PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Resolution WSD-002
Wildfire Safety Division
June 11, 2020

R E S O L U T I O N

RESOLUTION WSD-002 Guidance Resolution on 2020 Wildfire Mitigation Plans Pursuant to Public Utilities Code Section 8386.

This Resolution gives overall guidance on the 2020 Wildfire Mitigation Plans (WMPs) submitted by the electrical corporations the Commission regulates. This Guidance Resolution is accompanied by individual Resolutions addressing each electrical corporation's WMP.

The Commission's most important responsibility is ensuring that its regulations keep Californians safe. Starting in 2007 with catastrophic wildfires in the San Diego area, the equipment of large electric utilities the Commission regulates has been implicated in the most devastating wildfires in our state's history. California's Legislature enacted several legislative measures requiring electrical corporations to submit, and the WSD to review, approve or otherwise act on WMPs designed to reduce the risk of utility-caused catastrophic wildfire. Key among the legislative measures are Senate Bill 901 (2018), Assembly Bill 1054 (2019), and Assembly Bill 111, discussed in detail below.

Along with this Resolution, which imposes requirements on all electrical corporations named below, the WSD is issuing separate Resolutions addressing the individual WMPs of Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas & Electric Company, PacifiCorp, Liberty Utilities, Bear Valley

Electric Service, and a single Resolution on the WMPs of independent transmission owners Trans Bay Cable, LLC and Horizon West Transmission, LLC. In conducting this evaluation, the WSD considers and incorporates input from the Wildfire Safety Advisory Board, the public and other stakeholders.

Electrical infrastructure and equipment pose ongoing risks of starting wildfires due to the presence of electric current. There are three elements required to start a fire: fuel (such as dry vegetation), oxygen, and an ignition source (heat). A spark from electrical infrastructure and equipment can provide the ignition point from which a wildfire can spread and cause catastrophic harm to life, property, and the environment.[1]

WMPs contain an electrical corporation's detailed plans to reduce the risk that equipment will ignite a wildfire. Electrical corporations are also required to demonstrate, through evaluation of a wildfire mitigation measure's "risk-spend efficiency," that California electric ratepayers' funds are only being spent on mitigation measures that are effective in reducing utility-caused wildfire risk.

Generally speaking, the key and most costly aspects of the individual WMPs consist of vegetation management; system hardening, such as widespread electric line replacement with covered conductors designed to lower wildfire ignition; new inspection programs; and "situational awareness" technology, such as weather stations, high definition cameras, and use of computer modeling, weather and wind data and machine learning to predict where wildfires are most likely to strike. In addition, de-energization of power lines, also called Public Safety Power Shutoff (PSPS), while potentially useful in the mitigation of

[1] Nothing in the review and approval of WMPs relieves the electrical corporations of any otherwise applicable environmental laws or other statutory requirements. Moreover, environmental stewardship is an important value to California and electrical corporations are expected to consider environmental values in all their decision-making.

wildfires, results in significant hardship and cost to utility customers. Individual WMP Resolutions focus most substantively on these issues and address deficiencies of the plans.

PROPOSED OUTCOME:

- Provides overarching guidance binding electrical corporations with regard to their 2020 WMPs
- Discusses the maturity of the electrical corporations as compared to their peers and utilities in the United States and around the world
- Discusses upcoming 2021 wildfire guidelines and the process for updating metrics
- Addresses impact of Covid-19 on WMPs.

SAFETY CONSIDERATIONS:

- Mitigation of catastrophic wildfires in California is among the most important safety challenges the Commission-regulated electrical corporations face. WMPs list all an electrical corporation's proposed actions to help prevent catastrophic wildfire, so comprehensive WMPs are essential to safety.
- By implementing measures such as vegetation management, system hardening (such as insulating overhead lines and removing or upgrading equipment most likely to cause fire ignition), improved inspection and maintenance, situational awareness (cameras, weather stations, and use of data to predict areas of highest fire threat), improved community engagement and awareness, and other measures, utility-caused catastrophic wildfire risk should be reduced over time.
- Wildfire Safety Division and Commission substantive and procedural changes for 2020 should increase California's ability to mitigate catastrophic wildfire caused by electrical corporations.

ESTIMATED COST:

- Nothing in this Resolution should be construed as approval of the costs associated with the WMP mitigation efforts. As set forth in Public Utilities Code §8386(g), and confirmed by Decision (D.) 19-05-036,[2] The Commission will consider recovery of costs related to WMPs in the electrical corporations' General Rate Cases.

[2] *See* D.19-05-036 beginning at p. 21.

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SUMMARY

This Resolution gives overall guidance on the 2020 Wildfire Mitigation Plans (WMPs) submitted by the electrical corporations the Commission regulates. In addition, this Guidance Resolution provides an overview of the framework used in 2020 for WMP submissions, including the Wildfire Safety Division's (WSD) 2020 WMP Guidelines, Utility Wildfire Mitigation Maturity Model, data standardization efforts, and performance metrics. Following this summary is a discussion of the WMP evaluation process used by the WSD, including an overview of the deficiency/condition framework used in the Resolutions addressing each electrical corporation's 2020 WMP.

The Guidance Resolution continues by discussing common deficiencies found across the electrical corporations' WMPs and the WSD's plans to bring WMPs into compliance with the 2020 WMP Guidelines. Finally, this Guidance Resolution provides a discussion of the post-WMP reporting and change order processes, and introduces the 2021 WMP evaluation process, including updates to the 2021 WMP Guidelines and the WSD transition to the California Natural Resources Agency (CNRA).

1. BACKGROUND

Catastrophic wildfires in 2017-19 led the California Legislature to pass Senate Bill (SB) 901 in 2018 and its successor Assembly Bill (AB) 1054 in 2019, as well as AB 111. SB 901 and AB 1054 contain detailed requirements for electrical corporations' WMPs and provide a 90-day review cycle of WMPs by the Commission. AB 111 establishes a new WSD within the Commission. The duties of the WSD are contained in Public Utilities (Pub. Util.) Code Section 326(a), including to oversee and assure electrical corporations' compliance with wildfire safety requirements and to develop and recommend to the Commission performance metrics to achieve maximum feasible wildfire risk reduction.

SB 901 required a formal Commission proceeding for WMP review, and to that end the Commission reviewed the 2019 WMPs in Rulemaking (R.) 18-10-007. The decisions addressing the 2019 WMPs also added additional requirements for the 2020 WMPs. After the Commission issued its WMP decisions on

May 30, 2019,[3] the Legislature enacted AB 1054 and AB 111, which established the WSD. AB 1054 contains similar WMP requirements to SB 901 but allows WMPs of a three-year, rather than one-year duration. AB 1054 also requires the WSD to review and approve, deny or approve with conditions the electrical corporations' WMPs, with Commission ratification to follow thereafter. Further, AB 1054 requires establishment of a Wildfire Safety Advisory Board (WSAB), with appointees from the California Governor and Legislature, to provide comment on the 2020 WMPs. AB 1054 specifically requires the WSAB to develop and make recommendations related to the metrics used to evaluate WMPs in 2021 and beyond.[4] The WSD requested the WSAB provide recommendations on the 2020 WMPs, and the WSD considered the WSAB's recommendations as part of its 2020 WMP evaluation process.

Building on lessons learned from the WMP review process in 2019, the WSD developed and required all electrical corporations to conform their WMPs to a set of new WMP Guidelines starting in 2020.[5] In a change from the Commission's 2019 process, the WMP Guidelines add requirements on detail, data, and other supporting information, as discussed in detail below. The WMP Guidelines are designed: 1) to increase standardization of information collected on electrical corporations' wildfire risk exposure; 2) to enable systematic and uniform review of information each electrical corporation submits; and 3) to move electrical corporations toward an effective long-term wildfire mitigation strategy, with systematic tracking of improvements over time.

The Commission adopted Resolution WSD-001 setting forth the process for WSD and Commission review of the 2020 WMPs. The resolution called for electrical corporations to submit their 2020 WMPs on February 7, 2020. Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), San Diego Gas and Electric Company (SDG&E), PacifiCorp, Liberty Utilities,

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[3] Decisions (D.) 19-05-036, D.19-05-037, D.19-05-038, D.19-05-039, D.19-05-040 and D.19-05-041 (May 30, 2019).

[4] Pub. Util. Code § 8386.3 (Wildfire Safety Division), § 326.1 (Wildfire Safety Advisory Board).

[5] A ruling issued on December 19, 2019 in proceeding R.18-10-007 described and attached all of the material electrical corporations were required to use in submitting their 2020 WMPs.

Bear Valley Electric Service, Trans Bay Cable, LLC and Horizon West Transmission submitted WMPs on that date.

Shortly after electrical corporations filed their WMPs, the WSD held two sets of all-day workshops over four days, on February 18, 19, 24 and 25, 2020. The February 18-19, 2020 informational workshops called for the electrical corporations to present to stakeholders and the public details on their WMPs, and for stakeholders to ask questions, raise concerns, and otherwise comment on the WMPs' contents. The February 24-25, 2020 technical workshops focused more in depth on key provisions of the WMPs: vegetation management, system hardening, risk-spend efficiency, emerging technology, and reduction of the scale and scope of Public Safety Power Shutoff (PSPS) events. Again, stakeholder and public input was offered.[6]

Stakeholders were also allowed to submit comments on the WMPs, to which the electrical corporation replied. Stakeholders and members of the public commented on the WMPs on April 7, 2020, and the electrical corporations responded to those comments on April 16, 2020.

2. NOTICE

In accordance with Pub. Util. Code § 8386(d), notice of all electrical corporations' WMPs was given by posting of the WMPs on the WSD's webpage, at www.cpuc.ca.gov/wildfiremitigationplans, on February 7, 2020, in accordance with the requirements of Pub. Util. Code Section 8386(d). Further, the electrical corporations served their 2020 WMPs on the Commission's existing WMP formal proceeding (R.18-10-007) service list, as Resolution WSD-001 provided. Resolution WSD-001 also required the filers to post all data request responses, as well as any document referenced in WMPs, on their own websites and update websites with notice to the R.18-10-007 service list on a weekly basis.

[6] Presentations, agendas and other details of the workshops appear on the Commission's WMP homepage, located at www.cpuc.ca.gov/wildfiremitigationplans.

3. WILDFIRE SAFETY ADVISORY BOARD RECOMMENDATIONS (WSAB)

The WSAB provided recommendations on the WMPs on April 15, 2020.[7] The WSD has considered the WSAB's recommendations, and this Resolution and the utility-specific Resolutions incorporate WSAB's input throughout.

The WSAB focused its recommendations on high-level input and identification of shortcomings in the 2020 WMPs to inform upcoming wildfire mitigation efforts. WSAB recommendations focused on the following areas: vegetation management and inspection; grid design and system hardening; resource allocation methodology; and communication with the community, planning, preparedness and recovery after PSPS events. WSAB recommendations apply to PG&E, SCE and SDG&E.

WSAB, in its evaluation of WMPs, did not recommend requiring resubmittal of 2020 WMP documents; rather, WSAB's recommendations are intended to be additive guidance to inform the WSD's evaluation of 2020 WMPs and future wildfire mitigation efforts. The WSAB acknowledges that some recommendations may overlap efforts in other ongoing Commission proceedings but anticipates that recommendations for the improvement of wildfire mitigation work from multiple sources will be brought together under a utility's WMP.

WSAB recommends the WSD consider the following:

1. Whether the utilities have provided adequate information to track and document their outreach efforts regarding emergency preparedness, event protocols, and post-event learnings.
2. Whether the utilities have provided adequate information to demonstrate that they are forming closer partnerships with city and county governments. This includes providing specific protocols for communicating with local fire departments and ensuring that utilities include a qualified local government liaison when an Incident Management Team is assembled in advance of a potential PSPS event.

[7] *See* www.cpuc.ca.gov/wsab for a complete copy of the WSAB's recommendations to the WSD.

3. The accessibility of the utilities' advanced weather modeling and fire modeling information and whether additional information should be made publicly available.
4. Whether the utilities should be required to submit pilot program implementation plans to be assessed for reasonableness and cost.
5. The sufficiency of information provided about utility vegetation treatment approaches including: A) whether vegetation treatment practices in non-forested areas are actually increasing wildfire risk; B) whether the utilities have developed programs to increase fuel moisture retention; C) whether the plans justify targeting certain at-risk species based on specific characteristics; and D) whether the fuel treatment programs that go beyond the requirements in General Order (GO) 95 follow best practices or have been scientifically reviewed.
6. Whether the utilities are effectively analyzing damage and potential ignition events that occur during PSPS to determine the effectiveness of their wildfire mitigation measures.
7. Whether the utilities are hiring asset inspectors with qualifications that go beyond basic knowledge of GO 95 requirements and whether the utilities are developing robust training programs.
8. Developing a deeper understanding of how the utilities are prioritizing certain line segments for exclusion from PSPS events.
9. Whether the utilities have completed an analysis of the High Fire Threat District (HFTD) maps to identify segments of the grid that may be excluded from PSPS events due to minimal fire risk. Further, strategies such as increased segmentation or switching generation sources should be considered to exclude low-risk downstream lines from PSPS events.
10. Whether the utilities factor the risk and cost to customers that result from a PSPS event into their risk spend efficiency calculations.
11. Whether the utilities should be required to develop specific re-energization timeframe goals. The utilities' wildfire mitigation measures should be designed to prioritize the quick re-energization of lines after a PSPS event.

4. PUBLIC AND STAKEHOLDER COMMENT

Various stakeholders submitted comments to the WSD on the 2020 WMPs. Organizations that traditionally act as parties or respondents in formal proceedings pursuant to the Commission's Rules of Practice and Procedure submitted comments, including many organizations that are parties to R.18-10-007. Organizations and entities that submitted comments, some of which are parties to R.18-10-007, are: California Environmental Justice Alliance, Kevin Collins, East Bay Municipal Utility District, Energy Producers and Users Coalition, Green Power Institute, Joint Local Governments, Mussey Grade Road Alliance, Orange County Fire Authority, Perimeter Solutions, Protect our Communities Foundation, Public Advocates Office, Santa Clara County, Al Stein, and The Utility Reform Network. In addition, a significant number of members of the public submitted input focusing mostly on PG&E's 2019 PSPS actions, vegetation management programs and other issues. PG&E, SCE, SDG&E, Liberty Utilities, PacifiCorp, and Bear Valley Electric Service submitted reply comments. Most comments focused on individual utility WMPs and are addressed within each utility-specific Resolution. To the extent comments were applicable generally to all WMPs, that input is reflected within this Resolution.

5. DISCUSSION

5.1. COVID-19 IMPACT ON WILDFIRE MITIGATION PLANS

On March 19, 2020, the Governor of California signed Executive Order N-33-20 (stay-at-home order) requiring Californians to heed the order of the California State Public Health Officer and the Director of the California Department of Public Health that all individuals living in California stay home or at their place of residence, except as needed to maintain continuity of operation of the federal critical infrastructure sectors, in order to address the public health emergency presented by the COVID-19 disease.[8]

As articulated in the March 27, 2020 joint letters of the WSD, CAL FIRE and the California Governor's Office of Emergency Services regarding essential wildfire

[8] Executive Order N-33-20. Available at: https://covid19.ca.gov/img/Executive-Order-N-33-20.pdf.

and PSPS mitigation work during COVID-19 sent to each electrical corporation, electrical corporations are expected to continue to prioritize essential safety work. The WSD expects the electrical corporations to make every effort to keep WMP implementation progress on track, including necessary coordination with local jurisdictions. Such effort is essential to ensuring that electrical corporations are prepared for the upcoming and subsequent wildfire seasons, while complying with COVID-19 restrictions requiring residents to shelter-in-place, practice social distancing, and comply with other measures that California's public health officials may recommend or that Governor Newsom or other officials may require in response to the COVID-19 pandemic.

Furthermore, the WSD expects the electrical corporations to continue to make meaningful progress on PSPS mitigation goals, including continuing with sectionalization projects, local outreach and coordination, establishing customer resource centers, and microgrid projects. Electrical corporations are expected to limit planned outage work during this time to wildfire mitigation, PSPS reduction, projects that immediately impact reliability if delayed, and emergency/public safety outages. In addition, electrical corporations are expected to undertake any other critical work related to operating a safe and reliable grid and to mitigate wildfire and/or PSPS risk. The WSD expects that electrical corporations are thoroughly incorporating COVID-19 orders, response activities, and other considerations into their PSPS operations and protocols and will follow orders issued by the Commission in R.18-12-005 or any other Commission action pertaining to PSPS.

5.2. WILDFIRE SAFETY DIVISION WILDFIRE MITIGATION PLAN GUIDELINES AND PROCESS IMPROVEMENTS

In adopting the electrical corporations' 2019 WMPs, the Commission made clear it expected the WMP process to evolve moving forward:

> The WMP decisions the Commission issues in this proceeding are but one action the state and its regulated electrical corporations will take to mitigate the risk of catastrophic wildfire. This will be an annual process, and we expect continuous improvement as our actions here are an important element of the collective state efforts to

> mitigate risks of catastrophic wildfires. As such, the annual WMP process will be iterative, and will require reporting, monitoring, evaluation and updating to ensure the electrical corporations are targeting the greatest risk with effective programs. D.19-05-036 at 36.

To further the objectives of AB 1054 and D.19-05-036, the Commission and the WSD implemented substantial changes to the 2020 WMP process to further enhance the depth, comparability and quality of utility WMP submissions. On December 16, 2020, the Commission issued 2020 WMP Guidelines via Administrative Law Judge's (ALJ) ruling in R.18-10-007. The WMP Guidelines required electrical corporations to follow a specific template for their 2020 WMPs and complete a survey assessing their maturity as compared to peers and other electric utilities, with responses forming part of a "maturity model."[9]

The 2020 WMP Guidelines provided for a standardized submission template, inclusion of a glossary of terms to ensure clarity and consistency, and structured data tables to identify relevant data and provide a systemic means of organizing data in WMP submissions. Other innovations include the requirement for electrical corporations, beginning in their 2021 WMPs, to provide certain standard data prior to WMP submission, develop a standard set of metrics for assessing whether electrical corporations are effectively mitigating the risk of catastrophic wildfire, and submit wide-ranging geographic information system (GIS) files and data to support the reported information.

The 2020 WMP Guidelines structure 2020 WMP submissions into six sections, as follows:

1) Persons responsible for executing the plan
2) Metrics and underlying data

[9] Following the December 16, 2019 ALJ Ruling, several clarifications and updates to survey questions and copy edit errors in the scoring rubric were addressed. These changes are reflected in redlines to these documents and are available at: www.cpuc.ca.gov/wildfiremitigationplans.

3) Baseline ignition probability and wildfire risk exposure
4) Inputs to the plan and directional vision for wildfire risk exposure,
5) Wildfire mitigation activity for each year of the 3-year plan term, including expected outcomes
6) Utility GIS attachments

Parties to R.18-10-007 were invited to comment on the 2020 WMP Guidelines on January 7, 2020; however, due to the compressed 90-day timeline under which the WSD had to act upon 2020 WMPs to ensure new WMPs are in place before the 2020 wildfire season, the WSD was unable to incorporate party comments into the 2020 WMP Guidelines. The WSD will therefore incorporate comments into its 2021 WMP Guideline revision, as well as soliciting further stakeholder input for those guidelines.

5.2.1. MATURITY MODEL

One significant enhancement to the 2020 WMP process relates to a first-of-its-kind maturity model that provides a method to assess utility wildfire risk reduction capabilities and examine the relative maturity of individual wildfire mitigation programs. In keeping with its core value of accountability through transparency and to enhance its focus on safety, the WSD has developed the Utility Wildfire Mitigation Maturity Model ("Maturity Model" or "Model") to use in the evaluation of electrical corporations' current and projected activities, capabilities and plans to address the wildfire risk in their service territories across a broad range of categories. These categories include:

1) Risk assessment and mapping;
2) Situational awareness and forecasting;
3) Grid design and system hardening;
4) Asset management and inspections;
5) Vegetation management and inspections;

6) Grid operations and protocols;[10]
7) Data governance;
8) Resource allocation methodology;
9) Emergency planning and preparedness; and
10) Stakeholder cooperation and engagement.[11]

These 10 categories encompass a set of 52 unique capabilities that together form the basis of a robust utility wildfire mitigation program. The WSD assessed the maturity of each electrical corporation's ability to mitigate its wildfire risk by analyzing their responses to a detailed survey with over 200 questions pertaining to the 52 capabilities that build on the foregoing 10 elements and evaluating utility responses against the initiatives contained in each electrical corporation's WMP.[12] The results of this assessment enable the WSD to determine how "mature" the electrical corporation is with regard to the capability addressed in its wildfire mitigation program, and how much the electrical corporation plans to improve its efforts over the three-year plan period. In general, the maturity model assessment process outlines numerous elements that an electrical corporation must meet to reach a particular level of maturity, and the sophistication of requirements related to a capability typically increase in parallel to the increase in maturity level.

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

[10] PSPS plans, capabilities, and initiatives are addressed in this category.

[11] These 10 categories correlate to the categories of detailed wildfire mitigation programs contained in Section 5.3 of electrical corporation WMPs.

[12] Verified utility responses to the maturity model survey are available at: https://www.cpuc.ca.gov/wildfiremitigationplans/.

rubric.[13] The levels were calculated using an "all or nothing" binary approach. That is, levels are reported as whole numbers only. Thus, in order to reach a specific maturity level, an electrical corporation would have to meet 100 percent of the threshold requirements for that level, as detailed in the maturity model rubric. In general, the maturity model rubric outlines numerous elements that are required to be met to achieve a given level, and the sophistication of requirements to reach a level typically increases with each successively higher maturity level.

For example, to obtain a level of 1 in Capability 24 of the 52 total capabilities, titled "Vegetation grow-in mitigation," the electrical corporation (or utility) must demonstrate the following: "[u]tility maintains vegetation around lines and equipment according to minimum statutory and regulatory clearances. Utility: i) removes vegetation waste along right of ways and ii) within 1 week of cutting vegetation across entire grid."[14] Thus, in order to receive a maturity level of 1 for Capability 24, an electrical corporation would not only have to maintain minimum regulatory clearances around its overhead lines but also remove the vegetation waste along its right of ways within one week of conducting vegetation clearance work. If an electrical corporation meets only one of these requirements, then it would be assigned the next lowest level. In this example, a level of 0 would be assigned and the electrical corporation would not receive "partial credit" towards a level of 1.

Accordingly, the maturity model results require context and should not be interpreted as the final word on an electrical corporation's wildfire mitigation capabilities without an understanding of this assessment process. Therefore, each electrical corporation's maturity model results should be viewed as levels or thresholds – they are not absolute scores. As shown in the previous example, while the quantitative maturity levels generated from the model are useful in

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[13] The complete maturity model and supporting documents are available at: https://www.cpuc.ca.gov/wildfiremitigationplans/.

[14] The complete maturity model and supporting documents are available at: http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M322/K150/322150488.PDF.

providing a standardized basis for comparison across utility wildfire mitigation programs, the levels themselves do not tell the whole story. Consequently, one must be cautious when assessing and comparing numerical maturity levels to ensure the full context of the maturity model rubric requirements for that capability are understood.

A review of the maturity model results reveals that certain electrical corporations are currently at the low end of the range for various capabilities. The WSD's intent in providing clear review and evaluation of performance (including identifying weaknesses) is to drive electrical corporations to improve their wildfire mitigation programs. The WSD does not intend to use the maturity model to immediately penalize electrical corporations for poor performance, but the WSD expects improvement and advancements in maturity over time. The first maturity model assessment establishes a starting point for each electrical corporation. The WSD will use this baseline to gauge each electrical corporation's willingness and ability to become industry leaders in wildfire mitigation planning and response. The maturity model provides specific elements that the electrical corporation can add to its toolbox to improve its wildfire mitigation capabilities, which in turn will produce a higher level of maturity (*i.e.*, a more mature wildfire mitigation program) in the future.

Given that the maturity model is new, further refinement and calibration of the rubric requirements may be necessary. As noted, use of the maturity model in 2020 allows the WSD to establish a baseline in order to track improvement in wildfire mitigation programs over time. The WSD will study and assess the model used in 2020 to determine whether alternative approaches may better drive utility improvements or align with Commission and WSD objectives. To do so, the WSD will facilitate model improvement by identifying best practices, strengths and weaknesses across the utility landscape that the model should reflect, taking into account the best interests of ratepayers, other key stakeholders and the electrical corporations. Any enhancements to the model will be addressed in the WSD's publication of 2021 WMP Guidelines. The WSD intends to work with the electrical corporations and other stakeholders to refine and update the maturity model in 2021 and future years.

A detailed summary of maturity model assessments and outputs are provided as appendices to the individual utility Resolutions being issued concurrently with this Guidance Resolution.

5.2.2. DATA STANDARDIZATION

Another improvement over the 2019 WMP process includes standardization, structuring and expansion of WMP data collection and reporting. To ensure clarity and consistency among WMPs, the 2020 WMP Guidelines include a glossary of terms. Establishing consistent definitions for key terminology allows for better standardization across the WMP submissions and provides a clear reference and additional detail for interested stakeholders. In addition to clarifying and defining terminology, the 2020 WMP Guidelines include 31 tables for filers to complete. The tables require electrical corporations to provide data in a consistent format, allowing for quicker review and comparison given the short three-month review and approval deadline imposed by California Public Utilities Code Section 8386.3(a). The WSD will continue to pursue improvements that enhance the WMP review and approval process.

5.2.3. PERFORMANCE METRICS

To supplement the foregoing changes in data structure and standardization, the 2020 WMP Guidelines also require reporting of outcome and progress metrics to measure efficacy and track plan progress. In D.19-05-036, the Commission found that the effectiveness of wildfire mitigation activities contained in electrical corporations' WMPs could not be determined through the use of "program targets," e.g., number of miles of covered conductor installed or number of trees trimmed. Further, the Commission found that "program targets" did not meet the requirements of Public Utilities Code 8386 to establish metrics to evaluate WMP performance. To remedy this shortcoming in 2019 WMPs, for 2020, the WMP Guidelines require filers to group metrics and program targets as follows.

- *Progress metrics* track how much electrical corporation wildfire mitigation activity has managed to change the conditions of electrical corporation wildfire risk exposure in terms of drivers of ignition probability.

- *Outcome metrics* measure the performance of an electrical corporation and its service territory in terms of both leading and lagging indicators of wildfire risk, PSPS risk, and other direct and indirect consequences of wildfire and PSPS, including the potential unintended consequences of wildfire mitigation work.
- *Program targets* measure tracking of proposed wildfire mitigation activities against the scope and pace of those activities as laid out in the WMPs, but do not track the efficacy of those activities. The primary use of these program targets in 2020 will be to gauge electrical corporation follow-through on WMPs.

In addition to these metrics, the 2020 WMP Guidelines implement a set of parameters to normalize reported data across utility submissions for comparison purposes. Due to its direct linkage to utility wildfire risk, one normalizing parameter is geographic location – specifically, location of assets in the Commission's High Fire-Threat District (HFTD). This allows for concentrated focus on locations within the state at elevated or extreme risk of catastrophic wildfire in the event of utility ignition. Another normalizing parameter is circuit mileage for various types of power lines (*i.e.,* overhead vs. underground). Normalizing over circuit mileage accounts for differences in size across different utilities. The final normalizing parameter used is Red Flag Warning (RFW) circuit mile days, a newly-created measure that examines the miles of utility grid subject to RFW each day over the year, and is intended to account for temporal and geographic variances in fire weather potential across different utility service territories.

A detailed summary and comparison of performance metrics, current state of utility service territories, and resource allocation across "peer utilities" is provided in Appendix B. In this context, peer utilities are grouped into large electrical corporations (PG&E, SCE, and SDG&E) and other filers (Liberty Utilities, PacifiCorp, Bear Valley Electric Service (collectively, small and multijurisdictional utilities, or SMJUs), and Horizon West Transmission and Trans Bay Cable, LLC (collectively independent transmission operators, or ITOs).

5.2.4. GEOGRAPHIC INFORMATION SYSTEMS (GIS) DATA

GIS data is used to spatially and visually evaluate information, produce custom maps, and conduct analysis that adds value for decision-makers, utility providers, and the public. The 2019 WMP reviews and the rapid emergence of widespread PSPS implementation in California revealed both the lack of electric utility GIS data available to California state agencies and the vital importance of having such data. Therefore, the 2020 WMP Guidelines included a list of GIS data to be submitted by each electrical corporation.

In response, electrical corporations submitted a large amount of useful GIS data that the Commission and the WSD had never received at such a scale. A significant portion of this data was posted on the electrical corporations' public websites at the same time it was submitted to the Commission, thus providing interested stakeholders access to unprecedented amounts of utility GIS data.

Up until the submission of 2020 WMPs in February 2020, publicly available transmission line data was the only California electric utility GIS data widely available to the Commission. Utility GIS data is critical in enabling agencies to effectively regulate the safety of the electrical system and inform planning of wildfire mitigation initiatives, such as fire-safe fuel treatments and prescribed burns. A wide range of electric utility GIS data also enables agencies to effectively respond to large damaging wildfires and other disasters and enhances efforts to assist the public with evacuation and recovery tied to such events.

The quantity and quality of data submitted in 2020 is a substantial improvement over the past. However, the electrical corporations still have significant room for improvement. To that end, a detailed discussion of the common deficiencies in the 2020 WMP data submissions is provided in Section 5.4.6, and related efforts by the WSD for further refinement of the 2021 WMP data strategy is provided in Section 5.9.1, below.

