects failure modes and propagation, existing hardware	iv. Weather measured at the circuit level, how weather effects failure modes and propagation, existing hardware	v. Weather measured at the circuit level, how weather effects failure modes and propagation, existing hardware, level of vegetation
1f: To what extent is future change in climate taken into account for future risk estimation?	i. Future climate change not accounted for in estimating future weather and resulting risk	i. Future climate change not accounted for in estimating future weather and resulting risk	iv. Modeling with multiple scenarios used to estimate effects of a changing climate on future weather and risk, taking into account difference in geography and vegetation, and considering increase in extreme weather event frequency
Capability 2. Ignition risk estimation			

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: 2 (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**
2a: How is ignition risk calculated?	ii. Tools and processes can reliably categorize the risk of ignition across the grid into at least two categories based on characteristics and condition of lines, equipment, surrounding vegetation, and localized weather patterns	iv. Tools and processes can quantitatively and accurately assess the risk of ignition across the grid based on characteristics and condition of lines, equipment, surrounding vegetation, localized weather patterns, and flying debris probability, with probability based on specific failure modes and top contributors to those failure modes	iv. Tools and processes can quantitatively and accurately assess the risk of ignition across the grid based on characteristics and condition of lines, equipment, surrounding vegetation, localized weather patterns, and flying debris probability, with probability based on specific failure modes and top contributors to those failure modes
2b: How automated is the ignition risk calculation tool?	ii. Partially (<50%)	ii. Partially (<50%)	iii. Mostly (>=50%)
2c: How granular is the tool?	v. Asset-based	v. Asset-based	v. Asset-based
2d: How is risk assessment confirmed? Select all that apply.	i. By experts ii. By historical data	i. By experts ii. By historical data	i. By experts ii. By historical data
2e: What confidence interval, in percent, does the utility use in its wildfire risk assessments?	>95%	>95%	>95%

Capability 3. Estimation of wildfire consequences for communities			
Capability maturity level based on Maturity Rubric (0 - 4)	Start of cycle: 0	By end of year 1 (current): 1	Planned state by end of cycle: 2 (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**
3a: How is estimated consequence of ignition relayed?	iv. Consequence of ignition events quantitatively, accurately, and precisely estimated	iv. Consequence of ignition events quantitatively, accurately, and precisely estimated	iv. Consequence of ignition events quantitatively, accurately, and precisely estimated
3b: What metrics are used to estimate the consequence of ignition risk?	ii. As a function of at least potential fatalities, and one or both of structures burned, or area burned	ii. As a function of at least potential fatalities, and one or both of structures burned, or area burned	ii. As a function of at least potential fatalities, and one or both of structures burned, or area burned
3c: Is the ignition risk impact analysis available for all seasons?	i. No	i. No	ii. Yes
3d: How automated is the ignition risk estimation process?	i. Not automated	ii. Partially (<50%)	iii. Mostly (>=50%)
3e: How granular is the ignition risk estimation process?	v. Asset-based	v. Asset-based	v. Asset-based
3f: How are the outputs of the ignition risk impact assessment tool evaluated?	iii. Outputs independently assessed by experts and confirmed by historical data	iii. Outputs independently assessed by experts and confirmed by historical data	iii. Outputs independently assessed by experts and confirmed by historical data
3g: What other inputs are used to estimate impact?	i. Level and conditions of vegetation and weather	iii. Level and conditions of vegetation and weather, including the vegetation specifies immediately surrounding the ignition site and up-to-date moisture content, local weather patterns	iii. Level and conditions of vegetation and weather, including the vegetation specifies immediately surrounding the ignition site and up-to-date moisture content, local weather patterns

Capability 4. Estimation of wildfire and PSPS risk-reduction impact			
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 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**
4a: How is risk reduction impact estimated?	ii. Approach accurately estimates risk reduction potential of initiatives categorically (e.g. High, Medium, Low)	iii. Approach reliably estimates risk reduction potential of initiatives on an interval scale (e.g. specific quantitative units)	iii. Approach reliably estimates risk reduction potential of initiatives on an interval scale (e.g. specific quantitative units)
4b: How automated is your ignition risk reduction impact assessment tool?	ii. Partially (<50%)	ii. Partially (<50%)	iii. Mostly (>=50%)
4c: How granular is the ignition risk reduction impact assessment tool?	ii. Regional	v. Asset-based	v. Asset-based
4d: How are ignition risk reduction impact assessment tool estimates assessed?	iii. Independent expert assessment	iii. Independent expert assessment	iii. Independent expert assessment
4e: What additional information is used to estimate risk reduction impact?	iii. Existing hardware type and condition, including operating history	iii. Existing hardware type and condition, including operating history	v. Existing hardware type and condition, including operating history; level and condition of vegetation; weather; and combination of initiatives already deployed

