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SPONSOR/WITNESS: PacifiCorp/Brian King
DESCRIPTION: ALJ Ruling on Wildfire Mitigation Plan Templates and Related Material and Allowing Comment with Attachments 1-5 (Dec. 16, 2019)
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ALJ: GERALD F. KELLY

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BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Implement Electric Utility Wildfire Mitigation Plans Pursuant to Senate Bill 901 (2018).	Rulemaking 18-10-007

ADMINISTRATIVE LAW JUDGE'S RULING ON WILDFIRE MITIGATION PLAN TEMPLATES AND RELATED MATERIAL AND ALLOWING COMMENT

This ruling seeks party review and comment on the proposed Wildfire Mitigation Plan (WMP) template(s) and other evaluative materials on which the Commission will rely in 2020. The Commission has developed a new process for submission and evaluation of electrical corporations' WMPs in 2020 that will use 2019 data as a baseline and use a "maturity model" to evaluate respondent electrical corporations' progress over time in mitigating the risk of catastrophic wildfire.[1]

Assembly Bill (AB) 1054 and AB 111 provide for a transition of the WMP work previously handled in a formal proceeding before an Administrative Law Judge to a process run by the newly created Wildfire Safety Division (WSD). In its first year of operation, the WSD will work from the attached materials, but the evaluation criteria for WMPs will continue to evolve over time. It is expected

[1] Respondent electrical corporations are Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas & Electric Company, Liberty Utilities (CalPeco Electric), Bear Valley Electric Service, a division of Golden State Water Company, and Pacific Power, a division of PacifiCorp, along with several Independent Transmission Owners identified in Decision 19-05-036.

that WSD's work in 2020 will result in lessons that cause further refinement of the process for subsequent years. Further, WSD may revise the attached material for evaluating and determining compliance with WMPs as it staffs up and gains experience with the WMP process. With that proviso, the following is an overview of the required contents of WMPs, data submissions, metrics, and the maturity model. Further information is provided in the attachments themselves.

Parties to this proceeding may comment on the matters raised in this ruling and its attachments no later than January 7, 2020, and comments shall not exceed 15 pages. For purposes of transparency, this ruling is being concurrently served on the Commission's Public Safety Power Shutoff (PSPS) /De-Energization proceeding, Rulemaking (R.) 18-12-005, and its Disaster Relief proceeding, R.18-03-011. Any stakeholder wishing to file comments in accordance with this ruling shall file them in R.18-10-007 as described below.

1. Utility WMP Submission Requirements and Wildfire Mitigation Evaluation

Pursuant to Senate Bill 901 (2018), the Commission has required electrical corporations[2] to submit WMPs assessing the level of wildfire risk and outlining their plans to address this risk. The WSD and Safety and Enforcement Division (SED) staff will determine whether or not the actions proposed by each utility are appropriate to address the level of risk identified and whether the plan will put the utility on a path to achieving the Commission's long-term wildfire risk reduction goals.

California's investor owned electric utilities submitted their first WMPs to the Commission in 2019. Based on lessons learned from the 2019

[2] While a few Independent Transmission Owners submitted WMPs, this ruling applies to electric investor owned utilities – that is, all respondents to this rulemaking except the Independent Transmission Owners.

submissions and the 2019 wildfire season, WSD and SED staff are implementing changes to the WMP process.

The revised WMP Guidelines represent a milestone in the evolution of the WMP process and are intended to aid in the evaluation of utilities' wildfire mitigation efforts and ensure consistency with the Commission's long-term wildfire goals.

The full set of materials includes the following documents:

1. **WMP Guidelines**, which include a long-term approach for the WMP review timeline, requirements for the utility filings, and a mapping of the WMP Guidelines to statutory requirements.
2. **Utility Wildfire Mitigation Maturity Model**, which describes a methodology and provides a framework that can be used to assess utility capabilities in reducing wildfire risk and corresponding maturity levels.
3. **Utility Survey**, which collects utility information relevant to the Utility Wildfire Mitigation Maturity Model.
4. **WMP Metrics**, which evaluate each utility's wildfire mitigation approach, progress, and results related to ongoing wildfire mitigation activities.
5. **Supplemental Data Request**, which outlines a broader set of data that the Commission is requesting from utilities and intends to formalize in requirements in the 2021 WMP process to evaluate utility plans, activities, and outcomes in greater detail.

As part of their 2020 WMP filing, due on February 7, 2020, utilities shall develop their WMPs by following these WMP Guidelines and complete the Utility Survey as an input to the maturity evaluation that WSD and SED staff will conduct using the Utility Wildfire Mitigation Maturity Model.

More detail about each attachment follows.

Attachment 1 - Utility Wildfire Mitigation Plan (WMP) Guidelines

The WMP is a standardized mechanism with which the Commission holds utilities accountable for reducing wildfire risk and reducing the use of PSPS events. In 2020, revised WMP Guidelines ensure that utilities submit relevant, sufficient and standardized data that allows reviewers to conduct thorough evaluations.

The detailed revisions to the WMP processes are found in the WMP Guidelines document, which achieves the following:

- Data disclosures are frontloaded by requiring utilities to submit data no later than the deadline for WMP submittal.
- Data collection is standardized using templates, which are provided throughout the WMP Guidelines. These templates require the structured disclosure of wildfire and PSPS-relevant data from the utilities in a format that is well-defined and comparable to facilitate assessment of wildfire mitigation activities and sharing of best practices both with other utilities and other agencies and stakeholders in California.
- Analysis of detailed and standardized data formats is enabled by requiring utilities to provide relevant attachments. For example, utilities are required to provide various maps in GIS formats to enable reviewers to visualize and analyze this data at a granular level, as needed.
- There is an emphasis on "risk spend efficiency" – maximizing the amount of risk reduction achieved per dollar spent. Utilities are required to quantify their planned investments and resources allocated to wildfire mitigation efforts and to disclose the expected impact using relevant outcome-based metrics.

The revised WMP Guidelines develop a focus on longer-term planning. While future guidelines will require iteration, this first revision is a step toward establishing a baseline understanding of the risk that each utility faces and enabling planning over the 3-year WMP cycle and beyond. In particular, the WMP Guidelines provide an outlook on longer-term investments and grid modernization necessary to reduce the probability of utility-caused ignitions and the potential consequences if such ignitions occur.

Attachment 2 and Attachment 3 - Utility Wildfire Mitigation Maturity Model and Utility Survey

Based on lessons learned from the 2019 WMP process, Commission staff developed a formalized evaluation framework called the Utility Wildfire Mitigation Maturity Model. The Utility Wildfire Mitigation Maturity Model describes capabilities and corresponding maturity levels. Furthermore, a Utility Survey is provided to collect utility information relevant to each utility's maturity.

Specifically, the Utility Wildfire Mitigation Maturity Model is being implemented by:

1. Identifying a set of utility wildfire mitigation capabilities that represent a comprehensive set of best practices in managing wildfire risks.
2. Assessing the baseline maturity of each utility by comparing its practices to an absolute reference established in the maturity model and using utility-reported data in the form of survey responses, which will be confirmed by additional data disclosures and audits, as needed.
3. Scoring each utility's targeted maturity advancement following the end of the 3-year WMP timeframe, based on the utility's WMP submission and survey.

4. Annually re-evaluating utility maturity to track progress against targeted maturity advancement.
5. Updating the maturity model as needed to drive improvement over the long-term.

This Utility Wildfire Mitigation Maturity Model is intended to provide the Commission and the public with a nuanced and objective view of the utility's wildfire mitigation capabilities and identify best practices that should be shared.

Attachment 4 - WMP Metrics

Going forward, a set of metrics will be introduced for evaluation of utility implementation of WMPs. The metrics are in development and will continue to evolve, but the attached document, titled WMP Metrics, lays out an initial set that was created based on workshops, party comments and metrics suggested in the Safety Model Assessment Proceeding (Application 15-05-002 *et al*).

There are two sets of WMP Metrics: Progress Metrics designed to track reductions of wildfire risk exposure and Outcome Metrics that track performance against related outcomes. Apart from these metrics, utilities are expected to develop a set of "Program Targets" to track implementation of the self-defined set of initiatives in their WMPs.

Progress Metrics track risk reduction activities in general and can be used to compare relative progress toward wildfire risk reduction. Progress Metrics were developed to ensure that the concrete steps utilities implement are demonstrably reducing and improving utilities' ability to manage wildfire and PSPS risk. Program Targets, by contrast, measure utility-specific WMP implementation progress against self-imposed targets outlined in submitted utility WMPs.

Outcome Metrics were developed to track performance against safety, property, affordability, reliability, sustainability and natural resources priorities. Outcome metrics include a combination of leading indicators (*e.g.*, wildfire near-misses from utility equipment failure) and lagging indicators (*e.g.*, number of fatalities due to utility-ignited wildfire).

Progress Metrics and Outcome Metrics are normalized, where applicable, by relevant factors to support comparison across years, different types of territory, and across utilities.

While all of the metrics proposed are relevant in tracking progress and outcomes toward reduced risk of utility-ignited wildfire and PSPS, some of the metrics rely on utilities collecting data from other agencies, including the California Department of Forestry and Fire Protection (CAL FIRE) and the California Governor's Office of Emergency Services (Cal OES).

Attachment 5 - Supplemental Data Request

A Supplemental Data Request (SDR) is being issued to the utilities as part of the 2020 WMP process but separate from the 2020 WMP Guidelines. In 2020, the utilities are requested to provide all data outlined in the SDR that they have available or can prepare ahead of the 2020 WMP submission. The WSD intends to provide an updated version of this SDR for use in 2021 and beyond.

The WMP Guidelines and all related documents are expected to evolve with input from stakeholders. In the meantime, the utilities shall use these WMP Guidelines for the development of their 2020 WMPs.

2. Comment Process

For purposes of transparency, this ruling is being concurrently served on the Commission's PSPS/De-Energization proceeding, R.18-12-005, and its Disaster Relief proceeding, R.18-03-011. Any stakeholder wishing to file comments in accordance with this ruling shall file them in R.18-10-007, this Wildfire Mitigation Plan proceeding. If such stakeholder is not a party to proceeding R.18-10-007 and wishes to file comments responsive to this ruling, the stakeholder shall file a motion for party status in R.18-10-007 in accordance with Commission rules along with its comments.

IT IS RULED that

1. Any party to Rulemaking 18-10-007 may file and serve comments on the contents of the Wildfire Mitigation Plan materials attached to this ruling no later than January 7, 2020. Such comments shall not exceed 15 pages.

2. Any stakeholder that is not a party to this proceeding (Rulemaking (R.) 18-10-007) that wishes to file comments shall file concurrently with their comments in proceeding R.18-10-007 a motion for party status in R.18-10-007 in accordance with Commission rules.

Dated December 16, 2019, at San Francisco, California.

/s/ SARAH R. THOMAS
Sarah R. Thomas
Administrative Law Judge

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ATTACHMENT 1

(WMP Guidelines)

Wildfire Mitigation Plan (WMP) Guidelines

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I. WMP submission and review process and timeline

The California Public Utilities Commission (henceforth the CPUC or the Commission) Guidance Decision (D.19-05-036) included substantive and procedural requirements for future plans based on lessons learned during the first WMP proceeding and established an expectation for improvement in the WMPs each year.

The experience of the 2019 WMP submission and review process points towards the benefit of greater structure and consistency in data, receiving supporting data earlier in the WMP process, and utilizing a structured and consistent approach to evaluate utility wildfire mitigation. Several guiding principles based on lessons learned inform the WMP Guidelines for 2020: frontloading the WMP review cycle where possible, standardizing information collection, and establishing a baseline of risk exposure and maturity for each utility.

