Wildfire Mitigation Plan Action Statement:
San Diego Gas & Electric Company

Wildfire Safety Division

Draft Action Statement on San Diego Gas & Electric Company's 2021 Wildfire Mitigation Plan Update

June 2021

WSD-019 - Attachment A

Contents

Introduction and Background

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

SDG&E'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 WSD will become the Office of Energy Infrastructure Safety (Energy Safety) within the California Natural Resources Agency (CNRA).[6]

The main regulatory vehicle for the WSD 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 the WSD; AB 1054 provides, "After approval by the division, the commission shall ratify the action of the division." [10] The WSD must ensure utility wildfire mitigation efforts sufficiently address increasing utility

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[1] Because the WSD is transitioning to the Office of Energy Infrastructure Safety (Energy Safety) on July 1, 2021, any references herein to WSD actions that post-date this transition should be interpreted as actions for which Energy Safety will take responsibility. Section 10 of the associated Resolution provides further detail on the transition of the WSD to Energy Safety.

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

[3] Stats. of 2019, Ch. 79.

[4] Pub. Util. Code § 8386.3(a).

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

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

[7] Stats. of 2016, Ch. 598.

[8] Stats. of 2018, Ch. 626.

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

[10] Pub. Util. Code § 8386.3(a).

wildfire risk. To support its efforts, the WSD developed a long-term strategic roadmap, Reducing Utility-Related Wildfire Risk (2020).[11] This strategic roadmap informs the WSD's work in updating the WMP process and guidelines and the WSD's evaluation of the WMPs.

2. Multi-Year Plan Process

In February of 2020, the utilities[12] 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).[13] The 2020 Class B Deficiencies required resolution through Quarterly Reports,[14] and Class C Deficiencies were to be resolved in the 2021 WMP Update.

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

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[11] The Wildfire Safety Division's strategic roadmap Reducing Utility-Related Wildfire Risk (2020) (accessed March 4, 2021): https://www.cpuc.ca.gov/WSD/roadmap/.

[12] 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.

[13] 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.

[14] "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.

[15] SDG&E's Remedial Compliance Plan of July 27, 2020 (accessed March 2, 2021): https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/About_Us/Organization/Divisions/WSD/SDGE%20WMP%20Remedial%20Compliance%20Plan%2007-27-2020%20(R.18-10-007).pdf.

[16] The WSD's evaluation of SDG&E's Remedial Compliance Plan, issued December 30, 2020 (accessed March 2, 2021): https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/About_Us/Organization/Divisions/WSD/SDGE%20RCP%20Action%20Statement%202021230.pdf.

Deficiencies.[17] The WSD released its evaluation of SDG&E's Quarterly Report on January 8, 2021, and also issued direction to address "insufficient" responses in its 2021 WMP Update.[18]

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).[19] 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, the WSD amended its review process and will no longer issue conditional approvals. Instead, where the WSD found critical issues with 2021 submissions, the WSD is issuing a Revision Notice 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, the WSD will determine whether the response is sufficient to warrant approval, although additional ongoing reporting or other conditions may be required, or the response is insufficient such that denial of the WMP is warranted due to the utility inadequately reducing wildfire risk and its potential impact to public safety.

The WSD evaluated 2021 WMP Updates according to the following factors:

- 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.

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[17] SDG&E's Quarterly Report of September 9, 2021 (accessed March 2, 2021):
ftp://ftp.cpuc.ca.gov/WMP/QuarterlyReports/2020/SDGE%20First%20Quarterly%20Report%20on%202020%20WMP%209-9-2020.pdf.
Subsequent Quarterly Reports addressing conditions requiring ongoing reporting will be evaluated as part of utilities' 2021 WMP Updates.

[18] The WSD's evaluation of SDG&E's first Quarterly Report, issued on January 8, 2021 (accessed March 2, 2021):
https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/About_Us/Organization/Divisions/WSD/SDGE%20QR%20Action%20Statement.pdf.
The WSD issued an extension to the large investor-owned utilities to respond to insufficient Quarterly Reports until February 26, 2021.

[19] See https://www.cpuc.ca.gov/wildfiremitigationplans for adopted 2021 WMP Guidelines.

- 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.[20] 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, the WSD relied upon SDG&E's WMP submission and the subsequent update, input from California Department of Forestry and Fire Protection (CAL FIRE), input from the Wildfire Safety Advisory Board (WSAB), public comments, responses to the WSD's data requests, utility-reported data, and utility responses to the Utility Maturity Survey.

Upon completion of its review, the WSD 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 Update 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 Action Statement nor CPUC's Resolution should be construed as approval of any WMP-related costs.[21]

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[20] 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.

[21] The WSD'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.

1. Summary of Key Findings

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

1.1. Areas of Significant Progress

The WSD finds that SDG&E has made significant progress over the past year and/or has matured in its mitigation strategies for future years in the following areas:

- Overall, SDG&E's identification and evaluation of wildfire mitigation initiatives demonstrate innovation in the utility's approach to reducing wildfire risk.
- SDG&E recognizes PSPS as a risk and is refining how it is integrating reduction of this risk into its overall risk assessment.
- SDG&E has made progress developing its Wildfire Risk Reduction Model (WRRM) and WRRM Operations (WRRM-Ops) model to assess its wildfire risk from a grid asset perspective. The utility has developed a new model, the Wildfire Next Generation System (WiNGS), which provides the additional capability of analyzing circuit segments for risk (wildfire and PSPS), as well as calculating risk-spend efficiency (RSE) estimates. The utility expects to use WiNGs to help prioritize grid hardening mitigations.
- SDG&E has advanced from traditional hardening[22] to undergrounding and covered conductor in the high fire threat district (HFTD). The utility states that the hardening of a full circuit segment using covered conductor or undergrounding may lead to reducing or eliminating PSPS events in the treated area.
- SDG&E reported twice as many initiative RSE estimates in its 2021 WMP Update as in its 2020 WMP. The utility also further developed its risk-quantification methodology and included PSPS impacts in select RSE estimates.

1.2. Revision Notices

The WSD did not issue a Revision Notice to SDG&E in this WMP Update review cycle.

1.3. Key Areas for Improvement and Remedies

The WSD 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. The WSD approves SDG&E's 2021 WMP Update; however, the WSD finds that SDG&E must focus over the next year on the following areas set forth in Table 1 below. While continued progress toward maturity is important in all areas of a utility's WMP, the WSD finds these areas to be

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[22] In this Action Statement, "traditional hardening" refers to any hardening efforts involving bare conductor (i.e., hardening through bare wire conductor replacements, increasing pole strength or spacing between conductors).

key for SDG&E to continue to drive down utility-related wildfire risk. The WSD expects SDG&E 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. The WSD will closely monitor progress in each of these areas over the coming year.

In addition to Table 1 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 1: Key areas for improvement and remedies.

Utility-#	Issue title	Issue description	Remedies required and alternative timeline if applicable
SDGE-1	Inadequate transparency in accounting for ignition sources in risk modelling and mitigation selection	SDG&E identifies vehicle contact and balloon contact as the first and second highest ignition risks but does not explain how that affects its risk models or mitigation selection.	SDG&E must fully explain: 1. How third-party ignition sources feed into SDG&E's risk models; 2. How ignition sources impact SDG&E's mitigation selection process, including: a. How SDG&E prioritizes ignition sources; b. If SDG&E treats third-party ignition sources that are not under SDG&E's direct control differently than other ignition sources, and if so, how; c. How SDG&E targets its mitigations efforts to reduce ignitions that are more likely to result in catastrophic wildfire conditions.

Utility-#	Issue title	Issue description	Remedies required and alternative timeline if applicable
SDGE-2	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. The WSD 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[23] must collaborate through a working group facilitated by Energy Safety[24] to develop a more consistent statewide approach to wildfire risk modeling. After the WSD 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.
SDGE-3	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[25] and therefore fail to provide a full basis for understanding how covered conductor	The utilities[26] 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

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[23] Here "utilities" refers to SDG&E and Pacific Gas and Electric Company (PG&E), Southern California Edison Company (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.

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

[25] 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.

[26] Here "utilities" refers to SDG&E and Pacific Gas and Electric Company (PG&E), Southern California Edison Company (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.

Utility-#	Issue title	Issue description	Remedies required and alternative timeline if applicable
		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.	initiatives in its potential to reduce PSPS risk.
SDGE-4	Inadequate joint plan to study the effectiveness of enhanced clearances	RCP Action-SDGE-4 (Class A)[27] required SDG&E, PG&E, and SCE to "submit a joint, unified plan" to begin a study of the effectiveness of extended vegetation clearances.[28] SDG&E submitted its plan to study the effectiveness of extended vegetation clearance as part of its 2021 WMP Update.[29] SDG&E, PG&E, and SCE 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 Addressing 2020 Wildfire Mitigation Plan Quarterly Report Insufficiencies."	SDG&E, PG&E, and SCE will participate in a multi-year vegetation clearance study. The WSD 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[30] into the determination of outage and ignition risk caused by vegetation contact. 4. Assess the effectiveness of enhanced clearances.

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[27] A note about the numbered conditions referenced in this document: "RCP Action-SDGE-[#]" here refers to one of the actions required by the WSD in its evaluation of SDG&E's Remedial Compliance Plan of 2020, issued Dec. 30, 2020. The WSD issued four such orders (RCP Action-SDGE-1 through RCP Action-SDGE-4). There are two other related sets of references in this document: "SDGE-[#]" refers to one of the actions required by the WSD in its evaluation of SDG&E's 2020 WMP issued June 11, 2020 (SDGE-1 through SDGE-16). "QR Action-SDGE-[#]" refers to one of the actions required by the WSD in its evaluation of SDGE's first quarterly report issued Jan. 8, 2021 (QR Action-SDGE-1 through Action-SDGE-49). 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).

[28] Wildfire Safety Division Evaluation of San Diego Gas and Electric's Remedial Compliance Plan, December 30, 2020, p. 9.

[29] SDG&E 2021 WMP Update, p. 70.

[30] 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
		The WSD acknowledges the complexity of this issue; any study performed assessing the effectiveness of enhanced clearances will take years of data collection and rigorous analysis.	In preparation for this study and the eventual analysis, SDG&E 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 below outlines the feature classes which the WSD believes will be most relevant to the study. Additional requirements related to this study may be included in the Action Statements for PG&E and SCE's 2021 WMP Updates. The WSD will also be updating the GIS Reporting Standards in 2021, which may include additional data attributes for vegetation-related risk events.
SDGE-5	Incomplete identification of vegetation species and record keeping	SDG&E reports that it targets trees based on characteristics of the species. SDG&E targets "eucalyptus, palm, oak, pine, and sycamore."[31] However, these are not tree species, but tree genera. SDG&E needs to ensure proper identification of trees to the species level.	SDG&E 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).

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[31] SDG&E 2021 WMP Update, p. 263.

Utility-#	Issue title	Issue description	Remedies required and alternative timeline if applicable
			3. 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.).[32] 4. Require its vegetation management (VM) and outage reporting personnel to use the unknown "sp." designation only as a last resort by including this requirement in its standard operating protocols and training programs for such work. 5. Notwithstanding (4), identify the genus and species of a tree that has caused an outage[33] or ignition[34] in the Quarterly Data Reports (in these cases, an unknown "sp." designation is not acceptable). 6. Teach tree species identification skills in its VM personnel training programs, both in initial and continuing education. 7. Where possible SDG&E must remedy any unknown species designations made in the field by the time SDG&E submits each Quarterly Data Report, by, for example, allowing inspectors to upload pictures of tree-identifying

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[32] 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.

[33] 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.

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

Utility-#	Issue title	Issue description	Remedies required and alternative timeline if applicable
			characteristics and having a qualified individual identify the species using the inspector's report.
SDGE-6	Limited evidence of quantitative analysis to identify "at-risk" species	Mussey Grade Road Alliance (MGRA) analyzed SDG&E's vegetation-caused outage data to determine the outages per 1000 trees per year by tree genus.[35] MGRA found that palm, cypress, and century plant constituted the highest risk with >1 outage per 1000 trees per year. These data are inconsistent with SDG&E's statement that it "targeted species identified as a higher risk due to growth potential, failure characteristics and relative outage frequency. These species include eucalyptus, sycamore, oak, pine, and palm."[36] Only palms are common to both lists. Additionally, QR Action-SDGE-46 (Class B), from Jan. 8, 2021,[37] required SDG&E to "define quantitative threshold values […] for the criteria used to define a tree as 'at-risk.'"[38] SDG&E responded to this requirement stating, "evaluation is based more on qualitative factors rather than quantitative."[39] SDG&E must use quantitative data to inform its "at-risk" species targeting; qualitative evaluation of a tree's risk does not	In Section 7.3.5.15 (or equivalent) of its 2022 WMP Update, SDG&E must: 1. Describe its methodologies for determining what species it considers "at-risk." 2. Explain in complete detail why discrepancies exist between the genera with the highest number of outages per 1000 trees per year and SDG&E's "targeted species identified as a higher risk due to growth potential, failure characteristics and relative outage frequency."[40] 3. Define quantitative threshold values (whether a standard value, a range of values, or an example of a typical value) for the criteria used to define a tree as "at-risk."

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[35] Mussey Grade Road Alliance's Comments on 2021 Wildfire Mitigation Plans of PG&E, SCE, and SDG&E March 29, 2021, p. 40.

[36] SDG&E 2021 WMP Update, p. 278.

[37] See previous footnote on references to RCP Action-SDGE-[#], QR Action-SDGE-[#], and SDGE-[#].

[38] Wildfire Safety Division Evaluation of San Diego Gas & Electric Company's First Quarterly Report, January 8, 2021, p. 32.

[39] SDG&E "Supplemental Filing Addressing 2020 Wildfire Mitigation Plan Quarterly Report Insufficiencies," February 26, 2021, p. 75.

[40] SDG&E 2021 WMP Update, p. 278.

Utility-#	Issue title	Issue description	Remedies required and alternative timeline if applicable
		adequately address the quantitative risk of ignition or outage.	
SDGE-7	Need for quantified vegetation management (VM) compliance targets	In Table 12, SDG&E only defines quantitative targets for four of 20 VM initiatives. The WSD is statutorily required to audit SDG&E when a "substantial portion" of SDG&E'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), the WSD cannot fully realize its statutory obligations.	SDG&E must define quantitative targets for all VM initiatives in Table 12. If quantitative targets are not applicable to an initiative, SDG&E must fully justify this, define goals within that initiative, and include a timeline in which it expects to achieve those goals.
SDGE-8	Non-communicative remote-controlled switches	SDG&E experienced several incidents in which non-communicative Supervisory Control and Data Acquisition (SCADA) switches caused customers to be de-energized without notice.[42, 43] SDG&E indicates that it has no plans to alter its existing practices to ensure this issue does not continue in the future.[44] In its WMP Update, SDG&E does not discuss any plans to take system-level proactive steps to validate that existing SCADA switches remain fully functional[45] or to ensure	SDG&E must: 1. Discuss its plans to take system-level proactive steps to validate that existing SCADA switches remain fully functional. 2. Discuss its plans to ensure that newly installed SCADA switches are fully functional. 3. Describe the steps it is taking to increase and improve inspections and testing of SCADA switches.

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

[42] For more information on PSPS-related notification requirements, see D.19-05-042, Decision Adopting De-Energization (Public Safety Power Shut-Off) Guidelines (Phase 1 Guidelines), issued June 4, 2019, p. 86-87 (accessed May 19, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M296/K598/296598822.PDF.

[43] SDG&E November 26-December 9, 2020, post-event report, p. 38, and SDG&E December 23-24, 2020, post event report, p. 12: each state "These missed notifications may be attributed to non-communicative SCADA switches, which require SDG&E's Electric Distribution Operations to de-energize upstream of the intended sectionalizing device."

[44] SDG&E March 4, 2021, Response to Cal Advocates Data Request SDGE-2021WMP-04, Question 11 (accessed May 18, 2021): https://www.sdge.com/sites/default/files/regulatory/2021%20WMP%20CalPA-SDGE-DR4%2003-04-2021.pdf.

[45] That is, communicative, operational, and remotely operable.

Utility-#	Issue title	Issue description	Remedies required and alternative timeline if applicable
		that newly installed SCADA switches are fully functional.	
SDGE-9	Inadequate transparency associated with SDG&E's decision-making process	SDG&E does not clearly explain its initiative selection process or how RSE estimates impact the process. For example, SDG&E does not quantitively justify the selection of undergrounding compared to other mitigation alternatives. RSE estimates provide a quantitative pathway to assess the relative risk reduction benefit provided by mitigation initiatives and inform the initiative selection process.	SDG&E must: 1. Elaborate on its decision-making process to include a thorough overview of its initiative selection procedure. The overview must show the rankings of the relative decision-making factors (e.g., planning and execution lead times, resource constraints, etc.) and pinpoint where quantifiable risk reductions and RSE estimates are considered in the initiative selection process. The WSD recommends a cascading, dynamic "if-then" style flowchart to effectively demonstrate this prioritization process and satisfy this requirement. 2. Using the newly developed decision-making overview, demonstrate that its undergrounding projects are a reasonable and effective use of resources to achieve risk reduction compared to other mitigation alternatives.
SDGE-10	Insufficient detail regarding prioritization of HFTD in undergrounding and covered conductor mitigation efforts	Stakeholders expressed concerns that SDG&E is not adequately targeting its covered conductor installations and undergrounding efforts to high-risk circuits in its HFTD areas.[46] It can be more cost-effective to bundle projects in proximate geographic areas[47] than to perform mitigation initiatives strictly from the highest priority circuit segment to the lowest. Additionally, a	SDG&E must fully demonstrate that its undergrounding and covered conductor mitigation efforts are focused on efficiently reducing wildfire risk and PSPS events, including a description of how SDG&E determines the order in which circuit segments are scheduled for mitigation.

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[46] Cal Advocates' Comments on SCE and SDG&E WMP Updates, pp. 16-17.

[47] SDG&E states at p. 206: "…projects are bundled based on geographic proximity for construction efficiency and to reduce outages when required."

Utility-#	Issue title	Issue description	Remedies required and alternative timeline if applicable
		strictly hierarchical strategy would not necessarily reduce PSPS events in the near term. It is therefore *theoretically* possible that a strategy of directing 100% of mitigation efforts to HFTD areas may not be the most reasonable and cost-effective strategy for reducing wildfire risk and PSPS events. However, SDG&E does not provide sufficient detail regarding its strategy for determining workflow to fully assess if SDG&E is sufficiently prioritizing HFTD areas in its undergrounding and covered conductor mitigation efforts. SDG&E must effectively demonstrate that its mitigation efforts are focused on efficiently reducing wildfire risk and PSPS events.	
SDGE-11	RSE values vary across utilities	The WSD 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,[48] SDGE's RSE was 76.73,[49] and SCE's RSE was 4,192.[50] 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.	The utilities[51] must collaborate through a working group facilitated by Energy Safety[52] to develop a more standardized approach to the inputs and assumptions used for RSE calculations. After the WSD completes its evaluation of the 2021 WMP Updates, it will provide additional detail on the specifics of this working group.

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[48] 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.

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

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

[51] 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.

[52] 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
			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.

In addition to the key areas for improvement listed in Table 1 above, the WSD lists additional issues for continued improvement to increase the maturity of SDG&E's wildfire mitigation capabilities in the evaluation sections below. These additional issues are denoted by bullet points. The WSD expects SDG&E 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 the WSD to monitor progress and ascertain potential improvements to maturity based on progress to date.[53]

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

The WSD makes the following key findings regarding SDG&E's maturity progress in 2021:
- The utility has been and remains generally more advanced than its peer utilities as measured by the Utility Maturity Survey.
- In the three instances where the utility showed a regression in maturity, two were due to a change in the interpretation of the question rather than regression in capability (Maturity

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[53] See SDG&E's 2021 response to the Maturity Survey (accessed April 29, 2021): https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/About_Us/Organization/Divisions/WSD/SDGE%202021%20Survey.pdf.

Survey questions A.II.b, A.IV.b).[54] In the third instance, SDG&E has justified its temporary downgrade in capability regarding customer notifications due to concerns about over-notification (Maturity Survey question F.III.b).[55,56] The WSD agrees that over-notification must be minimized, however SDG&E must continue to advance its customer notification programs to ensure that all affected customers are timely and accurately notified in advance about PSPS events.

- For more than half 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 rated itself at the best possible maturity level (per the scale in the survey) on 59% of the Maturity Survey questions (145 of 247 questions) for 2020, 2021, and 2023 (projected).
- For three-quarters of the questions on the survey the utility is at and plans to stay at the top of the maturity scale.
  - The utility rated itself at either the next-best or best possible maturity level on 77% of the questions (189 of 247) in 2021 and 2023 (projected).
- The utility rated itself on the low or low-middle end of maturity on less than 10% of the questions (9.3% or 23 questions).
  - The "asset inspection cycle" (D.II) competency area was the utility's weakest in this regard, with six low-maturity responses. Nine of the utility's low-maturity responses were in the "asset management and inspections" competency (Section D). For seven of these nine low-maturity responses, SDG&E reports that it does not expect an increase in its maturity level between 2021 and the start of 2023.
    - The WSD recognizes asset inspections as a place where SDG&E has room for improvement. For more information, see Section 5.4 Asset Management and Inspections.

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[54] Question A.II.b on the Maturity Survey is "How automated is the ignition risk calculation tool?"; question A.IV.b on the Maturity Survey is "How automated is your ignition risk reduction impact assessment tool?" On both questions the utility answered "mostly" in 2020 but downgraded its assessment to "partially" (<50%) in 2021. The utility gave an explanation on a phone call with the utility on March 10, 2021, and in a written data request response received March 17 (WSD-SDGE-03, see Appendix 10.2). In brief, the apparent downgrade comes from the utility deciding in 2020 that automation meant using an algorithm, but in 2021 deciding that it relies on subject matter experts to validate numbers enough that the process shouldn't be described as "mostly" automated. In its response to both questions the utility reports that it expects to be using a "mostly" automated process by 2023.

[55] See the utility's explanation of its 2021 changes in maturity on the Maturity Survey in its response to a data request from MGRA submitted by the utility on March 17, 2021, "MGRA DR 5 - SDGE UWMMA Survey 2021" (accessed April 29, 2021): https://www.sdge.com/sites/default/files/regulatory/MGRA%20DR%205%20-%20SDGE%20UWMMA%20Survey%202021.pdf.

[56] Question F.III.b on the Maturity Survey is "What share of customers are communicated to regarding forecasted PSPS events?" In 2020 the utility answered that its current state was "iii. PSPS event are communicated to >98% of affected customers and >99.5% of medical baseline customers in advance of PSPS action," and in 2021 it reported its current state as: "ii. PSPS event are communicated to >95% of affected customers and >99% of medical baseline customers in advance of PSPS action." It reports that it expects to return to the previous level of communication by 2023.

2. Wildfire Safety Advisory Board Input

The Wildfire Safety Advisory Board (WSAB) provided recommendations on the 2021 WMP Updates of the three large utilities on April 16, 2021.[57] The WSD 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
- Vegetation management: inspections, strategies and pilots
- System design and management: grid hardening, operations, inspections, and emerging technology
- Public safety power shutoffs: reducing the scale, scope and frequency
- Emergency planning and communication: emergency preparedness, stakeholder cooperation, and community engagement

3. Public and Stakeholder Comment

The following individuals and organizations submitted comments by March 29, 2021, and reply comments by April 13, 2021, on SDG&E's 2021 WMP Update:

- Acton Town Council
- Public Advocates Office at the California Public Utilities Commission (Cal Advocates)
- Green Power Institute (GPI)
- Mussey Grade Road Alliance (MGRA)
- Protect Our Communities Foundation (PCF)
- Small Business Utility Advocates (SBUA)
- The Utility Reform Network (TURN)
- Other members of the public

The WSD has evaluated comments and concurs with the following stakeholder input on SDG&E's 2021 WMP Update, as reflected in this Action Statement:

- There should be a coordinated approach to the calculation of risk-spend efficiency values across the utilities (MGRA, TURN, Cal Advocates). In particular there should be a coordinated approach to looking at the costs and risk-spend efficiency of covered conductor installation across the utilities (MGRA, TURN, Cal Advocates).

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[57] The WSAB's "Recommendations on the 2021 Wildfire Mitigation Plan Updates for Large Investor-Owned Utilities," approved April 14, 2021, and issued April 16, 2021, can be read here: https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/About_Us/Organization/Divisions/WSD/WSAB%20Recommendations%20on%202021%20Large%20IOU%20WMP%20Updates%20Issued%204.16.2021.pdf.

- There should also be a coordinated approach to the utilities' risk modeling efforts, supported by a WSD-led technical working group (Cal Advocates). The risk models should be subject to verification (MGRA).
- SDG&E should demonstrate that its undergrounding projects are more cost-effective than less costly alternatives and are appropriately targeted on high-risk circuits (Cal Advocates).
- SDG&E should present information on its plans to validate that new and existing Supervisory Control and Data Acquisition (SCADA) switches are operational and document precautions it is taking to ensure that customers are not de-energized without notice (Cal Advocates).
- SDG&E does not provide sufficient analysis of how it will incorporate its pilot programs' results into PSPS decision making (PCF).
- SDG&E should continue making progress in providing support (including access to microgrids and other back-up power assistance programs) to vulnerable populations among its customers, particularly those in the high fire threat district (HFTD) (SBUA).
- SDG&E should continue making progress in providing wildfire-related outreach and communications to customers who are "hard-to-reach," (e.g., tribal communities and customers with access and functional needs [AFN] or limited English proficiency [LEP]) (SBUA).
- SDG&E's Energy Solutions Partner Network, which includes nearly 200 community-based organizations (CBOs), plays a key role in distributing wildfire preparedness information among different customer segments (SBUA).
- SDG&E needs to provide more granularity to its analysis of hazard trees, down to the species level, analyzing outage risk per species (MGRA).
- The utilities need to make more progress on their joint plan to begin a study of the effectiveness of extended vegetation clearances (MGRA).
- 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) (MGRA).

4. Discussion

The following sections discuss in detail SDG&E'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[58] 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

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[58] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 14-21 (accessed May 27, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M352/K460/352460864.pdf.

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.

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

Issues and Remedies

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

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

- ISSUE: Requirement 11, a prioritized list of wildfire risks and drivers, was not clearly evident in the WMP Update. It was provided in response to a data request (see Appendix 10.2).
  - o REMEDY: Provide a table with a prioritized list of wildfire risks and drivers and the rationale for prioritization.
- ISSUE: Requirement 15, supporting information regarding whether the utility has an adequately sized and trained workforce to promptly restore service after an outage was not clearly evident in the WMP Update. It was provided in response to a data request (see Appendix 10.2).
  - o REMEDY: Provide the size (in numbers) of the workforce available to restore service after an outage. Include a breakdown of the number of workers by classification.

4.2. Actuals and Planned Spending for the Mitigation Plan

The WMP Guidelines[59] 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.[60] The WMP Guidelines requires that ratepayer impact calculations are clearly shown to demonstrate how each value was derived. Nothing in

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[59] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 22-24 (accessed May 27, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M352/K460/352460864.pdf.

[60] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, Section 3.2 "Summary of ratepayer impact," p. 23 (accessed June 2, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M352/K460/352460864.pdf.

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).

SDG&E provided all required information regarding expenditures.

