THE PUBLIC ADVOCATES OFFICE
CALIFORNIA PUBLIC UTILITIES COMMISSION

COMMENTS OF THE PUBLIC ADVOCATES OFFICE ON THE 2020 WILDFIRE MITIGATION PLANS

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Glossary	
Abbreviation	**Full name or description**
AFN	Access and Functional Needs
ALJ Ruling on WMP Guidelines	*Administrative Law Judge's Ruling on Wildfire Mitigation Plan Templates and Related Material and Allowing Comment*, December 16, 2019
Bear Valley	Bear Valley Electric Service, a division of Golden State Water Company
BVES	Bear Valley Electric Service
Commission	California Public Utilities Commission
CPUC	California Public Utilities Commission
EFD	Early Fault Detection
FPI	Fire Potential Index
GIS	Geographical Information System
GRC	General Rate Case
HFTD	High Fire Threat District
IVR	Interactive Voice Response
Liberty	Liberty Utilities (CalPeco Electric) LLC
PacifiCorp	Pacific Power, a Division of PacifiCorp (doing business in California as PacifiCorp)
PG&E	Pacific Gas and Electric Company
PSPS	Public Safety Power Shutoff
RFW	Red Flag Warning
RSE	Risk Spend Efficiency
SCE	Southern California Edison Company
SDG&E	San Diego Gas & Electric Company
UAS	Unmanned Aerial System, i.e., drone
WMP	Wildfire Mitigation Plan

WMP Guidelines	The Commission's guidelines for 2020 WMP submissions. See Attachment 1 to the December 16, 2019 *Administrative Law Judge's Ruling on Wildfire Mitigation Plan Templates and Related Material and Allowing Comment*.
WSD	Wildfire Safety Division of the California Public Utilities Commission
WSD-001	*Resolution WSD-001 to Establish Procedures for the Wildfire Safety Division's Review of 2020 Wildfire Mitigation Plans Pursuant to Public Utilities Code Sections 8386 and 8386.3*, January 24, 2020
WUI	Wildland-Urban Interface

I. Introduction

Pursuant to the California Public Utilities Commission's (Commission) Rules of Practice and Procedure and Resolution WSD-001, the Public Advocate's Office at the California Public Utilities Commission (Cal Advocates) respectfully submits these comments on wildfire mitigation plans (WMPs) submitted by investor-owned electric utilities operating in California.

Bear Valley Electric Service (Bear Valley), Liberty Utilities (CalPeco Electric) LLC (Liberty), Pacific Gas and Electric Company (PG&E), PacifiCorp, San Diego Gas & Electric Company (SDG&E), and Southern California Edison Company (SCE) submitted and served wildfire mitigation plans on February 7, 2020, pursuant to Resolution WSD-001 and the *Administrative Law Judge's Ruling on Wildfire Mitigation Plan Templates and Related Material and Allowing Comment* (ALJ Ruling on WMP Guidelines), issued December 16, 2019. Resolution WSD-001 permits interested persons to serve comments by April 7, 2020.[1]

The Public Advocate's Office addresses the electric utilities' WMPs in the following order: PG&E, SCE, SDG&E, PacifiCorp, Liberty, and Bear Valley. We then conclude with recommendations applicable to all utilities.

[1] *Resolution WSD-001 to Establish Procedures for the Wildfire Safety Division's Review of 2020 Wildfire Mitigation Plans Pursuant to Public Utilities Code Sections 8386 and 8386.3*, issued January 24, 2020, p. 3.

II. Table of Recommendations

Item Number	Applies to:	Recommendation	Section of these Comments
1	PG&E	The WSD should require PG&E to submit a supplement within 30 days using the WMP Guidelines' normalization protocol for 2020.	III.B
2	PG&E	The WSD should require PG&E to submit a supplement that explains the need for the Process Quality Group and defines its role.	III.C
3	PG&E	The WSD should require PG&E to submit a revised Table 23, providing the number of circuit-miles slated to be hardened using covered conductor and the number miles to be undergrounded	III.D
4	PG&E	The WSD should require PG&E to calculate RSEs for all wildfire risk mitigation strategies.	III.E
5	SCE	The WSD should approve SCE's WMP on the condition that SCE submit a supplement to its plan within 30 days that details the parameters of the emerging technology pilots.	IV.B
6	SCE	SCE should evaluate its UAS drone pilot for termination and present this analysis and its recommendations in its 2021 WMP submission	IV.C
7	SCE	The WSD should direct SCE to obtain ten years of historical wind data and use it to determine high wind conditions for SCE's 2021 WMP submission.	IV.D
8	SDG&E	The WSD should require SDG&E to submit a supplement to its 2020 WMP within 30 days that addresses issues in the system hardening and vegetation management sections of SDG&E's WMP.	V.B
9	SDG&E	The WSD should require SDG&E to revise the system hardening section of the WMP.	V.C
10	SDG&E	The WSD should require SDG&E to revise the vegetation management section of its WMP.	V.D
11	PacifiCorp	The WSD should require an advice letter filing in October 2020 to address whether PacifiCorp is making progress in mitigating wildfire risks consistent with fulfilling the commitments made in the WMP.	VI.B
12	PacifiCorp	If PacifiCorp is unable to meet its current WMP goals, the WSD should require PacifiCorp to submit a full, three-year	VI.B

		WMP in 2021 that describes PacifiCorp's multi-year mitigation strategy, re-evaluates program goals and proposes remedial actions.	
13	PacifiCorp	The WSD should require PacifiCorp to demonstrate that its system hardening programs are on track.	VI.C
14	PacifiCorp	The WSD should require PacifiCorp to report on grid sectionalization progress in HFTD areas in the recommended October 2020 progress report advice letter.	VI.D
15	PacifiCorp	In future WMP filings, the WSD should require PacifiCorp to prioritize increasing grid sectionalization in its HFTD areas or explain why focusing these resources outside the HTFD is appropriate.	VI.D
16	PacifiCorp	The WSD should require PacifiCorp to proceed with its planned project to upgrade tracking, database management, and GIS mapping of its vegetation management, and report on program progress in the progress report advice letter.	VI.E
17	Liberty	The WSD should require Liberty to provide and clearly label the required geospatial data in its 2021 WMP filing.	VII.B
18	Liberty	The WSD should require Liberty to upgrade its GIS system and submit a complete asset inventory with its 2021 WMP submission.	VII.C
19	Liberty	The WSD should require Liberty to submit a full three-year WMP again in 2021.	VII.C
20	Bear Valley	The WSD should direct Bear Valley to submit a supplement to its 2020 WMP within 30 days via tier 2 advice letter.	VIII.B, VIII.D
21	Bear Valley	The WSD should require Bear Valley to provide an analysis of how the Ute Lines undergrounding project will mitigate wildfire risk and why undergrounding is the best option.	VIII.B
22	Bear Valley	The WSD should require Bear Valley to submit a supplement that provides a thorough analysis of resource constraints.	VIII.C
23	Bear Valley	The WSD should direct Bear Valley to submit a supplement that describes its emergency notification protocols for medical baseline customers or critical care customers.	VIII.D
24	All utilities	The WSD should hold workshops to refine the WMP Guidelines and process prior to 2021 WMP submissions.	IX.A
25	All utilities	The WSD should revise the data normalization method.	IX.A.1

26	All utilities	The WSD should develop uniform definitions of the terms "ignition" and "near miss."	IX.A.2
27	All utilities	The WSD should re-examine the value of forecast data on drivers of ignition probability and consider eliminating Table 31 from the WMP Guidelines.	IX.A.3
28	All utilities	The WSD should consider revising or eliminating several tables on baseline ignition probability and exposure to wildfire risk in Section 3 of the WMP Guidelines.	IX.A.4
29	All utilities	The WSD should clarify that utilities are required to detail planned system hardening projects in future WMP submissions.	IX.A.5
30	All utilities	For future WMP submissions, the WSD should specify that utilities are required to report an RSE estimate for each mitigation measure.	IX.A.6
31	All utilities	As a condition of approving 2020 WMPs, the WSD should require each utility to submit a supplement to justify its undergrounding projects before beginning construction.	IX.B
32	All utilities	Starting in 2021, the WSD should require the utilities to identify and justify planned undergrounding projects in each WMP submission, including annual updates.	IX.B
33	All utilities	The WSD should only approve the electric utilities' 2020 WMPs on the condition that each utility submit a supplement addressing resource constraints and feasibility	IX.C
34	All utilities	The WSD should revise the WMP Guidelines for future years to place greater emphasis on resource constraints, feasibility, and contingency planning.	IX.C
35	PG&E, SCE, and SDG&E	The WSD should require more robust risk-scoring models in 2021.	IX.D
36	PG&E, SCE, and SDG&E	As a condition of approving 2020 WMPs, the WSD should require each utility to submit a supplement demonstrating the accuracy of its wildfire models.	IX.E
37	PG&E, SCE, and SDG&E	For future WMP submissions, the WSD should require utilities to perform and publish validation analyses of the models they use to assess wildfire risk.	IX.E
38	All utilities	The WSD should establish a technical working group to review models used to assess wildfire risk.	IX.E

III. Pacific Gas and Electric Company (PG&E)

PG&E serves 5.51 million customers in its service territory in northern and central California. Its service territory covers 71,700 square miles,[2] and includes approximately 18,125 miles of overhead transmission lines[3] and 80,710 miles of overhead distribution lines.[4] PG&E has 30,600 miles of overhead lines (combined transmission and distribution) in High Fire Threat Districts (HFTD), with 22,200 of these miles in a Tier 2 HFTD and 8,400 miles in a Tier 3 HFTD.[5] Ten percent of PG&E's customers live in a HFTD.[6]

A. Summary of PG&E's 2020 WMP.

For its 2020 WMP, PG&E describes a wildfire risk mitigation strategy focused on vegetation management, line inspections, system hardening and improvements to its Public Safety Power Shutoff (PSPS) program. PG&E reports spending $2.44 billion in wildfire risk mitigation activities for 2019, which was slightly greater than its forecast amount of $2.27 billion.[7] For 2020 through 2022, PG&E forecasts over $9.00 billion in spending including $5.43 billion[8] for system hardening. As part of its system hardening spend, PG&E proposes to harden 1,060 miles of its distribution system at a cost of $1.63 billion.[9] PG&E also intends to replace bare wires with covered conductor in HFTD areas.

For vegetation management, PG&E plans to inspect over 25,000 miles of distribution lines in HFTD areas and perform remediation efforts across 5,400 miles at a total cost of $2.64 billion.[10] PG&E acknowledges that resource issues, such as

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[2] PG&E Response to CalAdvocates Data Request CA R.18-10-007 008-Q01, March 14, 2019.

[3] PG&E's WMP 2020, Table PG&E-2-1.

[4] PG&E's WMP 2020, Table PG&E-2-1.

[5] PG&E Response to CalAdvocates Data Request CA R.18-10-007 008-Q01, March 14, 2019.

[6] PG&E Response to CalAdvocates Data Request CA R.18-10-007 008-Q01, March 14, 2019.

[7] PG&E's 2020 WMP Table 21 through Table 30, aggregated expenses.

[8] PG&E's 2020 WMP Table 23, Grid Design and System Hardening.

[9] PG&E's 2020 WMP Table 23, System Hardening, Distribution.

[10] PG&E's 2020 WMP, Table 25.

availability of tree trimmers, may curtail its plans.[11] PG&E plans to spend about $53 million in 2020 for new or emerging technologies such as line sensor devices, substation upgrades, rapid earth fault detectors, and enhanced asset and wind load assessments.[12]

B. The WSD should require PG&E to re-submit normalized metrics and should revise the data normalization method in future years.

PG&E did not adhere to the data normalization methodology put forward in the WMP Guidelines, but its proposed modifications make sense.[13] The Wildfire Safety Division (WSD) should require the other utilities to adopt, with modification, the method used by PG&E in its 2020 WMP. The WMP Guidelines establish a normalization protocol and request that utilities add a "normalized" line below certain reported data to enable a like comparison between utilities. The protocol calls for utilities to normalize data that is likely to vary year-to year based on fire-weather conditions. The protocol calls for reported metrics to be divided by Red Flag Warning days per circuit mile times the number of days the RFW is under effect.

PG&E contends that Red Flag Warning days should be normalized by total *overhead* circuit miles within HFTD Tier 2 and Tier 3 areas only.[14] PG&E explains that the overhead system "represents a far greater fire risk in comparison to the underground system," and HFTD Tier 2 and 3 areas "represent the greatest wildfire risk."[15] In addition, PG&E converts total Red Flag Warning hours into 24-hour time periods to more precisely determine Red Flag Warning days, instead of relying on gross Red Flag Warning days.

PG&E reports normalized data based upon its own methodology.[16] As such, the denominator used by PG&E to report its data is smaller than those specified in the WMP

[11] PG&E's 2020 WMP, p. 5-193.

[12] PG&E's 2020 WMP, Table 5.1.D.3, pp. 5-13 through 5-15.

[13] WMP Guidelines, pp. 4-5.

[14] PG&E's WMP 2020, pp. 2-9 and 10.

[15] PG&E's 2020 WMP, p. 2-9, 10

[16] PG&E's 2020 WMP, Table 2.

Guidelines, making PG&E's normalized data inconsistent with the guidelines. Thus, PG&E's normalized values cannot be compared with normalized data submitted by the other utilities.

The WSD should require PG&E to make a supplemental filing using the WMP Guidelines' normalization protocol for 2020 so that PG&E's data conforms with data submitted by the other utilities.[17] Specifically, the WSD should approve PG&E's WMP on the condition that PG&E submit a supplement within 30 days,[18] via tier 2 advice letter, that provides all metrics in the format required in the WMP Guidelines.

For future years, the Public Advocates Office recommends that the WSD modify its normalization guidelines to conform with the methodology used by PG&E, with one modification, as discussed below in Section IX.A of these comments (generally applicable recommendations).

C. The WSD should direct PG&E to define the functions of the proposed Process Quality Group.

PG&E states that monitoring and auditing of plan activities will fall to its WMP implementation teams, the WMP Program Management Office (PMO) and the Internal Audit organization.[19] In addition, PG&E plans on creating a new group in 2020 known as the Process Quality Group to exist alongside its Internal Audit and Electric Quality Assurance groups.[20] This group will be responsible for "establishing and monitoring process control measures and notifying responsible parties to take corrective measures when predefined inspection quality standards are not achieved."[21] It is not clear how the role of the Process Quality Group differs from that of the other groups responsible for plan implementation quality assurance. In particular, PG&E does not explain how the

[17] The WSD has authority to require a supplemental WMP submission under Public Utilities Code Section 8386(c)(22), which requires electrical corporations to submit a wildfire mitigation plan that includes "any other information that the Wildfire Safety Division may require."