Accordingly, the WSD will adopt four key elements of the 2020 WMP submission and review process:

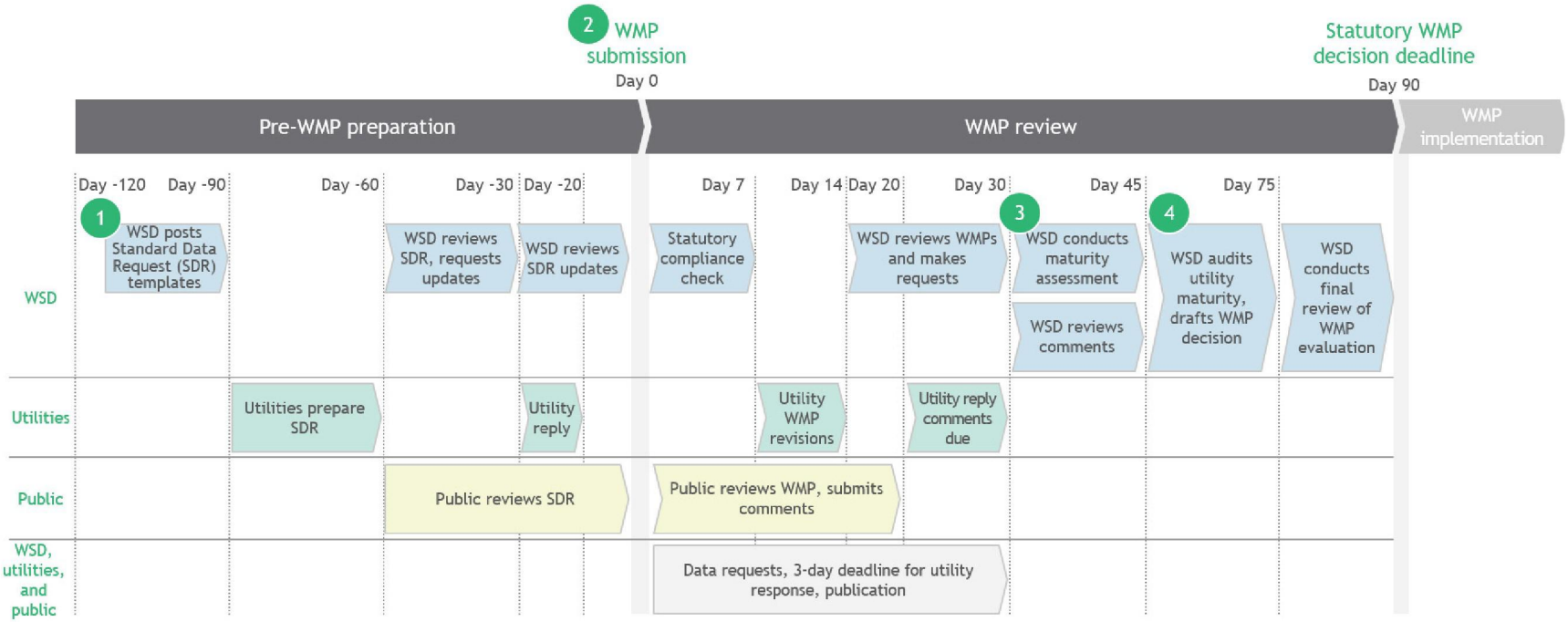
1. **Frontload data collection.** This will extend the timeframe for WSD and party review of relevant utility data in advance of the WMP submission and review period, in addition to reducing the need for follow-up data requests.
2. **Standardize templates for utility WMP submission.** Templates help WSD staff more easily uncover relevant supporting information and facilitate comparison across utilities.
3. **Systematize qualitative evaluation using the utility wildfire mitigation maturity assessment.** An assessment framework increases the objectivity of review and allows WSD staff to more efficiently conduct a thorough review.
4. **Use audit to validate wildfire mitigation maturity model assessment.** Audits can help the WSD ensure accuracy and consistency of the utility wildfire mitigation maturity assessments.

Timeline to accommodate process updates

Where feasible, the WMP submission and review timeline will be updated to accommodate these process updates, as below. The 2020 WMP cycle cannot accommodate the full 120-day pre-WMP preparation phase. Therefore, CPUC staff shall engage with utilities to begin working on understanding methodology and data that supports WMPs ahead of the 2020 filing. In future years, a fuller 120 day pre-WMP preparation phase will be used.

Figure 1 outlines the future view of the WMP submission and review timeline. Each number in Figure 1 represents the implementation of one of the four key elements above.

Figure 1: Descriptive view of future WMP submission and review timeline



II. Wildfire Mitigation Plan Guidelines

Structure

The WMP itself is composed of five sections and their corresponding templates:

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, including current and directional vision for wildfire risk exposure,
5. Wildfire mitigation activity for each year of the 3-year WMP term, including expected outcomes of the 3-year plan.

An additional section 6 in the document provides a location for utilities to attach the GIS files required to support the information reported.

Instructions for filling out the WMP are given with each section of the WMP. Sections of this document contain a portion for the utility to provide a narrative response. This narrative response may include quantitative and qualitative explanations, as well as supporting documentation including relevant maps, spreadsheets, photographs, and other relevant information. Many sections also instruct the utility to provide a separate quantitative-focused response in the tables, where cells must be filled out by utilities according to the instructions provided in each section. Some tables include comment boxes. Utilities may extend the size of comment boxes as needed to provide an adequate description for each aspect of the WMP.

Should any portion of the WMP require information that the utility has not collected itself nor could ascertain based on information that the utility does collect, the utility shall work with federal, state, and local agencies, stakeholders, and partners to collect or compile the information.

Where the information in question is not collected by any stakeholder and cannot be collected by the utility, the utility shall indicate this in the comments and include a description of the most similar data point(s) that the utility and/or other stakeholders do track that most closely fits the requirement.

For example, by the WMP deadline, the utility may not have a full accounting of the value of property destroyed by utility-ignited wildfire in a given year due to ongoing investigation into the cause of one or more wildfires within its service territory. In this example, the utility shall indicate 1) the known sum of the value of property determined by fire AHJs to have been destroyed by utility-ignited wildfire in that year, albeit incomplete, and 2) a list of the wildfires in that year for which utility facilities are being investigated as a potential source of ignition but for which the cause is still undetermined and an estimation of value of property destroyed by each. Finally, the utility shall describe its plan to improve its data collection and/or cooperation with partners with the goal of collecting the required information, including the timeline to implementation.

In the event that any of the requested information is confidential, the utility shall provide 2 versions, 1 which includes all of the information and a second that does not include the confidential information.

Clarification of normalization calculation: For those metrics and other figures that are likely to vary year-to-year based on the prevalence of fire-weather conditions, instructions are included to report said metric or figure both 1) as a total for the year and 2) normalized by Red Flag Warning (RFW) circuit mile

days. The denominator "RFW circuit mile days" 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. 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.

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0 Glossary of defined terms

Term	Definition
10-hour dead fuel moisture content	Moisture content of small dead vegetation (e.g. grass, leaves, which burn quickly but not intensely), which can respond to changes in atmospheric moisture content within 10 hours.
Access and functional needs populations	Per Government Code § 8593.3 and D.19-05-042, individuals who have developmental or intellectual disabilities, physical disabilities, chronic conditions, injuries, limited English proficiency or who are non-English speaking, older adults, children, people living in institutionalized settings, or those who are low income, homeless, or transportation disadvantaged, including, but not limited to, those who are dependent on public transit or those who are pregnant.
Authority Having Jurisdiction	AHJ, party with assigned responsibility, depending on location and circumstance.
Asset (utility)	Electric lines, equipment, or supporting hardware.
At-risk species	Species of vegetation that are particularly likely to contact power lines in the event of high winds and/or ignite if they catch a spark.
Baseline (ignition probability, maturity)	A measure, typically of the current state, to establish a starting point for comparison.
Carbon dioxide equivalent	Tons of greenhouse gases (GHG) emitted, multiplied by the global warming potential relative to carbon dioxide.
Contractor	Any individual in the temporary and/or indirect employ of the utility whose limited hours and/or time-bound term of employment are not considered as "full-time" for tax and/or any other purposes.
Critical facilities and infrastructure	In accordance with the interim definition adopted in D.19-05-042, those facilities and infrastructure that are essential to the public safety and that require additional assistance and advance planning to ensure resiliency during de energization events, namely: emergency services sector (police stations, fire stations, emergency operations centers), government facilities sector (schools, jails, prisons), healthcare and public health sector (public health departments, medical facilities, including hospitals, skilled nursing facilities, nursing homes, blood banks, health care facilities, dialysis centers and hospice facilities), energy sector (public and private utility facilities vital to maintaining or restoring normal service, including, but not limited to, interconnected publicly owned utilities and electric cooperatives), water and wastewater systems sector (facilities associated with the provision of drinking water or processing of wastewater including facilities used to pump, divert, transport, store, treat and deliver water or wastewater), communications sector (communication carrier infrastructure including selective routers, central offices, head ends, cellular switches, remote terminals and cellular sites), and chemical sector (facilities associated with the provision of manufacturing, maintaining, or distributing hazardous materials and chemicals).
Customer hours	Total number of customers, multiplied by the average number of hours (e.g. of power outage).
Data cleaning	Calibrating raw data to remove errors (including typographical and numerical mistakes).
Dead fuel moisture content	Moisture content of dead vegetation, which responds solely to current environmental conditions and is critical in determining fire potential.
Detailed inspection	In accordance with GO 165, an inspection where individual pieces of equipment and structures are carefully examined, visually and through use of routine diagnostic test, as appropriate, and (if practical and if useful information can be so gathered) opened, and the condition of each rated and recorded.

Enhanced inspection	Inspection whose frequency and thoroughness exceeds the requirements of the detailed inspection, particularly if driven by risk calculations.
Evacuation impact	Number of people evacuated, with the duration for which they are evacuated, from homes and businesses, due to wildfires.
Evacuation zone	Areas designated by CAL FIRE and local fire agency evacuation orders, to include both "voluntary" and "mandatory" in addition to other orders such as "precautionary" and "immediate threat".
Fuel density	Mass of fuel (vegetation) per area which could combust in a wildfire.
Fuel management	Removing or thinning vegetation to reduce the potential rate of propagation or intensity of wildfires.
Fuel moisture content	Amount of moisture in a given mass of fuel (vegetation), measured as a percentage of its dry weight.
Full-time employee	Any individual in the ongoing and/or direct employ of the utility whose hours and/or term of employment are considered as "full-time" for tax and/or any other purposes.
GO 95 nonconformance	Condition of a utility asset that does not meet standards established by General Order 95.
Greenhouse gas (GHG) emissions	Health and Safety Code 38505 identifies seven greenhouse gases that ARB is responsible to monitor and regulate in order to reduce emissions: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), sulfur hexafluoride (SF6), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and nitrogen trifluoride (NF3).
Grid hardening	Actions (such as equipment upgrades, maintenance, and planning for more resilient infrastructure) taken in response to the risk of undesirable events (such as outages) or undesirable conditions of the electrical system in order to reduce or mitigate those events and conditions, informed by an assessment of the relevant risk drivers or factors.
Grid topology	General design of an electric grid, whether looped or radial, with consequences for reliability and ability to support de-energization (e.g., being able to deliver electricity from an additional source).
High Fire Threat District (HFTD)	Per D.17-01-009, areas of the State designated by the CPUC and CAL FIRE to have elevated wildfire risk, indicating where utilities must take additional action (per GO 95, GO 165, and GO 166) to mitigate wildfire risk.
Highly rural region	In accordance with 38 CFR 17.701, "highly rural" shall be defined as those areas with a population of less than 7 persons per square mile.
Ignition probability	The relative possibility that an ignition will occur, probability is quantified as a number between 0% and 100% (where 0% indicates impossibility and 100% indicates certainty). The higher the probability of an event, the more certainty there is that the event will occur. (Often informally referred to as likelihood or chance).
Ignition-related deficiency	Any condition which may result in ignition or has previously resulted in ignition, even if not during the past five years.
Impact/consequence of ignitions	The effect or outcome of a wildfire ignition, affecting objectives, which may be expressed by terms including, although not limited to health, safety, reliability, economic and/or environmental damage.
Initiative	Measure or activity proposed or in process designed to reduce the consequences and/or probability of wildfire or PSPS.
Inspection protocol	Documented procedures to be followed in order to validate that a piece of equipment is in good condition and expected to operate safely and effectively.
Invasive species	Non-native species whose proliferation increases the risk of wildfires.
Level 1 finding	In accordance with GO 95, an immediate safety and/or reliability risk with high probability for significant impact.

Level 2 finding	In accordance with GO 95, a variable (non-immediate high to low) safety and/or reliability risk.
Level 3 finding	In accordance with GO 95, an acceptable safety and/or reliability risk.
Life expectancy	Anticipated years that a piece of equipment can be expected to meet safety and performance requirements.
Limited English Proficiency (LEP)	Populations with limited English working proficiency based on the International Language Roundtable scale.
Live fuel moisture content	Moisture content within living vegetation, which can retain water longer than dead fuel.
Lost energy	Energy that would have been delivered were it not for an outage.
Major roads	Interstate highways, U.S. highways, state and county routes.
Match drop simulation	Wildfire simulation method that takes an arbitrary ignition and forecasts propagation and consequence/impact.
Member of the public	Any individual not employed by the utility.
Multi-attribute value function	Risk calculation methodology introduced during CPUC's S-MAP and RAMP proceedings.
Near miss	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.
Near-miss simulation	Simulation of what the consequence would have been of an ignition had it occurred.
Need for PSPS	When utilities' criteria for utilizing PSPS are met.
Noncompliant clearance	Rights-of-way whose vegetation is not trimmed in accordance with the requirements of GO 95.
Outages of the type that could ignite a wildfire	Outages that, in the judgement of the utility, could have ignited a wildfire.
Outcome metrics	Measurements of the performance of the utility and its service territory in terms of both leading and lagging indicators of wildfire, PSPS, and other consequences of wildfire risk, including the potential unintended consequences of wildfire mitigation work, such as acreage burned by utility-ignited wildfire.
Overcapacity	When the energy transmitted by utility equipment exceeds that of its nameplate capacity.
Patrol inspection	In accordance with GO 165, a simple visual inspection of applicable utility equipment and structures that is designed to identify obvious structural problems and hazards. Patrol inspections may be carried out in the course of other company business.
Percentile conditions	Top X% of a particular set (e.g. wind speed), based on a historical data set with sufficient detail.
Planned outage	Electric outage announced ahead of time by the utility.
Preventive maintenance (PM)	The practice of maintaining equipment on a regular schedule, based on risk, elapsed time, run-time meter readings, or number of operations. The intent of PM is to "prevent" maintenance problems or failures before they take place by following routine and comprehensive maintenance procedures. The goal is to achieve fewer, shorter, and more predictable outages.
Priority essential services	Critical first responders, public safety partners, critical facilities and infrastructure, operators of telecommunications infrastructure, and water utilities/agencies.
Program targets	Measurements of activity identified in WMPs and subsequent annual updates, in terms of volume or scope of work, such as number trees trimmed or miles of power lines hardened.