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

- SDG&E shows an increase between its 2020 planned spend and 2020 actual spend ($452,470,000 to $569,237,000).[61] The WSD requested information regarding whether the additional costs involved additional investment outside the HFTD area, or if the costs were spent in the existing HFTD work area, or areas had been reclassified between 2019 and 2020. Per a phone meeting between WSD and SDG&E staff held Feb. 10, 2021, the only area outside the HFTD covered in the WMP Update is the part of the wildland-urban interface (WUI) that is not in the HFTD: the same area as was covered in the 2020 WMP. The higher costs relate to costs from more investment in the existing work area (e.g., engineering and covered conductors). This was supported by the utility's response to a data request submitted to the utility on Feb. 18, 2021 (WSD-SDGE-01, see Appendix 10.2).

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[61] SDG&E WMP Update, Table 3-1, p. 7 (for actual 2020 costs); Question 1 of data request WSD-SDGE-01 and SDG&E's 2020 WMP (for proposed 2020 costs).

Figures

Planned and actual spending ($M), territory-wide spend
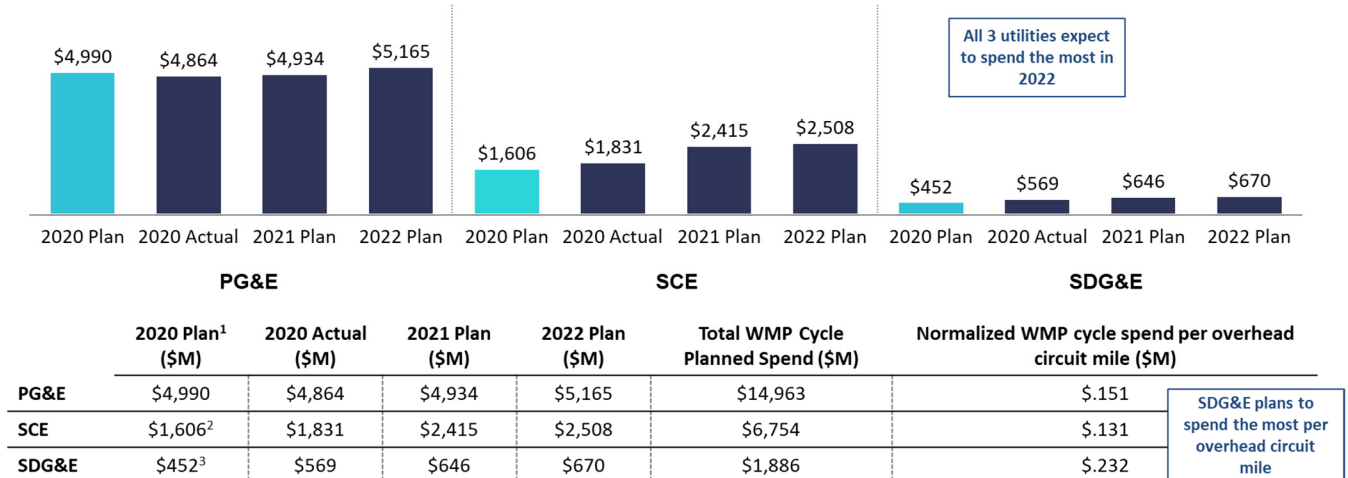
	2020 Plan[1] ($M)	2020 Actual ($M)	2021 Plan ($M)	2022 Plan ($M)	Total WMP Cycle Planned Spend ($M)	Normalized WMP cycle spend per overhead circuit mile ($M)
PG&E	$4,990	$4,864	$4,934	$5,165	$14,963	$.151
SCE	$1,606[2]	$1,831	$2,415	$2,508	$6,754	$.131
SDG&E	$452[3]	$569	$646	$670	$1,886	$.232

Source: Tables 8 and 12 of utility 2021 WMPs, Tables 21-30 of utility 2020 WMPs, and subsequent data requests
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. 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 across utilities, territory-wide spend.

See Figure 4.2.b for the comparison of the high fire threat district actual and planned spends of the three large electrical utilities. SDG&E has the second highest spend per overhead circuit mile in the HFTD.

Planned and actual spending ($M), HFTD-only spend
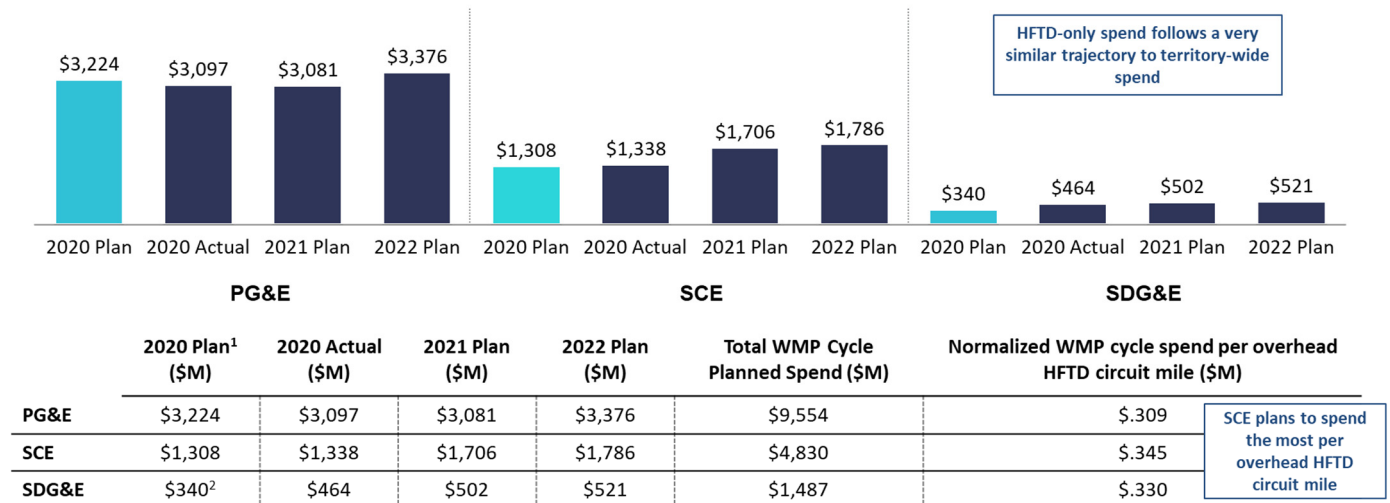
	2020 Plan[1] ($M)	2020 Actual ($M)	2021 Plan ($M)	2022 Plan ($M)	Total WMP Cycle Planned Spend ($M)	Normalized WMP cycle spend per overhead HFTD circuit mile ($M)
PG&E	$3,224	$3,097	$3,081	$3,376	$9,554	$.309
SCE	$1,308	$1,338	$1,706	$1,786	$4,830	$.345
SDG&E	$340[2]	$464	$502	$521	$1,487	$.330

Source: Tables 8 and 12 of utility 2021 WMPs, Tables 21-30 of utility 2020 WMPs, and subsequent data requests
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.
Note: PG&E submitted errata on 3/17/21 in which 2021-reported spend changed for initiatives 7.3.3.11.2 and 7.3.3.12.4 but did not provide the HFTD / non-HFTD split for those spend changes. Thus, assumptions were made regarding % of spend that is HFTD for those initiatives, based on %s that PG&E provided in previous data.

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

4.3.   Lessons Learned and Risk Trends

This section of the WMP Guidelines[62] 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.

SDG&E provided all required information on lessons learned, current risk trends, and research conducted.

- SDG&E provides an update on its development of a WMP Data Governance Framework (DGF) and an automated Central Data Repository (CDR).
- SDG&E reports on its study of its reliability performance data from some of its oldest programs such as overhead distribution hardening and overhead transmission hardening. It reports that it was able to measure the effectiveness of these mitigations by comparing the reliability performance before and after hardening.
- SDG&E presents the lessons learned from the 11 pilot programs/demonstrations it reported in its 2020 WMP.

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

This section of the WMP Guidelines[63] 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

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[62] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 24-29 (accessed May 27, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M352/K460/352460864.pdf.
[63] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 29-31(accessed May 27, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M352/K460/352460864.pdf.

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 WSD 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[64] 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.

SDG&E provided all required information.

- SDG&E's overarching WMP objective is to prevent and mitigate the risk of wildfires caused by utility equipment.
- SDG&E presented its 3-year and 10-year objectives for each of the ten maturity capabilities (WMP Update Table 5-1).
- It listed and described its program metrics and targets (WMP Update Table 5-2).

Workforce planning:

This subsection of the WMP Guidelines[65] 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

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[64] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 29-30 (accessed May 27, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M352/K460/352460864.pdf.
[65] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 30-31 (accessed May 27, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M352/K460/352460864.pdf.

SDG&E provided all information required regarding worker qualifications within each of the required roles.
- SDG&E described the minimum qualifications for its vegetation inspection and management workforce.
- SDG&E reported on its electrical asset training programs.
  - The SDG&E Skills Training Center trains qualified electrical workers (QEWs) to conduct Overhead CMP Detailed and Quality Control (QC) inspections through a two-day course, covering the Overhead (89 condition codes) and QC (50 conditions codes) portion of the CMP program.
- SDG&E reported on its participation in the collaborative development of a community college-oriented Utility Line-Clearance Arborist training program.

4.5. Metrics and Underlying Data

The WMP Guidelines[66] 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.[67] 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 detailed review of the utility's progress and shortcomings in its Quarterly Data Reports.

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[66] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 32-41 (accessed May 27, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M352/K460/352460864.pdf.
[67] 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.

Figures

Ignitions per 10,000 overhead circuit miles

Total ignitions increased in 2020 for PG&E and SDG&E – and equip. failure ignitions increased for all
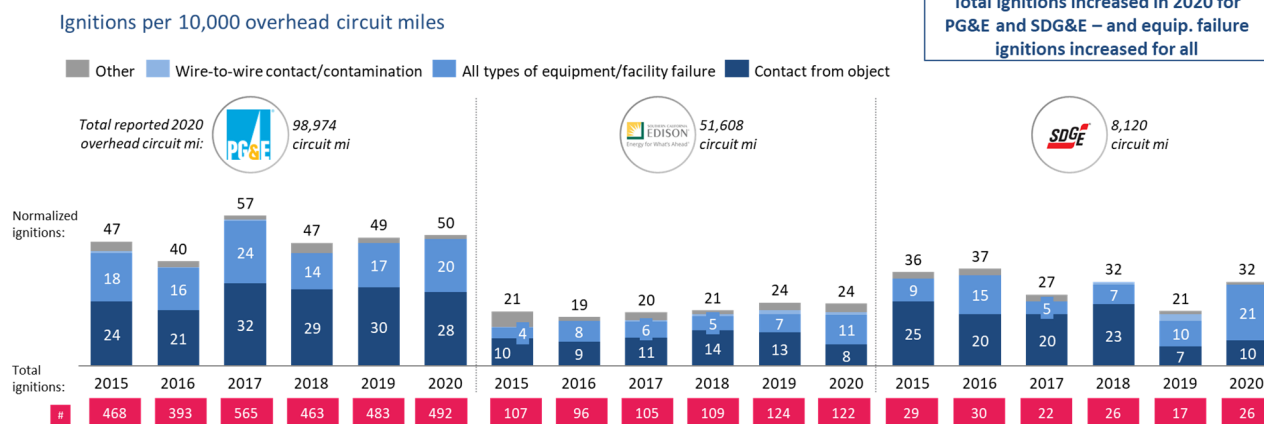
Source: Tables 8 and 7.1 from utility 2021 WMPs
Note: The total number of ignitions for each year was normalized using the 2020 reported overhead circuit miles for each utility, in their 2021 WMPs.
Note: In the data that PG&E, SCE and SDG&E submitted for Table 7.2, the total number of ignitions did not 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.[68]

Risk events per overhead circuit mile, *including ignitions*

For utilities, risk events decreased from 2019-20, with mix of risk events remaining largely the same

Utilities predict risk events will stay relatively flat in 2021-22
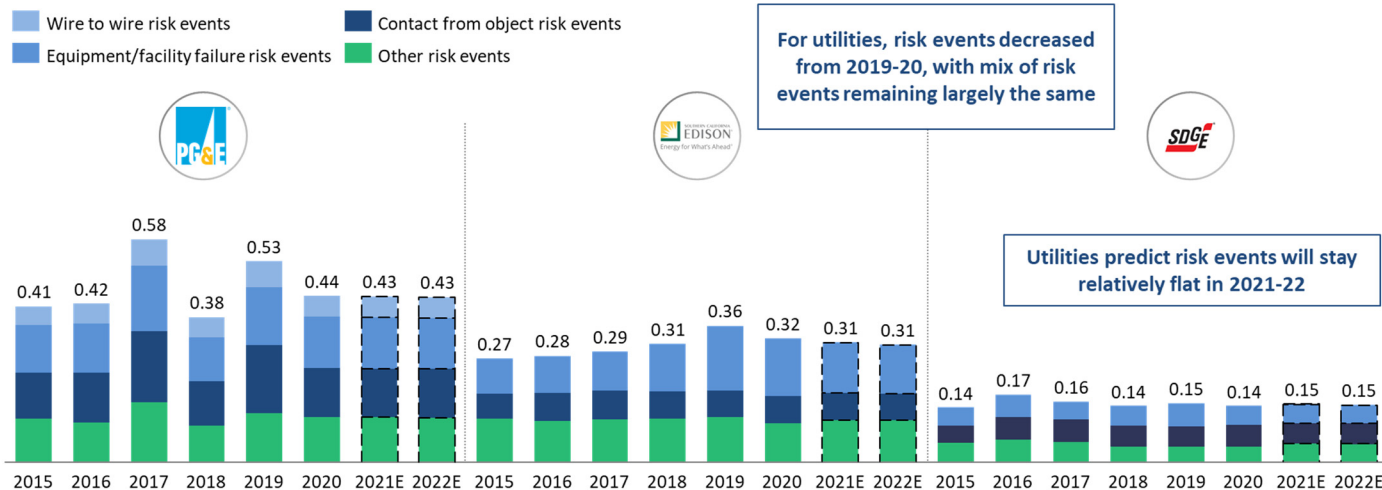
Source: Risk events from Table 7.1 of utility 2021 WMPs, overhead circuit miles from Table 8 of utility 2021 WMPs
Note: A risk event is defined as an event with probability of ignition, including wires down, contacts with objects, line slap, events with evidence of heat generation, and other events that cause sparking or have the potential to cause ignition.

Figure 4.5.b: Actual and projected risk events per overhead circuit mile.

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[68] SCE and PG&E values are subject to change pending analysis of Revision Notice responses submitted June 3, 2021.

Red Flag Warning (RFW) overhead (OH) circuit mile days per year – entire utility territory
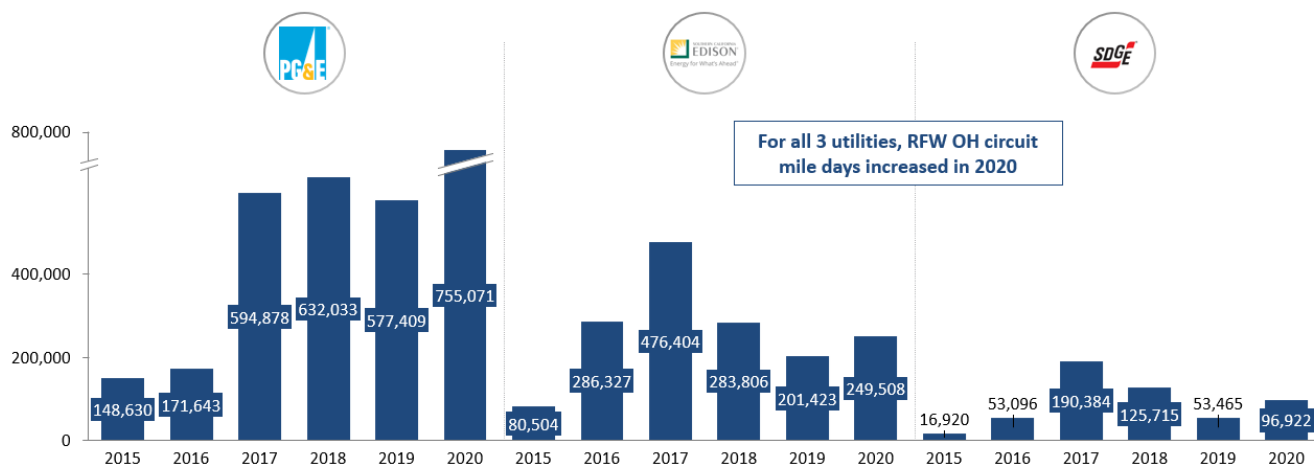
Source: Table 6 of 2021 utility WMPs.

Figure 4.5.c: Red Flag Warning (RFW) overhead circuit mile days per year.

Level 1, 2, and 3 asset inspection findings for transmission and distribution, per circuit mile inspected
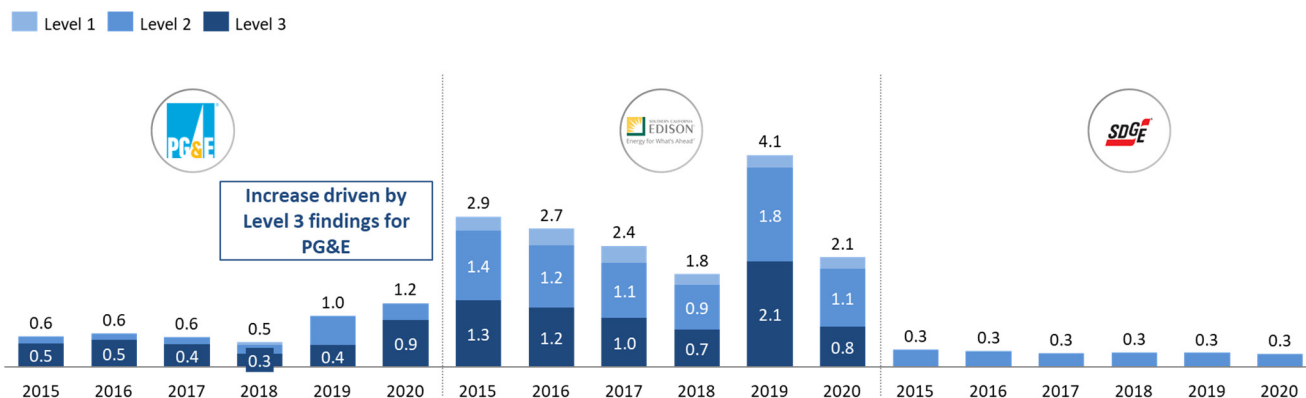
Source: Inspection findings from Table 1 of utility 2021 WMPs.
Note: A Level 1 finding is an immediate safety and/or reliability risk with high probability for significant impact. A Level 2 finding is a variable (non-immediate high to low safety and/or reliability risk. A Level 3 finding is an acceptable safety and/or reliability risk.

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

SDG&E's inspection findings per circuit mile inspected have remained steady for five years, as shown in Figure 4.5.d.

5. Mitigation Initiatives and Maturity Evaluation

This section of the WMP Guidelines[69] 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,[70] 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 WSD 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 10.3:

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

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[69] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 42-46 (accessed May 27, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M352/K460/352460864.pdf.

[70] 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 WSD website here: https://www.cpuc.ca.gov/wildfiremitigationplans/.

Figures

Maturity score (0 – 4) actual and projected

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 for PG&E, SCE, and SDG&E.

Maturity score (0 – 4) actual and projected

Projected growth through WMP cycle in Maturity by Category: SDG&E

Category	Scores		
	Start	Current	End
A. Risk assessment and mapping	2.0	1.8	2.4
B. Situational Awareness and Forecasting	2.6	2.6	2.6
C. Grid design and system hardening	2.4	2.6	3.2
D. Asset management and inspections	2.0	2.0	2.2
E. Vegetation management and inspection	2.7	2.7	3.3
F. Grid operations and protocols	2.5	2.5	2.7
G. Data governance	3.0	3.0	3.5
H. Resource allocation methodology	1.0	1.2	2.5
I. Emergency planning and preparedness	4.0	4.0	4.0
J. Stakeholder cooperation and community engagement	3.2	3.6	3.8

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

Figure 5.b: Self-reported projected growth in maturity by category, SDG&E.

Below, the WSD evaluates SDG&E'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[71] 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,[72] 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

Compared to its peers, SDG&E continues to lead the three large electrical utilities in assessing risk. It has the most sophisticated situational awareness and understanding of its risk exposure.

Progress over the past year

The WSD finds that SDG&E has made the following progress:

- Since last year's WMP submission, SDG&E has developed the Wildfire Next Generation System (WiNGS), a decision support tool using the same Multi-Attribute Value Function (MAVF) adopted in the Safety Model and Assessment Proceeding (S-MAP), which provides a more granular

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[71] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 43-44 (accessed May 27, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M352/K460/352460864.pdf.

[72] 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.

application to better target initiatives and provides a consistent view of wildfire risk. WiNGS is expected to include a granularity between asset and system levels that should account for PSPS risk and help calculate how much mitigation measures might reduce that risk.

- In 2019, SDG&E showed a strong ability in risk assessment and mapping. Progress is articulated through a list of activities which includes incorporating climate change considerations, enhanced weather modeling and forecasting, fuel moisture modeling, and ongoing developments to the utility's fire behavior modeling capability. SDG&E uses a third-party vendor's consequence modeling tool (one also used by PG&E and SCE). The use of this consequence modeling tool allows broad data sharing among the large electrical utilities.

- SDG&E is establishing an innovation lab to foster an environment that supports collaborative research in climate-focused utility industry issues. SDG&E is committed to improving its integration of climate change considerations through the work of its Fire Science Climate Adaptation Department.
  - o The WSD is expecting to learn more about the work of this department and how it provides input to the utility's risk assessment process in future WMP updates.

- SDG&E expects to spend $1.539 million in 2021 and $1.881 million in 2022 on its risk assessment and mapping initiatives.[73] It states that an RSE score is not calculated for this initiative category because it is not reducing a particular risk but providing better information to make risk-informed decisions.[74]

- SDG&E shows a commitment to improving risk assessment tools by allocating this initiative $4.6 million in 2021.

- SDG&E provides a high-level annual timeline for risk assessment showing significant plans for the next ten years. Although it is on the higher end of maturity for incorporating climate change modeling in its risk assessment, SDG&E does not predict improvement in maturity in this area from 2020 through 2023. If its plans unfold as expected, SDG&E appears to have the ability for improvement on the maturity matrix in this capability.

- SDG&E indicates it is progressing in its climate change adaptation capacity. The utility expects to complete a vulnerability assessment in 18-24 months. The findings of the vulnerability assessment will first be incorporated in 2023.

- In 2020, a light detection and ranging (LiDAR) pilot project was conducted to validate field observations. In 2020, the utility integrated the use of a mobile phone application which relies

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[73] SDG&E 2021 WMP Update, Table 3-2, p. 8.

[74] "This initiative is foundational to supporting wildfire mitigation efforts. Quantifying an RSE for such a mitigation would be difficult and not beneficial because it cannot be directly tied to reducing a risk driver and measuring the effectiveness of that reduction. It supports various initiatives by providing better information to make risk-informed mitigation decisions" (SDG&E 2021 WMP Update, Table 7-1, p. 160).

on LiDAR data and PLS-CADD[75] modeling for field verification of tree clearances, line movement, and position relative to electric infrastructure.

- The utility began collaborating with the other large electrical utilities, the Utility Arborist Association, industry professionals, and academia to create a "Utility Arborist Trainee" curriculum for community colleges throughout California. Once the course is completed the trainee may become a Line Clearance Qualified worker. This should help alleviate the problem of a lack of qualified line clearance workers.

- SDG&E showed a 100% increase in total ignitions caused by distribution equipment failure between 2019 and 2020 (from 8 to 16 ignitions).[76] The majority of this increase was due to lightning arrestor damage or failure, which increased from 0 incidents in 2019 to 5 in 2020.[77] This aligns with the abnormal increase in lightning incidents in 2020. Excluding ignitions due to lightning arrestors, SDG&E also saw a spike in ignitions caused by connection device damage or failure, which increased from 1 in 2019 to 3 in 2020.[78] SDG&E's hotline clamp and connector replacement initiatives, due for completion in 2024, should address these sorts of failures.[79]

SDG&E has room for improvement regarding the following points:

- SDG&E identifies vehicle contact and balloon contact respectively as the first and second highest ranked risks for ignitions throughout its system.[80] SDG&E states that these two drivers are outside of SDG&E's control, as "both are customer driven contacts and are not a result of equipment failure, a lack of maintenance, high winds, animal contacts or vegetation contacts."[81] Due to third-party causation, both vehicle and balloon contact typically happen in urban areas, which are less prone to catastrophic fire spread. It is unclear how SDG&E weighs vehicle contact and balloon contact when determining areas of risk and prioritization of mitigations, instead only stating that SDG&E's goal is to lower the overall ignition potential across all risk driver categories. SDG&E should focus less on such ignition sources given that they may be independent of SDG&E management decisions, such as how it maintains and operates its system, and are also independent of weather conditions (they are not more likely to occur

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[75] PLS-CADD stands for "Power Line Systems - Computer Aided Design and Drafting," an overhead power line design program.

[76] In SDG&E's 2021 WMP Update, Table 7.2 shows an increase in "Equipment / facility failure – Distribution" ignitions from 8 in 2019 to 16 in 2020 (table lines 2.a to 2.o). See Figure 5.1.c below for details on ignition numbers.

[77] SDG&E 2021 WMP Update, Table 7.2. See Figure 5.1.d below for details on ignition numbers.

[78] Ibid.

[79] SDG&E 2021 WMP Update, p. 206.

[80] SDG&E's written response to question on phone call held Feb. 10, 2021, received February 16, 2021, and written response to follow-up questions received March 4, 2021, as part of WSD-SDGE-02 (for more information see Appendix 10.2).

[81] Ibid.

during higher risk conditions). While the WSD agrees SDG&E should be mitigating all ignition risk drivers, it is important that SDG&E properly prioritizes ignition sources over which it has more influence and ignitions likely to have high consequences in its risk calculations.

- 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 the WSD understands that each territory presents differing environments and ignition risks, modeling across the utilities should be more consistent.
- SDG&E predicts an increase in ignitions due to conductor failure from the 2020 number in both 2021 and 2022,[82] but does not provide an explanation for this increase despite increased mitigation efforts specific to conductor failure, such as covered conductor and undergrounding.

Key Areas for Improvement and Remedies

The WSD finds that SDG&E must focus on the following areas as significant to reducing utility-related wildfire risk:

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[82] SDG&E 2021 WMP Update, Table 7.2, which shows 0 ignitions due to conductor failure from 2018-2020, predicts 1.134 in 2021 and 1.1126 in 2022.

Utility-#	Issue title	Issue description	Remedies required
SDGE-1	Inadequate transparency in accounting for ignition sources in risk modelling and mitigation selection	SDG&E identifies vehicle contact and balloon contact as the first and second highest ignition risks but does not explain how that affects its risk models or mitigation selection.	SDG&E must fully explain: 1. How third-party ignition sources feed into SDG&E's risk models; 2. How ignition sources impact SDG&E's mitigation selection process, including: a. How SDG&E prioritizes ignition sources; b. If SDG&E treats third-party ignition sources that are not under SDG&E's direct control differently than other ignition sources, and if so, how; c. How SDG&E targets its mitigations efforts to reduce ignitions that are more likely to result in catastrophic wildfire conditions.
SDGE-2	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. The WSD 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[83] must collaborate through a working group facilitated by Energy Safety[84] to develop a more consistent statewide approach to wildfire risk modeling. After the WSD 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.