5.3. EVALUATION OF INDIVIDUAL ELECTRICAL CORPORATIONS' WMPS

5.3.1. STRUCTURE OF INDIVIDUAL ELECTRICAL CORPORATION WMPS

In addition to this Guidance Resolution, the WSD issues six Resolutions addressing the WMPs of PG&E, SCE, SDG&E, Bear Valley Electric Service, Liberty Utilities and PacifiCorp. The WSD issues one additional Resolution addressing the WMPs of both Trans Bay Cable, LLC and Horizon West Transmission. The Resolutions addressing individual electrical corporations' WMPs share a common format and are structured according to the five main sections of the 2020 WMP Guidelines, excluding GIS data: 1. Persons responsible for executing the plan, 2. Metrics and underlying data, 3. Baseline ignition probability and wildfire risk exposure, 4. Inputs to the plan and directional vision for wildfire risk exposure, 5. Wildfire mitigation activity for each year of the 3-year plan term, including expected outcomes. Following these five sections, individual Resolutions contain a section discussing maturity model results. The evaluation methodology, including the concept of "Deficiencies" with each WMP and associated "Conditions" that must be fulfilled as a component of approval, is discussed in the following section.

5.3.2. EVALUATION OF ELECTRICAL CORPORATIONS' WMPS

The changes made to the 2020 WMP Guidelines and process helped steer the WSD's review and disposition of electrical corporations' 2020 WMPs. The standardization of terminology and data submissions through structured data tables allowed for greater clarity, transparency and comparability across utilities. The maturity model provided an objective means of establishing and understanding electrical corporations' current and planned advancement in key capabilities, allowing for assessment of electrical corporations' baseline maturity and ambitiousness of their WMPs, as reflected through projected maturity growth.

The WSD used electrical corporations' 2020 WMP submissions and subsequent updates, responses to WSD data requests, and responses to the maturity model

survey questions in its assessment of 2020 WMPs. The WSD evaluated 2020 WMPs according to the following factors:

i) Completeness: The WMP is complete and comprehensively responds to the WMP requirements;

ii) Technical feasibility and effectiveness: Initiatives proposed in the WMP are technically feasible and are effective in addressing the risks that exist in the utility's territory;

iii) Resource use efficiency: Initiatives are an efficient use of utility resources;

iv) Forward looking growth: The utility is targeting maturity growth.

Upon completion of this review, the WSD then determined whether each utility's 2020 WMP should either be:

1) Approved without conditions (Full Approval)
2) Approved with conditions (Conditional Approval)
3) Denied (Denial)

A conditional approval identifies each missing or inadequate element in the WMP and requires specific action to remedy the problem according to particular timelines. The 2020 WMP Resolutions for each electrical corporation contain a set of "Deficiencies" and associated "Conditions" to remedy those deficiencies. Each deficiency is categorized into one of the following categories, with Class A being the most serious:

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

Class A deficiencies are of the highest concern and require an electrical corporation to develop and submit to the WSD, within 45 days of Commission ratification of the WMP Resolutions, a remedial compliance plan (RCP) to resolve the identified deficiency. An RCP must present all missing information and/or articulate the electrical corporation's plan, including proposed timeline, to bring

the electrical corporation's WMP into compliance. RCPs shall be named "[Name]'s 2020 Wildfire Mitigation Plan Remedial Compliance Plan."

Class B deficiencies are of moderate concern and require reporting on a quarterly basis by the electrical corporation to provide missing data or update its progress in a quarterly report. Such information shall be submitted either one time in the first quarterly report or on an ongoing basis as specified by each condition. The quarterly reports shall be named "[Name]'s Quarterly Report on 2020 Wildfire Mitigation Plan for [period covered]." Each electrical corporation shall submit its initial quarterly report 90 days after the Commission ratifies the WSD Resolutions, and every three months thereafter. In some cases, individual Resolutions impose other additional reporting requirements, and the Resolutions contain relevant detail for those reports.

Finally, Class C deficiencies require the electrical corporation to submit additional detail and information or otherwise come into compliance in its 2021 annual WMP update. Each deficiency and corresponding condition are uniquely numbered for ease of use and tracking purposes. The WSD notes that just because a deficiency is classified as a Class A, B or C as part of the 2020 WMP review does not mean that the deficiency will be classified the same way in future years, if the deficiency persists. The WSD will make its evaluations on the best available data and information, including whether a particular deficiency is ongoing.

Submission of all reports shall be by e-mail to the Director of the WSD at WildfireSafetyDivision@cpuc.ca.gov. The electrical corporations shall concurrently serve all reports on the Department of Forestry and Fire Protection at CALFIREUtilityFireMitigationUnit@fire.ca.gov and on the service list in R.18-10-007 consistent with the procedures set forth in Rules 1.9 and 1.10 of the Commission's Rules of Practice and Procedure.

A list of all deficiencies and conditions identified in an electrical corporation's WMP is attached to the resolution on that electrical corporation's WMP. Each electrical corporation must meet the listed conditions specific to its WMP in full in order for its WMP to be deemed in compliance with statute and WMP Guidelines.

5.4. COMMON DEFICIENCIES AND CONDITIONS ACROSS 2020 WMPS

Development and execution of WMPs are essential to reduce utility wildfire related risk. While individual Resolutions address each WMP in detail, noting where each WMP is strong and detailing specific deficiencies and conditions that bind the relevant electrical corporation, there were common areas of weakness across all WMPs.

The key areas of weakness across all WMPs are discussed below, including deficiencies and associated conditions. The deficiencies and associated conditions herein do not apply to Horizon West Transmission, LLC and Trans Bay Cable, LLC.

5.4.1. ANALYSIS TO DETERMINE MOST EFFECTIVE WAYS OF MITIGATING CATASTROPHIC WILDFIRE

The WMP Guidelines and statutory requirements require electrical corporations to prove that they are choosing mitigation measures that present the greatest utility-caused wildfire risk reduction at the least cost. Most WMPs, however, fall far short in this area. Key deficiencies are the following:

- Failure to analyze each WMP initiative to determine whether it is an effective use of resources;
- Lack of detail and analysis to explain how the chosen portfolio of WMP initiatives will achieve goals to reduce the scope, frequency and impact of PSPS events;
- Lack of detail and discussion of how electrical corporations use risk modeling efforts to support utility decision-making to prioritize WMP initiatives;
- Limited discussion of alternatives analysis for chosen WMP initiatives;
- Where risk analysis is present, failure to use Risk Spend Efficiency (RSE), which is the type of analysis already adopted by the Commission for use in the Risk Assessment and Management Phase (RAMP) of utility General

Rate Cases (GRCs), including in the Safety Model Assessment Proceeding (S-MAP);

- Aggregation of initiatives into broader programs and reporting WMP required data at program levels instead of individually for each initiative; and
- Inconsistencies and gaps in data submissions.

Deficiency (Guidance-1, Class B): *Lack of RSE information.*

2020 WMP submissions contain sparse and sporadic detail regarding the RSE of WMP initiatives. RSE calculations are critical for determining whether utilities are effectively allocating resources to initiatives that provide the greatest risk reduction benefits per dollar spent, thus ensuring responsible use of ratepayer funds. Although RSE concepts have been considered for several years through Commission GRCs, utilities still display unrefined and limited abilities to produce such information. Considering that utilities propose to spend billions of dollars on WMP initiatives, not having quantifiable information on how those initiatives reduce utility ignition risk relative to their cost severely limits the WSD's ability to evaluate the efficacy of such initiatives and each utility's portfolio of initiatives, as outlined in 2020 WMPs.

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

Condition (Guidance-1, Class B): In its first quarterly report, each electrical corporation shall provide the following:

i) Its calculated reduction in ignition risk for each initiative in its 2020 WMP;

ii) Its calculated reduction in wildfire consequence risk for each initiative in its 2020 WMP; and

iii) The risk models used to calculate (i) and (ii) above.

Deficiency (Guidance-2, Class B): *Lack of alternatives analysis for chosen initiatives.*

2020 WMP submissions contain little to no detail regarding utilities' process for comparing potential WMP initiatives. While most WMP initiatives are generally assumed to reduce utility wildfire risk, there are typically several alternatives that can address specific drivers of utility ignitions and near misses. However, 2020 WMPs generally do not include any discussion of which alternatives were considered, how the utility evaluated the efficacy of each alternative, and how the utility ultimately decided upon the suite of initiatives presented in its 2020 WMP.

Condition (Guidance-2, Class B): In its first quarterly report, each electrical corporation shall provide the following:

i) All alternatives considered for each grid hardening or vegetation management initiative in its 2020 WMP;

ii) All tools, models, and other resources used to compare alternative initiatives;

iii) How it quantified and determined the risk reduction benefits of each initiative; and

iv) Why it chose to implement each initiative over alternative options.

Deficiency (Guidance-3, Class A): *Lack of risk modeling to inform decision-making.*

Electrical corporations do not provide sufficient detail in their 2020 WMPs to demonstrate how they are leveraging risk models to target the highest risk portions of the grid. While most utilities indicate current progress and work on developing models to estimate risk across their service territories, there is a lack of focus on how these models can be used in practice to prioritize initiatives to address specific ignition drivers and geographies. Specifically, utilities fail to outline in detail how they determine where to prioritize to improve asset management or determine portions of circuits that would benefit the most from hardening and vegetation management.

By continuing to improve wildfire risk modeling and basing its wildfire mitigations on its wildfire risk modeling outputs, electrical corporations can potentially achieve a greater level of risk reduction with the same resources.

Condition (Guidance-3, Class A): Each electrical corporation shall submit in its remedial correction plan (RCP) the following:

i) How it intends to apply risk modeling and risk assessment techniques to each initiative in its WMP, with an emphasis on much more targeted use of asset management, vegetation management, grid hardening and PSPS based on wildfire risk modeling outputs;

ii) Identify all wildfire risk analyses it currently performs (including probability and consequence modeling) to determine which mitigation is targeted to circuits and assets where initiatives will provide the greatest benefit to wildfire risk reduction;

iii) A timeline to leverage its risk modeling outputs to prioritize and target initiatives and set PSPS thresholds, including at least asset management, grid operations, vegetation management, and system hardening initiatives;

iv) How it intends to incorporate future improvements in risk modeling into initiative prioritization and targeting processes; and

v) How it intends to adapt its approach based on learnings going forward.

5.4.2. WMP INITIATIVE IMPACTS ON PSPS

Across 2020 WMP submissions, utilities indicate goals of reducing the scope, frequency and duration of PSPS events but also indicate intentions of continuing to implement PSPS as a wildfire mitigation measure. Considering the rapid expansion of PSPS use as a wildfire mitigation measure, and the numerous hardships, inconveniences and hazards created by vast implementation, it is concerning that 2020 WMPs provide minimal to no discussion of how the chosen portfolio of initiatives will allow the utility to achieve its goals for reducing PSPS impacts.

Deficiency (Guidance-4, Class B): *Lack of discussion on PSPS impacts.*

Across 2020 WMP submissions, utilities indicate goals of reducing the scope, frequency and duration of PSPS events but also indicate intentions of continuing to implement PSPS as a wildfire mitigation measure in the immediate future. Considering the rapid expansion of PSPS use as a wildfire mitigation measure, and the numerous hardships, inconveniences and hazards created by its vast implementation, it is concerning that 2020 WMPs provide no discussion of how the chosen portfolio of initiatives will allow the utility to achieve its goals for reducing PSPS impacts. Specifically, no 2020 WMPs discuss the relationship between various grid hardening, vegetation management, and asset management initiatives and the corresponding impacts on thresholds for initiating PSPS events.

Condition (Guidance-4, Class B): In its first quarterly report, each electrical corporation shall detail whether and how each initiative in its WMP:

i) Affects its threshold values for initiating PSPS events;

ii) Is expected to reduce the frequency (i.e. number of events) of PSPS events;

iii) Is expected to reduce the scope (i.e. number of customers impacted) of PSPS events;

iv) Is expected to reduce the duration of PSPS events; and

v) Supports its directional vision for necessity of PSPS, as outlined in Section 4.4 of its WMP.

5.4.3. AGGREGATION OF INITIATIVES

A common deficiency in 2020 WMPs relates to the practice of aggregating initiatives into broader programs and reporting of data and information at the program level, thus preventing the WSD from evaluating the efficacy of individual initiatives.

Deficiency (Guidance-5, Class B): *Aggregation of initiatives into programs.*

In their 2020 WMP submissions, electrical corporations often combine various initiatives into broader programs and report cost, risk and other related data at the program level. This aggregation of initiatives and bundled reporting creates several issues. First, because cost data is typically reported across programs and not individual initiatives, it is not possible for the WSD to evaluate the efficacy of each initiative. Second, when initiatives are bundled and reported together as programs, it prevents the WSD from being able to assess which initiatives are effectively reducing utility wildfire risk. Consequently, this creates the challenge that ineffective elements of broad programs cannot be determined and future considerations of initiatives within programs can only be done collectively.

Condition (Guidance-5, Class B): In its first quarterly report, each electrical corporation shall:

i) Break out its programs outlined in section 5.3 into individual initiatives;

ii) Report its spend on each individual initiative;

iii) Describe the effectiveness of each initiative at reducing ignition probability or wildfire consequence;

iv) List all data and metrics used to evaluate effectiveness described in (iii), including the threshold values used to differentiate between effective and ineffective initiatives; and

v) Provide the information required for each initiative in section 5.3 of the Guidelines.

If an electrical corporation does not have the relevant data for each initiative, it shall: i) explain the difference between what it reports and what the WMP Guidelines require, ii) explain why it cannot meet the WMP Guidelines, and iii) develop a plan to obtain and share the relevant initiative information at the initiative level rather than the program level, including a timeline of when such information will be provided.

Deficiency (Guidance-6, Class B): *Failure to disaggregate WMP initiatives from standard operations.*

While WMPs are designed to outline and detail filer's plans and initiatives for mitigating wildfire risk, many existing programs also provide wildfire risk reduction benefits. For example, General Order (GO) 165 requires annual patrol inspections and detailed inspections every five years for electrical infrastructure. These programs and initiatives are often referenced in 2020 WMPs as "supporting," "routine," "enabling," "standard," or "foundational" work. For these types of programs, in most cases, electrical corporations do not report cost or risk reduction data, as the work is considered part of their electric operations and it is indicated that this information is not tracked independently.

Several electrical corporations state that their programs for inspecting and maintaining crossarms, poles, transformers, transmission towers and similar infrastructure, which also reduce wildfire risk, are embedded within standard maintenance programs litigated in GRCs. Consequently, it is difficult to determine whether and how these programs incrementally impact wildfire risk reduction or if related WMP initiatives are redundant and unnecessary. While utilities may not have historically considered the costs and effectiveness of such programs and initiatives, given that numerous WMP initiatives have apparent overlap or potential redundancy, it is imperative that utilities provide such data to validate the need for and effectiveness of additional programs.

It is not clear how electrical corporations are tracking their WMP activities in memorandum accounts if they do not budget for them by type of initiative. The Commission will scrutinize electrical corporations' memorandum accounts for WMP carefully, and if all costs are simply lumped together or included in general operations and maintenance accounts, electrical corporations risk failing to provide entitlement to cost recovery.

Condition (Guidance-6, Class B): In its first quarterly report, each electrical corporation shall:

i) Clearly identify each initiative in Section 5.3 of its WMP as "Standard Operations" or "Augmented Wildfire Operations;"

ii) Report WMP required data for all Standard Operations and Augmented Wildfire Operations;

iii) Confirm that it is budgeting and accounting for WMP activity of each initiative; and

iv) Include a "ledger" of all subaccounts that show a breakdown by initiative.

Deficiency (Guidance-7, Class B): *Lack of detail on effectiveness of "enhanced" inspection programs.*

Utilities engage in numerous 'enhanced' inspection programs, but it is unclear if such 'enhanced' programs are incrementally effective over routine patrol and detailed inspections, particularly if patrol and detail inspections are scheduled based on risk rather than GO 95 minimums.

***Condition (Guidance-7, Class B*)**: In its first quarterly report, each electrical corporation shall detail:

i) The incremental quantifiable risk identified by such 'enhanced' inspection programs;

ii) Whether it addresses the findings uncovered by 'enhanced' programs differently than findings discovered through existing inspections; and

iii) A detailed cost-benefit analysis of combining elements of such 'enhanced' inspections into existing inspection programs.

5.4.4. PREVALENCE OF EQUIVOCATING LANGUAGE –FAILURE OF COMMITMENT

A continuing issue from 2019 that persists in 2020 WMPs is the extensive use of non-committal equivocating language. The prevalent use of equivocating language results in sparse commitment from utilities for achieving the intended goal of WMPs – reducing the risk of catastrophic wildfire posed by electrical lines and equipment.

Deficiency (Guidance-8, Class C): *Prevalence of equivocating language – failure of commitment.*

While there have been many improvements and advancements reflected in 2020 WMPs, a key concern remains regarding discussion of WMP objectives and the

prevalent use of "equivocating language" to avoid making measurable, quantifiable, and verifiable commitments. While electrical corporations make promises to quantifiably reduce PSPS impacts and the frequency of near misses and ignitions, other promises are far less specific. Terms such as, "track," "assess," "evaluate," and "evolve" are repeated hundreds of times throughout the 2020 WMPs. Without sufficient details, none of these terms provide the WSD or the public with a measurable, quantifiable, and verifiable goal against which electrical corporations could be held.

Condition (Guidance-8, Class C): In its 2021 WMP update, each electrical corporation shall:

i) Include objectives for each of its initiatives that are measurable, quantifiable, and verifiable by the WSD;
ii) Provide targets and timelines for all strategies, plans, and approaches to wildfire mitigation that are measurable, quantifiable and verifiable by the WSD; and
iii) Dispense with empty rhetoric and not use terms that are ambiguous, misleading, or otherwise have the result of diluting commitments. Continued use of equivocating language may result in denial of future WMPs.

5.4.5. PILOT PROGRAM DISCUSSIONS

During WMP workshops in February 2020 and throughout the WMPs, electrical corporations mentioned implementing numerous pilot programs to test and evaluate new, emerging and pre-commercial technology. A variety of these technologies show potential in reducing utility wildfire risk. In fact, during the WMP workshops in February 2020, a panel of utility experts discussing emerging technologies unanimously indicated that early/advance fault detection technologies show the most promise in reducing utility wildfire risk in the near-term. Although it is encouraging that utilities indicate they are engaging in pilot studies and evaluating different technologies, discussion and communication of those efforts lacks detail and specificity.

Deficiency (Guidance-9, Class B): *Insufficient discussion of pilot programs.*

Electrical corporations do not describe how they will evaluate and expand the use of successfully piloted technology or which piloted technology has proven ineffective. To ensure pilots that are successful result in expansion, if warranted and justified with quantitative data, electrical corporations must evaluate each pilot or demonstration and describe how it will expand use of successful pilots.

Condition (Guidance-9, Class B): In its quarterly report, each electrical corporation shall detail:

i) All pilot programs or demonstrations identified in its WMP;

ii) Status of the pilot, including where pilots have been initiated and whether the pilot is progressing toward broader adoption;

iii) Results of the pilot, including quantitative performance metrics and quantitative risk reduction benefits;

iv) How the electrical corporation remedies ignitions or faults revealed during the pilot on a schedule that promptly mitigates the risk of such ignition or fault, and incorporates such mitigation into its operational practices;_and

v) A proposal for how to expand use of the technology if it reduces ignition risk materially.

5.4.6. DATA AND METRICS

The 2019 WMP decisions made clear that electrical corporations had to demonstrate that their mitigation measures are effective in mitigating utility-caused wildfire risk. The WMP statute requires the use of metrics to demonstrate effectiveness, but the metrics must be meaningful. In this regard, the 2019 decisions and the 2020 WMP Guidelines stress that relevant metrics do not simply count the number of mitigations and assume effectiveness. Thus, for example, setting and achieving a goal of trimming a million trees or installing 1,000 circuit miles of covered conductor does not prove that the electrical corporation is actually reducing wildfire risk. Rather, to demonstrate the effectiveness of such measures, the electrical corporation must show a reduction in ignitions at times when winds are high, vegetation is dry, or its region is experiencing high heat or RFW events.

While the electrical corporations' submission of large amounts of GIS and other data marks a seminal evolution in data transparency and sharing, the 2020 WMP process has highlighted the need for additional refinement and improvement across all electrical corporation data submissions to ensure compatibility, completeness and usefulness. The WSD intends to address most areas for improvement in the 2021 WMP updates described in Section 9, including standardized file formats, more comprehensive metadata that define fields and better software compatibility for certain files.

Over the past several months, the WSD has been working on the development of an enterprise data strategy to better support WMP reviews and utility-caused wildfire risk reduction. Through lessons learned from the 2019 WMP process and those learned during the expanded data reporting efforts for 2020 WMPs, the WSD is creating a master data taxonomy and data schema. In other words, the WSD is determining how to name and format each type of data and designing a way of organizing the data so that it is consistent across electrical corporations. The master data taxonomy will serve as a central ledger of spatial and non-spatial data related to utility wildfire mitigation and WMPs. The data schema will provide standardized guidelines to inform future WMP data submissions.

Finalization of these documents requires additional refinement through discussion with electrical corporations and other stakeholders, in addition to further study of existing datasets. The WSD expects to engage in these discussions and publish refinements through updated 2021 WMP Guidelines expected later this year. The WSD may ask certain stakeholders with expertise in data and data analysis to form a working group to ensure data are collected and updated in a way that facilitates efficient comparison and analysis.

Deficiency (Guidance-10, Class B): *Data issues – general.*

Although the availability of data, including GIS data, provides unprecedented insight into utility infrastructure and operations, inconsistencies and gaps in the data present a number of challenges and hurdles. As it relates to GIS data,

electrical corporation submissions often had inconsistent file formats and naming conventions, contained little to no metadata, were incomplete or missing many data attributes and utilized varying schema. These deficiencies rendered cross-utility comparisons impossible without substantive, resource- and time-consuming manipulation of the data. Additional data challenges included varying interpretations of WMP Guideline data requirements, leading to inconsistency of data submitted.

Condition (Guidance-10, Class B): Electrical corporations shall ensure that all future data submissions to the WSD adhere to the forthcoming data taxonomy and schema currently being developed by the WSD. Additionally, each electrical corporation shall file a quarterly report detailing:

i) Locations where grid hardening, vegetation management, and asset inspections were completed over the prior reporting period, clearly identifying each initiative and supported with GIS data;

ii) The type of hardening, vegetation management and asset inspection work done, and the number of circuit miles covered, supported with GIS data;

iii) The analysis that led it to target that specific area and hardening, vegetation management or asset inspection initiative; and

iv) Hardening, vegetation management, and asset inspection work scheduled for the following reporting period, with the detail in (i) – (iii).

5.4.7. ADDRESSING PERSONNEL SHORTAGES

Electrical corporations express having experienced some level of difficulty finding sufficient numbers of experienced personnel, particularly in vegetation management. Electrical corporations typically describe a competitive environment that makes attracting talent difficult.

Deficiency (Guidance-11, Class B): *Lack of detail on plans to address personnel shortages.*

Electrical corporations do not explain in detail the range of activities that they are undertaking to recruit and train personnel to grow the overall pool of talent in areas of personnel shortage.

Condition (Guidance-11, Class B): In its first quarterly report, each electrical corporation shall detail:

i) A listing and description of its programs for recruitment and training of personnel, including for vegetation management;

ii) A description of its strategy for direct recruiting and indirect recruiting via contractors and subcontractors; and

iii) Its metrics to track the effectiveness of its recruiting programs, including metrics to track the percentage of recruits that are newly trained, percentage from out of state, and the percentage that were working for another California utility immediately prior to being hired.

5.4.8. LONG-TERM PLANNING

All electrical corporations were required in section 5.1 of the 2020 WMP Guidelines to describe their organization-wide wildfire mitigation strategy within the next three years and within the next 10 years. Few provided detailed strategies with information that the WSD could use to fully understand the electrical corporation's long-term wildfire mitigation strategy.

Deficiency (Guidance-12, Class B): *Lack of detail on long-term planning.*

Electrical corporations do not provide sufficient detail regarding long-term wildfire mitigation plans and how the initiatives in their WMPs align with and support those long-term plans.

Condition (Guidance-12, Class B): In their first quarterly report, each electrical corporations shall detail:

i) Its expected state of wildfire mitigation in 10 years, including 1) a description of wildfire mitigation capabilities in 10 years, 2) a description of its grid architecture, lines, and equipment;

ii) A year-by-year timeline for reaching these goals;

iii) A list of activities that will be required to achieve this end goal; and

iv) A description of how the electrical corporation's three-year WMP is a step on the way to this 10-year goal.

5.5. COMPLIANCE WITH 2019 WMP ORDERING PARAGRAPHS

On June 3, 2019, the Commission issued a series of six decisions approving electrical corporations' 2019 WMPs.[15] These decisions contained many ordering paragraphs (OPs) requiring action by electrical corporations in their 2020 WMP submissions. Many of these OPs were resolved through changes made to the WMP Guidelines and process and were thus automatically incorporated into the 2020 WMP submissions.

The WSD has reviewed the 2020 WMPs submissions for compliance with 2019 OPs. It has determined that each 2019 OP has either been addressed in the electrical corporation's 2020 WMP or is the subject of conditions in this Guidance Resolution or the individual Resolutions being issued this year.

5.6. WMP CHANGE ORDERS

It is essential that there be a process for modifying (*i.e.,* reducing, increasing, or ending) WMP mitigation measures, as data and results on electrical corporation ignition risk reduction impacts justify. At a high level, the objective of the change order process is to ensure the electrical corporation continues to follow the most effective and efficient approach to mitigate its wildfire risk. This could change as new information becomes available and as the electrical corporation gains experience and measures the outcomes of its initiatives.

The change order process set forth herein provides a mechanism for the electrical corporation to make adjustments based on this information and experience. The goal of this process is to ensure that electrical corporations make changes to their WMPs only if they are demonstrated to be improvements per WMP approval criteria (*i.e.*, completeness, technical feasibility, effectiveness, and resource use efficiency). Another goal of the change order process is to maximize the WSD's visibility and ability to respond to any changes to the approved plan as efficiently and as streamlined as possible. The change order process is not intended to provide electrical corporations with a pass to unilaterally change its

[15] These included D.19-05-036, D.19-05-037, D.19-05-038, D.19-05-039, D.19-05-040, D.19-05-041.

WMP initiatives and program targets; rather, its purpose is to provide a mechanism for refining elements of WMP initiatives when there is demonstrable quantitative and qualitative justification for doing so.

Therefore, electrical corporations shall submit two reports to the WSD entitled "Change Orders Report" (Change Orders) describing the changes to WMP programs and initiatives being considered by the electrical corporation. The WSD will review Change Order Reports and either approve/deny Change Orders after submission or, if proposed changes are deemed less significant, evaluate the proposed changes as part of the 2021 WMP update. Therefore, in each annual WMP update, electrical corporations shall submit a detailed summary of all change orders submitted but not yet acted upon by the WSD.

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

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

v. Change in work being done

vi. Other change (described)

d. A detailed description of the proposed change

ii) Justification for the proposed change

a. In what way, if any, does the change address or improve:

i. Completeness

ii. Technical feasibility of the initiative

iii. Effectiveness of the initiative

iv. Resource use efficiency over portfolio of WMP initiatives

iii) Change in expected outcomes from the proposed change

a. What outcomes, including quantitative ignition probability and PSPS risk reduction, was the changed initiative expected to achieve in the 2020 WMP?

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

The first Change Orders Report shall be submitted no later than three months from the effective date of this Resolution and the second report no later than six months after the effective date of this Resolution. Submission of all Change Order Reports shall be by e-mail to the Director of the WSD at WildfireSafetyDivision@cpuc.ca.gov. The electrical corporations shall concurrently serve all reports on the Department of Forestry and Fire Protection at CALFIREUtilityFireMitigationUnit@fire.ca.gov and on the service list in R.18-10-007 consistent with the procedures set forth in Rules 1.9 and 1.10 of the Commission's Rules of Practice and Procedure.

Stakeholders may comment on Change Order Reports within fifteen days of submission following the submission instructions above but may not otherwise seek change orders through this process. Attempts to increase program size or expense may require separate electrical corporation applications, at the discretion of the WSD and/or the full Commission. The WSD may modify the

process for submitting or reviewing Change Orders at its discretion with written notice on the service list of R.18-10-007.

5.7. CONSULTATION WITH CAL FIRE HAS OCCURRED

Pub. Util. Code § 8386.3(a) requires the WSD to consult with CAL FIRE in reviewing electrical corporations' 2020 WMPs. The Commission and CAL FIRE have a memorandum of understanding in place to facilitate this consultation (Pub. Util. Code § 8386.5). The Commission and the WSD have met these requirements, but neither this Resolution nor the Resolutions on the individual WMPs purport to speak for CAL FIRE.

5.8. 2021 WILDFIRE MITIGATION PLAN AND DATA SCHEDULE

The WSD is required by Pub. Util. Code § 8386(b) to establish a schedule for the submission of subsequent comprehensive wildfire mitigation plans, which may allow for the staggering of compliance periods for each electrical corporation. In its discretion, the WSD may allow the annual submissions to be updates to the last approved comprehensive wildfire mitigation plan, provided that each electrical corporation shall submit a comprehensive wildfire mitigation plan at least once every three years.

Pursuant to the foregoing requirement, the WSD has determined that all electrical corporations shall file an update to their 2020 WMPs in 2021. The WSD will issue a schedule for such submission separately and may stagger the electrical corporations' submissions to give the WSD and stakeholders more time to review each update. As discussed below, the WSD will also refine and update its WMP Guidelines and other supporting documents.

Trans Bay Cable, LLC and Horizon West Transmission are differently situated to the other electrical corporations, having minimal ignition risk due to their locations and footprints. As such, the WSD will issue separate guidance to Trans Bay Cable and Horizon West Transmission on the required contents of 2021 WMP updates. The WSD will also consider a more streamlined data and submission process for these companies in advance of their next comprehensive WMP filing in 2023.

In addition, all electrical corporations shall update the tables and data submitted with their 2020 WMPs (and any table or data required in this Resolution or the companion individual Resolutions) on a schedule that ensures the Commission and stakeholders have the updates three months before WMP updates are due. Based on these data submissions, the WSD may issue data requests, identify deficiencies, and give feedback to the electrical corporations before they file their WMP updates so that the actual WMP updates are comprehensive and complete. Since the WSD has only 90 days to review WMPs, this advance work is essential to a full review. The WSD will issue a schedule for these submissions in the near future.