[18] The Public Advocates Office recommends that the 30-day clock commence when the WSD issues its resolution regarding PG&E's WMP.

[19] PG&E's 2020 WMP, p. 5-28.

[20] PG&E's 2020 WMP, p. 5-30.

[21] PG&E's 2020 WMP, p. 5-30.

duties of the Process Quality Group will differ from those of the Electric Quality Assurance group.

PG&E should clearly define the role and scope of work for the group. In particular, PG&E should explain how the new group neither duplicates existing functions nor causes important oversight responsibilities to fall between the cracks in the organizational structure.

The WSD should require PG&E to submit a supplement to its WMP that explains the need for the Process Quality Group and defines its role. This supplement should occur on the same 30-day timeframe noted above.

D. The WSD should require PG&E to provide more information about its planned system hardening initiatives.

System hardening is a broad category that covers wide range of distribution and transmission infrastructure improvements. It represents the largest proposed spend ($367 million) of all the wildfire risk mitigation measures in PG&E's 2020 WMP.[22]

For 2020-2022, PG&E proposes to harden 1,060 circuit-miles of line, but PG&E does not state how many circuit-miles of covered conductor it plans to install,[23] even though the WMP Guidelines require this information.[24] The Public Advocates Office is unable to ascertain how many circuit-miles of line PG&E plans to replace with covered conductor line versus how many circuit-miles it plans to underground. Vegetation contact is the number one incident category, and covered conductors can mitigate the risk of ignition from vegetation contact. PG&E acknowledges that it does not have a targeted covered conductor program,[25] yet PG&E states that it will replace all bare overhead lines, both primary and secondary, with covered conductor in HFTD areas,[26] and that only a

[22] PG&E's 2020 WMP, Table 23.

[23] PG&E's 2020 WMP, p. 5-116.

[24] Table 23 of the WMP Guidelines directs utilities to separately provide information on the extent of planned and actual work in several categories of grid design and system hardening improvements. The listed categories include "covered conductor installation" and "undergrounding of electric lines and/or equipment."

[25] PG&E's 2020 WMP, p. 5-116, Section 5.3.3.3.

[26] PG&E's 2020 WMP, pp. 5-140 and 5-141, Section 5.3.3.17.1.

"relatively small portion of the circuit miles included in the System Hardening Program will be undergrounded."[27]

The Public Advocates Office recommends that the WSD require PG&E to provide the number of circuit-miles slated to be hardened using covered conductor, and the number miles to be undergrounded. The WSD should direct PG&E to submit a revised Table 23, including this information, as part of the supplemental filing noted above. The WSD should also clarify that utilities will be required to provide this information in future WMP submissions.

E. The WSD should require PG&E to report Risk Spend Efficiency estimates for each wildfire mitigation strategy.

PG&E calculates Risk Spend Efficiencies (RSE) for only four mitigation programs related to wildfire risk: system hardening (HFTD areas), enhanced vegetation management (HFTD areas), surge arrestor replacement (entire service territory), and PSPS for HFTD areas. For the other mitigation programs, PG&E states that it is unable to calculate an RSE.[28] RSEs range from a low of under 1 for replacement of surge arrestors to over 40 for PSPS events. The higher the RSE, the more beneficial it is to make the system improvements or conduct the activity. The WMP Guidelines require that for each mitigation measure, utilities must report an RSE.[29] The purpose for this is to guide the utilities spending to measures that are most efficient for reducing risk. In PG&E's case, the utility does not have specific programs for the discrete categories and instead combines several mitigations measures into a broader category. This approach makes it more difficult to determine which mitigation is more useful and cost-efficient in reducing ignitions.

The Public Advocates Office recommends that the WSD require PG&E to calculate RSEs for all wildfire risk mitigation strategies in order to make it easier for stakeholders to see the relative value of different approaches to reducing the risk of ignitions.

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[27] PG&E's 2020 WMP, p. 5-142, Section 5.3.3.17.1.

[28] PG&E's 2020 WMP, p. 5-227.

[29] PG&E's 2020 WMP, RSE column, Tables 21 through 30; WMP Guidelines, Tables 21 through 30.

F. Conclusion

The Public Advocates Office recommends that the Wildfire Safety Division require PG&E to make a supplemental WMP submission,[30] via tier 2 advice letter, that:

- Reports metrics following the WMP Guidelines' normalization protocol for 2020, so that PG&E's reported normalized data can be compared with that provided by the other utilities.
- Explains the need for the new Process Quality Group and to define its distinct role.
- Provides the number of circuit-miles PG&E plans to harden using covered conductor, and the number of miles it plans to underground.
- Provides RSEs for all wildfire risk mitigation strategies.

IV. Southern California Edison Company (SCE)

A. Overview of SCE's WMP.

SCE has the second-largest electric service territory in the state, covering approximately 50,000 square miles, in central, coastal and southern California, and serving over 15 million people.[31] Approximately 27 percent of SCE's service territory is in HFTD Tier 2 or Tier 3 areas, and approximately 29 percent of SCE's overhead distribution and transmission lines are in HFTD areas.[32]

SCE's forecasts that its 2020 through 2022 WMP costs will total $2.7 billion in capital expenditures and $1.2 billion in operations and maintenance expenses. Many of SCE's WMP programs and activities are included in its Grid Safety and Resiliency Program (GSRP) Application[33] or are extensions of programs described in its 2019 WMP. SCE uses lessons from implementation of its 2019 WMP to accelerate work where possible.

SCE's 2020 WMP (covering the years 2020-2022) contains 69 specific activities related to infrastructure hardening, vegetation management, inspections and

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[30] Public Utilities Code Section 8386(c)(22).

[31] SCE Response to Public Advocates Office Data Request CalAdvocates-SCE-R1810007-03.

[32] SCE Response to Public Advocates Office Data Request CalAdvocates-SCE-R1810007-03.

[33] A.18-09-002, *Application of SCE for Approval of Its Grid Safety and Resiliency Program*, September 10, 2018.

remediations, situational awareness, and de-energization. SCE's 2020 WMP includes advancements in new technologies, data analytics capabilities, and risk modeling.

B. The WSD should require SCE to provide key information regarding its emerging technology pilots.

The WSD should require SCE to provide a supplement to its 2020 WMP with more information about the new programs and technology SCE is piloting. While SCE's 2020 WMP includes advancements in new technology and data analytics and capabilities, SCE's 2020 WMP lacks key information about the specific pilot programs it will deploy in 2020. SCE states that deployment of certain pilot programs may be accelerated, delayed, or terminated based on "factors such as pilot performance, competing technology options and prioritization of work efforts."[34] SCE identifies specific technologies to be piloted and how they may be beneficial to SCE's wildfire mitigation efforts, but does not include specifics about pilot parameters, implementation strategy, or criteria of success.

For example, SCE's Early Fault Detection (EFD) Evaluation description states that SCE plans to install at least 10 EFD sensors, but up to 90 sensors are included in the scope of the pilot for evaluation depending on lessons learned, costs and material availability.[35] SCE does not state how many EFD sensors it forecasts to be installed in 2020 or 2021, but states that in 2022 it will evaluate the technology and develop potential next steps.[36] SCE should state what criteria will be used to evaluate the technology, and how it will determine the success of the technology. SCE should also explain what its potential next steps for deployment of this technology will be, if the pilot proves successful.

The WSD should require SCE to submit a supplement to its 2020 WMP with further information about the emerging technology pilots and evaluations. For each pilot or evaluation, this additional information should include the expected timeline and scale of deployment, success criteria that each activity will be held to, what the grounds for

[34] SCE 2020 WMP, p. 5-51.

[35] SCE 2020 WMP, p. 5-51.

[36] SCE 2020 WMP, p. 5-51.

termination will be, and other specifics about how the pilot will be implemented in 2020 and future years.

Therefore, the WSD should approve SCE's WMP on the condition that SCE submit a supplement to its plan within 30 days, via a tier 2 advice letter, that details the parameters of the emerging technology pilots.[37]

C. SCE should identify an evaluation date for its Advanced Unmanned Aerial Systems Study.

In 2019, SCE evaluated the capabilities of its Extended Visual Line of Sight (EVLOS) Unmanned Aerial System (UAS drone) study.[38] SCE will conduct additional demonstration flights in 2020 and "anticipates operationalizing this capability sometime in 2021-2022" in limited areas.[39, 40] The Public Advocates Office recommends that SCE evaluate the success of the pilot program this year and report its findings in its 2021 WMP submission, as well as including a recommendation regarding whether the pilot program should be continued or terminated.

SCE states that additional demonstration flights are needed to prove the viability and effectiveness of using UAS drones compared to traditional patrolling methods, and will conduct additional demonstration flights in 2020.[41] SCE reports that it encountered several challenges during the first round of field demonstrations, which SCE hopes to improve on in the next round of demonstration flights.[42] Among these challenges, the UAS drone sensor "provided inadequate quality data for inspection of assets during patrol, and live-feed transmission was unreliable and inadequate for inspection of assets

[37] The Public Advocates Office recommends that the 30-day clock commence with the WSD's approval of the WMP, if SCE's WMP is approved.

[38] SCE 2020 WMP, p. 5-88.

[39] SCE 2020 WMP, p. 5-88.

[40] SCE Response to Data Request CalAdvocates-SCE-2020WMP-02, Q. 02.

[41] SCE 2020 WMP, p. 5-89.

[42] SCE Response to Data Request CalAdvocates-SCE-2020WMP-02, Q. 02.

during patrol."[43] The UAS drone also did not achieve the stated objective of reaching a three-mile distance from the pilot in command.[44]

SCE has identified recommendations for how to improve on these challenges and will improve pre-flight planning through the additional demonstration flights in 2020. However, should the UAS drone pilot study still yield unsatisfactory results to that fail to prove the benefits of the technology in 2020, the Public Advocates Office recommends that SCE evaluate the pilot study for termination, and present this analysis and its recommendations in its 2021 WMP submission.

D. The WSD should direct SCE to use ten years of wind data in its 2021 WMP submission.

The WMP Guidelines require SCE to provide the 95th and 99th percentile wind conditions in circuit mile days, using ten years of wind data (2005 to 2014).[45] This data is presented in Table 10 of SCE's 2020 WMP, but SCE uses its historical, modeled wind gust data from 2009 to 2014 to calculate the 95th and 99th percentile wind values for each circuit. In response to a Public Advocates Office data request, SCE states that the data for years prior to 2009 was not available at the time of WMP submission.[46]

SCE's limited data on historical wind conditions does not merit rejecting SCE's WMP, but SCE should improve this next year. To the extent that the data for the years 2005 to 2008 is available, SCE should be required to calculate the 95th and 99th percentile wind conditions using data from 2005 to 2014, as required by Table 10 in the WMP Guidelines. Therefore, the WSD should direct SCE to obtain ten years of historical wind data and use it to determine high wind conditions for SCE's 2021 WMP submission.

E. Conclusion

The Public Advocates Office makes the following recommendations regarding SCE's WMP:

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[43] SCE Response to Data Request CalAdvocates-SCE-2020WMP-02, Q. 02.

[44] SCE Response to Data Request CalAdvocates-SCE-2020WMP-02, Q. 02.

[45] WMP Guidelines, Table 10.

[46] SCE Response to Data Request CalAdvocates-SCE-2020WMP-02, Q. 03.

- The WSD should approve SCE's WMP on the condition that SCE submit a supplement providing key information regarding the emerging technology pilots.[47]
- If the UAS drone technology does not show satisfactory results in 2020, SCE should evaluate whether the UAS drone pilot merits continuation or termination. SCE should present its findings and recommendations in its 2021 WMP submission.
- The WSD should direct SCE to estimate high wind conditions based on ten years of historical wind data in its 2021 WMP submission.

V. San Diego Gas & Electric Company (SDG&E)

A. Introduction

SDG&E is a California electric and gas utility, which provides retail electric service to approximately 1.5 million customer accounts in Southern California.[48] SDG&E's service territory covers over 4,100 miles in San Diego and Orange counties.[49] Approximately 34 percent (or 1,401 square miles) of SDG&E's service territory is in an HFTD Tier 2, and 35 percent (1,437 square miles) is in an HFTD Tier 3.[50] While nearly 69 percent of SDG&E's service territory is within an HFTD, only about 16 percent of total customer accounts are located within these areas.[51]

As of 2019, SDG&E's service territory includes 2,005 miles of electric transmission lines, of which 1,834 (91 percent) are overhead and 171 (9 percent) are underground. SDG&E's electric distribution system is 17,225 miles, of which 6,502 (38 percent) are overhead and 10,723 (62 percent) are underground.[52] SDG&E's service territory includes 4,502 miles of overhead transmission and distribution lines in an

[47] Public Utilities Code Section 8386(c)(22).

[48] SDG&E Response to CalPA Data Request CA R.18-10-007 002, March 14, 2019.

[49] SDG&E Response to CalPA Data Request CA R.18-10-007 002, March 14, 2019.

[50] SDG&E Response to CalPA Data Request CA R.18-10-007 002, March 14, 2019.

[51] SDG&E Response to CalPA Data Request CA R.18-10-007 002, March 14, 2019.

[52] SDG&E Response to CalPA Data Request CA R.18-10-007 002, March 14, 2019.

HFTD, of which 2,550 miles are in an HFTD Tier 2 and 1,952 miles are in an HFTD Tier 3.[53]

SDG&E's total proposed spending for its 2020-22 WMP is expressed as a range; with a low estimate of $1.1 billion and a high estimate of $1.6 billion.[54] Major spending categories include its Grid Design and System Hardening initiatives, estimated to cost between $696 million and $1 billion; Asset Management Inspections, estimated between $132 million and $160 million; and Vegetation Management and Inspections Initiatives, estimated at $150 million to $224 million.

B. Recommendations

The Public Advocates Office has identified two specific areas where SDG&E's WMP should be modified to appropriately focus on the most serious risk factors for catastrophic wildfires.