Progress metrics	Measurements that track how much utility wildfire mitigation activity has changed the conditions of utility wildfire risk exposure or utility ability to manage wildfire risk exposure, in terms of leading indicators of ignition probability and wildfire consequences.
Property	Private and public property, buildings and structures, infrastructure, and other items of value that were destroyed by wildfire, including both third-party property and utility assets.
PSPS risk	The potential for the occurrence of a PSPS event expressed in terms of a combination of various outcomes of the event and their associated probabilities.
PSPS weather	Weather that exceeds a utility's risk threshold for initiating a PSPS.
Red Flag Warning	RFW, level of wildfire risk from weather as declared by the National Weather Service.
RFW Circuit Mile Day	Sum of miles of utility grid subject to Red Flag Warning each day. 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.
Risk-spend efficiency	An estimate of the cost-effectiveness of initiatives, calculated by dividing the mitigation risk reduction benefit by the mitigation cost estimate based on the full set of risk reduction benefits estimated from the incurred costs.
Rule	Section of public utility code requiring a particular activity or establishing a particular threshold.
Run-to-failure	A maintenance approach that replaces equipment only when it fails.
Rural region	In accordance with GO 165, "rural" shall be defined as those areas with a population of less than 1,000 persons per square mile as determined by the United States Bureau of the Census.
Safety Hazard	A condition that poses a significant threat to human life or property.
Simulated wildfire	Propagation and impact/consequence of a wildfire ignited at a particular point ('match drop'), as simulated by fire spread software.
Span	The space between adjacent supporting poles or structures on a circuit consisting of electric line and equipment. "Span level" refers to asset-scale granularity.
System Average Interruption Duration Index (SAIDI)	System-wide total number of minutes per year of sustained outage per customer served.
Third-party contact	Contact between a piece of electrical equipment and another object, whether natural (tree branch) or human (vehicle).
Time to expected failure	Time remaining on the life expectancy of a piece of equipment.
Top 30% of proprietary fire potential index	Top 30% of FPI or equivalent scale (e.g., “Extreme” on SCE’s FPI; “extreme”, 15 or greater, on SDG&E’s FPI; and 4 or above on PG&E’s FPI).
Trees with strike potential / hazard trees	Trees that could either 'fall in' to a power line, or have branches detach and 'fly in' to contact a power line in high-wind conditions.
Unplanned outage	Electric outage that occurs with no advance notice from the utility (e.g. blackout).
Urban region	In accordance with GO 165, "urban" shall be defined as those areas with a population of more than 1,000 persons per square mile as determined by the United States Bureau of the Census.
Utility-ignited wildfire	Wildfires ignited by utility infrastructure or employees, including all wildfires determined by AHJ investigation to originate from ignition caused by utility infrastructure.
Vegetation management	Trimming and clearance of trees, branches, and other vegetation that poses the risk of contact with electric equipment.
Vegetation risk index	Risk index indicating the probability of vegetation-related outages along a particular circuit, based on the vegetation species, density, height, and growth rate.

Weather normalization	Adjusting metrics based on relative weather risk, with RFW circuit mile days as the normalization factor.
Wildfire impact/ consequence	The effect or outcome of a wildfire affecting objectives, which may be expressed, by terms including, although not limited to health, safety, reliability, economic and/or environmental damage.
Wildfire risk	The potential for the occurrence of a wildfire event expressed in terms of a combination of various outcomes of the wildfire and their associated probabilities.
Wildfire-only WMP programs	Activities, practices, and strategies that are only necessitated by wildfire risk, unrelated to or beyond that required by minimum reliability and/or safety requirements. Such programs are not indicated or in common use in areas where wildfire risk is minimal (e.g., territory with no vegetation or fuel) or under conditions where wildfires are unlikely to ignite or spread (e.g., when rain is falling).
Wildland urban interface (WUI)	A geographical area identified by the state as a "Fire Hazard Severity Zone", or other areas designated by the enforcing agency to be a significant risk from wildfires, established pursuant to Title 24, Part 2, Chapter 7A.
Wire down	Instance where an electric transmission or distribution conductor is broken and falls from its intended position to rest on the ground or a foreign object.

1 Persons responsible for executing the WMP

Provide an accounting of the responsibilities of the responsible person(s) executing the plan, including:

1. Executive level with overall responsibility
2. Program owners specific to each component of the plan

Ensure that the plan components described in (2) include an accounting for each of the WMP sections and subsections.

1.1 Verification

Complete the following verification for the WMP submission:

(See Rule 1.11)
(Where Applicant is a Corporation)

I am an officer of the applicant corporation herein, and am authorized to make this verification on its behalf. The statements in the foregoing document are true of my own knowledge, except as to matters which are therein stated on information or belief, and as to those matters I believe them to be true.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on _____ at _____, California.
(Date) (Name of city)

_____
(Signature and Title of Corporate Officer)

2 Metrics and underlying data

Instructions: Report performance on the following progress and outcome metrics within the utility's service territory over the past five years. Where a utility does not collect its own data for a given metric, that utility shall work with the relevant sources to collect the information for its service territory, and clearly identify the owner and dataset used to provide the response in "Comments" column.

Progress metrics, listed below, track how much utility wildfire mitigation activity has managed to change the conditions of utility wildfire risk exposure in terms of drivers of ignition probability.

Outcome metrics measure the performance of a utility and its service territory in terms of both leading and lagging indicators of wildfire risk, PSPS risk, and other direct and indirect consequences of wildfire and PSPS, including the potential unintended consequences of wildfire mitigation work.

In the 2019 WMPs, utilities proposed sets of "program targets" that enable tracking implementation of proposed wildfire mitigation activities against the scope of those activities as laid out in the WMPs but do not track the efficacy of those activities. Utilities shall continue to report program targets, however, the primary use of these will be to gauge follow-through on WMPs while recognizing that some WMP initiatives should be adjusted after plan submittal based on new information and lessons learned.

2.1 Lessons learned: how tracking metrics on the 2019 plan has informed the 2020 plan

Describe how the utility's plan has evolved since the 2019 WMP submission. Outline any major themes and lessons learned from the 2019 plan and subsequent implementation of the initiatives. In particular, focus on how utility performance against the metrics used has informed the utility's 2020 WMP.

2.2 Recent performance on progress metrics, last 5 years

Instructions for Table 1:

Report performance on the following metrics within the utility's service territory over the past five years. Where the utility does not collect its own data on a given metric, the utility shall work with the relevant state agencies to collect the relevant information for its service territory, and clearly identify the owner and dataset used to provide the response in the "Comments" column.

Table 1: Recent performance on progress metrics, last 5 years

#	Progress metric name	Annual performance					Unit(s)	Comments
		2015	2016	2017	2018	2019		
1	Grid condition findings from inspection						Number of Level 1, 2, and 3 findings per mile of circuit in HFTD, and per total miles of circuit for each of the following inspection types: 1. Patrol inspections 2. Detailed inspections 3. Other inspection types	
2	Vegetation clearance findings from inspection						Percentage of right-of-way with noncompliant clearance based on applicable rules and regulations at the time of inspection, as a percentage of all right-of-way inspected	
3	Extent of grid modularization						Number of sectionalizing devices per circuit mile plus number of automated grid control equipment in: 1. HFTD 2. Non-HFTD	
4	Data collection and reporting						Percent of data requested in SDR and WMP collected in initial submission	

2.3 Recent performance on outcome metrics, annual and normalized for weather, last 5 years

Instructions for Table 2:

Report performance on the following metrics within the utility's service territory over the past five years. Where the utility does not collect its own data on a given metric, the utility shall work with the relevant state agencies to collect the relevant information for its service territory, and clearly identify the owner and dataset used to provide the response in "Comments" column.

Provide a list of all types of findings and number of findings per type, in total and in number of findings per circuit mile.

Table 2: Recent performance on outcome metrics, last 5 years

Metric type	#	Outcome metric name	Annual performance					Unit(s)	Comments
			2015	2016	2017	2018	2019		
1. Near misses	1.a.	Number of all events (such as unplanned outages, faults, conventional blown fuses, etc.) that could result in ignition, by type according to utility-provided list (total)						Number per year	
	1.b.	Number of all events (such as unplanned outages, faults, conventional blown fuses, etc.) that could result in ignition, by type according to utility-provided list (normalized)						Number per RFW circuit mile day per year	
	1.c.	Number of wires down (total)						Number of wires down per year	
	1.d.	Number of wires down (normalized)						Number per RFW circuit mile day per year	
2. Utility inspection findings	2.a.	Number of Level 1 findings that could increase the probability of ignition discovered per circuit mile inspected						Average number of Level 1 findings that could increase the probability of ignition discovered by all inspections per circuit mile per year	

Metric type	#	Outcome metric name	Annual performance					Unit(s)	Comments
			2015	2016	2017	2018	2019		
	2.b.	Number of Level 2 findings that could increase the probability of ignition discovered per circuit mile inspected						Average number of Level 2 findings that could increase the probability of ignition discovered by all inspections per circuit mile per year	
	2.c.	Number of Level 3 findings that could increase the probability of ignition discovered per circuit mile inspected						Average number of Level 3 findings that could increase the probability of ignition discovered by all inspections per circuit mile per year	
3. Customer hours of PSPS and other outages	3.a.	Customer hours of planned outages including PSPS (total)						Total customer hours of planned outages per year	
	3.b.	Customer hours of planned outages including PSPS (normalized)						Total customer hours of planned outages per RFW circuit mile day per year	
	3.c.	Customer hours of unplanned outages, not including PSPS (total)						Total customer hours of unplanned outages per year	
	3.d.	Customer hours of unplanned outages, not including PSPS (normalized)						Total customer hours of unplanned outages per RFW circuit mile day per year	
	3.e.	Increase in System Average Interruption Duration Index (SAIDI)						Change in minutes compared to the previous year	
4. Utility ignited wildfire fatalities	4.a.	Fatalities due to utility-ignited wildfire (total)						Number of fatalities per year	
	4.b.	Fatalities due to utility-ignited wildfire (normalized)						Number of fatalities per RFW circuit mile day per year	
5. Accidental deaths resulting from utility wildfire mitigation initiatives	5.a.	Deaths due to utility wildfire mitigation activities (total)						Number of fatalities per year	

Metric type	#	Outcome metric name	Annual performance					Unit(s)	Comments
			2015	2016	2017	2018	2019		
6. OSHA-reportable injuries from utility wildfire mitigation initiatives	6.a.	OSHA-reportable injuries due to utility wildfire mitigation activities (total)						Number of OSHA-reportable injuries per year	
	6.b.	OSHA-reportable injuries due to utility wildfire mitigation activities (normalized)						Number of OSHA-reportable injuries per year per 1000 line miles of grid	
7. Value of assets destroyed by utility-ignited wildfire, listed by asset type	7.a.	Value of assets destroyed by utility-ignited wildfire (total)						Dollars of damage or destruction per year	
	7.b.	Value of assets destroyed by utility-ignited wildfire (normalized)						Dollars of damage or destruction per RFW circuit mile day per year	
8. Structures damaged or destroyed by utility-ignited wildfire	8.a.	Number of structures destroyed by utility-ignited wildfire (total)						Number of structures destroyed per year	
	8.b.	Number of structures destroyed by utility-ignited wildfire (normalized)						Number of structures destroyed per RFW circuit mile day per year	
9. Acreage burned by utility-ignited wildfire	9.a.	Acreage burned by utility-ignited wildfire (total)						Acres burned per year	
	9.b.	Acreage burned by utility-ignited wildfire (normalized)						Acres burned per RFW circuit mile day per year	
10. Number of utility wildfire ignitions	10.a.	Number of ignitions (total) according to existing ignition data reporting requirement						Number per year	
	10.b.	Number of ignitions (normalized)						Number per RFW circuit mile day per year	
	10.c.	Number of ignitions in HFTD (subtotal)						Number in HFTD per year	
	10.c.i.	Number of ignitions in HFTD Zone 1						Number in HFTD Zone 1 per year	
	10.c.ii.	Number of ignitions in HFTD Tier 2						Number in HFTD Tier 2 per year	
	10.c.iii.	Number of ignitions in HFTD Tier 3						Number in HFTD Tier 3 per year	

Metric type	#	Outcome metric name	Annual performance					Unit(s)	Comments
			2015	2016	2017	2018	2019		
	10.d.	Number of ignitions in HFTD (subtotal, normalized)						Number in HFTD per RFW circuit mile day per year	
	10.d.i.	Number of ignitions in HFTD Zone 1 (normalized)						Number in HFTD Zone 1 per RFW circuit mile day per year	
	10.d.ii.	Number of ignitions in HFTD Tier 2 (normalized)						Number in HFTD Tier 2 per RFW circuit mile day per year	
	10.d.iii.	Number of ignitions in HFTD Tier 3 (normalized)						Number in HFTD Tier 3 per RFW circuit mile day per year	
	10.e.	Number of ignitions in non-HFTD (subtotal)						Number in non-HFTD per year	
	10.f.	Number of ignitions in non-HFTD (normalized)						Number in non-HFTD per RFW circuit mile day per year	
11. Critical infrastructure impacted	11.a.	Critical infrastructure impacted by PSPS						Number of critical infrastructure (in accordance with D.19-05-042) locations impacted per hour multiplied by hours offline per year	
	11.b.	Critical infrastructure impacted by PSPS (normalized)						Number of critical infrastructure (in accordance with D.19-05-042) locations impacted per hour multiplied by hours offline per RFW circuit mile day per year	

2.4 Description of additional metrics

Instructions for Table 3:

In addition to the metrics specified above, list and describe all other metrics the utility uses to evaluate wildfire mitigation performance, the utility's performance on those metrics over the last five years, the units reported, the assumptions that underlie the use of those metrics, and how the performance reported could be validated by third parties outside the utility, such as analysts or academic researchers. Identified

metrics must be of enough detail and scope to effectively inform the performance (i.e., reduction in ignition probability or wildfire consequence) of each preventive strategy and program.