5.9. 2021 WILDFIRE MITIGATION PLAN GUIDELINES, PERFORMANCE METRICS, AND MATURITY MODEL UPDATES AND WSD TRANSITION TO CALIFORNIA NATURAL RESOURCES AGENCY

Several events will occur between now and July 2021 related to metrics, WMP Guidelines, the Maturity Model and ultimately the AB 1054-mandated move of the WSD from a Division of this Commission to an Office of the California Natural Resources Agency (CNRA).

5.9.1. WMP GUIDELINES, PERFORMANCE METRICS AND MATURITY MODEL

As noted above, parties commented on January 7, 2020 on the 2020 WMP Guidelines issued with the December 16, 2019 ruling in R.18-10-007, but there was insufficient time to update the Guidelines before the February 7, 2020 WMP submission deadline. The WSD will consider the input provided and its own lessons learned from this year's process and issue revised WMP Guidelines for 2021. The process may allow additional comment and workshops and will consider input from the WSAB as required by Public Utilities Code §8389(2)(b). As such, the WSD will issue updated Guidelines and Performance Metrics by October 31, 2020 for adoption and approval by the Commission by December 1, 2020, as required by Pub. Util. Code § 8389(3)(c-d).

In R.18-10-007, as noted above, the Commission directed the electrical corporations to use metrics that do not simply count trees trimmed or miles of

covered conductor installed, but that measure the effectiveness of these actions in mitigating utility-caused wildfire. Several sets of comments and other filings on appropriate metrics were submitted in the formal proceeding, but the enactment of AB 1054 transfers these responsibilities to the WSD. As a result, the metric development process that began in R.18-10-007 will be superseded by a process run by the WSD. The WSD will issue additional guidance on the WMP Guideline and Performance Metrics update process later this year.

As the discussion of the maturity model earlier in this Resolution indicates, refinement of the model may be necessary. Along with updates to the WMP Guidelines, the WSD will issue updates to the maturity model according to the deadlines set forth above.

5.9.2. WSD MOVE TO CALIFORNIA NATURAL RESOURCES AGENCY

Public Utilities Code § 326(b) requires that, by July 1, 2021, the WSD will transition to the CNRA and become the Office of Energy Infrastructure Safety (OEIS). This transition will occur during the current three-year WMP cycle and therefore may alter some of the form of submissions or processes used by the WSD/OEIS to evaluate WMPs. The WSD will issue guidance as necessary to ensure electrical corporations and stakeholders are aware of any changes to the WMP submission, evaluation, reporting and compliance processes as a result of transition to CNRA and conversion to OEIS.

6. COMMENTS

A draft of this Resolution was served on the service list for R.18-10-007. Comments were allowed under Rule 14.5 of the Commission's Rules of Practice and Procedure. The WSD accepted one set of comments per stakeholder that collectively addressed Draft Resolutions WSD-002 – WSD-009, which represent the totality of the WSD's evaluation of the 2020 WMPs.

The following stakeholders served timely comments on one or more of the WMP Draft Resolutions: Kevin Collins on May 26, 2020; and PG&E, Southern California Edison Company, SDG&E, Bear Valley, California Association of Small and Multi-Jurisdictional Utilities, Horizon West Transmission, California Environmental Justice Alliance, East Bay Municipal Utility District, Energy

Producers and User Coalition, Green Power Institute, Mussey Grade Road Alliance, Protect our Communities Foundation, Public Advocates Office, Catherine Sandoval, County of Santa Cruz, and The Utility Reform Network on May 27, 2020. Additionally, several members of the public submitted input regarding the Draft Resolutions. The following is a synopsis of the WSD's response to comments:

Using RSE to Evaluate PSPS – Several stakeholders comment that RSE is a poor tool to evaluate PSPS because electrical corporations assume 100 percent mitigation, very low implementation costs, and do not account for other societal and economic costs related to the cascading impacts from initiation of a PSPS event. If electrical corporations used RSE alone to justify mitigation measures, PSPS would likely always come out on top. The WSD agrees that RSE as an evaluation tool of PSPS is extremely limited in utility. Therefore, electrical corporations shall not use RSE as a means of justifying or evaluating the efficacy of PSPS as a mitigation measure.

PSPS Issues Addressed Elsewhere – Several stakeholders requested additional detail or requirements related to PSPS which are already addressed in other Commission decisions or proceedings. For example, GPI comments that the WSD should require a plan for PSPS re-energization, EBMUD comments that water and wastewater agencies should be included as public safety partners, and Sandoval requests analysis and discussion of critical infrastructure in relation to PSPS events. These issues have been addressed in R.18-12-005.[16]

Combining of Initiatives – PG&E comments that it is unable to comply with several Guidance Resolution conditions requiring disaggregation of wildfire mitigation

[16] *See* Phase 1 and Phase 2 decisions adopted in R.18-12-005. Specifically, the Appendix to the Phase 2 decision, D.20-05-051, entitled "Adopted Phase 2 Guidelines in Addition to Appendix A to D.19-05-042 and ESRB-8," contains requirements in subsections (e) and (f) for re-energization and communication with water providers. Further, D.20-05-051 contains several references to critical infrastructure. *See, e.g.*, D.20-05-051 at 47: ("The record further supports that the electric IOUs should notice not only public safety partners of power restoration but also the operators of critical facilities and critical infrastructure and then, immediately after, impacted utility customers.")

initiatives. PG&E, citing conditions Guidance-1, 2, 3, 5 and 6, asserts that some activities are tracked and carried out in integrated fashion and cannot be feasibly separated into sub-elements or separate initiatives. PG&E also claims it cannot account for certain WMP work separately from general maintenance because many of PG&E's wildfire-related programs and initiatives have been in place for years and there is no quick or easy way to completely re-classify these programs and initiatives from an accounting, tracking, and risk perspective. SDG&E makes a similar argument.

It is not adequate for electrical corporations to claim they cannot comply with these conditions. As a first step, therefore, electrical corporations shall, by July 13, 2020, furnish a list of all mitigation measures that are part of a combined program that they claim they cannot disaggregate. The WSD may provide additional guidance thereafter, hold workshops or engage in other consultation, but electrical corporations remain bound by all Guidance conditions requiring disaggregation of initiatives into individual mitigations or groups of related mitigation.

Risk Assessment and Risk-Spend Efficiency – SDG&E and SCE claim that certain parts of their WMPs do not lend themselves to the Commission-mandated risk assessment process in S-MAP/RAMP and should be exempted from Guidance-1, 2, 5 and 6. SDG&E asserts that many initiative categories such as a centralized data repository and community engagement do not have a quantifiable impact on ignitions, so the WSD should not require RSE calculations. In addition to listing programs that do not have an impact on ignitions, SCE claims it should not have to perform RSE analysis for traditional programs that have been performed for many years (*e.g.*, vegetation management to achieve clearances around electric lines and equipment). The WSD agrees that wildfire mitigation measures are initiatives designed to reduce the risk of utility-caused ignition, but declines to modify Guidance-1, 2, 5 and 6. The WSD will work with electrical corporations to determine whether there are some initiative categories that should be analyzed in a different manner from RSE.

Process – Class A and B Conditions – Several stakeholders ask for additional information on what the WSD's process will be for reviewing, taking input on and determining the sufficiency of electrical corporations' Class A (RCP) and B

(quarterly report) submissions. The WSD will issue guidance on the process shortly after adoption of this resolution.

Employee and Contractor Data – PG&E and SCE ask for clarity on what employee training and recruitment data the WSD is seeking. PG&E asserts it should not have to furnish data about whether they or their contractors hired their employees from other California utilities or whether the employees come from other states. They claim the information is private or that they simply do not have it. SCE asks the WSD to clarify whether it seeks information only on vegetation management workers, or all areas where the electrical corporations are having trouble retaining sufficient personnel.

The WSD seeks this information to ensure California electrical corporations are actively working to expand the qualified workforce and are not borrowing from the same limited pool, *i.e.* hiring qualified employees away from one another. Hence, the WSD's focus is on areas where labor shortages or constraints exist. Electrical corporations must make every effort to provide the information required in the conditions at a level appropriate for the WSD to evaluate the utilities' efforts to expand the pool of qualified workers.

Data Taxonomy and Schema – The large electrical corporations challenge Guidance-10 on data taxonomy and schema, claiming they are do not organize their data as the WSD asks. PG&E states that "[t]he utilities operate different GIS systems with different data characteristics, software packages, tools and features. There is high risk that a unilaterally created data taxonomy will be very difficult or even impossible for one or more utilities to complete."[17] PG&E proposes that the WSD host workshops/meetings to ensure alignment and understanding of the desired outcomes for information being requested, the level of detail available and needed, and how the utilities will represent the appropriate information in their maps. The WSD plans to solicit input from the utilities to discuss intent, needs and expectations related to WMP data and issue refined data requirements for public input later this year.

[17] PG&E's Comments on Draft Resolutions at p. 7.

10-year Planning Horizon – The large electrical corporations challenge the WSD's authority to ask the electrical corporations to submit goals for a ten-year planning horizon. The WSD has the statutory authority to request such information; Pub. Util. Code Section 8386(c)(22) requires electrical corporations to furnish with their WMPs "any other information that the Wildfire Safety Division may require." PG&E asserts that the WSD may only require WMPs to cover a three-year period. Section 8386(b) states that WMPs must cover "at least a three-year period." The words "at least" suggest a longer period is permissible; therefore, the WSD is within its statutory authority to ask for 10-year planning horizon.

Furthermore, many of the activities set forth in electrical corporations' WMPs span beyond a three-year period, *e.g*. many grid hardening initiatives will take more than three years to deploy. Therefore, planning horizons beyond three-years are likely considered by electrical corporations when choosing WMP initiatives. It is essential that electrical corporations communicate a long-term vision that differs from "business as usual" given the scale and time horizon of certain WMP initiatives.

FINDINGS

1. On March 19, 2020, the Governor of California signed Executive Order N-33-20 requiring Californians to heed the order of the California State Public Health Officer and the Director of the California Department of Public Health that all individuals living in California stay home or at their place of residence, except as needed to maintain continuity of operation of the federal critical infrastructure sectors, in order to address the public health emergency presented by the COVID-19 disease.
2. There was inadequate time to incorporate party comments on the WMP Guidelines and supporting material served with Administrative Law Judge Thomas' December 16, 2019 ruling given the short time between issuance of the materials and the February 7, 2020 deadline for 2020 WMP submission.
3. The binary nature of maturity model scoring means that if an electrical corporation currently lacks one element of a multi-part requirement, the electrical corporation is deemed to lack maturity on the entire requirement.

4. Use of the maturity model in 2020 allows the WSD to establish a baseline in order to track improvement in wildfire mitigation programs over time. The maturity model should be used primarily to assess an electrical corporation's progress over time.
5. Given that the maturity model is new, further refinement and calibration of the scoring requirements may be necessary.
6. The effectiveness of wildfire mitigation activities contained in electrical corporations' WMPs cannot be determined using "program targets," *e.g.*, number of miles of covered conductor installed or number of trees trimmed.
7. Program targets do not meet the requirements of Public Utilities Code 8386 to establish metrics to evaluate WMP performance.
8. A conditional approval of a WMP identifies each missing or inadequate element in the WMP and requires specific action to remedy the problem according to particular timelines. The 2020 WMP Resolutions for each electrical corporation contain a set of "Deficiencies" and associated "Conditions" to remedy those deficiencies. Each deficiency is categorized into one of the following categories, with Class A being the most serious:
    - Class A – aspects of the WMP are lacking or flawed;
    - Class B – insufficient detail or justification provided in WMP;
    - Class C – gaps in baseline or historical data, as required in 2020 WMP Guidelines.
9. Class A deficiencies are of the highest concern and require an electrical corporation to develop and submit to the WSD, within 45 days of Commission ratification of WMP Resolutions, an RCP to resolve the identified deficiency. An RCP must present all missing information and/or articulate the electrical corporation's plan, including proposed timeline, to bring the electrical corporation's WMP into compliance.
10. Class B deficiencies are of medium concern and require reporting on a quarterly basis by the electrical corporation to provide missing data or update its progress. This quarterly reporting is in addition to Tier 1 advice letters filings mandated in Public Utilities Code § 8389(e)(7).

11. Class C deficiencies require the electrical corporation to submit additional detail and information or otherwise come into compliance in its 2021 annual WMP update.
12. Each of the following electrical corporations' WMPs contain the Guidance Deficiencies set forth in Appendix A: PG&E, SCE, SDG&E, PacifiCorp, Liberty and Bear Valley.
13. The WSD has reviewed the 2020 WMP submissions for compliance with the ordering paragraphs contained in the Commission's 2019 decisions on each electrical corporation's 2019 WMP. Each 2019 ordering paragraph has either been addressed in the electrical corporation's 2020 WMP or is the subject of Conditions in this Resolution or the individual Resolutions being issued this year.
14. It is essential that there be a process for modifying, reducing, increasing, or ending mitigation measures that are not working, or otherwise require modification.
15. Pub. Util. Code § 8386.3(a) requires the WSD to consult with CAL FIRE in reviewing electrical corporations' 2020 WMPs. The Commission and CAL FIRE have a memorandum of understanding in place to facilitate this consultation (Pub. Util. Code § 8386.5). The Commission and the WSD have met these requirements, but neither this Resolution nor the Resolutions on the individual WMPs purport to speak for CAL FIRE.
16. The WSD is required by Pub. Util. Code § 8386(b) to establish a schedule for the submission of subsequent comprehensive wildfire mitigation plans, which may allow for the staggering of compliance periods for each electrical corporation. In its discretion, the WSD may allow the annual submissions to be updates to the last approved comprehensive wildfire mitigation plan; provided, that each electrical corporation shall submit a comprehensive wildfire mitigation plan at least once every three years.
17. Trans Bay Cable, LLC and Horizon West Transmission are differently situated to the other electrical corporations, having minimal ignition risk due to their locations and footprints. The WSD will issue guidance to Trans Bay Cable and Horizon West Transmission on the required contents of 2021 WMP updates. The WSD will also consider a more streamlined data and

submission process for these companies in advance of their next comprehensive WMP filing in 2023.

THEREFORE, IT IS ORDERED THAT:

1. The Wildfire Safety Division's Guidance on 2020 Wildfire Mitigation Plans is, hereby ratified.
2. Nothing in this Resolution constitutes approval of the costs associated with electrical corporations' Wildfire Mitigation Plan (WMP) efforts. As set forth in Public Utilities Code §8386(g), and confirmed by Decision 19-05-036, the Commission will consider costs recovery related to WMPs in the electrical corporations' General Rate Cases or application permitted by Section 8386.4(b)(2).
3. Electrical corporations shall make every effort to keep Wildfire Mitigation Plan implementation progress on track in order to ensure that electrical corporations are prepared for the upcoming and subsequent wildfire seasons while complying with direction from public health officials regarding shelter-in-place, social distancing, or other measures that may need to be taken in response to the COVID-19 pandemic.
4. Electrical corporations shall thoroughly incorporate COVID-19 orders, response activities, and other considerations into their Public Safety Power Shutoff (PSPS) operations and protocols and follow orders issued by the Commission in Rulemaking 18-12-005 or any other Commission orders pertaining to PSPS.
5. All electrical corporations shall submit an update to their 2020 Wildfire Mitigation Plans in 2021. The Wildfire safety Division will issue a schedule for such submission separately and may stagger the electrical corporations' submissions.
6. Each of the following electrical corporations: Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas & Electric Company, PacifiCorp, Liberty Utilities, and Bear Valley Electric Service shall comply with the Guidance Conditions set forth in Appendix A to this Resolution in order for its Wildfire Mitigation Plan to be deemed in compliance with Public Utilities Code Section 8386 and the Wildfire Safety Division's Wildfire Mitigation Plan Guidelines. In complying with each

Condition, the named electrical corporations shall look to the corresponding Deficiency for guidance.

7. For Class A deficiencies, Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas & Electric Company, PacifiCorp, Liberty Utilities, and Bear Valley Electric Service must submit Remedial Compliance Plans (RCP) to the Director of the Wildfire Safety Division within 45 days of Commission ratification of the Wildfire Mitigation Plan Resolutions. An RCP must present all missing information and/or articulate the electrical corporation's plan, including proposed timeline, to bring the electrical corporation's WMP into compliance. RCPs shall be named "[Name]'s 2020 Wildfire Mitigation Plan Remedial Compliance Plan." Submission of all reports shall be by e-mail to the Director of the Wildfire Safety Division at WildfireSafetyDivision@cpuc.ca.gov. The electrical corporations shall concurrently serve all reports on the Department of Forestry and Fire Protection at CALFIREUtilityFireMitigationUnit@fire.ca.gov and on the service list in Rulemaking 18-10-007 consistent with the procedures set forth in Rules 1.9 and 1.10 of the Commission's Rules of Practice and Procedure.

8. For Class B deficiencies, Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas & Electric Company, PacifiCorp, Liberty Utilities, and Bear Valley Electric Service must submit quarterly reports to the Director of the Wildfire Safety Division. Information requested in the quarterly reports shall be submitted either one time in the first quarterly report or on an ongoing basis as specified by each condition. The quarterly reports shall be named "[Name]'s Quarterly Report on 2020 Wildfire Mitigation Plan for [period covered]." The first quarterly report must be submitted 90 days after the Commission ratifies the Wildfire Mitigation Plan Resolutions, and every three months thereafter. In some cases, individual Resolutions impose other additional reporting requirements, and the Resolutions contain relevant detail for those reports with which named electrical corporations must comply. Submission of all quarterly reports shall be by e-mail to the Director of the Wildfire Safety Division at WildfireSafetyDivision@cpuc.ca.gov. The electrical corporations shall concurrently serve all reports on the Department of Forestry and Fire Protection at CALFIREUtilityFireMitigationUnit@fire.ca.gov and on the

service list in Rulemaking 18-10-007 consistent with the procedures set forth in Rules 1.9 and 1.10 of the Commission's Rules of Practice and Procedure.

9. For Class C deficiencies, Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas & Electric Company, PacifiCorp, Liberty Utilities, and Bear Valley Electric Service must submit additional detail and information or otherwise come into compliance in its 2021 annual Wildfire Mitigation Plan update.

10. Electrical corporations seeking to modify, reduce, increase or end any initiatives in its Wildfire Mitigation Plan prior to the 2021 Wildfire Mitigation Plan update shall submit a report to Wildfire Safety Division entitled "Change Orders Report" containing the information set forth in this resolution. The first such report shall be submitted no later than three months from the ratification date of this Resolution and the second one no later than six months after the ratification date of this Resolution. Submission shall be by e-mail to the Director of the Wildfire Safety Division at WildfireSafetyDivision@cpuc.ca.gov. The electrical corporations shall concurrently serve all reports on the Department of Forestry and Fire Protection at CALFIREUtilityFireMitigationUnit@fire.ca.gov and on the service list in Rulemaking 18-10-007 consistent with the procedures set forth in Rules 1.9 and 1.10 of the Commission's Rules of Practice and Procedure.

11. Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas & Electric Company, PacifiCorp, Liberty Utilities, and Bear Valley Electric Service must, by July 13, 2020, furnish a list of all mitigation measures that are part of a combined program that they claim they cannot disaggregate. Submission shall be by e-mail to the Director of the Wildfire Safety Division at WildfireSafetyDivision@cpuc.ca.gov. The electrical corporations shall concurrently serve all reports on the Department of Forestry and Fire Protection at CALFIREUtilityFireMitigationUnit@fire.ca.gov and on the service list in Rulemaking 18-10-007 consistent with the procedures set forth in Rules 1.9 and 1.10 of the Commission's Rules of Practice and Procedure.

12. Nothing in the review and approval of WMPs relieves the electrical corporations of any otherwise applicable environmental laws or other statutory requirements. Moreover, environmental stewardship is an important value to California and electrical corporations are expected to consider environmental values in all their decision-making. Each electrical corporation shall meet the listed conditions in its individual Resolution in full in order for its Wildfire Mitigation plan to be

deemed in compliance with Public Utilities Code Section 8386 and Wildfire Mitigation Plan Guidelines.

This Resolution is effective today.

I certify that the foregoing resolution was duly introduced, passed and adopted at a conference of the Public Utilities Commission of the State of California held on June 11, 2020; the following Commissioners voting favorably thereon:

/s/ ALICE STEBBINS
Alice Stebbins
Executive Director

MARYBEL BATJER
President
LIANE M. RANDOLPH
MARTHA GUZMAN ACEVES
CLIFFORD RECHTSCHAFFEN
GENEVIEVE SHIROMA
Commissioners

APPENDIX A

Deficiencies and Conditions

Guidance-1	Lack of risk spend efficiency (RSE) information
Class	B
Deficiency	2020 WMP submissions contain sparse and sporadic detail regarding the RSE of WMP initiatives. RSE calculations are critical for determining whether utilities are effectively allocating resources to initiatives that provide the greatest risk reduction benefits per dollar spent, thus ensuring responsible use of ratepayer funds. Although RSE concepts have been considered for several years through Commission GRCs, utilities still display unrefined and limited abilities to produce such information. Considering that utilities propose to spend billions of dollars on WMP initiatives, not having quantifiable information on how those initiatives reduce utility ignition risk relative to their cost severely limits the WSD's ability to evaluate the efficacy of such initiatives and each utility's portfolio of initiatives, as outlined in 2020 WMPs. Further, RSE is not an appropriate tool for justifying the use of PSPS. When calculating RSE for PSPS, electrical corporations generally assume 100% wildfire risk mitigation and very low implementation costs because societal costs and impact are not included. When calculated this way, PSPS will always rise to the top as a wildfire mitigation tool, but it will always fail to account for its true costs to customers. Therefore, electrical corporations shall not rely on RSE calculations as a tool to justify the use of PSPS.
Condition	In its first quarterly report, each electrical corporation shall provide the following: i. its calculated reduction in ignition risk for each initiative in its 2020 WMP; ii. its calculated reduction in wildfire consequence risk for each initiative in its 2020 WMP; and iii. the risk models used to calculate (i) and (ii) above.

Guidance-2	Lack of alternatives analysis for chosen initiatives
Class	B
Deficiency	2020 WMP submissions contain little to no detail regarding utilities' process for comparing potential WMP initiatives. While most WMP initiatives are generally assumed to reduce utility wildfire risk, there are typically several alternatives that can address specific drivers of utility ignitions and near misses. However, 2020 WMPs generally do not include any discussion of which alternatives were considered, how the utility evaluated the efficacy of each alternative, and how the utility ultimately decided upon the suite of initiatives presented in its 2020 WMP.
Condition	In its first quarterly report, each electrical corporation shall provide the following: i. all alternatives considered for each grid hardening or vegetation management initiative in its 2020 WMP; ii. all tools, models, and other resources used to compare alternative initiatives; iii. how it quantified and determined the risk reduction benefits of each initiative; and iv. why it chose to implement each initiative over alternative options.

Guidance-3	Lack of risk modeling to inform decision-making
Class	A
Deficiency	Electrical corporations do not provide sufficient detail in their 2020 WMPs to demonstrate how they are leveraging risk models to target the highest risk portions of the grid. While most utilities indicate current progress and work on developing models to estimate risk across their service territories, there is a lack of focus on how these models can be used in practice to prioritize initiatives to address specific ignition drivers and geographies. Specifically, utilities fail to outline in detail how they determine where to prioritize to improve asset management or determine portions of circuits that would benefit the most from hardening and vegetation management. By continuing to improve wildfire risk modeling and basing its wildfire mitigations on its wildfire risk modeling outputs, electrical corporations can potentially achieve a greater level of risk reduction with the same resources.
Condition	Each electrical corporation shall submit in its remedial correction plan (RCP) the following: i. how it intends to apply risk modeling and risk assessment techniques to each initiative in its WMP, with an emphasis on much more targeted use of asset management, vegetation management, grid hardening and PSPS based on wildfire risk modeling outputs; ii. identify all wildfire risk analyses it currently performs (including probability and consequence modeling) to determine which mitigation is targeted to circuits and assets where initiatives will provide the greatest benefit to wildfire risk reduction; iii. a timeline to leverage its risk modeling outputs to prioritize and target initiatives and set PSPS thresholds, including at least asset management, grid operations, vegetation management, and system hardening initiatives; iv. how it intends to incorporate future improvements in risk modeling into initiative prioritization and targeting processes; and v. how it intends to adapt its approach based on learnings going forward.

Guidance-4	Lack of discussion on PSPS impacts
Class	B
Deficiency	Across 2020 WMP submissions, utilities indicate goals of reducing the scope, frequency and duration of PSPS events but also indicate intentions of continuing to implement PSPS as a wildfire mitigation measure in the immediate future. Considering the rapid expansion of PSPS use as a wildfire mitigation measure, and the numerous hardships, inconveniences and hazards created by its vast implementation, it is concerning that 2020 WMPs provide no discussion of how the chosen portfolio of initiatives will allow the utility to achieve its goals for reducing PSPS impacts. Specifically, no 2020 WMPs discuss the relationship between various grid hardening, vegetation management, and asset management initiatives and the corresponding impacts on thresholds for initiating PSPS events.
Condition	In its first quarterly report, each electrical corporation shall detail whether and how each initiative in its WMP: i. affects its threshold values for initiating PSPS events; ii. is expected to reduce the frequency (i.e. number of events) of PSPS events; iii. is expected to reduce the scope (i.e. number of customers impacted) of PSPS events; iv. is expected to reduce the duration of PSPS events; and v. supports its directional vision for necessity of PSPS, as outlined in Section 4.4 of its WMP.

Guidance-5	Aggregation of initiatives into programs
Class	B
Deficiency	In their 2020 WMP submissions, electrical corporations often combine various initiatives into broader programs and report cost, risk and other related data at the program level. This aggregation of initiatives and bundled reporting creates several issues. First, because cost data is typically reported across programs and not individual initiatives, it is not possible for the WSD to evaluate the efficacy of each initiative. Second, when initiatives are bundled and reported together as programs, it prevents the WSD from being able to assess which initiatives are effectively reducing utility wildfire risk. Consequently, this creates the challenge that ineffective elements of broad programs cannot be determined and future considerations of initiatives within programs can only be done collectively.
Condition	In its first quarterly report, each electrical corporation shall: i. break out its programs outlined in section 5.3 into individual initiatives; ii. report its spend on each individual initiative; iii. describe the effectiveness of each initiative at reducing ignition probability or wildfire consequence; iv. list all data and metrics used to evaluate effectiveness described in (iii), including the threshold values used to differentiate between effective and ineffective initiatives; and v. provide the information required for each initiative in section 5.3 of the Guidelines.

Guidance-6	Failure to disaggregate WMP initiatives from standard operations
Class	B
Deficiency	While WMPs are designed to outline and detail filer's plans and initiatives for mitigating wildfire risk, many existing programs also provide wildfire risk reduction benefits. For example, General Order 165 requires annual patrol inspections and detailed inspections every five years for electrical infrastructure. These programs and initiatives are often referenced in 2020 WMPs as "supporting," "routine," "enabling," "standard," or "foundational" work. For these types of programs, in most cases, electrical corporations do not report cost or risk reduction data, as the work is considered part of their electric operations and it is indicated that this information is not tracked independently. Several electrical corporations state that their programs for inspecting and maintaining crossarms, poles, transformers, transmission towers and similar infrastructure, which also reduce wildfire risk, are embedded within standard maintenance programs litigated in GRCs. Consequently, it is difficult to determine whether and how these programs incrementally impact wildfire risk reduction or if related WMP initiatives are redundant and unnecessary. While utilities may not have historically considered the costs and effectiveness of such programs and initiatives, given that numerous WMP initiatives have apparent overlap or potential redundancy, it is imperative that utilities provide such data to validate the need for and effectiveness of additional programs. It is not clear how electrical corporations are tracking their WMP activities in memorandum accounts if they do not budget for them by type of initiative. The Commission will scrutinize electrical corporations' memorandum accounts for WMP carefully, and if all costs are simply lumped together or included in general operations and maintenance accounts, electrical corporations risk failing to provide entitlement to cost recovery.
Condition	In its first quarterly report, each electrical corporation shall: i. clearly identify each initiative in Section 5.3 of its WMP as "Standard Operations" or "Augmented Wildfire Operations;" ii. report WMP required data for all Standard Operations and Augmented Wildfire Operations; iii. confirm that it is budgeting and accounting for WMP activity of each initiative; and iv. include a "ledger" of all subaccounts that show a breakdown by initiative.

Guidance-7	Lack of detail on effectiveness of "enhanced" inspection programs
Class	B
Deficiency	Utilities engage in numerous 'enhanced' inspection programs, but it is unclear if such 'enhanced' programs are incrementally effective over routine patrol and detailed inspections, particularly if patrol and detail inspections are scheduled based on risk rather than GO 95 minimums.
Condition	In its first quarterly report, each electrical corporation shall detail: i. the incremental quantifiable risk identified by such 'enhanced' inspection programs; ii. whether it addresses the findings uncovered by 'enhanced' programs differently than findings discovered through existing inspections; and iii. a detailed cost-benefit analysis of combining elements of such 'enhanced' inspections into existing inspection programs.

Guidance-8	Prevalence of equivocating language – failure of commitment
Class	C
Deficiency	While there have been many improvements and advancements reflected in 2020 WMPs, a key concern remains regarding discussion of WMP objectives and the prevalent use of "equivocating language" to avoid making measurable, quantifiable, and verifiable commitments. While electrical corporations make promises to quantifiably reduce PSPS impacts and the frequency of near misses and ignitions, other promises are far less specific. Terms such as, "track," "assess," "evaluate," and "evolve" are repeated hundreds of times throughout the 2020 WMPs. Without sufficient details, none of these terms provide the WSD or the public with a measurable, quantifiable, and verifiable goal against which electrical corporations could be held.
Condition	In its 2021 WMP update, each electrical corporation shall: i. include objectives for each of its initiatives that are measurable, quantifiable, and verifiable by the WSD; ii. provide targets and timelines for all strategies, plans, and approaches to wildfire mitigation that are measurable, quantifiable and verifiable by the WSD; and iii. dispense with empty rhetoric and not use terms that are ambiguous, misleading, or otherwise have the result of diluting commitments. Continued use of equivocating language may result in denial of future WMPs.