Additional Issues and Remedies

In addition to the key areas listed above, the WSD finds the following additional issue and associated remedy. The WSD expects SDG&E to take action to address these issues and report on progress made over the year in its 2022 WMP Update.

- ISSUE: SDG&E predicts an increase in conductor failure but fails to provide an explanation for such increase despite ongoing mitigation efforts.
  - o REMEDY: Provide an explanation for SDG&E's prediction for increased ignitions due to conductor damage or failure and describe how covered conductor and undergrounding initiatives may affect ignitions due to conductor damage or failure.

Figures
Below are charts used as part of the WSD's review of SDG&E's risk assessment and mapping section:

Maturity score (0 – 4) actual and projected
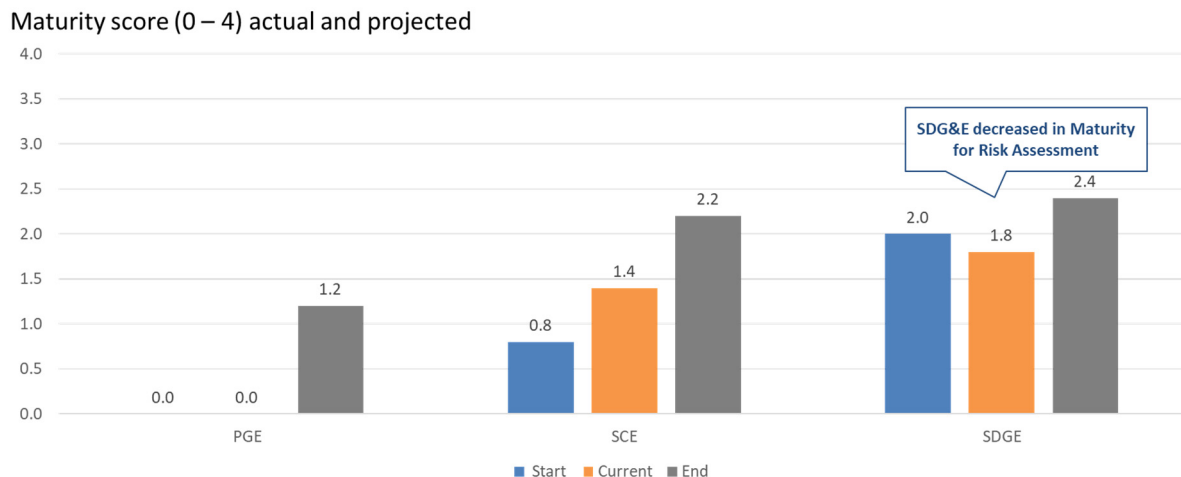
Source: 2021 Maturity Model survey data for PG&E, SCE and SDG&E

Figure 5.1.a: Risk assessment & mapping maturity score progress.

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[83] Here "utilities" refers to SDG&E and Pacific Gas and Electric Company (PG&E), Southern California Edison Company (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.

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

Actual and projected spend ($K) per HFTD overhead circuit mile
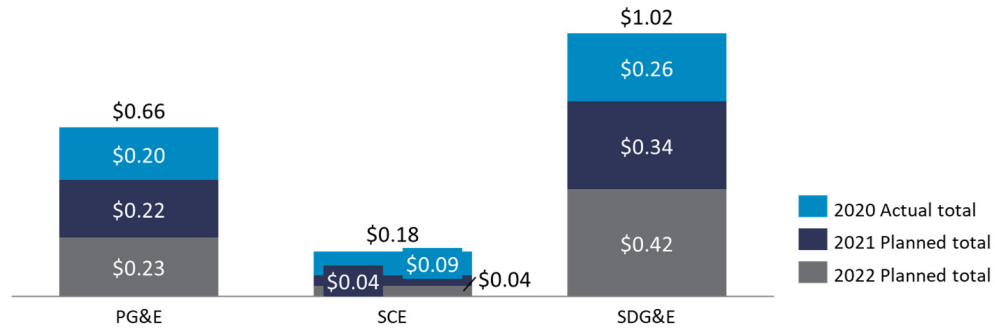
	PG&E ($K)	SCE ($K)	SDG&E ($K)
2020 Actual Total	$0.20	$0.09	$0.26
2021 Planned Total	$0.22	$0.04	$0.34
2022 Planned Total	$0.23	$0.04	$0.42

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

Figure 5.1.b: Risk assessment & mapping spend per HFTD overhead circuit mile, large utilities 2020-2022.
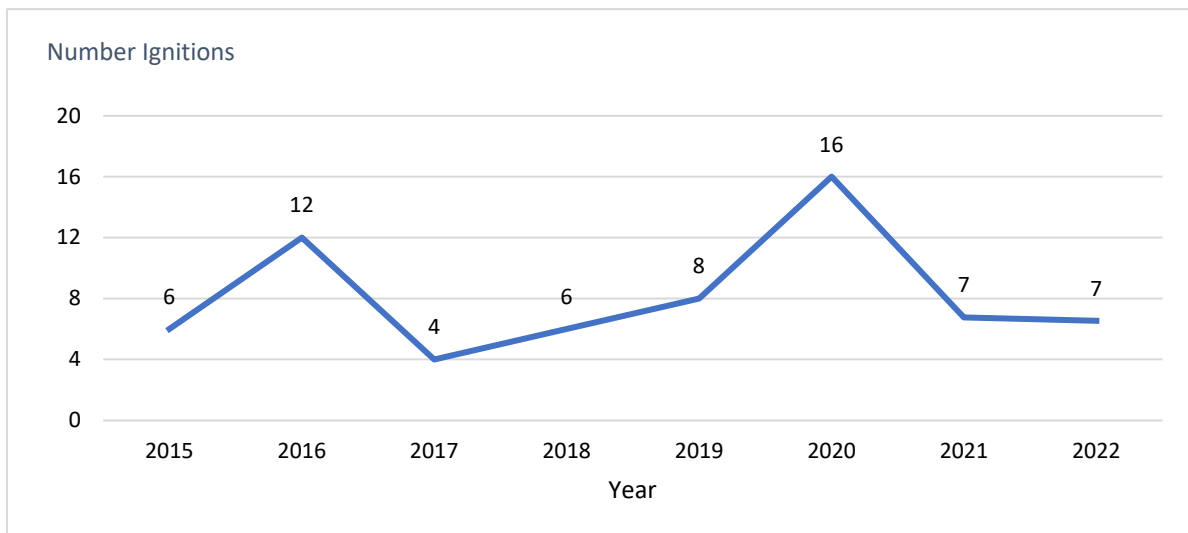
Data source: SDG&E's 2021 WMP Update Table 7.2

Figure 5.1.c: Number of annual ignitions for equipment/facility failure, distribution.

Number of ignitions

	2015	2016	2017	2018	2019	2020	2021	2022
– – Conductor damage or failure — Distribution	2	3	1	0	0	0	1	1
—— Fuse damage or failure - Distribution	0	0	1	0	1	1	0	0
······ Lightning arrestor damage or failure- Distribution	0	2	1	0	0	5	1	1
– – Connection device damage or failure - Distribution	2	3	0	0	1	3	1	1
—— Other - Distribution	0	1	1	3	3	2	2	2
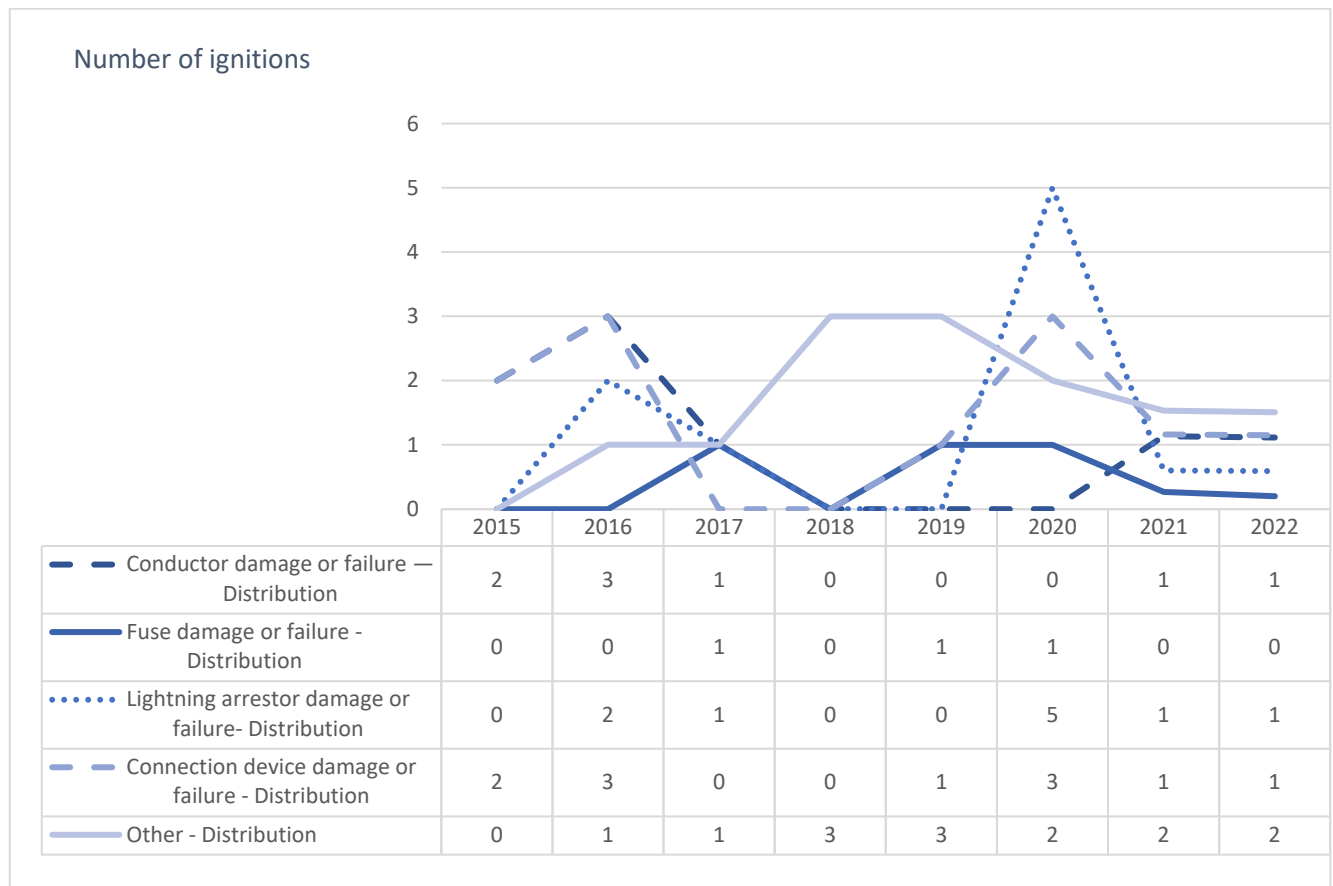
Data source: SDG&E's 2021 WMP Update Table 7.2

Figure 5.1.d. Annual Ignitions from equipment failure by equipment type
(not exhaustive of all equipment types).

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

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[85] 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.

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

The WSD finds that SDG&E has made progress in its situational awareness and forecasting and finds this section of SDG&E's 2021 WMP Update to be sufficient. SDG&E continues to improve its situational tools with measures such as adding and updating weather stations, enhancing its fire potential index (FPI), integrating new models in the Santa Ana Wildfire Threat Index (SAWTI), generating weather data using high performance computing clusters, and deploying additional wireless fault indicators in its service territory.

Progress over the past year

The WSD finds that SDG&E has made the following progress:

*   Advanced weather monitoring and weather stations: in 2020, SDG&E added 30 weather stations to its weather station network and rebuilt 50 additional weather stations near the end of their life cycle, which met and exceeded the utility's targets. This increased the utility's total weather station network to 220. These additional weather stations are anticipated to reduce the utility's PSPS impacts by giving it the ability to further sectionalize its circuits. SDG&E has shown advancements in its weather stations' capabilities, as they have been upgraded in 2020 to report wind speeds every 30 seconds, rather than every 10 minutes like the weather stations of SDG&E's peer utilities. This upgrade should allow SDGE to be more granular in assessing elevated fire weather events in its service territory and validate near real-time conditions. This should also refine the inputs that go into SDGE's Fire Potential Index (FPI), which informs operational decision-making to mitigate wildfire potential within its service territory, such as recloser settings, PSPS decision-making, restrictions on type of work to be performed, and the

use of contract firefighting resources. Additionally, SDG&E has integrated the use of an artificial intelligence forecasting system for 59 circuit segments, which is anticipated to improve the utility's forecasting capability.

- High performance computing infrastructure: SDG&E uses three high performance computing clusters to generate high quality weather data that is incorporated into its FPI, SAWTI, and WRMM-Ops. SDG&E shares its forecast products with the National Weather Service, U.S. Forest Service, and other partners.
- Fire Potential Index (FPI): SDG&E has continued to improve its FPI since 2012. At a high level its FPI is comprised of three components: fuel moistures, weather, and a "green-up" component that rates the state of native grasses.[86] In 2020, SDG&E upgraded its FPI through analysis with a high performing computer cluster to enhance the weather component and incorporating artificial intelligence into the live fuel moisture component. SDG&E's meteorology team conducts daily verification of its FPI. SDG&E makes all its FPI information available through partnerships with academia and researchers through an API web portal.
- Santa Ana Wildfire Threat Index (SAWTI): SDG&E was a collaborative partner with the U.S. Forest Service and UCLA in the original development of the SAWTI, which calculates the potential for a large wildfire (likelihood of an ignition reaching or exceeding 250 acres) based on characteristics of the wind (dryness, strength, duration, extent, etc.) along with the dryness of the vegetation and the greenness of the grass. In 2020, SDG&E integrated a new artificial intelligence-based live fuel moisture model to improve the model output. SDG&E continues to work in collaboration with other agencies and academia to integrate the latest fire science into the SAWTI.
- Wireless Fault Indicators: SDG&E uses fault indicators to aid in electric service reliability, as they can concentrate focus to a much smaller portion of the electric circuit when trying to pinpoint a system failure/fault. This, in turn, can also lead to a faster response to a location if an ignition exists. In 2020, SDG&E installed 502 wireless fault indicators, with plans to install an additional 500 wireless fault indicators in 2021, finishing all the utility's HFTD areas in both Tier 2 and Tier 3.

SDG&E has room for improvement regarding the following point:

- Pilot programs: SDG&E provides limited discussion within this section of the status of various pilot programs related to situational awareness. Section 7.3.3.9 of SDG&E's 2021 WMP Update briefly mentions pilots of Early Fault Detection (EFD) and Wire Down Detection (WDD),[87] but SDG&E provides neither the status nor scope of these pilots. Additionally, SDG&E fails to provide any analysis of how successful pilots could reduce PSPS in the future.

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[86] SDG&E's FPI "green-up" component is used to rate the state of native grasses, which is determined using satellite data for various locations. It rates how wet or cured the native grass is. "Green-up" refers to the beginning of a new cycle of plant growth. "Green-up" may be signaled at different dates for different fuel models.

Issues and Remedies

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

- ISSUE: SDG&E has projected that it will be able to detect ignitions with satellite monitoring by 2022 in its Maturity Survey response. However, there is no information within the utility's 2021 WMP Update regarding how it anticipates achieving this goal.
    - REMEDY: SDG&E must provide more information about its plan to detect ignitions using satellite monitoring by 2022.
- ISSUE: SDG&E provides limited discussion regarding the status of situational awareness pilot programs within its 2021 WMP Update, with no ties to potential PSPS reduction.
    - REMEDY: SDG&E must provide further analysis around how situational awareness pilot programs could help reduce PSPS impacts.

Figures
Below are charts used as part of the WSD's review of SDG&E's situational awareness and forecasting section:

Maturity score (0 – 4) actual and projected
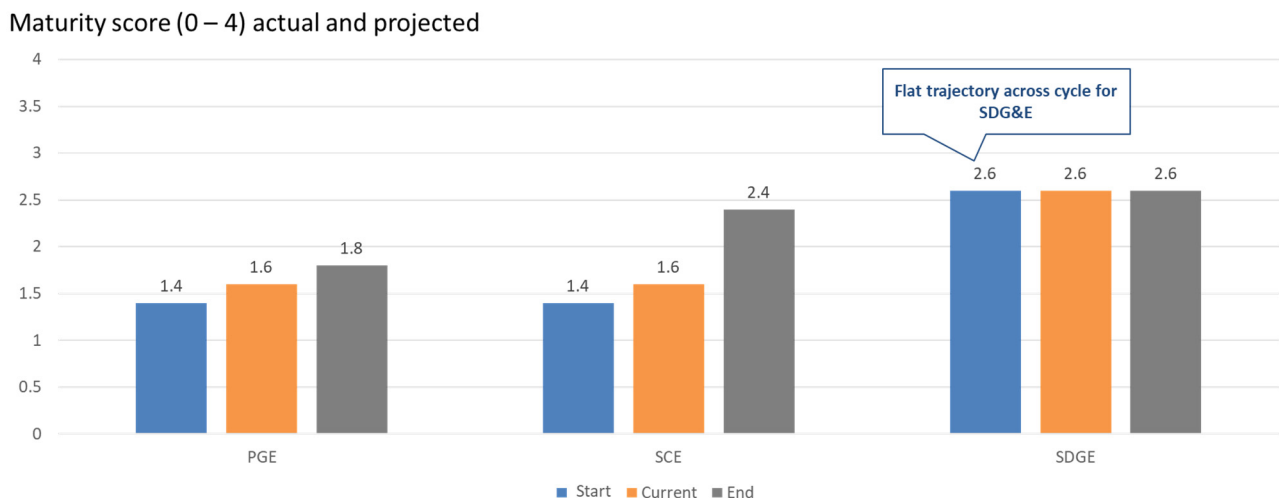
Source: 2021 Maturity Model survey data for PG&E, SCE and SDG&E

Figure 5.2.a: Situational awareness and forecasting maturity score progress.

Actual and projected spend ($K) per HFTD overhead circuit mile
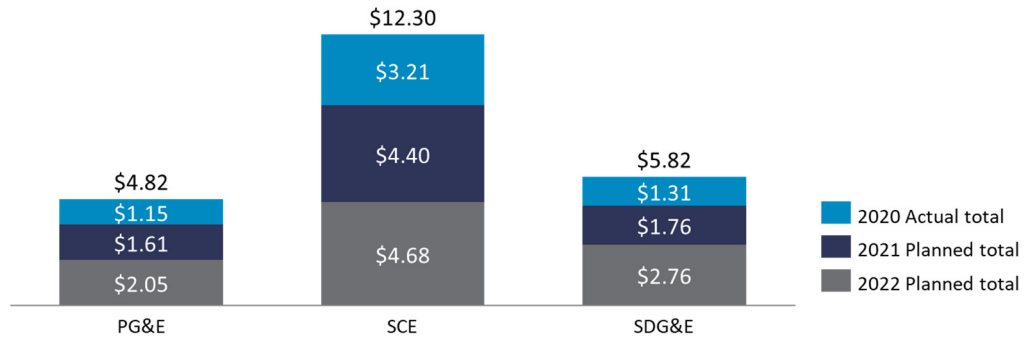
	PG&E ($K)	SCE ($K)	SDG&E ($K)
2020 Actual Total	$1.15	$3.21	$1.31
2021 Planned Total	$1.61	$4.40	$1.76
2022 Planned Total	$2.05	$4.68	$2.76

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

Figure 5.2.b: Situational awareness and 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[88] 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.

Overview

The WSD finds that SDG&E has made progress in its grid design and system hardening and finds this section of SDG&E's 2021 WMP Update to be generally sufficient. SDG&E has made significant progress

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[88] 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.

in its planning for future system hardening and in its ongoing replacement programs. However, SDG&E does not demonstrate that its undergrounding and covered conductor mitigation efforts are focused on efficiently reducing wildfire risk and PSPS events. It also does not demonstrate that its undergrounding plans are an efficient use of resources.

Progress over the past year

The WSD finds that SDG&E has made the following progress:

- SDG&E plans to replace all non-SCADA capacitors to SCADA switchable capacitors within the HFTD by the end of 2022. SDG&E replaced 30 in 2020 and plans to replace an additional 32 in 2021 and 40 in 2022.
- In 2020, SDG&E replaced around 600 poles through its Pole Replacement and Reinforcement Program and has only had one electrical fault and no ignitions in the past five years due to deteriorated wooden poles. SDG&E does not have a set estimate for pole replacements in the future, as numbers are based on inspection findings, but SDG&E plans on continuing its same program.
- SDG&E has made progress conducting ongoing replacement of expulsion fuses, having started the program in 2019. Since then, SDG&E has replaced about 51% of its expulsion fuses within the HFTD and plans to replace an additional 36% in 2021.[89] SDG&E calculates that the program has a 100% effectiveness based on replacement with CAL FIRE approved fuses, therefore eliminating the expulsion of hot materials during operation that could lead to ignition.
- SDG&E installed 303 remote sectionalizing devises, exceeding its initial 2020 target due to an accelerated rate for replacing switches. SDG&E plans on installing 10 PSPS sectionalizing devices in 2021 in order to reduce PSPS impacts by lowering the number of customers that could be affected in a PSPS event.
- In 2020, SDG&E completed the temporary configuration of four microgrid locations, with the plan to make more permanent solutions by the 2022 WMP Update. SDG&E has identified two additional locations for 2021 and is evaluating its service territory using WiNGS to determine other locations that would benefit from microgrids.
- SDG&E has targeted hotline clamp replacements due to the observed high risk of ignition. Between 2019 and 2020, SDG&E has replaced about 32% of its hotline clamps within the HFTD and intends to replace an additional 19% in 2021.[90] SDG&E is planning to replace all hotline clamps within the HFTD by 2024.

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[89] SDG&E replaced 2,490 fuses in 2019, 3,179 in 2020, 4,000 in 2021 (out of 11,000 total fuses) per SDG&E 2021 WMP Update, p. 197.

[90] SDG&E replaced 694 clamps in 2019, 2,061 in 2020, 1,650 in 2021 (out of 8,500 total fuses) per SDG&E 2021 WMP Update, p. 197.

- SDG&E is installing an LTE network in order to increase the reliability of its communication network, which is important for SDG&E's remote capabilities. SDG&E plans to install 10 base stations in 2021.
- In 2020, SDG&E finalized its plans for lightning arrestor installation, with a target of 924 installations in 2021.

SDG&E has room for improvement in the following areas:

- SDG&E is moving to a circuit segment-based approach for its grid hardening efforts due to PSPS operations, instead of its previous asset-based approach. With that, SDG&E is moving away from "traditional hardening" efforts, which include using bare conductor replacements, toward primarily using covered conductor for overhead hardening projects, starting such hardening projects in 2022 based on the WiNGS model output. Since both the WRRM (which initially identified and prioritized hardening efforts) and the WiNGS model identified the same circuits to target for grid hardening efforts, SDG&E may be reconductoring sections that were previously hardened, therefore nullifying the benefit and increasing costs in areas that have already undergone risk reduction efforts. In response to data requests sent by WSD, SDG&E confirmed that no circuits that recently underwent traditional hardening overlap with circuits scheduled for covered conductor installation, but the utility must ensure that such an overlap does not occur in the future.[91]
- SDG&E states that although covered conductor is estimated to be 70% effective (without giving a full explanation of how this is determined), covered conductor is only estimated to reduce 0.21 ignitions annually.[92] SDG&E also considers a single year for 1.9 miles of covered conductor a "successful pilot,"[93] even though the sample size is small and a year of data does not seem sufficient to demonstrate the effectiveness of covered conductor. SDG&E's current covered conductor program is the smallest of the three large utilities. SDG&E's current effectiveness and RSE estimates for covered conductor differ vastly from those of PG&E and SCE. Program scope and reasoning between the large electrical utilities lack consistency, potentially leading to expedited covered conductor deployment without first demonstrating a full understanding of its long-term effectiveness. SDG&E's current covered conductor pilot efforts are limited in scope, and the utility provides little data about the pilot's size and duration.
- The RSE value SDG&E provides for distribution pole replacement is not calculated separately from asset inspections. This issue should be addressed as part of the new condition SDGE-11 (RSE values vary across utilities).

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[91] See data request WSD-SDGE-03 (Question 2e) in Appendix 10.2.

[92] SDG&E 2021 WMP Update, p. 192.

[93] SDG&E 2021 WMP Update, p. 193.

Key Areas for Improvement and Remedies

The WSD finds that SDG&E must focus on the following areas as significant to reducing utility-related wildfire risk:

Utility-#	Issue title	Issue description	Remedies required
SDGE-3	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[94] 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[95] 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.

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[94] 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.

[95] Here "utilities" refers to SDG&E and Pacific Gas and Electric Company (PG&E), Southern California Edison Company (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.

Additional Issues and Remedies

In addition to the key area listed above, the WSD finds the following additional issues and associated remedies. The WSD expects SDG&E to take action to address these issues and report on progress made over the year in its 2022 WMP Update.

- ISSUE: According to the utility's WMP Update, it appears SDG&E could potentially install covered conductor on circuit segments that were recently hardened as part of traditional bare wire hardening efforts, resulting in duplication of hardening efforts.
  - REMEDY: SDG&E must demonstrate how it is reducing double-hardening efforts, for example, by showing how it is de-prioritizing or excluding already-hardened circuit segments from future covered conductor replacement projects.
- ISSUE: SDG&E relies heavily on undergrounding as its mitigation measure of choice. Of SDG&E's mitigations, undergrounding is one of the costliest and most resource-intensive at its outset. According to SDG&E, undergrounding also provides the highest risk reduction of mitigation alternatives in its portfolio. Relying heavily on undergrounding means that, with a fixed budget, SDG&E's hardening efforts reach fewer residents and locations than if it were to deploy other mitigation initiatives. However, the risk reduction for those locations would likely be higher and ongoing maintenance costs lower than if SDG&E chose other mitigation alternatives. As discussed in key area for improvement SDGE-8, SDG&E does not provide sufficient detail as to its decision-making process for initiative selection to demonstrate that it is using its resources wisely to obtain the greatest feasible reduction in wildfire risk. This issue is discussed further in Section 5.8 as part of key area for improvement SDGE-9 (Inadequate transparency associated with SDG&E's decision-making process).
  - REMEDY: SDG&E must demonstrate that its undergrounding projects are a reasonable and wise use of resources to achieve risk reduction compared to other mitigation alternatives. This remedy is incorporated into the remedies for SDGE-8.