Table 3: List and description of additional metrics, last 5 years

Metric	Performance					Units	Underlying assumptions	Third-party validation
	2015	2016	2017	2018	2019			

Note: Add more rows as needed.

2.5 Description of program targets

Instructions for Table 4:

In addition to the metrics specified above, list and describe all program targets the electrical corporation uses to track utility WMP implementation, the utility's performance on those metrics over the last five years, the units reported, the assumptions that underlie the use of those metrics, and how the performance reported could be validated by third parties outside the utility, such as analysts or academic researchers. Identified metrics must be of enough detail and scope to effectively inform the performance (i.e., reduction in ignition probability or wildfire consequence) of each preventive strategy and program.

Each program target shall be associated with a percent completeness and based upon the contents of the WMP.

Table 4: List and description of program targets, last 5 years

Program target	2019 performance	Units	Underlying assumptions	Third-party validation

Note: Add more rows as needed.

2.6 Detailed information supporting outcome metrics

Instructions for Table 5:
Enclose detailed information as requested for the metrics below. Report numbers of accidental deaths attributed to any utility wildfire mitigation activities, as listed in the utility's 2019 WMP filing or otherwise, according to the type of activity in column one, and by the relationship to the utility, for each of the last five years. For fatalities caused by activities beyond these categories, add rows to specify accordingly. The relationship to the utility statuses of full-time employee, contractor, and member of public are mutually exclusive, such that no individual can be counted in more than one category, nor can any individual fatality be attributed to more than one activity.

Report subtotals calculated for each row and column.

Table 5: Accidental deaths due to utility wildfire mitigation initiatives, last 5 years

Activity	Victim															Total
	Full-time employee					Contractor					Member of public					
Year	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019	
Inspection																
Vegetation management																
Utility fuel management																
Grid hardening																

Other																
Total																

Note: Add more rows as needed.

Instructions for Table 6:
Report numbers of OSHA-reportable injuries attributed to any utility wildfire mitigation initiatives, as listed in the utility's 2019 WMP filing or otherwise, according to the type of activity in column one, and by the identity of the victim, for each of the last five years. For members of the public, all injuries that meet OSHA-reportable standards of severity (i.e., injury or illness resulting in loss of consciousness or requiring medical treatment beyond first aid) shall be included, even if those incidents are not reported to OSHA due to the identity of the victims.

For OSHA-reportable injuries caused by activities beyond these categories, add rows to specify accordingly. The victim identities listed are mutually exclusive, such that no individual victim can be counted as more than one identity, nor can any individual OSHA-reportable injury be attributed to more than one activity. Report subtotals calculated for each row and column.

Table 6: OSHA-reportable injuries due to utility wildfire mitigation initiatives, last 5 years

Activity	**Victim**															**Total**
	Full-time employee					**Contractor**					**Member of public**					
Year	**2015**	**2016**	**2017**	**2018**	**2019**	**2015**	**2016**	**2017**	**2018**	**2019**	**2015**	**2016**	**2017**	**2018**	**2019**	
Inspection																
Vegetation management																
Utility fuel management																
Grid hardening																
Other																
Total																

Note: Add more rows as needed.

Instructions for Table 7:
Report details on methodology used to calculate or model potential impact of ignitions, including list of all input used in impact simulation; data selection and treatment methodologies; assumptions, including Subject Matter Expert (SME) input; equation(s), functions, or other algorithms used to obtain output; output type(s), e.g., wind speed model; and comments.

Table 7: Methodology for potential impact of ignitions

List of all data inputs used in impact simulation	Sources of data inputs	Data selection and treatment methodologies	Assumptions, including SME input	Equation(s), functions, or other algorithms used to obtain output	Output type(s), e.g., wind speed model	Comments

Note: Add more rows as needed.

2.7 Mapping recent, modelled, and baseline conditions

Instructions for Table 8:
Report underlying data for recent conditions (over the last five years) of the utility service territory in a downloadable shapefile GIS format, to include the following layers of data plotted on the utility service territory map as specified below, at a minimum. Provide information for each year; calculate and provide a five-year average. Name and attach files according to the table below.

Table 8: Map file requirements for recent and modelled conditions of utility service territory, last 5 years

Layer name	Measurements	Units	Attachment location
Recent weather patterns	Average annual number of Red Flag Warning days per square mile across service territory	Area, days, square mile resolution	6.1
	Average 95th and 99th percentile wind speed and prevailing direction (actual)	Area, miles per hour, at a square mile resolution or better, noting where measurements are actual or interpolated	
Recent drivers of ignition probability	Date of recent ignitions categorized by ignition probability driver	Point, GPS coordinate, days, square mile resolution	6.2
Recent use of PSPS	Duration of PSPS events and area of the grid affected in customer hours per year	Area, customer hours, square mile resolution	6.3

Instructions for Table 9:
Report underlying data for baseline conditions (projected for 2020) of the utility service territory in a downloadable shapefile GIS format and database, to include the following layers of data plotted on the utility service territory map as specified below, at a minimum. Report more granular resolutions where available (e.g., asset-level instead of by circuit mile).

Table 9: Map file requirements for baseline condition of utility service territory projected for 2020

Layer name	Measurements / variables	Units	Appendix location
Current baseline state of service territory and utility equipment	Non-HFTD vs HFTD (Zone 1, Tier 2, Tier 3) regions of utility service territory	Area, square mile resolution per type	6.4
	Urban vs. rural vs. highly rural regions of utility service territory	Area, square mile resolution per type	
	WUI regions of utility service territory	Area, square mile resolution	
	Number and location of critical facilities	Point, GPS coordinate	
	Number and location of customers	Area, number of people, square mile resolution	
	Number and location of customers belonging to access and functional needs populations	Area, number of people, square mile resolution	
	Overhead transmission lines	Line, quarter mile resolution	
	Overhead distribution lines	Line, quarter mile resolution	
	Location of substations	Point, GPS coordinate	
	Location of weather stations	Point, GPS coordinate	
	All utility assets by asset type, model, age, specifications, and condition	Point, GPS coordinate	
Location of planned utility equipment additions or removal	Non-HFTD vs HFTD (Zone 1, Tier 2, Tier 3) regions of utility service territory	Line, quarter mile resolution	6.5
	Urban vs. rural vs. highly rural regions of utility service territory	Line, quarter mile resolution	
	WUI regions of utility service territory	Line, quarter mile resolution	
	Circuit miles of overhead transmission lines	Line, quarter mile resolution	
	Circuit miles of overhead distribution lines	Line, quarter mile resolution	
	Location of substations	Point, GPS coordinate	
Planned 2020 WMP initiative activity per year	Location of 2020 WMP initiative activity for each activity as planned to be completed by the end of each year of the plan term	Line, quarter mile resolution	7.6

3 Baseline ignition probability and wildfire risk exposure

3.1 Recent weather patterns, last 5 years

Instructions for Table 10:
Report weather measurements based upon the duration and scope of NWS Red Flag Warnings and upon proprietary Fire Potential Index (or other similar fire risk potential measure) for each year. Calculate and report 5-year historical average. Ensure underlying data is provided per Section 2.7.

Table 10: Weather patterns, last 5 years

Weather measurement	2015	2016	2017	2018	2019	5-year historical average	Unit(s)
Red Flag Warning days							RFW circuit mile days per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure							Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
95th percentile wind conditions							Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions							Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
Other							

Note: Add additional rows as needed.

[1] Threshold here defined as top 30% of FPI or equivalent scale (e.g., "Extreme" on SCE's FPI; "extreme", 15 or greater, on SDG&E's FPI; and 4 or above on PG&E's FPI), .

3.2 Recent drivers of ignition probability, last 5 years

Instructions for Table 11:
Report recent drivers of ignition probability according to whether or not near misses of that type are tracked, the number of incidents per year (e.g., all instances of animal contact regardless of whether they caused an outage, an ignition, or neither), the rate at which those incidents (e.g., object contact, equipment failure, etc.) cause an ignition in the column, and the number of ignitions that those incidents caused by category, for each of last five years.

Calculate and include 5-year historical averages. This requirement applies to all utilities, not only those required to submit annual ignition data. Any utility that does not have complete 2019 ignition data compiled by the WMP deadline shall indicate in the 2019 columns that said information is incomplete. List additional drivers tracked in the "other" row and add additional rows as needed. Ensure underlying data is provided per Section 2.7.

Table 11: Key recent drivers of ignition probability, last 5 years

Incident type by ignition probability driver		Near misses tracked (y/n)?	Number of incidents per year						Average percentage probability of ignition per incident						Number of ignitions per year from this driver					
			2015	2016	2017	2018	2019	Average	2015	2016	2017	2018	2019	Average	2015	2016	2017	2018	2019	Average
Contact from object	All types of object contact																			
	Animal contact																			
	Balloon contact																			
	Veg. contact																			
	Vehicle contact																			
All types of equipment / facility failure	All types																			
	Capacitor bank failure																			
	Conductor failure—all																			

	Conductor failure—wires down																		
	Fuse failure—all																		
	Fuse failure—conventional blown fuse																		
	Lightning arrestor failure																		
	Switch failure																		
	Transformer failure																		
Wire-to-wire contact / contamination																			
Other																			

Note: Add additional rows as needed.

3.3 Recent use of PSPS, last 5 years

Instructions for Table 12:
Report use of PSPS according to the number and duration of PSPS events in total and normalized across weather conditions each year (by dividing by the number of RFW circuit mile days). List additional PSPS characteristics tracked in the "other" row and additional rows as needed.

Table 12: Recent use of PSPS, last 5 years

PSPS characteristic	2015	2016	2017	2018	2019	Unit(s)
Frequency of PSPS events (total)						Number of instances where utility operating protocol requires de-energization of a circuit or portion thereof to reduce ignition probability, per year
Frequency of PSPS events (normalized)						Number of instances where utility operating protocol requires de-energization of a circuit or portion thereof in order to reduce ignition probability, per RFW circuit mile day per year
Scope of PSPS events (total)						Circuit-events, measured in number of events multiplied by number of circuits de-energized per year
Scope of PSPS events (normalized)						Circuit-events, measured in number of events multiplied by number of circuits targeted for de-energization per RFW circuit mile day per year
Duration of PSPS events (total)						Customer hours per year
Duration of PSPS events (normalized)						Customer hours per RFW circuit mile day per year
Other						

Note: Add additional rows as needed.

3.4 Baseline state of equipment and wildfire and PSPS event risk reduction plans

3.4.1 Current baseline state of service territory and utility equipment

Instructions for Table 13:
Provide summary data for the current baseline state of HFTD and non-HFTD service territory in terms of circuit miles; overhead transmission lines, overhead distribution lines, substations, and critical facilities located within the territory; and customers by type, located in urban versus rural versus highly rural areas and including the subset within the Wildland-Urban Interface (WUI).

The totals of the cells for each category of information (e.g., "circuit miles" or "circuit miles in WUI") would be equal to the overall service territory total (e.g., the total of number of customers in urban, rural, and highly rural areas of HFTD plus those in urban, rural, and highly rural areas of non-HFTD would equal the total number of customers of the entire service territory). Ensure underlying data is provided per Section 2.7.

Table 13: Current baseline state of service territory and utility equipment

Land use	Characteristic tracked	In non-HFTD	In HFTD Zone 1	In HFTD Tier 2	In HFTD Tier 3
In urban areas	Circuit miles				
	Circuit miles in WUI				
	Number of critical facilities				
	Number of critical facilities in WUI				
	Number of customers				
	Number of customers in WUI				
	Number of customers belonging to access and functional needs populations				
	Number of customers belonging to access and functional needs populations in WUI				

Land use	Characteristic tracked	In non-HFTD	In HFTD Zone 1	In HFTD Tier 2	In HFTD Tier 3
	Circuit miles of overhead transmission lines				
	Circuit miles of overhead transmission lines in WUI				
	Circuit miles of overhead distribution lines				
	Circuit miles of overhead distribution lines in WUI				
	Number of substations				
	Number of substations in WUI				
In rural areas	Circuit miles				
	Circuit miles in WUI				
	Number of critical facilities				
	Number of critical facilities in WUI				
	Number of customers				
	Number of customers in WUI				
	Number of customers belonging to access and functional needs populations				
	Number of customers belonging to access and functional needs populations in WUI				
	Circuit miles of overhead transmission lines				
	Circuit miles of overhead transmission lines in WUI				

Land use	Characteristic tracked	In non-HFTD	In HFTD Zone 1	In HFTD Tier 2	In HFTD Tier 3
	Circuit miles of overhead distribution lines				
	Circuit miles of overhead distribution lines in WUI				
	Number of substations				
	Number of substations in WUI				
In highly rural areas	Circuit miles				
	Circuit miles in WUI				
	Number of critical facilities				
	Number of critical facilities in WUI				
	Number of customers				
	Number of customers in WUI				
	Number of customers belonging to access and functional needs populations				
	Number of customers belonging to access and functional needs populations in WUI				
	Circuit miles of overhead transmission lines				
	Circuit miles of overhead transmission lines in WUI				
	Circuit miles of overhead distribution lines				
	Circuit miles of overhead distribution lines in WUI				

Land use	Characteristic tracked	In non-HFTD	In HFTD Zone 1	In HFTD Tier 2	In HFTD Tier 3
	Number of substations				
	Number of substations in WUI				

Instructions for Table 14:
Input summary data on number of utility weather stations located in utility service territory by type.

