## RECOMMENDATIONS ON THE

# 2020 UTILITY WILDFIRE MITIGATION PLANS

## WILDFIRE SAFETY ADVISORY BOARD

Approved April 15, 2020

**Recommendations on the 2020 Utility Wildfire Mitigation Plans**

**Wildfire Safety Advisory Board**

This document contains the recommendations of the Wildfire Safety Advisory Board on the utilities' 2020 Wildfire Mitigation Plans (WMP). Members of the Board developed these recommendations in collaboration with the ongoing work efforts undertaken at the California Public Utilities Commission by the Wildfire Safety Division, CalFire, California Office of Emergency Services. We hope that recommendations identified here will help our state to focus efforts to plan to mitigate the wildfire risks going moving.

Members of the Wildfire Safety Advisory Board:

- Marcie Edwards, Chair
- Diane Fellman, Vice Chair
- Ralph M. Armstrong Jr., Board Member
- Jessica Block, Board Member
- John Mader, Board Member
- Christopher Porter, Board Member
- Alexandra Syphard, Board Member

More information about Board Members can be found on the CPUC's Wildfire Safety Advisory Board Website: https://www.cpuc.ca.gov/WSAB/.


## *Acknowledgement*

*These recommendations have been developed for adoption at the April 15, 2020 Wildfire Safety Advisory Board Meeting in anticipation of the State of California's upcoming wildfire season. The Coronavirus Disease (COVID-19) pandemic has altered the course of lives of all residents in this state and the nation. Many unprecedented changes have occurred during the conceptualization and drafting of this document. This adds color to the experiences of Californians impacted by wildfires and reaffirms our commitment to work collaboratively for the benefit of all members of our great state.*

*We want to acknowledge and thank the civil servants of the State of California who continue to work for the benefit of us all during this tumultuous time. Our gratitude extends to our emergency and essential services workers who, every day, help our society move forward: our nurses, doctors, hospital professionals in all departments, grocers, farmers, goods movers, mail providers, custodians, and water system professionals.*

*The Board recognizes the dedication of our staff, Jamie Ormond and Katherine Stockton, who have gone above and beyond in these challenging circumstances and timelines to organize the Board's start-up effort and pull together the input of its members into a cohesive, comprehensible document.*

## 1. Introduction

Wildfire season is a part of California's history and will continue to be. The Wildfire Safety Advisory Board's (the Board) goal is to assist the California Public Utilities Commission's (CPUC) Wildfire Safety Division as they provide direction to the utilities. The Wildfire Safety Division has been given the task of considering and giving the utilities feedback on all of the investor owned utilities' 2020 Wildfire Mitigation Plans (WMP). The magnitude and significance of this endeavor cannot go unstated. Human life, utility infrastructure, and California's future development depend on utilities and the natural environment coexisting more harmoniously in the future.

These recommendations do not request that the utilities resubmit documents related to their 2020 WMPs. The Board intends that these recommendations be considered additive guidance in consideration of the 2021 WMPs currently under development.

Given the timeframe and criticality of these recommendations, the Board focused on the three big investor owned utilities, Pacific Gas & Electric (PG&E), Southern California Edison (SCE), San Diego Gas and Electric (SDG&E).[1] Additional information will be contained in the next round of recommendations. Members of the Board look forward to our ongoing collaboration.

This draft, published on April 14, 2020 adds justifications for the Board's recommendations in light of the global novel coronavirus 2019 (COVID-19) pandemic. Certain Board recommendations have become critical given the global COVID-19 pandemic especially, (1) forming deeper partnerships with local city and county governments, with protocols for informing city and county agencies and first responders,[2] (2) developing more robust training programs for utility workers,[3] and (3) reducing the number of PSPS events, shortening PSPS event duration, and ensuring re-energization occurs more quickly.[4]

## 2. Procedural History

Following the catastrophic fires of 2017 and 2018, the CPUC opened Rulemaking 18-10-007 to provide guidance on the form and contents and process for review and implementation of the investor-owned electric utilities' wildfire mitigation plans to be filed pursuant to Senate Bill 901.[5] The CPUC issued the wildfire mitigation plan guidance Decision (D.) 19-05-035 on June 3, 2019, in time for the large investor owned electric utilities, three small and multijurisdictional utilities, and two independent transmission owners, to act. That decision ordered all utilities to collect data and

[1] Although the Board did not focus on Liberty, Bear Valley, and PacifiCorp during this round of review, the universal recommendations apply.

[2] *See* Recommendation 2.

[3] *See* Recommendation 7.

[4] *See* Recommendations 8, 9, 10, 11.

[5] Stats. 2018, Ch. 626 (Dodd).

file reports, established preliminary metrics to evaluate the mitigation plans, and clarified that the metrics focused on the success of mitigating and lowering the risk of future catastrophic wildfires.

Assembly Bill 1054[6] and Assembly Bill 111[7] established the Board consisting of seven independent members appointed by the Governor, Speaker of the Assembly, and Senate Committee on Rules, to advise and make recommendations related to wildfire safety to the California Public Utilities Commission's Wildfire Safety Division.

The recommendations before us today are the Board's thoughts on the utilities' 2020 Wildfire Mitigation Plans. The Board provides these recommendations to Wildfire Safety Division for consideration as the new division considers the sufficiency of the currently filed plans. The Board's recommendations provide high-level input about upcoming wildfire mitigation efforts for consideration immediately, in the near or medium term, and over the long term.

## 3. Recommendations Developed as the CPUC Takes Procedural Action

These recommendations were produced as a result of Board review of the investor owned utilities' 2020 WMPs. Board members bring individual expertise in reviewing these plans, independent of current CPUC actions. In its first review, Board recommendations may overlap efforts that are ongoing in open CPUC formal proceedings. We anticipate that as wildfire mitigation work progresses, the various forums for procedural developments will be brought together into the WMP documents.

## 4. Areas of Review and Focus of Recommendations

As the Board considered the efforts documented in the utility WMPs to protect communities by preventing ignitions caused by utility infrastructure and reducing the impacts of deenergization, the Board focused on four main categories in order to develop our recommendations:

(A) Vegetation management and inspections,

(B) Grid design and system hardening,

(C) Resource allocation methodology including "Risk Spend Efficiency," and

(D) Communication with the community, planning, preparedness and recovery after Public Safety Power Shutoff (PSPS) events.

Throughout the development of our recommendations, these four broad categories overlapped with the ten maturity model categories that organize utility wildfire safety planning.[8] These elements are

[6] Stats. 2019, Ch. 79 (Holden).

[7] Stats. 2019, Ch. 81 (Committee on Budget).

[8] "The Utility Wildfire Mitigation Maturity Model is a method to assess utility wildfire risk reduction capabilities and examine the relative maturity of the wildfire mitigation programs." The applicable

called out at the top of each of the recommendation in order to provide additional detail as to how these recommendations might be considered by utilities, Wildfire Safety Division, and the CPUC going forward.

## 5. Themes / Findings

Throughout the process of drafting these recommendations, several issues reappeared in a variety of ways. These recurring themes surfaced as Board Members reviewed various areas of the 2020 Wildfire Mitigation Plans and synthesized the information against various areas of expertise. The recommendations that follow look at different topics in a straight-forward fashion. Here, these higher-level themes are discussed and can be considered goalposts for successful wildfire mitigation implementation going forward:

- First, the utilities provide a varying degree of detail for each element of their plans. For the CPUC to be able to review plans and provide feedback and oversight, details matter. In each of the recommendations the Board includes performance metrics which provide a framework that might be helpful to the utilities regarding type of information that could be delivered to the CPUC for review in the future.