Figures
Below are charts used as part of the WSD's review of SDG&E's grid design and system hardening section:

Maturity score (0 – 4) actual and projected

Projected growth despite flat trajectory between start and current score

	Start	Current	End
PGE	0.8	0.8	2.0
SCE	1.4	2.4	2.8
SDGE	2.4	2.6	3.2
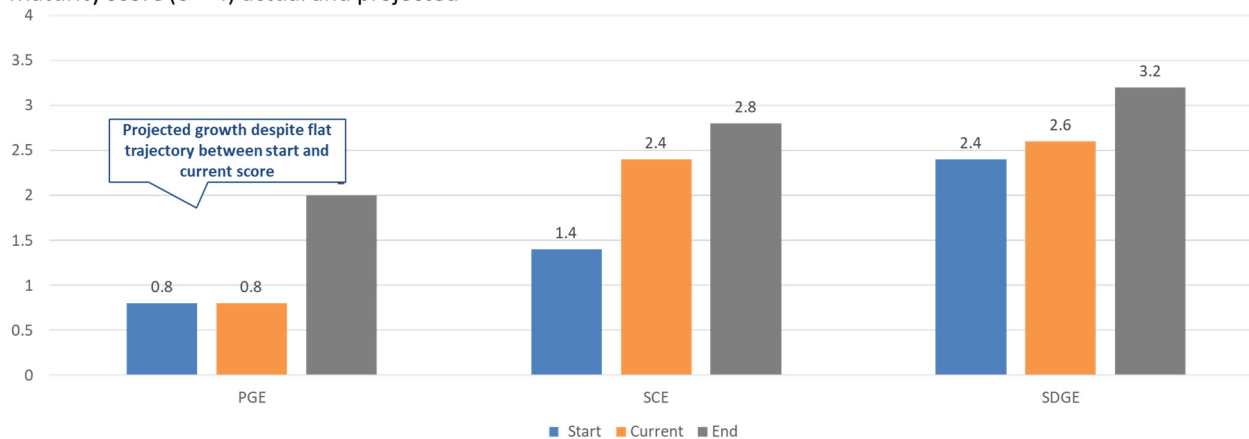
Source: 2021 Maturity Model survey data for PG&E, SCE and SDG&E

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

Actual and projected spend ($K) per HFTD overhead circuit mile
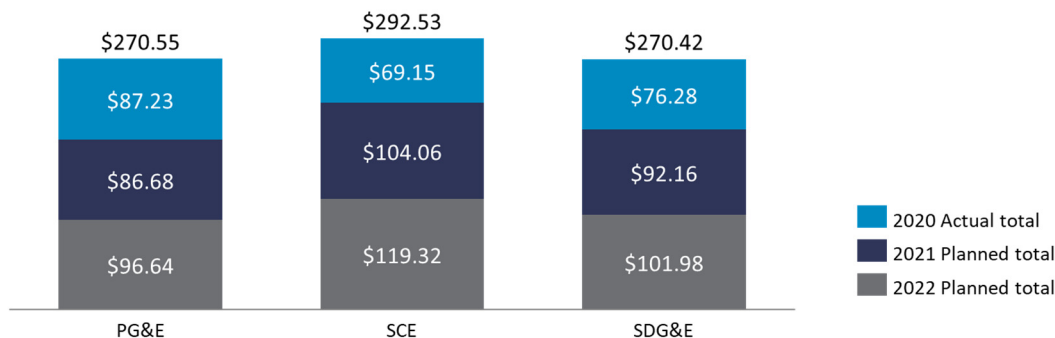
	PG&E ($K)	SCE ($K)	SDG&E ($K)
2020 Actual Total	$87.23	$69.15	$76.28
2021 Planned Total	$86.68	$104.06	$92.16
2022 Planned Total	$96.64	$119.32	$101.98

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

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

Risk events per circuit mile
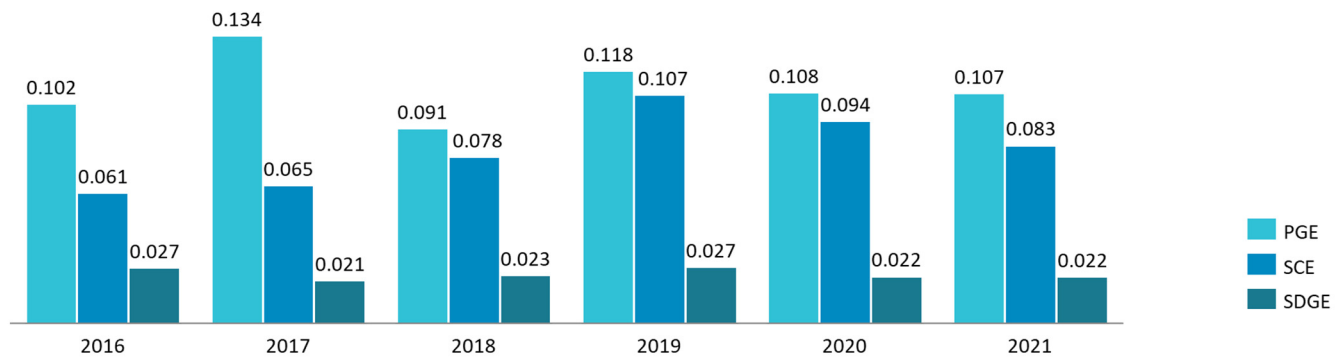
Source: Table 7.1 of utility 2021 WMPs

Figure 5.3.c: Utility risk events due to equipment/facility failure per circuit mile,
large utilities 2016-2021.

5.4. Asset Management and Inspections

Introduction

The asset management and inspections section of the WMP Guidelines[96] 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

The WSD finds that SDG&E has made progress in its asset management and inspections and finds this section of SDG&E's 2021 WMP Update to be generally sufficient. However, SDG&E does not present comprehensive inspection reporting data in its 2021 WMP Update. It also does not anticipate

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[96] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 44-45 (accessed May 27, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M352/K460/352460864.pdf.

improvements in its maturity score for inspection scheduling or auditing contractor activity. SDG&E must provide explanations or remedies for these issues.

Progress over the past year

The WSD finds that SDG&E has made the following progress:

- SDG&E currently completes detailed inspections on all transmission structures on a three-year cycle and plans on continuing in this practice in subsequent years.
- As part of its pilot initiative using infrared to inspect distribution electric lines and equipment, SDG&E completed infrared inspections on approximately 13,000 distribution structures within Tier 3 of the HFTD in 2020. The results of the pilot showed an estimated less than one ignition reduced in the Tier 3 HFTD.
- In 2020, SDG&E completed infrared patrols on all energized transmission lines in its system. In addition, infrared patrols along with visual patrols were completed prior to multiple Red Flag Warning events to verify the integrity of the system in the impacted areas prior to the event.
- SDG&E meets or exceeds the requirements of the inspections mandated by Public Resource Code Sections 4292 and 4293 as well as General Order (GO) 95, GO 128, GO 165, and GO 174, including patrolling its system once a year in urban areas and in HFTD Tier 2 and Tier 3. Additionally, SDG&E uses drones and infrared to augment its current patrols and inspections.
- SDG&E states that it is developing new programs such as the distribution and transmission drone programs to supplement its existing inspection programs.

SDG&E has room for improvement regarding the following point:

- Excluding the use of drones or infrared inspections, the utility's increased inspections are not more rigorous inspections, but simply more frequent routine inspections. SDG&E should focus on enhancing inspections to directly address equipment and assets that pose wildfire risk, either from historical data or as identified with SDG&E's models, as it is unclear that more frequent inspections would adequately address and prioritize these risks.

Issues and Remedies

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

- ISSUE: SDG&E does not present comprehensive inspection reporting data in its 2021 WMP Update. The WSD's guidelines for completing Table 1 in the WMP Update direct that inspection findings be split into three categories: patrol inspections, detailed inspections, and other

inspections. SDG&E interprets each of these inspection types to refer to a discrete inspections program, rather than using "other" as a catch-all category for all inspections beyond patrol and detailed inspections. SDG&E's interpretation provides an incomplete overview of its inspection programs. For example, SDG&E does not include inspection findings for programs such as drone inspections, despite finding far more issues through drone inspections than through the inspections it includes in Table 1. SDG&E's method of reporting inspection types therefore does not provide a complete picture of the scope and efficacy of SDG&E's inspection programs.

  o REMEDY: In future non-spatial data filings, SDG&E must provide a comprehensive accounting of the number of inspections performed in the HFTD across all inspection programs, and the number of findings by type from each inspection. Each inspection program which is performed in the HFTD must be represented as a line item, with associated findings.

- ISSUE: In its 2021 Maturity Survey,[97] SDG&E does not report any anticipated change in its maturity score for scheduling patrol, detailed, or other inspections from the current year to the start of 2023. SDG&E reports that it does not plan to use its risk model outputs or continuous monitoring by sensors to guide future inspection scheduling prior to 2023. SDG&E explains that some of its inspection programs are driven by compliance standards,[98] and that its ultimate goal is to use its risk model to optimize inspection/assessment strategies and prioritization.[99] However, SDG&E does not provide a timeline for achieving this goal. SDG&E also does not explain if it evaluated the possible benefits of incorporating continuous monitoring by sensors into its inspection scheduling practices and procedures, or if it plans to incorporate continuous monitoring by sensors into inspection scheduling sometime in the future.

  o REMEDY: SDG&E must evaluate which types of inspections could be improved by including risk model outputs and/or continuous monitoring by sensors in scheduling practices and procedures.

  o REMEDY: SDG&E must update its plans for inspection scheduling practices for any inspections that it finds can benefit from incorporating these additional elements into scheduling practices and procedures.

  o REMEDY: SDG&E must specify the timeline for incorporating these additional elements into scheduling practices and procedures.

- ISSUE: In its 2021 Maturity Survey,[100] SDG&E does not report any anticipated change in its maturity score for auditing contractor activity from the current year to the start of 2023. SDG&E does not explain whether it assessed the potential benefits of auditing contractor activity by

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[97] SDG&E 2021 Maturity Survey Sections D.II.b through D.II.h, and section D.III.b.

[98] SDG&E's March 17, 2021, response to data request WSD-SDGE-03 (Question 4) states: "…some initiatives are driven by compliance standards and thus cannot be treated the same way as other initiatives currently being evaluated in the model. An example of such an initiative is the CMP inspections program which is based on GO 165 requirements." (See Appendix 10.2 for full text.)

[99] SDG&E 2021 WMP Update, p. A-15.

[100] SDG&E Maturity Survey, Section D.V.a.

using technologies capable of auditing a sample of the contractor's work through automated or semi-automated techniques (e.g., LIDAR scans). In its asset inspections timeline, SDG&E reports that by the end of 2024 it plans to use LiDAR to support post-construction survey and pre-construction design conditions.[101] However, it does not specifically discuss this related to auditing contractors' work.

- o REMEDY: SDG&E must evaluate whether it could improve its auditing of contractor activity by including technologies capable of auditing a sample of the contractors' work through automated or semi-automated techniques prior to 2023.
- o SDG&E must update its plans for auditing contractor activity if it finds it can benefit from incorporating these additional techniques.

Figures

Below are charts used as part of the WSD's review of SDG&E's asset management and inspections section:
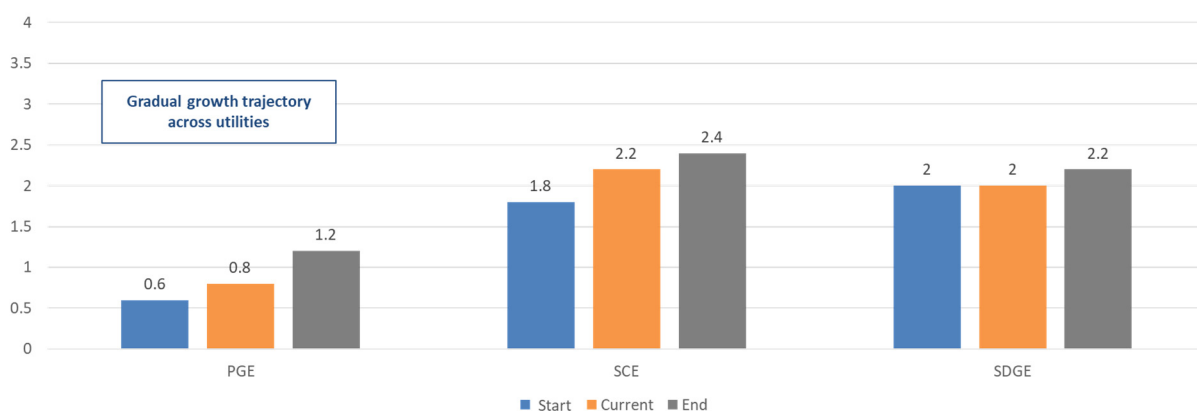
Maturity score (0 – 4) actual and projected

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

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[101] SDG&E 2021 WMP Update, p. A-12.

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

	PG&E ($K)	SCE ($K)	SDG&E ($K)
2020 Actual Total	$9.71	$25.98	$18.10
2021 Planned Total	$8.64	$28.49	$15.17
2022 Planned Total	$7.81	$19.92	$13.03
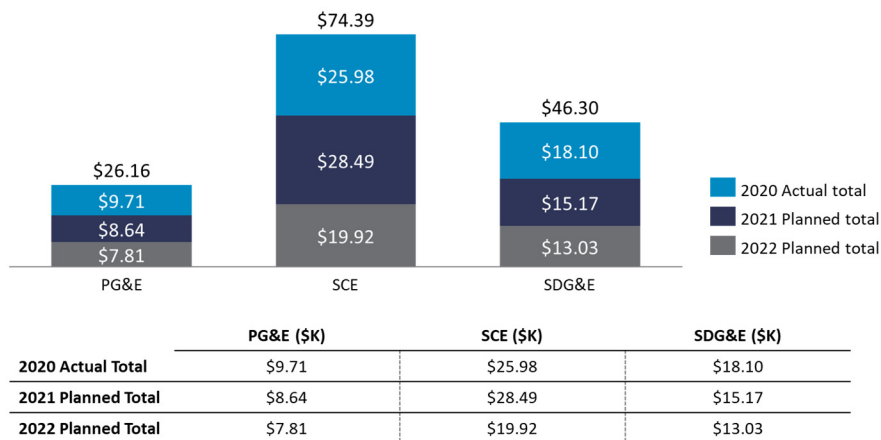
Source: Table 12 of utility 2021 WMPs and subsequent data requests

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

5.5. Vegetation Management and Inspections

Introduction

This section of the WMP Guidelines[102] 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

SDG&E "maintains an electronic tree database that tracks the inspection, trimming, and auditing activity of its nearly 457,000 inventory trees."[103] SDG&E uses this highly granular data to efficiently mitigate risk from vegetation contact. Figure 5.5.a shows that SDG&E anticipates a vegetation management program maturity of 3.3 by the end of 2022, higher than SCE and PG&E. Notwithstanding, SDG&E must continue to improve its vegetation management program, pioneering new techniques that allow for more granular data collection and targeting of high-risk areas and species.

Progress over the past year

The WSD finds that SDG&E has made the following progress:
- SDG&E increased the scale of its tree trimming program in 2020, pruning 221,500 trees and removing 12,985 trees. On average, SDG&E prunes approximately 175,000 trees each year and removes approximately 8,500.
- In 2021-2022, SDG&E "plans to explore"[104] using its new wildfire risk model, WiNGS, to inform vegetation management (VM) prioritization. Inclusion of VM into WiNGS would allow SDG&E to refine prioritization and implementation of VM projects.
- SDG&E is implementing a new system, EPOCH, to manage vegetation inspections in early 2021. The system is expected to improve computer performance and mapping software and allow inspectors to include documents and photos in entries.

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[102] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, p. 45 (accessed May 27, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M352/K460/352460864.pdf.

[103] SDG&E 2021 WMP Update, p. 263.

[104] SDG&E 2021 WMP Update, 270.

- SDG&E performed a pilot using LiDAR in 2020; the results showed discrepancies between LiDAR data and field observations. SDG&E expects to use LiDAR "to some degree"[105] in its HFTD in 2021. As research in LiDAR improves, SDG&E will incorporate LiDAR as an integrated component in VM.
- SDG&E requires contractor personnel to be certified as an International Society of Arboriculture (ISA) Certified Arborist and/or ISA-certified utility specialist. In 2020, SDG&E, along with various industry partners, worked with California community colleges to create a course in which students become "Line Clearance Qualified."[106]
- SDG&E highlighted "sustainable"[107] vegetation management activities, including delivering woody debris to a green waste facility.
- SDG&E expanded pole clearance to 50 feet on select poles and applied fire retardant to some poles within HFTD Tier 3 of its service territory. This practice goes beyond the minimum regulatory requirement of a 10-foot pole clearance.[108] Additional clearance can reduce the risk of ignitions from pole mounted equipment/hardware and provides defensible space for poles, regardless of the fire's origin.

SDG&E has room for improvement regarding the following point:
- For expanded pole clearance (see above), selection for these poles lacks risk-based criteria beyond HFTD designation.

Key Areas for Improvement and Remedies

The WSD finds that SDG&E must focus on the following areas as significant to reducing utility-related wildfire risk:

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[105] SDG&E 2021 WMP Update, p. 275.

[106] SDG&E 2021 WMP Update, p. 282.

[107] SDG&E 2021 WMP Update, p. 274.

[108] Public Resources Code Section 4292.

Utility-#	Issue title	Issue description	Remedies required
SDGE-4	Inadequate joint plan to study the effectiveness of enhanced clearances	RCP Action-SDGE-4 (Class A)[109] required SDG&E, PG&E, and SCE to "submit a joint, unified plan" to begin a study of the effectiveness of extended vegetation clearances.[110] SDG&E submitted its plan to study the effectiveness of extended vegetation clearance as part of its 2021 WMP Update.[111] SDG&E, PG&E, and SCE 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 Addressing 2020 Wildfire Mitigation Plan Quarterly Report Insufficiencies." The WSD acknowledges the complexity of this issue; any study performed assessing the effectiveness of enhanced clearances will take years of data collection and rigorous analysis.	SDG&E, PG&E, and SCE will participate in a multi-year vegetation clearance study. The WSD 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[112] 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, SDG&E 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 below outlines the feature classes which the WSD believes will be most relevant to the study. Additional requirements related to this study may be included in the Action Statements for PG&E and SCE's 2021 WMP Updates. The WSD will also be updating the GIS

			Reporting Standards in 2021, which may include additional data attributes for vegetation-related risk events.
SDGE-5	Incomplete identification of vegetation species and record keeping	SDG&E reports that it targets trees based on characteristics of the species. SDG&E targets "eucalyptus, palm, oak, pine, and sycamore."[113] However, these are not tree species, but tree genera. SDG&E needs to ensure proper identification of trees to the species level.	SDG&E 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. 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

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[109] A note about the numbered conditions referenced in this document: "RCP Action-SDGE-[#]" here refers to one of the actions required by the WSD in its evaluation of SDG&E's Remedial Compliance Plan of 2020, issued Dec. 30, 2020. The WSD issued four such orders (RCP Action-SDGE-1 through RCP Action-SDGE-4). There are two other related sets of references in this document: "SDGE-[#]" refers to one of the actions required by the WSD in its evaluation of SDG&E's 2020 WMP issued June 11, 2020 (SDGE-1 through SDGE-16). "QR Action-SDGE-[#]" refers to one of the actions required by the WSD in its evaluation of SDGE's first quarterly report issued Jan. 8, 2021 (QR Action-SDGE-1 through Action-SDGE-49). 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).

[110] Wildfire Safety Division Evaluation of San Diego Gas and Electric's Remedial Compliance Plan, December 30, 2020, p. 9.

[111] SDG&E 2021 WMP Update, p. 70.

[112] 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.

[113] SDG&E 2021 WMP Update, p. 263.

			simply "Quercus," use "Quercus sp." If referencing multiple species within a genus use "spp." (e.g., Quercus spp.). 4. Require its VM and outage reporting personnel to use the unknown "sp." designation only as a last resort by including this requirement in its standard operating protocols and training programs for such work. 5. Notwithstanding (4), identify the genus and species of a tree that has caused an outage[114] or ignition[115] in the Quarterly Data Reports (in these cases, an unknown "sp." designation is not acceptable). 6. Teach tree species identification skills in its VM personnel training programs, both in initial and continuing education. 7. Where possible SDG&E must remedy any unknown species designations made in the field by the time SDG&E submits each Quarterly Data Report, by, for example, allowing inspectors to upload pictures of tree-identifying characteristics and having a qualified individual identify the species using the inspector's report.

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[114] 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.
[115] WSD GIS Data Reporting Standard Version 2, Ignition (Feature Class), Section 3.4.3.

| SDGE-6 | Limited evidence of quantitative analysis to identify "at-risk" species | Mussey Grade Road Alliance (MGRA) analyzed SDG&E's vegetation-caused outage data to determine the outages per 1000 trees per year by tree genus.[116] MGRA found that palm, cypress, and century plant constituted the highest risk with >1 outage per 1000 trees per year. These data are inconsistent with SDG&E's statement that it "targeted species identified as a higher risk due to growth potential, failure characteristics and relative outage frequency. These species include eucalyptus, sycamore, oak, pine, and palm."[117] Only palms are common to both lists.

Additionally, QR Action-SDGE-46 (Class B), from Jan. 8, 2021,[118] required SDG&E to "define quantitative threshold values […] for the criteria used to define a tree as 'at-risk.'"[119] SDG&E responded to this requirement stating, "evaluation is based more on qualitative factors rather than quantitative."[120] SDG&E must use quantitative data to inform its "at-risk" species targeting; qualitative evaluation of a tree's risk does not | In Section 7.3.5.15 (or equivalent) of its 2022 WMP Update, SDG&E must:
1. Describe its methodologies for determining what species it considers "at-risk."
2. Explain in complete detail why discrepancies exist between the genera with the highest number of outages per 1000 trees per year and SDG&E's "targeted species identified as a higher risk due to growth potential, failure characteristics and relative outage frequency."[121]
3. Define quantitative threshold values (whether a standard value, a range of values, or an example of a typical value) for the criteria used to define a tree as "at-risk." |

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[116] Mussey Grade Road Alliance's Comments on 2021 Wildfire Mitigation Plans of PG&E, SCE, and SDG&E March 29, 2021, p. 40.

[117] SDG&E 2021 WMP Update, p. 278.

[118] See previous footnote on references to RCP Action-SDGE-[#], QR Action-SDGE-[#], and SDGE-[#].

[119] Wildfire Safety Division Evaluation of San Diego Gas & Electric Company's First Quarterly Report, January 8, 2021, p. 32.

[120] SDG&E "Supplemental Filing Addressing 2020 Wildfire Mitigation Plan Quarterly Report Insufficiencies," February 26, 2021, p. 75.

[121] SDG&E 2021 WMP Update, p. 278.

		adequately address the quantitative risk of ignition or outage.	
SDGE-7	Need for quantified VM compliance targets	In Table 12, SDG&E only defines quantitative targets for four of 20 VM initiatives. The WSD is statutorily required to audit SDG&E when a "substantial portion" of SDG&E's VM work is complete;[122] without quantifiable targets in the WMP and subsequent reporting on those targets in the Quarterly Data Report (QDR) and Quarterly Initiative Update (QIU), the WSD cannot fully realize its statutory obligations.	SDG&E must define quantitative targets for all VM initiatives in Table 12. If quantitative targets are not applicable to an initiative, SDG&E must fully justify this, define goals within that initiative, and include a timeline in which it expects to achieve those goals.

Additional Issues and Remedies

In addition to the key areas listed above, the WSD finds the following issues and associated remedies. The WSD expects SDG&E to take action to address these issues and report on progress made over the year in its 2022 WMP Update.

- ISSUE: In Section 7.3.5.1, SDG&E provides customer outreach highlights and describes how it modified customer communication practices during 2020 in response to the COVID-19 pandemic. However, SDG&E does not describe its standard customer outreach processes for 2021 and beyond. Additionally, SDG&E failed to provide an adequate response to QR Action-SDGE-33 (Class B) which required additional information regarding SDG&E's customer outreach.
  - REMEDY: SDG&E must provide a visual description (e.g., flow chart, decision tree, etc.) of customer and partner agency notifications for routine, enhanced, and emergency tree-trimming and tree-removal. Include the methods of notification(s) (e.g., phone calls, emails, door hangers, etc.) and sequences of notification(s).
  - REMEDY: SDG&E must discuss how SDG&E ensures stakeholder input is relayed to and implemented by vegetation crews, both internal and contracted.
- ISSUE: SDG&E states that "[a] minimum random sampling of 15% of completed work is audited to determine compliance with scoping requirements."[123] SDG&E does not explain how it

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

[123] SDG&E 2021 WMP Update, p. 123.

determined that 15% is an adequate audit sample size, nor does it report the actual percent of worked completed that was audited in 2020.

- o REMEDY: SDG&E must explain in full and complete detail how utility determined 15% is an adequate evaluation of completed vegetation management work.
- o REMEDY: SDG&E must report the number of audits completed and the percentage of work completed that was audited in 2020 and 2021 by inspection type (e.g., routine and enhanced).

- ISSUE: SDG&E does not provide enough detail regarding emergency VM. It does not provide enough concrete specifics on their vegetation management during red flag warnings or other urgent conditions.
  - o REMEDY: SDG&E must demonstrate progress for this initiative (Section 7.3.5.4), referencing risk-informed analysis, spend, and future improvements.

- ISSUE: QR Action-SDGE-31 (Class B) required SDG&E to "provide a comparison between the number of General Order (GO) 95, Rule 18 Priority Level 1, 2, and 3 findings found in each vegetation management inspection, including pre-inspection, enhanced inspections, and any audits conducted by SDG&E or its third-party evaluator, for each of SDG&E's Vegetation Management Areas (VMA)."[124] SDG&E responded to this requirement by simply stating that "Priority levels 1, 2, and 3 findings are not part of vegetation management inspections."[125] This response ignores the intent of the requirement which was to evaluate the effectiveness of SDG&E's VM inspection programs by providing the "number and quality of findings per inspection," an intent which was originally expressed as part of the 2020 WMP condition SDGE-7 (Class B).[126]
  - o REMEDY: SDG&E must provide a comparison between the number and quality (e.g., Priority 1, Priority 2, etc.) of vegetation inspection findings. SDG&E must break down this comparison by inspection type (i.e., pre-inspections, enhanced inspections, and any audits conducted by SDG&E or its third-party evaluator) and by SDG&E's Vegetation Management Areas (VMA). The following are suggested column headers:

VMA	Inspection Type	Quality of Finding (Priority 1, Priority 2, etc. or similar)	# of Findings

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[124] Wildfire Safety Division Evaluation of San Diego Gas & Electric Company's First Quarterly Report, January 8, 2021, p. 26.

[125] SDG&E "Supplemental Filing Addressing 2020 Wildfire Mitigation Plan Quarterly Report Insufficiencies," February 26, 2021, p. 67.

[126] Resolution WSD-007, Appendix A.

Enhanced clearances study preliminary data standards

In accordance with key area for improvement SDGE-4 (Inadequate joint plan to study the effectiveness of enhanced clearances), Table 2 below presents the data groups from the WSD GIS Data Reporting Standard for California Electrical Corporations – Version Two (V2) that are vital to the forthcoming study that will evaluate the effectiveness of enhanced clearances.

Table 2: Focused data collection for enhanced clearances effectiveness study.