First, SDG&E's system hardening plan places too much emphasis on mitigations to ensure service reliability in the event of a de-energization event, rather than focusing on mitigations that provide the most effective and efficient reduction of wildfire risk. SDG&E proposes to harden entire circuits in the PSPS zone, however doing so shifts focus away from existing asset hardening programs which are targeted based on maximizing risk-reduction. As a result, SDG&E proposes a number of mitigations such as whole-home generators for select customers in the PSPS zone that do not directly reduce wildfire risk.

Second, SDG&E has proposed to implement a 25-foot post-prune tree trim clearance in the HFTD, a significant increase over the 12-foot clearance required by General Order 95.[55] The Commission previously rejected this proposal when SDG&E made it in its 2019 WMP.[56] The Commission ordered SDG&E to provide additional evidence that the change would be effective at reducing wildfire risk, and to provide

[53] SDG&E Response to CalPA Data Request CA R.18-10-007 002, March 14, 2019.

[54] SDG&E Revised 2020 WMP, information compiled from Tables 21 – 29.

[55] GO 95, Appendix E.

[56] SDG&E 2019 WMP, pp. 43-44.

detailed guidelines for determining where a 25-foot clearance would be both feasible and necessary.[57] SDG&E's 2020 WMP filing does not provide clear criteria for when or where the expanded clearance will be applied, or show that increasing the post-prune clearance will provide any incremental reduction in wildfire risk.

The system hardening and vegetation management programs are central to SDG&E's overall WMP. In terms of forecast spending, these programs make up about 76 percent of the total WMP forecast spending for 2020-2022 using SDG&E's low scenario, and about 79 percent of the total using SDG&E's high scenario.[58] Because these two programs are core to the overall WMP strategy, the WSD should direct SDG&E to improve or clarify its 2020 WMP as discussed below.

To address the issues with SDG&E's system hardening and vegetation management programs these comments make the following recommendations regarding SDG&E's WMP:

- The WSD should require SDG&E to submit a supplement to its 2020 WMP within 30 days[59] that addresses the following issues:
    - SDG&E should revise the system hardening section of its 2020 WMP to focus on wildfire risk reduction not reliability. Circuit-based hardening efforts should be focused on mitigating the community impact of PSPS events, rather than on ensuring service reliability to individual customers. Alternatively, SDG&E should demonstrate that its current strategy is optimally designed to reduce the risk of catastrophic wildfires.
    - SDG&E should comply with D.19-05-039 by providing clear and detailed documentation of the criteria for its determination that a 25-foot post-prune clearance is both feasible and necessary.

[57] D.19-05-039, p. 10.

[58] SDG&E Revised 2020 WMP, information compiled from Tables 21 – 29.

[59] The Public Advocates Office recommends that the 30-day clock commence when the WSD issues its resolution.

C. The WSD should require SDG&E to revise the system hardening section of the WMP.

SDG&E's system hardening strategy is shifting. Rather than targeting individual system assets for hardening based solely on risk reduction, SDG&E plans to implement system hardening programs that harden entire circuits or circuit segments to mitigate the potential for service interruptions in SDG&E's PSPS zones, and to reduce the number of customers who are subject to PSPS events. This is a major change of strategy, which may lead to the prioritization of system hardening projects that are primarily intended to provide reliability benefits to a small number of customers who may be subject to PSPS events. Correspondingly, SDG&E is reducing the priority given to system hardening projects that aim to reduce the risk of causing a catastrophic wildfire.

In order to address the serious concerns with the scope of SDG&E's system hardening programs raised herein, the WSD should require SDG&E to demonstrate that the system hardening section of its WMP is well targeted to reduce wildfire risk. The revised system hardening plan should place more emphasis on minimizing the risk of catastrophic wildfire and deemphasize system hardening efforts where the primary focus is on increasing individual service reliability in the case of a PSPS event. Circuit-based hardening should not be the default strategy, except where SDG&E can show that it provides community benefits, or where it can be demonstrated to be the best available mitigation option for a given circuit. Alternatively, where SDG&E can demonstrate that the strategies described in its current 2020 WMP submission are the best available approach to reduce wildfire risk, SDG&E should provide evidence to justify its current approach.

1. SDG&E's WMP emphasizes resiliency over reducing the risk of catastrophic wildfires.

SDG&E's focus on mitigating the harms of PSPS is a divergence from the core purpose of the WMP: to reduce the risk of catastrophic wildfires caused by utility equipment. In the WMP, each electric utility is required to provide:

> A description of the preventive strategies and programs to be adopted by the electrical corporation to minimize the risk of its electrical lines and equipment causing catastrophic

wildfires, including consideration of dynamic climate change risks.[60]

SDG&E proposes to continue identifying assets that pose a risk of igniting a catastrophic wildfire and then mitigating those risks, but also proposes to give seemingly equal weight to reducing the harm caused customers by its voluntary decisions to de-energize lines. The de-energization rulemaking may be a more appropriate venue to consider how to mitigate the impact of de-energization on customers. Public Utilities Code Section 8386 calls for utilities' WMPs to provide a strategy for mitigating the effects of de-energization on specific high-priority public facilities and customers.[61] However, it is not the purpose of a WMP to mitigate the effects of de-energization on customers generally. These issues are important, but they are better addressed in a holistic way across utilities in the de-energization proceeding.[62]

2. SDG&E focuses on hardening entire circuits to mitigate the impact of de-energization events.

SDG&E's WMP proposes to begin targeting system hardening programs to mitigate the reliability effects of potential PSPS events within the HFTD. SDG&E states that "system hardening programs are evolving to address not only the reduction of wildfire risk, but also the mitigation of the scale and impacts of PSPS events."[63] This shift has resulted in lowering the priority of some asset-based mitigations proposed in 2019, which will "continue in parallel [to circuit based efforts] but will be completed over an extended timeframe."[64]

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[60] Public Utilities Code Section 8386(c)(3).

[61] Public Utilities Code Section 8386(c)(6): "each electrical corporation shall include protocols related to mitigating the public safety impacts of disabling reclosers and deenergizing portions of the electrical distribution system that consider the impacts on all of the following:

(A) Critical first responders.

(B) Health and communication infrastructure.

(C) Customers who receive medical baseline allowances…"

[62] Phase 2 of R.18-12-005 is explicitly scoped to address issues relating the mitigation of PSPS events.

[63] SDG&E Revised 2020 WMP, p. 65.

[64] SDG&E Revised 2020 WMP, p. 39.

To mitigate PSPS impacts on the circuit level, SDG&E proposes to employ "a combination of strategic undergrounding, remote sectionalizing, covered conductor, overhead hardening, microgrids, and SDG&E provided customer generation to reduce customer impacts."[65] While in concept these proposals sound reasonable, SDG&E has not demonstrated that these circuit-based mitigations amount to a more cost-effective mitigation of risk than SDG&E's current asset-based mitigations. SDG&E acknowledges the uncertainty, and states that "asset based hardening strategies are more risk spend efficient according to SDG&E's current models. However, current models do not account for all the customer impacts of PSPS events."[66]

Some applications of circuit-based hardening may in fact be sufficiently cost-effective relative to the mitigated risk to warrant implementation, and SDG&E should continue to refine its risk model to incorporate the broad impact of PSPS events. However, circuit-based hardening should not be the default strategy unless SDG&E can show that this is the best available risk mitigation option for a given circuit.

3. SDG&E's WMP places too much focus on reliability objectives related to PSPS.

The system hardening strategy outlined in SDG&E's WMP places more emphasis on reliability than is warranted given the relative rarity and the small number of customers impacted by PSPS events in SDG&E's service territory. To put SDG&E's PSPS events in perspective, since 2013, SDG&E has reported de-energizing approximately 95,000 customers, with an average outage duration of approximately 33

[65] SDG&E Revised 2020 WMP, p. 134.

[66] Public Advocates Office Data Request: CALPA-SDG&E-03, Q3.

hours.[67] In 2019, just over 48,000[68] customers were de-energized with an average duration of approximately 30.5 hours.[69]

In terms of total customer hours, de-energization events represent only about one third of all outages on SDG&E's system in the year 2019.[70] Since customers who live in the HFTD will experience more outages than other SDG&E customers, some level of investment in mitigating PSPS event likelihood may be justified, but not the wholesale programmatic changes proposed for SDG&E's 2020 WMP.

4. SDG&E should eliminate the whole-home generator program.

SDG&E's emphasis on PSPS-related reliability has resulted in proposed mitigations that appear to be primarily intended to produce relatively minor reliability gains for a small number of customers, rather than to produce an overall reduction in the risk of catastrophic wildfire. For example, the purpose of the whole-home generator program is to install generators for some residential customers in areas with high PSPS risk and low customer density, where the cost of circuit hardening for PSPS mitigation would exceed the cost of providing these customers with generation resources.

The program as proposed by SDG&E lacks key implementation details. For example, SDG&E states that it is "currently evaluating a broad range of generators from fossil fuel generators to renewable resources."[71] While SDG&E intends to provide the

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[67] *See* CPUC De-Energization spreadsheet through December 31, 2019. The spreadsheet was filtered to include only SDG&E and then the outage hours and total customers impacted columns were analyzed. https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/News_Room/NewsUpdates/2020/De-energization%20Event%20History%20Thru%20Dec%2031%202019%20(as%20of%20Jan%2010%202020).xlsx

[68] Note that more than half (48,000) of the total (95,000) customers experiencing a de-energization did so in 2019.

[69] *See* CPUC De-Energization spreadsheet through December 31, 2019. The spreadsheet was filtered to include only SDG&E and data from 2019, and then the outage hours and total customers impacted columns were analyzed.

[70] In 2019, SDG&E customers experienced a total of 4,012,634 customer hours of outages. Of these, 1,325,490 customer hours were PSPS-related outages, 1,617,201 customer hours were unplanned outages, and 1,069,943 customer hours were (non-PSPS) planned outages. SDG&E Revised 2020 WMP, p. 3 and p. 20.

[71] Public Advocates Office Data Request: CALPA-SDG&E-02, Q1.

generator and installation at no cost to the customer, the customer would then be expected to "own and maintain the generators."[72]

SDG&E proposes to install between 240 and 360 generators per year,[73] at a cost of between $7.6 and $9.2 million per year.[74] On a unit cost basis, this amounts to about $25,600 and $31,700 per generator, a cost that appears to be substantially higher than the cost of a customer purchasing generation resources on their own. In 2019 testimony before the Commission, the Solar Energy Industries Association and Vote Solar (SEIA/VS) estimated that the upfront equipment cost[75] of a California Air Resources Board compliant portable inverter[76] electric generator sized to provide 3.5 kW of residential resiliency would be $2,390.[77] Thus, SDG&E's lowest cost estimate for the whole-home generation program is nearly 11 times as expensive as SEIA/VS's estimate. These substantially inflated costs would provide only minor reliability gains to a small number of customers.

In addition to concerns relating to cost and equity, the SDG&E program may have potentially serious environmental and safety impacts. SDG&E has not yet developed a sufficiently detailed plan to determine what type of generation resources would be employed, but has not ruled out using fossil generation, which raises safety and environmental concerns.[78] Requiring the use of renewable generation can alleviate some of these potential impacts, but does nothing to address concerns with cost and equity, and cannot entirely alleviate the safety concerns with SDG&E's proposal. SDG&E expects

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[72] Public Advocates Office Data Request: CALPA-SDG&E-02, Q1.

[73] SDG&E Revised 2020 WMP, p. 52.

[74] SDG&E Revised 2020 WMP, p. 42.

[75] Upfront costs included here include $1,650 for a 3.5 kW generator, $140 in state sales tax, and $600 for the installation of a transfer switch.

[76] Portable inverter generators are a premium product because they are substantially quieter than ordinary generators. Ordinary generators are less expensive.

[77] Rulemaking 14-10-003, *Prepared Direct Testimony of R. Thomas Beach on behalf of the Solar Energy Industries Association and Vote Solar*, October 7, 2019, p. 69.

[78] The Commission should not approve a program that encourages residential customers in areas prone to catastrophic wildfires to store flammable fossil fuels on their property. In fact, the Commission found in its Decision on SDG&E's 2019 WMP that "it is possible that gasoline-fueled back-up generators will create additional fire risk," D.19-05-039, Finding of Fact #5, p. 26.

the customer to own and maintain the generator, with no provision for the possibility that customers are unable or unwilling to perform necessary maintenance to operate the equipment safely, or to provision fuel.

Finally, the whole-home generator program is not authorized by Public Utilities Code Section 8386[79] and, therefore, should neither be included in the WMP nor recorded to a WMP-related memorandum account. Although Section 8386 does not prevent SDG&E from implementing the whole-home generator program under other authority,[80] SDG&E fails to identify any authority that supports the proposed program.[81]

The whole-home generator program proposed by SDG&E is primarily a reliability program, and raises serious concerns regarding safety, environmental impact, and equity. Unless SDG&E can explain how the program furthers wildfire mitigation, the program should be removed from SDG&E's WMP.

5. SDG&E's WMP should focus on community resources and vulnerable customers when determining where to employ circuit-based mitigations to increase reliability.

SDG&E should address customer vulnerability during a PSPS event at the community level, and can do so in a more cost-effective way than by trying to fully insulate a few individual customers from PSPS-related outages. Targeting benefits to the community (through mitigation of PSPS impacts to schools, community centers, and critical facilities) is almost certainly more impactful and cost-effective than targeting individual customers.

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[79] Public Utilities Code Section 8386(c)(6)(C): "The electrical corporation may deploy backup electrical generation resources or provide financial assistance for backup electrical resources to a customer receiving a medical baseline allowance for a customer who meets all of the following requirements:

(i) The customer relies on life-support equipment that operates on electricity to sustain life.

(ii) The customer demonstrates financial need...

(iii) The customer is not eligible for backup electrical resources provided through medical services, medical insurance, or community resources."

[80] Public Utilities Code Section 8386(c)(6)(D): "Subparagraph (C) shall not be construed as preventing an electrical corporation from deploying backup electrical resources or providing financial assistance for backup electrical resources under any other authority."

[81] SDG&E Revised 2020 WMP, p. 83.

SDG&E's WMP includes steps in this direction. For example, SDG&E states that PSPS mitigation efforts included in its WMP will mitigate PSPS events to "nearly all public schools (approximately two dozen) that had previously been subject to a PSPS event."[82] SDG&E should extend this approach by identifying any other community resources that are highly vulnerable to de-energization and prioritizing these facilities.