- Second, utility wildfire mitigation is creating huge swathes of new data that many organizations should be able to learn from and utilize. As more information is produced, this data should be neutral and state-managed in a central repository that is sharable by a broader community network of researchers and fire scientists. Federal agencies, and insurance companies, could input and utilize this information. It may be appropriate to establish a task force or open forum to have deeper discussions and evaluations of emerging tech and scientific discovery. The University of California might be the appropriate home for such a repository provided that utilities submit updated data to be inputted on a quarterly basis. We rightfully acknowledge the differences between utilities but would suggest as much data as reasonably possible be compared and contrasted.

- Finally, future WMPs should describe lessons learned as an organizing principle. Integrating best practices from lessons learned into the WMP narrative will help the utilities demonstrate their ongoing efforts to the reader.

maturity model categories are identified in the header of each of the Boards recommendations. *The Utility Wildfire Mitigation Maturity Model,* Attachment 2 to Administrative Law Judge Thomas' December 16, 2019 Ruling in Rulemaking 18-10-007 at 2, available at: http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M322/K150/322150488.PDF.

## Board Recommendations

1. Developing and Tracking Community Engagement Activities ..... 6
2. Working with Local Government Liaisons in Emergency Situations ..... 8
3. Sharing Developing Science and Situational Awareness Data ..... 10
4. Future Proofing Utility Pilots and Aligning Pilots with Climate Goals ..... 13
5. Fuel Management, Removal of At-Risk Species, and Scientific Review ..... 15
6. Analyzing Near Misses ..... 19
7. Training Programs and Qualified Electrical Workers ..... 21
8. Criteria to Prioritize Reducing PSPS Events for Critical Infrastructure ..... 23
9. Analyzing Fire Maps to Exclude Lines from PSPS Events ..... 26
10. Risk Spend Efficiency and Costs of PSPS Events ..... 28
11. Re-Energization after PSPS Events ..... 30

## 1. Developing and Tracking Community Engagement Activities

| **Utility:** ☐ PG&E ☐ SCE ☐ SDG&E ☒ Applicable to all | Recommendation No. 1 |
|---|---|

**Main Categories:**

- ☐ Vegetation management and inspections
- ☐ Grid design and system hardening
- ☐ Resource allocation methodology incl. Risk Spend Efficiency
- ☒ Communication with the community, planning, preparedness and recovery after PSPS events

**Wildfire Mitigation Maturity Categories:**

- ☐ Risk assessment and mapping
- ☐ Situational awareness and forecasting
- ☐ Grid design and system hardening
- ☐ Asset management and inspections
- ☐ Vegetation management and inspections
- ☐ Grid operations and protocols
- ☐ Data governance
- ☐ Resource allocation methodology
- ☒ Emergency planning and preparedness
- ☒ Stakeholder cooperation and community engagement

**Timing:** ☒ Immediate ☒ Near Term ☐ Mid Term ☐ Long Term

### Issue/Metric:

- Completeness of outreach, public awareness and communications efforts regarding emergency planning and preparedness and stakeholder cooperation and community engagement as part of the 2020 WMPs.

### Current WMP Requirements:

- Sections 5.3.9 and 5.3.10 of the 2020 Wildfire Mitigation Plan Guidelines (2020 WMP Guidelines)[9] require the utilities to provide a description of the overall emergency preparedness and response plan and description of various community and stakeholder programs including coordination with Public Safety Partners, lessons learned from wildfire events and any other initiatives.

### Board Recommendation

- In its review, the Wildfire Safety Division should consider whether the utilities have provided adequate information to track and document their outreach efforts as part of the WMPs regarding emergency preparedness, event protocols and post-event learnings.

[9] 2020 WMP Guidelines, Attachment 1 to Administrative Law Judge Thomas' December 16, 2019 Ruling in Rulemaking 18-10-007 at 69-73, available at: http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M322/K133/322133494.PDF.

Observations:

- The CPUC is comprehensively examining the utilities' actions before and after PSPS events to engage with local and tribal governments, the Access and Functional Needs (AFN) population, public safety officials and other key stakeholders to achieve meaningful protocols that minimize the impacts on communities and maximize public involvement. These relevant proceedings are addressing this issue: ESRB-8; R. 18-12-005; I.19-11-013.[10] Each sets forth specific program requirements and seeks feedback on the effectiveness of the utility efforts.
- In the 2020 WMPs, the utilities have provided varying levels of information about their approaches. Each utility indicates that it has developed a plan (or intends to) and is executing.[11]

Wildfire Safety and Mitigation Performance Metrics:

- The utility WMP documents should provide an overview sufficient to understand the outreach efforts that are being formulated and implemented in other relevant CPUC proceedings as they relate to the goals of the WMPs.

[10] Other CPUC proceedings may be touching upon this critical issue as well.

[11] The maturity model questionnaires demonstrate that there are disparities in the utilities' views on the status of these programs. PG&E 2020 Wildfire Mitigation Plan Report (PG&E 2020 WMP), Section 5.3.9. on emergency planning and preparedness, reveals that, in many instances, PG&E did not have comprehensive plans for coordinating with stakeholders and states that "in the future, PG&E plans on …."

## 2. Working with Local Government Liaisons in Emergency Situations

| **Utility:** ☒ PG&E ☐ SCE ☐ SDG&E ☒ Applicable to all | Recommendation No. 2 |
|---|---|

**Main Categories:**

- ☐ Vegetation management and inspections
- ☐ Grid design and system hardening
- ☐ Resource allocation methodology incl. Risk Spend Efficiency
- ☒ Communication with the community, planning, preparedness and recovery after PSPS events

**Wildfire Mitigation Maturity Categories:**

- ☐ Risk assessment and mapping
- ☒ Situational awareness and forecasting
- ☐ Grid design and system hardening
- ☐ Asset management and inspections
- ☐ Vegetation management and inspections
- ☐ Grid operations and protocols
- ☐ Data governance
- ☐ Resource allocation methodology
- ☐ Emergency planning and preparedness
- ☒ Stakeholder cooperation and community engagement

**Timing:** ☒ Immediate ☒ Near Term ☐ Mid Term ☐ Long Term

### Issue/Metric:

- Level of local government and county integration into the utility Emergency Operations Centers for increased real-time collaboration.

### Current WMP Requirement:

- Section 5.3.9. of the 2020 WMP Guidelines requires each utility to describe how it communicates with local communities during an emergency including outreach, and awareness efforts before, during, and after a wildfire.

### Board Recommendation:

- In its review, Wildfire Safety Division should consider whether the utilities have provided information to demonstrate that they are forming closer partnerships with local city and county governments, with protocols for informing city and county fire departments, and have a competent and qualified liaison for the local governments and counties when a utility assembles an Incident Management Team at an Emergency Operations Center concerning a possible Public Safety Power Shutoff (PSPS) condition or event.

### Observations:

- The utilities have historic relationships with communities based on delivery of electricity and gas service. Under wildfire threat, utilities are acquiring increased situation awareness that should be shared with local city and county governments agencies at all levels in real-time at Emergency Operations Centers (EOC). Impacted county or local government liaisons should be integrated in the EOC to actively participate in informational briefings. The liaison will then be able to

activate resources and identify local at-risk population requiring enhanced services to reduce PSPS impact.

- City and county governments are responsible for meeting a wide range of local needs including identifying at-risk populations rapidly, including Medical Baseline customers and beyond.
- The global COVID-19 pandemic makes forming deeper partnerships with local city and county governments, with protocols for informing city and county agencies and first responders critical. Community partners can help the utilities manage any new developments or additional emergency response measures that result from COVID-19. Given the health risks for local government or community staff that are executing any emergency responses, timely and well-informed communication becomes more critical.
- With shared weather mapping information, local city and county governments can help situate accessible Community Resource Centers, where first responder resources can be deployed. Local governmental agencies can plan how and where to deploy resources.