Capability 5. Risk maps and simulation algorithms

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: 2 (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**
5a: What is the protocol to update risk mapping algorithms?	ii. Risk mapping algorithms updated based on detected deviations of risk model to ignitions and propagation	ii. Risk mapping algorithms updated based on detected deviations of risk model to ignitions and propagation	ii. Risk mapping algorithms updated based on detected deviations of risk model to ignitions and propagation
5b: How automated is the mechanism to determine whether to update algorithms based on deviations?	i. Not automated	i. Not automated	ii. Partially (<50%)
5c: How are deviations from risk model to ignitions and propagation detected?	ii. Manually	ii. Manually	iii. Semi-automated process
5d: How are decisions to update algorithms evaluated?	iii. Independently evaluated by experts and historical data	ii. Independently evaluated by experts	ii. Independently evaluated by experts
5e: What other data is used to make decisions on whether to update algorithms?	iii. Current and historic ignition and propagation data; near-miss data	iv. Current and historic ignition and propagation data; near-miss data; data from other utilities and other sources	iv. Current and historic ignition and propagation data; near-miss data; data from other utilities and other sources

Category B. Situational Awareness and Forecasting

	Avg cycle start maturity: 1.4	Avg current maturity: 1.6	Avg projected cycle end maturity: 2.4
Capability 6. Weather variables collected			
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 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**
6a: What weather data is currently collected?	iii. Range of accurate weather variables (e.g. humidity, precipitation, surface and atmospheric wind conditions) that impact probability of ignition and propagation from utility assets	iii. Range of accurate weather variables (e.g. humidity, precipitation, surface and atmospheric wind conditions) that impact probability of ignition and propagation from utility assets	iii. Range of accurate weather variables (e.g. humidity, precipitation, surface and atmospheric wind conditions) that impact probability of ignition and propagation from utility assets
6b: How are measurements validated?	ii. Manual field calibration measurements	ii. Manual field calibration measurements	iii. Automatic field calibration measurements
6c: Are elements that cannot be reliably measured in real time being predicted (e.g., fuel moisture content)?	ii. Yes	ii. Yes	ii. Yes
6d: How many sources are being used to provide data on weather metrics being collected?	iii. More than one	iii. More than one	iii. More than one

Capability 7. Weather data resolution			
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 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**
7a: How granular is the weather data that is collected?	ii. Weather data has sufficient granularity to reliably measure weather conditions in HFTD areas	iv. Weather data has sufficient granularity to reliably measure weather conditions in HFTD areas, and along the entire grid and in all areas needed to predict weather on the grid. Also includes wind estimations at various atmospheric altitudes relevant to ignition risk	iv. Weather data has sufficient granularity to reliably measure weather conditions in HFTD areas, and along the entire grid and in all areas needed to predict weather on the grid. Also includes wind estimations at various atmospheric altitudes relevant to ignition risk
7b: How frequently is data gathered	iv. At least six times per hour	iv. At least six times per hour	iv. At least six times per hour
7c: How granular is the tool?	iii. Circuit-based	iii. Circuit-based	iv. Span-based
7d: How automated is the process to measure weather conditions?	iv. Fully	iv. Fully	iv. Fully

Capability 8. Weather forecasting ability			
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: 3 (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**
8a: How sophisticated is the utility's weather forecasting capability?	iii. Utility has the ability to use a combination of accurate weather stations and external weather data to make accurate forecasts	iii. Utility has the ability to use a combination of accurate weather stations and external weather data to make accurate forecasts	iii. Utility has the ability to use a combination of accurate weather stations and external weather data to make accurate forecasts
8b: How far in advance can accurate forecasts be prepared?	i. Less than two weeks in advance	i. Less than two weeks in advance	i. Less than two weeks in advance
8c: At what level of granularity can forecasts be prepared?	iii. Circuit-based	iii. Circuit-based	iv. Span-based
8d: How are results error-checked?	iii. Criteria for option (ii) met, and forecasted results are subsequently error checked against measured weather data	iii. Criteria for option (ii) met, and forecasted results are subsequently error checked against measured weather data	iii. Criteria for option (ii) met, and forecasted results are subsequently error checked against measured weather data
8e: How automated is the forecast process?	iii. Mostly (>=50%)	iv. Fully	iv. Fully

Capability 9. External sources used in weather forecasting			
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 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**
9a: What source does the utility use for weather data?	iv. Utility uses a combination of accurate weather stations and external weather data, and elects to use the data set, as a whole or in composite, that is most accurate	iv. Utility uses a combination of accurate weather stations and external weather data, and elects to use the data set, as a whole or in composite, that is most accurate	iv. Utility uses a combination of accurate weather stations and external weather data, and elects to use the data set, as a whole or in composite, that is most accurate
9b: How is weather station data checked for errors?	ii. Mostly manual processes for error checking weather stations with external data sources	ii. Mostly manual processes for error checking weather stations with external data sources	ii. Mostly manual processes for error checking weather stations with external data sources
9c: For what is weather data used?	iii. Weather data is used to create a single visual and configurable live map that can be used to help make decisions	iii. Weather data is used to create a single visual and configurable live map that can be used to help make decisions	iii. Weather data is used to create a single visual and configurable live map that can be used to help make decisions