Guidance-9	Insufficient discussion of pilot programs
Class	B
Deficiency	Electrical corporations do not describe how they will evaluate and expand the use of successfully piloted technology or which piloted technology has proven ineffective. To ensure pilots that are successful result in expansion, if warranted and justified with quantitative data, electrical corporations must evaluate each pilot or demonstration and describe how it will expand use of successful pilots.
Condition	In its quarterly report, each electrical corporation shall detail: i. all pilot programs or demonstrations identified in its WMP; ii. status of the pilot, including where pilots have been initiated and whether the pilot is progressing toward broader adoption; iii. results of the pilot, including quantitative performance metrics and quantitative risk reduction benefits; iv. how the electrical corporation remedies ignitions or faults revealed during the pilot on a schedule that promptly mitigates the risk of such ignition or fault, and incorporates such mitigation into its operational practices; and v. a proposal for how to expand use of the technology if it reduces ignition risk materially.

Guidance-10	Data issues – general
Class	B
Deficiency	Although the availability of data, including GIS data, provides unprecedented insight into utility infrastructure and operations, inconsistencies and gaps in the data present a number of challenges and hurdles. As it relates to GIS data, electrical corporation submissions often had inconsistent file formats and naming conventions, contained little to no metadata, were incomplete or missing many data attributes and utilized varying schema. These deficiencies rendered cross-utility comparisons impossible without substantive, resource- and time-consuming manipulation of the data. Additional data challenges included varying interpretations of WMP Guideline data requirements, leading to inconsistency of data submitted.
Condition	Electrical corporations shall ensure that all future data submissions to the WSD adhere to the forthcoming data taxonomy and schema currently being developed by the WSD. Additionally, each electrical corporation shall file a quarterly report detailing: i. locations where grid hardening, vegetation management, and asset inspections were completed over the prior reporting period, clearly identifying each initiative and supported with GIS data, ii. the type of hardening, vegetation management and asset inspection work done, and the number of circuit miles covered, supported with GIS data iii. the analysis that led it to target that specific area and hardening, vegetation management or asset inspection initiative, and iv. hardening, vegetation management, and asset inspection work scheduled for the following reporting period, with the detail in (i) – (iii).

Guidance-11	Lack of detail on plans to address personnel shortages
Class	B
Deficiency	Electrical corporations do not explain in detail the range of activities that they are undertaking to recruit and train personnel to grow the overall pool of talent in areas of personnel shortage.
Condition	In its first quarterly report, each electrical corporation shall detail: i. a listing and description of its programs for recruitment and training of personnel, including for vegetation management; ii. a description of its strategy for direct recruiting and indirect recruiting via contractors and subcontractors; and iii. its metrics to track the effectiveness of its recruiting programs, including metrics to track the percentage of recruits that are newly trained, percentage from out of state, and the percentage that were working for another California utility immediately prior to being hired.

Guidance-12	Lack of detail on long-term planning
Class	B
Deficiency	Electrical corporations do not provide sufficient detail regarding long-term wildfire mitigation plans and how the initiatives in their WMPs align with and support those long-term plans.
Condition	In their first quarterly report, each electrical corporations shall detail: i. its expected state of wildfire mitigation in 10 years, including 1) a description of wildfire mitigation capabilities in 10 years, 2) a description of its grid architecture, lines, and equipment; ii. a year-by-year timeline for reaching these goals; iii. a list of activities that will be required to achieve this end goal; and iv. a description of how the electrical corporation's three-year WMP is a step on the way to this 10-year goal.

(End of Appendix A)

APPENDIX B

Detailed Figures & Charts

0. Description of Data Sources

All figures reference the latest submitted versions of 2020 WMPs as of April 10th, 2020. Data is pulled from Tables 1-31 of Utility WMPs unless stated otherwise.

By utility, the WMPs referenced in this document are:

PG&E	Update to WMP submitted March 17th, 2020
SCE	Revision 02 to WMP
SDG&E	Update to WMP submitted March 10th, 2020
Liberty CalPeco	Update to WMP submitted February 28th, 2020
PacifiCorp	Update to WMP submitted February 26th, 2020
Bear Valley Electric Service	Update to WMP submitted February 26th, 2020
Horizon West Transmission	Update to WMP submitted February 28th, 2020
Trans Bay Cable	Update to WMP submitted February 28th, 2020

All are available at cpuc.ca.gov/wildfiremitigationplans.

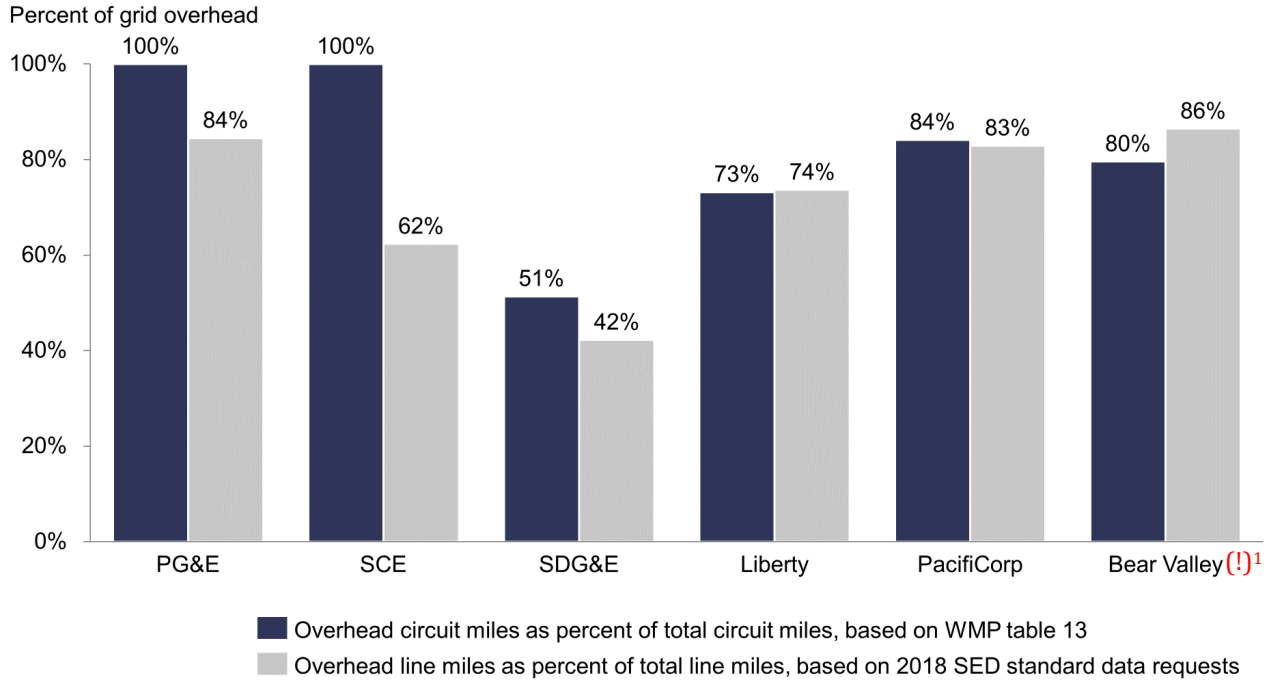
All the analysis and corresponding figures presented in this appendix rely upon data that is self-reported by the utilities. By utilizing and presenting this self-reported data in this appendix, the WSD is not independently validating that all data elements submitted by utilities are accurate. The WSD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

1. Figures

CONTENTS

1.1 Wildfire Risk Exposure

Figure 1.1a: Comparison of data sources for circuit typologies

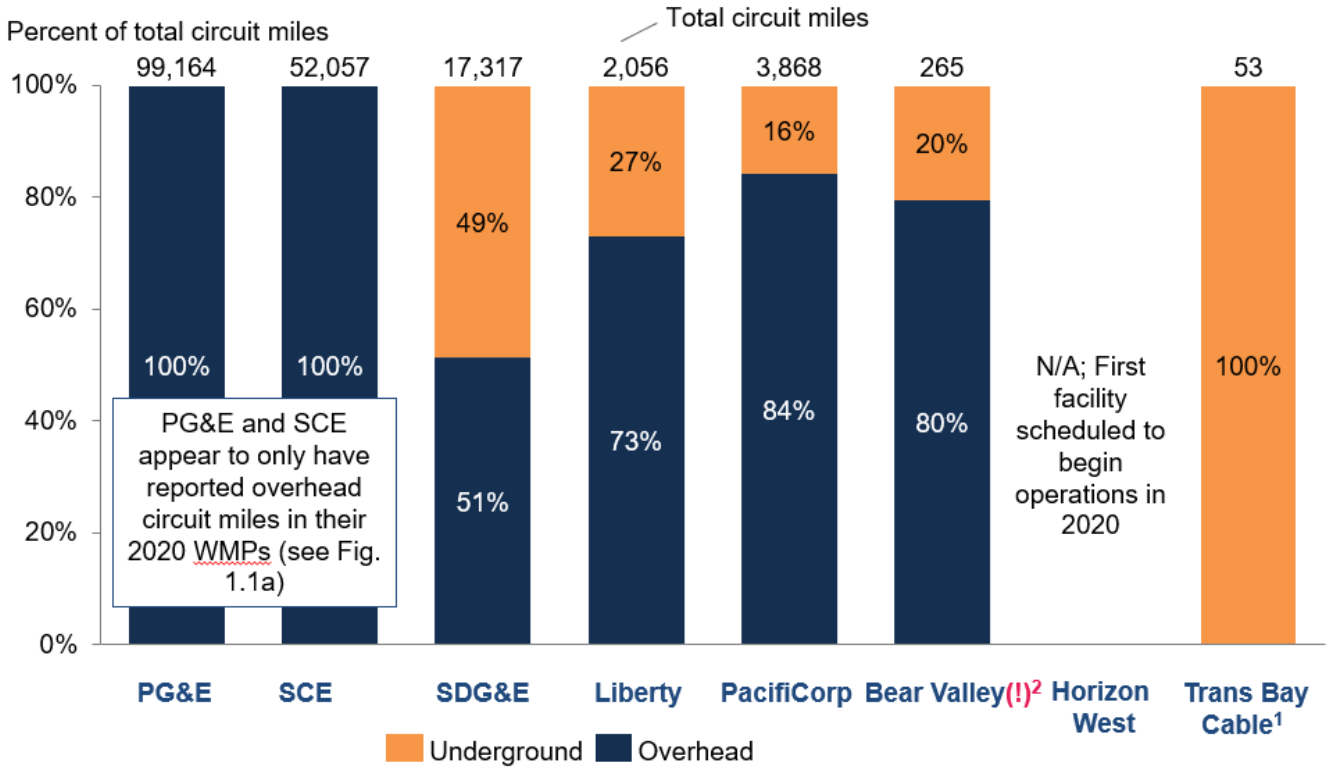


Note: In their 2020 WMPs, PG&E and SCE only reported circuit mileage data for overhead facilities. Based on the best available historical data on circuit mileage and grid topology in the Comission's possession, PG&E is reported to have 84% of its total line miles overhead, and SCE is reported to have 62% of its total line miles overhead. While the 2020 WMP Guidelines directed the utilities to report their grid topology breakdown by circuit miles, rather than line miles, the percentages overhead and underground are expected to be similar. The WSD will issue a data request to confirm accurate underground circuit mileage numbers.

1. BVES submitted errata on 5/20/2020 that changed their WMP. Those updates are not reflected here (WSD analysis forthcoming).

Source: SED standard data requests for annual grid data (reflect values as of December 2018), WMP Table 13

Figure 1.1b: Circuit topology breakdown by overhead and underground circuit miles

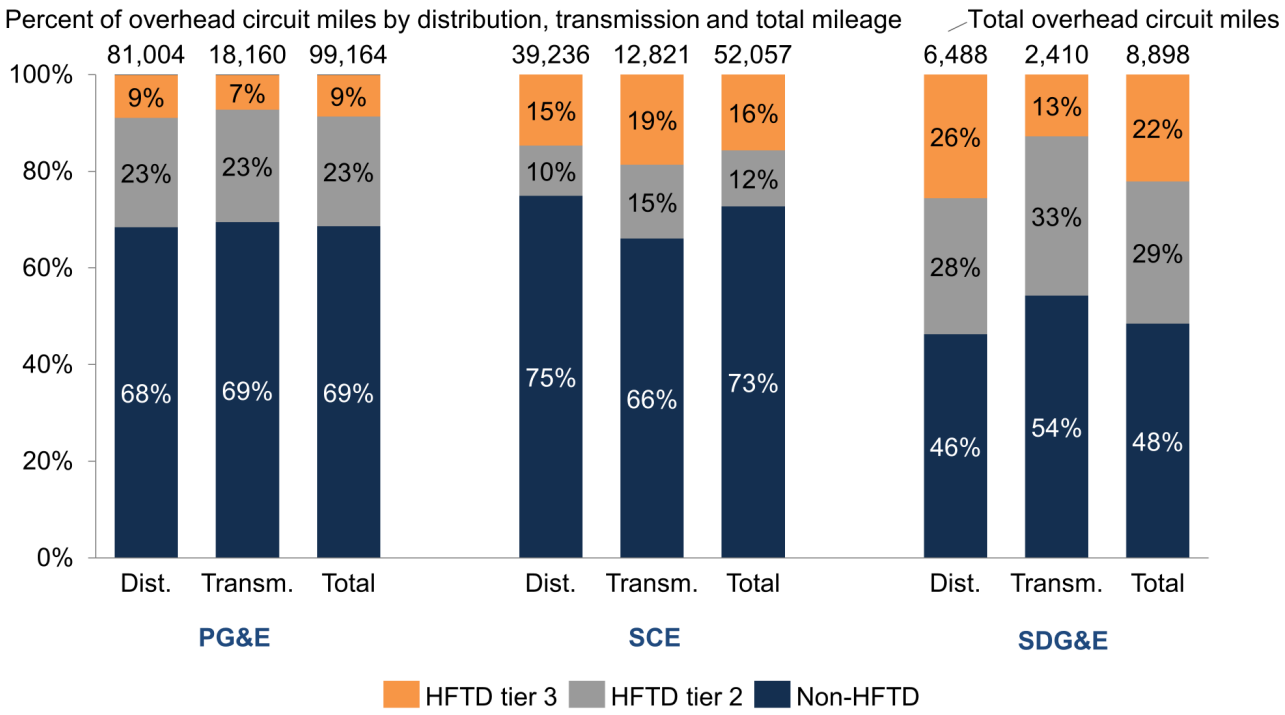


1. Trans Bay Cable did not report underground circuit miles in Table 13 of the WMP, but mentioned on page 8 of its WMP that it had 53 circuit miles of underground submarine cable, which is reflected in this chart.

2. BVES submitted errata on 5/20/2020 that changed their WMP. Those updates are not reflected here (WSD analysis forthcoming).

Source: WMP Table 13

Figure 1.2a: Overhead circuit miles by HFTD Tier (Large Utilities)
Broken out by distribution (dist.) and transmission (transm.)

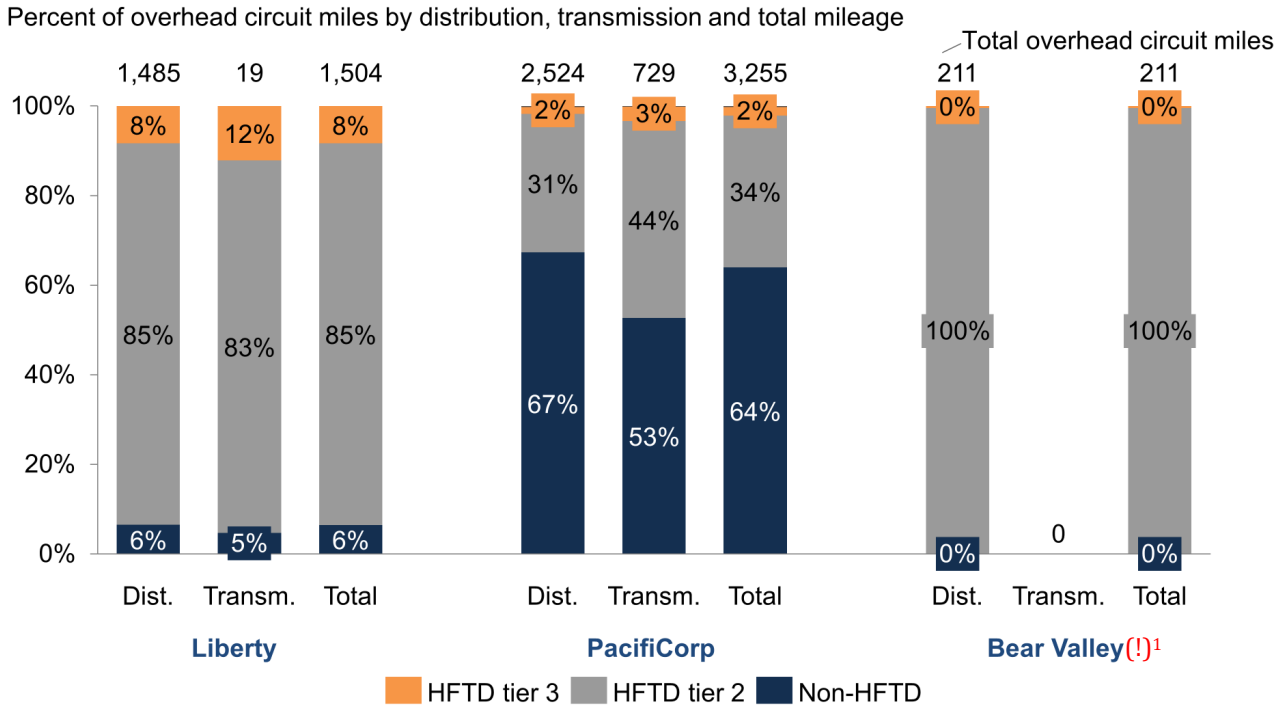


Note: Zone 1 not shown as subtotal.

Source: WMP Table 13

Figure 1.2b: Overhead circuit miles by HFTD Tier (Small Utilities)

Broken out by distribution (dist.) and transmission (transm.)

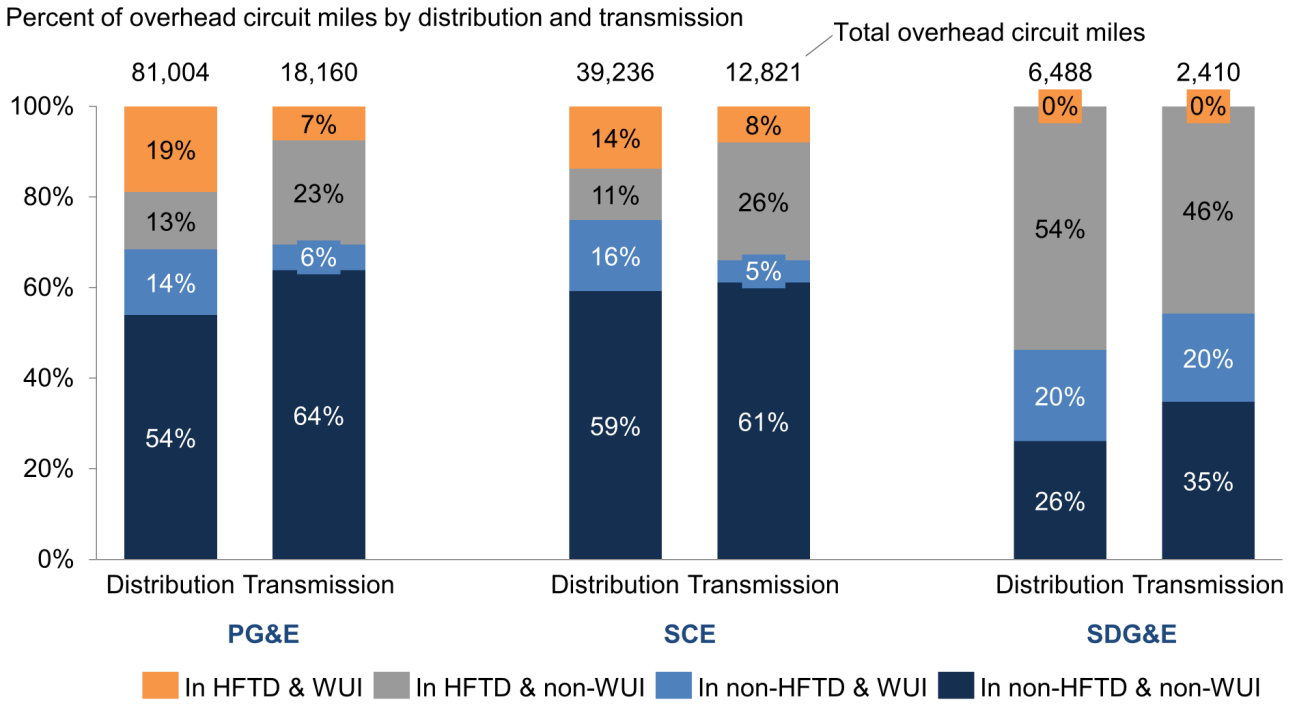


Note: Zone 1 not shown as subtotal.

1. BVES submitted errata on 5/20/2020 that changed their WMP. Those updates are not reflected here (WSD analysis forthcoming).

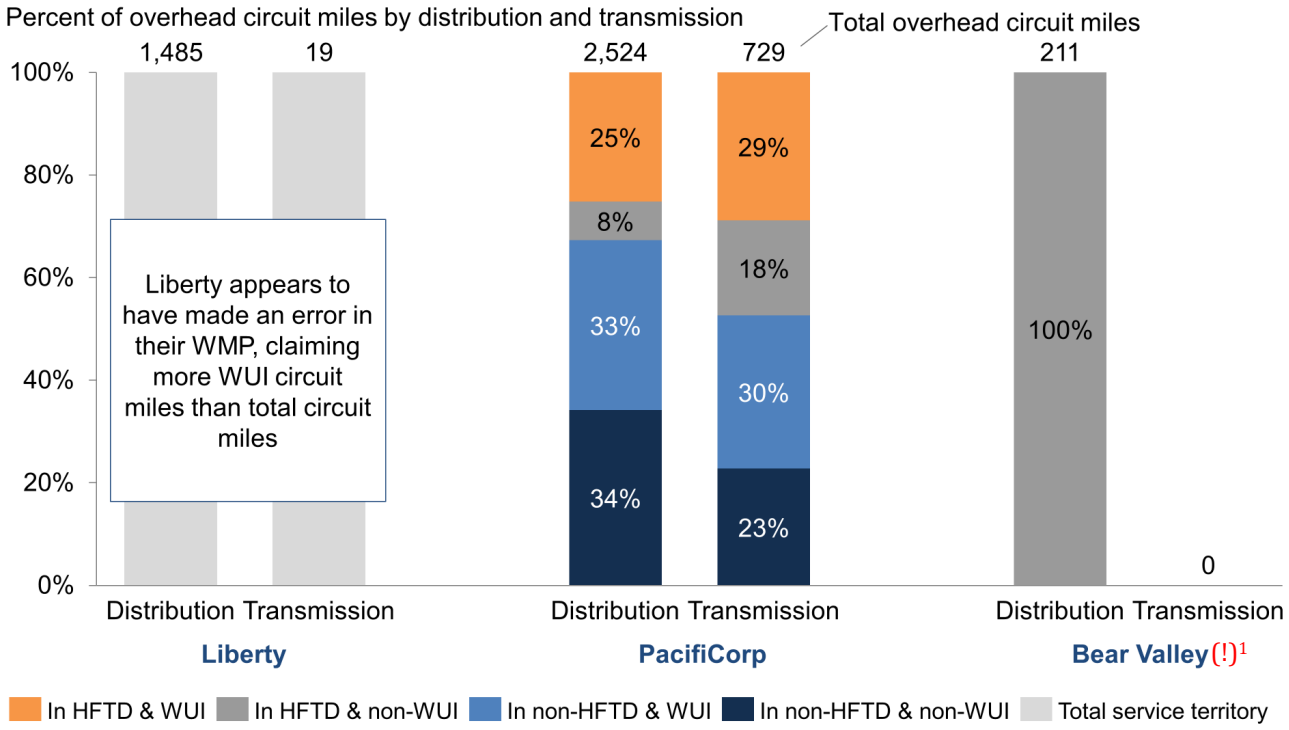
Source: WMP Table 13

Figure 1.3a: Breakdown of overhead transmission and distribution circuit miles by HFTD and WUI location (Large utilities)



Source: WMP Table 13

Figure 1.3b: Breakdown of overhead transmission and distribution circuit miles by HFTD and WUI location (Small utilities)

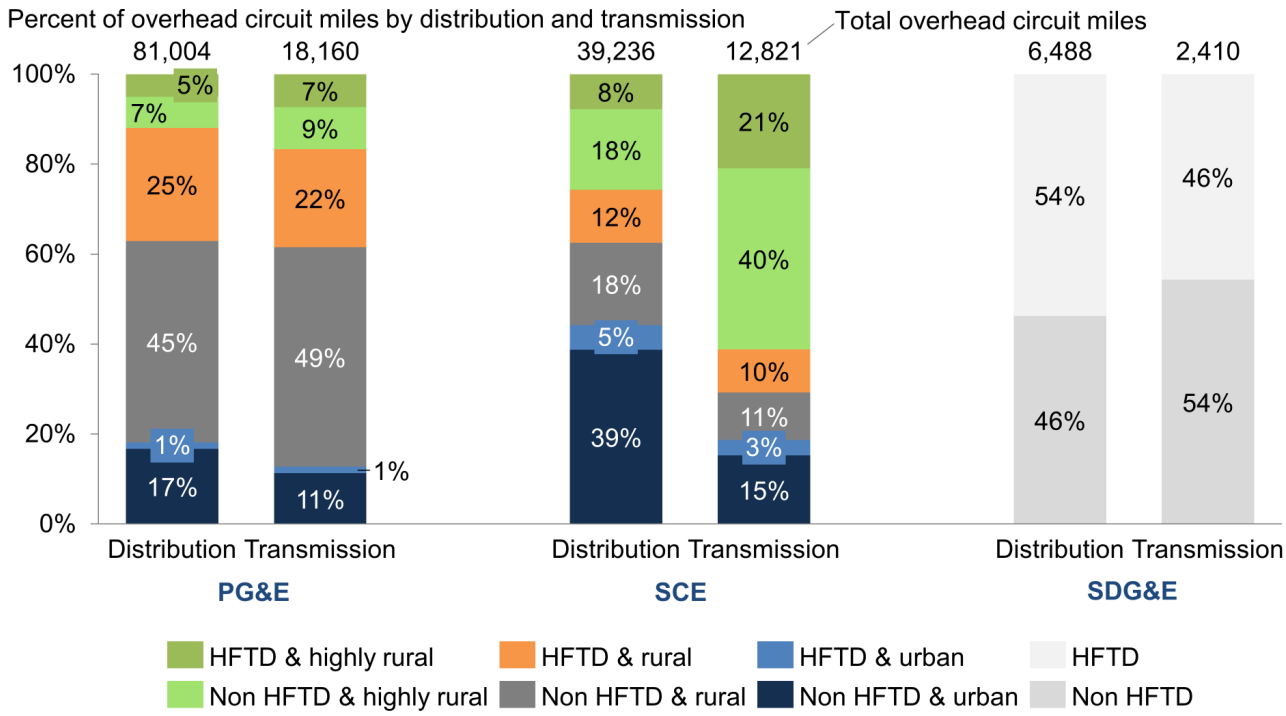


Note: Trans Bay Cable and Horizon West Transmission are not shown. Trans Bay Cable is almost entirely undergroud and submarine, and Horizon West Transmission did not yet have operational facilities at the time it submitted its 2020 WMP.

1. BVES submitted errata on 5/20/2020 that changed their WMP. Those updates are not reflected here (WSD analysis forthcoming).

Source: WMP Table 13

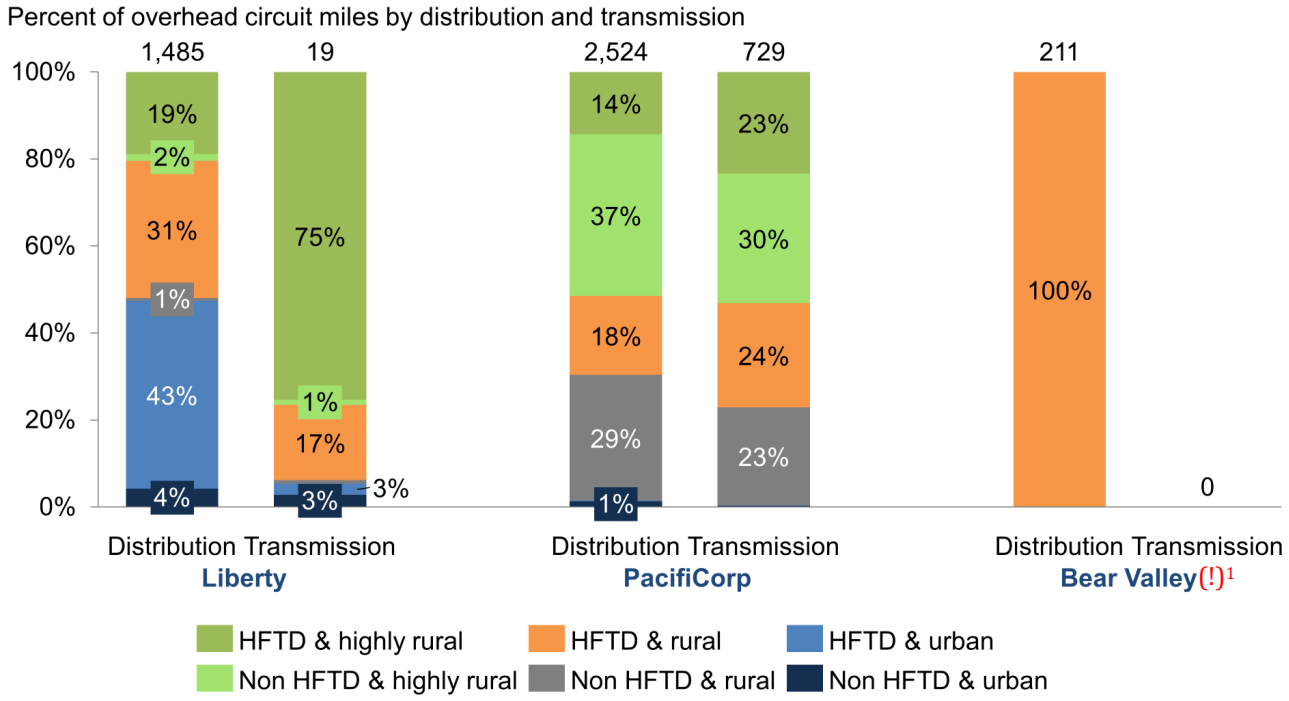
Figure 1.4a: Breakdown of overhead transmission and distribution circuit miles by HFTD and population density (Large utilities)



Note: SDG&E did not report breakdown of circuit mileage between areas of different population densities.