### Wildfire Safety and Mitigation Performance Metrics:

- An online emergency contact list with local government liaisons ought to be developed for each wildfire mitigation territory. The website developer's contact information should also be easily accessible so that local city and county governments agencies can submit their most updated contact information. This contact information and protocol ought to be easily accessible in advance of any emergency situation.

## 3. Sharing Developing Science and Situational Awareness Data

| **Utility:** ☐ PG&E ☐ SCE ☐ SDG&E ☒ Applicable to all | Recommendation No. 3 |
|---|---|

**Main Categories:**

- ☐ Vegetation management and inspections
- ☐ Grid design and system hardening
- ☒ Resource allocation methodology incl. Risk Spend Efficiency
- ☒ Communication with the community, planning, preparedness and recovery after PSPS events

**Wildfire Mitigation Maturity Categories:**

- ☒ Risk assessment and mapping
- ☒ Situational awareness and forecasting
- ☐ Grid design and system hardening
- ☐ Asset management and inspections
- ☐ Vegetation management and inspections
- ☐ Grid operations and protocols
- ☒ Data governance
- ☐ Resource allocation methodology
- ☒ Emergency planning and preparedness
- ☒ Stakeholder cooperation and community engagement

**Timing:** ☒ Immediate ☒ Near Term ☒ Mid Term ☒ Long Term

### Issue/Metric:

- Public access to utility situational awareness data and to developing fire and weather forecasting methodologies.

### Current WMP Requirement:

- Under Section 5.3.2. of the 2020 WMP Guidelines, the utilities must describe the situational awareness and forecasting programs and initiatives to reduce ignition probability and wildfire consequences.
- Section 5.3.7. of the 2020 WMP Guidelines requires the utilities provide a description of each data initiative including whether and how the utility: (1) maintains a centralized repository for data, (2) collaborates with outside organizations on utility ignition and wildfire research, (3) documents and discloses wildfire-related data and algorithms, and (4) tracks and analyzes near miss data.

### Board Recommendations:

- The Wildfire Safety Division should assess the accessibility of the utilities' advanced weather modeling and fire modeling information. The Wildfire Safety Division should also consider, particularly given federal critical infrastructure protection protocols, whether additional information should be made available to the public and the scientific community.

### Observations:

- For the developing wildfire science, there could be a state-wide, centralized data and situational awareness center that aggregates data from sources including High Definition cameras, and

weather stations, in addition to other data collected periodically like early warning data, Geographical Information Systems data, fuel modeling data, risk assessment modeling data, and historical burn patterns.

- Multiple weather modeling and fire behavior modeling methods should be used and compared to inform daily operations and assessments. Utilities should encourage modeler collaboration, the use of non-proprietary methods, and documenting the techniques used in the execution of the models.
- Fire modeling methods for daily planning and response are fields of research in development. Because of the inherent uncertainties with all fire models, the input data, approach, algorithms, assumptions, and validation results should be reviewed by stakeholders and the scientific community. Scientists within the utilities should compare different fire modeling approaches and methods to assess the sensitivity of results to different modeling assumptions and should report on the primary sources of uncertainty.
- In a number of sections, the WMPs state that the utilities develop their models or proposed actions in conjunction with "fire scientists" or "subject matter experts," without listing who these experts are, and their qualifications. This information should be transparent to ensure that the key developers of modelling decisions and assumptions have a demonstrated understanding of the complexity of fire behavior in different ecosystems. Future WMPs could include a resume or short bio listing the qualifications of each of the key scientists.
- The state of California's varied climate zones and the increasing uncertainties caused by climate change demonstrate that one size of modeling does not fit all. One fire model or one weather model will not solve all needs. Scientists model different combinations of weather, climate, and fuel data, at different time scales to determine which variables are appropriate for which conditions. These fields are rapidly evolving, and the utilities are important participants in the growth of the science. The data and the modeling methods should be publicly available so that scientists can vet them against existing research.
- A centralized situational awareness center, for example, would allow stakeholders to share information, lessons learned, and data to increase the utilities' ability to identify and adopt best operating protocols quickly.
- As weather modeling capabilities increase, the data collected, and any new discoveries should be reported to the CPUC and shared with the scientific community. PG&E is increasing the resolution or granularity of its weather models by going from a 3 km radius to a 2 km radius. SDG&E is increasing the frequency in which it collects weather data from every 10 minutes to 30 seconds. Increased data sharing will provide an opportunity to building an open scientific community and permit research findings and code developed by academics to be made available to the utilities to inform utility operations.
- Aggregating the extensive network of high definition cameras and weather stations deployed by California's utilities, and others, coupled with augmented risk assessment models developed by each utility within each High Fire Threat Districts (HFTD), will allow state, local governments, emergency agencies and others to better map weather patterns, fuel modelling, historical burn

patterns, and evolving conditions in the HFTDs. A higher resolution picture of the state's wildfire landscape will enhance utility wildfire threat responses and planning to events and improve communications with the community.

- A commitment to work on integrating the data from each of the utilities' proprietary technology into one central repository will increase the state's ability to map common areas and anomalies unique to specific HFTDs. Access to this information should be provided to communities at risk and first responders as it will create opportunities for more effective logistical planning and response. California should move away from archaic methodology and protocols, to a more evolved, mature, and sustainable cooperation and collaboration model.

### Wildfire Safety and Mitigation Performance Metrics:

- Addition of a section to the utility webpage that that include the curriculum vitae or minimum qualifications for the scientific professionals that the utility consulted with in the development of the plans that includes the coursework offered in fire mitigation modeling, including next course dates. Provides links that showcase the partnerships that the utility has created with various universities where interested future fire scientists can find training and education in the field.

- Creation of a portal, system, or facility where the utilities can upload their detailed weather and fire model code and data and the scientific community can access it for further analysis, again, consistent with federal critical infrastructure protection protocols. Thought should be given to recommending narrow changes to those protocols to accomplish this objective.

- Submission of coordination and collaboration plans and process milestones to achieve this portal, system, or facility out to be submitted in future WMPs including details as to how the scientific and educational community can access and utilize the data from the portal, system, or facility.

- Submission of a postmortem and lessons learned to the CPUC describing the model results that inform and trigger PSPS events so that a deeper assessment of infrastructure damage and high wind events can be developed.

## 4. Future Proofing Utility Pilots and Aligning Pilots with Climate Goals

| **Utility:** ☐ PG&E ☐ SCE ☐ SDG&E ☒ Applicable to all | Recommendation No. 4 |
|---|---|

**Main Categories:**

| | |
|---|---|
| ☐ Vegetation management and inspections | ☐ Resource allocation methodology incl. Risk Spend Efficiency |
| ☐ Grid design and system hardening | ☒ Communication with the community, planning, preparedness and recovery after PSPS events |

**Wildfire Mitigation Maturity Categories:**

| | |
|---|---|
| ☐ Risk assessment and mapping | ☒ Grid operations and protocols |
| ☐ Situational awareness and forecasting | ☐ Data governance |
| ☐ Grid design and system hardening | ☐ Resource allocation methodology [ |
| ☐ Asset management and inspections | ☒ Emergency planning and preparedness |
| ☐ Vegetation management and inspections | ☐ Stakeholder cooperation and community engagement XX |

**Timing:** ☐ Immediate ☒ Near Term ☒ Mid Term ☐ Long Term

### Issue/Metric:

- Oversight of utility pilots testing emerging technology and emergency resiliency measures.