SDG&E may be correct that there are situations where targeting undergrounding or other circuit-based mitigations at certain groups of customers on certain circuits will provide sufficient benefit to be the best mitigation option. In such cases, SDG&E should justify each project, by providing a description of the project, an analysis of alternatives to mitigate wildfire risk, and a comparison of the risk-spend efficiency of the alternatives. This justification should be included in SDG&E's WMP or in a subsequent tier 2 advice letter to be submitted before SDG&E begins hardening the circuit.

SDG&E is correct that vulnerable customers require special consideration, and targeted programs such as the generator grant program for medical baseline customers are appropriate and supported by Public Utilities Code Section 8386. It is much less clear, however, that the whole-home generation projects proposed by SDG&E, which at best would provide minimal reliability returns to a small number of individual customers based on system geography rather than legitimate need, are justified in comparison to other investments that actually reduce the risk of wildfires.

D. The WSD should require SDG&E to revise the vegetation management section of its WMP.

SDG&E's 2020 WMP proposes to modify the scope of its tree-trimming program "to achieve a 25-foot clearance post-prune, where feasible, between trees and electric facilities within the HFTD."[83] As SDG&E states, this is "a significant increase over the average 12 feet post-prune clearance that SDG&E currently achieves."[84]

[82] SDG&E Revised 2020 WMP, p. 135.

[83] SDG&E Revised 2020 WMP, p. 122.

[84] SDG&E Revised 2020 WMP, p. 122.

SDG&E made this proposal in its 2019 WMP, nearly verbatim.[85] In D.19-05-039, the Commission declined to approve the proposal, finding that while a 25-foot clearance may be appropriate in some circumstances, applying a 25-foot clearance to all trees in the HFTD was inappropriate. The Commission then specifically directed that:

> In SDG&E's next WMP, it shall propose, in detail, guidelines for where a 25-foot post-trim clearance for vegetation management is both feasible and necessary. If SDG&E plans to create a 25-foot clearance during this WMP cycle, it may only do so if such a practice is supported by scientific evidence or other data showing that such clearance will reduce risk under wildfire conditions.[86]

SDG&E has not made the required showing. Specifically, SDG&E has not presented any new data or analysis in this WMP that justifies implementing a 25-foot post-prune clearance throughout the HFTD, and does not provide the detailed proposal and supporting evidence expressly required by the Commission. SDG&E fails to comply with the requirements imposed by D.19-05-039, and instead repeats the same proposal that the Commission declined to adopt in 2019 almost verbatim.

Both the need for and absence of such a showing are evident in SDG&E's WMP. For example, SDG&E states that "eucalyptus, palm, oak, pine, and sycamore" are target species[87] for enhanced trimming and removal, and that "the criteria for determining target species include factors such as growth rate and characteristics, failure potential, outage history, and other environmental factors."[88] However, this contention lacks specific detail regarding how these factors are to be applied, or what specific factors led to each of these groups of tree species being targeted. In response to discovery, SDG&E stated that the 25-foot clearance proposed in the 2020 WMP "will be performed on targeted species within the HFTD, which comprise roughly 80,000 of over 400,000 trees in SDG&E's

[85] SDG&E 2019 WMP, pp. 43-44.

[86] D.19-05-039, p. 10.

[87] SDG&E incorrectly characterizes eucalyptus, oak, palm, pine, and sycamore as species. Palms are a taxonomic family. Eucalyptus, oak, pine and sycamore are genera. These groupings include many species. For example, the pine genus includes 126 species, the palm family includes approximately 2,600 species, and the eucalyptus genus includes over 700 species.

[88] SDG&E Revised 2020 WMP, p. 114.

inventory."[89] Whether SDG&E has applied some criteria to select these 80,000 trees is not set forth in its response to the data request and is not evident in its 2020 WMP filing. SDG&E states that the application of extended clearances will not be arbitrary, but rather it "will factor site-specific clearances, industry directional pruning standards (e.g., ANSI A-300), and proper techniques."[90]

The WSD should require SDG&E to fulfill the requirements of D.19-05-039. SDG&E should not default to 25-foot post-prune tree clearances in the HFTD until it demonstrates compliance with D.19-05-039. To comply with D.19-05-039, SDG&E should revise the vegetation management section of its WMP to include: (1) scientific evidence or other data showing that the increased clearance will reduce risk under wildfire conditions, and (2) detailed guidelines for how SDG&E intends to make the determination that a 25-foot post-prune clearance for vegetation management is both necessary and feasible. SDG&E should also address whether the expanded 25-foot clearance could be deployed on a narrower, more targeted geographical scale.[91] Finally, SDG&E should provide an explanation of how it determined which tree species should be targeted for expanded clearance.

E. Conclusion

The WSD should require SDG&E to file a supplement to its 2020 WMP within 30 days that addresses the issues raised herein.[92]

- SDG&E should demonstrate that the system hardening section of its WMP is well targeted to reduce wildfire risk. SDG&E should modify its system hardening strategy as follows:
    - Asset-based system hardening mitigations should continue to be targeted to reduce the risk of catastrophic wildfires caused by utility equipment.
    - Circuit-based system hardening mitigations should be targeted to produce community benefits. They should focus on community

[89] Public Advocates Office Data Request: CALPA-SDG&E-02, Q4.

[90] Public Advocates Office Data Request: CALPA-SDG&E-02, Q4.

[91] For example, only in HFTD Tier 3, or only in locations prone to very strong winds.

[92] Public Utilities Code Section 8386(c)(22).

resources such as schools, community centers, and critical facilities, rather than on producing reliability benefits for a small number of customers. There may be specific circumstances where circuit-based system hardening mitigations targeting a small group of individual customers are justified, but these situations are the exception rather than the rule.

- SDG&E should eliminate the proposed whole-home generation program.

- SDG&E should revise the vegetation management section of the WMP to comply with D.19-05-039, by providing:
  - Scientific evidence or other data showing that a 25-foot post-prune clearance will reduce risk under wildfire conditions.
  - Detailed guidelines for where a 25-foot post-prune clearance for vegetation management is both necessary and feasible.
  - A detailed explanation of how SDG&E determined which tree species merit expanded clearances.

VI. PacifiCorp

A. Introduction

PacifiCorp is a multi-jurisdictional utility that provides retail electric service to approximately 43,000 customers in California, in addition to the customers it serves in Idaho, Oregon, Utah, Washington, and Wyoming.[93] PacifiCorp's northern California service territory covers over 11,000 square miles in portions of Del Norte, Modoc, Shasta, and Siskiyou counties.[94] Approximately 62 percent (7,027 square miles) of its California service territory is in an HFTD Tier 2 and 1 percent (129 square miles) is in an HFTD Tier 3.[95]

[93] Application No. 18-04-002, *In the Matter of the Application of PACIFICORP (U-901-E), an Oregon Company, for an Order Authorizing a General Rate Increase Effective January 1, 2019,* April 12, 2018, p. 1; PacifiCorp Response to CalPA Data Request CA R.18-10-007 002, March 14, 2019.

[94] Application No. 18-04-002, *In the Matter of the Application of PACIFICORP (U-901-E), an Oregon Company, for an Order Authorizing a General Rate Increase Effective January 1, 2019,* April 12, 2018, p. 1.

[95] PacifiCorp Response to CalPA Data Request CA R.18-10-007 002, March 14, 2019.

PacifiCorp's California service territory includes 729 miles of transmission lines, all of which are overhead. This service territory also has 2,973 miles of distribution lines, of which 2,340 miles are overhead and 633 miles are underground.[96] PacifiCorp's California service territory has 1,178 miles of overhead lines (combined transmission and distribution) in a HFTD, of which 1,108 miles are in an HFTD Tier 2 and 70 miles are in an HFTD Tier 3.[97] About 46 percent of PacifiCorp's California customers live in an HFTD.[98]

B. Overview of PacifiCorp's WMP and Recommendations.

PacifiCorp is in the planning and engineering phases of many of the most important wildfire risk reduction programs included in its WMP. For example, PacifiCorp states that it is currently developing a Wildfire Mitigation Delivery Project Management Office (PMO), which will be responsible for planning and tracking wildfire mitigations efforts and for performing quality assurance functions related to the work.[99]

PacifiCorp's system hardening programs in particular are mostly still in the engineering and planning stages, with cumulative plan completion percentages ranging between 3 percent and 15 percent.[100] PacifiCorp states that one if its goals for grid design and system hardening prior to the next WMP update is to "identify, scope, and begin all projects."[101] For this reason, PacifiCorp's system hardening programs should be monitored by the WSD to ensure that PacifiCorp is on track to timely complete its overall WMP objectives.

To facilitate this monitoring, the WSD should require PacifiCorp to file a tier 2 advice letter in October 2020. If PacifiCorp is able to demonstrate sufficient progress in

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[96] PacifiCorp Response to CalPA Data Request CA R.18-10-007 002, March 14, 2019.

[97] PacifiCorp Response to CalPA Data Request CA R.18-10-007 002, March 14, 2019.

[98] PacifiCorp Response to CalPA Data Request CA R.18-10-007 002, March 14, 2019.

[99] PacifiCorp 2020 WMP, p. 103.

[100] See Table 4 of PacifiCorp's 2020 WMP, at pp 29-30, reproduced as **Error! Reference source not found. Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.**below.

[101] PacifiCorp 2020 WMP, p. 98.

the areas discussed below, it may be appropriate for the WSD to permit PacifiCorp to submit an update of its 2020 WMP, rather than requiring a new WMP in 2021.[102] If PacifiCorp is unable to meet its current plan goals, the WSD should require PacifiCorp to submit a full WMP in 2021 that describes PacifiCorp's multi-year mitigation strategy, re-evaluates program goals and proposes remedial actions.

Table 1: PacifiCorp System Hardening 2019 Completion

Program Details		Program Target		Progress	
Initiative	**Duration**	**Total Planned Unit(s)**	**Anticipated Completion**	**2019 Performance / Update**	**Cumulative Percent Complete of Total Plan (%)**
Installation of Covered Conductor	Multi-year (5 yr)	221 line-miles	2023	Engineering and scoping completed for 38 line-miles planned in 2020	10%
Replacement of Copper Conductor	Multi-year (5 yr)	53 line-miles	2023	Engineering specification and scope completed for 3 line miles planned in 2020;	3%
Installation of System Automation Equipment	Multi-year (4 yr)	68 projects	2022	10 projects complete	15%
Proactive Wood Pole Replacement	Multi-year (5 yr)	4,000	2023	Engineering standard and specification completed	10%

The Public Advocates Office makes the following recommendations regarding PacifiCorp's WMP:

- The WSD should require an advice letter filing in October 2020 to address whether PacifiCorp is making progress in mitigating wildfire risks consistent with fulfilling the commitments made in the WMP. In particular, PacifiCorp's AL filing should:
    - Demonstrate whether it has made sufficient progress in achieving its system hardening goals;

[102] Provided that PacifiCorp contends that an update of the 2020 WMP is appropriate. If PacifiCorp determines that providing a full WMP filing is necessary, it should be permitted to do so.

- Provide an update on PacifiCorp's 2020 grid sectionalization progress; and
- Provide an update on PacifiCorp's progress in upgrading the tracking, database management, and Geographical Information System (GIS) mapping of its vegetation management efforts.

- If PacifiCorp is able to demonstrate sufficient progress in these areas, the WSD should authorize PacifiCorp to submit an update to its 2020 WMP in 2021, rather than a new WMP.
- If PacifiCorp is not able demonstrate sufficient progress, the WSD should require PacifiCorp to file a full WMP that reevaluates program goals in light of actual progress and PacifiCorp should be required to propose remedial actions.

C. The WSD should require PacifiCorp to demonstrate that its system hardening programs are on track.

Most of PacifiCorp's WMP related system hardening work to date has been planning and engineering, and as a result very little infrastructure work has been completed and PacifiCorp's system hardening initiatives appear to be behind schedule. This could result in it being infeasible for PacifiCorp to achieve the level of risk reduction in future years that it has forecast, especially if unforeseen resource constraints or other complications impact PacifiCorp's ability to ramp up program work in 2021 through 2023.

Table 1 above, adapted from Table 4 in PacifiCorp's WMP,[103] shows the "Cumulative Percent Complete" of PacifiCorp's system hardening programs. These values are developed by dividing the number of projects or line-miles completed in 2019 by the total number of projects or line-miles PacifiCorp aims to complete within four to five years, as shown in the last column above. Using the expected planned duration of each project to extrapolate the progress PacifiCorp should have achieved by 2019 assuming equal progress in all program years, it appears that PacifiCorp's system hardening projects are all significantly behind schedule:

[103] PacifiCorp 2020 WMP, pp 29-30.

a. **Covered conductor installation**:[104] PacifiCorp's covered conductor program focuses on the replacement of existing transmission and distribution conductor in the HFTD with "insulated conductor solutions such as insulated cable, spacer cable, and crossarm insulation."[105] PacifiCorp has phased the program over five years, and as of the end of 2019 has completed 10 percent of program work, rather than the 20 percent that would be expected assuming equal progress across all years of the program. PacifiCorp states that "2019 efforts focused on development of engineering standards and detailed scoping,"[106] and expects to ramp up installation in subsequent years.

b. **Replace small size copper conductor**:[107] PacifiCorp has implemented a program to replace small diameter copper and iron conductor with aluminum stranded conductor. PacifiCorp states that this replacement is necessary because the small diameter conductor is unable to "coordinate with upstream fusing and relay settings required for advanced fault detection programs."[108] The program is planned over five years, and PacifiCorp reports 3 percent completion in 2019, rather than the 20 percent that would be expected assuming equal progress across all years of the program. As with the covered conductor program, PacifiCorp states that 2019 was largely focused on engineering and scoping work, and that a significant ramp-up in installation is planned for subsequent years.[109]

c. **Installation of system automation equipment**:[110] PacifiCorp's system automation program is focused on the "deployment of distribution and transmission protection and control schemes and equipment," which is

[104] PacifiCorp 2020 WMP, Section 5.3.3.3, pp. 139-142.

[105] PacifiCorp 2020 WMP, p. 139.

[106] PacifiCorp 2020 WMP, p. 139.

[107] PacifiCorp 2020 WMP, Section 5.3.3.18, pp. 164-166.

[108] PacifiCorp 2020 WMP, p. 164.

[109] PacifiCorp 2020 WMP, p. 164.