Capability 10. Wildfire detection processes and capabilities			
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: 2 (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**
10 : Are there well-defined procedures for detecting ignitions along the grid?	ii. Yes	ii. Yes	ii. Yes
10b: What equipment is used to detect ignitions?	iii. Well-defined equipment for detecting ignitions along grid, including remote detection equipment including cameras	iv. Well-defined equipment for detecting ignitions along grid, including remote detection equipment including cameras, and satellite monitoring	iv. Well-defined equipment for detecting ignitions along grid, including remote detection equipment including cameras, and satellite monitoring
10 : How is information on detected ignitions reported?	iii. Procedure exists for notifying suppression forces and key stakeholders	iii. Procedure exists for notifying suppression forces and key stakeholders	iv. Procedure automatically, accurately, and in real time notifies suppression forces and key stakeholders
10d: What role does ignition detection software play in wildfire detection?	i. Ignition detection software not currently deployed	i. Ignition detection software not currently deployed	ii. Ignition detection software in cameras used to augment ignition detection procedures

Category C. Grid design and system hardening

	Avg cycle start maturity: 1.4	Avg current maturity: 2.4	Avg projected cycle end maturity: 2.8
Capability 11. Approach to prioritizing initiatives across territory			
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: 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**
11a: How are wildfire risk reduction initiatives prioritized?	iv. Plan prioritizes wildfire risk reduction initiatives at the span level based on i) risk modeling driven by local geography and climate/weather conditions, fuel loads and moisture content and topography ii) detailed wildfire and PSPS risk simulations across individual circuits	iv. Plan prioritizes wildfire risk reduction initiatives at the span level based on i) risk modeling driven by local geography and climate/weather conditions, fuel loads and moisture content and topography ii) detailed wildfire and PSPS risk simulations across individual circuits	v. Plan prioritizes wildfire risk reduction initiatives at the asset level based on i) risk modeling driven by local geography and climate/weather conditions, fuel loads and moisture content and topography ii) risk estimates across individual circuits, including estimates of actual consequence, and iii) taking power delivery uptime into account (e.g. reliability, PSPS, etc.)

Capability 12. Grid design for minimizing ignition risk			
Capability maturity level based on Maturity Rubric (0 - 4)	Start of cycle: 0	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**
12a: Does grid design meet minimum G095 requirements and loading standards in HFTD areas?	ii. Yes	iii. Grid topology exceeds design requirements, designed based on accurate understanding of drivers of utility ignition risk	iii. Grid topology exceeds design requirements, designed based on accurate understanding of drivers of utility ignition risk
12b: Does the utility provide micro grids or islanding where traditional grid infrastructure is impracticable and wildfire risk is high?	i. No	ii. Yes	ii. Yes
12c: Does routing of new portions of the grid take wildfire risk into account?	ii. No	i. Yes	i. Yes
12d: Are efforts made to incorporate the latest asset management strategies and new technologies into grid topology?	iii. Yes, across the entire service area	iii. Yes, across the entire service area	iii. Yes, across the entire service area

Capability 13. Grid design for resiliency and minimizing PSPS			
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: 2 (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**
13a: What level of redundancy does the utility's transmission architecture have?	ii. n-1 redundancy for all circuits subject to PSPS	ii. n-1 redundancy for all circuits subject to PSPS	ii. n-1 redundancy for all circuits subject to PSPS
13b: What level of redundancy does the utility's distribution architecture have?	ii. n-1 redundancy covering at least 50% of customers in HFTD	iii. n-1 redundancy covering at least 70% of customers in HFTD	iii. n-1 redundancy covering at least 70% of customers in HFTD
13c: What level of sectionalization does the utility's distribution architecture have?	v. Switches in HFTD areas to individually isolate circuits, such that no more than 200 customers sit within one switch	v. Switches in HFTD areas to individually isolate circuits, such that no more than 200 customers sit within one switch	v. Switches in HFTD areas to individually isolate circuits, such that no more than 200 customers sit within one switch
13d: How does the utility consider egress points in its grid topology?	i. Does not consider	i. Does not consider	ii. Egress points used as an input for grid topology design

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 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 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 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 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 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 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 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 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 22. Vegetation inspection cycle			
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 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**
22a: How frequent are all types of vegetation inspections?	iii. Above minimum regulatory requirements, with more frequent inspections for highest risk areas	iii. Above minimum regulatory requirements, with more frequent inspections for highest risk areas	iii. Above minimum regulatory requirements, with more frequent inspections for highest risk areas
22b: How are vegetation inspections scheduled?	ii. Based on up-to-date static maps of predominant vegetation species and environment	ii. Based on up-to-date static maps of predominant vegetation species and environment	ii. Based on up-to-date static maps of predominant vegetation species and environment
22c: What are the inputs to scheduling vegetation inspections?	ii. Up to date, static maps of vegetation and environment, as well as data on annual growing conditions	ii. Up to date, static maps of vegetation and environment, as well as data on annual growing conditions	ii. Up to date, static maps of vegetation and environment, as well as data on annual growing conditions