Data Group	Source	Section
Wire Down Event (Feature Class)	WSD GIS Data Reporting Standard V2	3.4.2
Ignition (Feature Class)	WSD GIS Data Reporting Standard V2	3.4.3
Transmission Unplanned Outage (Feature Class)	WSD GIS Data Reporting Standard V2	3.4.4
Transmission Vegetation Caused Unplanned Outage (Feature Class)	WSD GIS Data Reporting Standard V2	3.4.5
Distribution Unplanned Outage (Feature Class)	WSD GIS Data Reporting Standard V2	3.4.6
Distribution Vegetation Caused Unplanned Outage (Feature Class)	WSD GIS Data Reporting Standard V2	3.4.7
Vegetation Inspections	WSD GIS Data Reporting Standard V2	3.5.1
Vegetation Management Projects	WSD GIS Data Reporting Standard V2	3.5.2

Figures
Below are charts used as part of the WSD's review of SDG&E's vegetation management and inspections section:
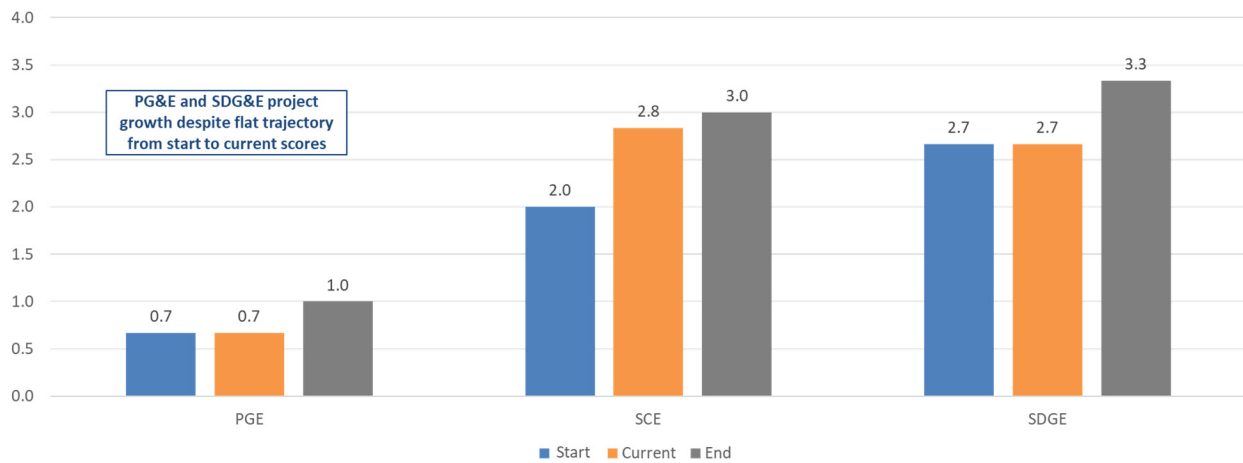
Maturity score (0 – 4) actual and projected

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

Actual and projected spend ($K) per HFTD overhead circuit mile
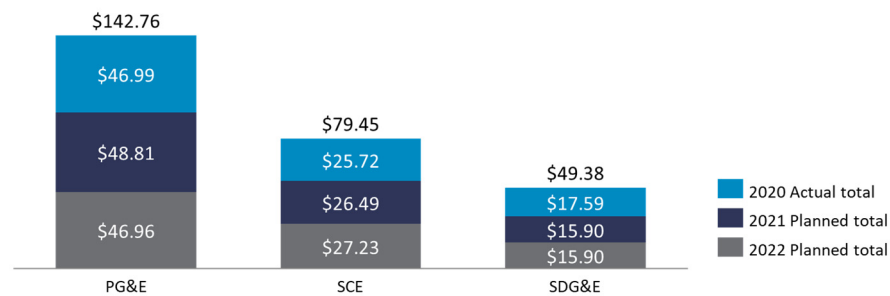
	PG&E ($K)	SCE ($K)	SDG&E ($K)
2020 Actual Total	$46.99	$25.72	$17.59
2021 Planned Total	$48.81	$26.49	$15.90
2022 Planned Total	$46.96	$27.23	$15.90

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

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

Risk events per circuit mile
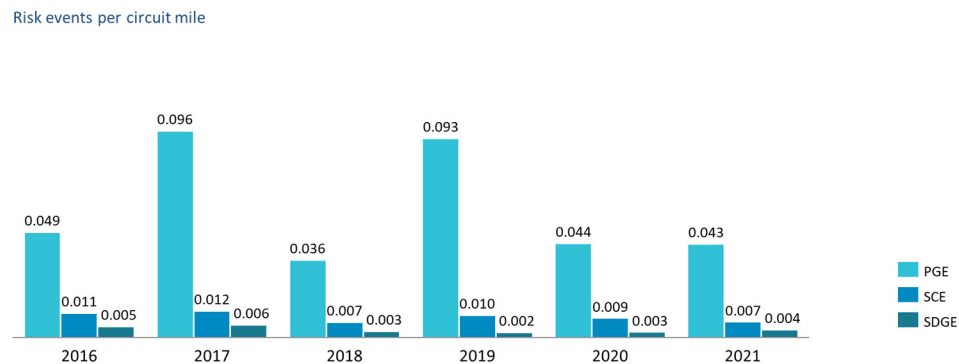
Source: Table 7.1 of utility 2021 WMPs

Figure 5.5.c: Utility risk events due to vegetation contact per circuit mile,
large utilities 2016-2021.

5.6.   Grid Operations and Operating Protocols, Including PSPS

Introduction

The grid operations and operating protocols section of the WMP Guidelines[127] requires discussion of ways the utility operates its system to reduce wildfire risk. For example, disabling the reclosing function of automatic reclosers[128] 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

The WSD finds that SDG&E has made progress in grid operations and protocols and finds this section of SDG&E's 2021 WMP Update to be generally sufficient. However, SDG&E experienced several incidents in which non-communicative SCADA switches caused customers to be de-energized without notice. SDG&E must take proactive steps to ensure that this does not continue to be an issue in the future.

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[127] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, p. 45 (accessed May 27, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M352/K460/352460864.pdf.
[128] 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.

Progress over the past year

In general, SDG&E does not have many new operational changes, instead continuing business-as-usual for programs implemented in previous years, most of which were successful in 2020, including the following:

- Disabling reclosers in HFTDs at all times since 2018.
- Implementing more sensitive and fast protection settings, as operated in 2020 and continued to be used in 2021.
- Modifying operating procedures during high fire risk days.
- Using Contract Fire Resources (CFRs) when utility activity being performed during higher fire risk days, as initialized in 2020 and continued in 2021.
- Using software to lower PSPS recovery times, initialized in 2020, with further possible options being explored such as helicopters and drones.
- Using its Aviation Program to help suppress ignitions and fires, even if not utility-caused.

SDG&E has room for improvement regarding the following points:

- Ensuring that existing SCADA switches remain fully functional.
- Ensuring that newly installed SCADA switches are fully functional.

Key Areas for Improvement and Remedies

The WSD finds that SDG&E must focus on the following areas as significant to reducing utility-related wildfire risk:

Utility-#	Issue title	Issue description	Remedies required
SDGE-8	Non-communicative remote-controlled switches	SDG&E experienced several incidents in which non-communicative SCADA switches caused customers to be de-energized without notice.[129],[130] SDG&E indicates that it has no plans to alter its existing practices to ensure this issue does not continue in the future.[131] In its WMP Update, SDG&E does not discuss any plans to take system-level proactive steps to validate that existing SCADA switches remain fully functional[132] or to ensure that newly installed SCADA switches are fully functional.	SDG&E must: 1. Discuss its plans to take system-level proactive steps to validate that existing SCADA switches remain fully functional. 2. Discuss its plans to ensure that newly installed SCADA switches are fully functional. 3. Describe the steps it is taking to increase and improve inspections and testing of SCADA switches.

Figures

Below are charts used as part of the WSD's review of SDG&E's grid operations and operating protocols section:

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[129] For more information on PSPS-related notification requirements, see D.19-05-042, Decision Adopting De-Energization (Public Safety Power Shut-Off) Guidelines (Phase 1 Guidelines), issued June 4, 2019, p. 86-87 (accessed May 19, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M296/K598/296598822.PDF.

[130] SDG&E November 26-December 9, 2020, post-event report, p. 38, and SDG&E December 23-24, 2020, post event report, p. 12: each state "These missed notifications may be attributed to non-communicative SCADA switches, which require SDG&E's Electric Distribution Operations to de-energize upstream of the intended sectionalizing device."

[131] SDG&E's March 4, 2021, Response to Cal Advocates Data Request SDGE-2021WMP-05, Question 11.

[132] Here "functional" means communicative, operational, and remotely operable.

Maturity score (0 – 4) actual and projected
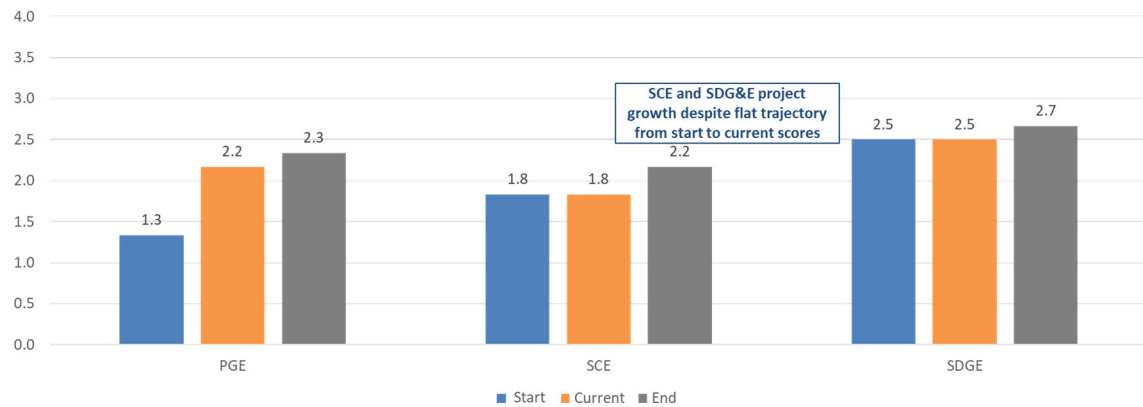
Source: 2021 Maturity Model survey data for PG&E, SCE and SDG&E

*Figure 5.6.a: Grid operations & protocols maturity score progress.*

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

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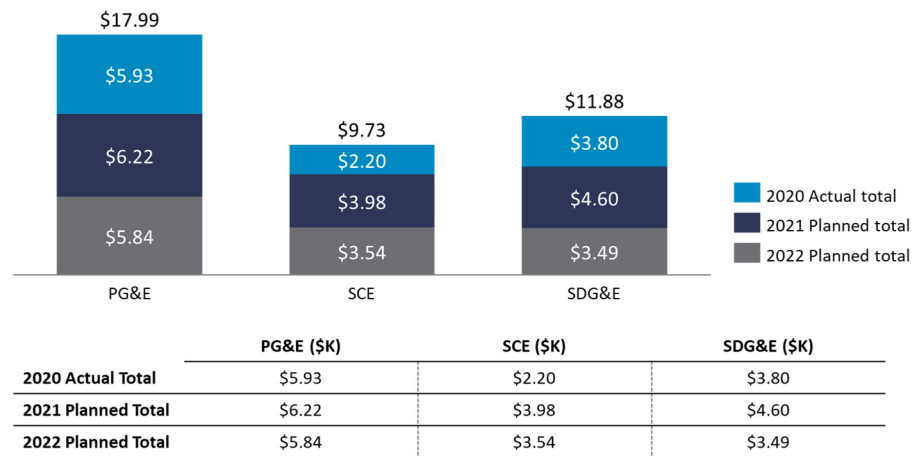
Source: Table 12 of utility 2021 WMPs and subsequent data requests

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

5.7.   Data Governance

Introduction

The data governance section of the WMP Guidelines[133] requires information on the utility's initiatives to create a centralized wildfire-related data repository, conduct collaborative 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, WSD has received two more QDRs 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.[134] The analysis of spatial data in this section focuses on specific areas where the data SDG&E submitted with its 2021 WMP Update do not meet the GIS Standard.

Overview

Over the last year, SDG&E made progress in developing its data governance program and took important steps to create a central data repository. SDG&E provided some information on its collaborative research, but that information was not sufficiently detailed. SDG&E met expectations regarding its documentation and disclosure of wildfire-related data and algorithms but did not demonstrate much improvement in its quarterly spatial data compared to previous submissions.

Progress over the past year

The WSD finds that SDG&E has made the following progress:
- SDG&E began developing a data governance framework and an automated central data repository.
- It established a partnership with the Scripps Institute of Oceanography to develop a tool to predict the onset of precipitation.

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[133] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, p. 45 (accessed May 27, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M352/K460/352460864.pdf.
[134] The most recent version of the standard, version 2, can be downloaded here: ftp://ftp.cpuc.ca.gov/WMP/2021/GIS/WSD%20GIS%20Data%20Reporting%20Standard.pdf.

- It is collaborating with San Jose State University to develop remote sensing tools to assess live fuel moisture.
- It has indicated that it made improvements to two of its models:
  - WRRM-Ops.
  - Fire Potential Index.
- It further developed the new Wildfire Next Generation System (WiNGS) model to evaluate wildfire and PSPS impacts at a fine scale.
- It developed a new Circuit Risk Index model of asset risk.

SDG&E has room for improvement regarding the following points:

- Spatial data in the Quarterly Data Report (QDR) submission: SDG&E 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 standard. 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:
  - Locations which are obviously in error: some of the data submitted in the Grid Hardening Line feature class were substantially outside the continental U.S. and at an implausible scale.
  - Missing age data: SDG&E did not provide age data for any of its conductor or point assets. This includes even estimated age ranges, which are requested if more specific age data are not available.
  - Missing primary keys: primary key/unique ID fields are fundamental, and data submitted without a unique primary key are not useable. The listed feature classes or tables had some records with missing primary keys or values in primary key fields that are not unique to each record:
    - PSPS Event Line (these IDs also are not in the specified format)
    - Distribution Outage
    - Vegetation Management Inspection Log
    - Asset Inspection Log
    - Grid Hardening Log
  - Missing foreign keys or foreign keys not in foreign table: foreign key fields are fundamental, and data submitted without foreign keys which are present in the corresponding table are of severely limited value. A primary key is a value in a data table that is unique for each entry (record) and does not change. Primary keys allow data in tables to be linked or referenced from other tables and tracked through time and multiple submissions. The listed feature classes or tables had some records with missing foreign keys, or listed foreign keys which were not present in the corresponding table:
    - PSPS Customer Meter Point
    - Vegetation Management Inspection Point
    - Asset Inspection Point

- ▪ Grid Hardening Point
  - o 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, SDG&E submitted data which 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., "Infrared/Thermal" instead of "Remote sensing – Infrared/Thermal"). In other cases, rather than determining which value in the domain specified by the WSD was appropriate, records were given the "Other – See comment" value, when the comment field obviously included information which could have been used to correctly populate the original field (see Distribution Outages, "Basic Cause" for example). Finally, some fields contain values which are not in the specified domain and bear no obvious relationship to the information requested– see "Conductor Type" in "Primary Distribution Line" for example.
  - o Missing data: SDG&E has not provided any explanation why they are only able to provide the location of 556 customer meters.
  - o Use of coded values: as an example, "Tree Species" in "Distribution VM Outage" contains coded information which is not explained in metadata and is therefore not useful to the WSD.
- Non-spatial data: SDG&E's non-spatial data (Tables 1-12) were received in accordance with WSD templates, however minor inconsistencies were present between the columns in the WSD template versus SDG&E's submission. Moving forward, if new columns are required for any table, those columns must be placed at the end (on the right side) of the submitted table. Table rows may be added as needed to list all of SDG&E's wildfire mitigation activities, provided each has a unique Activity Code number that fits within the WSD category scheme.

Issues and Remedies

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

- ISSUE: SDG&E's spatial QDR data submissions have shortcomings that must be remedied. SDG&E lacks internal quality control on its data submissions. Data are sometimes incomplete or unexplained.
  - o REMEDY: SDG&E must submit correct locations, complete age data, primary keys, and foreign keys.
  - o REMEDY: SDG&E must use domain values.

- o REMEDY: SDG&E must avoid using coded values other than those in domains specified by WSD or explain codes in metadata.
- o REMEDY: SDG&E must provide the locations 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 used as part of the WSD's review of SDG&E's data governance section:

Maturity score (0 – 4) actual and projected
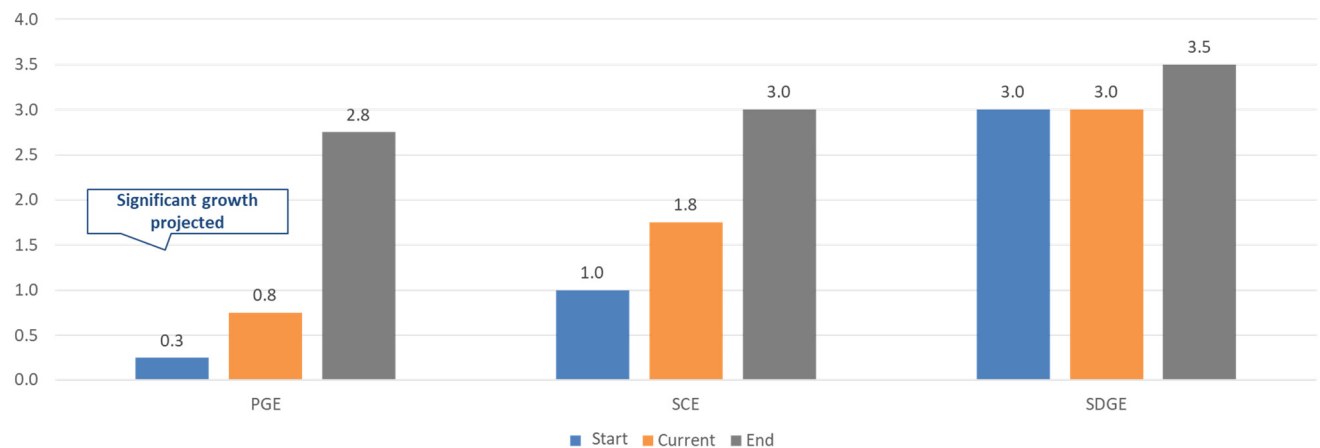
Source: 2021 Maturity Model survey data for PG&E, SCE and SDG&E

Figure 5.7.a: Data governance maturity score progress.

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

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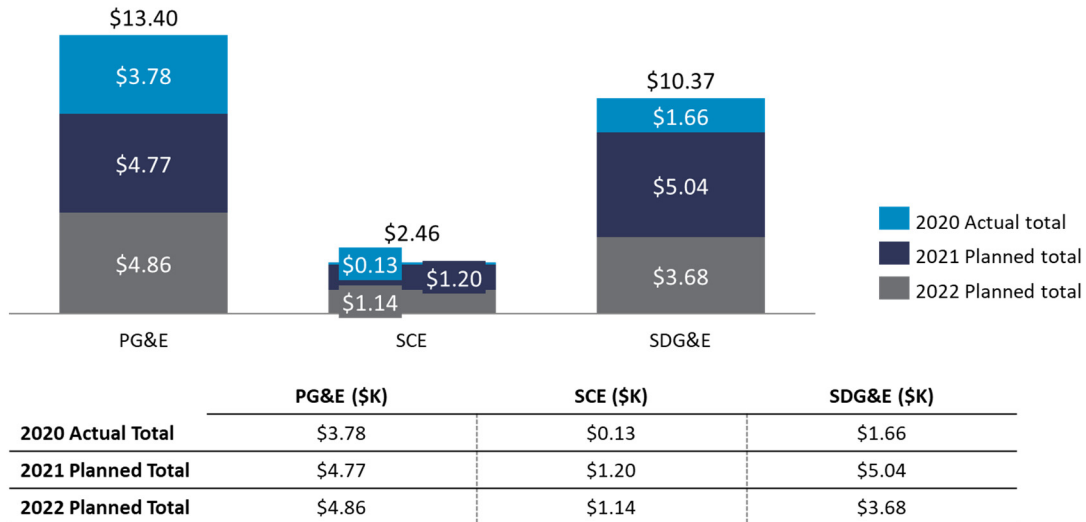
Source: Table 12 of utility 2021 WMPs and subsequent data requests

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[135] 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

Since the 2020 WMP, SDG&E has made great strides in its development of the WiNGS model to enable more granular risk assessment and alternatives analysis of system hardening mitigations. Specifically, SDG&E can more accurately quantify the cost-effectiveness of select mitigations by including PSPS impact into the RSE estimates. Even with the recent developments, it is still unclear how RSE estimates are weighted against other decision-making factors. SDG&E must bring clarity to its decision-making process by providing a thorough overview of the initiative selection procedure from beginning to

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[135] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, p. 45 (accessed May 27, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M352/K460/352460864.pdf.

implementation. The WSD and the WSAB recommend utilities to provide a visual diagram to bring clarity to its decision-making process.[136]

Progress over the past year

The WSD finds that SDG&E has made the following progress:
- SDG&E developed the WiNGS model to assess wildfire and PSPS risk at a greater granularity. This development improved SDG&E's risk assessment granularity from asset-level to segment-level.
- SDG&E updated risk quantification framework (RQF) to include "Acres Burned" as a new sub-attribute under Health and Safety and "Stakeholder Impact" as a new attribute.[137] The RQF's attributes now include Health and Safety, Reliability, Financial Impact, and Stakeholder Impact. The incorporations improve the accuracy of quantitative risk assessments.
- SDG&E can now include PSPS impacts into its total wildfire risk score (TWRS). The inclusion allows the utility to better understand the risks of initiatives and inform decision-making.

SDG&E has room for improvement regarding the following point:
- SDG&E's RSE estimate for covered conductor installation is vastly different from the other large electrical utilities, as shown in Table 3 below.

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

Utility	2020-2022 Circuit Miles[138]	2020-2022 Cost Per Mile[139]	Risk Reduction Efficiency[140]	RSE[141]
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

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[136] WSAB's "Recommendations on the 2021 Wildfire Mitigation Plan Updates for Large Investor-Owned Utilities," Recommendation 3 of Section 2, p. 5.

[137] SDG&E 2021 WMP Update, p. 25.

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

[139] Ibid.

[140] 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.

[141] 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).

a comparatively similar risk reduction efficiency, as seen in Table 3. More evaluation is needed to determine why SDG&E's RSE value differs from the other two large electrical utilities. RSE values for covered conductor should be more standardized in future WMP updates. More discussion relating to this topic is found in SDGE-11 (RSE values vary across utilities).

Key Areas for Improvement and Remedies

The WSD finds that SDG&E must focus on the following areas as significant to reducing utility-related wildfire risk:

Utility-#	Issue title	Issue description	Remedies required
SDGE-9	Inadequate transparency associated with SDG&E's decision-making process	SDG&E does not clearly explain its initiative selection process or how RSE estimates impact the process. For example, SDG&E does not quantitively justify the selection of undergrounding compared to other mitigation alternatives. RSE estimates provide a pathway to assess the relative risk reduction benefit provided by mitigation initiatives and inform the initiative selection process.	SDG&E must: 1. Elaborate on its decision-making process to include a thorough overview of the initiative selection procedure. The overview must show the rankings of the decision-making factors (e.g., planning and execution lead times, resource constraints, etc.) and pinpoint where quantifiable risk reductions and RSE estimates are considered in the initiative selection process. The WSD recommends a cascading, dynamic "if-then" style flowchart to effectively demonstrate this prioritization process and satisfy this requirement. 2. Using the newly developed decision-making overview, demonstrate that its undergrounding projects are a reasonable and effective use of resources to achieve risk reduction compared to other mitigation alternatives.
SDGE-10	Insufficient detail regarding prioritization of HFTD in undergrounding and covered conductor mitigation efforts	Stakeholders expressed concerns that SDG&E is not adequately targeting its covered conductor installations and undergrounding efforts to high-risk circuits in its HFTD areas.[142] It can be more cost-effective to bundle projects in proximate geographic areas[143] than to perform mitigation initiatives strictly from the highest priority circuit segment to the lowest. Additionally, a strictly hierarchical strategy	SDG&E must fully demonstrate that its undergrounding and covered conductor mitigation efforts are focused on efficiently reducing wildfire risk and PSPS events, including a description of how SDG&E determines the order in which circuit segments are scheduled for mitigation.

			would not necessarily reduce PSPS events in the near term. It is therefore *theoretically* possible that a strategy of directing 100% of mitigation efforts to HFTD areas may not be the most reasonable and cost-effective strategy for reducing wildfire risk and PSPS events. However, SDG&E does not provide sufficient detail regarding its strategy for determining workflow to fully assess if SDG&E is sufficiently prioritizing HFTD areas in its undergrounding and covered conductor mitigation efforts. SDG&E must effectively demonstrate that its mitigation efforts are focused on efficiently reducing wildfire risk and PSPS events.	
SDGE-11	RSE values vary across utilities		The WSD 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,[144] SDGE's	The utilities[147] must collaborate through a working group facilitated by Energy Safety[148] to develop a more standardized approach to the inputs and assumptions used for RSE calculations. After the WSD completes its evaluation of the 2021 WMP Updates, it will provide

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[142] Cal Advocates' Comments on SCE and SDG&E WMP Updates, pp. 16-17.

[143] SDG&E states: "…projects are bundled based on geographic proximity for construction efficiency and to reduce outages when required" (2021 WMP Update, p. 206).

[144] 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.

[147] Here "utilities" refers to SDG&E, Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE).

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

		RSE was 76.73,[145] and SCE's RSE was 4,192.[146] 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.

Additional Issues and Remedies

In addition to the key areas listed above, the WSD finds the following issues and associated remedies. The WSD expects SDG&E to take action to address these issues and report on progress made over the year in its 2022 WMP Update.

- ISSUE: In a data request response, SDG&E states that the utility plans on using WiNGS to evaluate vegetation management and microgrid initiatives as a proof of concept.[149]
    - o REMEDY: SDG&E must provide a detailed report on the evaluation effort and compare the accuracy of the model across evaluated initiatives.
- ISSUE: In its 2021 WMP Update, SDG&E continues to use noncommittal and equivocating language to describe future improvements to resource allocation methodology. Per Guidance-8, part iii of Section 5.4.4 of Resolution WSD-002, "Continued use of equivocating language may result in denial of future WMPs."[150] Regarding SDG&E's capital allocation planning process, SDG&E states, "As with the Company's risk evaluation processes, the capital planning process is

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

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

[149] Data request response WSD-SDGE-03 Question 4 (see Appendix 10.2).

[150] "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).

continuing to evolve as the Company endeavors to achieve the goal of determining *more quantitatively* the risk reduction per dollar invested, also referred to as risk spend efficiency or RSE."[151] The phrases "continuing to evolve" and "more quantitatively" are not measurable, quantifiable, or verifiable by the WSD. The use of these phrases indicates SDGE's insufficient commitment to improving its resource allocation methodology.

    o REMEDY: SDG&E must eliminate the usage of equivocating language in order to provide measurable, quantifiable, and verifiable benchmarks.

- ISSUE: For Capability 41c of the 2021 Maturity Survey, SDG&E selected "RSE estimates are verified by historical or experimental pilot data and confirmed by independent experts or other utilities in CA" starting in 2023. However, SDG&E does not provide details in its 2021 WMP Update regarding the independent experts or collaborations with other utilities to verify the calculated RSE estimations.

    o REMEDY: SDG&E must provide details regarding its collaborative efforts supporting RSE verification.

Figures

Below are tables and charts used as part of the WSD's review of SDG&E's resource allocation methodology section:

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[151] SDG&E's 2021 WMP Update, p. 308

Top 5 Initiative Activities by Planned Spend – SDG&E ($M)

> Undergrounding is the highest spend initiative and 54% of SDG&E's total circuit miles are underground

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 7.3.3.16 Undergrounding of electric lines and/or equipment (Strategic undergrounding)	Grid Design & System Hardening	$31	$39	$123	$202	$365	19%
2 7.3.3.17.1 Distribution overhead system hardening (Bare Conductor Hardening)	Grid Design & System Hardening	$87	$142	$94	$5	$241	13%
3 7.3.5.2 Detailed inspections of vegetation around distribution electric lines and equipment (Tree Trimming)	Vegetation Management & Inspections	$28	$58	$50	$50	$157	8%
4 7.3.3.3 Covered conductor installation	Grid Design & System Hardening	$1	$2	$57	$99	$157	8%
5 7.3.3.18.1 Distribution communications reliability improvements	Grid Design & System Hardening	$32	$35	$50	$71	$157	8%
Total spend for top 5 initiatives		**$178**	**$276**	**$374**	**$427**	**$1,076**	**57%**

(Note box: 7.3.3.3 in top 5 for SCE; 7.3.5.2 in top 5 for PG&E as well)

Source: Table 12 of 2021 utility WMPs, Tables 21-30 of 2020 utility WMPs, and subsequent data requests.