### Current WMP Requirements:

- Section 5.1 of the 2020 WMP Guidelines encourages utilities to use new and emerging technologies.
- On March 9, 2020, CPUC Executive Director Alice Stebbins sent a letter to the utilities directing that they prepare to deploy microgrids for resiliency purposes as wildfire season quickly approaches.

### Board Recommendations:

- The Board recommends that the Wildfire Safety Division consider requiring the utilities to submit pilot implementation plans for all new and emerging technologies for wildfire mitigation. The Wildfire Safety Division should consider developing requirements and criteria to assess the reasonableness of the pilot implementation plans and the costs. The pilots that the utilities are designing to reduce the impact of Public Safety Power Shutoff events should also align with state goals for resiliency and climate.[12]

[12] For example, the track in CPUC Rulemaking 19-09-009 that is establishing criteria for rolling out microgrids.

Observations:

- The utilities' WMPs mention pilots frequently, but none of the plans include implementation details or details that would allow regulators to judge the expected effectiveness of the pilots. The Wildfire Safety Division could look to the program implementation plans submitted by utilities with respect to new and emerging technology, including how success ought to be measured, a full report of the expected costs, and proposed cost recovery. The CPUC should develop requirements and criteria to assess the reasonableness of the pilot implementation plans and the costs. These pilot implementation plans should extend beyond microgrid development.
- In addition to allowing the CPUC to judge the effectiveness of the pilots, pilot implementation plans will allow stakeholders to provide technical input based on industry knowledge. Transparency regarding the costs of these pilots will allow the CPUC and ratepayer advocates to assess whether the benefits outweigh the cost of the pilots to ratepayers.
- The CPUC could consider requesting that the utilities submit pilot implementation plans as a future reporting requirement and developing criteria that the division can use to judge the effectiveness of the pilots.
- It is appropriate to deploy generators in emergency conditions that utilize fossil fuels in the immediate term to reduce the impact of Public Safety Power Shutoff (PSPS) events. However, increased fossil fuel use for back-up generation every fire season is not a solution that aligns with long-term state goals. The utilities should continue to actively move forward on alternative local generation plans (e.g. microgrids, customer cogeneration, localized voltage support, localized dynamic/transient system stability support) that further state environmental goals while assisting the California Independent System Operator to maintain power system reliability. This goal will be attained most quickly with effective pilots for microgrids and other technologies and sharing results widely.

Wildfire Safety and Mitigation Performance Metrics:

- Submission of pilot implementation plans to the CPUC that include the goal of the pilot, the anticipated cost to develop and interconnect the pilot, and an outline of how success will be measured upon pilot completion. After pilot completion, the utility should report on pilot results to the CPUC and even more broadly.
- Continued development of alternative generation to align with state emissions goals and PSPS events duration reduction.

## 5. Fuel Management, Removal of At-Risk Species, and Scientific Review

| **Utility:** ☐ PG&E ☐ SCE ☒ SDG&E ☒ Applicable to all | Recommendation No. 5 |
|---|---|

**Main Categories:**

- ☒ Vegetation management and inspections
- ☐ Grid design and system hardening
- ☒ Resource allocation methodology incl. Risk Spend Efficiency
- ☐ Communication with the community, planning, preparedness and recovery after PSPS events

**Wildfire Mitigation Maturity Categories:**

- ☐ Risk assessment and mapping
- ☐ Situational awareness and forecasting
- ☐ Grid design and system hardening
- ☐ Asset management and inspections
- ☒ Vegetation management and inspections
- ☐ Grid operations and protocols
- ☐ Data governance
- ☒ Resource allocation methodology
- ☐ Emergency planning and preparedness
- ☐ Stakeholder cooperation and community engagement

**Timing:** ☐ Immediate ☒ Near Term ☐ Mid Term ☐ Long Term

### Issue/Metric:

- Fuel management in non-forested areas; Increasing fuel moisture retention; Justifying targeting at-risk species based on species and subspecies; and Verifying utility plans comport with best practices.

### Current WMP Requirement:

- Section 5.3.5 of the 2020 WMP Guidelines require the utilities to describe each utility's vegetation treatment protocols relating to vegetation that could pose a grow-in or fall-in risk to utility equipment. The WMPs must also include in the description the threshold by which the utility makes decisions of whether to (1) treat, or (2) remove vegetation.
- Current trimming requirements are described in General Order 95, Rule 35, Appendix E.[13]

### Board Recommendations:

- The Wildfire Safety Division, in its review, should consider the sufficiency of the information provided about utility vegetation treatment approaches including (1) whether vegetation treatment in non-forested areas is creating a more flammable environment, (2) whether the utilities have developed programs to increase fuel moisture retention, (3) whether the plans justify targeting certain at-risk species based on the specific characteristics of species and subspecies, and (4) whether the fuel treatment programs that go beyond the 12-foot radial requirements in General Order 95 follow best practices or have been be reviewed by scientists.

[13] Branches, limbs, and overhanging vegetation must be trimmed to the recommended 12-foot radial clearance of utility infrastructure or distribution lines at the time of trim.

Observations:

- *Whether vegetation treatment in non-forested areas is creating a more flammable environment:* The utilities make vegetation management decisions that determine whether to (1) treat, or (2) remove vegetation. The removal of certain species can lead to an infill of dry grass, which may create a more flammable environment. More specific details on how different vegetation types are treated would help evaluate whether the vegetation treatment approaches are consistent with the scientific literature and best practices for different fire regimes.

  → The utility plans should provide sufficient information about how woody shrubland vegetation will be treated. It is widely accepted in the scientific literature that the effects and effectiveness of vegetation treatment efforts vary depending on whether the ecosystem is forested or non-forested and whether the fires are wind-driven or not.[14]

  → Different natural fire regimes in the state have changed in opposite directions over the last 100 years, and treatment effects will vary depending on the way broader-scale fire mitigation regimes have changed.[15] Given the wide variation of treatments and approaches, the utilities should indicate whether the approaches they choose are consistent with best practices in the industry.

  → Woody shrubs and grasses tend to have trade-offs in terms of their risk to communities. For instance, woody shrubs tend to burn at higher intensity than grasses, but grasses are much more flammable, for much longer times of the year.[16] Also, whenever woody shrubs are removed in vegetation management efforts, the widespread distribution of grass, with high dispersal capacity and high resilience to fire, ensures that it will grow in and replace the woody vegetation, which has occurred over large extents of southern California already.[17] If fires are infrequent, the woody vegetation may return. If fires are frequent, the woody shrubs may be eliminated because they cannot recover.

---

[14] *See* Schoennagel, Tania, Thomas T. Veblen, and William H. Romme. "The interaction of fire, fuels, and climate across Rocky Mountain forests." BioScience 54.7 (2004): 661-676; Moritz, M.A., Keeley, J.E., Johnson, E.A. and Schaffner, A.A., 2004. Testing a basic assumption of shrubland fire management: how important is fuel age? Frontiers in Ecology and the Environment, 2(2), pp.67-72; and Price OF, Bradstock RA, Keeley JE, Syphard AD. The impact of antecedent fire area on burned area in southern California coastal ecosystems. Journal of environmental management. 2012 Dec 30;113:301-7.

[15] *See* Safford, H. D., & Van de Water, K. M. (2014). Using fire return interval departure (FRID) analysis to map spatial and temporal changes in fire frequency on national forest lands in California. Res. Pap. PSW-RP-266. Albany, CA: US Department of Agriculture, Forest Service, Pacific Southwest Research Station. 59 p, 266.