Capability 23. Vegetation 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 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**
23a: 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 vegetation types 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 vegetation types 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 vegetation types typically responsible for ignitions and near misses
23b: 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
23c: At what level of granularity are the depth of checklists, training, and procedures customized?	ii. Across a region	v. At the asset level	v. At the asset level

Capability 24. Vegetation grow-in mitigation			
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 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**
24a: How does utility clearance around lines and equipment perform relative to expected standards?	ii. Utility meet minimum statutory and regulatory clearances around all lines and equipment	iii. Utility exceeds minimum statutory and regulatory clearances around all lines and equipment	iii. Utility exceeds minimum statutory and regulatory clearances around all lines and equipment
24b: Does utility meet or exceed minimum statutory or regulatory clearances during all seasons?	ii. Yes	ii. Yes	ii. Yes
24c: What modeling is used to guide clearances around lines and equipment?	ii. Ignition and propagation risk modeling	ii. Ignition and propagation risk modeling	ii. Ignition and propagation risk modeling
24d: What biological modeling is used to guide clearance around lines and equipment	ii. Species growth rates and species limb failure rates, cross referenced with local climatological conditions	ii. Species growth rates and species limb failure rates, cross referenced with local climatological conditions	ii. Species growth rates and species limb failure rates, cross referenced with local climatological conditions
24e: Are community organizations engaged in setting local clearances and protocols?	ii. Yes	ii. Yes	ii. Yes
24f: Does the utility remove vegetation waste along its right of way across the entire grid?	ii. Yes	ii. Yes	ii. Yes
24g: How long after cutting vegetation does the utility remove vegetation waste along right of way?	iv. On the same day	iv. On the same day	iv. On the same day

24h: Does the utility work with local landowners to provide a cost-effective use for cutting vegetation?	i. No	ii. Yes	ii. Yes
24i: Does the utility work with partners to identify new cost-effective uses for vegetation, taking into consideration environmental impacts and emissions of vegetation waste?	i. No	ii. Yes	ii. Yes

Capability 25. Vegetation fall-in mitigation			
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**
25a: Does the utility have a process for treating vegetation outside of right of ways?	iv. Utility systematically removes vegetation outside of right of way, informing relevant communities of removal	iv. Utility systematically removes vegetation outside of right of way, informing relevant communities of removal	iv. Utility systematically removes vegetation outside of right of way, informing relevant communities of removal
25b: How is potential vegetation that may pose a threat identified?	iv. Based on the probability and consequences of impact on electric lines and equipment as determined by risk modeling, as well as regular and accurate systematic inspections for high-risk trees outside the right of way or environmental and climatological conditions contributing to increased risk	iv. Based on the probability and consequences of impact on electric lines and equipment as determined by risk modeling, as well as regular and accurate systematic inspections for high-risk trees outside the right of way or environmental and climatological conditions contributing to increased risk	iv. Based on the probability and consequences of impact on electric lines and equipment as determined by risk modeling, as well as regular and accurate systematic inspections for high-risk trees outside the right of way or environmental and climatological conditions contributing to increased risk
25c: Is vegetation removed with cooperation from the community?	ii. Yes	ii. Yes	ii. Yes

25d: Does the utility remove vegetation waste outside its right of way across the entire grid?	ii. Yes	ii. Yes	ii. Yes
25e: How long after cutting vegetation does the utility remove vegetation waste outside its right of way?	iv. On the same day	iv. On the same day	iv. On the same day
25f: Does the utility work with local landowners to provide a cost-effective use for cutting vegetation?	i. No	ii. Yes	ii. Yes
25g: Does the utility work with partners to identify new cost-effective uses for vegetation, taking into consideration environmental impacts and emissions of vegetation waste?	i. No	ii. Yes	ii. Yes

Capability 26. QA/QC for vegetation 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: 3 (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**
26a: How is contractor and employee 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	iii. Through an established and demonstrably functioning audit process to manage and confirm work completed by subcontractors, where contractor activity is subject to semi-automated audits using technologies capable of sampling the contractor's work (e.g., LiDAR scans, photographic evidence)
26b: Do contractors follow the same processes and standards as utility's own employees?	ii. Yes	ii. Yes	ii. Yes
26c: How frequently is QA/QC information used to identify deficiencies in quality of work performance and inspections performance?	iv. Regularly	iv. Regularly	iv. Regularly
26d: How is 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
26e: Are workforce management software tools used to manage and confirm work completed by subcontractors?	ii. Yes	ii. Yes	ii. Yes

Category F. Grid operations and protocols

	Avg cycle start maturity: 1.8	Avg current maturity: 1.8	Avg projected cycle end maturity: 2.2
Capability 27. Protective equipment and device settings			
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 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**
27a: How are grid elements adjusted during high threat weather conditions?	iv. Utility increases sensitivity of risk reduction elements during high threat weather conditions based on risk mapping and monitors near misses	iv. Utility increases sensitivity of risk reduction elements during high threat weather conditions based on risk mapping and monitors near misses	iv. Utility increases sensitivity of risk reduction elements during high threat weather conditions based on risk mapping and monitors near misses
27b: Is there an automated process for adjusting sensitivity of grid elements and evaluating effectiveness?	ii. Partially automated process	ii. Partially automated process	ii. Partially automated process
27c: Is there a predetermined protocol driven by fire conditions for adjusting sensitivity of grid elements?	ii. Yes	ii. Yes	ii. Yes