[110] PacifiCorp 2020 WMP, Section 5.3.3.9, pp. 153-155.

intended to "enhance fault detection capabilities, reduce fault isolation time, improve fault location and record availability, and expedite restoration efforts."[111] The project scope is over four years. It was 15 percent complete as of the end of 2019, rather than the 25 percent that would be expected assuming equal progress across all years of the program.

d. **Distribution and transmission pole replacement and reinforcement**:[112] PacifiCorp's pole replacement program is focused on accelerating the replacement of wooden poles in the HTFD with "non-wooden solutions" such as steel or fiberglass. For this program, PacifiCorp forecasts only 29 percent of poles will be installed in the first four years of the project, and that the remaining 71 percent of the poles will be installed in 2023, the final year of the program.[113] PacifiCorp states that the limited scope of the program in early years is intended to "properly align with other WMP programs and level load resources across the multi-year WMP,"[114] and claims that "years 2022 and 2023 [will] reflect a significant ramp up in proactive pole replacements as other [system hardening] programs ramp down."[115]

PacifiCorp's current project planning indicates that PacifiCorp will need to complete a comparatively large amount of system hardening projects in 2022 and 2023. PacifiCorp states that "2019 [system hardening] efforts significantly focused on engineering and scoping efforts,"[116] which results in a disproportionate amount of the field work taking place in the latter years of the system hardening programs. PacifiCorp does not address the feasibility of performing the bulk of system hardening infrastructure work in the last program year, which could potentially result in resource constraints

[111] PacifiCorp 2020 WMP, p. 153.

[112] PacifiCorp 2020 WMP, Section 5.3.3.6, pp. 145-148.

[113] PacifiCorp 2020 WMP, p. 145.

[114] DR CalAdvocates-PacifiCorp-2020WMP-02, Q2.

[115] DR CalAdvocates-PacifiCorp-2020WMP-02, Q2.

[116] PacifiCorp 2020 WMP, p. 139.

should unforeseen circumstances affect the availability of sufficient staff and materials to execute the multiple concurrent programs.

PacifiCorp states that it "anticipates tracking these activities monthly and assessing annually for needed changes" and that its Wildfire Mitigation Delivery Project Management Office will be tasked with "assessing program completion versus targets, re-assessing program targets, and adding or reallocating of resources as needed to ensure program targets are met."[117]

As a condition of approving PacifiCorp's WMP, the WSD should require PacifiCorp to file an advice letter in October 2020 that provides information about its progress. If PacifiCorp is able to demonstrate that it is meeting its system hardening goals and will be able to ensure program completion within the planned timeframe, the WSD should authorize PacifiCorp to submit a 2021 WMP update rather than a new, three-year WMP. If PacifiCorp's progress indicates that it is unable to meet its current WMP goals, the WSD should require PacifiCorp to file a new WMP in 2021 that revises the system hardening plan to do one of the following: (a) demonstrate that PacifiCorp has allocated adequate resources to achieve its existing goals, (b) reevaluate existing programs in light of actual progress and propose more feasible program progress goals, or (c) identify alternative risk mitigation strategies that are equally effective and are feasible to execute using available resources.

An October 2020 submission date for the advice letter will allow WSD and stakeholders to assess PacifiCorp's progress for the majority of 2020 while also allowing time to for PacifiCorp to prepare its 2021 WMP. Stakeholders can submit protests or responses by late October to provide input on PacifiCorp's progress. The WSD can issue a disposition of the advice letter by the end of November with sufficient time for PacifiCorp to prepare a new WMP, if necessary, for submission in early February 2021.

[117] DR CalAdvocates-PacifiCorp-2020WMP-02, Q4.

D. The WSD should require PacifiCorp to focus grid sectionalization efforts on the HFTD.

The Public Advocates Office is concerned that PacifiCorp is not focusing resources on reducing the scope of de-energization events in the most at-risk areas. Nearly 46 percent of PacifiCorp's customer accounts are located within either HFTD Tier 2 or 3,[118] and PacifiCorp notes that "approximately 20% of PacifiCorp's California customers are located or are electrically-connected to the designated Tier 3 area within its service territory."[119] However, PacifiCorp's grid sectionalization assets as of 2019 are primarily located outside of the HFTD. PacifiCorp's data indicates that circuits within the HFTD (both Tier 2 and Tier 3) have an average of 33 percent fewer sectionalizing and automated grid control devices per circuit-mile than the system average. PacifiCorp shows in Table 1 of its WMP that for the year 2019, the number of sectionalization and automated grid control devices within the HFTD was 11.35 per circuit mile, whereas the number in PacifiCorp's system as a whole was 17.08 per circuit mile.[120]

PacifiCorp's Grid Topology Improvement program, which is intended to increase grid sectionalization to mitigate PSPS impacts, is in the planning stages.[121] PacifiCorp states that "as 2019 represents the first year of PacifiCorp's PSPS program, the company does not yet have a defined list of [PSPS] mitigation projects."[122] Grid sectionalization devices can effectively mitigate PSPS impacts on customers within an HTFD, but the devices must be located within the HFTD or on circuits electrically connected to it.

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[118] PacifiCorp Response to CalPA Data Request CA R.18-10-007 002, March 14, 2019.

[119] PacifiCorp 2020 WMP, p. 77: "Approximately 20% of PacifiCorp's California customers are located or are electrically-connected to the designated Tier 3 area within its service territory. Thus, it is challenging to mitigate the impacts of PSPS, until sufficient hardening efforts have been delivered to minimize the ignition risk during environmentally favorable periods described in Section 5.3.3."

[120] PacifiCorp 2020 WMP, p. 20.

[121] PacifiCorp 2020 WMP, pp. 150-152.

[122] PacifiCorp response to Cal Advocates DR-02, Question 2.3c, "As 2019 represents the first year of PacifiCorp's PSPS program, the company does not yet have a defined list of mitigation projects. PacifiCorp anticipates that as this program evolves, these projects may include proactive installation of equipment but also recognizes that as weather patterns and risk can change quickly, specific proactive projects may not always be effective. Alternatively, the company may also look at [enhancing] procedures and readiness to implement reactive switching or isolation points during an event."

PacifiCorp's data seems to indicate that currently installation of these devices is much less common within the HFTD than on the system as a whole.

In order to assess progress in increasing the penetration of grid sectionalization devices in the HFTD, the WSD should require PacifiCorp to report on sectionalization progress for 2020 in the October 2020 progress report advice letter recommended herein. In future WMP filings, the WSD should require PacifiCorp to prioritize increasing grid sectionalization in its HFTD Tier 2 and Tier 3, or explain why a grid sectionalization program that focuses the majority of resources outside the HTFD is appropriate and will serve as an effective PSPS mitigation.

E. PacifiCorp should proceed with creation of an electronic database to track vegetation management.

PacifiCorp's WMP identifies a need for better data management related to vegetation management. The Public Advocates Office agrees that this should be a priority. In assessing its annual performance metrics for "vegetation clearance findings from inspection" within the vegetation management program, PacifiCorp states that "the company does not currently have an electronic database that preserves the data in a way required" to track the performance metrics, but that "PacifiCorp has incorporated the need for an electronic solution into a program" to improve inspections within the vegetation management program.[123] Further discussing the need for an electronic database, PacifiCorp explains that it:

> Has tracked vegetation management activities at the local level, generally relying on paper forms, maps, documents, and local knowledge. In recognition of growing wildfire risk, and [to] move toward improved transparency, efficiency, and data analytics, PacifiCorp is [planning] to incorporate and pilot the use of the utility's electronic database programs to identify, plan, track, and record completion of vegetation management activities. Foresters will begin working the GIS department to secure digital maps consistent with the company's master

[123] PacifiCorp 2020 WMP, p. 20.

version and use electronic forms and records to capture activities.[124]

Without electronic access to past work, PacifiCorp may not have the data accessible at hand to make well-informed decisions as to how to prioritize its vegetation management work. The Public Advocates Office agrees with PacifiCorp's assessment that an electronic database is necessary both to plan work and to track its completion, as well as to plan appropriately for resource allocation within its vegetation management projects moving forward. The WSD should require that PacifiCorp proceed with its planned project to upgrade tracking, database management, and GIS mapping of its vegetation management, and report on program progress in the progress report advice letter filing recommended herein.

F. Conclusion

The Public Advocates Office makes the following recommendations regarding PacifiCorp's WMP:

- The WSD should require PacifiCorp to submit a progress report (via tier 2 advice letter) in October of 2020 that details PacifiCorp's progress in mitigating wildfire risks. This progress report should specifically address PacifiCorp's system hardening initiatives, its grid sectionalization efforts, and its ability to track geospatial data on vegetation management.
- If PacifiCorp demonstrates that it is on track to meet its WMP goals, the WSD should authorize PacifiCorp to submit an update to its 2020 WMP in 2021. Otherwise, PacifiCorp should submit a new, three-year WMP that re-examines wildfire mitigation strategies and targets, addresses resource constraints, and considers alternative risk mitigation strategies that are effective and feasible.
- The WSD should direct PacifiCorp to prioritize its efforts to improve tracking, database management, and GIS mapping of its vegetation management.

[124] PacifiCorp 2020 WMP, p. 226.

VII. Liberty Utilities

A. Summary and Recommendations on Liberty's 2020 WMP

Liberty Utilities (Liberty) has a small, mountainous service territory spanning seven counties near the California-Nevada border and Lake Tahoe.[125] Liberty's California service territory is approximately 1,500 square miles. Liberty serves approximately 49,000 customer connections in California. The majority of Liberty's territory is designated as rural or highly rural, and the majority is designated as HFTD Tier 2 or Tier 3.

Liberty estimates its 2020 WMP will cost approximately $40 million over the course of the next three years.[126] Liberty's WMP consists of a comprehensive evaluation of resource capabilities and system-wide assets to reduce overall wildfire risks. Liberty identifies six main foci for the next three years:

1. Substation rebuilds,
2. Microgrid Pilot Project located in Sagehen,
3. Non-expulsion and electronic fuse replacements,
4. Distribution Fault Anticipation – research project with Texas A&M University,
5. Installation of auto-reclosers throughout Liberty's service territory, and
6. Emerging technologies – focused on high impedance fault detection and rapid earth fault current limiting.[127]

The WSD should require Liberty to rectify the shortcomings discussed below, in its 2021 WMP.

[125] Liberty WMP, p. 134.

[126] Liberty estimates approximately a range of $13 million in annual capital investments covering all aspects of the WMP, including inspection plans, system hardening, operational practices, and situational awareness over the course of 2020 – 2022. This equals a $40 million estimate.

[127] Liberty WMP, p. 37.

B. The WSD should require Liberty to provide and clearly label all geospatial data.

Liberty should provide all information required by the WMP Guidelines, in a clear and concise manner. Specifically, Liberty has not provided the geospatial data for Table 8 as required by the WMP Guidelines.[128] Table 8 of the WMP Guidelines requires each utility to provide GIS data in a downloadable format on recent weather patterns, recent drivers of ignition probability, and recent use of PSPS.[129] These appendices, which related to the topic of mapping recent, modelled, and baseline conditions, are not available on Liberty's website.

In response to a data request, Liberty stated that "The GIS map files requested for Tables 8 and 9 of Liberty CalPeco's 2020 WMP are uploaded on Liberty CalPeco's Wildfire Mitigation webpage."[130] However, based on the Public Advocates Office's examination of Liberty's webpage and the GIS files that were provided, the Public Advocates Office could not locate the information for Table 8. The GIS data for Table 8 was not posted or publicly available, and when asked, Liberty failed to provide a link demonstrating the data was posted as required.

Liberty's failure to provide the required data in a clear and well-labeled manner prevents the Public Advocates Office and other parties from analyzing the recent, modelled, and baseline conditions to make directed recommendations. This is important because almost all of Liberty's customers and lines are situated in a Tier 2 or Tier 3 High Fire Threat District.

The Public Advocates Office recommends that the WSD require Liberty to provide and clearly label this geospatial data in its 2021 WMP filing.

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[128] Attachment 1, WMP Guidelines, p. 25, Table 8.

[129] Attachment 1, WMP Guidelines, p. 25, Table 8.

[130] Liberty Utilities Data Request #2. Liberty's WMP webpage is https://california.libertyutilities.com/south-lake-tahoe/residential/safety/electrical/wildfire-mitigation.html

C. The WSD should require Liberty to submit a three-year plan in 2021 and provide a full GIS asset survey.

Liberty states that it currently lacks the ability to provide geospatial data on all its assets and planned investments to the level described in the WMP guidelines. Liberty requires a more robust GIS system for this purpose.[131] Liberty also notes in its WMP that "a system-wide inventory is necessary to facilitate data tracking on maintenance inspections, and replacements at the location/circuit level."[132]

Based on its 2020 WMP Capital Forecast, Liberty states that its two primary goals are to complete its system-wide survey and create an asset inventory database. The estimated cost of these projects is $6.0 million, with a completion deadline in 2020. Liberty has noted that these projects will help "identify and mitigate hazards at a programmatic level."[133] Upon completion of the system survey, Liberty states that it will be able to create an asset inventory database documenting the location and condition of every overhead distribution asset within Liberty's service territory. With the system survey project accounting for an estimated 44 percent of the capital expenditures for the 2020 WMP, it is important for Liberty stay on track and not be delayed. The WSD should direct Liberty to provide quarterly updates (via tier 1 advice letters) on the progress of the system-wide survey, inventory database, and upgrades to its GIS system.

The WSD should require Liberty to make substantial improvements in its provision of geospatial data by 2021. While Liberty's 2020 WMP is adequate to guide this year's wildfire mitigation work, it does not provide satisfactory data on Liberty's long-term system improvement and wildfire mitigation strategies. The WSD should require Liberty to upgrade its GIS system and submit a complete asset inventory with its 2021 WMP submission. Furthermore, since Liberty's 2020 WMP submission lacks crucial geospatial data on Liberty's assets and planned mitigation projects, the WSD should require Liberty to submit a full three-year plan again in 2021.

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[131] Liberty Advice Letter 133-E, p. 5.

[132] Liberty WMP, p. 4.

[133] Liberty WMP, p. 1.

D. Conclusion

The Public Advocates Office recommends that the WSD approve Liberty's 2020 WMP on the condition that Liberty provide quarterly progress reports on its system-wide survey, inventory database, and upgrades to its GIS system.

As part of approving Liberty's 2020 WMP, the WSD should establish additional requirements as prerequisites to approval of Liberty's 2021 WMP:

- Provide all required data in a clearly labeled manner.
- Upgrade its GIS system and submit a complete geospatial asset inventory with its 2021 WMP submission.
- Submit a full three-year WMP.