[16] *See* Fusco, Emily J., et al. "Invasive grasses increase fire occurrence and frequency across US ecoregions." *Proceedings of the National Academy of Sciences* 116.47 (2019): 23594-23599.

[17] *See* Syphard, Alexandra D., Teresa J. Brennan, and Jon E. Keeley. "Extent and drivers of vegetation type conversion in Southern California chaparral." *Ecosphere* 10.7 (2019): e02796; and Park, Isaac W.,

- *Whether the utilities have developed programs to increase fuel moisture retention*: Whatever a spark lands on will determine whether there is a fire that starts and can propagate. Fires often start in dry grasses rather than plants with higher fuel moisture content, like evergreen shrubs or oak trees. Plants with higher fuel moisture will often extinguish the spark. Removing woody shrubs and replacing them with grass leads to a generally more flammable environment where fires can start and then propagate.[18] If the fire starts in grass, it can then spread quickly into woody vegetation that burns with higher intensity and flame lengths and is more dangerous. The utilities should consider programs that increase fuel moisture.

  → For example, irrigating using recycled water near utility infrastructure could help reduce wildfire risk by reducing fuels like dry grass. Recycled water is wastewater that is treated to remove suspended solids, pollutants and bacteria. It is not treated at the same level as drinking water. Recycled water is safe for irrigation of parks, medians and other landscaped areas, soil compaction, and dust control, as well as many other non-drinking uses. Though California is experiencing a drought, using recycled water will not take away valuable drinking water.

- *Whether the plans justify targeting certain at-risk species:* Proper identification of vegetation species and subspecies, not the genus alone, will help to ensure justification in treatment or removal based on the specific characteristics of species and subspecies of at-risk trees. The plans list at risk trees by genus. However, tree species often vary widely within the same genus. For example, there is a vast difference in fuel characteristics between a sclerophyllous-leaved scrub oak (Q. berberidifolia) and a deciduous-leaved black oak (Q. kelloggii). Therefore, the utility vegetation management plans should consider the species and sub-species, in addition to the genus.

- *Whether the fuel treatment programs that go beyond the 12-foot radial requirements follow best practices:* The general efforts mentioned in the utility plans extend vegetation management into areas both inside and outside of utility rights of way. Given the uncertainty of the WMP' potential fire mitigation benefits, it is questionable whether the fuels treatment programs that extend beyond the required General Order 95 12-foot radius should be part of the utilities' responsibility, especially given the costs of these efforts.

  → For example, SDG&E awarded three $75,000 grants in 2019 to local Reservations and one grant of $100,000 that was distributed to three Fire Safe Councils.[19] SDG&E is expanding

and G. Darrel Jenerette. "Causes and feedbacks to widespread grass invasion into chaparral shrub dominated landscapes." *Landscape Ecology* 34.3 (2019): 459-471.

[18] See Keeley, Jon E., and Alexandra D. Syphard. "Twenty-first century California, USA, wildfires: fuel-dominated vs. wind-dominated fires." *Fire Ecology* 15, no. 1 (2019): 24; and Gibbons, Philip, A. Malcolm Gill, Nicholas Shore, Max A. Moritz, Stephen Dovers, and Geoffrey J. Cary. "Options for reducing house-losses during wildfires without clearing trees and shrubs." *Landscape and Urban Planning* 174 (2018): 10-17.

[19] SDG&E 2020 Wildfire Mitigation Plan (SDG&E 2020 WMP), Section 5.3.5.5. at 120.

upon this program to further increase vegetation management and grants and to collaborate with other fuels managers to remove more vegetation.

→ These vegetation management plans, particularly if conducted in shrublands, should at a minimum be reviewed by several fire scientists and ecologists.

### Wildfire Safety and Mitigation Performance Metrics:

- In future WMPs, utilities should submit project and pilot project plans, detail their vegetation management treat or remove plans, and evaluation criteria prior to implementation, defending their plans with relevant scientific citations. Additional details about utilities' intended fuel treatment plan should be submitted so that CPUC can measure the benefits of utility is spending. After project implementation, the utilities should provide detailed findings of successes and challenges.
- Submission of data for each vegetation treatment area including longitude/latitude, species and sub-species, environment type (forested or non-forested), type of treatment, treatment details, justification, fuel removal, estimated cost to complete treatment, risk reduction, and risk-spend efficiency.

## 6. Analyzing Near Misses

| **Utility:** ☐ PG&E ☐ SCE ☐ SDG&E ☒ Applicable to all | Recommendation No. 6 |
|---|---|

**Main Categories:**

- ☒ Vegetation management and inspections
- ☒ Grid design and system hardening
- ☐ Resource allocation methodology incl. Risk Spend Efficiency
- ☒ Communication with the community, planning, preparedness and recovery after PSPS events

**Wildfire Mitigation Maturity Categories:**

- ☐ Risk assessment and mapping
- ☐ Situational awareness and forecasting
- ☒ Grid design and system hardening
- ☐ Asset management and inspections
- ☒ Vegetation management and inspections
- ☐ Grid operations and protocols
- ☐ Data governance
- ☐ Resource allocation methodology
- ☐ Emergency planning and preparedness
- ☐ Stakeholder cooperation and community engagement

**Timing:** ☐ Immediate ☒ Near Term ☐ Mid Term ☐ Long Term

### Issue/Metric:

- Tracking incidents that occur during PSPS events to determine the effectiveness of each utility's grid hardening and vegetation management programs, and speed of restoration programs.

### Current WMP Requirements:

- 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."[20]
- The 2020 WMP Guidelines request near miss data in Sections 2.3, 3.2, 4.3, 5.3.7, and 5.6.1.

### Board Recommendations:

- In its review, the Wildfire Safety Division should consider whether the utilities are effectively analyzing near miss data during PSPS events to determine the effectiveness of the vegetation management, grid hardening, as well as speed of restoration programs, in their wildfire mitigation activities and the effectiveness of each PSPS event.

### Observations:

- In 2019, PSPS events were called in several geographic locations that had already received grid hardening and vegetation management measures. In these locations, the utility should track whether incidents occurred that would have caused an outage had the PSPS event not been

[20] 2020 WMP Guidelines at 11.

utilized (also known as "near misses"). Tracking near misses as they relate to PSPS events could help identify additional measures that should be utilized to reduce the risk.

- Gathering as much information as possible from each incident or near miss that occurs during a PSPS event could help the Wildfire Safety Division, the CPUC, stakeholders and the Board understand how the application of mitigation measures reduce the need for PSPS events.
- The information that could be collected for each incident or near miss that occurs during a PSPS event includes:
  - → weather conditions such as estimated wind speed;
  - → damage found; and
  - → cause of the damage while the line was de-energized.

  Tracking and providing this information could aid in the effectiveness of the current and future grid hardening and enhanced vegetation plans by helping to determine threshold factors to consider when deciding to initiate a future a PSPS event.

### Wildfire Safety and Mitigation Performance Metrics:

- Each utility should investigate, identify and catalog all damage that has occurred to their system during a PSPS event and cross reference the location against where the utility's hardening and enhanced vegetation measures were completed.

## 7. Training Programs and Qualified Electrical Workers

| **Utility:** ☒ PG&E ☐ SCE ☐ SDG&E ☒ Applicable to all | Recommendation No. 7 |
|---|---|

**Main Categories:**

- ☐ Vegetation management and inspections
- ☒ Grid design and system hardening
- ☐ Resource allocation methodology incl. Risk Spend Efficiency
- ☐ Communication with the community, planning, preparedness and recovery after PSPS events

**Wildfire Mitigation Maturity Categories:**

- ☐ Risk assessment and mapping
- ☐ Situational awareness and forecasting
- ☐ Grid design and system hardening
- ☒ Asset management and inspections
- ☐ Vegetation management and inspections
- ☐ Grid operations and protocols
- ☐ Data governance
- ☐ Resource allocation methodology
- ☐ Emergency planning and preparedness
- ☐ Stakeholder cooperation and community engagement

**Timing:** ☐ Immediate ☒ Near Term ☐ Mid Term ☐ Long Term

### Issue/Metric:

- The qualifications of electrical workers performing electrical asset inspections within HFTDs; Training programs that increase the pool of qualified workers.