Source: WMP Table 13

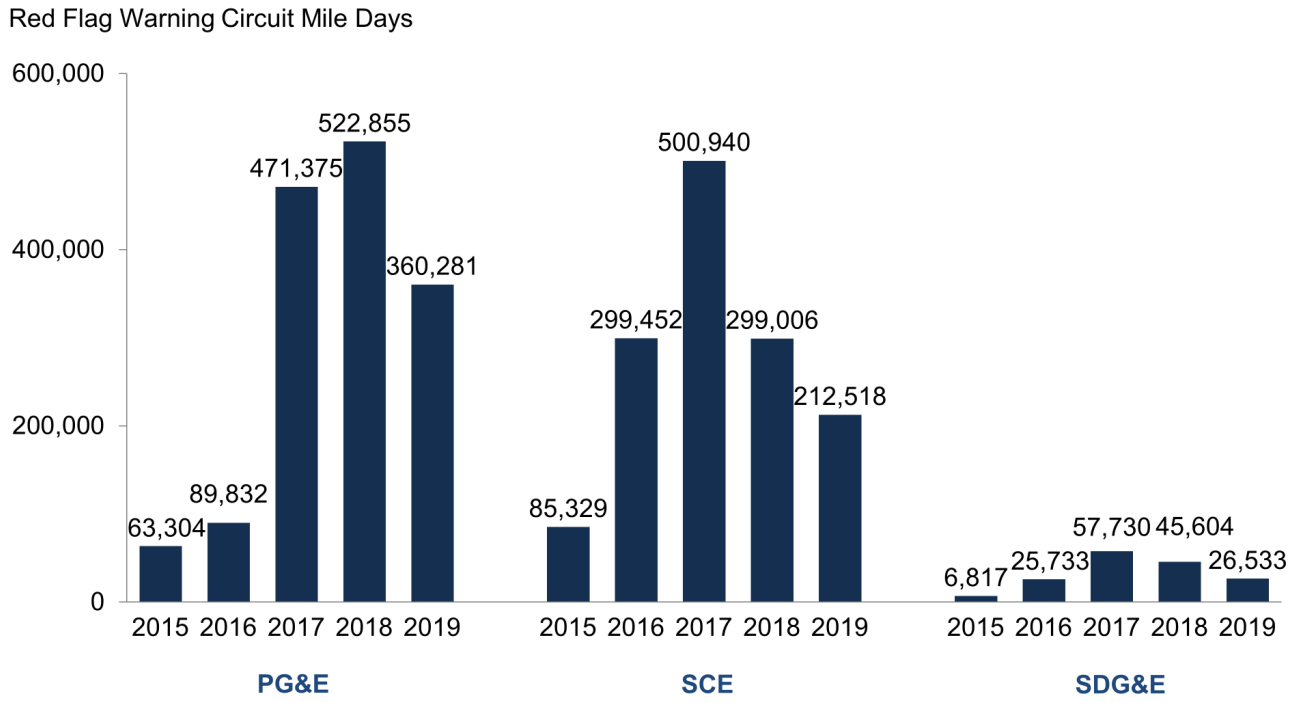
Figure 1.4b: Breakdown of overhead transmission and distribution circuit miles by HFTD and population density (Small utilities)



1. BVES submitted errata on 5/20/2020 that changed their WMP. Those updates are not reflected here (WSD analysis forthcoming).

Source: WMP Table 13

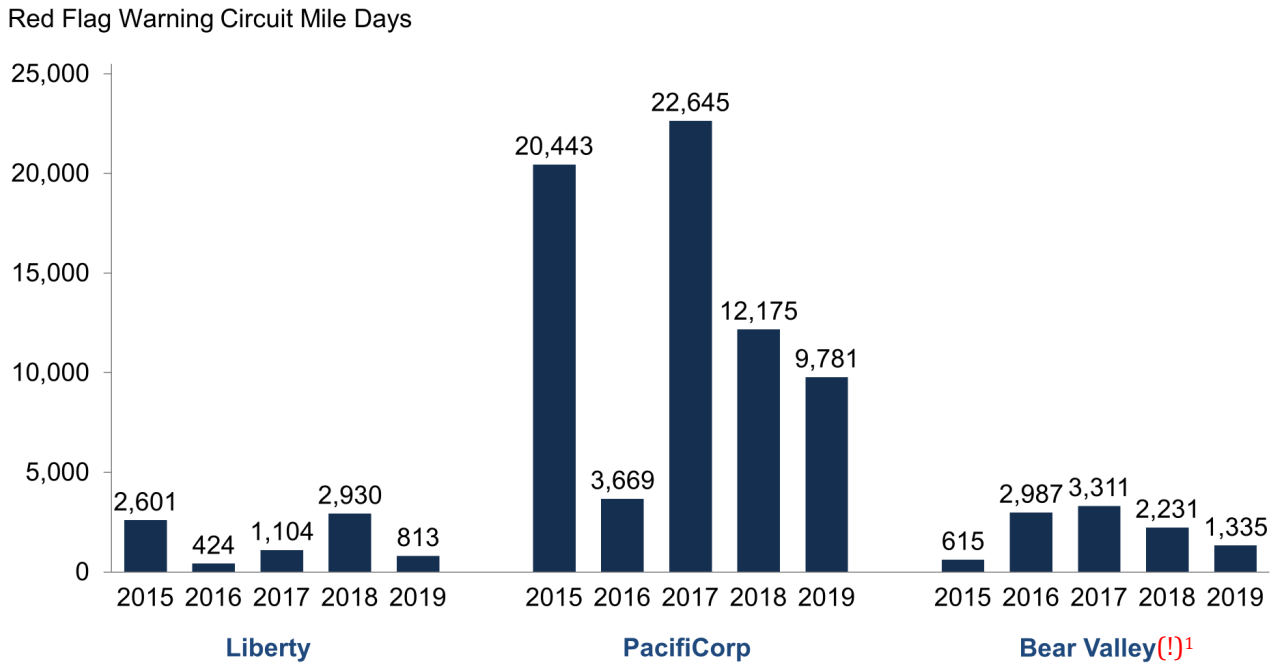
Figure 1.5a: Red flag warning circuit mile days per year by utility (Large utilities)



Note: A "Red Flag Warning (RFW) Circuit Mile Day" is intended to capture the duration and scope of the fire weather that year. It is defined on page 5 of the 2020 WMP Guidelines to be calculated as the number of circuit miles that were under a RFW multiplied by the number of days those miles were under said RFW. For example, if 100 circuit miles were under a RFW for 1 day, and 10 of those miles were under RFW for an additional day, then the total RFW circuit mile days would be 110.

Source: WMP Table 10

Figure 1.5b: Red flag warning circuit mile days per year by utility (Small utilities)

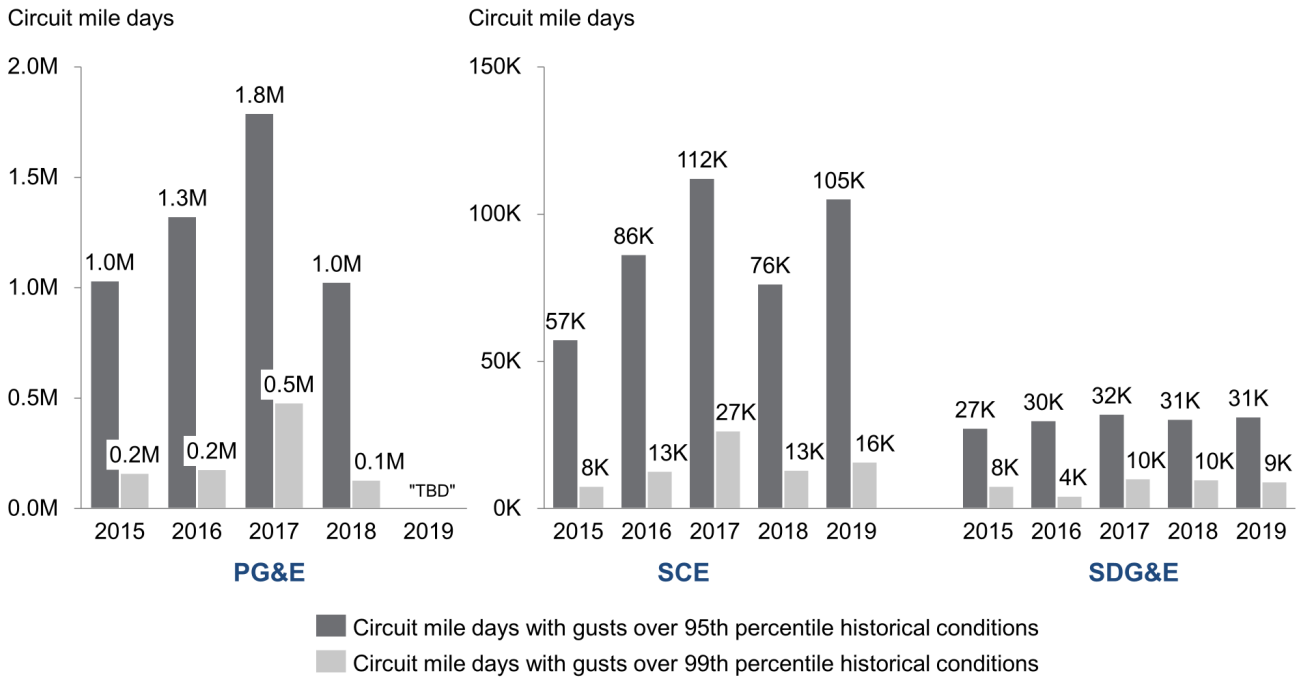


Note: A "Red Flag Warning (RFW) Circuit Mile Day" is intended to capture the duration and scope of the fire weather that year. It is defined on page 5 of the 2020 WMP Guidelines to be calculated as the number of circuit miles that were under a RFW multiplied by the number of days those miles were under said RFW. For example, if 100 circuit miles were under a RFW for 1 day, and 10 of those miles were under RFW for an additional day, then the total RFW circuit mile days would be 110.

1. BVES submitted errata on 5/20/2020 that changed their WMP. Those updates are not reflected here (WSD analysis forthcoming).

Source: WMP Table 10

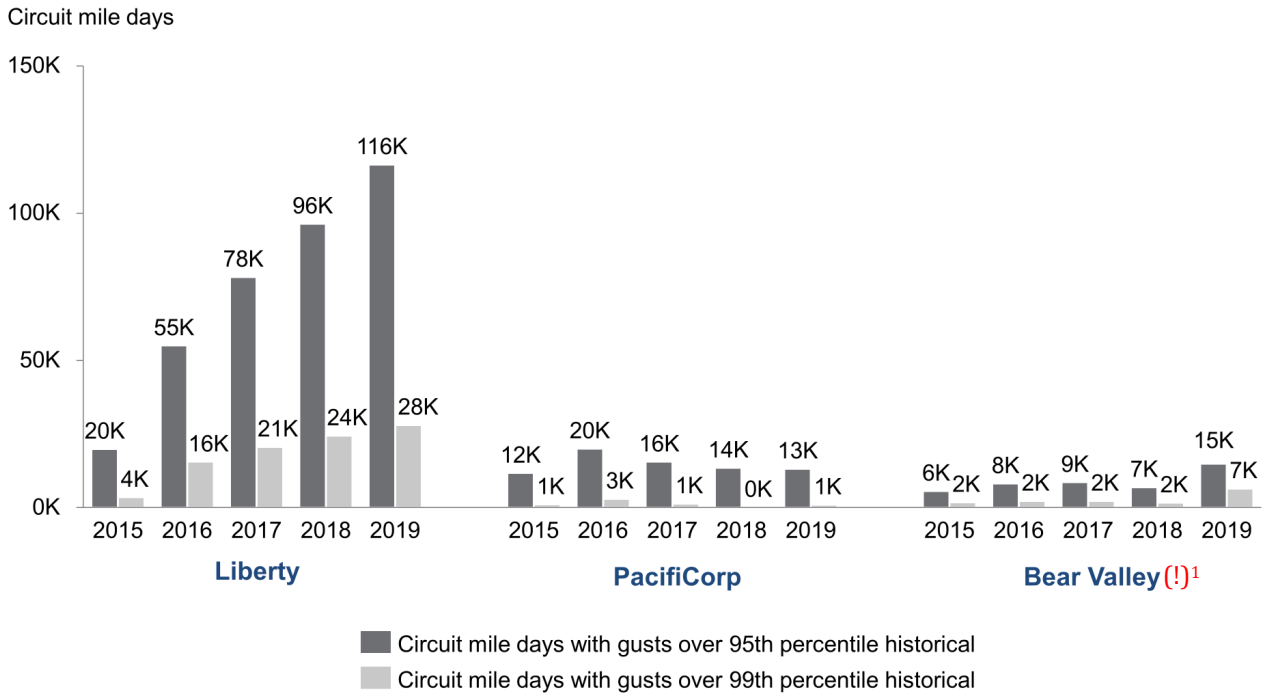
Figure 1.5c: 95th and 99th percentile wind conditions (Large utilities)



Note: Utilities were directed to report historical conditions as conditions over 10 prior years, 2005-2014. SCE appears to have instead reported historical conditions over the 5 prior years, 2009-2014, thus using a different baseline to calculate 95th and 99th percentile wind speeds. More information is needed to fully address potential inconsistencies between utilities. PG&E stated that 2019 data would not be available until late Q2 2020.

Source: WMP Table 10

Figure 1.5d: 95th and 99th percentile wind conditions (Small utilities)



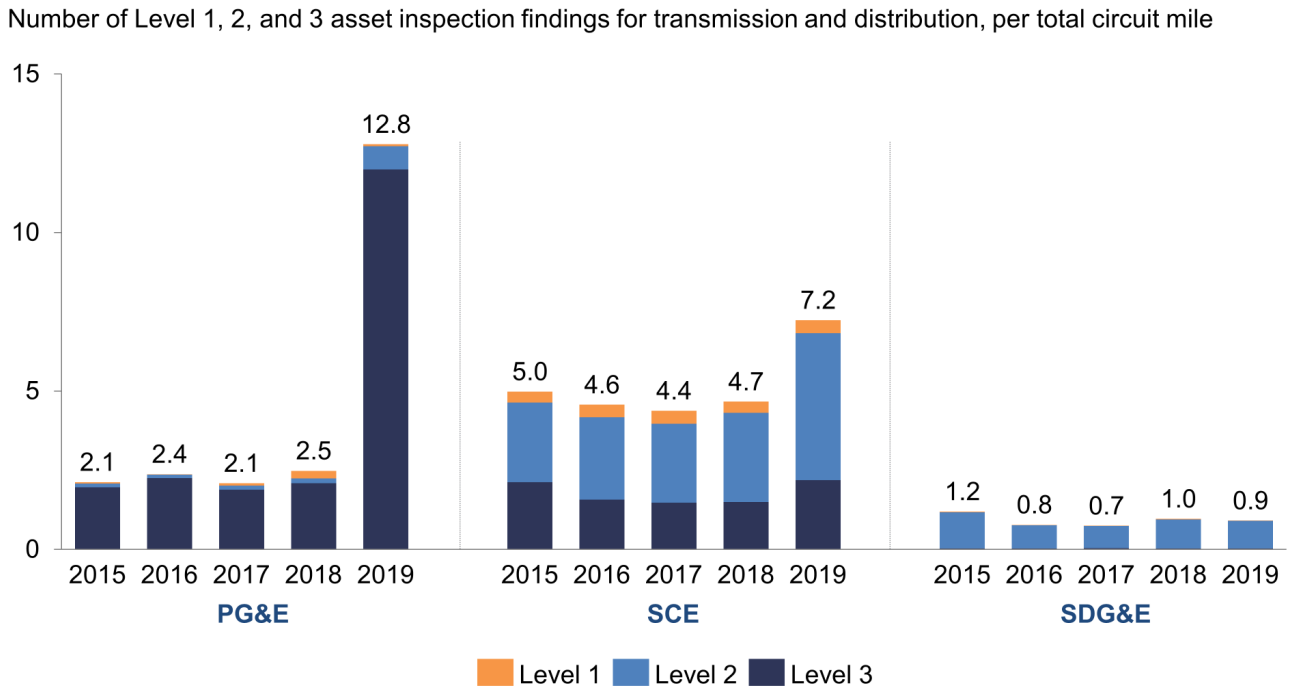
Note: Historical conditions refer to conditions over 10 prior years, 2005-2014.

1. BVES submitted errata on 5/20/2020 that changed their WMP. Those updates are not reflected here (WSD analysis forthcoming).

Source: WMP Table 10

1.2 Outcome Metrics

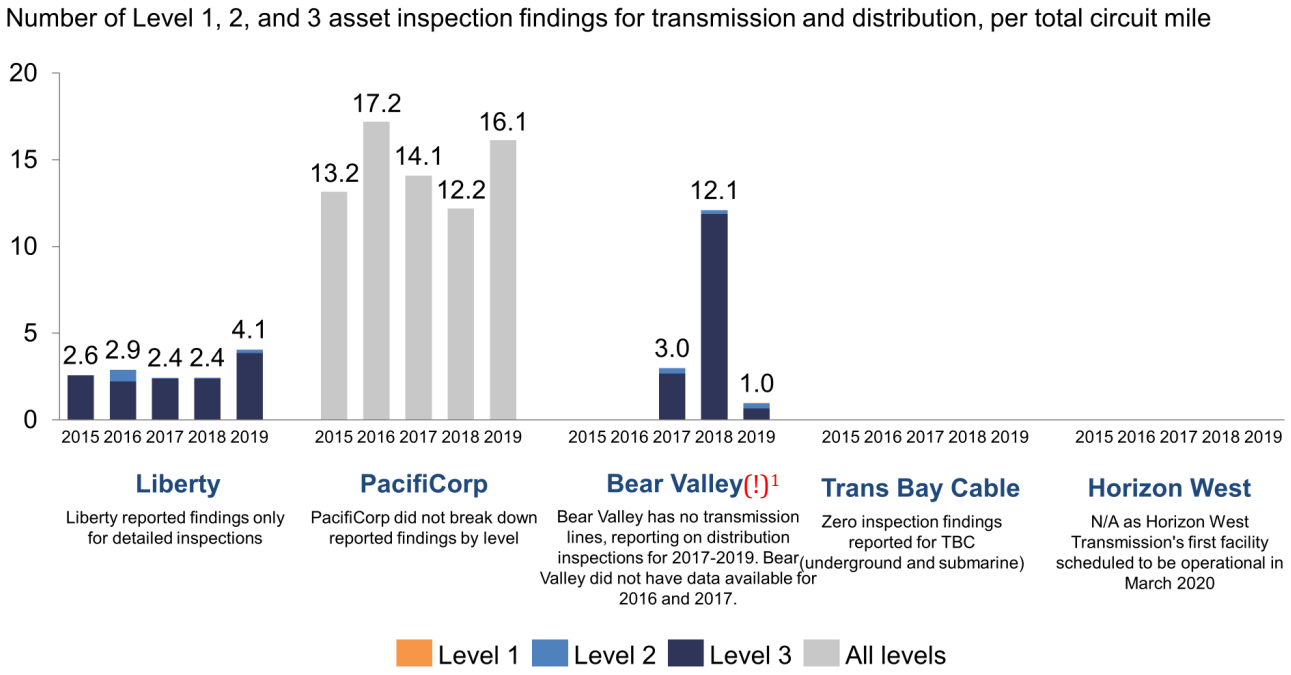
Figure 2.1a: Asset inspection findings normalized by total circuit mileage (Large utilities)



Note: Utilities reported their inspection findings as normalized by total circuit miles in Table 1 of their WMPs.

Source: WMP Table 1

Figure 2.1b: Asset inspection findings normalized by total circuit mileage (Small utilities)

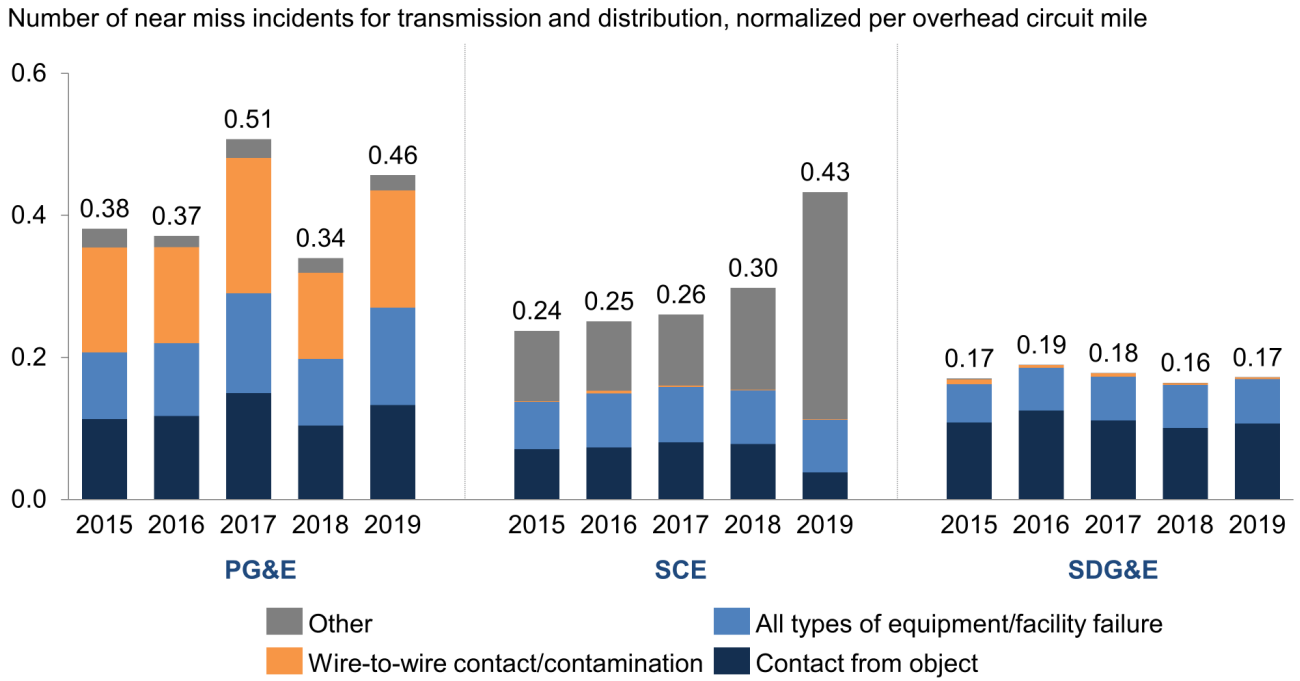


Note: Utilities reported their inspection findings as normalized by total circuit miles in Table 1 of their WMPs. In Table 1, Liberty reported inspection findings in miles between findings rather than in findings per circuit mile as the 2020 WMP Guidelines directed. To represent inspection findings in a way consistent with the reporting of other utilities, the WSD inverted the metric reported by Liberty to show inspection findings in findings per circuit mile in this chart. Bear Valley reported inspecton findings normalized per overhead cirucit mile rather than per total cirucit mile as instructed. For consistency, the WSD re-normalized these findings per total circuit mile using data from Table 13.

1. BVES submitted errata on 5/20/2020 that changed their WMP. Those updates are not reflected here (WSD analysis forthcoming).

Source: WMP Table 1

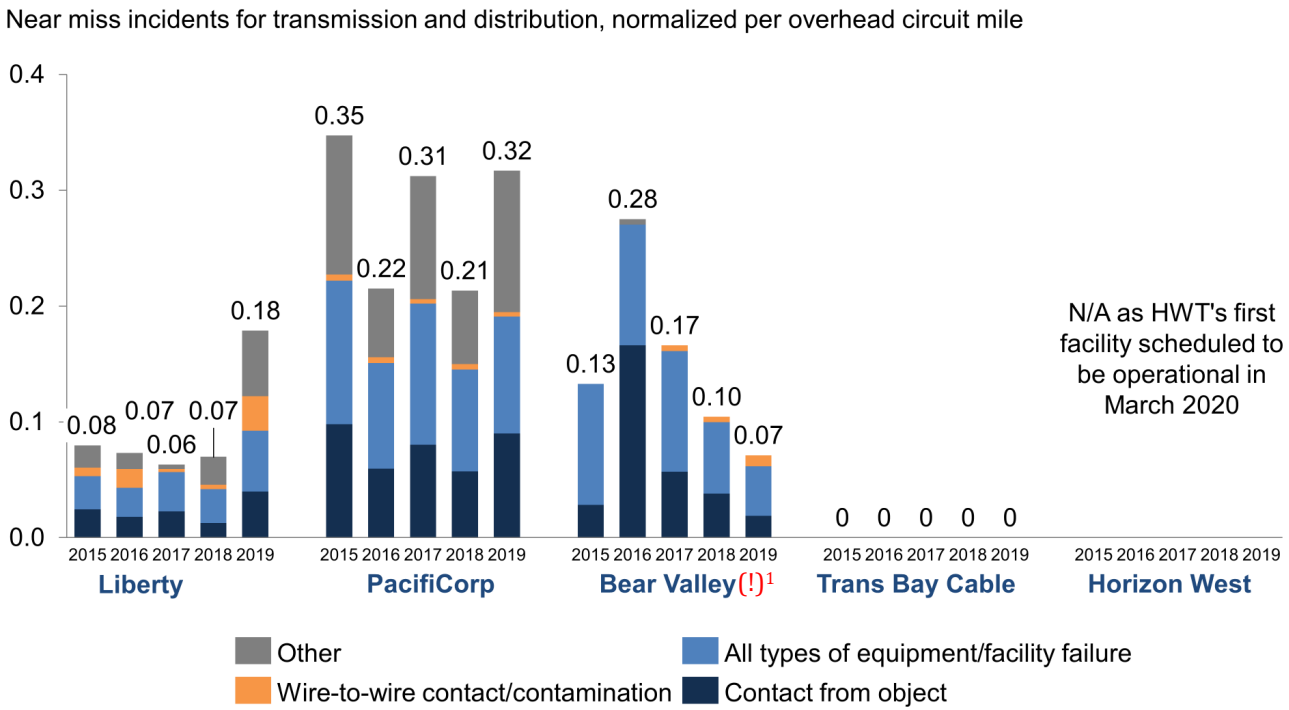
Figure 2.2a: Near miss incidents normalized by overhead circuit mileage (Large utilities)



Note: The measurement of each 'near miss' is not yet perfectly standardized across utilities. The WSD will work toward a more standardized approach for tracking and classifying near miss data for 2021 WMPs. A near miss was defined in the 2020 WMP Guidelines as "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."

Source: Tables 11a and 11b from utility WMPs and data requests, normalized by data from Table 13 of utility WMPs; SDG&E equipment failure numbers adjusted to address inconsistencies in subtotal calculations provided by SDG&E.

Figure 2.2b: Near miss incidents normalized by overhead circuit mileage (Small utilities)



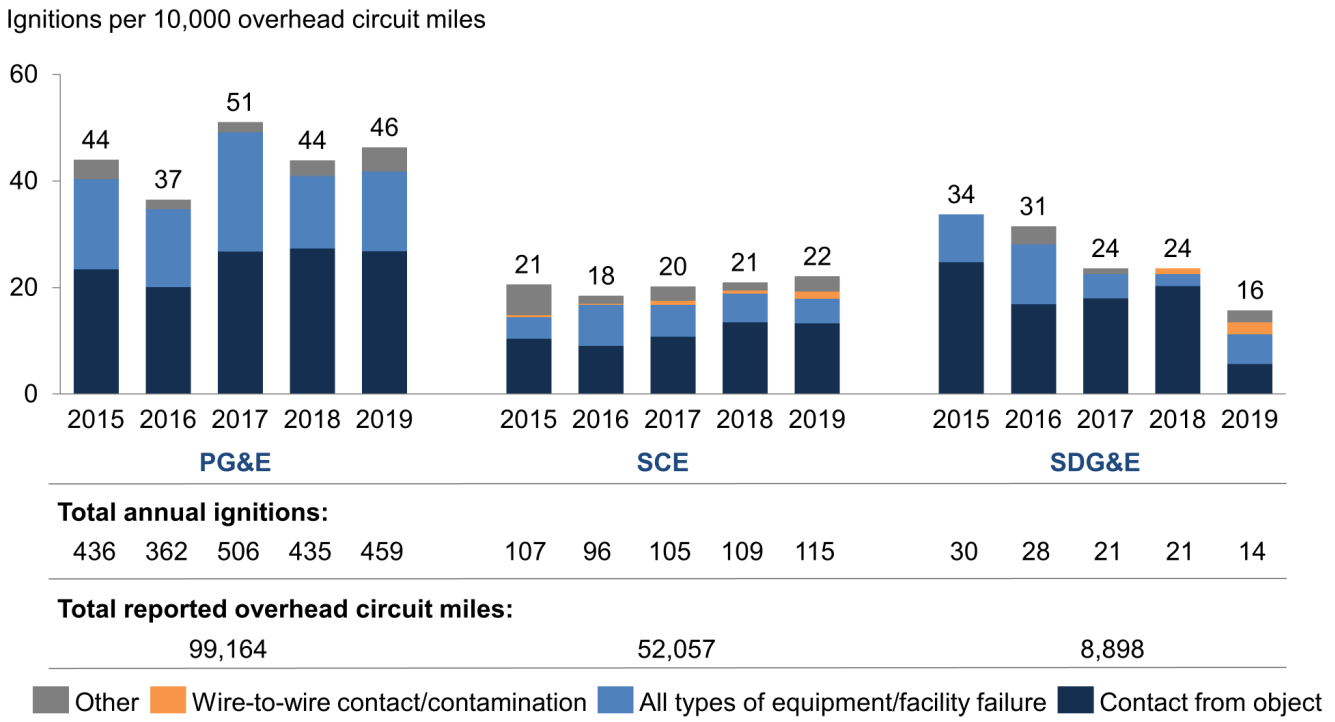
Note: The measurement of each 'near miss' is not yet perfectly standardized across utilities. The WSD will work toward a more standardized approach for tracking and classifying near miss data for 2021 WMPs. A near miss was defined in the 2020 WMP Guidelines as "An event with significant probability of 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."