Table 14: Summary data on weather station count

Weather station count type	Current count	Unit(s)
Number of weather stations (total)		Total number located in service territory and operated by utility
Number of weather stations (normalized)		Total number located in service territory and operated by utility, divided by total number of circuit miles in utility service territory
Number of weather stations in non-HFTD (total)		Total number located in non-HFTD service territory and operated by utility
Number of weather stations in non-HFTD (normalized)		Total number located in non-HFTD service territory and operated by utility, divided by total number of circuit miles in non-HFTD service territory
Number of weather stations in HFTD Zone 1 (total)		Total number located in HFTD Zone 1 service territory and operated by utility
Number of weather stations in HFTD Zone 1 (normalized)		Total number located in HFTD Zone 1 service territory and operated by utility, divided by total number of circuit miles in HFTD Zone 1 service territory
Number of weather stations in HFTD Tier 2 (total)		Total number located in HFTD Tier 2 service territory and operated by utility
Number of weather stations in HFTD Tier 2 (normalized)		Total number located in HFTD Tier 2 service territory and operated by utility, divided by total number of circuit miles in HFTD Tier 2 service territory
Number of weather stations in HFTD Tier 3 (total)		Total number located in HFTD Tier 3 service territory and operated by utility
Number of weather stations in HFTD Tier 3 (normalized)		Total number located in HFTD Tier 3 service territory and operated by utility, divided by total number of circuit miles in HFTD Tier 3 service territory

Instructions for Table 15:
Input summary data on number of utility fault indicators located in utility service territory by type.

Table 15: Summary data on fault indicator count

Fault indicator count type	Current count	Unit(s)
Number of fault indicators (total)		Total number located in service territory and operated by utility
Number of fault indicators (normalized)		Total number located in service territory and operated by utility, divided by total number of circuit miles in utility service territory
Number of fault indicators in non-HFTD (total)		Total number located in non-HFTD service territory and operated by utility
Number of fault indicators in non-HFTD (normalized)		Total number located in non-HFTD service territory and operated by utility, divided by total number of circuit miles in non-HFTD service territory
Number of fault indicators in HFTD Zone 1 (total)		Total number located in HFTD Zone 1 service territory and operated by utility
Number of fault indicators in HFTD Zone 1 (normalized)		Total number located in HFTD Zone 1 service territory and operated by utility, divided by total number of circuit miles in HFTD Zone 1 service territory
Number of fault indicators in HFTD Tier 2 (total)		Total number located in HFTD Tier 2 service territory and operated by utility
Number of fault indicators in HFTD Tier 2 (normalized)		Total number located in HFTD Tier 2 service territory and operated by utility, divided by total number of circuit miles in HFTD Tier 2 service territory
Number of fault indicators in HFTD Tier 3 (total)		Total number located in HFTD Tier 3 service territory and operated by utility
Number of fault indicators in HFTD Tier 3 (normalized)		Total number located in HFTD Tier 3 service territory and operated by utility, divided by total number of circuit miles in HFTD Tier 3 service territory

3.4.2 Planned additions, removal, and upgrade of utility equipment by end of 3-year plan term

Instructions for Table 16:
Input summary information for the planned additions or removal of utility equipment to be completed by the end of the 3-year plan term in 2022. Report net additions using positive numbers and net removals and undergrounding using negative numbers for circuit miles and numbers of substations.

Table 16: Location of planned utility equipment additions or removal by end of 3-year plan term

Land use	Characteristic tracked	Changes by end-2022			
		In non-HFTD	In HFTD Zone 1	In HFTD Tier 2	In HFTD Tier 3
In urban areas	Circuit miles of overhead transmission lines				
	Circuit miles of overhead distribution lines				
	Circuit miles of overhead transmission lines in WUI				
	Circuit miles of overhead distribution lines in WUI				
	Number of substations				
	Number of substations in WUI				
	Number of weather stations				
	Number of weather stations in WUI				
In rural areas	Circuit miles of overhead transmission lines				
	Circuit miles of overhead distribution lines				
	Circuit miles of overhead transmission lines in WUI				

	Circuit miles of overhead distribution lines in WUI				
	Number of substations				
	Number of substations in WUI				
	Number of weather stations				
	Number of weather stations in WUI				
In highly rural areas	Circuit miles of overhead transmission lines				
	Circuit miles of overhead distribution lines				
	Circuit miles of overhead transmission lines in WUI				
	Circuit miles of overhead distribution lines in WUI				
	Number of substations				
	Number of substations in WUI				
	Number of weather stations				
	Number of weather stations in WUI				

Transmission lines refer to all lines at or above 65kV, and distribution lines refer to all lines below 65kV.

Instructions for Table 17:

Referring to the program targets discussed above, report plan for hardening upgrades in detail below. Report plan in terms of number of circuit miles or substations to be upgraded for each year, assuming complete implementation of wildfire mitigation activities, for HFTD and non-HFTD service territory for circuit miles of transmission lines, circuit miles of transmission lines located in Wildland-Urban Interface (WUI), circuit miles of distribution lines, circuit miles of distribution lines in WUI, number of substations, and number of substations in the WUI.

Include a list of the hardening initiatives included in the calculations for the below table.

Table 17: Location of planned utility infrastructure upgrades

Land use	Characteristic tracked	In non-HFTD			In HFTD Zone 1			In HFTD Tier 2			In HFTD Tier 3		
		2020	2021	2022	2020	2021	2022	2020	2021	2022	2020	2021	2022
Total circuit miles planned for hardening each year, all types and locations													
Total number of substations planned for hardening each year, all locations													
In urban areas	Circuit miles planned for grid hardening of overhead transmission lines												
	Circuit miles of overhead transmission lines in WUI to harden												
	Circuit miles of overhead distribution lines to harden												
	Circuit miles of overhead distribution lines in WUI to harden												
	Circuit miles of overhead transmission lines in WUI to harden												
	Number of substations to harden												
	Number of substations in WUI to harden												
In rural areas	Circuit miles of overhead transmission lines to harden												
	Circuit miles of overhead transmission lines in WUI to harden												
	Circuit miles of overhead distribution lines to harden												
	Circuit miles of overhead distribution lines in WUI to harden												
	Circuit miles of overhead transmission lines in WUI to harden												
	Number of substations to harden												
	Number of substations in WUI to harden												
In highly rural areas	Circuit miles of overhead transmission lines to harden												
	Circuit miles of overhead transmission lines in WUI to harden												
	Circuit miles of overhead distribution lines to harden												
	Circuit miles of overhead distribution lines in WUI to harden												
	Circuit miles of overhead transmission lines in WUI to harden												
	Number of substations to harden												
	Number of substations in WUI to harden												

Transmission lines refer to all lines at or above 65kV, and distribution lines refer to all lines below 65kV.

3.4.3 Status quo ignition probability drivers by service territory

Instructions for Table 18:
Report 5-year historical average drivers of ignition probability according to:

- the average number of incidents per year
- the likelihood of ignition per incident, meaning, the rate at which those incidents (e.g., object contact, equipment failure, etc.) would be expected to cause an ignition (e.g., if 50% of vegetation contacts result in ignition, then the value for the "Likelihood of ignition per incident" column would be "50%" in that row); and
- the 5-year historical average of the number of ignitions from this driver by location in non-HFTD, HFTD Zone 1, HFTD Tier 2, and HFTD Tier 3. List additional risk drivers tracked in the "other" row and additional rows as needed. If changes would be expected for plan years 2 and 3, describe.

Table 18: Key drivers of ignition probability

Ignition probability drivers		Number of incidents per year (according to 5-year historical average)	Average likelihood of ignition per incident	Ignitions from this driver (according to 5-year historical average)				
				Total	In non-HFTD	In HFTD Zone 1	In HFTD Tier 2	In HFTD Tier 3
Contact from object	All types of object contact							
	Animal contact							
	Balloon contact							
	Vegetation contact							
	Vehicle contact							
All types of equipment / facility failure	All types							
	Capacitor bank failure							

	Conductor failure—all							
	Conductor failure—wires down							
	Fuse failure—all							
	Fuse failure—conventional blown fuse							
	Lightning arrestor failure							
	Switch failure							
	Transformer failure							
Wire-to-wire contact / contamination								
Other								

4 Inputs to the plan and directional vision for wildfire risk exposure

4.1 The objectives of the plan

The objectives of the plan shall, at a minimum, be consistent with the requirements of California Public Utilities Code §8386(a). Describe utility WMP objectives, categorized by each of the following timeframes:

1. Before the upcoming wildfire season, as defined by the California Department of Forestry and Fire Protection (CAL FIRE),
2. Before the next annual update,
3. Within the next 3 years, and
4. Within the next 10 years.

4.2 Understanding major trends impacting ignition probability and wildfire consequence

Describe how the utility assesses wildfire risk in terms of ignition probability and estimated wildfire consequence, including use of Multi-Attribute Risk Score (MARS) and Multi-Attribute Value Function (MAVF) as in the Safety Model and Assessment Proceeding (S-MAP) and Risk Assessment Mitigation Phase (RAMP). Include description of how the utility distinguishes between these risks and the risks to safety and reliability. List and describe each "known local condition" that the utility monitors per GO 95, Rule 31.1, including how the condition is monitored and evaluated. In addition:

A. Describe how the utility monitors and accounts for the contribution of weather to ignition probability and estimated wildfire consequence in its decision-making, including describing any utility-generated Fire Potential Index or other measure (including input variables, equations, the scale or rating system, an explanation of how uncertainties are accounted for, an explanation of how this index is used to inform operational decisions, and an explanation of how trends in index ratings impact medium-term decisions such as maintenance and longer-term decisions such as capital investments, etc.).
B. Describe how the utility monitors and accounts for the contribution of fuel conditions to ignition probability and estimated wildfire consequence in its decision-making, including describing any proprietary fuel condition index (or other measures tracked), the outputs of said index or other measures, and the methodology used for projecting future fuel conditions. Include discussion of measurements and units for live fuel moisture content, dead fuel moisture content, density of each fuel type, and any other variables tracked. Describe the measures and thresholds the utility uses to determine extreme fuel conditions, including what fuel moisture measurements and threshold values the utility considers "extreme" and its strategy for how fuel conditions inform operational decision-making.

4.2.1 Service territory fire-threat evaluation and ignition risk trends

Discuss fire-threat evaluation of the service territory to determine whether an expanded High Fire Threat District (HFTD) is warranted (i.e., beyond existing Tier 2 and Tier 3 areas). This section shall include a discussion of any fire threat assessment of its service territory performed by the electrical corporation. In the event that the electrical corporation's assessment determines the fire threat rating for any part of its service territory is insufficient (i.e., the actual fire threat is greater than what is indicated in the CPUC Fire Threat Map and High Fire Threat District designations), the corporation shall identify those areas for consideration of HFTD modification, based on the new information or environmental changes. To the extent this identification relies upon a meteorological or climatological study, a thorough explanation and copy of the study shall be included.

Instructions for Table 19:

In the "Rank" column, numerically rank the trends anticipated to exhibit the greatest change and have the greatest impact on ignition probability and estimated wildfire consequence (be it to increase or decrease ignition probability and estimated wildfire consequence) in ten years. Rank in order from 1 to 8, where 1 represents the greatest anticipated change or impact on ignition probability and estimated wildfire consequence and 8 is the least anticipated change or impact.

In the "Comments" column, provide a narrative to describe the expected change and expected impact on the utility's network, including whether the trend is expected to significantly increase risk, moderately increase risk, have limited or no impact, moderately decrease risk, or significantly decrease risk. Use quantitative estimates wherever possible. Also outline any programs being implemented to specifically address this trend.

Table 19: Macro trends impacting ignition probability and/or wildfire consequence

Rank	Macro trends impacting utility ignited ignition probability and estimated wildfire consequence by year 10	Comments
	Change in ignition probability and estimated wildfire consequence due to climate change	
	Change in ignition probability and estimated wildfire consequence due to relevant invasive species, such as bark beetles	
	Change in ignition probability and estimated wildfire consequence due to other drivers of change in fuel density and moisture	
	Population changes (including Access and Functional Needs population) that could be impacted by utility ignition	
	Population changes in HFTD that could be impacted by utility ignition	

	Population changes in WUI that could be impacted by utility ignition	
	Utility infrastructure location in HFTD vs non-HFTD	
	Utility infrastructure location in urban vs rural vs highly rural areas	[2]

List and describe any additional macro trends impacting ignition probability and estimated wildfire consequence within utility service territory, including trends within the control of the utility, trends within the utility's ability to influence, and externalities (i.e., trends beyond the utility's control, such as population changes within the utility's territory).

List and describe all relevant drivers of ignition probability and estimated wildfire consequences and the mitigations that are identified in the Risk Assessment Mitigation Phase (RAMP) and not included in the above, including how these are expected to evolve. Rank these drivers from highest to lowest risk and describe how they are expected to evolve.

4.3 Change in ignition probability drivers

Based on the implementation of the above wildfire mitigation initiatives, explain how the utility sees its ignition probability drivers evolving over the 3 year term of the WMP. Focus on ignition probability and estimated wildfire consequence reduction by ignition probability driver, detailed risk driver, and include a description of how the utility expects to see incidents evolve over the same period, both in total number (of occurrence of a given incident type, whether resulting in a near miss or in an ignition) and in likelihood of causing an ignition by type. Outline methodology for determining ignition probability from events, including data used to determine likelihood of ignition probability, such as past ignition events, number of near misses, and description of events (including vegetation and equipment condition).