Capability 28. Incorporating ignition risk factors in grid control			
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 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**
28a: Does the utility have a clearly explained process for determining whether to operate the grid beyond current or voltage designs?	ii. Yes	ii. Yes	ii. Yes
28b: Does the utility have systems in place to automatically track operation history including current, loads, and voltage throughout the grid at the circuit level?	ii. Yes	ii. Yes	ii. Yes
28c: Does the utility use predictive modeling to estimate the expected life and make equipment maintenance, rebuild, or replacement decisions based on grid operating history, and is that model reviewed?	ii. Modeling is used, but not evaluated by external experts	ii. Modeling is used, but not evaluated by external experts	ii. Modeling is used, but not evaluated by external experts
28d: When does the utility operate the grid above rated voltage and current load?	iii. Never	iii. Never	iii. Never

Capability 29. PSPS op. model and consequence mitigation			
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: 2 (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**
29a: How effective is PSPS event forecasting?	iv. PSPS event generally forecasted accurately with fewer than 25% of predictions being false positives	iv. PSPS event generally forecasted accurately with fewer than 25% of predictions being false positives	iv. PSPS event generally forecasted accurately with fewer than 25% of predictions being false positives
29b: What share of customers are communicated to regarding forecasted PSPS events?	ii. PSPS event are communicated to >95% of affected customers and >99% of medical baseline customers in advance of PSPS action	ii. PSPS event are communicated to >95% of affected customers and >99% of medical baseline customers in advance of PSPS action	v. PSPS event are communicated to >99.9% of affected customers and 100% of medical baseline customers in advance of PSPS action
29c: During PSPS events, what percent of customers complain?	iii. Less than 0.5%	iii. Less than 0.5%	iii. Less than 0.5%
29d: During PSPS events, does the utility's website go down?	i. No	i. No	i. No
29e: During PSPS events, what is the average downtime per customer?	ii. Less than 1 hour	ii. Less than 1 hour	iii. Less than 0.5 hours
29f: Are specific resources provided to all affected customers to alleviate the impact of the power shutoff (e.g., providing backup generators, supplies, batteries, etc.)?	ii. Yes	ii. Yes	ii. Yes

Capability 30. Protocols for PSPS initiation			
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 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**
30a: Does the utility have explicit thresholds for activating a PSPS?	ii. Utility has explicit policies and explanation for the thresholds above which PSPS is activated as a measure of last resort	ii. Utility has explicit policies and explanation for the thresholds above which PSPS is activated as a measure of last resort	ii. Utility has explicit policies and explanation for the thresholds above which PSPS is activated as a measure of last resort
30b: Which of the following does the utility take into account when making PSPS decisions? Select all that apply	i. SME opinion ii. A partially automated system which recommends circuits for which PSPS should be activated and is validated by SMEs	i. SME opinion ii. A partially automated system which recommends circuits for which PSPS should be activated and is validated by SMEs	i. SME opinion ii. A partially automated system which recommends circuits for which PSPS should be activated and is validated by SMEs
30c: Under which circumstances does the utility de-energize circuits? Select all that apply.	i. Upon detection of damaged conditions of electric equipment ii. When circuit presents a safety risk to suppression or other personnel iii. When equipment has come into contact with foreign objects posing ignition risk iv. Additional reasons not listed	i. Upon detection of damaged conditions of electric equipment ii. When circuit presents a safety risk to suppression or other personnel iii. When equipment has come into contact with foreign objects posing ignition risk iv. Additional reasons not listed	i. Upon detection of damaged conditions of electric equipment ii. When circuit presents a safety risk to suppression or other personnel iii. When equipment has come into contact with foreign objects posing ignition risk iv. Additional reasons not listed
30d: Given the condition of the grid, with what probability does the utility expect any large scale PSPS events affecting more than 10,000 people to occur in the coming year?	ii. Greater than 5% - Grid condition paired with risk indicates that PSPS may be necessary in 2020 in some areas	ii. Greater than 5% - Grid condition paired with risk indicates that PSPS may be necessary in 2020 in some areas	ii. Greater than 5% - Grid condition paired with risk indicates that PSPS may be necessary in 2020 in some areas

Capability 31. Protocols for PSPS re-energization			
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: 2 (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**
31a: Is there a process for inspecting de-energized sections of the grid prior to re-energization?	ii. Existing process for accurately inspecting de-energized sections of the grid prior to re-energization	ii. Existing process for accurately inspecting de-energized sections of the grid prior to re-energization	ii. Existing process for accurately inspecting de-energized sections of the grid prior to re-energization
31b: How automated is the process for inspecting de-energized sections of the grid prior to re-energization?	i. Manual process, not automated at all	i. Manual process, not automated at all	ii. Partially automated (<50%)
31c: What is the average amount of time that it takes you to re-energize your grid from a PSPS once weather has subsided to below your de-energization threshold?	iv. Within 12 hours	v. Within 8 hours	v. Within 8 hours
31d: What level of understanding of probability of ignitions after PSPS events does the utility have across the grid?	iii. Utility has accurate quantitative understanding of ignition risk following re-energization, by asset, validated by historical data and near misses	iii. Utility has accurate quantitative understanding of ignition risk following re-energization, by asset, validated by historical data and near misses	iii. Utility has accurate quantitative understanding of ignition risk following re-energization, by asset, validated by historical data and near misses