For PacifiCorp, the largest drivers of "Other" near misses were "Other" (50% on average over the 5 year period) and "Unknown" (42% on average over the 5 year period).

1. BVES submitted errata on 5/20/2020 that changed their WMP. Those updates are not reflected here (WSD analysis forthcoming).

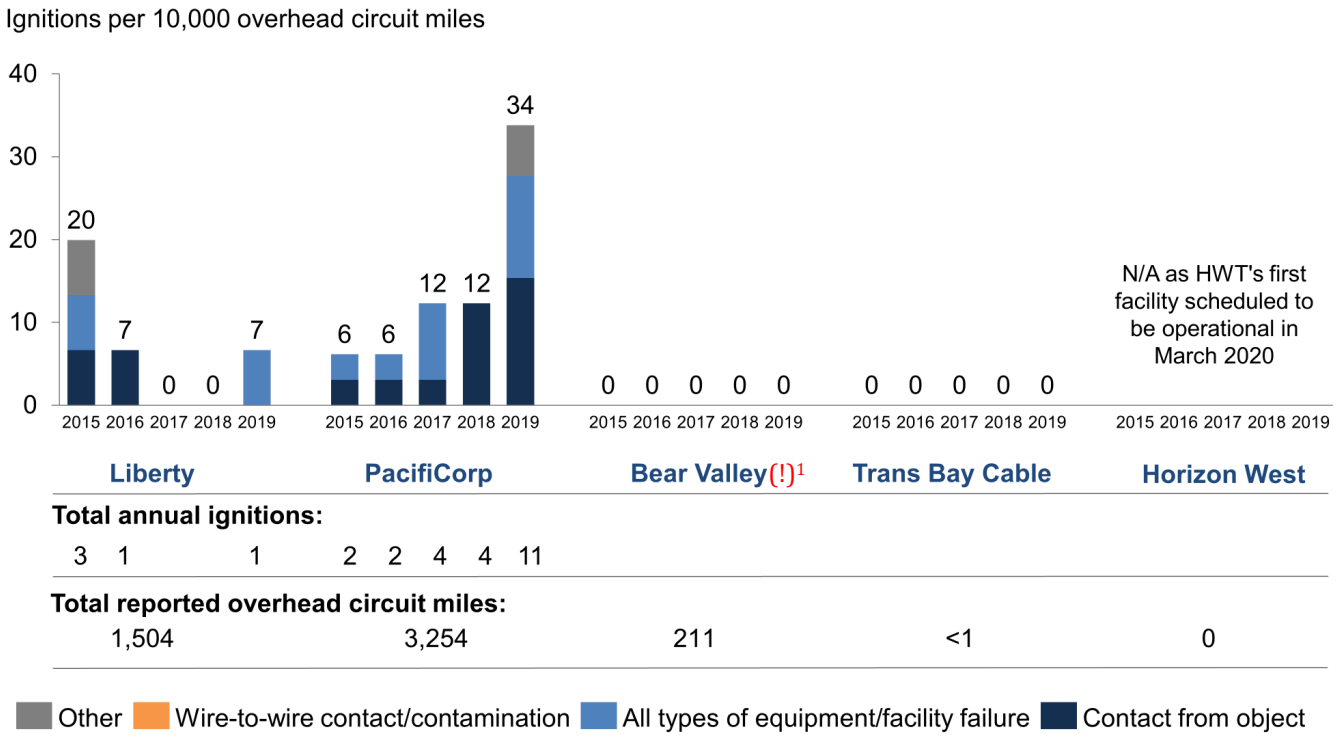
Source: Tables 11a and 11b from utility WMPs and data requests, normalized by data from Table 13 of utility WMPs; BVES numbers adjusted to address inconsistencies in subtotal calculations provided.

Figure 2.3a: Number of ignitions, normalized by overhead circuit mileage (Large utilities)



Source: Tables 11a and 11b from utility WMPs and data requests normalized by data from Table 13 of utility WMPs; SDG&E equipment failure numbers adjusted to address inconsistencies in subtotal calculations provided.

Figure 2.3b: Number of ignitions, normalized by overhead circuit mileage (Small utilities)

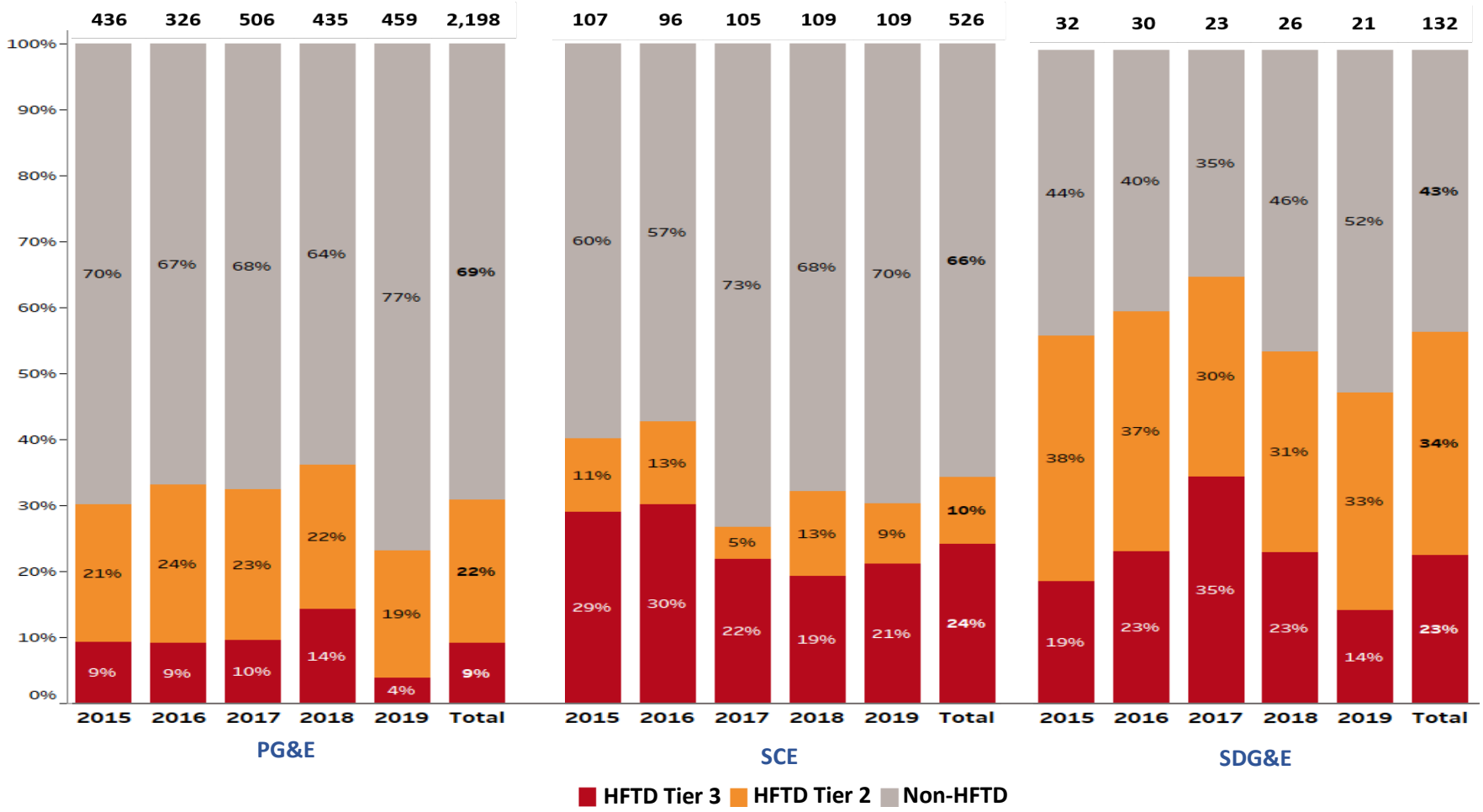


Note: Total number of ignititions only shown for utilities and years where ignitions were greater than zero.

1. BVES submitted errata on 5/20/2020 that changed their WMP. Those updates are not reflected here (WSD analysis forthcoming).

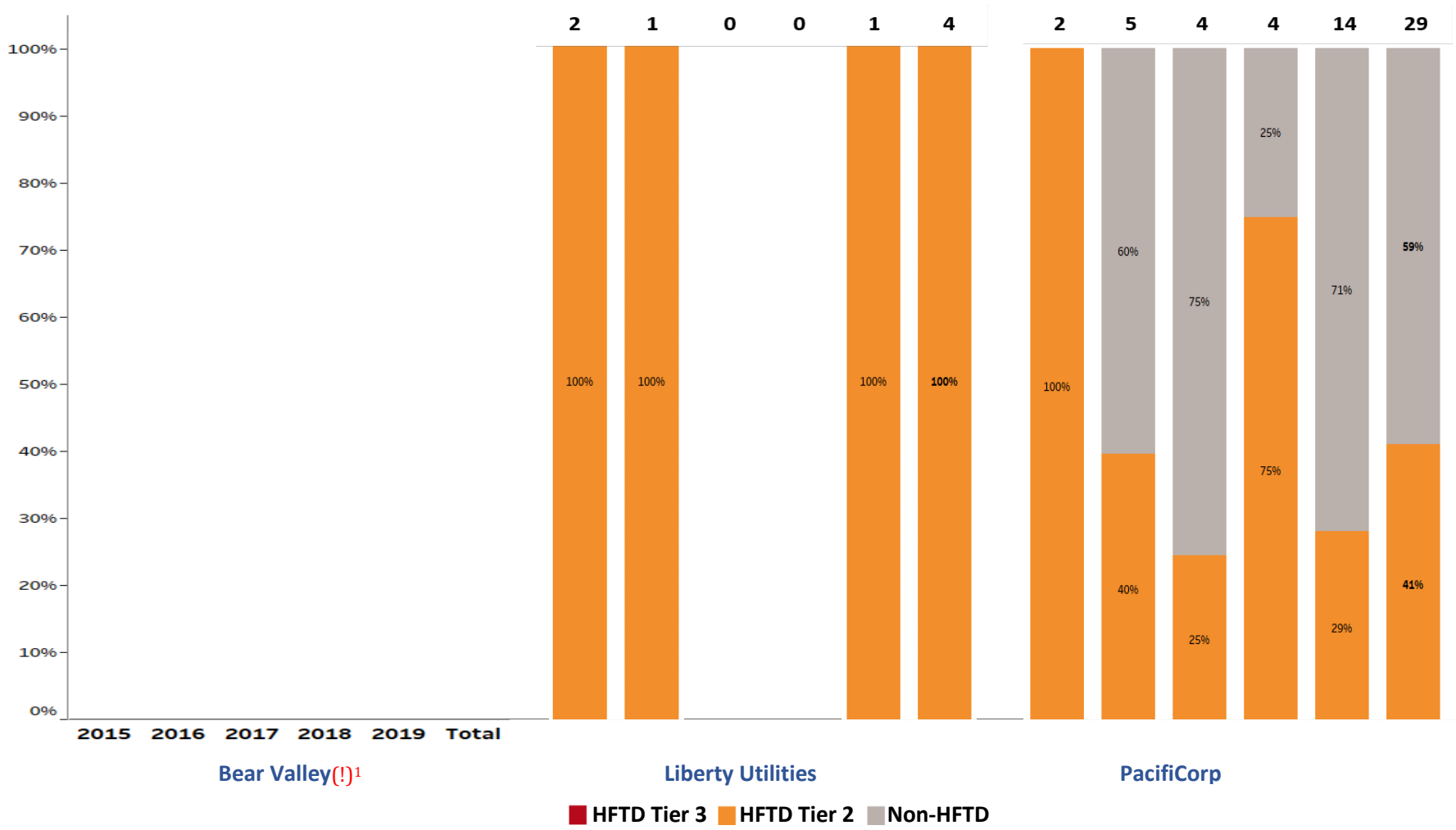
Source: Tables 11a and 11b from utility WMPs and data requests normalized by data from Table 13 of utility WMPs; PacifiCorp numbers adjusted to account for Tables 11c and 11d.

Figure 2.4a: Total ignitions by HFTD location (Large utilities)



Note: Ignitions in Zone 1 HFTD areas make up less than 1% of total ignitions.
Source: Table 2 from utility WMPs

Figure 2.4b: Total ignitions by HFTD location (Small utilities)

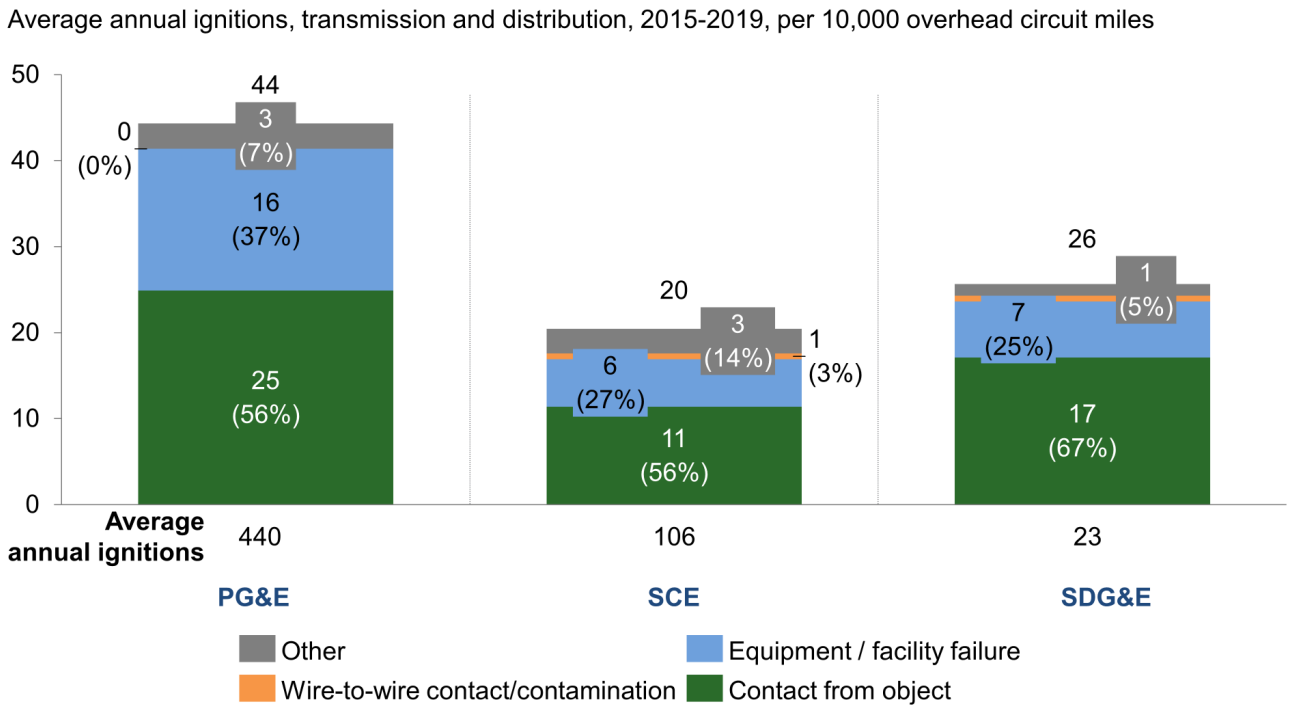


Note: Ignitions in Zone 1 HFTD areas make up less than 1% of total ignitions.

1. BVES submitted errata on 5/20/2020 that changed their WMP. Those updates are not reflected here (WSD analysis forthcoming).

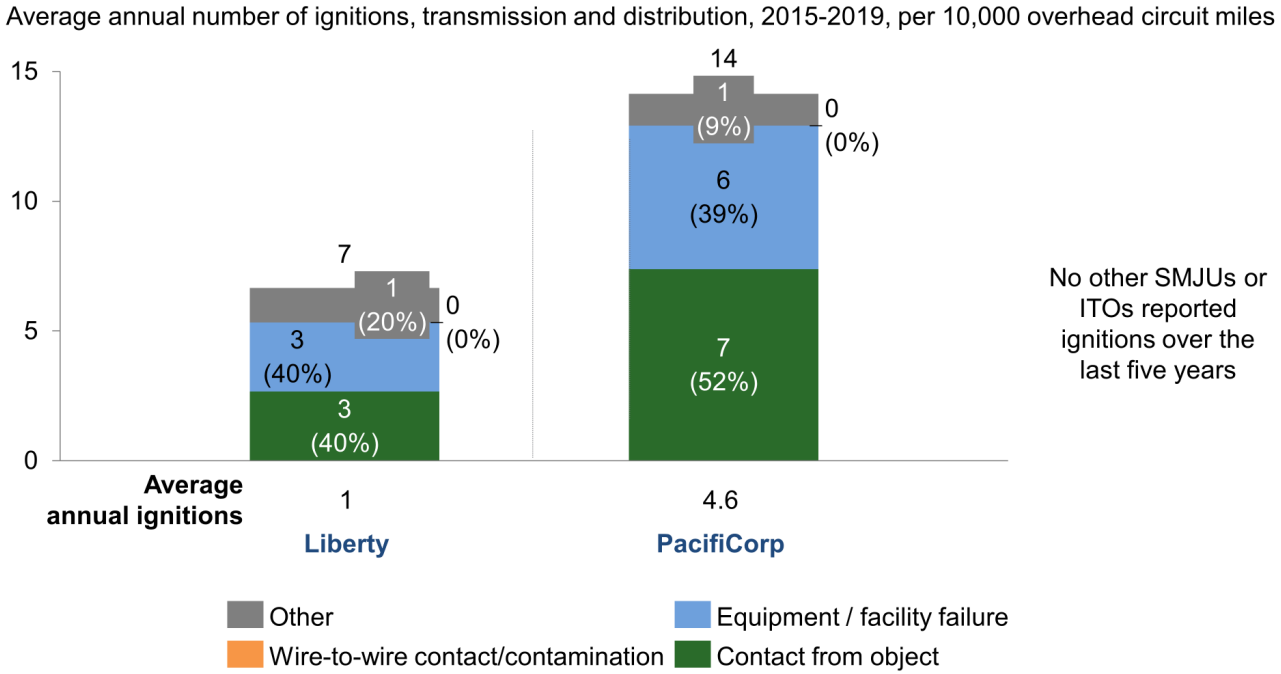
Source: Table 2 from utility WMPs

Figure 2.5a: Ignitions by ignition probability driver type (Large utilities)



Source: Tables 11a and 11b from utility WMPs and data requests normalized by data from Table 13 of utility WMPs; SDG&E equipment failure numbers adjusted to address inconsistencies in subtotal calculations provided.

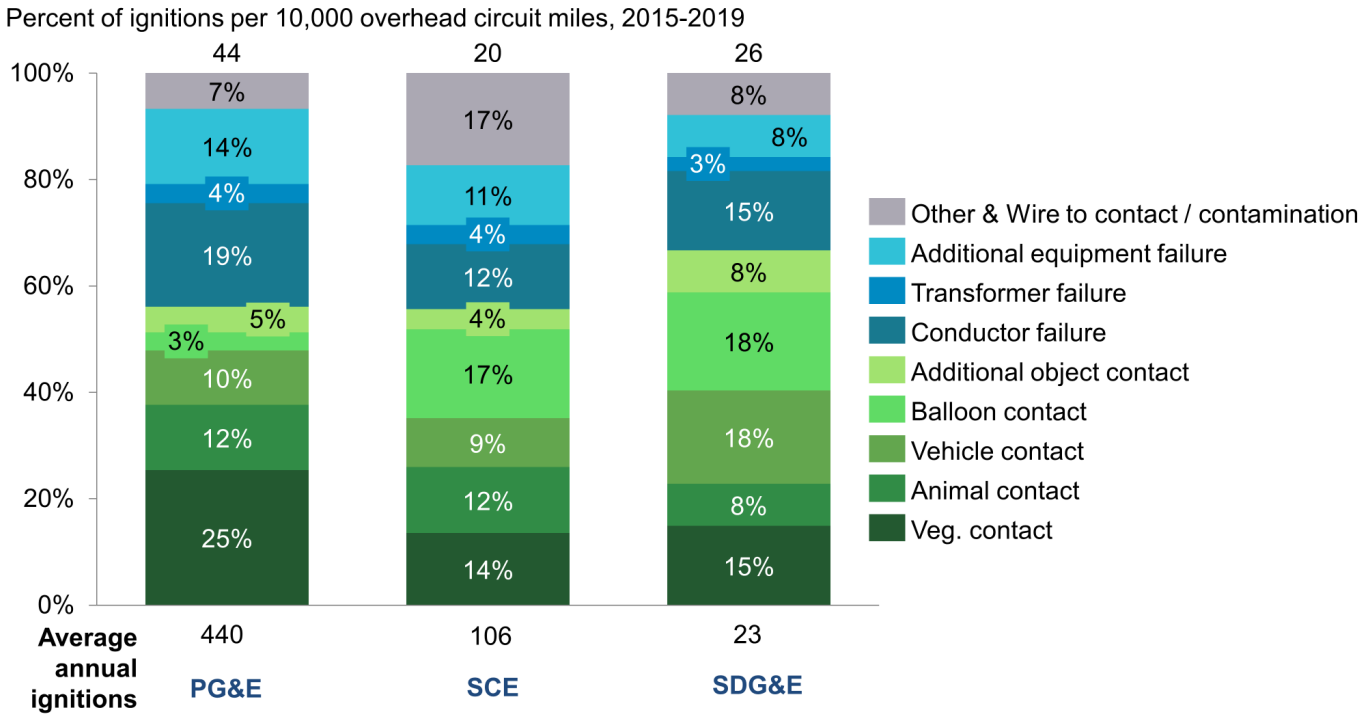
Figure 2.5b: Ignitions by ignition probability driver type (Small utilities)



Note: Since Liberty and PacifiCorp have less than 10,000 overhead circuit miles, their average number of total annual ignitions per 10,000 circuit miles is greater than their average number of total annual ignitions.

Source: Tables 11a and 11b from utility WMPs and data requests, normalized by data from Table 13 of utility WMPs; PacifiCorp numbers adjusted to account for Tables 11c and 11d.

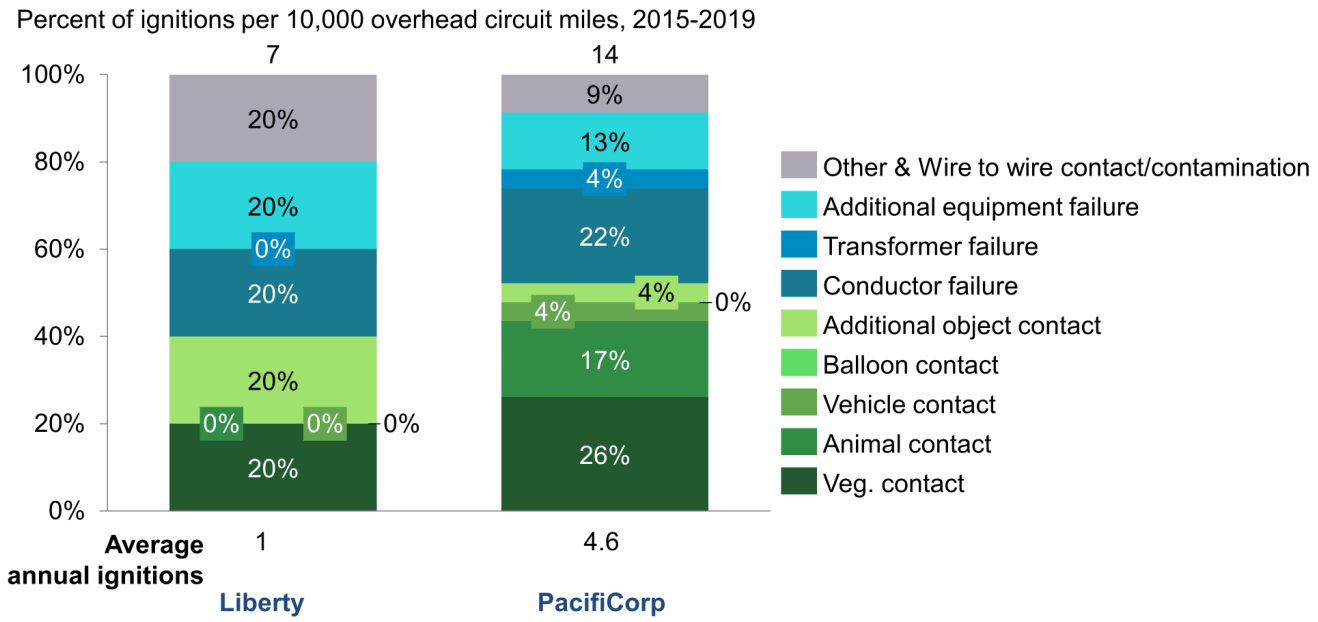
Figure 2.6a: Detail: Share of ignitions due to each ignition probability driver (Large utilities)



Note: Conductor failure includes conductor failure (as reported), splice, clamp and connector. Other includes wire to wire contact / contamination.

Source: Tables 11a and 11b from utility WMPs and data request normalized by data from Table 13 of utility WMPs; SDG&E equipment failure numbers adjusted to address inconsistencies in subtotal calculations provided. Since SDG&E has less than 10,000 overhead circuit miles, its average number of total annual ignitions per 10,000 circuit miles is greater than its average number of total annual ignitions.

Figure 2.6b: Detail: Share of ignitions due to each ignition probability driver (Small utilities)

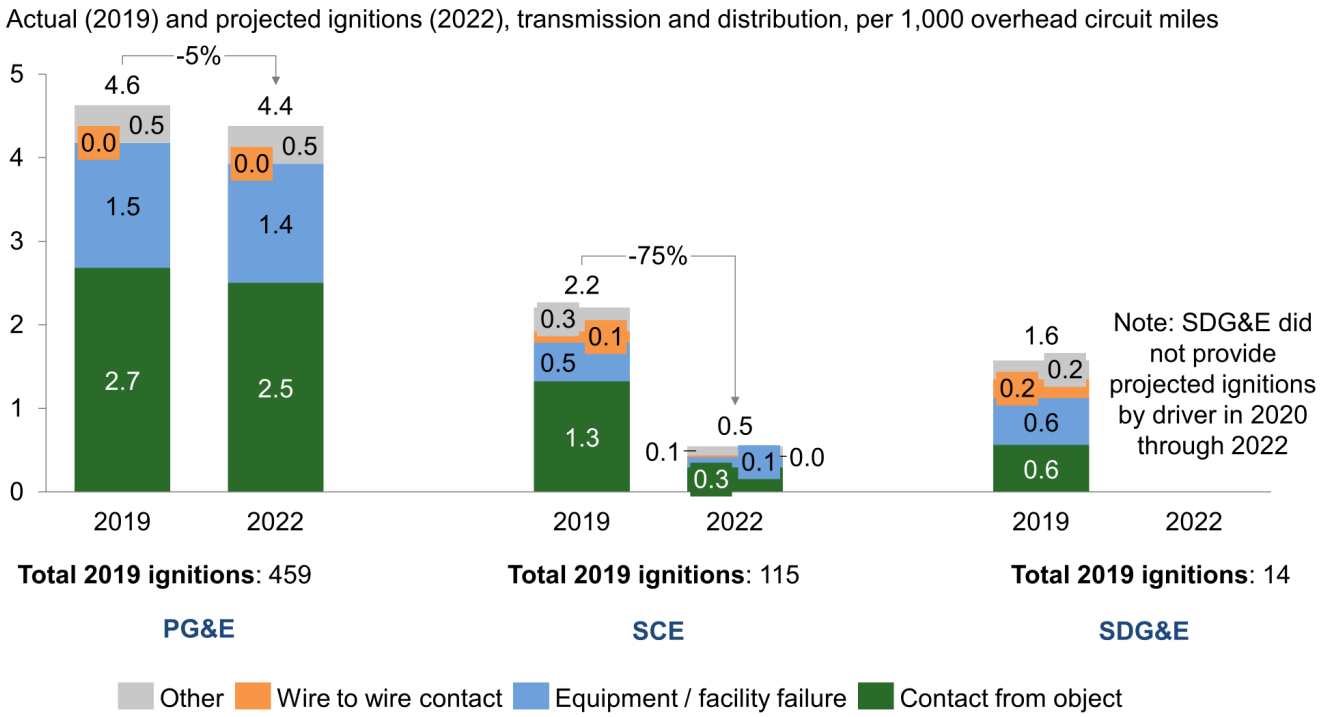


No other small utilities reported ignitions over the last five years

Note: Conductor failure includes conductor failure (as reported), splice, clamp and connector. Other includes wire-to-wire contact / contamination. Since Liberty and PacifiCorp have less than 10,000 overhead circuit miles, their average number of total annual ignitions per 10,000 circuit miles is greater than their average number of total annual ignitions.