### Current WMP Requirement:

- Section 5.3.4. of the WMP Guidelines requires utilities to create an accurate depiction of all assets and conditions within the HFTD in their territory.
- Section 5.3.11. of the WMP Guidelines defines various initiatives to include training and development of the workforce.[21] The utilities are therefore required to describe in the WMPs information about training and workforce development for initiatives including improving asset management and inspections, improving vegetation management and inspections, recruiting vegetation management personnel, grid operations work procedures in conditions of elevated fire risk, and emergency preparedness and planning for service restoration.

### Recommendations:

- The Wildfire Safety Division should consider whether the utilities are hiring electrical asset inspectors with qualifications that go beyond a basic knowledge of General Order 95 requirements. The Division should also consider whether the utilities are developing robust training programs that (A) train workers to identify hazards that could ignite wildfires, and (B) increase the pool of qualified electrical workers.

[21] 2020 WMP Guidelines at 74-82.

### Observations:

- The level of expertise that is currently relied upon to perform electrical inspections is inconsistent across utilities. Although utility overhead inspectors must have basic knowledge of General Order 95 requirements, moving forward, additional electrical inspection training should be required.
- Utilities should develop additional qualified workers to inspect and vet electrical assets within each wildfire mitigation area.
- Given the concerns in the workforce over safety as a result of continued operations during the global COVID-19 pandemic, training programs become more important than ever. Workforce training to effectively identify hazards as well as increasing the pool of qualified workers remains critical because wildfire threat remains high despite the impacts of COVID-19. The utilities should use all available technological resources to continue and expand training efforts because wildfire prevention, mitigation, and response cannot slow down as a result of the COVID-19 pandemic.
- As areas are inspected and vetted, theses territories should be geo-coded and added to the GIS files submitted to the Wildfire Safety Division. A dedicated workforce of qualified utility inspectors to perform electrical inspection will provide a level of skill and experience that the Wildfire Safety Division can rely on for accurate and informative mapping of utility assets.
- The Board expects utilities to work towards a high level of maturity in the Utility Wildfire Mitigation Maturity Model with respect to the development of a highly qualified workforce.

### Wildfire Safety and Mitigation Performance Metrics:

- Submission of proposals for CPUC consideration of minimum qualifications for electrical inspectors.
- Submission of strategic plans to the Wildfire Safety Division that will help the utility increase the number of qualified electrical workers trained to perform electrical asset inspections. The experience and training required includes familiarity with electrical construction practices, the apparatus necessary to sectionalize and de-energize circuits, and a variety of hazards associated with such equipment.
- Submission of Geographical Information System data and time stamped locations to the Wildfire Safety Division of all inspections performed by qualified electrical inspectors.

## 8. Criteria to Prioritize Reducing PSPS Events for Critical Infrastructure

| **Utility:** ☐ PG&E ☐ SCE ☐ SDG&E ☒ Applicable to all | Recommendation No. 8 |
|---|---|

**Main Categories:**

| | |
|---|---|
| ☐ Vegetation management and inspections | ☐ Resource allocation methodology incl. Risk Spend Efficiency |
| ☒ Grid design and system hardening | ☐ Communication with the community, planning, preparedness and recovery after PSPS events |

**Wildfire Mitigation Maturity Categories:**

| | |
|---|---|
| ☐ Risk assessment and mapping | ☒ Grid operations and protocols |
| ☐ Situational awareness and forecasting | ☐ Data governance |
| ☒ Grid design and system hardening | ☒ Resource allocation methodology |
| ☐ Asset management and inspections | ☐ Emergency planning and preparedness |
| ☐ Vegetation management and inspections | ☐ Stakeholder cooperation and community engagement |

**Timing:** ☒ Immediate ☒ Near Term ☒ Mid Term ☒ Long Term

### Issue/Metric:

- Criteria for grid design and system hardening measures designed to exclude line sections from Public Safety Power Shutoffs (PSPS).

### Current WMP Requirements:

- Section 5.3.8. of the 2020 WMP Guidelines on resource allocation requires the utilities to describe each utility's initiatives to minimize the risk of its equipment or facilities causing wildfires, including (1) Allocation methodology development and application, (2) Risk reduction scenario development and analysis, (3) Risk spend efficiency analysis, and (4) Any other initiatives that do not fall within those categories.[22]

### Board Recommendations:

- In its review, the Wildfire Safety Division should consider how the utilities are prioritizing and expediting excluding certain line segments, in timing and geography, from future PSPS events. The Wildfire Safety Division could consider requiring the utilities to expedite the development of "Grid Hardening Operating Criteria"[23] to evaluate each circuit within a distribution or transmission line with the goal of reducing PSPS events for certain circuits as part of the safety certificate process.

[22] 2020 WMP Guidelines at 67.

[20] For example, PG&E 2020 WMP, Section 5.3.3.8. at 5-125.

Observations:

- Risk assessments and resource allocation analyses the utilities are performing should promote the goal of reducing the number and duration of PSPS events for critical infrastructure, customers who have experienced numerous events, and line sections that serve the maximum number of customers. Risk assessments and resource allocation analyses performed should help the utility accomplish this goal.

- We cannot contemplate all possible impacts of COVID-19, but we list a few here. COVID-19 has changed how we use energy and the impact that losing power would have on the lives of Californians due to physical or social distancing. So many business activities have transferred to the home so that PSPS impacts would further deteriorate the economy. Further, during PSPS events, people cannot rely on physical help from family members in other households. Reducing the number of PSPS events, shortening PSPS event duration, and ensuring re-energization occurs more quickly is even more important. Emergency centers have been a critical tool for communities to mitigate the impacts of PSPS events, but now must be reimagined to comply with physical distancing requirements. Finally, individuals impacted by PSPS events have less access to necessary resources because of COVID-19.

- State and local municipalities will be able to help determine the highest priority line sections to target for future PSPS avoidance.

- The utilities' portfolio of grid hardening and vegetation management measures should promote reducing the PSPS events for these customers by identifying, (1) Critical community infrastructure (hospitals, waste water treatment, town squares, grocery stores, retirement homes, etc.); (2) Customers that have already experienced numerous PSPS events; and (3) Lines sections that serve the maximum number of customers.

  → During the February 18th Informational Workshop,[24] SDG&E referenced work to reduce the effects PSPS by analyzing each circuit section and applying a portfolio of mitigations to exempt circuit sections from PSPS events. SDG&E explained that its process focuses in the short term on line segments serving vital infrastructure that benefits communities (i.e. critical care facilities, town squares, and grocery stores). SDG&E's WMP provide little detail regarding SDG&E's work to exclude certain line sections from future PSPS events including lines with critical infrastructure, customers who have experience frequent PSPS events, and lines that serve the maximum number of customers.

  → PG&E stated that work done in transmission line assessment, distribution segmentation, and distributed generation enabled microgrids that will reduce PSPS impacts by a projected 33%.[25] However, the work PG&E has done to harden its system was not cited as a reason PG&E was forecasting a reduction in PSPS events.

[24] Informational Workshop: 2020 Wildfire Mitigation Plans - Day 1, February 18, 2020 at 4:50:39, available at: https://youtu.be/vEHNRANBLGY.