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

Actual and planned spend by initiative category ($M)

Category	Value
Risk Assessment & Mapping	$5
Situational Awareness & Forecasting	$26
Grid Design & System Hardening	$1,219
Asset Management & Inspections	$209
Vegetation Management & Inspections	$223
Grid Operations & Operating Protocols	$54
Data Governance	$47
Resource Allocation Methodology	$18
Emergency Planning and Preparedness	$47
Stakeholder Cooperation & Community Engagement	$39

Legend: 2020 Actual total; 2021 Planned total; 2022 Planned total

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

Figure 5.8.b: Overview of spend by initiative category, SDG&E.

Total WMP Cycle Planned Spend ($M and %)

> Top 3 spend categories the same across all utilities

	PG&E Plan Total	SCE Plan Total[1]	SDG&E Plan Total
Grid Design & System Hardening	$8,355 M (56%)	$4,095 M (61%)	$1,219 M (65%)
Veg Mgmt. & Inspections	$4,409 M (29%)	$1,112 M (16%)	$223 M (12%)
Asset Mgmt. & Inspections	$808 M (5%)	$1,041 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%)	$172 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%)	$62 M (1%)	$18 M (1%)
Risk Assessment & Mapping	$20 M (0.1%)	$ 2 (0%)	$5 M (0.2%)
Total Planned Spend for WMP cycle	**$14,963 M**	**$6,754 M[2]**	**$1,886 M**

Source: Tables 3-1, 3-2 and 12 of 2021 utility WMPs, and subsequent data requests
1. SCE's totals were taken from Table 12 of its 2021 WMP as Table 3-1 only reported spend in HFRAs; PG&E and SDG&E totals are taken from Table 3-1
2. 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.

Total WMP Cycle Planned Spend ($M), territory-wide
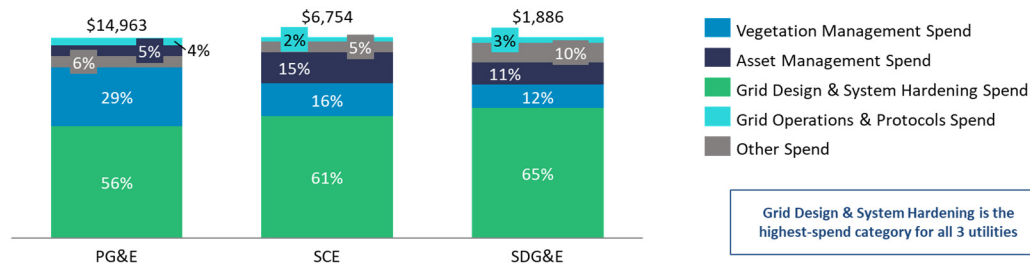
	PG&E ($M)	SCE ($M)	SDG&E ($M)
Grid Design & System Hardening	$8,355	$4,095	$1,219
Veg. Mgmt. & Inspections	$4,409	$1,112	$223
Asset Mgmt. & Inspections	$808	$1,041	$209
Grid Operations & Protocols	$556	$136	$54
Other	$835	$368	$182

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

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

Total WMP Cycle Planned Spend ($M), HFTD-only spend

	Vegetation Management Spend
	Asset Management Spend
	Grid Design & System Hardening Spend
	Grid Operations & Protocols Spend
	Other Spend

Grid Design & System Hardening is the highest-spend category for all 3 utilities in HFTDs
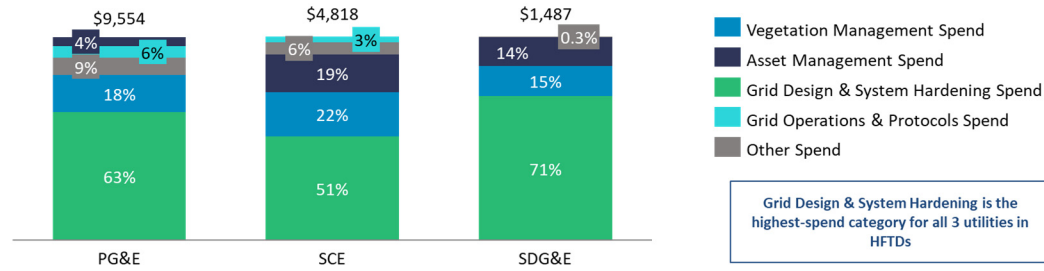
	PG&E ($M)	SCE ($M)	SDG&E ($M)	
Grid Design & System Hardening	$6,033	$2,454	$1,050	SDG&E did not report HFTD / non-HFTD split for Grid. Ops
Veg. Mgmt. & Inspections	$1,724	$1,049	$223	
Asset Mgmt. & Inspections	$426	$896	$210	
Grid Operations & Protocols	$555	$136	$0	
Other	$815	$282	$4	

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

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

Maturity score (0 – 4) actual and projected
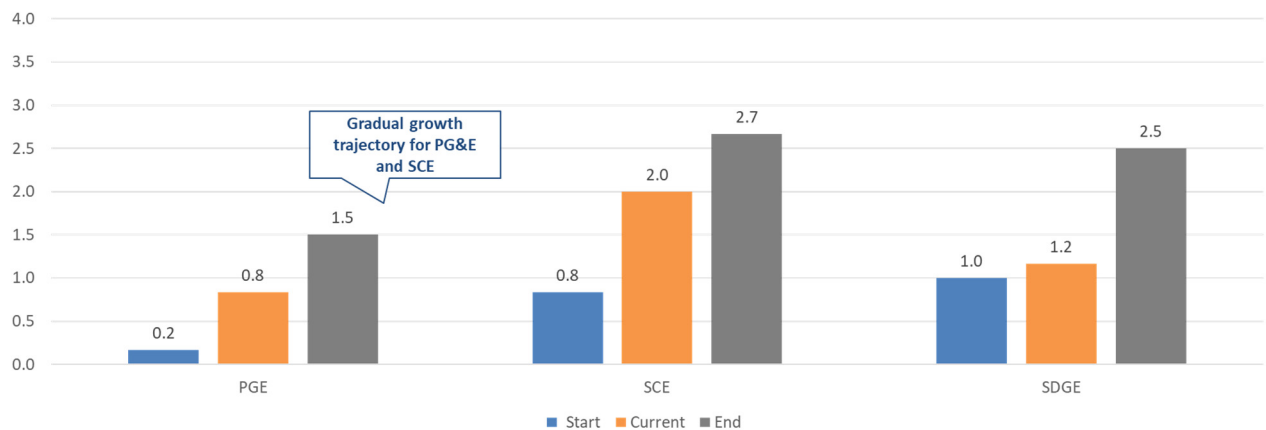
Source: 2021 Maturity Model survey data for PG&E, SCE and SDG&E

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

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

	PG&E ($K)	SCE ($K)	SDG&E ($K)
2020 Actual Total	$0.21	$3.41	$1.19
2021 Planned Total	$0.23	$0.57	$1.64
2022 Planned Total	$0.23	$0.43	$1.25
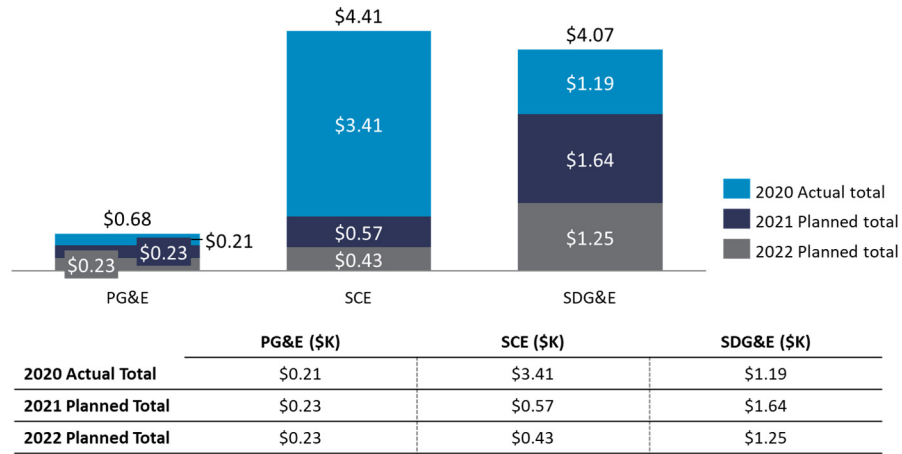
Source: Table 12 of utility 2021 WMPs and subsequent data requests

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[152] 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),[153] and other languages required by the Commission.

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

The WSD finds that SDG&E has made progress in its emergency planning and preparedness and finds this section of SDG&E's 2021 WMP Update to be sufficient.

Progress over the past year

The WSD finds that SDG&E has made the following progress:

- SDG&E is making progress on training its workforce for service restoration with its Apprentice Lineman program for teaching construction standards and methods related to General Order (GO) 95 and GO 128. This training is foundational and part of the journeyman program to understand and recognize infractions and system anomalies.
- Regarding community outreach, public awareness, and communication efforts, SDG&E launched a new public education campaign designed to reach AFN communities.

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[152] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, p. 46 (accessed May 27, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M352/K460/352460864.pdf.
[153] 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.

- SDG&E has improved its customer support in emergencies by focusing on outreach for its most vulnerable customers and using its multi-channel approach, which includes agreements with 2-1-1 San Diego and 2-1-2 Orange County to provide support for AFN customers impacted by PSPS.
- SDG&E follows its Company Emergency Response Plan (CERP) along with related standards to implement its Disaster and Emergency Preparedness Plan initiative. SDG&E updates its Emergency Response Plan based on lessons learned and external stakeholder feedback, and it is working toward updating its CERP by September 2021.
- SDG&E is updating its preparedness and planning for service restoration initiative by using its mutual assistance network for additional resources and faster restoration time.
- SDG&E's After-Action Review (AAR) program supports stakeholder involvement in finding solutions to mitigate risks identified during incidents and events.
    - In 2020, SDG&E disseminated six AAR reports to serve as reference tools to inform emergency response planning, training, and exercise activities.
- In 2020, SDG&E dedicated four information technology specialists in emergency management to support, develop, and drive technology solutions toward the preparedness and response to ensure timely decision making. The collaboration between information technology and emergency planning helped to address lessons learned from the 2020 fire season responses and improved responders' ability to react quickly during active responses.
- SDG&E shows an increase in emergency planning spend and assigns itself high Maturity Model scores (4) in all years. SDG&E's emergency planning and preparedness spend is greater per HFTD overhead circuit mile than its peer utilities (see Figure 5.9.b below).
- To support its goal of providing adequate workforce for service restoration, SDG&E trains qualified electrical workers, apprentices, and line assistants with the necessary tools to support outage restoration, patrols, inspections, and maintenance.
- SDG&E built an Incident Command System (ICS) program to train its line side employees. This training is supported by its Electric Regional Operations Skills Training Center where relevant scenarios of storm response and PSPS built-in virtual reality are integrated with the ICS processes and procedures.
    - SDG&E asserts that ICS training, storm response, and PSPS needs are integrated into all aspects of line assistant training, linemen apprentice program, ETS and Fault Finder training.
- SDG&E expects future improvements to include exercises and tabletops partnership with its emergency services, electric distribution operations, substation, transmission construction, and maintenance and grid operations. SDG&E has made the commitment that its departments will have all PSPS IMT and Task Force members fully trained and qualified or requalified by mid-year July 1, 2021.

SDG&E has room for improvement regarding the following point:

- SDG&E does not indicate the number of staff trained in its "well-established, State-approved Lineman Apprentice program."

Issues and Remedies

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

- ISSUE: SDG&E is making progress on training its workforce but doesn't provide the number of people trained. It mentions its preparation for service restoration through training with its Apprentice Lineman program for teaching construction standards and methods related to GO 95 and GO 128 and training its workforce in emergency preparedness in various programs.
    o REMEDY: SDG&E must provide the number of trainees that complete its Apprentice Lineman program.
    o REMEDY: SDG&E must provide the number of employees trained for emergency preparedness to demonstrate the adequacy of its trained workforce.
- ISSUE: SDG&E states that after a wildfire event the utility reviews and evaluates communications to customers and the general public. Part of this process includes reaching out to affected customers to solicit feedback on communications related to the event. The 2021 WMP Update did not provide sufficient details about this process.
    o REMEDY: SDG&E must explain what information is being collected about wildfire outreach efforts, how it is collected, and how it is used to inform future outreach efforts.
- ISSUE: SDG&E reviews its Mutual Assistance Plan annually pursuant to GO 166. This plan was updated in 2020 to include COVID-19 consideration. It is not clear how employees are trained in the contents of this plan.
    o REMEDY: To demonstrate improvement from 2020, SDG&E must describe how its employees are trained with the contents of its plan.

Figures
Below are charts used as part of the WSD's review of SDG&E's emergency planning and preparedness section:

Maturity score (0 – 4) actual and projected
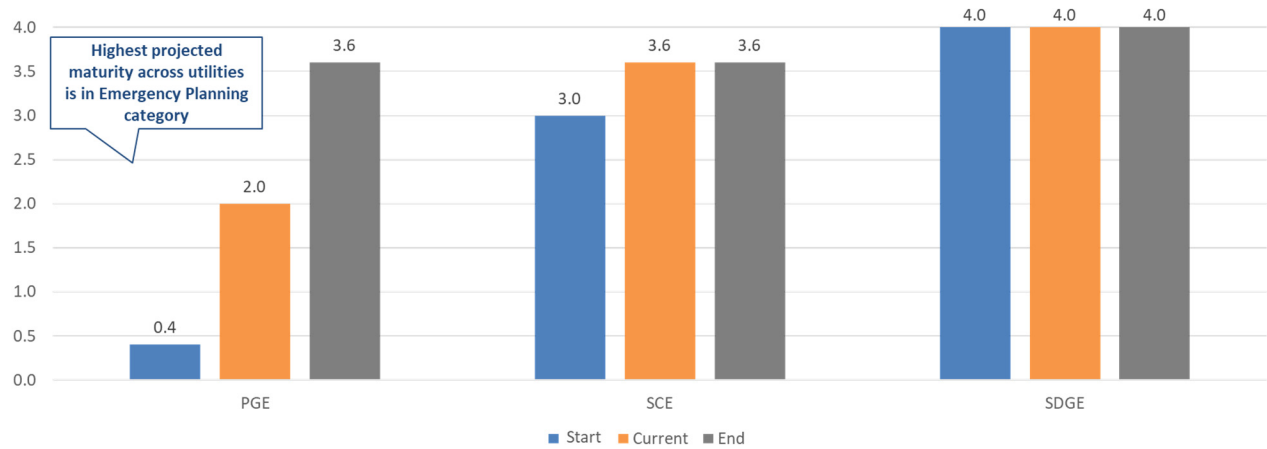
Source: 2021 Maturity Model survey data for PG&E, SCE and SDG&E

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

Emergency planning & preparedness spend per 1000 customers: Utilities 2020-22

Actual and projected spend ($K) per 1000 customers

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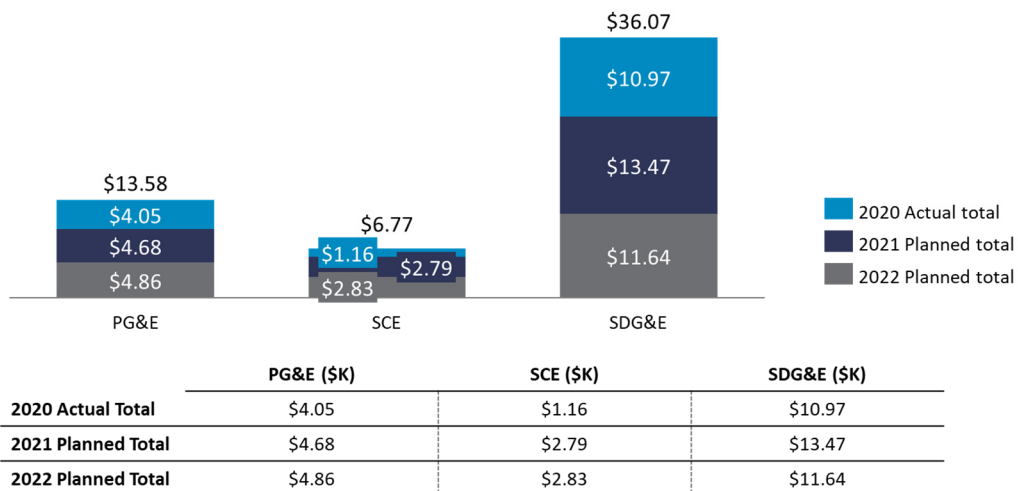
Source: Table 12 of utility 2021 WMPs and subsequent data requests

Figure 5.9.b: Emergency planning & preparedness spend per 1000 customers,
large utilities 2020-2022.

5.10. Stakeholder Cooperation and Community Engagement

Introduction

The final initiative category in the WMP Guidelines[154] 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

The WSD finds that SDG&E has made significant progress in its stakeholder cooperation and community engagement programs and finds this section of SDG&E's 2021 WMP Update to be sufficient.

Progress over the past year

The WSD finds that SDG&E has made the following progress:
- SDG&E continues to use its relationship with Community Based Organizations (CBOs) and stakeholders to amplify and disseminate information. Using its Energy Solutions Partner Network and its relationship with emergency response agencies, SDG&E continues to try to improve outreach to stakeholders.
- To satisfy its community engagement, outreach, and public awareness requirements, SDG&E uses its partner network of nearly 200 CBOs in connecting with constituents. The partner network better enables SDG&E to reach diverse multicultural, multilingual, senior, special needs, disadvantaged and AFN communities. SDG&E continues to review the prevalent languages among its customer base to reach more of its customers.
- SDG&E works with organizations year-round to prepare customers for wildfires, using presentations, meetings, and amplification of emergency preparedness information.
- SDG&E has continued its ongoing effort to support wildfire mitigation and community fire safety with its Wildfire Safety Community Advisory Council (WSCAC). WSCAC is a forum for community leaders to provide input, recommendations, and feedback to support SDG&E's senior management and the Board of Director's Safety Committee.
- In 2020, SDG&E expanded its public education and outreach efforts to include PSPS safety and resiliency communications before, during, and after a PSPS. The communications include online webinars, drive-thru wildfire safety fairs, a PSPS mobile app, a dedicated AFN public education campaign, and partnering with external businesses, government associations, and CBOs.

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[154] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, p. 46 (accessed May 27, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M352/K460/352460864.pdf.

- SDG&E is working to expand 2021 wildfire safety and PSPS outreach communications to Native American communities including planning efforts to include Indian Health Councils, the Inter Tribal Long Term Recovery Foundation, and a third party, AdPro, that specializes in tribal communications.

Issues and Remedies

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

- ISSUE: While SDG&E has made progress in its communication practices and cooperation with agencies, SDG&E does not specify how it is using feedback from stakeholder engagement activities.
  - REMEDY: SDG&E must explain how it is incorporating feedback into its community engagement efforts to improve its wildfire mitigation plan.

Figures

Below are charts used as part of the WSD's review of SDG&E's stakeholder cooperation and community engagement section:

Maturity score (0 – 4) actual and projected
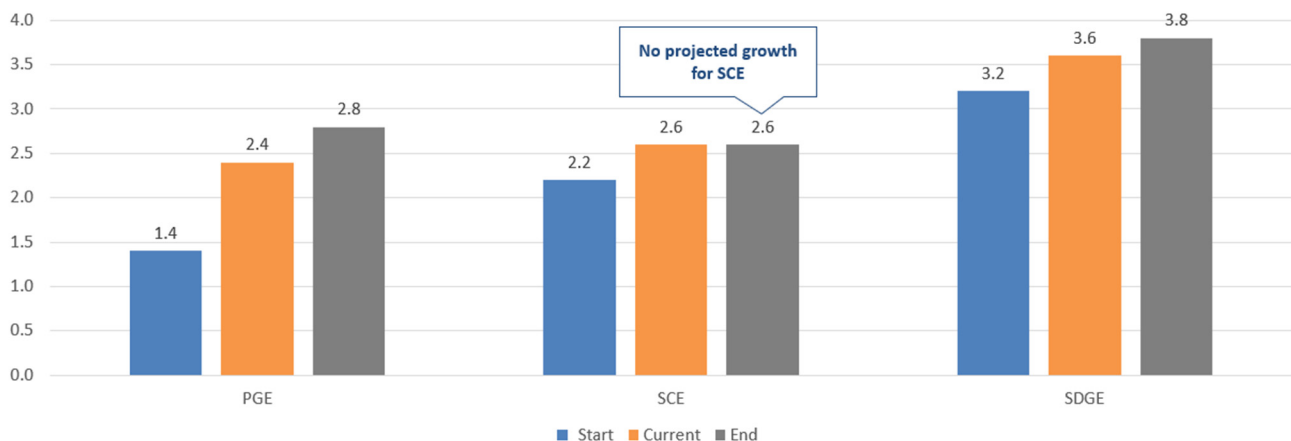
Figure 5.10.a: Stakeholder cooperation & community engagement maturity score progress.

Stakeholder cooperation & community engagement spend per 1000 customers: Utilities 2020-22

Actual and projected spend ($K) per 1000 customers
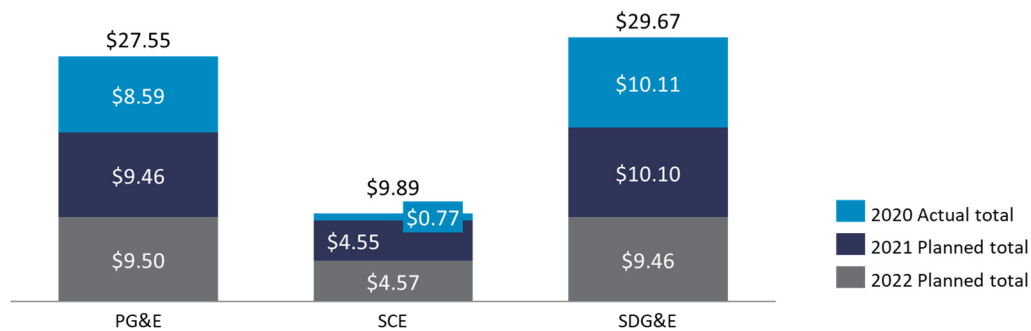
	PG&E ($K)	SCE ($K)	SDG&E ($K)
2020 Actual Total	$8.59	$0.77	$10.11
2021 Planned Total	$9.46	$4.55	$10.10
2022 Planned Total	$9.50	$4.57	$9.46

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

Figure 5.10.b: Stakeholder cooperation & community engagement spend per 1000 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. The WSD supports the use of PSPS only as a last resort and expects utilities to clearly present plans for reducing the scale, scope, and frequency of PSPS events.

In 2021, the WSD separated the reporting of PSPS from the reporting of mitigations and progress metrics to reflect the definition of PSPS as a measure of 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).[155] This

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[155] From Resolution WSD-002, issued June 19, 2020: "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." (p. 18)

section of the WMP Guidelines[156] 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

SDG&E provides extensive descriptions of achievements over the last year. However, discussion of the lessons learned, updates to 2020 processes, and future progress is scant (even in Section 4 "Lessons Learned and Risk Trends"). SDG&E must ensure that future WMP submissions are forward-looking, experience-informed plans rather than a retrospective list of accomplishments.

Progress over the past year

The WSD finds that SDG&E has made progress in the following areas:
- SDG&E has updated its overall risk assessment to include the impacts of PSPS in risk evaluation.
- In 2020, SDG&E furthered programs designed to reduce customer PSPS impacts. It:
  o Deployed four new microgrid sites.
  o Installed and upgraded weather stations to allow reporting every 30 seconds.
  o Refined Fire Potential Index (FPI) to assess risk more accurately than Red Flag Warnings.
  o Established ten Community Resource Centers at fixed facilities and developed plans for two new sites in 2021.
- SDG&E estimates that 3,000 to 5,000 customers could benefit from reduced PSPS impacts by the next annual update, subject to scale and severity of actual weather events.
- SDG&E established support services to mitigate PSPS impact to AFN populations. In 2020, SDG&E launched its AFN Support Models with 2-1-1 acting as a resource for information, education, and support services.

SDG&E has room for improvement regarding the following points:
- SDG&E provides a list of inputs that it uses to determine whether to de-energize sections of its system; however, SDG&E does not have an algorithm that quantifies and calculates the weight of each factor for calling a PSPS and states that it is exploring the development of a model that may be used in the future.
- SDG&E should focus its future WMP submissions to be forward-looking plans. While past accomplishments may be noteworthy, SDG&E must explain how those experiences factor into the continued refinement of PSPS implementation in order to ensure that the impact to customers is minimized.

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[156] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 46-49 (accessed May 27, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M352/K460/352460864.pdf.

Issues and Remedies

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

- ISSUE: SDG&E employs Resiliency Grant Programs, Standby Power Programs, and Resiliency Assistance Programs to mitigate the impact of PSPS on customers. SDG&E states that it prioritizes these resiliency programs by HFTD tier; however, it is not clear how SDG&E ensures that PSPS impacts to the most vulnerable populations are sufficiently mitigated by its patchwork of resiliency programs.
    - o REMEDY: SDG&E must demonstrate that all Medical Baseline and AFN customers in the HFTD are adequately covered by its resiliency programs.

Figures
Below are charts used as part of the WSD's review of SDG&E's Public Safety Power Shutoff section:
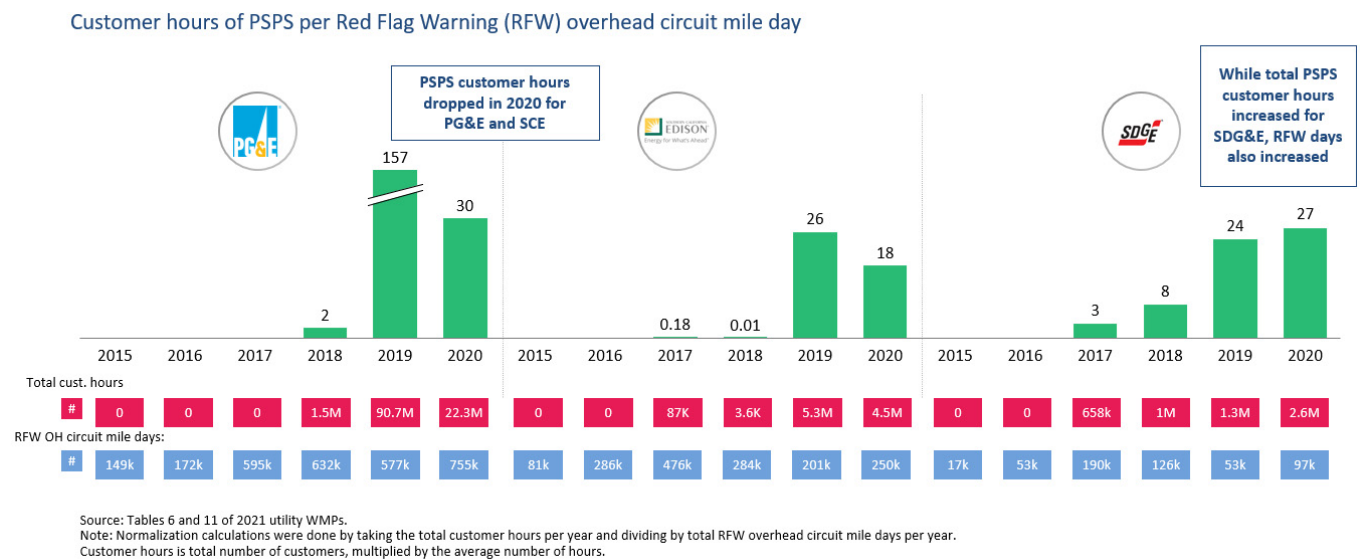
Figure 6.a: PSPS duration in customer hours (normalized).