Source: Tables 11a and 11b from utility WMPs and data requests, normalized by data from Table 13 of utility WMPs; PacifiCorp numbers adjusted to account for Tables 11c and 11d.

Figure 2.7a: Actual and projected ignitions for top ignition drivers, 2019 and 2022



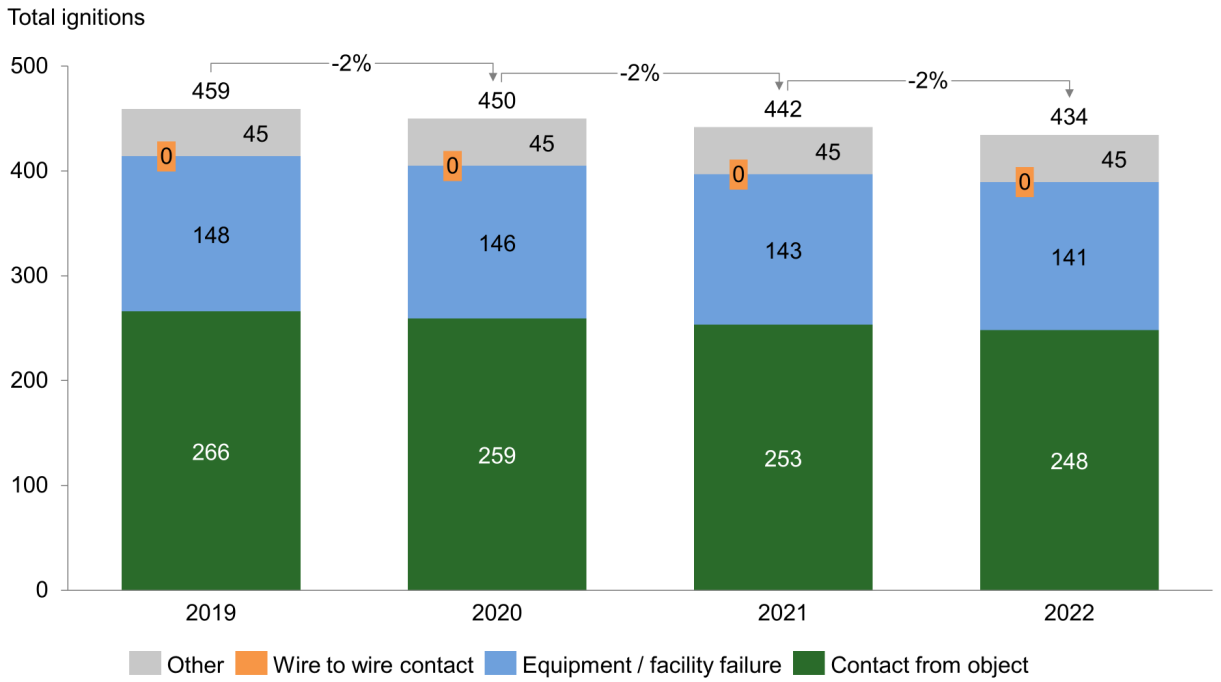
Note: Projections assume WMP implementation acording to plan and weather pattens consistent with 5 year historical average. See the 2020 WMP Guidelines for further detail.

Small utilities populated Table 31 either not at all or with all zeroes. Specifically: Horizon West Transmission left it blank as it did not yet have operational facilities when it submitted its 2020 WMP; Trans Bay Cable and Bear Valley Electric Service reported anticipating no ignitions (having seen no ignitions in the past 5 years); Liberty did not populate Table 31; PacifiCorp reported only a general reducing trend anticipated with no discrete data available.

Source: Tables 11a, 11b, 31a, and 31b from utility WMPs and data requests; SDG&E equipment failure numbers adjusted to address inconsistencies in subtotal calculations provided by SDG&E.

Figure 2.7b: PG&E Detail: Actual and projected ignitions for top ignition drivers, 2019 and 2022

Figure shows reported 2019 ignitions and projected future ignitions by driver category, for transmission and distribution

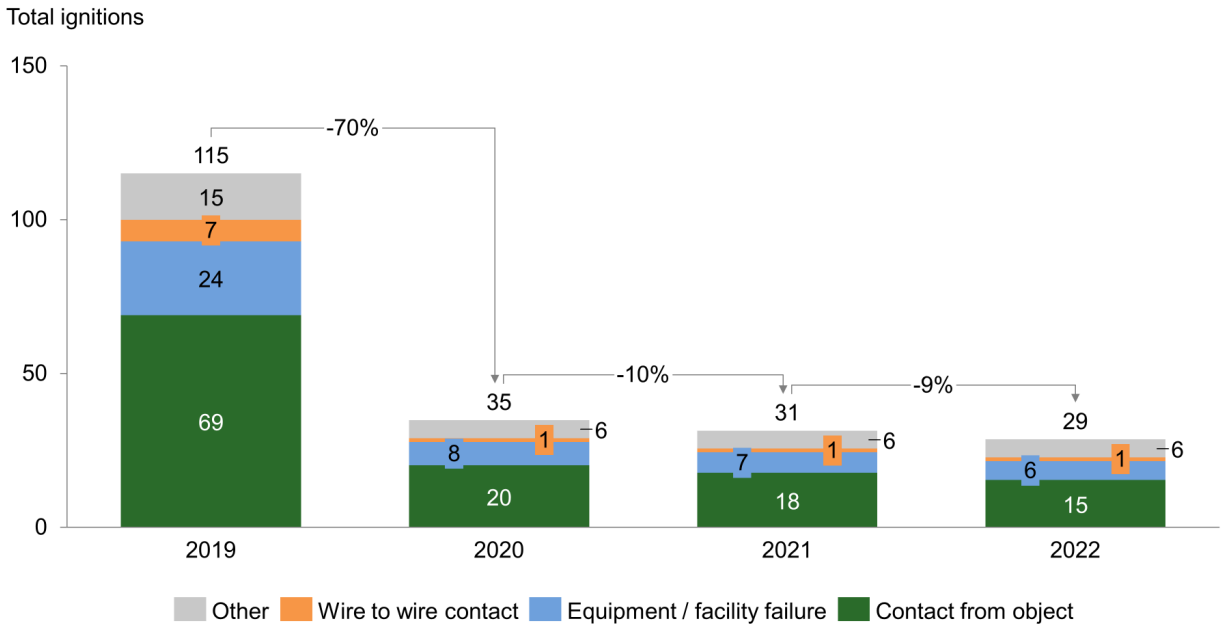


Note: Projections assume WMP implementation according to plan and weather patterns consistent with 5 year historical average. See the 2020 WMP Guidelines for more information on assumptions made.

Source: Tables 11a, 11b, 31a, and 31b from PG&E WMP and data requests

Figure 2.7c: SCE Detail: Actual and projected ignitions for top ignition drivers, 2019 and 2022

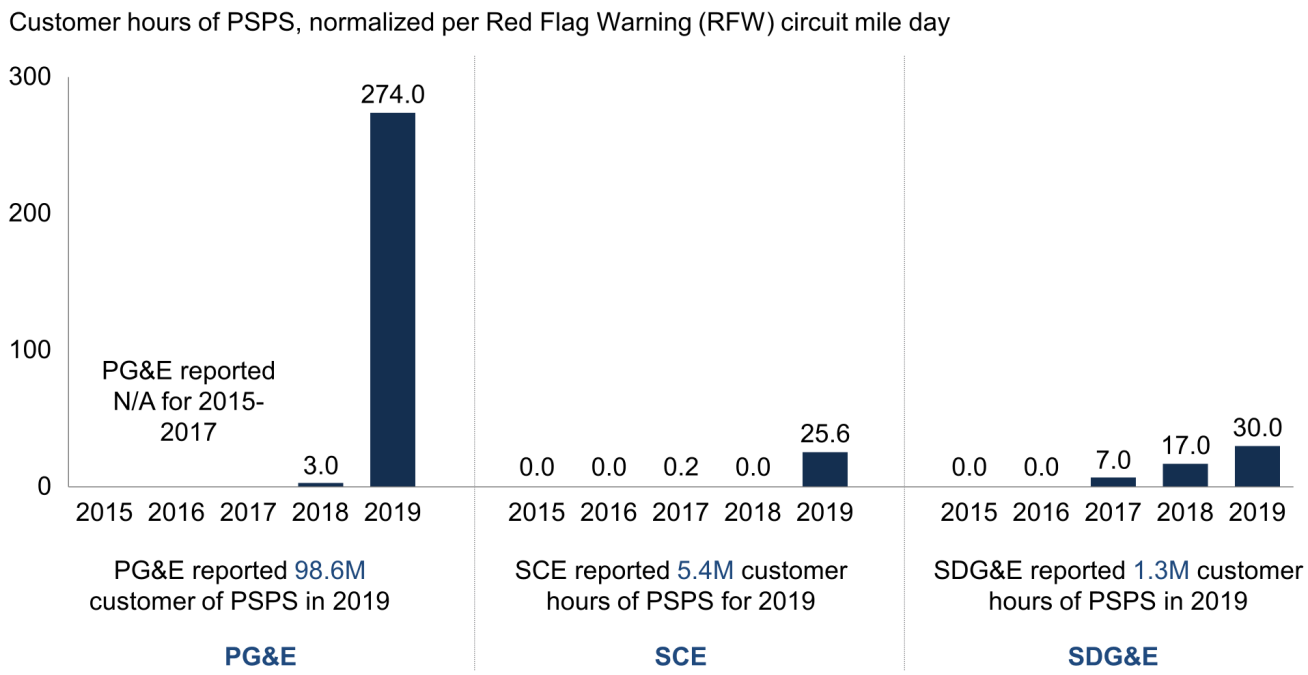
Figure shows reported 2019 ignitions and projected future ignitions by driver category, for transmission and distribution



Source: Tables 11a, 11b, 31a, and 31b from SCE WMP and data requests

Note: Projections assume WMP implementation according to plan and weather patterns consistent with 5 year historical average. See the 2020 WMP Guidelines for more information on assumptions made.

Figure 2.8a: Normalized PSPS duration in customer hours (Large utilities)

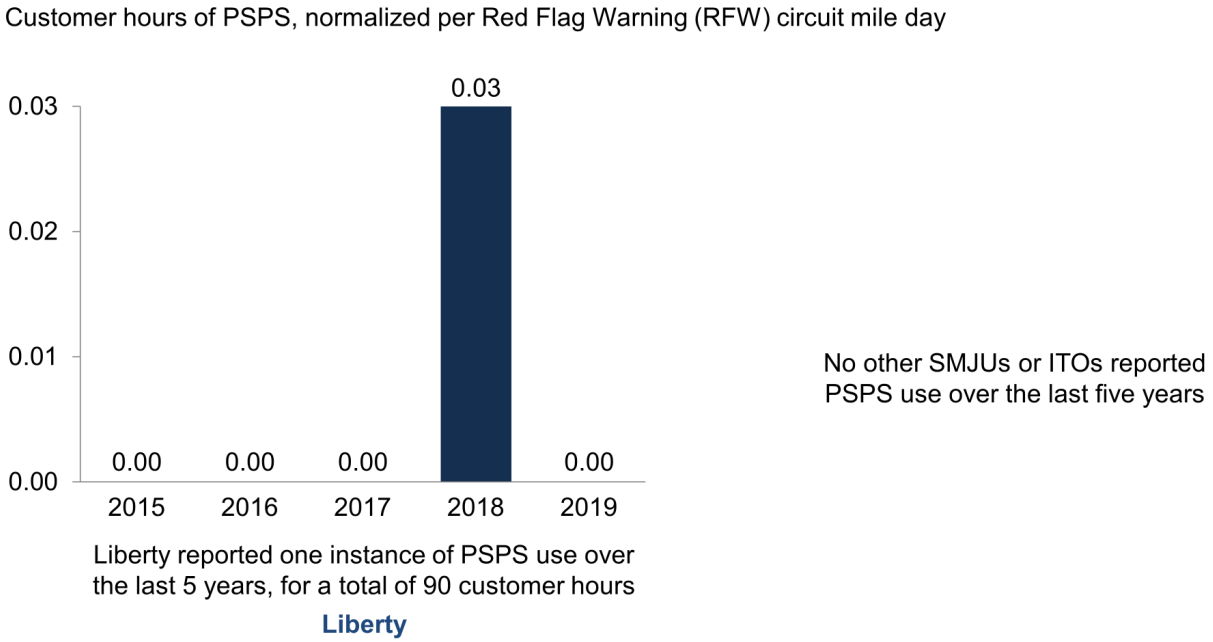


Note: Normalization using RFW circuit mile days helps take into account fire weather conditions based on a commonly used metric; more detail is necessary to address potential inconsistencies in how each utility calculates this figure. A "Red Flag Warning (RFW) Circuit Mile Day" is intended to capture the duration and scope of the fire weather that year and is calculated as the number of circuit miles that were under a RFW multiplied by the number of days those miles were under said RFW (per page 5 of the 2020 WMP Guidelines). For example, if 100 circuit miles were under a RFW for 1 day, and 10 of those miles were under RFW for an additional day, then the total RFW circuit mile days would be 110.

Utilities' ability to implement PSPS (including accurate predictions and customer communication) is captured in the Utility Wildfire Mitigation Maturity Model's "PSPS operating model and consequence mitigation" capability.

Source: Table 12 of utility WMPs.

Figure 2.8b: Normalized PSPS duration in customer hours (Small utilities)

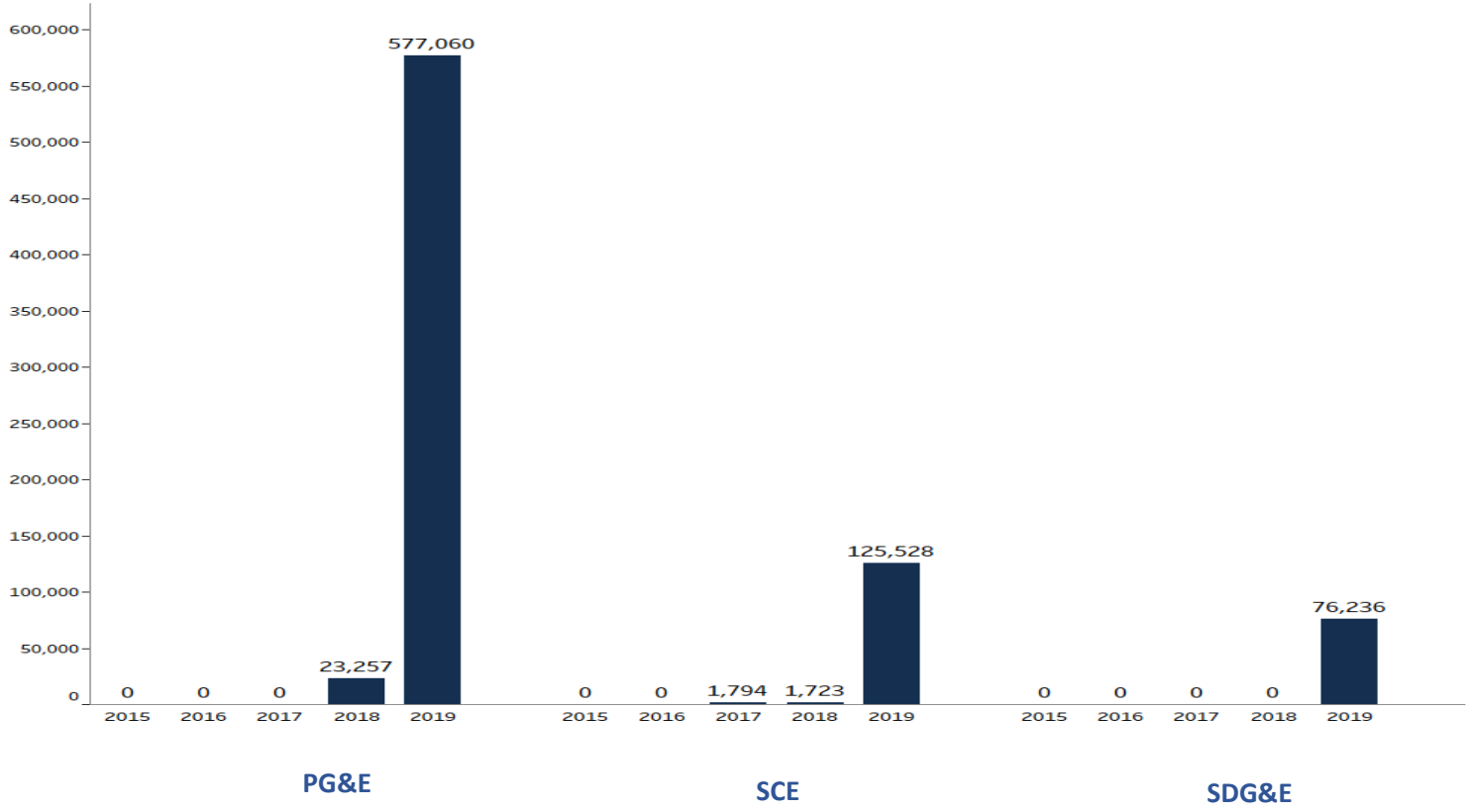


Note: Normalization using RFW circuit mile days helps take into account fire weather conditions based on a commonly used metric; more detail is necessary to address potential inconsistencies in how each utility calculates this figure. A "Red Flag Warning (RFW) Circuit Mile Day" is intended to capture the duration and scope of the fire weather that year and is calculated as the number of circuit miles that were under a RFW multiplied by the number of days those miles were under said RFW (per page 5 of the 2020 WMP Guidelines). For example, if 100 circuit miles were under a RFW for 1 day, and 10 of those miles were under RFW for an additional day, then the total RFW circuit mile days would be 110.

Utilities' ability to implement PSPS (including accurate predictions and customer communication) is captured in the Utility Wildfire Mitigation Maturity Model's "PSPS operating model and consequence mitigation" capability.

Source: Table 12 of utility WMPs.

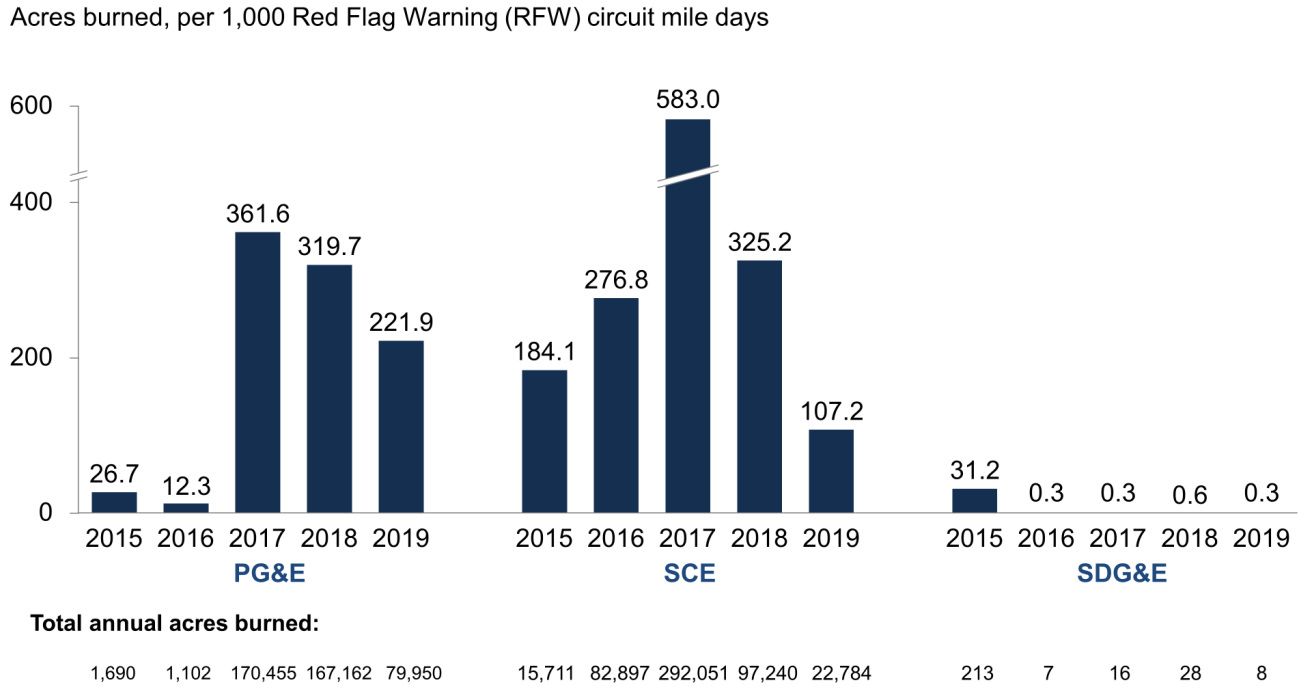
Figure 2.8c: PSPS impacts on critical infrastructure



Note: Count is based on number of critical infrastructure locations impacted per hour multiplied by hours offline per year

Source: Table 2 of utility WMPs

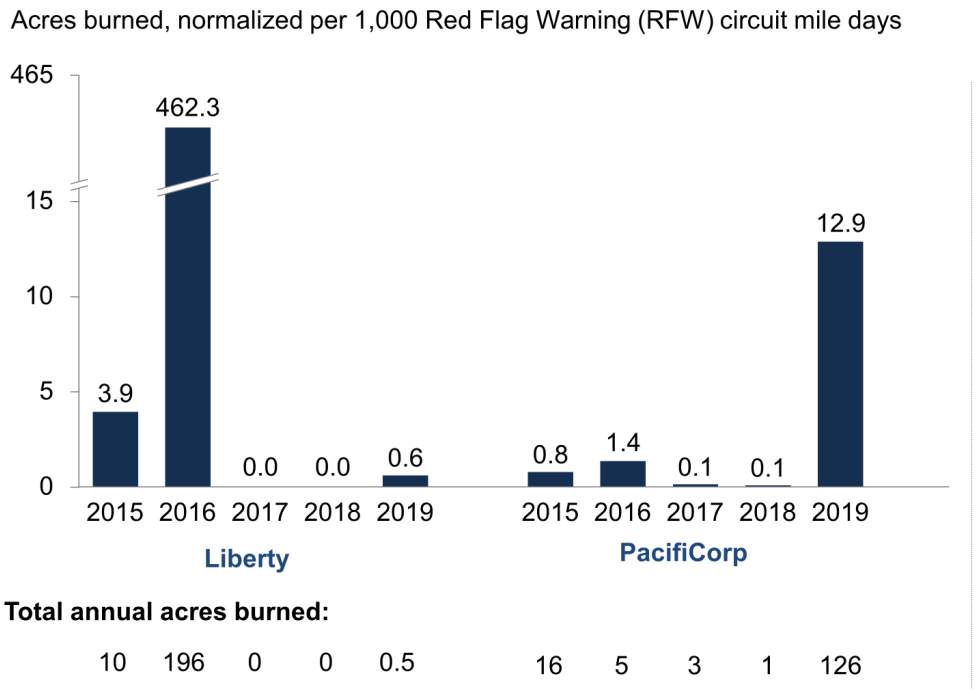
Figure 2.9a: Normalized area burned by utility ignited wildfire (Large utilities)



Note: Normalization using RFW circuit mile days helps take into account fire weather conditions based on a commonly used metric. A "Red Flag Warning (RFW) Circuit Mile Day" is intended to capture the duration and scope of the fire weather that year. It is defined on page 5 of the 2020 WMP Guidelines to be calculated as the number of circuit miles that were under a RFW multiplied by the number of days those miles were under said RFW. For example, if 100 circuit miles were under a RFW for 1 day, and 10 of those miles were under RFW for an additional day, then the total RFW circuit mile days would be 110. To address inconsistencies in how utilities normalized this metric in Table 2 of their WMPs, this table shows number of acres burned as reported in Table 2 normalized by RFW Circuit Mile Days as reported in Table 10.

Source: Table 2 and Table 10 of utility WMPs.

Figure 2.9b: Normalized area burned by utility ignited wildfire (Small utilities)

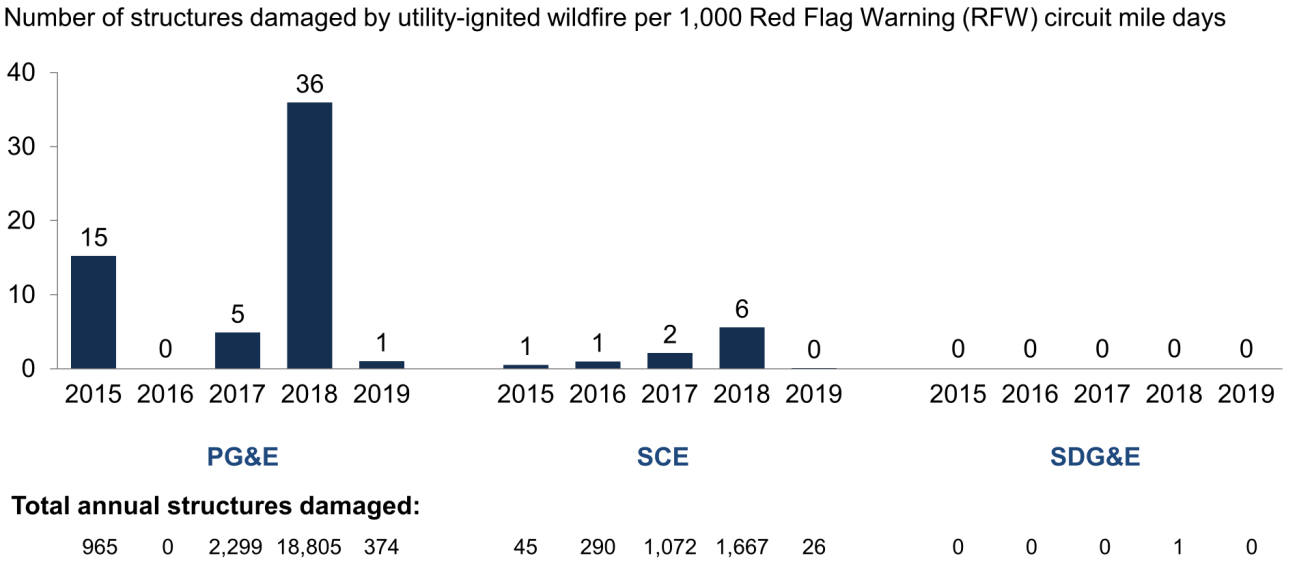


No other SMJUs or ITOs reported any area burned over the last 5 years

Note: Normalization using RFW circuit mile days helps take into account fire weather conditions based on a commonly used metric. A "Red Flag Warning (RFW) Circuit Mile Day" is intended to capture the duration and scope of the fire weather that year. It is defined on page 5 of the 2020 WMP Guidelines to be calculated as the number of circuit miles that were under a RFW multiplied by the number of days those miles were under said RFW. For example, if 100 circuit miles were under a RFW for 1 day, and 10 of those miles were under RFW for an additional day, then the total RFW circuit mile days would be 110. To address inconsistencies in how utilities normalized this metric in Table 2 of their WMPs, this table shows number of acres burned as reported in Table 2 normalized by RFW Circuit Mile Days as reported in Table 10.

Source: Table 2 and Table 10 of utility WMPs.

Figure 2.10: Number of structures damaged by utility ignited wildfire



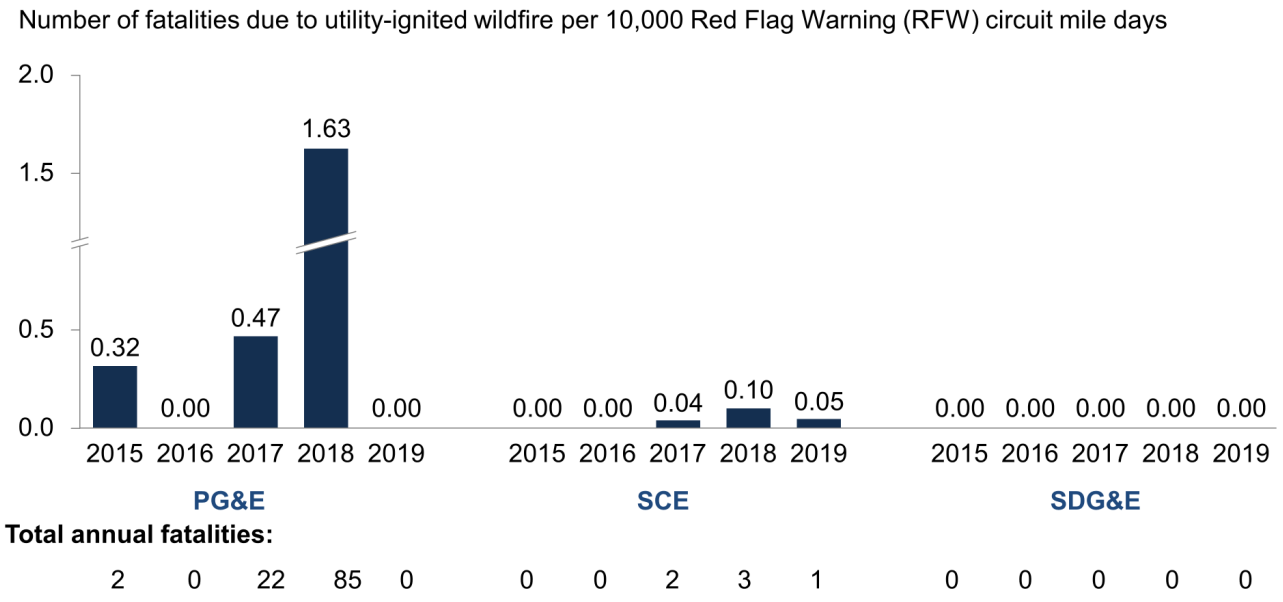
No SMJUs or ITOs reported number of structures damaged over the past 5 years

Note: Normalization using RFW circuit mile days helps take into account fire weather conditions based on a commonly used metric. A "Red Flag Warning (RFW) Circuit Mile Day" is intended to capture the duration and scope of the fire weather that year. It is defined on page 5 of the 2020 WMP Guidelines to be calculated as the number of circuit miles that were under a RFW multiplied by the number of days those miles were under said RFW. For example, if 100 circuit miles were under a RFW for 1 day, and 10 of those miles were under RFW for an additional day, then the total RFW circuit mile days would be 110.