[25] *Id.* at 1:52:24.

- Expediting the development of "Grid Hardening Operating Criteria"[26] is critical and will allow the utility to evaluate each circuit within a distribution or transmission line. This criterion will help the utility to evaluate the grid hardening techniques possible for each circuit to achieve the goal that the hardening technique should remove the circuit section from requiring deenergization in a future PSPS event. The utilities could develop more conservative, interim criteria in order to achieve the goal of reducing PSPS events for certain circuits.
- While refining Grid Hardening Operating Criteria is critical, grid hardening is not the only wildfire mitigation technique being deployed. Grid hardening and other wildfire mitigation techniques are not mutually exclusive. Other types of mitigation techniques should be included in the grid hardening operating criteria so that operators gain the confidence needed to safely avoid initiating a PSPS event for a specific circuit section. For example, the removal of some high-risk trees reduces the risk of foreign objects hitting the lines. Vegetation management, in this case, could reduce the risk of a wildfire and possibly allow a line section to be excluded from a PSPS event during higher wind conditions.
- The resource allocation section of the WMPs should reflect this priority on grid hardening and vegetation management mitigation measures that will allow the reduction in duration and number of PSPS for certain circuits. One example is in the use of covered conductors. Using covered conductor requires using the most robust equipment and is more resources intensive in terms of construction resources and money. There may be areas due to topography (e.g. urban areas in the High Fire Threat Districts) and areas with a specific weather history where other a less resource intensive techniques could be used to avoid the initiation or exclude certain circuits from PSPS events using the same spend to achieve the same goal of avoiding PSPS events or excluding certain circuits from PSPS events.
- The utilities should promote efforts that achieve the dual emphasis of A) work done to reduce the risk of utility initiates wildfires and B) removing line sections from potential future PSPS events. Actions that are interrelated and mutually supportive should be favored.

### Wildfire Safety and Mitigation Performance Metrics:

- Submission of "Grid Hardening Operating Criteria"[27] that evaluates each circuit within a distribution or transmission line with the goal of reducing PSPS events for certain circuits. Analysis and documentation of utility priorities that promote the exclusion of line segments that serve critical infrastructure from future PSPS events.
- A Risk Spend Efficiency analysis that assesses the cost of reducing PSPS per mitigation strategy by line segment and customer outage minutes projected to be avoided.

[26] For example, PG&E 2020 WMP, Section 5.3.3.8. at 5-125.

[27] For example, PG&E 2020 WMP, Section 5.3.3.8. at 5-125.

## 9. Analyzing Fire Maps to Exclude Lines from PSPS Events

| **Utility:** ☐ PG&E ☐ SCE ☐ SDG&E ☒ Applicable to all | Recommendation No. 9 |
|---|---|

**Main Categories:**

- ☐ Vegetation management and inspections
- ☒ Grid design and system hardening
- ☐ Resource allocation methodology incl. Risk Spend Efficiency
- ☒ Communication with the community, planning, preparedness and recovery after PSPS events

**Wildfire Mitigation Maturity Categories:**

- ☐ Risk assessment and mapping
- ☐ Situational awareness and forecasting
- ☒ Grid design and system hardening
- ☐ Asset management and inspections
- ☐ Vegetation management and inspections
- ☒ Grid operations and protocols
- ☐ Data governance
- ☐ Resource allocation methodology
- ☒ Emergency planning and preparedness
- ☐ Stakeholder cooperation and community engagement

**Timing:** ☐ Immediate ☐ Near Term ☒ Mid Term ☐ Long Term

### Issue/Metric:

- Identifying areas within the HFTD maps that may safely be excluded from PSPS events due to undergrounding, grid hardening, sectionalizing, or location in an urban area outside the wildland urban interface.

### Current WMP Requirements:

- Maps designating HFTD were developed through a nine-year[28] stakeholder process with the CPUC and CalFire. These maps were approved in CPUC Decision 17-12-024. Tier 2 HFTDs indicate elevated threat. Tier 3 HFTDs indicate extreme threat. CPUC regulations require different wildfire mitigation treatment depending upon whether an area is designated as a Tier 2 or 3 HFTD.
- The 2020 WMP Guidelines require the utilities to describe their directional vision for PSPS events in Section 4.4. PSPS events are also described in sections 3.3, 3.4, and 6.3. Grid hardening measures are described in Section 5.3.3.

### Board Recommendations:

- The Wildfire Safety Division, in its review, should consider whether the utilities have completed an analysis of the HFTD maps to identify segments of the grid that may be excluded from PSPS events because the fire risk is minimal. These include areas with undergrounded or hardened

[28] This nine-year period begins with the opening of Rulemaking 08-11-005 in response to October 2007 fires in Southern California. The nine-year period ends with the development of the HFTD maps approved in D.17-12-024.

lines, the capability to sectionalize, and, clearly, urban areas. Further, increasing segmentation or switching generation sources should be considered in order to exclude from PSPS events low-risk lines that are downstream from high-risk lines. Adjusting generation may require changes California Independent System Operator (CAISO) protocols.

### Observations:

- PSPS events should be limited to those circuits with overhead lines because overhead lines create a high risk of ignition. Historically, many localities have required new developments to underground electrical wires. Undergrounded wires typically do not require deenergization due to wildfire risk.
- Currently, large swaths of urban area fall within the same high fire threat Tier 2 and 3 zones as forested geographies. Meaning, many urban areas that are not part of the wildland urban interface are included in Tier 2 and 3 zones. These non-wildland urban interface areas should be identified as they may not require the same wildfire mitigation strategies as Tier 2 and 3 zones.
- If a transmission or distribution line does pose a high fire risk, the utility and the California Independent System Operator should consider prioritizing switching the generation source so that a community that is downstream from the high risk line can continue to receive utility service and be excluded from PSPS events that are potentially unnecessary in that location. The utilities should consider prioritizing maintaining electric supply to downstream communities that do not pose a high fire risk, while still deenergizing those overhead circuits that do pose a risk.
- As discussed throughout these recommendations, the global COVID-19 pandemic has changed how we as a society do business. The utilities should proceed with all due haste with efforts to reduce the number of PSPS events, shorten PSPS event duration, and ensure that re-energization occurs more quickly. Analyzing fire maps is one tool the utilities could use to expedite this goal.

### Wildfire Safety and Mitigation Performance Metrics:

- An analysis with the HFTD maps that identifies segments of the grid that will be excluded from PSPS events because they pose less fire risk due to (1) undergrounding, (2) significant hardening measures, or (3) location in an urban area outside the wildland urban interface.
- Operating plans that include switching generation sources during PSPS events in cases where such action would allow a community that is downstream from high fire risk areas, to continue to receive utility service. Some procedural vehicle may need to be found because a rule change may be required to permit utilities to change generation source in emergency circumstances.

## 10. Risk Spend Efficiency and Costs of PSPS Events

| **Utility:** ☐ PG&E ☐ SCE ☐ SDG&E ☒ Applicable to all | Recommendation No. 10 |
|---|---|

**Main Categories:**

- ☐ Vegetation management and inspections
- ☐ Grid design and system hardening
- ☒ Resource allocation methodology incl. Risk Spend Efficiency
- ☐ Communication with the community, planning, preparedness and recovery after PSPS events

**Wildfire Mitigation Maturity Categories:**

- ☐ Risk assessment and mapping
- ☐ Situational awareness and forecasting
- ☒ Grid design and system hardening
- ☐ Asset management and inspections
- ☐ Vegetation management and inspections
- ☐ Grid operations and protocols
- ☐ Data governance
- ☒ Resource allocation methodology
- ☐ Emergency planning and preparedness
- ☐ Stakeholder cooperation and community engagement

**Timing:** ☐ Immediate ☒ Near Term ☒ Mid Term ☒ Long Term

### Issue/Metric:

- Including in the Risk Spend Efficiency analysis the costs and risks of Public Safety Power Shutoffs (PSPS) to customers.