Capability 32. Ignition prevention and suppression			
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 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**
32a: Does the utility have defined policies around the role of workers in suppressing ignitions?	iii. Utilities have explicit policies about the role of crews, including contractors and subcontractors, at the site of ignition	iii. Utilities have explicit policies about the role of crews, including contractors and subcontractors, at the site of ignition	iii. Utilities have explicit policies about the role of crews, including contractors and subcontractors, at the site of ignition
32b: What training and tools are provided to workers in the field?	iii. All criteria in option (ii) met; In addition, suppression tools and training to suppress small ignitions caused by workers or in immediate vicinity of workers are provided	iii. All criteria in option (ii) met; In addition, suppression tools and training to suppress small ignitions caused by workers or in immediate vicinity of workers are provided	iii. All criteria in option (ii) met; In addition, suppression tools and training to suppress small ignitions caused by workers or in immediate vicinity of workers are provided
32c: In the events where workers have encountered an ignition, have any Cal/OSHA reported injuries or fatalities occurred in in the last year?	i. No	i. No	i. No
32d: Does the utility provide training to other workers at other utilities and outside the utility industry on best practices to minimize, report and suppress ignitions?	ii. Yes	ii. Yes	ii. Yes

Category G. Data governance

	Avg cycle start maturity: 1	Avg current maturity: 1.8	Avg projected cycle end maturity: 3
Capability 33. Data collection and curation			
Capability maturity level based on Maturity Rubric (0 - 4)	Start of cycle: 0	By end of year 1 (current): 0	Planned state by end of cycle: 2 (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**
33a: Does the utility have a centralized database of situational, operational, and risk data?	i. No	i. No	ii. Yes
33b: Is the utility able to use advanced analytics on its centralized database of situational, operational, and risk data to make operational and investment decisions?	ii. Yes, but only for short term decision making	ii. Yes, but only for short term decision making	iii. Yes, for both short term and long-term decision making
33c: Does the utility collect data from all sensored portions of electric lines, equipment, weather stations, etc.?	ii. Yes	ii. Yes	ii. Yes
33d: Is the utility's database of situational, operational, and risk data able to ingest and share data using real-time API protocols with a wide variety of stakeholders?	i. No	i. No	i. No
33e: Does the utility identify highest priority additional data sources to improve decision making?	ii. Yes	ii. Yes	ii. Yes

33f: Does the utility share best practices for database management and use with other utilities in California and beyond?	ii. Yes	ii. Yes	ii. Yes

Capability 34. Data transparency and analytics			
Capability maturity level based on Maturity Rubric (0 - 4)	Start of cycle: 0	By end of year 1 (current): 0	Planned state by end of cycle: 2 (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**
34a: Is there a single document cataloguing all fire-related data and algorithms, analyses, and data processes?	i. No	i. No	ii. Yes
34b: Is there an explanation of the sources, cleaning processes, and assumptions made in the single document catalog?	i. No	i. No	ii. Yes
34c: Are all analyses, algorithms, and data processing explained and documented?	ii. Analyses, algorithms, and data processing are documented	ii. Analyses, algorithms, and data processing are documented	iii. Analyses, algorithms, and data processing are documented and explained
34d: Is there a system for sharing data in real time across multiple levels of permissions?	i. No system capable of sharing data in real time across multiple levels of permissions	i. No system capable of sharing data in real time across multiple levels of permissions	iii. System is capable of sharing across at least three levels of permissions, including a.) utility-regulator permissions, b.) first responder permissions, and c.) public data sharing

34e: Are the most relevant wildfire related data algorithms disclosed?	ii. Yes, disclosed to regulators and other relevant stakeholders upon request	iii. Yes, disclosed publicly in WMP upon request	iii. Yes, disclosed publicly in WMP upon request

Capability 35. Near-miss tracking			
Capability maturity level based on Maturity Rubric (0 - 4)	Start of cycle: 0	By end of year 1 (current): 3	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**
35a: Does the utility track near miss data for all near misses with wildfire ignition potential?	ii. Yes	ii. Yes	ii. Yes
35b: Based on near miss data captured, is the utility able to simulate wildfire potential given an ignition based on event characteristics, fuel loads, and moisture?	i. No	ii. Yes	ii. Yes
35c: Does the utility capture data related to the specific mode of failure when capturing near-miss data?	i. No	ii. Yes	ii. Yes
35d: Is the utility able to predict the probability of a near miss in causing an ignition based on a set of event characteristics?	i. No	ii. Yes	ii. Yes
35e: Does the utility use data from near misses to change grid	i. No	i. No	ii. Yes

operation protocols in real time?