4.4 Directional vision for necessity of PSPS

Describe any lessons learned from PSPS since the utility's last WMP submission and expectations for how the utility's PSPS program will evolve over the coming 1, 3, and 10 years. Be specific by including a description of the utility's protocols and thresholds for PSPS implementation. Include a quantitative description of how the circuits and numbers of customers that the utility expects will be impacted by any necessary PSPS events is expected to evolve over time. The description of protocols must be sufficiently detailed and clear to enable a skilled operator to follow the same protocols.

[2] Comment on difference in approach to serving customers in urban versus rural versus highly rural areas.

When calculating anticipated PSPS, consider recent weather extremes, including peak weather conditions over the past 10 years as well as recent weather years and how the utility's current PSPS protocols would be applied to those years.

Instructions for Table 20:

Rank order the characteristic of PSPS events (in terms of numbers of customers affected, frequency, scope, and duration) anticipated to change the most and have the greatest impact on reliability (be it to increase or decrease) over the next ten years. Rank in order from 1 to 9, where 1 means greatest anticipated change or impact and 9 means minimal change or impact on ignition probability and estimated wildfire consequence. To the right of the ranked magnitude of impact, indicate whether the impact is to significantly increase reliability, moderately increase reliability, have limited or no impact, moderately decrease reliability, or significantly decrease reliability. For each, include comments describing expected change and expected impact, using quantitative estimates wherever possible.

Table 20: Anticipated characteristics of PSPS use over next 10 years

Rank order 1-9	PSPS characteristic	Significantly increase; increase; no change; decrease; significantly decrease	Comments
	Number of customers affected by PSPS events (total)		
	Number of customers affected by PSPS events (normalized by fire weather, e.g., Red Flag Warning line mile days)		
	Frequency of PSPS events in number of instances where utility operating protocol requires de-energization of a circuit or portion thereof to reduce ignition probability (total)		
	Frequency of PSPS events in number of instances where utility operating protocol requires de-energization of a circuit or portion thereof to reduce ignition probability (normalized by fire weather, e.g., Red Flag Warning line mile days)		
	Scope of PSPS events in circuit-events, measured in number of events multiplied by number of circuits targeted for de-energization (total)		
	Scope of PSPS events in circuit-events, measured in number of events multiplied by		

	number of circuits targeted for de-energization (normalized by fire weather, e.g., Red Flag Warning line mile days)		
	Duration of PSPS events in customer hours (total)		
	Duration of PSPS events in customer hours (normalized by fire weather, e.g., Red Flag Warning line mile days)		
	Other		

5 Wildfire mitigation strategy and programs for 2019 and for each year of the 3-year WMP term

5.1 Wildfire mitigation strategy

Describe organization-wide wildfire mitigation strategy and goals for each of the following time periods:

1. Before the upcoming wildfire season, as defined by the California Department of Forestry and Fire Protection (CAL FIRE),
2. Before the next annual update,
3. Within the next 3 years, and
4. Within the next 10 years.

The description of utility wildfire mitigation strategy shall:

A. Discuss the utility's approach to determining how to manage wildfire risk (in terms of ignition probability and estimated wildfire consequence) as distinct from managing risks to safety and/or reliability. Describe how this determination is made both for (1) the types of activities needed and (2) the extent of those activities needed to mitigate these two different groups of risks. Describe to what degree the activities needed to manage wildfire risk may be incremental to those needed to address safety and/or reliability risks.
B. Include a summary of what major investments and implementation of wildfire mitigation initiatives achieved over the past year, any lessons learned, any changed circumstances for the 2020 WMP term (i.e., 2020-2022), and any corresponding adjustment in priorities for the upcoming plan term. Organize summaries of initiatives by the wildfire mitigation categories listed in Section 5.3.
C. List and describe all challenges associated with limited resources and how these challenges are expected to evolve over the next 3 years.
D. Outline how the utility expects new technologies and innovations to impact the utility's strategy and implementation approach over the next 3 years, including the utility's program for integrating new technologies into the utility's grid.

5.2 Wildfire Mitigation Plan implementation

Describe the processes and procedures the electrical corporation will use to do all the following:

A. Monitor and audit the implementation of the plan. Include what is being audited, who conducts the audits, what type of data is being collected, and how the data undergoes quality assurance and quality control.
B. Identify any deficiencies in the plan or the plan's implementation and correct those deficiencies.
C. Monitor and audit the effectiveness of inspections, including inspections performed by contractors, carried out under the plan and other applicable statutes and commission rules.
D. For all data that is used to drive wildfire-related decisions, including grid operations, capital allocation, community engagement, and other areas, provide a thorough description of the utility's data architecture and flows. List and describe 1) all dashboards and reports directly or indirectly related to ignition probability and estimated wildfire consequences and reduction, and 2) all available GIS data and products. For each, include metadata and a data dictionary that defines all information about the data. For each, also describe how the utility collects

data, including a list of all wildfire-related data elements, where it is stored, how it is accessed, and by whom. Explain processes for QA/QC, cleaning and analyzing, normalizing, and utilizing data to drive internal decisions. Include list of internal data standards and cross-reference for they datasets or map products to which the standards apply.

5.3 Detailed wildfire mitigation programs

In this section, describe how the utility's specific programs and initiatives plan to execute the strategy set out in Section 5.1. The specific programs and initiatives are divided into 10 categories, with each providing a space for a narrative description of the utility's initiatives and a summary table for numeric input in the subsequent tables in this section. The initiatives are organized by the following categories provided in this section:

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
7. Data governance
8. Resource allocation methodology
9. Emergency planning and preparedness
10. Stakeholder cooperation and community engagement

To the extent applicable and relevant, if an electric utility has completed a Safety Model and Assessment Proceeding (S-MAP) and Risk Assessment Mitigation Phase (RAMP) as part of its General Rate Case that identifies safety models or programs the electrical corporation has implemented to mitigate ignition probability and estimated wildfire consequence, then the models or programs identified pursuant to this section must comport with those identified in the S-MAP proceeding. Describe any differences with S-MAP and RAMP and provide rationale.

Instructions for Table 21 through Table 30:

List and summarize each initiative using the tables below for each corresponding category. Provide a separate line item for each initiative within each category. Use the initiative rows provided for these initiatives undertaken by the utility and create new rows for initiatives only when absolutely necessary. Where the utility plans to conduct additional activities that cannot be categorized into the initiatives below, add a corresponding row to the table in the relevant category and add details on each activity to complete the row according to instructions before.

For each wildfire mitigation activity, report information on:

1. total per-initiative spend in dollars ($);
2. line miles to be treated (as applicable)[3] in miles (mi);
3. spend per treated line mile (or, where initiative is not implemented on a per-line-mile basis, per total line miles of the system);
4. ignition probability drivers targeted (from the list of ignition probability drivers indicated in utility SDR Table 24 Key drivers of ignition probability, or other as needed);
5. risk reduction of the activity according to utility multi-attribute value function (MAVF); and
6. risk-spend efficiency in dollars per unit of risk reduction; and
7. other risk drivers addressed.

For the quantitative characteristics of the activities, six values shall be reported for each activity. These include numbers for the plan for 2019, actual activity spending and other calculations for the activity as actually implemented in 2019, the plan for year 1 of this WMP, estimates for years 2 and 3 of this WMP, and a subtotal for the 3-year WMP term ("2020-2022 plan total").

For each activity, also:

1. identify whether the program/strategy is existing or new;
2. if existing, identify the proceeding where the program/strategy costs have been subjected to Commission review;
3. if new, identify any memorandum account where related costs are being tracked and provide an explanation of how double tracking is prevented in the comments;

[3] Where a given activity does not take place in geographic distribution across the service territory (e.g., personnel work procedures and training in conditions of elevated fire risk), input "N/A" in the corresponding cell.

4. indicate whether the program/strategy is implemented in compliance with existing regulations or exceeds current regulatory requirements;
5. if a program/strategy is identified as meeting a current regulatory requirement, cite the associated order, rule, or code;
6. include comments as needed to clarify or explain the data provided.

5.3.1 Risk assessment and mapping

Description of programs to reduce ignition probability and wildfire consequence

For each of the below initiatives, provide a detailed description and approximate timeline of each, whether already implemented or planned, to minimize the risk of its equipment or facilities causing wildfires. Include a description for the utility's programs, the utility's rationale behind each of the elements of this program, the utility's prioritization approach/methodology to determine spending and deployment of human and other resources, how the utility will conduct audits or other quality checks on each program, how the utility plans to demonstrate over time whether each component is effective and, if not, how the utility plans to evolve each component to ensure effective spend of ratepayer funds.

Include descriptions across each of the following initiatives. Input the following initiative names into a spreadsheet formatted according to the template below and input information for each cell in the row.

1. A summarized risk map showing the overall ignition probability and estimated wildfire consequence along electric lines and equipment
2. Climate-driven risk map and modelling based on various relevant weather scenarios
3. Ignition probability mapping showing the probability of ignition along the electric lines and equipment
4. Initiative mapping and estimation of wildfire and PSPS risk-reduction impact
5. Match drop simulations showing the potential wildfire consequence of ignitions that occur along the electric lines and equipment
6. Weather-driven risk map and modelling based on various relevant weather scenarios
7. Other / not listed [only if an initiative cannot feasibly be classified within those listed above]

Table 21: Risk assessment and mapping

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
[EXAMPLE] A summarized risk map showing the overall ignition probability and estimated wildfire consequence along electric lines and equipment	2019 plan													
	2019 actual													
	2020													
	2021													
	2022													
	2020-2022 plan total													

For each of the above initiatives, describe the utility's current program and provide an explanation of how the utility expects to evolve the utility's program over each of the following time periods:

1. Before the upcoming wildfire season,
2. Before the next annual update,
3. Within the next 3 years, and
4. Within the next 10 years.

5.3.2 Situational awareness and forecasting

Description of programs to reduce ignition probability and wildfire consequence

For each of the below initiatives, provide a detailed description and approximate timeline of each, whether already implemented or planned, to minimize the risk of its equipment or facilities causing wildfires. Include a description of the utility's initiatives, the utility's rationale behind each of the elements of the initiatives, the utility's prioritization approach/methodology to determine spending and deployment of human and other resources, how the utility will conduct audits or other quality checks on each initiative, how the utility plans to demonstrate over time whether each component of the initiatives is effective and, if not, how the utility plans to evolve each component to ensure effective spend of ratepayer funds.

Include descriptions across each of the following initiatives. Input the following initiative names into a spreadsheet formatted according to the template below and input information for each cell in the row.

1. Advanced weather monitoring and weather stations
2. Continuous monitoring sensors
3. Fault indicators for detecting faults on electric lines and equipment
4. Forecast of a fire risk index, fire potential index, or similar
5. Personnel monitoring areas of electric lines and equipment in elevated fire risk conditions
6. Weather forecasting and estimating impacts on electric lines and equipment
7. Other / not listed [only if an initiative cannot feasibly be classified within those listed above]

Table 22: Situational awareness and forecasting

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
[EXAMPLE] Advanced weather monitoring and weather stations	2019 plan													
	2019 actual													
	2020													
	2021													
	2022													
	2020-2022 plan total													

For each of the above initiatives, describe the utility's current program and provide an explanation of how the utility expects to evolve the utility's program over each of the following time periods:

1. Before the upcoming wildfire season,
2. Before the next annual update,
3. Within the next 3 years, and
4. Within the next 10 years.

5.3.3 Grid design and system hardening

Describe utility approach to the following categories of maintenance of transmission lines, distribution lines, and equipment, respectively:

1. Routine maintenance programs and protocols (i.e., covering general maintenance approach and programmatic structure),
2. Non-routine maintenance, further delineated into:
    a. Emergency response maintenance/repair, and
    b. Inspection response maintenance/repair.

Discuss proactive replacement programs versus run-to-failure models for each group, including:

1. Whether there are specific line elements or equipment that are prioritized for preventive maintenance or replacement,
2. How those programs are established,
3. What data or information is utilized to make those determinations, and
4. What level of subjectivity is implemented in making those determinations

Description of programs to reduce ignition probability and wildfire consequence

For each of the below initiatives, provide a detailed description and approximate timeline of each, whether already implemented or planned, to minimize the risk of its equipment or facilities causing wildfires. Include a description of the utility's initiatives, the utility's rationale behind each of the elements of the initiatives, the utility's prioritization approach/methodology to determine spending and deployment of human and other resources, how the utility will conduct audits or other quality checks on each initiative, how the utility plans to demonstrate over time whether each component of the initiatives is effective and, if not, how the utility plans to evolve each component to ensure effective spend of ratepayer funds.

Include descriptions across each of the following initiatives. Input the following initiative names into a spreadsheet formatted according to the template below and input information for each cell in the row.