### Current WMP Requirement:

- Section 5.3.8. of the 2020 WMP Guidelines on resource allocation requires the utilities to describe their risk sped efficiency analysis. The 2020 WMP Guidelines state that, "Risk spend efficiency is an estimate of the cost-effectiveness of wildfire mitigation initiatives. This is calculated by dividing the mitigation risk reduction benefit by the mitigation cost estimate-based on the full set of risk reduction benefits estimated from the incurred cost."[29]

### Board Recommendation:

- The Wildfire Safety Division should consider whether the utilities factor into their risk spend efficiency calculations the risk and cost to customers that results from a PSPS event in addition to consideration of PSPS event wildfire risk reduction.

### Observations:

- PSPS events are costly to customers and there are many risks and negative consequences to customers when these planned deenergization events occur. These costs and risks should be

[29] 2020 WMP Guidelines at 12.

factored in the utility analysis. The utilities should consider whether the risks to customers outweigh the risk reduction of initiating a PSPS event.

- The negative costs and risks for each customer vary greatly by customer class and type. For example, costs to residential customers include food spoilage, and the potential interruption of medical baseline devices. For businesses, loss of productivity is likely one of the main costs.

- Given the global COVID-19 pandemic, the presumably increased costs of PSPS events should be included in the risk spend efficiency analysis.

### Wildfire Safety and Mitigation Performance Metrics:

- A Risk Spend Efficiency analysis that includes an assessment of the cost to customers of PSPS events. Avoiding PSPS events should increase the efficiency of each mitigation strategy and could include a count of customer outage minutes projected to be avoided. Stakeholders, especially local governments and community groups would want to provide input into developing the assumptions and quantifying the negative costs to customers that the utilities may include in their risk spend efficiency analysis.

## 11. Re-Energization after PSPS Events

**Utility:** ☐ PG&E ☐ SCE ☐ SDG&E ☒ Applicable to all | Recommendation No. 11

**Main Categories:**

- ☐ Vegetation management and inspections
- ☒ Grid design and system hardening
- ☐ Resource allocation methodology incl. Risk Spend Efficiency
- ☒ Communication with the community, planning, preparedness and recovery after PSPS events

**Wildfire Mitigation Maturity Categories:**

- ☐ Risk assessment and mapping
- ☐ Situational awareness and forecasting
- ☒ Grid design and system hardening
- ☐ Asset management and inspections
- ☐ Vegetation management and inspections
- ☒ Grid operations and protocols
- ☐ Data governance
- ☐ Resource allocation methodology
- ☐ Emergency planning and preparedness
- ☐ Stakeholder cooperation and community engagement

**Timing:** ☐ Immediate ☒ Near Term ☒ Mid Term ☐ Long Term

### Issue/Metric:

- Technology and grid upgrades that prioritize line re-energizations and the quick restoration of electricity service to customers.

### Current WMP Requirements:

- Section 5.3.9 of the WMP Guidelines requires utilities to provide a general description of the overall energy preparedness and response plan showing an adequate and trained workforce that can promptly restore service after a major event, taking into account mutual aid and contractors.
- Section 5.3.11 of the WMP Guidelines requires utilities to detail how they plan to conduct inspections and remediation necessary to re-energize power lines and restore service to customers.
- Section 5.3.11 of the WMP Guidelines requires utilities to detail how they are designing and executing procedures that accelerate the restoration of electric service in areas that were de-energized, while maintaining safety and reliability standards.

### Board Recommendation:

- The Wildfire Safety Division should consider directing the utilities to develop informal and specific re-energization timeframe goals for the 2020 WMPs consider inserting those goals in the 2021 WMPs. The utilities' wildfire mitigation measures like grid hardening and vegetation management should be designed to prioritize the quick re-energization of lines once it is safe to end a PSPS event.

Observations:

- PG&E's WMP sets a 2020 goal of restoring power for 98 percent of customers within 12 daylight hours from the time that weather conditions clear. PG&E set a 2019 goal of restoring power 24 daylight hours after weather conditions have cleared.[30] SCE and SDG&E's WMPs do not specify a timeline for restoring power. SCE states in its WMP that power will be restored when it is safe to reenergize the circuits, with the order of re-energization determined by factors such as customer safety and wellbeing, affected essential services, damage to electrical and other infrastructure and circuit design and topology.[31] SDG&E's states in its WMP that energy restoration will occur when weather forecasts indicate winds will not reaccelerate at or above dangerous levels, and after all de-energized lines have been inspected and determined safe.[32]
- As discussed throughout these recommendations, the global COVID-19 pandemic should expedite the utilities' priorities to reduce the number of PSPS events, shorten PSPS event duration, and ensure that re-energization occurs more quickly.
- The utilities' plans specify some grid design and system hardening measures they have taken or intend to take to prevent power line-started fires and to accelerate re-energization:
  - → PG&E states in its WMP that it will use advanced meteorology tools to forecast wildfire risk conditions with more granularity as well as to apply improved analysis of which parts of the system face high risk.[33] The plan also describes how utility will improve switching and sectionalization so that PSPS events affect smaller portions of the grid.
  - → SCE states in its WMP that it has improved the re-energization process by developing protocols specific to PSPS events. That includes notifying affected parties that a circuit is in the process of being restored, as well having the steps approved by management.[34] The protocols also include circuit-specific switching plans created prior to an event, which can save time in both de-energizing and re-energizing circuits. SCE states in its WMP that it will also explore new tools and technologies that can shorten electricity restoration times.
  - → SDG&E states in its WMP that the utility has deployed several measures to shorten service restoration times such as: remote distribution sectionalizing devices that let the utility more efficiently manage system operations and reliability; [35] wireless fault indicators that can

[30] PG&E 2020 Wildfire Mitigation Plan Report (PG&E 2020 WMP), Section 5.6.2.1.1.

[31] SCE 2020-2022 Wildfire Mitigation Plan (SCE 2020 WMP), Section 5.3.6.4.

[32] SDG&E 2020 Wildfire Mitigation Plan (SDG&E 2020 WMP), Section 5.3.6.4.

[33] PG&E 2020 WMP, Section 4.1.

[34] SCE 2020 WMP, Section 5.3.9.5.

[35] SDG&E 2020 WMP, Section 5.1.

concentrate on a smaller portion of the electric circuit[36]; steel utility poles;[37] and overhead distribution reclosers.[38]

Wildfire Safety and Mitigation Performance Metrics:

- Track the time of re-energization per circuit after a determination that adverse weather conditions have ended.
- Conduct a postmortem on each circuit restoration as to the cause of any delay in restoration to determine whether it was related to limited staff, equipment, an access problem, or other issue.

[36] SDG&E 2020 WMP, Section 5.3.2.3.

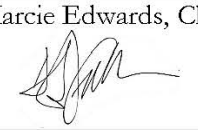
[37] SDG&E 2020 WMP, Section 5.3.3.17.1.

[38] SDG&E 2020 WMP, Section 5.3.6.1.

The Wildfire Safety Advisory Board's Recommendations on the 2020 Utility Wildfire Mitigation Plans are hereby executed on April 17, 2020.



Marcie Edwards, Chair



Diane Fellman, Vice Chair



Ralph M. Armstrong Jr., Board Member



Jessica Block, Board Member



John Mader, Board Member



Christopher Porter, Board Member