Capability 36. Data sharing with research community			
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 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**
36a: Does the utility make disclosures and share data?	iii. Utility makes required disclosures and shares data beyond what is required	iii. Utility makes required disclosures and shares data beyond what is required	iii. Utility makes required disclosures and shares data beyond what is required
36b: Does the utility in engage in research?	iv. Utility funds and participates in both independent and collaborative research, and ensures that research, where possible, is abstracted and applied to other utilities	iv. Utility funds and participates in both independent and collaborative research, and ensures that research, where possible, is abstracted and applied to other utilities	iv. Utility funds and participates in both independent and collaborative research, and ensures that research, where possible, is abstracted and applied to other utilities
36c: What subjects does utility research address?	ii. Utility ignited wildfires and risk reduction initiatives	ii. Utility ignited wildfires and risk reduction initiatives	ii. Utility ignited wildfires and risk reduction initiatives
36d: Does the utility promote best practices based on latest independent scientific and operational research?	ii. Yes	ii. Yes	ii. Yes

Category H. Resource allocation methodology

	Avg cycle start maturity: 0.8	Avg current maturity: 2	Avg projected cycle end maturity: 2.7
Capability 37. Scenario analysis across different risk levels			
Capability maturity level based on Maturity Rubric (0 - 4)	Start of cycle: 1	By end of year 1 (current): 3	Planned state by end of cycle: 3 (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**
37a: For what risk scenarios is the utility able to provide projected cost and total risk reduction potential?	iii. Utility provides an accurate high-risk reduction and low risk reduction scenario, in addition to their proposed scenario, and the projected cost and total risk reduction potential	iii. Utility provides an accurate high-risk reduction and low risk reduction scenario, in addition to their proposed scenario, and the projected cost and total risk reduction potential	iii. Utility provides an accurate high-risk reduction and low risk reduction scenario, in addition to their proposed scenario, and the projected cost and total risk reduction potential
37b: For what level of granularity is the utility able to provide projections for each scenario?	ii. Region level	iv. Span level	0
37c: Does the utility include a long term (e.g., 6-10 year) risk estimate taking into account macro factors (climate change, etc.) as well as planned risk reduction initiatives in its scenarios?	i. No	i. No	i. No
37d: Does the utility provide an estimate of impact on reliability factors in its scenarios?	ii. Yes	ii. Yes	ii. Yes

Capability 38. Presentation of relative risk spend efficiency for portfolio of initiatives			
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 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**
38a: Does the utility present accurate qualitative rankings for its initiatives by risk spend efficiency?	ii. Yes	ii. Yes	ii. Yes
38b: What initiatives are captured in the ranking of risk spend efficiency?	ii. All commercial initiatives	ii. All commercial initiatives	ii. All commercial initiatives
38c: Does the utility include figures for present value cost and project risk reduction impact of each initiative, clearly documenting all assumptions (e.g. useful life, discount rate, etc.)?	ii. Yes	ii. Yes	ii. Yes
38d: Does the utility provide an explanation of their investment in each particular initiative?	ii. Yes, including the expected overall reduction in risk	ii. Yes, including the expected overall reduction in risk	iii. Yes, including the expected overall reduction in risk and estimates of impact on reliability factors
38e: At what level of granularity is the utility able to provide risk efficiency figures?	ii. Region level	iv. Span level	iv. Span level

Capability 39. Process for determining risk spend efficiency of vegetation management initiatives			
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 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**
39a: How accurate of a risk spend efficiency calculation can the utility provide?	ii. Utility has an accurate relative understanding of the cost and effectiveness to produce a reliable risk spend efficiency estimate	ii. Utility has an accurate relative understanding of the cost and effectiveness to produce a reliable risk spend efficiency estimate	iii. Utility has accurate quantitative understanding of cost and effectiveness to produce a reliable risk spend efficiency estimate
39b: At what level can estimates be prepared?	ii. Regional	iii. Circuit-based	iii. Circuit-based
39c: How frequently are estimates updated?	iii. Annually or more frequently	iii. Annually or more frequently	iii. Annually or more frequently
39d: What vegetation management initiatives does the utility include within its evaluation?	ii. Some	iii. Most	iii. Most
39e: Can the utility evaluate risk reduction synergies from combination of various initiatives?	i. No	ii. Yes	ii. Yes

Capability 40. Process for determining risk spend efficiency of system hardening initiatives			
Capability maturity level based on Maturity Rubric (0 - 4)	Start of cycle: 1	By end of year 1 (current): 3	Planned state by end of cycle: 3 (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**
40a: How accurate of a risk spend efficiency calculation can the utility provide?	ii. Utility has accurate relative understanding of cost and effectiveness to produce a reliable risk spend efficiency estimate	iii. Utility has accurate quantitative understanding of cost and effectiveness to produce a reliable risk spend efficiency estimate	iii. Utility has accurate quantitative understanding of cost and effectiveness to produce a reliable risk spend efficiency estimate
40b: At what level can estimates be prepared?	ii. Regional	0	0
40c: How frequently are estimates updated?	iii. Annually or more frequently	iii. Annually or more frequently	iii. Annually or more frequently
40d: What grid hardening initiatives are included in the utility risk spend efficiency analysis?	iv. All commercially available grid hardening initiatives	iv. All commercially available grid hardening initiatives	iv. All commercially available grid hardening initiatives
40e: Can the utility evaluate risk reduction effects from the combination of various initiatives?	i. No	i. No	ii. Yes