1. Capacitor maintenance and replacement program
2. Circuit breaker maintenance and installation to de-energize lines upon detecting a fault
3. Covered conductor installation
4. Covered conductor maintenance
5. Crossarm maintenance, repair, and replacement
6. Distribution pole replacement and reinforcement, including with composite poles
7. Expulsion fuse replacement
8. Grid topology improvements to mitigate or reduce PSPS events
9. Installation of system automation equipment
10. Maintenance, repair, and replacement of connectors, including hotline clamps

11. Mitigation of impact on customers and other residents affected during PSPS event
12. Other corrective action
13. Pole loading infrastructure hardening and replacement program based on pole loading assessment program
14. Transformers maintenance and replacement
15. Transmission tower maintenance and replacement
16. Undergrounding of electric lines and/or equipment
17. Updates to grid topology to minimize risk of ignition in HFTDs
18. Other / not listed [only if an initiative cannot feasibly be classified within those listed above]

Table 23: Grid design and system hardening

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
[EXAMPLE] Capacitor maintenance and replacement program	2019 plan													
	2019 actual													
	2020													
	2021													
	2022													
	2020-2022 plan total													

For each of the above initiatives, describe the utility's current program and provide an explanation of how the utility expects to evolve the utility's program over each of the following time periods:

1. Before the upcoming wildfire season,
2. Before the next annual update,
3. Within the next 3 years, and
4. Within the next 10 years.

5.3.4 Asset management and inspections

Explain the rationale for any utility ignition probability-specific inspections (e.g., "enhanced inspections") within the HFTD as deemed necessary over and above the standard inspections. This shall include information about how (i.e., criteria, protocols, etc.) the electrical corporation determines additional inspections are necessary.

Describe the utility's maintenance protocols relating to maintenance of any electric lines or equipment that could, directly or indirectly, relate to wildfire ignition. Include in the description the threshold by which the utility makes decisions of whether to (1) repair, or (2) replace electric lines and equipment. Describe all electric lines and equipment that the utility "runs-to-failure", those that the utility maintains on a risk-based maintenance plan, and those that are managed by other approaches; describe each approach. Explain the maintenance program that the utility follows and rationale for all lines and equipment.

Description of programs to reduce ignition probability and wildfire consequence

For each of the below initiatives, provide a detailed description and approximate timeline of each, whether already implemented or planned, to minimize the risk of its equipment or facilities causing wildfires. Include a description for the utility's programs, the utility's rationale behind each of the elements of this program, the utility's prioritization approach/methodology to determine spending and deployment of human and other resources, how the utility will conduct audits or other quality checks on each program, how the utility plans to demonstrate over time whether each component is effective and, if not, how the utility plans to evolve each component to ensure effective spend of ratepayer funds.

Include descriptions across each of the following initiatives. Input the following initiative names into a spreadsheet formatted according to the template below and input information for each cell in the row.

1. Detailed inspections of distribution electric lines and equipment
2. Detailed inspections of transmission electric lines and equipment
3. Improvement of inspections
4. Infrared inspections of distribution electric lines and equipment
5. Infrared inspections of transmission electric lines and equipment
6. Intrusive pole inspections
7. LiDAR inspections of distribution electric lines and equipment
8. LiDAR inspections of transmission electric lines and equipment
9. Other discretionary inspection of distribution electric lines and equipment, beyond inspections mandated by rules and regulations
10. Other discretionary inspection of transmission electric lines and equipment, beyond inspections mandated by rules and regulations
11. Patrol inspections of distribution electric lines and equipment
12. Patrol inspections of transmission electric lines and equipment
13. Pole loading assessment program to determine safety factor
14. Quality assurance / quality control of inspections
15. Substation inspections

16. Other / not listed [only if an initiative cannot feasibly be classified within those listed above]

Table 24: Asset management and inspections

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
[EXAMPLE] Detailed inspections of distribution electric lines and equipment	2019 plan													
	2019 actual													
	2020													
	2021													
	2022													
	2020-2022 plan total													

For each of the above initiatives, describe the utility's current program and provide an explanation of how the utility expects to evolve the utility's program over each of the following time periods:

1. Before the upcoming wildfire season,
2. Before the next annual update,
3. Within the next 3 years, and
4. Within the next 10 years.

5.3.5 Vegetation management and inspections

Explain the rationale for any utility ignition probability-specific inspections (e.g., "enhanced inspections") within the HFTD as deemed necessary over and above the standard inspections. This shall include information about how (i.e., criteria, protocols, etc.) the electrical corporation determines additional inspections are necessary.

Describe the utility's vegetation treatment protocols relating to treatment of any vegetation that could pose a grow-in or fall-in risk to utility equipment. Include in the description the threshold by which the utility makes decisions of whether to (1) treat, or (2) remove vegetation.

Discuss the overall objectives, strategies, and tactics of the electrical corporation for vegetation management. In the discussion,

1. Address how the electrical corporation has collaborated with local land managers to leverage opportunities for fuel treatment activities and fire break creation, and compliance with other local, state, and federal forestry and timber regulations.
2. Discuss how the electrical corporation identifies and determines which vegetation is at risk of ignition from utility electric lines and equipment.
3. Describe how (i.e., criteria, data, protocols, studies, etc.) the utility made the determination to trim any vegetation beyond required clearances in GO 95.
4. Describe utility plan to mitigate identified trees with strike potential, including information about how (i.e., criteria, protocols, data, statutes, etc.) the electrical corporation identifies and defines "hazard trees" and "trees with strike potential" based on height and feasible path to strike powerlines or equipment. Describe utility plan to identify reliability/at-risk tree species to trim or remove, where feasible, per location-specific criteria.
5. Include a discussion of how the utility's overall vegetation management initiatives address risks that may arise from trimming or removing trees, including but not limited to erosion, wind, flooding, etc.

Description of programs to reduce ignition probability and wildfire consequence

For each of the below initiatives, provide a detailed description and approximate timeline of each, whether already implemented or planned, to minimize the risk of its equipment or facilities causing wildfires. Include a description of the utility's initiatives, the utility's rationale behind each of the elements of the initiatives, the utility's prioritization approach/methodology to determine spending and deployment of human and other resources, how the utility will conduct audits or other quality checks on each initiative, how the utility plans to demonstrate over time whether each component of the initiatives is effective and, if not, how the utility plans to evolve each component to ensure effective spend of ratepayer funds.

Include descriptions across each of the following initiatives. Input the following initiative names into a spreadsheet formatted according to the template below and input information for each cell in the row.

1. Additional efforts to manage community and environmental impacts
2. Detailed inspections of vegetation around distribution electric lines and equipment

3. Detailed inspections of vegetation around transmission electric lines and equipment
4. Emergency response vegetation management due to red flag warning or other urgent conditions
5. Fuel management and reduction of "slash" from vegetation management activities
6. Improvement of inspections
7. LiDAR inspections of vegetation around distribution electric lines and equipment
8. LiDAR inspections of vegetation around transmission electric lines and equipment
9. Other discretionary inspection of vegetation around distribution electric lines and equipment, beyond inspections mandated by rules and regulations
10. Other discretionary inspection of vegetation around transmission electric lines and equipment, beyond inspections mandated by rules and regulations
11. Patrol inspections of vegetation around distribution electric lines and equipment
12. Patrol inspections of vegetation around transmission electric lines and equipment
13. Quality assurance / quality control of inspections
14. Recruiting and training of vegetation management personnel
15. Remediation of at-risk species
16. Removal and remediation of trees with strike potential to electric lines and equipment
17. Substation inspections
18. Substation vegetation management
19. Vegetation inventory system
20. Vegetation management to achieve clearances around electric lines and equipment
21. Other / not listed [only if an initiative cannot feasibly be classified within those listed above]

Table 25: Vegetation management and inspections

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
[EXAMPLE] Additional efforts to manage	2019 plan													
	2019 actual													
	2020													

community and environmental impacts	2021													
	2022													
	2020-2022 plan total													

For each of the above initiatives, describe the utility's current program and provide an explanation of how the utility expects to evolve the utility's program over each of the following time periods:

1. Before the upcoming wildfire season,
2. Before the next annual update,
3. Within the next 3 years, and
4. Within the next 10 years.

5.3.6 Grid operations and protocols

Description of programs to reduce ignition probability and wildfire consequence

For each of the below initiatives, provide a detailed description and approximate timeline of each, whether already implemented or planned, to minimize the risk of its equipment or facilities causing wildfires. Include a description of the utility's initiatives, the utility's rationale behind each of the elements of the initiatives, the utility's prioritization approach/methodology to determine spending and deployment of human and other resources, how the utility will conduct audits or other quality checks on each initiative, how the utility plans to demonstrate over time whether each component of the initiatives is effective and, if not, how the utility plans to evolve each component to ensure effective spend of ratepayer funds.

Include descriptions across each of the following initiatives. Input the following initiative names into a spreadsheet formatted according to the template below and input information for each cell in the row.

1. Automatic recloser operations
2. Crew-accompanying ignition prevention and suppression resources and services
3. Personnel work procedures and training in conditions of elevated fire risk
4. Protocols for PSPS re-energization
5. PSPS events and mitigation of PSPS impacts
6. Stationed and on-call ignition prevention and suppression resources and services
7. Other / not listed [only if an initiative cannot feasibly be classified within those listed above]

Table 26: Grid operations and protocols

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
[EXAMPLE] * Automatic recloser operations	2019 plan													
	2019 actual													
	2020													
	2021													
	2022													
	2020-2022													

	plan total													

For each of the above initiatives, describe the utility's current program and provide an explanation of how the utility expects to evolve the utility's program over each of the following time periods:

1. Before the upcoming wildfire season,
2. Before the next annual update,
3. Within the next 3 years, and
4. Within the next 10 years.

5.3.7 Data governance

Description of programs to reduce ignition probability and wildfire consequence

For each of the below initiatives, provide a detailed description and approximate timeline of each, whether already implemented or planned, to minimize the risk of its equipment or facilities causing wildfires. Include a description of the utility's initiatives, the utility's rationale behind each of the elements of the initiatives, the utility's prioritization approach/methodology to determine spending and deployment of human and other resources, how the utility will conduct audits or other quality checks on each initiative, how the utility plans to demonstrate over time whether each component of the initiatives is effective and, if not, how the utility plans to evolve each component to ensure effective spend of ratepayer funds.

Include descriptions across each of the following initiatives. Input the following initiative names into a spreadsheet formatted according to the template below and input information for each cell in the row.

1. Centralized repository for data
2. Collaborative research on utility ignition and/or wildfire
3. Documentation and disclosure of wildfire-related data and algorithms
4. Tracking and analysis of near miss data
5. Other / not listed [only if an initiative cannot feasibly be classified within those listed above]

The list provided is non-exhaustive and utilities shall add additional initiatives to this table as their individual programs are designed and structured. Do not create a new initiative if the utility's initiatives can be classified under a provided initiative.

Table 27: Data governance

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
[EXAMPLE] Centralized repository for data	2019 plan													
	2019 actual													
	2020													
	2021													
	2022													
	2020-2022 plan total													

For each of the above initiatives, describe the utility's current program and provide an explanation of how the utility expects to evolve the utility's program over each of the following time periods:

1. Before the upcoming wildfire season,
2. Before the next annual update,
3. Within the next 3 years, and
4. Within the next 10 years.

5.3.8 Resource allocation methodology

Description of programs to reduce ignition probability and wildfire consequence

For each of the below initiatives, provide a detailed description and approximate timeline of each, whether already implemented or planned, to minimize the risk of its equipment or facilities causing wildfires. Include a description of the utility's initiatives, the utility's rationale behind each of the elements of the initiatives, the utility's prioritization approach/methodology to determine spending and deployment of human and other resources, how the utility will conduct audits or other quality checks on each initiative, how the utility plans to demonstrate over time whether each component of the initiatives is effective and, if not, how the utility plans to evolve each component to ensure effective spend of ratepayer funds.

Include descriptions across each of the following resource allocation methodology and sensitivities initiatives, including a description of the data flow into the calculations involved in each. Input the following initiative names into a spreadsheet formatted according to the template below and input information for each cell in the row.

1. Allocation methodology development and application
2. Risk reduction scenario development and analysis
3. Risk spend efficiency analysis
4. Other / not listed [only if an initiative cannot feasibly be classified within those listed above]

For each of the below initiatives, describe the utility's current program and provide an explanation of how the utility expects to evolve the utility's program over each of the following time periods:

1. Before the upcoming wildfire season
2. Before the next annual update
3. Within the next 3 years
4. Within the next 10 years

The list provided is non-exhaustive and utilities shall add additional initiatives to this table as their individual programs are designed and structured. Do not create a new initiative if the utility's initiatives can be classified under a provided initiative. Where the columns listed do not apply or cannot be meaningfully calculated for a given resource allocation methodology and sensitivities initiative, "N/A" may be logged in the corresponding cell.

Table 28: Resource allocation methodology

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
[EXAMPLE] Allocation methodology development and application	2019 plan													
	2019 actual													
	2020													
	2021													
	2022													
	2020-2022 plan total													

For each of the above initiatives, describe the utility's current program and provide an explanation of how the utility expects to evolve the utility's program over each of the following time periods:

1. Before the upcoming wildfire season,
2. Before the next annual update,
3. Within the next 3 years, and
4. Within the next 10 years.

5.3.9 Emergency planning and preparedness

Include a general description of the overall emergency preparedness and response plan, and detail:

1. A description of how plan is consistent with disaster and emergency preparedness plan prepared pursuant to Public Utilities Code Section 768.6, including:
   a. Plans to prepare for and restore service, including workforce mobilization (including mutual aid and contractors) and prepositioning equipment and employees
   b. Emergency communications, including community outreach, public awareness, and communications efforts before, during, and after a wildfire in English, Spanish, and the top three primary languages used in California other than English or Spanish, as determined by United States Census data
   c. Showing that the utility has an adequate and trained workforce to promptly restore service after a major event, taking into account mutual aid and contractors
2. Customer support in emergencies, including protocols for compliance with requirements adopted by the CPUC regarding activities to support customers during and after a wildfire, including:
   a. Outage reporting
   b. Support for low income customers
   c. Billing adjustments
   d. Deposit waivers
   e. Extended payment plans
   f. Suspension of disconnection and nonpayment fees
   g. Repair processing and timing
   h. Access to utility representatives
3. Coordination with Public Safety Partners, such as stationing utility personnel in county Emergency Operations Centers

Describe utility efforts to identify which additional languages are in use within the utility's service territory, including plan to identify and mitigate language access challenges.