Critical infrastructure impacted by PSPS, total
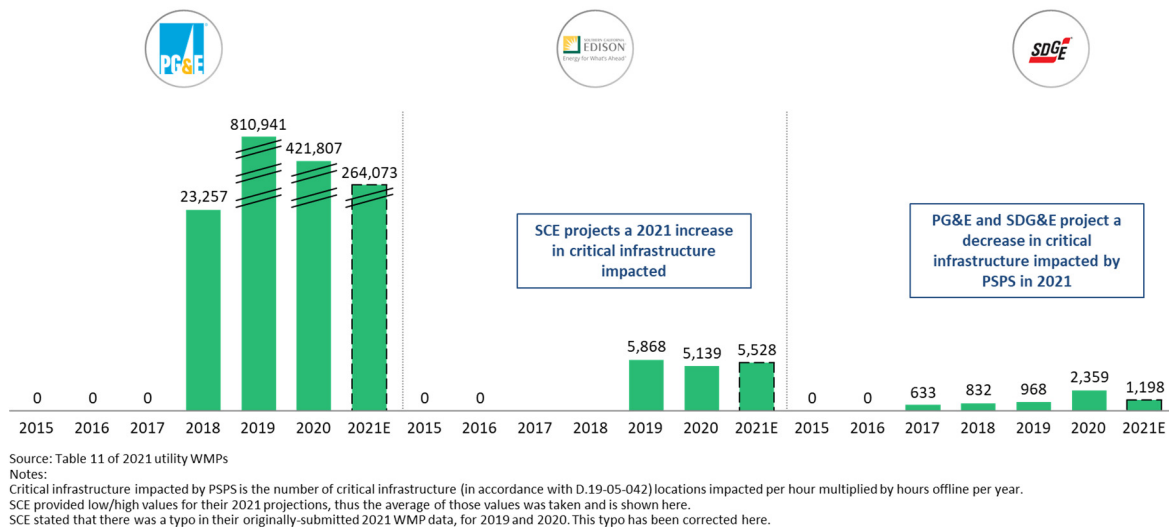
Figure 6.b: PSPS impacts on critical infrastructure.

7. Next Steps

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

Change Orders

If SDG&E 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, SDG&E 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 the WSD'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. The WSD 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 the WSD'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 submitted by e-mail to the Director of Energy Safety [the submission email address will be established after July 1, 2021]. Utilities shall concurrently serve all reports on the Department of Forestry and Fire Protection at CALFIREUtilityFireMitigationUnit@fire.ca.gov and on the service list in R.18-10-007, consistent with the procedures set forth in Rules 1.9 and 1.10 of the Commission's Rules of Practice and Procedure.

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. The WSD 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 the WSD 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 the WSD have met these requirements, but this Action Statement does not purport to speak for CAL FIRE.

9. Conclusion

SDG&E's 2021 WMP Update is approved.

Catastrophic wildfires remain a serious threat to the health and safety of Californians. Electrical corporations, including SDG&E, must continue to make progress toward reducing utility-related wildfire risk. Through the approval of SDG&E 2021 WMP submission, the WSD expects SDG&E to effectively implement its wildfire mitigation activities to reduce the risk of utility-related ignitions and the potential catastrophic consequences if an ignition occurs as well as to reduce the scale, scope, and frequency of PSPS events. SDG&E must meet the commitments in its 2020 WMP and update 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/ CAROLINE THOMAS JACOBS

Caroline Thomas Jacobs
Director, Wildfire Safety Division
California Public Utilities Commission

10. 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.[157]

The deficiencies found in 2020 have either been resolved or are folded into 2021 issues, as detailed in the table below.

Deficiency	Description	Conditions	Status
SDGE-1	(Class B) SDG&E reports a high number of ignitions related to balloon contact.	SDG&E was asked to describe the actions it is taking to study and mitigate the occurrence and potential consequence of metallic balloon-caused ignitions in its service territory.	Conditions met: deficiency resolved.
SDGE-2	(Class B) SDG&E reports a high number of ignitions related to vehicle contact.	SDG&E was asked to describe the actions it is taking to study and mitigate the occurrence and potential consequence of vehicle-	Conditions met: deficiency resolved.

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[157] Guidance Resolution WSD-002 can be found here (accessed June 9, 2021): https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M340/K859/340859823.PDF.

Deficiency	Description	Conditions	Status
		caused ignitions in its service territory.	
SDGE-3	(Class B) SDG&E fails to explain how it plans to incorporate lessons learned into updates of its risk models.	SDG&E was asked to give a timeline for incorporating lessons learned into its risk models and describe any new changes to its risk models.	Conditions met: deficiency resolved
SDGE-4	(Class B) SDG&E does not provide sufficient detail on strategic undergrounding pilots.	SDG&E was asked to give more details on its undergrounding pilot initiatives (e.g., data collection plan, effectiveness measurement).	Conditions not met: progress being monitored.
SDGE-5	(Class B) SDG&E does not provide sufficient detail on need for regulatory assistance.	SDG&E was asked to give more details on its history of collaborating with regulators and needs regarding regulatory assistance.	No longer applicable: resolved.
SDGE-6	(Class B) SDG&E does not provide sufficient detail on plans for reinforcing transmission lines.	SDG&E was asked to give more details on its plans for reinforcing transmission lines (e.g., specific actions with timelines).	Conditions met: deficiency resolved.
SDGE-7	(Class B) Potential redundancies in vegetation management activities.	SDG&E was asked to describe how it assesses effectiveness and determines the proper frequency of vegetation management processes.	Conditions not met: progress being monitored, see related issue description for remedy.
SDGE-8	(Class B) Consideration of environmental impacts, local community input.	SDG&E was asked to describe how it accounts for its vegetation management's environmental impacts and how it incorporates local stakeholder input into its vegetation management work.	Conditions not met: progress being monitored, see related issue description for remedy in 5.5. Vegetation Management and Inspections.
SDGE-9	(Class B) SDG&E does not explain how investments in undergrounding reduce planned vegetation management spend.	SDG&E was asked to describe whether and how it takes cost savings into account when evaluating the	Conditions met: deficiency resolved.

Deficiency	Description	Conditions	Status
		effectiveness of undergrounding initiatives and how it plans to account for realized cost savings through a reduced need for vegetation management activities, resulting from its undergrounding investments.	
SDGE-10	(Class C) Use of outside entities for fuel reduction.	SDG&E was asked to describe whether outside entities are conducting fuel reduction projects and how this work relates to the effectiveness of the overall vegetation management program.	Conditions met: deficiency resolved.
SDGE-11	(Class B) Lack of detail on vegetation management around substations.	SDG&E was asked to describe how it plans fuels reduction work around its substations and whether and how it maintains defensible space around them.	Conditions met: deficiency resolved.
SDGE-12	(Class B) Details of quality assurance, quality control.	SDG&E was asked to describe its quality assurance and quality control efforts (for vegetation management and inspection work in particular): effectiveness metrics; types, timing, results of audits; changes made as a result.	Conditions not met: progress being monitored.
SDGE-13	(Class A) Lack of risk reduction or other supporting data for increased time-of-trim clearances.	SDG&E was asked to Compare areas with and without enhanced post-trim clearances to measure the extent to which post-trim clearance distances affect probability of vegetation-caused ignitions and outages and collaborate with PG&E and SCE to develop a methodology for how to measure post-	Conditions not met: folded into new condition SDGE-4 (Inadequate joint plan to study the effectiveness of enhanced clearances).

Deficiency	Description	Conditions	Status
		trim vegetation clearance distance impacts on the probability of vegetation-caused ignitions and outages.	
SDGE-14	(Class B) Granularity of "at-risk species." (Hazard trees definition.)	SDG&E was asked to provide details on all tree species within the genera identified in its list of "at-risk" trees, the measures, properties and characteristics it considers in identifying "at-risk" trees, and the threshold values of these measures, properties and characteristics that result in a species being defined as "at-risk."	Conditions not met: folded into new conditions SDGE-4 (Inadequate joint plan to study the effectiveness of enhanced clearances), SDGE-5 (Incomplete identification of vegetation species and record keeping), and SDGE-6 (Limited evidence of quantitative analysis to identify "at-risk" species).
SDGE-15	(Class B) Details of centralized data repository.	SDG&E was asked to provide more details about its planned data repository, including types and sources of data that will be included, and how often the data will be updated.	Conditions met: deficiency resolved.
SDGE-16	(Class B) Details of cooperative fuel reduction work.	SDG&E was asked to give details about its plans to collaborate with the U.S. Forest Service to reduce fuel load.	Conditions met: deficiency resolved.
Guidance-1	(Class B) Lack of risk spend efficiency (RSE) information	SDG&E was asked to provide for each initiative in its 2020 WMP its calculated reduction in ignition and wildfire consequence risks; and the risk models used to calculate these.	Conditions not met: progress being monitored.
Guidance-2	(Class B) Lack of alternatives analysis for chosen initiatives.	SDG&E was asked to provide information on all the alternatives considered for each grid hardening or vegetation management initiative in its 2020 WMP, what it used to compare initiatives, how	Conditions not met: folded into new condition SDGE-9 (Inadequate transparency associated with SDG&E's decision-making process).

Deficiency	Description	Conditions	Status
		calculated the risk reduction benefits of each initiative, and why it chose to implement each initiative over alternative options.	
Guidance-3	(Class A) Lack of risk modeling to inform decision-making.	SDG&E was asked to provide more information on its risk modeling.	No longer applicable: resolved.
Guidance-4	(Class B) Lack of discussion on PSPS impacts.	SDG&E was asked to provide information on how each of its WMP initiatives affects PSPS threshold values, is expected to reduce PSPS frequency, is expected to reduce PSPS scope and duration, and supports its directional vision for PSPS necessity.	Conditions met: deficiency resolved.
Guidance-5	(Class B) Aggregation of initiatives into programs.	SDG&E was asked to provide the break-down of all initiatives in 5.3 "Detailed Wildfire Mitigation Programs" for spend, effectiveness, data and metrics used to measure effectiveness, and all points of information required in the guidelines for programs under 5.3.	Conditions met: deficiency resolved.
Guidance-6	(Class B) Failure to disaggregate WMP initiatives from standard operations.	SDG&E was asked to identify initiatives in 5.3 as standard or augmented operations and provide the ledger of subaccounts for all initiatives.	Conditions met: deficiency resolved.
Guidance-7	(Class B) Lack of detail on effectiveness of "enhanced" inspection programs.	SDG&E was asked to provide the incremental quantifiable risk identified by such 'enhanced' inspection programs, state whether the utility addresses the findings uncovered by 'enhanced' programs	Conditions met: deficiency resolved.

Deficiency	Description	Conditions	Status
		differently than findings discovered through existing inspections and provide a detailed cost-benefit analysis of combining elements of such 'enhanced' inspections into existing inspection programs.	
Guidance-8	(Class C) Prevalence of equivocating language – failure of commitment.	SDG&E was asked to provide in its 2021 WMP Update initiative objectives, targets and timelines that are measurable, quantifiable, and verifiable by the WSD. SDG&E was asked to avoid empty rhetoric and language that is ambiguous, misleading, or otherwise results in diluting commitments.	Conditions not met: progress being monitored, see related issue description for remedy in 5.8. Resource Allocation Methodology.
Guidance-9	(Class B) Insufficient discussion of pilot programs.	SDG&E was asked to describe all pilot programs identified in its WMP including their location, status, any results, progress toward up-scaling, and a proposal for up-scaling if it is successful at reducing ignition risk. The utility was also asked how it remedies ignitions or faults revealed during the pilot on a schedule that promptly mitigates the risk of such ignition or fault and incorporates such mitigation into its operational practices.	Conditions met: deficiency resolved.
Guidance-10	(Class B) Data issues – general.	SDG&E was asked to provide the locations of vegetation and asset/grid hardening inspections in the prior reporting period, the	Conditions met: deficiency resolved.

Deficiency	Description	Conditions	Status
		type/extent (in circuit miles) of work that was being inspected, the reason for targeting that work for inspection, and the same information for expected such inspections in the coming reporting period.	
Guidance-11	(Class B) Lack of detail on plans to address personnel shortages.	SDG&E was asked to provide information on its programs for personnel recruitment and training (in particular vegetation management personnel), its strategy for recruiting personnel via contractors, and its recruitment program effectiveness metrics.	Conditions met: deficiency resolved.
Guidance-12	(Class B) Lack of detail on long-term planning.	SDG&E was asked to describe its expected state of wildfire mitigation in 10 years, including its future relevant capabilities, its grid architecture, lines, and equipment, a year-by-year timeline for reaching these goals, activities necessary to its goals, and how the WMP is a step on the way to these goals.	Conditions met: deficiency resolved.

10.2. WSD Data Request Responses

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

Regarding the increase between SDG&E's 2020 planned spend and 2020 actual spend:
Data Request: WSD-SDGE-01 (Question 1)
Request date: Feb. 18, 2021
Request: The WSD requests clarification of two (2) overarching issues regarding the 2021 WMP Update
Table 12 (initiative spend by WMP activity), as follows:
1. Split reported spend by activity in HFTD and total activity spend (i.e., territory-wide including in non-HFTD)
2. Given changes in WMP activity spending, report planned spend as detailed in the 2020 WMP under the reporting system of the 2021 WMP (i.e., activity spend in HFTD and territory-wide)
The WSD provides the attached MS Excel file and additional clarifications for use in responding to this request. […] Provide a completed copy of [the attached] MS Excel ["Data request SDGE 2021 Table 12_v02 20210223.xlsx"- initiative spend by WMP activity] with the columns highlighted in tan populated with accurate information by Tuesday February 23, 2021 at 5 p.m.
Response date: Feb. 23, 2021
Response: Please refer to attachment "Data request SDGE 2021 Table 12_v02 20210223.xlsx."[158]
Please note SDG&E marked several initiatives that are foundational in nature with an N/A in column T. These initiatives support company initiatives within the HFTD, but cannot be quantified in a way that allows for a split by HFTD and non-HFTD.

Regarding Requirement 11 (prioritized list of wildfire risks and their drivers):
Data Request: WSD-SDGE-02 (Updated Table of Risks)
Request date: The WSD submitted the question to the utility on February 9, 2021, for a phone call held February 10; the WSD subsequently requested clarifications on a phone call held February 17, 2021.
Request: Identify where in the WMP Update we can find a prioritized list of wildfire risks with accompanying descriptions of these risks, including their main drivers. (Subsequently WSD asked the utility to clarify the units of analysis and the years of data included in the list.)

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[158] Download the spreadsheet "Data request SDGE 2021 Table 12_v02 20210223.xlsx" here (accessed April 29, 2021):
https://www.sdge.com/sites/default/files/regulatory/Data%20request%20SDGE%202021%20Table%2012_v02%20 20210217.xlsx.

Response date: The initial written response to the question discussed on the February 10 phone call was received February 16, 2021; the subsequent written clarification was received March 4, 2021 (as part of WSD-SDGE-02).

Response:

Updated Table of Risks

As discussed with the WSD, SDG&E provides this updated table of prioritized wildfire risknoting two key amendments:
1. Correcting column header to indicate that 2020 data are included
2. Including transmission data inadvertently filtered out in previous table

The data used is the same data provided in able 7.1 of the 2021 WMP update and representscounts of outages and ignitions. Definitions of the columns are provided below:
1. Cause category: high-level categorization of outage or ignition causes
2. Sub-cause category: more granular categorization of outage or ignition causes
3. Average outage: average annual count of outages (also referred to as risk events)calculated over the span of 2015 – 2020
4. Average ignition rate: shows the average annual ignition-to-outage ratio percentage overthe span of 2015 – 2020 and is calculated by dividing total count of ignitions by the totalcount of outages.
5. Adjusted risk: average annual count of ignitions that have occurred over the span of 2015 – 2020. It's also the product of the average outage and average ignition rate
6. Risk Ranking: ranking of the average annual counts of ignitions over the span of 2015- 2020, or the 'Adjusted Risk', in descending order from highest to lowest counts by sub-cause

Cause category	Sub-cause category	2015 - 2020			
		Average Outage	Average Ignition rate	Adjusted Risk	Risk Ranking
Contact from object	Vehicle contact	99.2	4.03%	4.00	1
Contact from object	Balloon contact	118.8	3.23%	3.83	2
Contact from object	Veg. contact	41.3	6.05%	2.50	3
Contact from object	Animal contact	84.8	2.36%	2.00	4
Contact from object	Other contact from object	34.7	5.29%	1.83	5
Equipment / facility failure	Other - Equipment / facility failure	12.2	15.07%	1.83	5
Equipment / facility failure	Connection device damage or failure	50.7	3.29%	1.67	6
Equipment / facility failure	Lightning arrestor damage or failure	24.3	5.48%	1.33	7
Unknown	Unknown	340.0	0.29%	1.00	8

Equipment / facility failure	Conductor damage or failure	44.7	2.24%	1.00	8
Equipment / facility failure	Transformer damage or failure	53.8	1.55%	0.83	9

Cause category	Sub-cause category	2015 - 2020			
		Average Outage	Average Ignition rate	Adjusted Risk	Risk Ranking
Equipment / facility failure	Switch damage or failure	14.5	4.60%	0.67	10
Equipment / facility failure	Fuse damage or failure	73.2	0.68%	0.50	11
Wire-to-wire contact	Wire-to-wire contact / contamination	4.3	11.54%	0.50	11
Equipment / facility failure	Anchor / guy damage or failure	1.8	27.27%	0.50	11
Equipment / facility failure	Capacitor bank damage or failure	9.0	3.70%	0.33	12
Vandalism / Theft	Vandalism / Theft	1.2	28.57%	0.33	12
Equipment / facility failure	Crossarm damage or failure	21.7	0.77%	0.17	13
Equipment / facility failure	Pole damage or failure	36.5	0.46%	0.17	13
Equipment / facility failure	Insulator and bushing damage or failure	16.2	0.00%	0.00	14
Equipment / facility failure	Recloser damage or failure	1.5	0.00%	0.00	14
Equipment / facility failure	Sectionalizer damage or failure	0.0	0.00%	0.00	14
Equipment / facility failure	Voltage regulator / booster damage or failure	0.5	0.00%	0.00	14
Contamination	Contamination	3.2	0.00%	0.00	14
Utility work / Operation	Utility work	5.7	0.00%	0.00	14
Other	All Other	0.2	0.00%	0.00	14

Regarding Requirement 15 (workforce available for restoration of service):
Data Request: WSD-SDGE-02 (Question 2)
Request date: March 1, 2021
Request: In order to demonstrate adequacy of size of service restoration workforce (requirement 8386[c][15]) provide the following:

a. Describe your current service restoration processes (i.e., damage assessments, repairs, switching activities, etc.) and tools (boots on the ground, drones, helicopters, etc.).

b. Report the type and number of each personnel classification currently employed by [SDG&E] that are involved in service restoration activities, including an explanation of what roles and responsibilities they have.

c. How many mutual aid agreements does the utility have in place? Explain the type and number of personnel classifications involved in each agreement (or the total number for all agreements).

d. How many contractors are in place for service restoration? Explain the type and number of personnel classifications retained as contractors.

Response date: March 4, 2021
Response:

a. In response to a catastrophic or extensive wildfire event causing damage to electric distribution facilities, SDG&E mobilizes an all-hands field and office workforce featuring an interdepartmental, shift-based, modularized event response team derived from Federal Emergency Management Agency (FEMA) Incident Command System (ICS) principles. At the onset of the event, usually reported through coordination with local fire agencies' incident command units, SDG&E deploys first responders such as electric troubleshooters to observe and report field conditions, provide an initial damage assessment, make conditions safer by implementing small-scale damage isolation (i.e., switching), and create damage assessment forms noting what type of labor and material are required to repair the damage. Construction supervisors, engineers, and other office staff manage network topology (i.e., fire perimeter mapping), customer, and damage-related data to continually inform the utility Incident Commander (IC) of event risks and priorities. The IC mobilizes an organization of section chiefs to lead Operations, Planning, Logistics, and Resource Coordination.

The Operations section's key objectives include bulk damage inspection, reconstruction line crew deployments, including initial make-safe strike teams, helicopter and drone operations to report damage perimeter and structure counts as dispatched in coordination between SDG&E Aviation Services and Fire Coordination in CAL FIRE-controlled airspace. This section provides central field command of re-energization of de-energized or reconstructed facilities (e.g., hold authorizations).

The Planning section's key objectives include prioritization of reconstruction in affected

areas and mobilizing modular field design teams. Following initial field assessments done in the Operations Section, planners will also perform field assessments to create designs and perform or request pole loading calculations as required. These assessments will typically be done visually on foot, but in the case of difficult terrain could employ drones. Pole loading calculations are performed on O-Calc or PLS-CADD as required by SDG&E standards. Completed designs are prioritized by Construction Supervisors and sent to the appropriate resources for construction. The construction crews, which will consist of Working Foremen, Linemen, Apprentice Lineman, and Line Assistants will perform the work and the required switching to energize the new facilities. Depending on the terrain, this work could be accomplished with bucket trucks accessing facilities, or helicopters setting the equipment.

The Logistics section's key objectives include mobilizing various resources in aid of expedited construction, including pole hole digging operations, securing and transporting material (e.g., critical pole stock), and mobilizing staging sites.

The Resource Coordination (RC) section's key objectives include managing critical event response personnel across multiple business units. The RC team, typically made up of crew schedulers, leaders from non-affected business units, and other administrators aims to balance event response resource needs with blue sky operations and develops resource plans in coordination with the Planning Section to maintain operational shifts that drive a consistent pace of construction and cyclical worker rest periods (e.g., 16-hour crew shifts).

      b.   Please refer to the table below:

Role	Description	Internal Quantity
Planner	Planners are responsible for fielding and designingelectric distribution facilities.	33
Construction Supervisor	Construction supervisors are responsible for prioritizing work and directing the field crews.	29
Electric Troubleshooter	Electric Troubleshooters are the first responders to outages or damages to SDG&E facilities. They are responsible for assessing the damage, making the scenesafe, and requesting follow-up repairs.	39
Working Foreman	The working foreman is a qualified electrical worker (QEW) that leads the crew by assigning work amongst crew members, holding safety tailgates, and ensuring construction and switching is done according to plan.	35

Role	Description	Internal Quantity
Lineman	A lineman is a QEW that has completed the Lineman Apprentice Program and passed the Journeyman Lineman test. They are part of the crew that performs restoration construction and switching.	142
Apprentice Lineman	Apprentice Linemen are currently in the SDG&E Apprentice program. An Apprentice Lineman may be qualified to only work on secondary voltages (up to 600V) or on primary voltages depending on where they are in their apprenticeship. They can work on electrical facilities for which they are qualified under the supervision of a QEW.	62
Line Assistant	Line assistants are not qualified to work on electricalfacilities. They assist with obtaining and preparing materials for the crew.	18

c. SDG&E has four Mutual Assistance Agreements in place that in enable cross-utility collaboration. The following are based on areas and regions: (1) for California there is Mutual Assistance Agreements among members of California Utilities Emergency Association (CUEA), (2) for the Western U.S. there is the Western Region Mutual Assistance Agreement for Electric and Natural Gas Utilities (WRMAG), and (3) Nationwide: Edison Electric Institute Mutual Assistance Agreement (EEI). In addition, SDG&E maintains a Mutual Assistance Agreement with American Gas Association (AGA).

d. SDG&E tracks its contract resources by crew. A crew typically consists of one Working Foreman, two to three Linemen, and one Apprentice Lineman or Line Assistant. SDG&E currently has 42 distribution crews available from contract resources, which would equate to:

Role	Contract Quantity
Working Foreman	42
Lineman	84 - 126
Apprentice Lineman or Line Assistant	42

Regarding the explanation why SDG&E downgraded its ignition risk calculation from mostly to partially automated from 2020 to 2021:

Data Request: WSD-SDGE-03 (Question 1)

Request date: March 12, 2021

Request: SDG&E's 2021 responses to two ignition risk questions on the Maturity Survey indicate de-maturation (from mostly automated to partially automated) since last year's survey: "A.II.b How automated is the ignition risk calculation tool?" and, "A.IV.b How automated is your ignition risk reduction impact assessment tool?"

1(a). The reason for this apparent de-maturation was given verbally in our March 10 call, provide an explanation in writing for the indicated decrease in automation and explain if the reason is different for these two questions about ignition risk.

1(b). Explain why SDG&E's 2021 Maturity Survey response to "A.III.d How automated is the ignition risk estimation process?" does not indicate de-maturation since 2020 (it stayed at "mostly automated").

Response date: March 17, 2021

Response: 1a) With regard to survey questions that pertain to ignition risk estimation, specifically how automated is the ignition risk calculation tool (A.II.b) and how automated is the ignition risk reduction impact assessment tool (A.IV.b), SDG&E's reason for de-maturation from "Mostly (<50%)" to "Partially (<50%)" in the current year was due to our interpretation of the question rather than a change in process of ignition risk estimation. SDG&E's interpretation of automation is when data are automatically pulled from different sources and databases, it automatically flows through different models to automatically simulate results without any involvement and interpretation from the Subject Matter Experts. Based on our understanding of this definition, questions related to Capability 2, 3, and 4 fall in different categories. Capability 2 (A.II.b) is focused on the likelihood of an ignition. SDG&E uses a combination of tools to assess ignition risk based on data, subject matter expert (SME) input, and ignition history. The tools used for assessment are automated, however, there is a need for manual effort upfront to gather the data, run it through the model, and lastly, it requires an SME for analysis of the outputs to make them meaningful. Based on this reasoning, the ignition risk estimation tool is partially automated. Capability 4 (A.IV.b) has a new element of risk modeling for PSPS risk reduction. However, very similar to capability 2, the tools are partially automated due to the manual process of gathering and interpreting the results.

1b) SDG&E's 2021 Maturity Survey response to "A.III.d How automated is the ignition risk estimation process?" does not indicate de-maturation since 2020 (it stayed at "mostly automated") is because the ignition risk estimation process has not changed.

Capability 3(A.III.d) is focused on consequences of an ignition. SDG&E primarily uses the WRRM-Ops model for modeling consequences of ignitions. The WRRM-Ops model is more advanced with regard to automation. SDG&E has installed software which automatically downloads output from weather models that are run by National Oceanic and Atmospheric Administration (NOAA). These data are then used in an automated process to run detailed

weather forecasts and automatically sends fire weather conditions to our fire behavior modeling system (WRRM-Ops). This system then, in an automated process, simulates over 10 million virtual wildfires and send the potential consequence (fire size, structures, population) to multiple visualization platforms for SME analysis, resulting in the "mostly automated" definition with regards to the consequence related modeling.