This figure is shown for IOUs only because the smaller utilities did not report structures damaged in a comparable way. PacifiCorp reported the value of assets desroyed, rather than number of structures damaged; Liberty reported no homes destroyed, only 18 utility poles; and no other SMJUs or ITOs reported any structures damaged.

Source: Table 2 of utility WMPs.

Figure 2.11: Fatalities due to utility ignited wildfire



No SMJUs or ITOs reported fatalities due to utility ignited wildfire over the past 5 years

Note: Normalization using RFW circuit mile days helps take into account fire weather conditions based on a commonly used metric. A "Red Flag Warning (RFW) Circuit Mile Day" is intended to capture the duration and scope of the fire weather that year. It is defined on page 5 of the 2020 WMP Guidelines to be calculated as the number of circuit miles that were under a RFW multiplied by the number of days those miles were under said RFW. For example, if 100 circuit miles were under a RFW for 1 day, and 10 of those miles were under RFW for an additional day, then the total RFW circuit mile days would be 110.

Source: Table 2 of utility WMPs.

1.3 Resource Allocation

Figure 3.1a: Overview of total plan spend across utilities (Large utilities)

		PG&E	SCE	SDG&E
Total spend	2019 planned spend	$2,296M	$671M	$255M
	2019 actual spend	$2,999M	$1,557M	$307M
	2020 planned spend	$3,171M	$1,606M	$444M
	2021 planned spend	$3,130M	$1,404M	$445M
	2022 planned spend	$3,247M	$1,501M	$448M
	Total planned spend as for 2020, 2021 and 2022, as reported by utility	**$9,548M**	**$4,511M**	**$1,336M**[1]
Normalized spend	Total planned spend for 2020, 2021 and 2022 per overhead HFTD circuit mile	$307K	$318K	$291K

1. Totals for SDG&E include a calculation error on the part of SDG&E in which the sum of the reported spend for 2020, 2021, and 2022 is not equal to the reported total 2020-2022 planned spend. This error has not been corrected by the WSD in this table.

Note: "M" stands for millions, "K" stands for thousands.

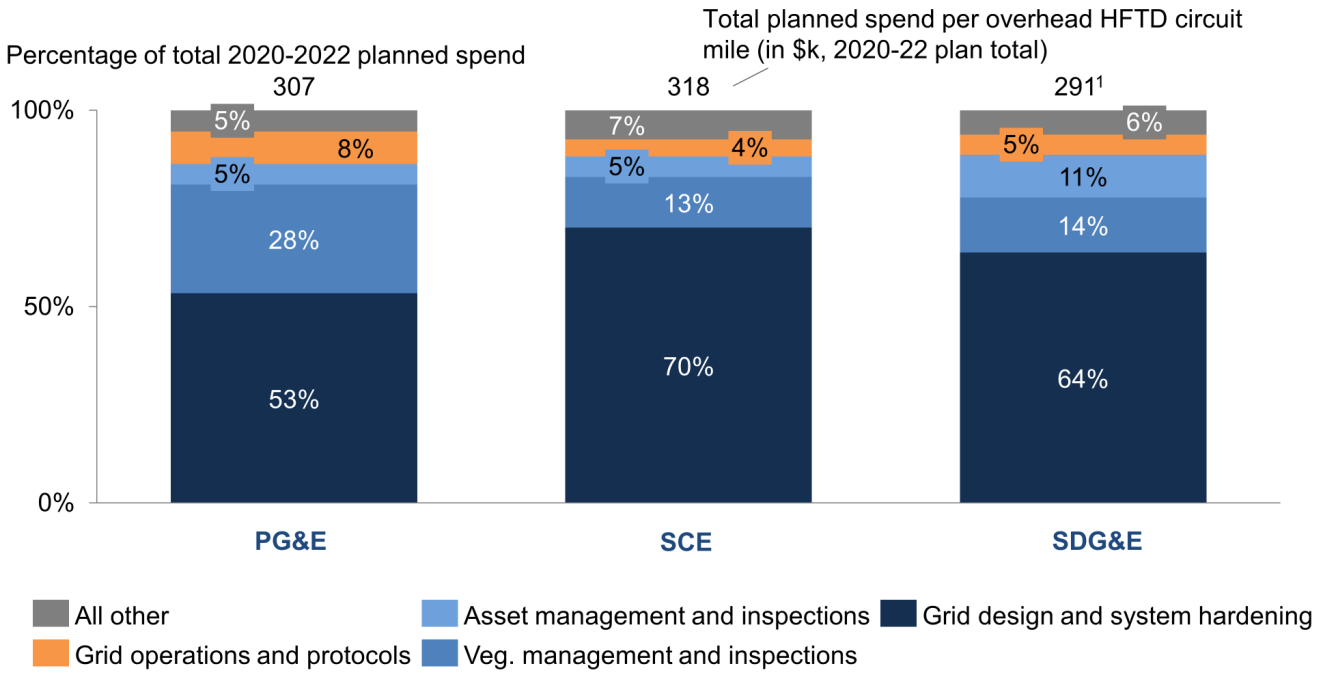
Source: Tables 21-30 from utility WMPs and data requests, normalized by data from Table 13 of utility WMPs

Figure 3.1b: Overview of total plan spend across utilities (Small utilities)

		Liberty	PacifiCorp	Bear Valley(!)[2]	Horizon West	Trans Bay Cable
Total spend	2019 planned spend	$4M	$1M	$12M	$0M	$0M
	2019 actual spend	$7M	$13M	$12M	$0M	$0M
	2020 planned spend	$30M	$26M	$84M	$4M	$0M
	2021 planned spend	$32M	$38M	$79M	$4M	$0M
	2022 planned spend	$27M	$37M	$79M	$0M	$0M
	Total planned spend as for 2020, 2021 and 2022, as reported by utility	**$88K[1]**	**$101M[1]**	**$247M[1]**	**$8M**	**$0M**
Normalized spend	Total planned spend for 2020, 2021 and 2022 per overhead HFTD circuit mile	$63K	$86K	$1,168K	NA – no operational facilities as of WMP submission	$0K

1. Totals for Liberty, PacifiCorp, and Bear Valley include calculation errors on the part of utilities in which the reported sum of the spend for 2020, 2021, and 2022 is not equal to the total reported 2020-2022 planned spend. This error has not been corrected by the WSD in this table.
2. BVES submitted errata on 5/20/2020 that changed their WMP. Those updates are not reflected here (WSD analysis forthcoming).
Note: "M" stands for millions, "K" stands for thousands.
Source: Tables 21-30 from utility WMPs and data requests, normalized by data from Table 13 of utility WMPs

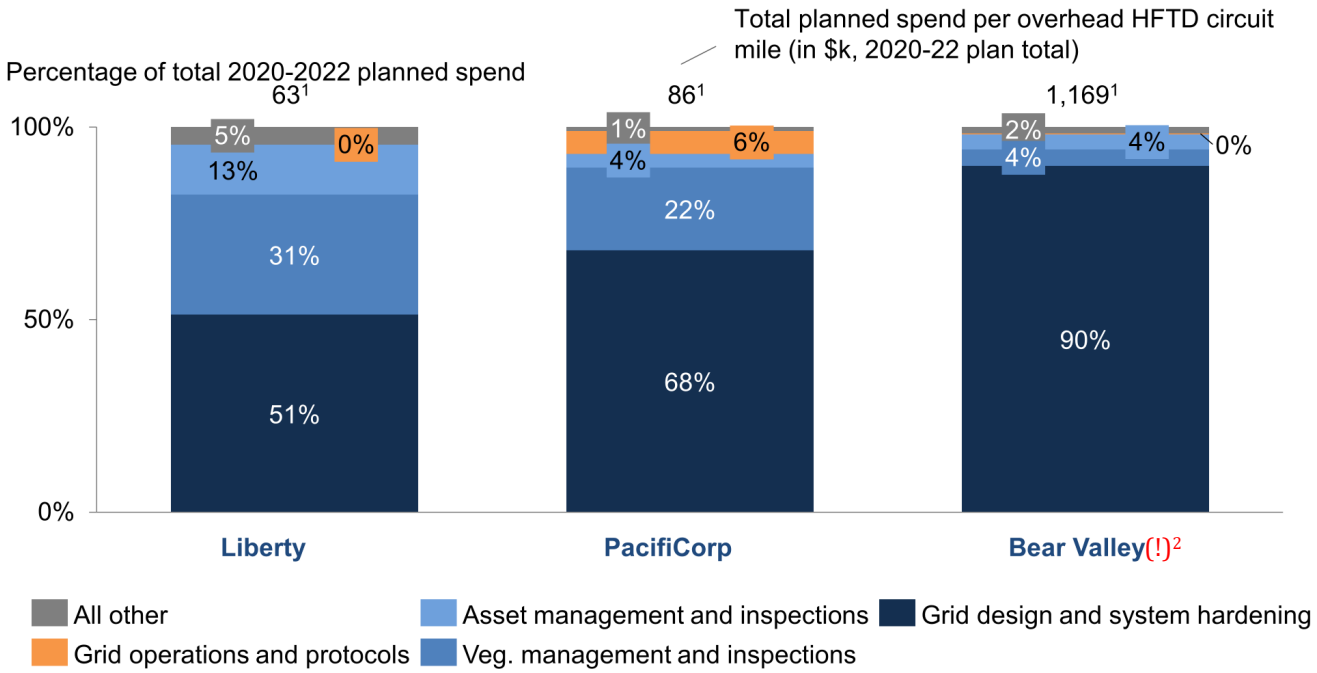
Figure 3.2a: Overview of total plan spend across utilities (Large utilities)



1. Totals for SDG&E include a calculation error on the part of SDG&E which has not been corrected by the WSD in this chart. Specifically, the sum of the reported spend for 2020, 2021, and 2022 is not equal to the reported total 2020-2022 spend as reported by SDG&E.

Source: Tables 21-30 from utility WMPs and data requests, normalized by data from Table 13 of utility WMPs

Figure 3.2b: Overview of total plan spend across utilities (Small utilities)



1. Totals for Liberty, PacifiCorp and Bear Valley include calculation errors on the part of those utilities which have not been corrected by the WSD in this chart. Specifically, the sum of the spend for 2020, 2021, and 2022 is not equal to the total 2020-2022 spend as reported by those utilities.

2. BVES submitted errata on 5/20/2020 that changed their WMP. Those updates are not reflected here (WSD analysis forthcoming).

Note: Spending for ITOs not shown here. Trans Bay Cable reports no planned spend. Horizon West Transmission (HWT) does not yet have operational facilities but reports up to $8M in planned spending, shown in HWT detailed appendix.

Source: Tables 21-30 from utility WMPs and data requests, normalized by data from Table 13 of utility WMPs

Figure 3.3a: Breakdown of planned spend by category (Large utilities)

Total plan spend is shown for 2020-2022 plan period as calculated by utility

	PG&E		SCE		SDG&E	
Category	**Total plan spend, $M**	**% of total**	**Total plan spend, $M**	**% of total**	**Total plan spend, $M**	**% of total**
Grid design / system hardening	5,102	53%	3,162	70%	853	64%
Vegetation mgt. and inspections	2,645	28%	583	13%	187	14%
Asset mgt. and inspections	499	5%	232	5%	146	11%
Grid operations and protocols	788	8%	198	4%	68[1]	5%
Data governance	177	2%	39	1%	1	0%
Situational awareness and forecasting	140	2%	90	2%	24	2%
Emergency planning and preparedness	114	1%	72	2%	18	1%
Stakeholder cooperation & community engagement	84	1%	0	0%	0	0%
Resource allocation methodology	0	0%	133	3%	26	2%
Risk assessment and mapping	0	0%	0	0%	14	1%
Total plan, 2020-2022	**9,548**	**100%**	**4,511**	**100%**	**1,336**	**100%**

1. SDG&E has reported an incorrect total (reported 2020-2022 total plan spend is not equal to the sum of planned 2020, 2021, and 2022 spend). This error has not been corrected by the WSD in this table.

Source: Tables 21-30 of utility WMPs

Figure 3.3b: Breakdown of planned spend by category (Small utilities)

Total plan spend is shown for 2020-2022 plan period as calculated by utility

	Liberty		PacifiCorp		Bear Valley(!)[2]	
Category	**Total plan spend, $M**	**% of total**	**Total plan spend, $M**	**% of total**	**Total plan spend, $M**	**% of total**
Grid design / system hardening	45	51%	68	68%	222[1]	90%
Vegetation mgt. and inspections	28	31%	22	22%	10	4%
Asset mgt. and inspections	11[1]	13%	4[1]	4%	10	4%
Grid operations and protocols	0	0%	6	6%	1	0%
Data governance	1	2%		0%	0	0%
Situational awareness and forecasting	2	2%	1	1%	4	2%
Emergency planning and preparedness	1	1%	0	0%	0	0%
Stakeholder cooperation & community engagement	0	0%	0	0%	0	0%
Resource allocation methodology	0	0%	0	0%	0	0%
Risk assessment and mapping	0	0%	0	0%	0	0%
Total plan, 2020-2022	**88**	**100%**	**101**	**100%**	**247**	**100%**

1. Totals for Liberty, PacifiCorp, and BVES include calculation errors on the part of utilities where reported 2020-2022 plan total spend is different from the sum of reported spend for 2020, 2021 and 2022. These errors have not been corrected by the WSD in this table.
2. BVES submitted errata on 5/20/2020 that changed their WMP. Those updates are not reflected here (WSD analysis forthcoming).

Source: Tables 21-30 of utility WMPs

Figure 3.4a: PG&E resource allocation detail for top 5 initiatives by planned spend

Total plan spend is shown for 2020-2022 plan period as calculated by utility

	Initiative	Category	Planned spend, $M						Initiative spend as percent of total planned spend
			2019 plan	2019 actual	2020 plan	2021 plan	2022 plan	2020-2022 plan total	
1	17-1. Updates to grid topology to minimize risk of ignition in HFTDs - System Hardening, Distribution	Grid design and system hardening	229	287	367	566	698	1,631	17%
2	15. Remediation of at-risk species - Enhanced Vegetation Management	Vegetation management and inspections	295	424	449	463	477	1,388	15%
3	15. Transmission tower maintenance and replacement	Grid design and system hardening	444	750	297	305	312	914	10%
4	6. Distribution pole replacement and reinforcement, including with composite poles	Grid design and system hardening	255	109	212	218	223	654	7%
5	12-4. Other corrective action - Distribution	Grid design and system hardening	322	167	200	205	210	614	6%
Total spend for top 5 initiatives by planned spend			**1,545**	**1,738**	**1,525**	**1,756**	**1,920**	**5,201**	**54%**

Source: Tables 21-30 of utility WMP

Figure 3.4b: PG&E resource allocation detail for top 4 categories by planned spend

Total plan spend is shown for 2020-2022 plan period as calculated by utility

Category	Total Category Planned Spend	Category spend as percent of total planned spend	Top 3 initiatives by planned spend in category Initiative names as reported in WMP	Initiative spend as percent of total planned spend
Grid design and system hardening	$5.1B	53%	17-1. System Hardening, Distribution	17%
			15. Transmission tower maintenance and replacement	10%
			6. Distribution pole replacement and reinforcement, including with composite poles	7%
Vegetation management and inspections	$2.6B	28%	15. Remediation of at-risk species-Enhanced Veg Mgt.	15%
			2. Detailed inspections of vegetation-Distribution	6%
			9. Other discretionary inspection of veg. around distribution lines and equipment, beyond those required by regulations	3%
Asset management of inspections	$499M	5%	1. Detailed inspections of distribution electric lines/equip.	3%
			2. Detailed inspections of transmission electric lines/equip.	2%
			15-1 Substation inspections - Transmission Substation	0%
Grid operations and protocols	$788M	8%	5-1. PSPS events and mitigation of PSPS impacts-Distribution	4%
			5-3. PSPS events and mitigation of PSPS impacts - Additional PSPS Mitigation Initiatives, Distribution	2%
			2. Crew-accompanying ignition prevention and suppression resources and services	1%

Note: "M" stands for millions, "B" stands for billions.

Source: Tables 21-30 of utility WMP

Figure 3.5a: SCE resource allocation detail for top 5 initiatives by planned spend

Total plan spend is shown for 2020-2022 plan period as calculated by utility

	Initiative	Category	Planned spend, $M						Initiative spend as percent of total planned spend
			2019 plan	2019 actual	2020 plan	2021 plan	2022 plan	2020-2022 plan total	
1	3.1. Covered conductor installation: covered conductor (SH-1)	Grid design and system hardening	42	240	454	656	772	1,883	42%
2	12.1. Other corrective action: distribution remediation (SH-12.1)	Grid design and system hardening	192	395	328	125	85	538	12%
3	20. Vegetation management to achieve clearances around electric lines and equipment	Vegetation management and inspections	76	247	76	64	61	201	4%
4	6.1. Distribution pole replacement and reinforcement, including with composite poles: composite poles and crossarms (SH-3)	Grid design and system hardening	5	Reported as "NA" - part of 3.1	57	64	74	194	4%
5	16.1. Removal and remediation of trees with strike potential to electric lines and equipment: hazard tree (VM-1)	Vegetation management and inspections	57	15	54	59	72	186	4%
Total spend for top 5 initiatives by planned spend			**372**	**897**	**969**	**969**	**1063**	**3002**	**67%**

Source: Tables 21-30 of utility WMP

Figure 3.5b: SCE resource allocation detail for top 4 categories by planned spend

Total plan spend is shown for 2020-2022 plan period as calculated by utility

Category	Total Category Planned Spend	Category spend as percent of total planned spend	Top 3 initiatives by planned spend Initiative names in some cases abbreviated to fit in this table	Initiative spend as percent of total plan spend
Grid design and system hardening	$3.1B	70%	3.1. Covered conductor installation: covered conductor	42%
			12.1. Other corrective action: Distribution remediation	12%
			6.1. Distribution pole replacement and reinforcement, including with composite poles: Composite poles and crossarms	4%
Vegetation management and inspections	$583M	13%	20. Vegetation management to achieve clearances around electric lines and equipment	4%
			16.1. Removal and remediation of trees with strike potential to electric lines and equipment: Hazard tree	4%
			16.2. Removal and remediation of trees with strike potential to electric lines and equipment: DRI quarterly inspections and tree removals	2%
Asset management of inspections	$232M	5%	9.2. Distribution aerial inspections	2%
			15. Substation inspections	1%
			10.2. Transmission aerial inspections	1%
Grid operations and protocols	$198M	4%	5.8. PSPS events and mitigation of PSPS impacts: SGIP resiliency	3%
			5. PSPS events and mitigation of PSPS impacts	0%
			5.3. PSPS events and mitigation of PSPS impacts: income qualified critical care (IQCC) customer battery backup incentive program	0%

Source: Tables 21-30 of utility WMP

Figure 3.6a: SDG&E resource allocation detail for top 5 initiatives by planned spend

Total plan spend is shown for 2020-2022 plan period as calculated by utility

	Initiative	Category	Planned spend, $M						Initiative spend as percent of total plan spend
			2019 plan	2019 actual	2020 plan	2021 plan	2022 plan	2020-2022 plan total	
1	Undergrounding of Electric Lines and/or Equipment	Grid design and system hardening	2	5	31	157	188	376	28%
2	Distribution Overhead Fire Hardening (OH)	Grid design and system hardening	75	121	87	12	7	106	8%
3	LTE Communication Network	Grid design and system hardening	11	7	32	32	42	105	8%
4	Tree Trimming	Vegetation management and inspections	Not provided[1]	34	28	28	28	83	6%
5	Drone Inspections (O&M) – Engr and construction	Asset management and inspections	Listed "NA"	Listed "NA"	27	24	20	71	5%
Total spend for top 5 initiatives by planned spend			**88**	**166**	**204**	**253**	**284**	**741**	**55%**

1. Incorporated into 2019 base costs.

Source: Tables 21-30 of utility WMP

Figure 3.6b: SDG&E resource allocation detail for top 4 categories by planned spend

Total plan spend is shown for 2020-2022 plan period as calculated by utility

Category	Total Category Planned Spend	Category spend as percent of total planned spend	Top 3 initiatives by planned spend Initiative names as reported in WMP	Initiative spend as percent of total planned spend
Grid design and system hardening	$853M	64%	Undergrounding of Electric Lines and/or Equipment	28%
			Distribution Overhead Fire Hardening (OH)	8%
			LTE Communication Network	8%
Vegetation management and inspections	$187M	14%	Tree Trimming	6%
			Enhanced Inspections Patrols and Trimming	5%
			Pole Brushing	1%
Asset management of inspections	$146M	11%	Drone Inspections (O&M) *Engineering & Construction	5%
			Drone Inspections (O&M) *Flights & Assessments	4%
			Drone Inspections (capital)	1%
Grid operations and protocols	$68M	5%	Aviation Firefighting Program (O&M)	2%
			Aviation Firefighting Program (Capital)	2%
			Communication Practices (O&M)[1]	1%

1. Totals for SDG&E include a calculation error on the part of SDG&E in which the sum of the reported spend for 2020, 2021, and 2022 is not equal to the reported total 2020-2022 planned spend. This error has not been corrected by the WSD in this table.

Note: "M" stands for millions

Source: Tables 21-30 of utility WMP

Figure 3.7: Liberty resource allocation detail for top 5 initiatives by planned spend

Total plan spend is shown for 2020-2022 plan period as calculated by utility

	Initiative	Category	Planned spend, $M						Initiative spend as percent of total plan spend
			2019 plan	2019 actual	2020 plan	2021 plan	2022 plan	2020-2022 plan total	
1	Covered Conductor Installation	Grid design and system hardening	1	1	3	8	10	21	24%
2	Remediation of at-risk-species	Vegetation management and inspections	0	5	5	5	5	14	16%
3	13. Pole loading infrastructure hardening and replacement program based on pole loading assessment program	Grid design and system hardening	1	1	2	3	4	8	9%
4	Undergrounding electric lines and/or equipment	Grid design and system hardening	0	0	2	6	0	8	9%
5	Fuel management and reduction of "slash" from vegetation management activities	Vegetation management and inspections	0	0	2	3	3	7	8%
Total spend for top 5 initiatives by planned spend			**2**	**6**	**13**	**24**	**21**	**58**	**66%**

Note: "M" stands for millions.

Source: Tables 21-30 of utility WMP

Figure 3.8: PacifiCorp resource allocation detail for top 5 initiatives by planned spend

Total plan spend is shown for 2020-2022 plan period as calculated by utility

	Initiative	Category	Planned spend, $M						Initiative spend as percent of total plan spend
			2019 plan	2019 actual	2020 plan	2021 plan	2022 plan	2020-2022 plan total	
1	3b. Covered conductor installation - distribution	Grid design and system hardening	0	0	8	11	12	31	31%
2	6b. Transmission pole replacement and reinforcement, including with composite poles	Grid design and system hardening	0	0	4	4	4	12	12%
3	3. Covered conductor installation - transmission	Grid design and system hardening	0	0	0	6	6	12	12%
4	20. Vegetation management to achieve clearances around electric lines and equipment	Vegetation management and inspections	0	4	3	3	3	10	10%
5	6. Distribution pole replacement and reinforcement, including with composite poles	Grid design and system hardening	0	0	0	3	3	5	5%
Total spend for top 5 initiatives by planned spend			**0**	**4**	**15**	**27**	**28**	**70**	**70%**

Note: "M" stands for millions.

Source: Tables 21-30 of utility WMP

Figure 3.9: Bear Valley resource allocation detail for top 5 initiatives by planned spend(!)[1]

Total plan spend is shown for 2020-2022 plan period as calculated by utility

	Initiative	Category	Planned spend, $M						Initiative spend as percent of total plan spend
			2019 plan	2019 actual	2020 plan	2021 plan	2022 plan	2020-2022 plan total	
1	16. Undergrounding of electric lines and/or equipment (35 kV system)	Grid design and system hardening	0	0	39	39	39	118	27%
2	16. Undergrounding of electric lines and/or equipment (4 kV system)	Grid design and system hardening	0	0	13	13	13	40	9%
3	18. Other / not listed (Covering overhead conductor)	Grid design and system hardening	0	0	4	4	4	11	2%
4	2. Detailed inspections of vegetation around distribution electric lines and equipment	Vegetation management and inspections	3	3	3	3	3	10	2%
5	20. Other / not listed (energy storage facility)	Grid design and system hardening	0	0	0	5	5	9	2%
Total spend for top 5 initiatives by planned spend			**3**	**3**	**59**	**64**	**64**	**187**	**43%**

1. BVES submitted errata on 5/20/2020 that changed their WMP. Those updates are not reflected here (WSD analysis forthcoming).

Note: "M" stands for millions.

Source: Tables 21-30 of utility WMP

Figure 3.10: Horizon West Transmission allocation detail for all planned initiatives

Total plan spend is shown for 2020-2022 plan period as calculated by utility. Horizon West reported only four initiatives with allocated spend

	Upper range[1] of planned spend, $M						
Initiative	2019 plan	2019 actual	2020 plan	2021 plan	2022 plan	2020-2022 plan total	**Initiative spend as percent of total plan spend**
SVC Site Hardening	0.00	0.00	2.20	4.30	0.00	6.50	77%
Underground of 115 feet of overhead line	0.00	0.00	1.70	0.00	0.00	1.70	20%
Advanced weather monitoring, weather stations and OH line/pole cameras	0.00	0.00	0.15	0.00	0.00	0.15	2%
Inspections (Training, facility, vegetation, and fuel modification)	0.00	0.00	0.04	0.04	0.04	0.11	1%
Total 2020-2022 planned spend	**0.00**	**0.00**	**4.09**	**4.34**	**0.04**	**8.46**	**100%**

1. For some initiatives, Horizon West reported a range of possible future spend. The higher number in that reported range is displayed in this table.

Note: "M" stands for millions.

Source: Tables 21-30 of utility WMP

(End of Appendix B)

APPENDIX C

Glossary of Terms

Glossary of Terms

Term	Definition
AB	Assembly Bill
AFN	Access and Functional Needs
ALJ	Administrative Law Judge
BVES	Bear Valley Electric Service
CAISO	California Independent System Operator
Cal Advocates	Public Advocate's Office
CAL FIRE	California Department of Forestry and Fire Protection
CEJA	California Environmental Justice Alliance
CNRA	California Natural Resources Agency
D.	Decision
DFA	Distribution Fault Attribution
EBMUD	East Bay Municipal Utility District
EFD	Early Fault Detection
EPIC	Electric Program Investment Charge
EPUC	Energy Producers and Users Coalition
EVM	Enhanced Vegetation Management
FERC	Federal Energy Regulatory Commission
FGDC	Federal Geographic Data Committee
FIRIS	Fire Integrated Real Time Intelligence System
FMEA	Failure Modes and Effects Analysis
FPI	Fire Potential Index
GIS	Geographic Information Systems
GO	General Order
GPI	Green Power Institute
GRC	General Rate Case
HFRA	High Fire Risk Area
HFTD	High Fire Threat District
Horizon West	Horizon West Transmission
HWT	Horizon West Transmission
I.	Investigation
ICS	Incident Command System
ICS	Incident Command Structure
IOU	Investor Owned Utility
ISA	International Society of Arboriculture
ITO	Independent Transmission Operator
IVM	Integrated Vegetation Management Plan
IVR	Interactive Voice Response
JIS	Joint Information System
kV	Kilovolt
Liberty	Liberty Utilities / CalPeco Electric
LiDAR	Light Detection and Ranging
LTE	Long-Term Evolution
Maturity Model	Utility Wildfire Mitigation Maturity Model
MAVF	Multi-Attribute Value Function
MGRA	Mussey Grade Road Alliance
MMAA	Mountain Mutual Aid Association
NERC	North American Electric Reliability Corporation
NFDRS	National Fire Danger Rating System
OCFA	Orange County Fire Authority
OEIS	Office of Energy Infrastructure Safety
OP	Ordering Paragraph
OPW	Outage Producing Winds
PG&E	Pacific Gas and Electric Company
PLP	Pole Loading Assessment Program
PMO (PacifiCorp)	Project Management Office
PMO (SCE)	Public Safety Program Management Office
PMU	Phasor Measurement Unit
POC	Protect Our Communities Foundation
PRC	Public Resources Code
PSPS	Public Safety Power Shutoff
QA	Quality Assurance
QC	Quality Control
R.	Rulemaking

Glossary of Terms

Term	Definition
RAMP	Risk Assessment and Management Phase
RAR	Remote Automatic Reclosers
RBDM	Risk-Based Decision Making
RCP	Remedial Compliance Plan
RCRC	Rural Counties of California Representatives
REFCL	Rapid Earth Fault Current Limiter
RFW	Red Flag Warning
RSE	Risk Spend Efficiency
SB	Senate Bill
SCADA	Supervisory Control and Data Acquisition
SCE	Southern California Edison Company
SDG&E	San Diego Gas & Electric Company
S-MAP	Safety Model Assessment Proceeding
SMJU	Small and Multijurisdictional Utility
SUI	Wildland-Urban Interface
SWATI	Santa Ana Wildfire Threat Index
TAT	Tree Assessment Tool
TBC	Trans Bay Cable
TURN	The Utility Reform Network
USFS	United States Forest Service
WMP	Wildfire Mitigation Plan
WRRM	Wildfire Risk Reduction Model
WSAB	Wildfire Safety Advisory Board
WSD	Wildfire Safety Division
WSIP	Wildfire Safety Inspection Program

(End of Appendix C)