Capability 41. Portfolio-wide initiative allocation methodology			
Capability maturity level based on Maturity Rubric (0 - 4)	Start of cycle: 0	By end of year 1 (current): 1	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**
41a: To what extent does the utility allocate capital to initiatives based on risk-spend efficiency (RSE)?	ii. Utility considers estimates of RSE when allocating capital	iii. Accurate RSE estimates for all initiatives are used to determine capital allocation within categories only (e.g. to choose the best vegetation management initiative)	iv. Accurate RSE estimates for all initiatives are used to determine capital allocation across portfolio (e.g. prioritizing between vegetation management and grid hardening)
41b: What information does the utility take into account when generating RSE estimates?	i. Average estimate of RSE by initiative category	iii. Specific information by initiative at the asset level, including state of specific assets and location where initiative will be implemented	iii. Specific information by initiative at the asset level, including state of specific assets and location where initiative will be implemented
41c: How does the utility verify RSE estimates?	ii. RSE estimates are verified by historical or experimental pilot data	ii. RSE estimates are verified by historical or experimental pilot data	iii. RSE estimates are verified by historical or experimental pilot data and confirmed by independent experts or other utilities in CA
41d: Does the utility take into consideration impact on safety, reliability, and other priorities when making spending decisions?	ii. Yes	ii. Yes	ii. Yes

Capability 42. Portfolio-wide innovation in new wildfire 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: 2 (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**
42a: How does the utility develop and evaluate the efficacy of new wildfire initiatives?	iv. Utility uses pilots, followed by in-field testing, measuring reduction in ignition events and near-misses.	iv. Utility uses pilots, followed by in-field testing, measuring reduction in ignition events and near-misses.	iv. Utility uses pilots, followed by in-field testing, measuring reduction in ignition events and near-misses.
42b: How does the utility develop and evaluate the risk spend efficiency of new wildfire initiatives?	i. No program in place	i. No program in place	ii. Utility uses total cost of ownership
42c: At what level of granularity does the utility measure the efficacy of new wildfire initiatives?	0	0	0
42d: Are the reviews of innovative initiatives audited by independent parties?	i. No	i. No	i. No
42e: Does the utility share the findings of its evaluation of innovative initiatives with other utilities, academia, and the general public?	ii. Yes	ii. Yes	ii. Yes

Category I. Emergency planning and preparedness

	Avg cycle start maturity: 3	Avg current maturity: 3.6	Avg projected cycle end maturity: 3.6
Capability 43. Wildfire plan integrated with overall disaster/ emergency plan			
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 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**
43a: Is the wildfire plan integrated with overall disaster and emergency plans?	iii. Wildfire plan is an integrated component of overall plan	iii. Wildfire plan is an integrated component of overall plan	iii. Wildfire plan is an integrated component of overall plan
43b: Does the utility run drills to audit the viability and execution of its wildfire plans?	ii. Yes	ii. Yes	ii. Yes
43c: Is the impact of confounding events or multiple simultaneous disasters considered in the planning process?	ii. Yes	ii. Yes	ii. Yes
43d: Is the plan integrated with disaster and emergency preparedness plans of other relevant stakeholders (e.g., CAL FIRE, Fire Safe Councils, etc.)?	ii. Yes	ii. Yes	ii. Yes
43e: Does the utility take a leading role in planning, coordinating, and integrating plans across stakeholders?	ii. Yes	ii. Yes	ii. Yes

Capability 44. Plan to restore service after wildfire related outage			
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 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**
44a: Are there detailed and actionable procedures in place to restore service after a wildfire related outage?	ii. Yes	ii. Yes	ii. Yes
44b: Are employee and subcontractor crews trained in, and aware of, plans?	ii. Yes	ii. Yes	ii. Yes
44c: To what level are procedures to restore service after a wildfire-related outage customized?	iii. Circuit level	iii. Circuit level	iii. Circuit level
44d: Is the customized procedure to restore service based on topography, vegetation, and community needs?	ii. Yes	ii. Yes	ii. Yes
44e: Is there an inventory of high risk spend efficiency resources available for repairs?	ii. Yes	ii. Yes	ii. Yes
44f: Is the wildfire plan integrated with overall disaster and emergency plans?	iii. Wildfire plan is an integrated component of overall plan	iii. Wildfire plan is an integrated component of overall plan	iii. Wildfire plan is an integrated component of overall plan

Capability 45. Emergency community engagement during and after wildfire

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 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 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 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 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 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 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 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

		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)

		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.

	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

		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

		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

	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

		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

	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

		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

		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

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

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

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