VIII. Bear Valley Electric Service

A. Overview of Bear Valley's 2020 WMP

Bear Valley Electric Service (Bear Valley), a division of Golden State Water Company, is a very small electric utility serving just over 22,000 residential customers (and approximately 24,000 meters) in 32 square miles of territory near Big Bear in the County of San Bernardino, California.[134] Bear Valley's service territory is mountainous and the entirety of its service area is above 3,000 feet elevation.[135] Bear Valley's entire territory is designated as HFTD Tier 2 or Tier 3. Bear Valley's service territory includes 88 miles of overhead sub-transmission lines, 3 miles of underground sub-transmission lines, 489 miles of overhead distribution lines, 89 miles of underground distribution lines, 13 substations, and an 8.4 megawatt natural gas-fueled peaking generation facility.[136]

Bear Valley forecasts its 2020-2022 wildfire mitigation measure costs by category in Table 4.2 of its WMP.[137] BVES's 2020 WMP focuses on five main areas of wildfire preparation and prevention, including:

- Design & Construction;
- Inspection and Maintenance;

[134] https://www.bves.com/media/managed/factsheet/BVES_FACT_SHEET_2019_v3.pdf

[135] Bear Valley WMP, p. 11.

[136] Bear Valley WMP, p. 29.

[137] Bear Valley WMP, p. 45, Table 4-2, Mitigation Measures Cost Information.

- Operational Practices;
- Situational and Conditional Awareness; and
- Response and Recovery.[138]

B. The WSD should require Bear Valley to explain its reasoning for undergrounding the Ute Lines.

Bear Valley states that due to complications resulting from the June 2016 Holcomb Fire, it must take control of the Ute Lines from SCE and underground the facilities to remove overhead facilities from forested areas.[139] However, Bear Valley does not explain its decision to underground the Ute Lines and whether it considered other system hardening methods, such as installing covered conductor.

In comments on Bear Valley's 2019 WMP filing, the Public Advocates Office recommended that Bear Valley provide additional information in its 2020 WMP filing to justify the undergrounding of the Ute Lines as a wildfire risk reduction measure, versus a reliability enhancement measure.[140] In D.19-05-040, the Commission directed Bear Valley to file an application for authority to acquire the Ute Lines.[141]

Bear Valley confirms in its 2020 WMP that it will file an application to acquire the Ute Lines,[142] but it does not address why the undergrounding project is necessary to reduce wildfire risks. Bear Valley states:

> By taking control of these lines and converting them to underground facilities… BVES will remove overhead facilities from forested areas. This removal will result in enhanced system safety, wildfire risk mitigation, and reliability.[143]

Bear Valley also does not discuss alternative methods for hardening the Ute Lines. Bear Valley should explain its reasoning for this undergrounding project and provide a

[138] Bear Valley WMP, p. 41.

[139] Bear Valley WMP, p. 49.

[140] Public Advocates Office Comments on the Wildfire Mitigation Plans (March 13, 2019), p. 14.

[141] D.19-05-040, pp. 30-31 and 86 (Ordering Paragraph 23).

[142] Bear Valley WMP, p. 49.

[143] Bear Valley WMP, p. 49.

comparison of undergrounding and alternative system hardening methods for the Ute Lines, including the risk-spend efficiency scores of each alternative.

The WSD should require Bear Valley to provide an analysis of how the Ute Lines undergrounding project will mitigate wildfire risk and why undergrounding is the best option. The WSD should direct Bear Valley to submit this justification of the undergrounding project as part of its testimony supporting the application required in D.19-05-040 to acquire the Ute Lines.

C. The WSD should require Bear Valley to describe resource constraints related to its 2020 WMP and explain how it will adapt to setbacks.

Bear Valley's 2020 WMP indicates that some of its 2019 WMP programs were not implemented due to unforeseen constraints and are being explored again in its 2020 WMP filing. The cost of Bear Valley's Radford Line covered conductor replacement project was significantly higher than Bear Valley had forecast, and the wire wrap pilot program was not ready to be deployed due to unavailable ampacity[144] on existing wires.[145] Bear Valley states that several utilities have experienced postponements with deploying covered conductor due to issues that range from procurement arrivals, resource adequacy, operating windows, access to rough terrain, and permitting delays.[146] Bear Valley's 2020 WMP submission lacks explanation of how it plans to adapt to possible challenges that may arise. Further challenges should be anticipated with implementing its WMP goals; therefore, it is critical that Bear Valley identify alternative backup plans to respond to foreseen and unforeseen challenges to ensure implementation of its 2020 WMP program goals.

The WSD should require Bear Valley to submit a supplement to its 2020 WMP that provides a thorough analysis of resource constraints. Bear Valley should submit this supplement within 30 days via tier 2 advice letter.[147]

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[144] Ampacity is the maximum current that a conductor can carry continuously under the conditions of use without exceeding its temperature rating.

[145] Bear Valley WMP, p. 52.

[146] Bear Valley WMP, p. 13.

[147] The Public Advocates Office recommends that the 30-day clock commence when the WSD issues its

D. The WSD should require Bear Valley to include its notification protocols for medical baseline customers for emergency or de-energization events in its 2021 WMP submission.

Bear Valley's PSPS and emergency notification procedures should be improved to ensure all customers are given adequate notification of possible de-energization or other emergency events.[148] Bear Valley's 2020 WMP filing does not specifically describe its notification protocols for medical baseline or critical care customers during de-energization and/or emergency events. In response to a data request, Bear Valley confirms that it contacts its medical baseline or critical care customers using its Interactive Voice Response (IVR) system, a system that tracks the calls received and not received by customers.[149] Bear Valley then follows up with phone calls to medical baseline or critical care customers during and after an IVR campaign if needed, whereas Bear Valley does not make follow-up calls to customers who are not medical baseline or critical care customers.[150] In addition, Bear Valley is soliciting email addresses from medical baseline customers.[151]

Bear Valley's 2020 WMP lacks vital information about PSPS notification protocols that is required by Public Utilities Code Section 8386.[152] The WSD should direct Bear Valley to submit a supplement that describes its specific notification protocols for medical baseline customers or critical care customers before, during, and after an emergency or de-energization event. Bear Valley should also describe any plans to

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resolution.

[148] When wind speeds are measured at or above 50 mph for more than three seconds, Bear Valley states that it will de-energize any power line that may pose a hazard, coordinate with local government and agencies, update notifications on its website and social media to warn of potential power shutoffs, and issue press releases to the local media. During Validated Extreme Fire Weather Conditions (when wind speeds are measured at 55 mph or greater for more than 3 seconds), Bear Valley will send notifications to customers through an Interactive Voice Response (IVR) system. *See* Bear Valley WMP, p. 67.

[149] Data Request Response CalAdvocates-BVES-2020WMP-02, Question 1.

[150] Data Request Response CalAdvocates-BVES-2020WMP-02, Question 2.

[151] Data Request Response CalAdvocates-BVES-2020WMP-02, Question 1.

[152] Public Utilities Code Section 8386(c)(6) and 8386(c)(7).

improve its notification protocols. Bear Valley should submit this information within 30 days as part of the tier 2 advice letter submission noted previously.

E. Conclusion

The Public Advocates Office makes the following recommendations with regard to Bear Valley:

- The WSD should require Bear Valley to provide an analysis of how the Ute Lines undergrounding project will mitigate wildfire risk and why undergrounding is the best option. Bear Valley should submit this justification in its application to acquire the Ute Lines.
- The WSD should require Bear Valley to submit a supplement to its 2020 WMP within 30 days,[153] via tier 2 advice letter, that:
  - Provides an analysis of resource constraints that may affect the implementation of Bear Valley's 2020 WMP.
  - Describes Bear Valley's de-energization notification protocols for medical baseline customers or critical care customers (and any planned changes to those protocols).

IX. Recommendations Applicable to All Electric Utilities

A. The WSD should hold workshops to refine the WMP Guidelines and process prior to the 2021 WMP submissions.

As stated in the ALJ Ruling on WMP Guidelines, it is expected that lessons learned from the 2020 WMP submission and evaluation process will result in refinements to the WMP process for future years.[154] The Public Advocates Office recommends that the WSD hold public workshops to discuss revisions to the WMP Guidelines and the 2021 WMP process. The workshops should take place in the summer and fall of 2020, so that any revisions to the WMP Guidelines can be implemented in time for the 2021 WMP submissions.

As a starting point, these workshops should develop a uniform definition of the terms "ignition" and "near miss" for the 2021 WMP submissions. The workshops should clarify any WMP requirements that were not interpreted consistently by all utilities, such

[153] Public Utilities Code Section 8386(c)(22).

[154] ALJ Ruling on WMP Guidelines, pp. 1-2 and 5.

as the data normalization of Red Flag Warning circuit-mile days (discussed previously in these comments, in section III.B on PG&E's 2020 WMP). These workshops should also consider revisions to the tables contained in the WMP Guidelines.

1. The WSD should revise the data normalization method.

The WMP Guidelines require utilities to normalize data on safety incidents to produce data that is comparable across utilities. The current WMP Guidelines require normalizing data according to the number of Red Flag Warning circuit-mile days.

For future WMP submissions, the WSD should adopt, with modification, the method used by PG&E in its 2020 WMP, instead of the methodology contained in the current WMP Guidelines.[155] In examining the normalized data reported under the current WMP Guidelines,[156] the normalized amounts appear small and have the potential to minimize the significance of the underlying data.[157] For example, in 2018 PG&E reports 85 deaths[158], [159] due to utility-ignited wildfires.[160] Normalized pursuant to the current WMP Guidelines, this number becomes 0.000163. Instead of normalizing per circuit mile, the Public Advocates Office recommends revising the protocol to require normalizing per 10,000 circuit miles. In addition, the Public Advocates Office recommends that the normalization protocol change circuit miles to *overhead* circuit miles to focus on the circuits with greatest wildfire risk.

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[155] ALJ Ruling on WMP Guidelines, pp. 4-5.

[156] ALJ Ruling on WMP Guidelines, pp. 4-5.

[157] PG&E's 2020 WMP, Table 2.

[158] The correct count of deaths caused by the Camp Fire is 86. *See* Sacramento Bee, "Camp Fire death toll rises to 86 after man who suffered third-degree burns dies," August 8, 2019, https://www.sacbee.com/news/california/fires/article233683422.html

[159] Sadly, the official death toll from the Camp Fire appears to be a substantial undercount. The Los Angeles Times has identified 50 more people whose deaths were probably caused by the Camp Fire, often because the evacuation, interruptions of care, and air pollution exacerbated underlying medical conditions. *See* Los Angeles Times, "Death toll in Camp fire probably includes 50 more people, report says," February 11, 2020, https://www.latimes.com/california/story/2020-02-11/death-toll-in-camp-fire-probably-includes-50-more-people-report-says

[160] PG&E's 2020 WMP, Table 2, Row 4.a.

2. The WSD should develop uniform definitions of the terms "ignition" and "near miss."

The terms "ignition" and "near miss" are central to the WMPs and the associated metrics that electric utilities are required to report. However, the electric utilities do not use these terms in a consistent fashion.

The WMP Guidelines do not define what counts as an "ignition." As shown in Table 2, all of the IOUs except PacifiCorp consider an "ignition" to be a "CPUC-Reportable Event," as defined in D.14-02-015.[161] PacifiCorp's definition is broader, as it counts all ignitions that are in the fire management organization or utility reporting databases. The Public Advocates Office recommends that the WSD should clarify that "ignition" is defined as a "CPUC-Reportable Event."

The WMP Guidelines define the term "near miss"[162] but the definition leaves room for varied interpretations. Specifically, the definition relies on determining whether an event has a "significant probability" of causing an ignition, which gives rise to its own set of interpretations. Also shown in Table 2 are the utilities' varying definitions of what entails a "significant probability of ignition" and is therefore considered a "near miss." One workshop should focus on allowing the WSD to establish consistent definitions of both of the terms "significant probability of ignition" and "near miss."

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[161] D. 14-02-015, *Decision Adopting Regulations to Reduce the Fire Hazards Associated with Overhead Electrical Utility Facilities and Aerial Communications Facilities*, issued February 5, 2014 in R.08-11-005, p. C-3:

> "CPUC-Reportable Event" means "any event where utility facilities are associated with the following conditions: (a) A self-propagating fire of material other than electrical and/or communication facilities, and (b) The resulting fire traveled greater than one linear meter from the ignition point, and (c) The utility has knowledge that the fire occurred. Ignition Point is the location, excluding utilities facilities, where a rapid, exothermic reaction was initiated that propagated and caused the material involved to undergo change, producing temperatures greatly in excess of ambient temperature."

[162] A near miss is "An event with significant probability of ignition, including wires down, contacts with objects, line slap, events with evidence of significant heat generation, and other events that cause sparking or have the potential to cause ignition." WMP Guidelines, p. 11.

Table 2 Utility Definitions of "Ignition" and "Near Miss		
Utility	**"Ignition"**	**"Near Miss"**
PG&E[163]	"CPUC-Reportable Event"	Not defined. "PG&E currently uses outage events as a proxy for near miss events as a large population of systems events to be analyzed."[164]
SCE[165]	"CPUC-Reportable Event"	"An event that did not result in ignitions (faults and wire downs) where SCE determined that these types of events historically resulted in an ignition under certain circumstances, such as wire down, equipment failure, or contact from an object."
SDG&E[166]	"CPUC-Reportable Event"	Any electrical fault on the system.
BVES[167]	"CPUC-Reportable Event"	BVES has very few "near misses" and "is able to examine the specific circumstances of each one to determine if the event entails a 'significant probability of ignition.'"
Liberty[168]	"CPUC-Reportable Event"	"Any event that has a possibility of ignition, including wires down, contacts with objects, line slap, and other events that cause sparking or have potential to cause ignition." "Liberty does not have enough historical ignition events to reasonably define what constitutes a significant probability of ignition."
PacifiCorp[169]	All ignitions[170] which are contained in databases maintained by fire management organizations or within utilities' fire reporting databases.	"An outage which could generate fault current."

[163] PG&E Response to Public Advocates Office Data Request CalAdvocates-PGE-2020WMP-01.

[164] "PG&E has not established a technical, operational definition of 'near miss' events," but will be working to establish a definition of "ignition near miss." PG&E Response to Public Advocates Office Data Request CalAdvocates-PGE-2020WMP-01, Question 2.