Regarding how SDG&E plans bare conductor hardening projects:
Data Request: WSD-SDGE-03 (Question 2)
Request date: March 12, 2021
Request: On page 220 of its 2021 WMP, SDG&E states: "While SDG&E's updated hardening strategies call for more covered conductor and strategic undergrounding, the added cost of redesigning those in flight bare conductor hardening projects to covered conductor or underground would have lowered the risk spend efficiency of those mitigations (for the inflight projects with additional redesign costs) below overhead hardening. Based on efficiency, more risk per dollar was reduced by completing the inflight traditional hardening programs when faced with redesign."
2(a). Provide the RSE for redesigning in-flight bare conductor hardening projects.
2(b). How many bare conductor hardening projects (by circuit mile) were identified to have possibly been fit for redesigning to covered conductor?
2(c). How many bare conductor hardening projects (by circuit mile) were identified to have possibly been fit for redesigning to strategic undergrounding?
2(d). How many inflight projects (by circuit mile) did not have redesign costs, and were those shifted to either covered conductor or strategic undergrounding projects?
2(e). Are there instances in which previously hardened circuits utilizing bare conductor hardening are going to be re-hardened utilizing covered conductor? If so, provide:
    i.   The number of circuit miles in which covered conductor projects will be replacing bare conductor hardened projects.
    ii. The percentage of covered conductor projects that will be replacing bare conductor hardened projects.
    iii. The percentage of bare conductor hardened projects completed that will be re-hardened using covered conductor.
2(f). Are there instances in which previously hardened circuits utilizing bare conductor hardening are going to be undergrounded? If so, provide:
    i.   The number of circuit miles in which strategic undergrounding projects will be replacing bare conductor hardened projects.
    ii. The percentage of strategic undergrounding projects that will be replacing bare conductor hardened projects.
    iii. The percentage of bare conductor hardened projects completed that will be undergrounded.
Response date: March 17, 2021

Response: 2(a). In order to provide the RSE for redesigning in-flight bare conductor hardening projects, SDG&E separated out the remaining scope of work for 2021 – 2022 to exclude work that has been completed in 2020. The total scope of miles remaining for bare conductor hardening for 2021 and 2022 as shown in the 2021 WMP update is 105 miles. Costs may depend on which phase the projects are in; the cost increases the further a project is in its lifecycle due to level of effort to redesign the in-flight work. The cost can vary drastically and could result in additional costs due to the need to accelerate work to meet WMP targets by the end of 2022. For instance, some of the bare conductor work is already well into construction and it would be more costly and impactful to redesign to other types of hardening.

Additionally, redesigning could lead to significant impacts to schedule and costs because of the need to spend more time and resources in 2021 to redesign, in which case construction would be pushed to 2022. This will lead an increased amount of accelerated work in 2022 to complete all the system hardening work in the current plan as well as the 105 miles of bare conductor hardening carried over from 2021. Such delays also delay associated risk reductions while projects are put on hold and could result in cost increases due to acceleration pressures. There are also additional uncertainties around the ability to obtain easements, permits, and environmental releases in time to construct in 2022 for different scopes of work. Customers could potentially be subjected to extended construction durations for projects already in construction. In cases where the bare wire and new poles have already been installed, customers may even experience more outages to replace the newly installed bare wire and poles with new covered conductor.

The summary table below provides an overview of the analysis comparing the overall RSE of completing the 105 miles of bare conductor work to pivoting that work to covered conductor or undergrounding. As shown in the analysis, pivoting to undergrounding has a much lower RSE compared to maintaining the current plan and although pivoting to covered conductor does have a slightly higher RSE, it is not deemed sufficient for the amount of disruption and risk reduction delays it would cause.

	Bare Conductor (2021 – 2022)	Covered Conductor (2021 – 2022)	Underground (2021 -2022)
Overhead Miles	105	105	105
RSE	47	51	17

2(b). As stated in 2(a), there are many factors that go into moving forward with redesigning bare conductor work to covered conductor. In 2020, SDG&E reevaluated current bare conductor projects and began the redesign of 2 miles for 2020, 23 miles for 2021, and 17 miles for 2022. No further redesigns of bare conductor projects are expected in our 2021 and 2022 workplans. All planned work for 2021 and 2022 have been scoped and no further redesigns are anticipated.

2(c). At this time, SDG&E has not identified any bare conductor projects that would need to be redesigned to strategic undergrounding. SDG&E will continue to evaluate this in the future.

2(e).

    i.   At this time, SDG&E has not scoped any previously bare conductor hardened work for conversion to covered conductor. SDG&E will continue to evaluate this in the future as it updates its risk models and will provide updates accordingly.

    ii.   Same response as i.

    iii.   Same response as i.

2(f).

    i.   At this time, SDG&E has not scoped any previously bare conductor hardened work for undergrounding. SDG&E will continue to evaluate this in the future as it updates its risk models and will provide updates accordingly.

    ii.   Same as response in i.

    iii.   Same as response in i.

Regarding how SDG&E plans to avoid duplicative hardening efforts:
Data Request: WSD-SDGE-03 (Question 3)
Request date: March 12, 2021
Request: How does SDG&E plan to minimize overlapping system hardening efforts when utilizing WiNGS model outcomes for circuit segments in which certain assets have already undergone system hardening upgrades?
Response date: March 17, 2021
Response: There are two ways in which previous system hardening can affect how WiNGS considers risk. First, the fact that system hardening has been performed is used to estimate the reduced current risk levels on that segment. The risk on a segment is estimated to be lower than in an instance where segment had not been partially or completely hardened. The accuracy of how WiNGS computes these risk reductions will improve with time, but currently focuses on generalized risk reduction by changing from an unhardened line to a traditionally hardened line. Future versions of WiNGS will identify specific risk reductions at the asset level to inform the aggregated segment-level risk.

Second, SDG&E includes the level of hardening during the scoping of future projects. If a segment has previously undergone some level of hardening, the general approach is to target portions of the segments that have not been hardened while leaving the hardened portions as-is. However, in some instances, SDG&E plans to evaluate where the benefits of making exceptions to this approach outweigh the costs by evaluating the potential risk reduction that can be achieved by converting bare conductor hardening to covered conductor or undergrounding where feasible and appropriate.

Regarding using WiNGs to prioritize wildfire mitigations beyond hardening:
Data Request: WSD-SDGE-03 (Question 4)
Request date: March 12, 2021
Request: What is the timeline for implementing WiNGS as a prioritization tool for all wildfire initiatives within SDG&E's WMP? How has WiNGS been used to inform decision-making for medium- and long-term planning outside of system hardening?
Response date: March 17, 2021
Response: WiNGS is not intended to be a tool for prioritizing all wildfire initiatives. Some initiatives such as risk assessment and mapping or data governance initiatives are considered foundational to supporting risk reduction but do not directly reduce the wildfire risk and thus cannot be prioritized in the model like other initiatives. Additionally, some initiatives are driven by compliance standards and thus cannot be treated the same way as other initiatives currently being evaluated in the model. An example of such an initiative is the CMP inspections program which is based on GO 165 requirements.

SDG&E continues to explore opportunities to expand the use of WiNGS to inform more initiatives. At this point, SDG&E uses WiNGS to inform system hardening initiatives as well as the deployment of generators through the Fixed Backup Power program. In 2021, SDG&E plans to explore a proof of concept for using WiNGS to evaluate vegetation management and microgrid initiatives. As SDG&E continues to refine its methodologies and captures lessons learned, it will explore further opportunities to expand the use of the model to other initiatives but there is no set timeline or number of initiatives to integrate at this point given how new the model is. Furthermore, as mentioned during the WMP workshops, SDG&E views WiNGS as a modular framework that allows for flexibility to develop and use more refined models to tackle specific risks outside of the model while also integrating them in WiNGS as components to the broader risk assessment. For example, while WiNGS provides an overall assessment of segment risks comprised of various risk drivers such as vegetation and asset-related risks, for purposes of prioritizing vegetation management, it may be more appropriate to use a model tailored to vegetation risks so that prioritization of those activities can be targeted to where the highest vegetation risk areas are—which can differ from the highest risk areas from an equipment standpoint.

As far as using WiNGS for medium and long-term planning outside of system hardening, SDG&E used WiNGS in 2020 to inform the deployment of generators in the FBP program in 2020 and will continue to utilize it as an input in the broader decision-making process for identifying candidate customers through that program.

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;	Automatic recloser operations; protocols for re-energization after PSPS; mitigation of PSPS

Action Statement: Grid operations and operating protocols, including 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: SDG&E's 2021 Maturity Survey

11.1.1.   SDG&E: 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://www.cpuc.ca.gov/wildfiremitigationplans/.

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, the WSD is not independently validating that all data elements submitted by utilities are accurate. The WSD will continue to evaluate utility data, conduct data requests, and conduct additional compliance activities to ensure that data provided is accurate.

11.1.2.   SDG&E: Introduction to Maturity Model Scoring[159]

In order to determine "maturity" in any one capability, the WSD 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. The WSD 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.[160] 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.

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."

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[159] From WSD-002, p. 10-11.

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

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. SDG&E: Maturity Detail by Capability

Legend: *Maturity Model Scores*

0	1	2	3	4

11.1.3.1 Category A. Risk Assessment and Mapping

	Avg cycle start maturity: 2	Avg current maturity: 1.8	Avg projected cycle end maturity: 2.4
Capability 1. Climate scenario modeling			
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)
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?	iv. Risk for various weather scenarios can be reliably estimated	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?	v. Asset-based	v. Asset-based	v. Asset-based
1d: How automated is the tool?	iii. Mostly (>=50%)	iii. Mostly (>=50%)	iii. Mostly (>=50%)
1e: What additional information is used to estimate model weather scenarios and their risk?	v. Weather measured at the circuit level, how weather effects failure modes and propagation, existing hardware, level of vegetation	v. Weather measured at the circuit level, how weather effects failure modes and propagation, existing hardware, level of vegetation	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?	iii. Basic temperature modeling used to estimate effects of a changing climate on future weather and risk, taking into account difference in geography and vegetation	iii. Basic temperature modeling used to estimate effects of a changing climate on future weather and risk, taking into account difference in geography and vegetation	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: 2	By end of year 1 (current): 1	Planned state by end of cycle: 2 (projected)
Question	Start of cycle	By end of year 1 (current)	Planned state by end of cycle
2a: How is ignition risk calculated?	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	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?	iii. Mostly (>=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 iii. Through real-time learning	i. By experts ii. By historical data iii. Through real-time learning	i. By experts ii. By historical data iii. Through real-time learning
2e: What confidence interval, in percent, does the utility use in its wildfire risk assessments?	>60%, or no quantified confidence interval	>60%, or no quantified confidence interval	>80%

Capability 3. Estimation of wildfire consequences for communities			
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)
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?	ii. Yes	ii. Yes	ii. Yes
3d: How automated is the ignition risk estimation process?	iii. Mostly (>=50%)	iii. Mostly (>=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?	ii. Outputs independently assessed by experts	iv. Outputs independently assessed by experts and confirmed based on real time learning, for example, using machine learning	iv. Outputs independently assessed by experts and confirmed based on real time learning, for example, using machine learning
3g: What other inputs are used to estimate impact?	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	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): 1	Planned state by end of cycle: 2 (projected)
Question	Start of cycle	By end of year 1 (current)	Planned state by end of cycle
4a: How is risk reduction impact estimated?	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)	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?	iii. Mostly (>=50%)	ii. Partially (<50%)	iii. Mostly (>=50%)
4c: How granular is the ignition risk reduction impact assessment tool?	ii. Regional	ii. Regional	iii. Circuit-based
4d: How are ignition risk reduction impact assessment tool estimates assessed?	iii. Independent expert assessment	iii. Independent expert assessment	iv. Independent expert assessment, supported by historical data of incidents and near misses
4e: What additional information is used to estimate risk reduction impact?	v. Existing hardware type and condition, including operating history; level and condition of vegetation; weather; and combination of initiatives already deployed	v. Existing hardware type and condition, including operating history; level and condition of vegetation; weather; and combination of initiatives already deployed	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: 2	By end of year 1 (current): 2	Planned state by end of cycle: 3 (projected)
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?	iii. Risk mapping algorithms updated continuously in real time	iii. Risk mapping algorithms updated continuously in real time	iii. Risk mapping algorithms updated continuously in real time
5b: How automated is the mechanism to determine whether to update algorithms based on deviations?	iii. Mostly (>=50%)	iii. Mostly (>=50%)	iii. Mostly (>=50%)
5c: How are deviations from risk model to ignitions and propagation detected?	iii. Semi-automated process	iii. Semi-automated process	iii. Semi-automated process
5d: How are decisions to update algorithms evaluated?	ii. Independently evaluated by experts	ii. Independently evaluated by experts	iii. Independently evaluated by experts and historical data
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	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

11.1.3.2 Category B. Situational Awareness and Forecasting

	Avg cycle start maturity: 2.6	Avg current maturity: 2.6	Avg projected cycle end maturity: 2.6
	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	ii. Manual 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: 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
7a: How granular is the weather data that is collected?	iii. 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	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	v. At least sixty times per hour	v. At least sixty times per hour
7c: How granular is the tool?	iv. Span-based	iv. Span-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: 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
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	iv. Utility has the ability to use a combination of accurate weather stations and external weather data to make accurate forecasts, and adjusts them in real time based on a learning algorithm and updated weather inputs
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?	iv. Span-based	iv. Span-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%)	iii. Mostly (>=50%)	iii. Mostly (>=50%)

Capability 9. External sources used in weather forecasting			
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
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?	iii. Mostly automated processes for error checking weather stations with external data sources	iii. Mostly automated processes for error checking weather stations with external data sources	iii. Mostly automated processes for error checking weather stations with external data sources
9c: For what is weather data used?	ii. Weather data is used to produce a combined weather 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: 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
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	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
10 : How is information on detected ignitions reported?	ii. Procedure exists for notifying suppression forces	iii. Procedure exists for notifying suppression forces and key stakeholders	iii. Procedure exists for notifying suppression forces and key stakeholders
10d: What role does ignition detection software play in wildfire detection?	ii. Ignition detection software in cameras used to augment ignition detection procedures	ii. Ignition detection software in cameras used to augment ignition detection procedures	ii. Ignition detection software in cameras used to augment ignition detection procedures

11.1.3.3 Category C. Grid design and system hardening

	Avg cycle start maturity: 2.4	Avg current maturity: 2.6	Avg projected cycle end maturity: 3.2
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: 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
12a: Does grid design meet minimum G095 requirements and loading standards in HFTD areas?	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	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?	ii. Yes	ii. Yes	ii. Yes
12c: Does routing of new portions of the grid take wildfire risk into account?	i. Yes	i. Yes	i. Yes
12d: Are efforts made to incorporate the latest asset management strategies and new technologies into grid topology?	ii. Yes, some effort made in HFTD areas	ii. Yes, some effort made in HFTD areas	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: 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
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	ii. n-1 redundancy covering at least 50% of customers in HFTD	ii. n-1 redundancy covering at least 50% of customers in HFTD
13c: What level of sectionalization does the utility's distribution architecture have?	iv. Switches in HFTD areas to individually isolate circuits, such that no more than 1000 customers sit within one switch	iv. Switches in HFTD areas to individually isolate circuits, such that no more than 1000 customers sit within one switch	iv. Switches in HFTD areas to individually isolate circuits, such that no more than 1000 customers sit within one switch
13d: How does the utility consider egress points in its grid topology?	ii. Egress points used as an input for grid topology design	ii. Egress points used as an input for grid topology design	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?	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	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	iii. Circuit-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?	iv. All	iv. All	iv. All
14e: Can the utility evaluate risk reduction synergies from combination of various initiatives?	i. No	ii. Yes	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: 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
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	iv. New initiatives independently evaluated, followed by field testing 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?	iii. Yes, extensively with industry, academia, and other utilities	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	ii. Yes

11.1.3.4 Category D. Asset management and inspections

	Avg cycle start maturity: 2	Avg current maturity: 2	Avg projected cycle end maturity: 2.2
	Capability 16. Asset inventory and condition assessments		
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
16a: What information is captured in the equipment inventory database?	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	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	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?	iii. Quarterly	iii. Quarterly	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	ii. A system and approach are in place to 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: 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
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?	ii. Based on up-to-date static maps of equipment types and environment	ii. Based on up-to-date static maps of equipment types and environment	ii. Based on up-to-date static maps of equipment types and environment
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	i. At least annually updated or verified static maps of equipment and environment
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?	ii. Based on up-to-date static maps of equipment types and environment	ii. Based on up-to-date static maps of equipment types and environment	ii. Based on up-to-date static maps of equipment types and environment
17f: What are the inputs to scheduling detailed 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	i. At least annually updated or verified static maps of equipment and environment
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?	ii. Based on up-to-date static maps of equipment types and environment	ii. Based on up-to-date static maps of equipment types and environment	ii. Based on up-to-date static maps of equipment types and environment
17i: What are the inputs to scheduling other 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	i. At least annually updated or verified static maps of equipment and environment

Capability 18. Asset inspection effectiveness			
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
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?	v. At the asset level	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	i. Based on wildfire risk in relevant area	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?	iii. QA/QC information is used to identify systemic deficiencies in quality of work and inspections, and recommend training based on weaknesses	iii. QA/QC information is used to identify systemic deficiencies in quality of work and inspections, and recommend training based on weaknesses	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

11.1.3.5 Category E. Vegetation management and inspections

	Avg cycle start maturity: 2.7	Avg current maturity: 2.7	Avg projected cycle end maturity: 3.3
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: 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
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	iii. Risk, as determined by predictive modeling of vegetation growth and growing conditions
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	iii. Predictive modeling of vegetation growth

Capability 23. Vegetation inspection effectiveness			
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
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?	iii. Based on predictive modeling based on vegetation and equipment type, age, and condition and validated by independent experts	iii. Based on predictive modeling based on vegetation and equipment type, age, and condition and validated by independent experts	iii. Based on predictive modeling based on vegetation and equipment type, age, and condition and validated by independent experts
23c: At what level of granularity are the depth of checklists, training, and procedures customized?	v. At the asset level	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: 2	By end of year 1 (current): 2	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?	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	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?	iii. None of the above	iii. None of the above	ii. Ignition and propagation risk modeling
24d: What biological modeling is used to guide clearance around lines and equipment	i. Species growth rates and species limb failure rates	i. Species growth rates and species limb failure rates	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?	ii. Yes	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?	ii. Yes	ii. Yes	ii. Yes

Capability 25. Vegetation fall-in mitigation			
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
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?	ii. Yes	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?	ii. Yes	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?	iii. QA/QC information is used to identify systemic deficiencies in quality of work and inspections, and recommend training based on weaknesses	iii. QA/QC information is used to identify systemic deficiencies in quality of work and inspections, and recommend training based on weaknesses	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

11.1.3.6 Category F. Grid operations and protocols

	Avg cycle start maturity: 2.5	Avg current maturity: 2.5	Avg projected cycle end maturity: 2.7
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

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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?	i. During any conditions	i. During any conditions	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?	iii. PSPS event are communicated to >98% of affected customers and >99.5% 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	iii. PSPS event are communicated to >98% of affected customers and >99.5% 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	v. Less than 0.1 hours	v. Less than 0.1 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: 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
31a: Is there a process for inspecting de-energized sections of the grid prior to re-energization?	iii. Existing process for accurately inspecting de-energized sections of the grid prior to re-energization, augmented with sensors and aerial tools	iii. Existing process for accurately inspecting de-energized sections of the grid prior to re-energization, augmented with sensors and aerial tools	iii. Existing process for accurately inspecting de-energized sections of the grid prior to re-energization, augmented with sensors and aerial tools
31b: How automated is the process for inspecting de-energized sections of the grid prior to re-energization?	iii. Mostly automated (>=50%)	iii. Mostly automated (>=50%)	iii. Mostly 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	iv. Within 12 hours	v. Within 8 hours
31d: What level of understanding of probability of ignitions after PSPS events does the utility have across the grid?	ii. Some probability estimates exist	ii. Some probability estimates exist	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: 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
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?	0	0	0
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

11.1.3.7 Category G. Data governance

	Avg cycle start maturity: 3	Avg current maturity: 3	Avg projected cycle end maturity: 3.5
	Capability 33. Data collection and curation		
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
33a: Does the utility have a centralized database of situational, operational, and risk data?	ii. Yes	ii. Yes	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?	iii. Yes, for both short term and long-term decision making	iii. Yes, for both short term and long-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?	ii. Yes	ii. Yes	ii. Yes

33e: Does the utility identify highest priority additional data sources to improve decision making?	iii. Yes, with plans to incorporate these into centralized database of situational, operational and risk data	iii. Yes, with plans to incorporate these into centralized database of situational, operational and risk data	iii. Yes, with plans to incorporate these into centralized database of situational, operational and risk data
33f: Does the utility share best practices for database management and use with other utilities in California and beyond?	ii. Yes	iii. Yes, with specific processes to do so in place	iii. Yes, with specific processes to do so in place

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?	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	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	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?	iii. Yes, disclosed publicly in WMP upon request	iv. Disclosed publicly as information becomes available (regardless of regulatory request)	iv. Disclosed publicly as information becomes available (regardless of regulatory request)

Capability 35. Near-miss tracking			
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
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?	ii. Yes	ii. Yes	ii. Yes
35c: Does the utility capture data related to the specific mode of failure when capturing near-miss data?	ii. Yes	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?	ii. Yes	ii. Yes	ii. Yes
35e: Does the utility use data from near misses to change grid operation protocols in real time?	ii. Yes	ii. Yes	ii. Yes

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

11.1.3.8 Category H. Resource allocation methodology

	Avg cycle start maturity: 1	Avg current maturity: 1.2	Avg projected cycle end maturity: 2.5
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): 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
37a: For what risk scenarios is the utility able to provide projected cost and total risk reduction potential?	ii. Utility provides an accurate high-risk reduction and low risk reduction 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	ii. Region level	iii. Circuit level
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?	ii. Yes	ii. Yes	ii. Yes
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): 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
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?	iii. All commercial initiatives and emerging initiatives	iii. All commercial initiatives and emerging initiatives	iii. All commercial initiatives and emerging 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?	iii. Yes, including the expected overall reduction in risk and estimates of impact on reliability factors	iii. Yes, including the expected overall reduction in risk and estimates of impact on reliability factors	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	ii. Region level	iii. Circuit 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): 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
39a: How accurate of a risk spend efficiency calculation can the utility provide?	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	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	ii. Regional	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?	iv. All	iv. All	0
39e: Can the utility evaluate risk reduction synergies from combination of various initiatives?	i. No	i. No	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): 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
40a: How accurate of a risk spend efficiency calculation can the utility provide?	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	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	iii. Circuit-based	iv. Span-based
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	0	0
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): 0	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	ii. Utility considers estimates of RSE when allocating capital	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?	ii. Specific information by initiative, including state of equipment and location where initiative will be implemented	ii. Specific information by initiative, including state of equipment 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: 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
42a: How does the utility develop and evaluate the efficacy of new wildfire initiatives?	iii. Utility uses pilots and measures direct reduction in ignition events and near-misses.	iii. Utility uses pilots and measures direct reduction in ignition events and near-misses.	iii. Utility uses pilots and measures direct reduction in ignition events and near-misses.
42b: How does the utility develop and evaluate the risk spend efficiency of new wildfire initiatives?	ii. Utility uses total cost of ownership	ii. Utility uses total cost of ownership	ii. Utility uses total cost of ownership
42c: At what level of granularity does the utility measure the efficacy of new wildfire initiatives?	iii. Circuit	iii. Circuit	iii. Circuit
42d: Are the reviews of innovative initiatives audited by independent parties?	i. No	i. No	ii. Yes
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

11.1.3.9 Category I. Emergency planning and preparedness

	Avg cycle start maturity: 4	Avg current maturity: 4	Avg projected cycle end maturity: 4
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?	iv. Span level	iv. Span level	iv. Span 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: 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
45a: Does the utility provide clear and substantially complete communication of available information relevant to affected customers?	iii. Yes, along with referrals to other agencies	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	iv. >99.9% of medical baseline customers	iv. >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: 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
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?	ii. Yes	ii. Yes	ii. Yes
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

11.1.3.10 Category J. Stakeholder cooperation and community engagement

	Avg cycle start maturity: 3.2	Avg current maturity: 3.6	Avg projected cycle end maturity: 3.8
Capability 48. Cooperation and best practice sharing with other utilities			
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
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?	ii. Yes	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: 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
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)?	i. No	i. No	i. No
49c: What percent of landowners are non-compliant with utility initiatives (e.g., vegetation management)?	iv. Less than 1 %	iv. Less than 1 %	iv. Less than 1 %
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: 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
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?	ii. Yes	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): 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
51a: What is the cooperative model between the utility and suppression agencies?	ii. Utility cooperates with suppression agencies by notifying them of ignitions	iii. Utility cooperates with suppression agencies by working cooperatively with them to detect ignitions, in addition to notifying them of ignitions as needed	iii. Utility cooperates with suppression agencies by working cooperatively with them to detect ignitions, in addition to notifying them of ignitions as needed
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?	ii. Yes	ii. Yes	ii. Yes
51d: Does the utility communicate fire paths to the community as requested?	ii. Yes	ii. Yes	ii. Yes
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: 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
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	iii. Utility conducts fuel management throughout service area
52b: Does the utility engage with other stakeholders as part of its fuel management efforts?	iv. Utility shares fuel management plans with other stakeholders, and coordinates fuel management activities, including adjusting plans, to cooperate with other stakeholders state-wide to focus on areas that would have the biggest impact in reducing wildfire risk	iv. Utility shares fuel management plans with other stakeholders, and coordinates fuel management activities, including adjusting plans, to cooperate with other stakeholders state-wide to focus on areas that would have the biggest impact in reducing wildfire risk	iv. Utility shares fuel management plans with other stakeholders, and coordinates fuel management activities, including adjusting plans, to cooperate with other stakeholders state-wide to focus on areas that would have the biggest impact in reducing wildfire risk
52c: Does the utility cultivate a native vegetative ecosystem across territory that is consistent with lower fire risk?	i. No	i. No	ii. Yes
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.　　SDG&E: 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 SDG&E'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

0	1	2	3	4

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: 3 Current: 3 End: 3	Start: 2 Current: 1 End: 2	Start: 2 Current: 2 End: 2	Start: 1 Current: 1 End: 2	Start: 2 Current: 2 End: 3	
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: 3 Current: 3 End: 3	Start: 3 Current: 3 End: 3	Start: 3 Current: 3 End: 3	Start: 2 Current: 2 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: 4 Current: 4 End: 4	Start: 2 Current: 2 End: 2	Start: 1 Current: 2 End: 2	Start: 2 Current: 2 End: 4	
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: 1 Current: 1 End: 2	Start: 2 Current: 2 End: 2	Start: 2 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: 3	Start: 3 Current: 3 End: 3	Start: 2 Current: 2 End: 4	Start: 4 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: 3 Current: 3 End: 3	Start: 4 Current: 4 End: 4
G. Data governance	33. Data collection and curation	34. Data transparency and analytics	35. Near-miss tracking	36. Data sharing with research community		
	Start: 4 Current: 4 End: 4	Start: 0 Current: 0 End: 2	Start: 4 Current: 4 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: 1 End: 2	Start: 1 Current: 1 End: 2	Start: 1 Current: 1 End: 2	Start: 1 Current: 2 End: 3	Start: 0 Current: 0 End: 4	Start: 2 Current: 2 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: 4 Current: 4 End: 4	Start: 4 Current: 4 End: 4	Start: 4 Current: 4 End: 4	
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: 4 Current: 4 End: 4	Start: 4 Current: 4 End: 4	Start: 4 Current: 4 End: 4	Start: 2 Current: 4 End: 4	Start: 2 Current: 2 End: 3	

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
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

Term	Definition
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

Term	Definition
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
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
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