[165] SCE Response to Public Advocates Office Data Request CalAdvocates-SCE-2020WMP-01.

[166] SDG&E Response to Public Advocates Office Data Request CalAdvocates-SDGE-2020WMP-01.

[167] BVES Response to Public Advocates Office Data Request CalAdvocates-BVES-2020WMP-01.

[168] Liberty Response to Public Advocates Office Data Request CalAdvocates-Liberty-2020WMP-01.

[169] PacifiCorp Response to Public Advocates Office Data Request CalAdvocates-PacifiCorp-2020WMP-01.

[170] One exception was Table 2, metric #10, which defined an ignition as events that are CPUC-reportable.

3. The WSD should re-examine the value of forecast data on drivers of ignition probability.

PG&E provides "change in drivers of ignition probability based on WMP implementation" three years out for several types of risky incidents as required by the WMP Guidelines.[171] PG&E provides two tables, one for distribution and the other for transmission. PG&E projects the number of incidents per year (2020 through 2022), average percentage likelihood of ignition, and number of ignitions mitigated.[172] Incidents cover a wide range of types, from line contact to equipment failure. The tables assume an incident reduction of 10 percent each year (from a 2019 base year) with a constant ignition to incident ratio (based on actual 2019 incidents) to estimate an 8 percent reduction for HFTD ignitions.[173] PG&E acknowledges that the validity of its assumptions can only be tested over time and are dependent on "climatological factors."

While PG&E has followed the directions contained in the WMP Guidelines, the usefulness of Table 31 as a tool for predicting the number of ignitions three years out is limited for several reasons. First of all, there is no basis for PG&E's assumption that incidents will decline 10 percent annually.[174] Second, the ignition rate per incident is based on only one year of data (2019), which may not be representative. Third, as PG&E acknowledges, year-to-year weather variability and long-run climate change affect fuel and vegetation moisture levels, and therefore ignition rates.

The WSD should consider whether the projections are useful for projecting future incidents or ignitions. Only recorded data will tell the efficacy of mitigation measures and in the absence of such, a projection of future incidents and ignitions based on unsupported assumptions is premature. The information may not be useful for its

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[171] WMP Guidelines, Table 31. The table lists several types of incidents that could result in an ignition, including animal contact, vegetation contact, several forms of equipment failure, and wire-to-wire contact.

[172] PG&E's 2020 WMP, pp. 5-277 & 5-278.

[173] PG&E's 2020 WMP, p. 5-278. PG&E does not explain how it arrives at an 8 percent reduction for HFTD ignitions. This conclusion appears to be at odds with PG&E's assumptions that incidents will decline by 10 percent each year and the ignition-to-incident ratio will remain constant.

[174] PG&E's 2020 WMP, p. 5-277. While the utility states that the 10 percent reduction is "derived from the risk prioritization of work, estimation of combined CWSP mitigation effectiveness and associated ignition risk reductions," no quantitative risk reduction calculation is provided.

intended purpose; to forecast future ignitions based on mitigation measures taken. When the WSD revises the WMP Guidelines for the 2021 WMP submissions, the WSD may want to consider eliminating this table from the WMP Guidelines.

4. The WSD should re-examine the value of several tables on baseline ignition probability and exposure to wildfire risk.

Section 3 of the WMP Guidelines (Baseline Ignition Probability and Wildfire Risk Exposure) requires utilities to report historical data from 2015 through 2019 in eight different tables to establish a baseline case to measure future performance. PG&E identifies a number of shortcomings with averaging the requested data, and cautions against using the data to assess wildfire risks.[175] For example, the WMP Guidelines ask each utility to provide and then average a series of weather data.[176] PG&E states that weather is variable and can only be useful as a trend and not an average.

PG&E asserts that the Drivers of Ignition Probability guidelines seek to determine the "average percentage probability of ignition per incident."[177] The calculation in the table, however, does not result in a probability calculation (how likely an event is to occur), but instead yields a frequency (how often an event occurs). Nonetheless, PG&E submits a completed table.

The Public Advocates Office agrees with PG&E that weather averaging is not a useful metric and that the value in calculating probabilities of event occurrence is unclear. Furthermore, the calculated ignition per incident averaged across five years, appears to be used only one time in the WMP in assessing Key Drivers of Ignition Probability to estimate ignitions by HFTD zones,[178] but is not used when forecasting ignitions per incident over time.[179]

[175] PG&E's 2020 WMP. p. 3-1.

[176] PG&E's 2020 WMP, Table 10, p. 3-2.

[177] PG&E's 2020 WMP, p. 3-4.

[178] PG&E's 2020 WMP, Table 18.

[179] PG&E's WMP, Table 31.

Additionally, the WMP Guidelines call for utilities to list planned utility infrastructure upgrades by HFTD and non-HFTD areas for 2020 through 2022.[180] This includes circuit-mile hardening, sub-station hardening and hardening in the Wildfire-Urban Interface (WUI) areas. These forecasts may be speculative or uncertain for the out-years. For example, PG&E has mostly left the categories in this table marked as "TBD" or "N/A," stating that "while PG&E has determined program targets for 2021 and 2022, project prioritization and timing have yet to be fully determined or mapped."[181]

When revising the WMP Guidelines for the 2021 WMP submissions, the WSD should evaluate whether the tables in Section 3 are needed and what value they add. Some of the data requested in these tables either is not useful or cannot feasibly be forecast with reasonable accuracy. If certain tables are unnecessary, then they should be eliminated from the WMP Guidelines for future years.

5. The WSD should require utilities to detail their planned system hardening projects.

As noted previously in the discussion of PG&E's WMP (Section III.D of these comments), PG&E does not provide separate data on how many circuit-miles PG&E will harden using covered conductor and how many miles it will underground, as required by the WMP Guidelines.[182] This information is important to understand a utility's risk mitigation strategy and choices. The WSD should clarify that utilities are required to provide this information in future WMP submissions.

6. The WSD should require utilities to report RSE scores for each mitigation activity.

As noted previously in the discussion of PG&E's WMP (Section III.E of these comments), PG&E only reports RSE scores for four broad programs, rather than providing RSE estimates for each mitigation measure. This makes it difficult to assess the

[180] WMP Guidelines, Section 3, Table 17.

[181] PG&E's 2020 WMP, p. 3-26. For 2020, PG&E plans a total of 241 miles of circuit hardening. This includes 183 miles of distribution system hardening, of which 180 miles are slated for the HFTD Tier 3 area.

[182] WMP Guidelines, Table 23.

relative merits of each mitigation measure or to understand the choices PG&E is making as it seeks to reduce wildfire risk.

For future WMP submissions, the WSD should specify that utilities are required to report an RSE estimate for each mitigation measure. Additionally, the WSD should direct utilities to provide RSE scores at a higher level of geographical granularity. For example, rather than providing a single estimate of the RSE of installing covered conductor across the service territory, a utility should calculate the RSE of installing covered conductor in each HFTD tier, as well as in the top five percent of circuits that have the highest wildfire risk. This information will help stakeholders and the WSD understand whether utilities are allocating resources in a reasonable and prudent manner to effectively reduce the risk of utility-caused wildfires.

B. The WSD should require utilities to provide justification for why undergrounding is an acceptable system hardening strategy in the locations where it is proposed.

Undergrounding overhead electric power lines can reduce the risk of wildfires caused by electrical infrastructure and increase system reliability. However, undergrounding overhead lines is costly,[183] and comes with practical drawbacks.[184, 185] For areas where the utilities have decided to underground overhead power lines, the WSD should require the utilities to provide a detailed justification as to why undergrounding is the most reasonable course of action, and why covered conductor is not an acceptable alternative.

Undergrounding projects take longer than installing covered conductor, making this a poor strategy for reducing wildfire risk in the near term.[186, 187] Moreover,

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[183] SCE and SDG&E estimate that undergrounding overhead electric lines costs approximately $3 million to $4 million per mile.

[184] SDG&E 2020 WMP, Table 23.

[185] SCE 2020 WMP, Table 23.

[186] SCE, "Undergrounding: Understanding the Facts," https://newsroom.edison.com/internal_redirect/cms.ipressroom.com.s3.amazonaws.com/166/files/20191/Undergrounding%20Fact%20Sheet.pdf

[187] PG&E Currents, Facts About Undergrounding Electric Lines, October 31, 2017. https://www.pgecurrents.com/2017/10/31/facts-about-undergrounding-electric-lines/

underground systems cannot be visually inspected, require longer service interruptions to perform repairs and maintenance, and are subject to dig-ins (a significant safety hazard).[188] Covered conductor is significantly less expensive than undergrounding, at between one-eighth and one-sixth of the cost, and the use of a covered conductor is anticipated to significantly reduce ignition risks.[189], [190]

Because of the significantly higher cost and drawbacks of undergrounding, the electric utilities should provide justification for the specific locations where they propose undergrounding projects and explain why covered conductor or an equivalent technology is not an acceptable alternative. As examples, justification could include documented analysis of alternatives, engineering reports, and analysis of the relative risk-spend efficiency of undergrounding and alternative mitigations. For 2020, the WSD should require each utility to submit a tier 2 advice letter to justify its undergrounding projects before beginning construction, as a condition of WMP approval. Starting in 2021 the WSD should require the utilities to address this issue in each WMP submission, including annual updates.[191]

C. The WSD should only approve the utilities' 2020 WMPs on the condition that each utility submits a supplement detailing the key constraints that affect its wildfire mitigation strategy.

The WSD should expect each electric utility to demonstrate that its WMP can feasibly be executed on the timeline described. A utility can propose to work on an ambitious mitigation plan, but is the plan realistic and practicable? A robust discussion of resource constraints is essential to determine whether the plan is feasible. Utilities must deliver the promised results; an unrealistic WMP is of little value to customers, the public, or the Commission.

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[188] SCE, "Undergrounding: Understanding the Facts," https://newsroom.edison.com/internal_redirect/cms.ipressroom.com.s3.amazonaws.com/166/files/20191/Undergrounding%20Fact%20Sheet.pdf

[189] SCE 2020 WMP, Table 23.

[190] SCE 2020 WMP, p. 5-63.

[191] The WSD should require utilities to identify and justify undergrounding projects in each annual update, not just the initial three-year plan. This is necessary because most of the 2020 WMPs do not identify specific undergrounding projects more than a year in advance.

The Public Advocates Office is concerned that the electric utilities are not sufficiently transparent about how resource and operational constraints affect their decision-making over their WMPs. Key constraints include, but are not limited to, labor supply, deployment timing, technology maturity, and supplies of materials.[192]

If utilities describe their decision-making processes transparently, then the public and the WSD can evaluate how well thought-out, how effective, and how cost-effective the proposed strategies are likely to be in addressing wildfire risk. Aside from the RSE, utilities have to consider many key constraints in developing WMPs, as pointed out by SCE:

> [W]hile an RSE is a valuable contributing metric to inform the development of the over WMP, it is important to recognize that RSEs are not, and should not, be the only factors used to develop a risk mitigation plan. The RSE metric does not take into account certain operational realities, including planning and execution lead times, resource constraints, work management efficiencies, and activity's total risk reduction potential on targeted areas of the system, and regulatory compliance requirements. SCE considers these additional factors while determining the type and volume of work undertaken to reduce wildfire risk in a timely manner, while managing customer impact of mitigation measures.[193]

This statement highlights how key constraints affect utilities' choices of mitigation measures, the extent to which each mitigation is deployed, and the subsequent cost allocation for wildfire risk.

Utilities' consideration of key constraints should be presented in substantial detail in their WMPs, while demonstrating the effort to reduce wildfire risk as much as possible. For example, utilities could present and quantify their key constraints in the form of graphics, numerical figures, statistical plots, or project management Gantt charts to demonstrate the critical pathway to completing the mitigation measures proposed.[194]

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[192] SCE response to PubAdv-SCE-077-PWL, q. 4.a.

[193] SCE 2020 WMP, p. 6.

[194] In response to PubAdv-SCE-099-PWL, q. 10.c, SCE provided a table listing out the annual unit of

[195] The Public Advocates Office's reasoning for greater transparency is further explained in testimonies on risk-informed strategy in the SCE General Rate Case (GRC)[196] and the PG&E GRC proceedings.[197] Below, we provide examples from PG&E's, Liberty's, and Bear Valley's WMPs to illustrate the need to properly consider and quantify key constraints facing utilities.

The WSD should approve the electric utilities' 2020 WMPs on the condition that each utility submit a supplement addressing resource constraints and feasibility. The supplement should identify resource constraints, describe how resource constraints may affect the costs of mitigation work (e.g., labor shortages may drive up the costs of mitigation work), identify risks to the timely completion of mitigation work, show how these factors affect the utility's choices of mitigation strategies, and demonstrate that the utility has developed contingency plans to ensure the successful, timely reduction of wildfire risks. Each electric utility should submit its supplement, via tier 2 advice letter, within 30 days from the WSD's approval of the WMP.

The WSD should also revise the WMP Guidelines for future years to place greater emphasis on issues of resource constraints, feasibility, and contingency planning. Among other things, the WSD should require utilities to identify the highest priority mitigation

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work forecast from the GRC (2019 to 2023) and referencing the sources of those figures in other SCE's prepared GRC testimonies. However, those figures and the reference table as in PubAdv-SCE-099-PWL-Q10c were not reported or provided in Ex. SCE-01, Vol. 2, on SCE's risk-informed strategy and business plan. These numerical figures or project milestones are not presented in the form of Gantt charts or other conventional graphical project management timeline.

[195] SCE' response to PubAdv-SCE-099-PWL, q. 5. When asked if it carried out "optimization routines or analysis to come up with an optimal mix of risk programs as its portfolio," SCE responded that it conducted a trade-off analysis: "the public safety impacts of shifting resources from traditional infrastructure replacement programs to wildfire mitigation work… showed that the safety reduction gained through the enhanced portfolio of wildfire mitigations exceeds the safety reduction los in other risk initiatives, specifically Contact with Energized Equipment, and Underground Equipment Failure."

A trade-off analysis may well illustrate how one strategy plan is more effective than the other, but the better strategy plan is not necessarily the most optimal plan unless the plan itself results from some optimization routines. The Public Advocates Office does not equate the "trade-off analysis" with "optimization routines" and cautions against conflating the terms. *See,* PubAdv-SCE-099-PWL, q. 5, q.7, q. 8, and q. 10.

[196] Application (A.) 19-08-013, Exhibit (Exh.) CalAdvocates-14.

[197] A.18-12-009, Exh. CalAdvocates-03.

measures in their WMPs and to show a method of determining the highest priority mitigations.

1. PG&E

PG&E proposes aggressive targets for hardening its distribution system but fails to demonstrate that these goals are achievable. System hardening includes activities such as pole replacement, conversion of uncovered lines to covered conductor and undergrounding of lines. These activities are labor intensive and can only be done during favorable weather. PG&E proposes to increase distribution system hardening from 241 miles in 2020 to 377 miles in 2021 and 442 miles in 2022. By contrast, in 2019, PG&E was only able to harden 150 miles of line out of a planned target of 171 miles.[198]

PG&E does not explain how it will achieve this increase in system hardening given that it failed to meet its more modest goal in 2019. PG&E states in its WMP that "While PG&E has determined program targets for 2021 and 2022, project prioritization and timing have yet to be fully determined or mapped."[199] Essentially, there is no discrete plan for 2021 and 2022, only aspirational goals for circuit mile hardening. Given that the 2019 target was not achieved, it is questionable whether PG&E will meet its WMP targets for distribution system hardening.

In its WMP, PG&E includes Section 5.1.C, "Challenges Associated with Limited Resources." PG&E acknowledges that "resource limitations may still be a challenge in a few key areas," including vegetation management, line workers and other labor markets.[200]

Overall, PG&E's WMP fails to address the risk of being unable to complete mitigation tasks. While the WMP identifies ignition risks and risk spend efficiencies, the underlying risk of not having the resources to complete the identified mitigation tasks is not sufficiently identified in PG&E's WMP. The WSD should consider revising the WMP Guidelines to directly address this issue.

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[198] PG&E has approximately 80,710 miles of overhead distribution line, with 25,300 miles of that line in HFTD 2 and 3 area. PG&E's 2020 WMP, p. 2-7.

[199] PG&E's 2020 WMP, p. 3-26.

[200] PG&E's 2020 WMP, p. 5-8.

2. Liberty Utilities

Liberty's acknowledges that it "is concerned about limited resources over the next three to five years"[201] and that "retaining and attracting new employees has been a challenge because of the high cost of living in Lake Tahoe."[202] Liberty's 2020 WMP recognizes uncertainty in the utility's ability to hire an additional ten employees to create a wildfire mitigation team and obtain enough system hardening materials to complete the goals set in Liberty's WMP. Liberty describes how it will address the constraints of limited labor and wildfire hardening materials; however, the level of detail within the WMP is limited. Liberty provided satisfactory responses in a telephone discussion with the Public Advocates Office, but Liberty's future WMPs should specifically address the issue of resource and staffing constraints and should include a robust back-up plan, describing how the utility will adapt if the identified constraints significantly impede its WMP goals.[203]

3. Bear Valley Electric Service

Bear Valley acknowledges that cost and accessibility of the Radford Line covered conductor project is a concern. The Radford Line is mostly accessible only by foot or helicopter and requires the use of specially trained linemen.[204] When Bear Valley bid out the design and the construction of the Radford Line project in November 20, 2019, the costs were significantly higher than it had originally planned.[205]

Bear Valley's WMP includes a plan to lower the cost of the Radford Line project; however, the level of detail within the WMP is limited. In a telephone discussion between Bear Valley and the Public Advocates Office, Bear Valley expressed that finding a reasonably priced contractor for the Radford Line remains a challenge.[206] This challenge may potentially hinder Bear Valley's WMP goals and is an example of key

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[201] Liberty WMP, p. 36.

[202] Liberty WMP, p. 108.

[203] Telephone conversation between Liberty and the Public Advocates Office, March 13, 2020.

[204] Bear Valley WMP, p. 32.

[205] Bear Valley WMP, p. 52.

[206] Telephone conversation between Bear Valley and the Public Advocates Office, March 20, 2020.

constraints faced by the utility. Bear Valley should present any alternative or back-up plans to show that it has a thorough, feasible plan to mitigate wildfire risks.

D. The WSD should require more robust risk-scoring models in 2021.

The utilities' wildfire mitigation plans are not based on robust risk-scoring models.[207] These models are highly dependent on the inclusion of recent major wildfires as the data points fed into the models: a few data points dramatically change the results.

The significant impact of a small number of data points in the models is illustrated by comparing two different versions of PG&E's risk scoring model (based on the Multi-Attribute Value Function): an old version for the PG&E's Test Year 2020 GRC (A.18-12-009) and a new version for this WMP and PG&E's upcoming RAMP, which will be submitted later this year.[208] In A.18-12-009, PG&E ranked wildfire as the eighth risk among the company's RAMP risk areas, while it now ranks wildfire as the top risk in its 2020 WMP.[209] PG&E explains that "[t]he reason for the change in ranking is because PG&E used wildfire data from 2015 through 2019 in its 2020 WMP. The analysis done for A.18-12-009 only included data from 2014 to 2015."[210]

Aside from the inclusion of data on wildfires that took place between 2015 and 2019, PG&E has modified other aspects of its Multi-Attribute Value Function for its 2020 WMP and the upcoming RAMP.[211, 212] However, PG&E did not provide an apples-to-apples comparison showing how the risk ranking would change with different years of input data and without changing any other variables (e.g., both using the new version of Multi-Attribute Value Function). PG&E could have provided this information as an

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[207] In statistics, a model is robust if it still provides insight into a problem despite having its variables or assumptions altered.

[208] D.20-01-002, Ordering Paragraph No. 3, pp. 78 and B-1, which directs utilities to transition to a four-year Rate Case Plan cycle, with a new schedule in Appendix B of the decision indicating that PG&E should file its RAMP application by June 30, 2020 for its Test Year 2023 GRC application.

[209] PG&E's response to data request CalAdvocates_021-Q12.

[210] PG&E's response to data request CalAdvocates_021-Q12.

[211] PG&E's 2020 RAMP Workshop # 2 slides, January 13, 2020.

[212] PG&E's 2020 RAMP Workshop # 3 slides, February 4, 2020.

appendix to its WMP. By failing to provide this information, PG&E's risk-scoring models are needlessly difficult to compare.[213] The resulting information (including the ranking of wildfire risk) is presented in pieces here and there, without directly showing a meaningful comparison of the results produced by the two versions of the models.[214]

E. The WSD should require utilities to submit supplemental information demonstrating the accuracy of their wildfire models.

The electric utilities rely on wildfire simulation models, weather models, and ignition probability models to understand the wildfire risks they face. However, the utilities have not yet demonstrated the accuracy of these models. Specifically, how credible are the models? Are they based on reasonable assumptions? Do they reflect the truth? When a model is not validated, it is not possible to determine whether the model accurately represents the reality for the quantities of interest.[215] This can have real-world consequences: a flawed model can lead to bad decision-making.

In engineering and physical sciences, verification, validation, and uncertainty quantification for physical simulation or predictive models (based on machine learning algorithms) is an indispensable step in demonstrating the credibility of the models.[216]

The accuracy or the predictive power of wildfire models (whether physical simulation models or predictive models of equipment failure) is instrumental in tackling

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[213] Changes in modeling assumptions and formulae have posed challenges for review dating back at least to the 2015 PG&E Gas Transmission and Storage Application 13-12-012. *See* for example, Exh. ORA-02, Safety and Risk Management, pp. 10-13. https://www.publicadvocates.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=2898

[214] In three RAMP pre-filing workshops that took place on November 14, 2019, January 13, 2020, and February 4, 2020, PG&E presented its new version of its Multi-Attribute Value Function, which is used in its 2020 WMP and its upcoming RAMP application. PG&E now ranks wildfire risk as its top risk. There was no reference to how the ranking of wildfire risk varies using the old versus the new versions of PG&E's Multi-Attribute Value Function. In general, it is a good practice to show how the results would vary using different methodologies by doing an apple-to-apple comparison.

[215] See, e.g., National Research Council. 2012. Assessing the Reliability of Complex Models: Mathematical and Statistical Foundations of Verification, Validation, and Uncertainty Quantification. Washington, DC: The National Academies Press. https://doi.org/10.17226/13395

[216] See, e.g., National Research Council. 2012. Assessing the Reliability of Complex Models: Mathematical and Statistical Foundations of Verification, Validation, and Uncertainty Quantification. Washington, DC: The National Academies Press. https://doi.org/10.17226/13395

See also: https://en.wikipedia.org/wiki/Statistical_model_validation

the risk of wildfires. Model outputs inform the utilities' choice of mitigation programs and their subsequent cost. For example, PG&E states that it has developed an ignition probability model "to inform PG&E's distribution system hardening priorities" in the HFTD part of its service territory.[217] This ignition probability model is a statistical model based upon historical outages and ignitions.[218] When asked if it has validated the accuracy and precision of this model, PG&E stated that it is "in the process of validating effectiveness of work on risk," but "currently a finalized validation does not exist."[219], [220] Therefore, it is unclear how well the ignition probability model can predict outages or ignitions.

The WSD should require utilities to perform and publish validation analyses of the models they use to assess wildfire risk. All utilities could greatly benefit from the knowledge exchange regarding how to refine their models. These models do not necessarily have to be perfectly accurate but should, over time, demonstrate improvement in their ability to make good predictions. Encouraging the electric utilities to be more transparent about the accuracy or the predictive power of their models will facilitate improvement and help effectively manage the complex risk of wildfires. To review these models, the WSD should establish a technical working group open to interested parties.

As a case study, SCE's model for ignition probability provides an example of a model that should be reviewed by a technical working group. SCE is developing several probabilistic models to understand wildfire risk it faces.[221] SCE explains reasonably

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[217] PG&E's 2020 WMP, p. 5-48, which states that PG&E developed an ignition probability model for "its electric lines and equipment that traverse HFTD areas within its service territory."

[218] PG&E's 2020 WMP, p. 5-48.

[219] PG&E's response to data request CalAdvocates_021, Question 3.

[220] Based on PG&E's response, it is unclear if PG&E uses "work on risk" to mean "mitigation activity work" or "modeling work." PG&E has previously misunderstood the Public Advocates Office's questions regarding the validation of its wildfire risk models ("For each of PG&E's wildfire risk models, please explain how has PG&E validated its output or results? …Has there been any proof of theory yet?") as asking about the "effectiveness of mitigations proposed." In response to the Public Advocates Office's question, PG&E replied that "[w]ith regard to proof of theory, PG&E interprets this question as relating to the assessment of the effectiveness of mitigations proposed as part of the 2020 GRC." *See*, A.18-12-009, PG&E's response to data request CalAdvcoates_160, Question 3.

[221] SCE's 2020 WMP, pp. 4-8.

clearly what these models involve and how they are developed. However, SCE has not demonstrated the performance of its models. It is vital to know whether its models yield good predictions with respect to historically observed data.

An example of an evolving risk model is the Probability of Ignition Module in SCE's Wildfire Risk Model. To develop this model:

> SCE used machine learning algorithms to assess the likelihood or probability that a piece of equipment will experience a fault resulting in a spark from either an EFF [equipment failure] or a CFO [contact from a foreign object], and the probability that fault will result in an ignition event. SCE used an extensive series of input variables including historical asset performance, weather, environmental, and geographical data to develop the predictive models.[222]

This quote shows how SCE built the model but does not show how the model performs. Other utilities provide even less detail regarding their wildfire models.

A similar model validation question exists with regard to Early Fault Detection systems. Early Fault Detection relies on a probabilistic model to detect faults on the distribution system. SCE is currently piloting such technology.[223] The Public Advocates Office appreciates SCE's effort to bring more insights to fault detection. However, it would be informative to know how well SCE's technology can detect faults thus far and how its technology compares to other utilities' work in the same area.

F. Conclusion

The Public Advocate's Office offers the following recommendations that are applicable to all utilities:

- The WSD should convene workshops or a working group in the summer or fall of 2020 to revise the WMP Guidelines prior to the 2021 WMP submissions. These workshops should:
  - Modify the data normalization protocol to conform with the methodology that PG&E used, but specify that only overhead circuit-miles should be

[222] SCE's 2020 WMP, pp. 42-43 (Section 4.3). See also, pp. 179-180 (Table SCE 5-12).

[223] SCE's 2020 WMP, p. 4, which states that "SCE is evaluating several technology solutions for early or advance detection of fault conditions."

included in the calculation and that the denominator should be increased to 10,000 circuit miles.

  - Develop uniform definitions of the terms "ignition" and "near miss."
  - Consider whether projections on drivers of ignition probability (contained in Table 31) are useful for forecasting future incidents and ignitions, and potentially eliminate this table from future WMP submissions.
  - Consider whether the baseline ignition probability tables in Section 3 of the WMP Guidelines are needed and what value they add.
  - Consider whether forecast data on the location of planned infrastructure upgrades is useful.
  - Clarify that utilities are required to detail their planned system hardening projects, including separately addressing covered conductor installation and system undergrounding.
  - Require utilities to calculate RSEs for each wildfire risk mitigation strategy and provide RSEs at a higher level of geographical granularity, to provide insight into see the relative value of different approaches to reducing the risk of ignitions.

- The WSD should only approve the 2020 WMPs on the condition that each utility submit a supplement[224] (via tier 2 advice letter) that:
  - Justifies undergrounding projects by analyzing alternative mitigation measures and showing that undergrounding is the most appropriate mitigation measure for the specific locations where it is proposed.
  - Addresses the resource constraints the utility is likely to face and demonstrates the feasibility of the mitigations described in the WMP.
  - Demonstrates the validity of the utility's wildfire models.
- For future WMP submissions, the WSD should require the utilities to strengthen the analysis that supports their WMPs, including:
  - Providing a detailed analysis of resource constraints, feasibility, and contingency planning.
  - Identifying the highest priority mitigation measures in their WMPs and showing a method of determining the highest priority mitigations.
  - Justifying undergrounding projects as described above.

[224] Public Utilities Code Section 8386(c)(22).

    - Providing more robust risk-scoring models.
    - Performing and publishing validation analyses of the models they use to assess wildfire risk.
- The WSD should establish a technical working group to review and provide input on wildfire risk models.

X. Conclusion

To ensure that electric utilities in California effectively reduce the risk of wildfires caused by utility equipment, the Public Advocate's Office respectfully requests that the Wildfire Safety Division and the Commission adopt the recommendations discussed above.