Description of programs to reduce ignition probability and wildfire consequence

For each of the below initiatives, provide a detailed description and approximate timeline of each, whether already implemented or planned, to minimize the risk of its equipment or facilities causing wildfires. Include a description of the utility's initiatives, the utility's rationale behind each of the elements of the initiatives, the utility's prioritization approach/methodology to determine spending and deployment of human and other resources, how the utility will conduct audits or other quality checks on each initiative, how the utility plans to demonstrate over time whether

each component of the initiatives is effective and, if not, how the utility plans to evolve each component to ensure effective spend of ratepayer funds.

Include descriptions across each of the following initiatives. Input the following initiative names into a spreadsheet formatted according to the template below and input information for each cell in the row.

1. Adequate and trained workforce for service restoration
2. Community outreach, public awareness, and communications efforts
3. Customer support in emergencies
4. Disaster and emergency preparedness plan
5. Preparedness and planning for service restoration
6. Protocols in place to learn from wildfire events
7. Other / not listed [only if an initiative cannot feasibly be classified within those listed above]

The list provided is non-exhaustive and utilities shall add additional initiatives to this table as their individual programs are designed and structured. Do not create a new initiative if the utility's initiatives can be classified under a provided initiative.

Table 29: Emergency planning and preparedness

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
[EXAMPLE] Adequate and trained workforce for service restoration	2019 plan													
	2019 actual													
	2020													
	2021													
	2022													
	2020-2022 plan total													

For each of the above initiatives, describe the utility's current program and provide an explanation of how the utility expects to evolve the utility's program over each of the following time periods:

1. Before the upcoming wildfire season,

2. Before the next annual update,
3. Within the next 3 years, and
4. Within the next 10 years.

5.3.10 Stakeholder cooperation and community engagement

Description of programs to reduce ignition probability and wildfire consequence

For each of the below initiatives, provide a detailed description and approximate timeline of each, whether already implemented or planned, to minimize the risk of its equipment or facilities causing wildfires. Include a description of the utility's initiatives, the utility's rationale behind each of the elements of the initiatives, the utility's prioritization approach/methodology to determine spending and deployment of human and other resources, how the utility will conduct audits or other quality checks on each initiative, how the utility plans to demonstrate over time whether each component of the initiatives is effective and, if not, how the utility plans to evolve each component to ensure effective spend of ratepayer funds.

Include descriptions across each of the following initiatives. Input the following initiative names into a spreadsheet formatted according to the template below and input information for each cell in the row.

1. Community engagement
2. Cooperation and best practice sharing with agencies outside CA
3. Cooperation with suppression agencies
4. Forest service and fuel reduction cooperation and joint roadmap
5. Other / not listed [only if an initiative cannot feasibly be classified within those listed above]

The list provided is non-exhaustive and utilities shall add additional initiatives to this table as their individual programs are designed and structured. Do not create a new initiative if the utility's initiatives can be classified under a provided initiative.

Table 30: Stakeholder cooperation and community engagement

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
[EXAMPLE] Community engagement	2019 plan													
	2019 actual													
	2020													
	2021													
	2022													
	2020-2022 plan total													

For each of the above initiatives, describe the utility's current program and provide an explanation of how the utility expects to evolve the utility's program over each of the following time periods:

1. Before the upcoming wildfire season,
2. Before the next annual update,
3. Within the next 3 years, and
4. Within the next 10 years.

5.3.11 Definitions of initiatives by category

Category	Initiative	Definition
A. Risk mapping and simulation	A summarized risk map that shows the overall ignition probability and estimated wildfire consequence along the electric lines and equipment	Development and use of tools and processes to develop and update risk map and simulations and to estimate risk reduction potential of initiatives for a given portion of the grid (or more granularly, e.g., circuit, span, or asset). May include verification efforts, independent assessment by experts, and updates.
	Climate-driven risk map and modelling based on various relevant weather scenarios	Development and use of tools and processes to estimate incremental risk of foreseeable climate scenarios, such as drought, across a given portion of the grid (or more granularly, e.g., circuit, span, or asset). May include verification efforts, independent assessment by experts, and updates.
	Ignition probability mapping showing the probability of ignition along the electric lines and equipment	Development and use of tools and processes to assess the risk of ignition across regions of the grid (or more granularly, e.g., circuits, spans, or assets).
	Initiative mapping and estimation of wildfire and PSPS risk-reduction impact	Development of a tool to estimate the risk reduction efficacy (for both wildfire and PSPS risk) and risk-spend efficiency of various initiatives.
	Match drop simulations showing the potential wildfire consequence of ignitions that occur along the electric lines and equipment	Development and use of tools and processes to assess the impact of potential ignition and risk to communities (e.g., in terms of potential fatalities, structures burned, monetary damages, area burned, impact on air quality and greenhouse gas, or GHG, reduction goals, etc.).
B. Situational awareness and forecasting	Advanced weather monitoring and weather stations	Purchase, installation, maintenance, and operation of weather stations. Collection, recording, and analysis of weather data from weather stations and from external sources.
	Continuous monitoring sensors	Installation, maintenance, and monitoring of sensors and sensorized equipment used to monitor the condition of electric lines and equipment.
	Fault indicators for detecting faults on electric lines and equipment	Installation and maintenance of fault indicators.
	Forecast of a fire risk index, fire potential index, or similar	Index that uses a combination of weather parameters (such as wind speed, humidity, and temperature), vegetation and/or fuel conditions, and other factors to judge current fire risk and to create a forecast indicative of fire risk. A sufficiently granular index shall inform operational decision-making.
	Personnel monitoring areas of electric lines and equipment in elevated fire risk conditions	Personnel position within utility service territory to monitor system conditions and weather on site. Field observations shall inform operational decisions.

	Weather forecasting and estimating impacts on electric lines and equipment	Development methodology for forecast of weather conditions relevant to utility operations, forecasting weather conditions and conducting analysis to incorporate into utility decision-making, learning and updates to reduce false positives and false negatives of forecast PSPS conditions.
C. Grid design and system hardening	Capacitor maintenance and replacement program	Remediation, adjustments, or installations of new equipment to improve or replace existing capacitor equipment.
	Circuit breaker maintenance and installation to de-energize lines upon detecting a fault	Remediation, adjustments, or installations of new equipment to improve or replace existing fast switching circuit breaker equipment to improve the ability to protect electrical circuits from damage caused by overload of electricity or short circuit.
	Covered conductor installation	Installation of covered or insulated conductors to replace standard bare or unprotected conductors (defined in accordance with GO 95 as supply conductors, including but not limited to lead wires, not enclosed in a grounded metal pole or not covered by: a "suitable protective covering" (in accordance with Rule 22.8), grounded metal conduit, or grounded metal sheath or shield). In accordance with GO 95, conductor is defined as a material suitable for: (1) carrying electric current, usually in the form of a wire, cable or bus bar, or (2) transmitting light in the case of fiber optics; insulated conductors as those which are surrounded by an insulating material (in accordance with Rule 21.6), the dielectric strength of which is sufficient to withstand the maximum difference of potential at normal operating voltages of the circuit without breakdown or puncture; and suitable protective covering as a covering of wood or other non-conductive material having the electrical insulating efficiency (12kV/in. dry) and impact strength (20ft.-lbs) of 1.5 inches of redwood or other material meeting the requirements of Rule 22.8-A, 22.8-B, 22.8-C or 22.8-D.
	Covered conductor maintenance	Remediation and adjustments to installed covered or insulated conductors. In accordance with GO 95, conductor is defined as a material suitable for: (1) carrying electric current, usually in the form of a wire, cable or bus bar, or (2) transmitting light in the case of fiber optics; insulated conductors as those which are surrounded by an insulating material (in accordance with Rule 21.6), the dielectric strength of which is sufficient to withstand the maximum difference of potential at normal operating voltages of the circuit without breakdown or puncture; and suitable protective covering as a covering of wood or other non-conductive material having the electrical insulating efficiency (12kV/in. dry) and impact strength (20ft.-lbs) of 1.5 inches of redwood or other material meeting the requirements of Rule 22.8-A, 22.8-B, 22.8-C or 22.8-D.
	Crossarm maintenance, repair, and replacement	Remediation, adjustments, or installations of new equipment to improve or replace existing crossarms, defined as horizontal support attached to poles or structures generally at right angles to the conductor supported in accordance with GO 95.

	Distribution pole replacement and reinforcement, including with composite poles	Remediation, adjustments, or installations of new equipment to improve or replace existing distribution poles (i.e., those supporting lines under 65kV), including with equipment such as composite poles manufactured with materials reduce ignition probability by increasing pole lifespan and resilience against failure from object contact and other events.
	Expulsion fuse replacement	Installations of new and CAL FIRE-approved power fuses to replace existing expulsion fuse equipment.
	Grid topology improvements to mitigate or reduce PSPS events	Plan to support and actions taken to mitigate or reduce PSPS events in terms of geographic scope and number of customers affected, such as installation and operation of electrical equipment to sectionalize or island portions of the grid, microgrids, or local generation.
	Installation of system automation equipment	Installation of electric equipment that increases the ability of the utility to automate system operation and monitoring, including equipment that can be adjusted remotely such as automatic reclosers (switching devices designed to detect and interrupt momentary faults that can reclose automatically and detect if a fault remains, remaining open if so).
	Maintenance, repair, and replacement of connectors, including hotline clamps	Remediation, adjustments, or installations of new equipment to improve or replace existing connector equipment, such as hotline clamps.
	Mitigation of impact on customers and other residents affected during PSPS event	Actions taken to improve access to electricity for customers and other residents during PSPS events, such as installation and operation of local generation equipment (at the community, household, or other level).
	Other corrective action	Other maintenance, repair, or replacement of utility equipment and structures so that they function properly and safely, including remediation activities (such as insulator washing) of other electric equipment deficiencies that may increase ignition probability due to potential equipment failure or other drivers.
	Pole loading infrastructure hardening and replacement program based on pole loading assessment program	Actions taken to remediate, adjust, or install replacement equipment for poles that the utility has identified as failing to meet safety factor requirements in accordance with GO 95 or additional utility standards in the utility's pole loading assessment program.
	Transformers maintenance and replacement	Remediation, adjustments, or installations of new equipment to improve or replace existing transformer equipment.
	Transmission tower maintenance and replacement	Remediation, adjustments, or installations of new equipment to improve or replace existing transmission towers (e.g., structures such as lattice steel towers or tubular steel poles that support lines at or above 65kV).
	Undergrounding of electric lines and/or equipment	Actions taken to convert overhead electric lines and/or equipment to underground electric lines and/or equipment (i.e., located underground and in accordance with GO 128).

	Updates to grid topology to minimize risk of ignition in HFTDs	Changes in the plan, installation, construction, removal, and/or undergrounding to minimize the risk of ignition due to the design, location, or configuration of utility electric equipment in HFTDs.
D. Asset management and inspections	Detailed inspections of distribution electric lines and equipment	In accordance with GO 165, careful visual inspections of overhead electric distribution lines and equipment where individual pieces of equipment and structures are carefully examined, visually and through use of routine diagnostic test, as appropriate, and (if practical and if useful information can be so gathered) opened, and the condition of each rated and recorded.
	Detailed inspections of transmission electric lines and equipment	Careful visual inspections of overhead electric transmission lines and equipment where individual pieces of equipment and structures are carefully examined, visually and through use of routine diagnostic test, as appropriate, and (if practical and if useful information can be so gathered) opened, and the condition of each rated and recorded.
	Improvement of inspections	Identifying and addressing deficiencies in inspections protocols and implementation by improving training and the evaluation of inspectors.
	Infrared inspections of distribution electric lines and equipment	Inspections of overhead electric distribution lines, equipment, and right-of-way using infrared (heat-sensing) technology and cameras that can identify "hot spots", or conditions that indicate deterioration or potential equipment failures, of electrical equipment.
	Infrared inspections of transmission electric lines and equipment	Inspections of overhead electric transmission lines, equipment, and right-of-way using infrared (heat-sensing) technology and cameras that can identify "hot spots", or conditions that indicate deterioration or potential equipment failures, of electrical equipment.
	Intrusive pole inspections	In accordance with GO 165, intrusive inspections involve movement of soil, taking samples for analysis, and/or using more sophisticated diagnostic tools beyond visual inspections or instrument reading.
	LiDAR inspections of distribution electric lines and equipment	Inspections of overhead electric transmission lines, equipment, and right-of-way using LiDAR (Light Detection and Ranging, a remote sensing method that uses light in the form of a pulsed laser to measure variable distances).
	LiDAR inspections of transmission electric lines and equipment	Inspections of overhead electric distribution lines, equipment, and right-of-way using LiDAR (Light Detection and Ranging, a remote sensing method that uses light in the form of a pulsed laser to measure variable distances).
	Other discretionary inspection of distribution electric lines and equipment, beyond inspections mandated by rules and regulations	Inspections of overhead electric transmission lines, equipment, and right-of-way that exceed or otherwise go beyond those mandated by rules and regulations, including GO 165, in terms of frequency, inspection checklist requirements or detail, analysis of and response to problems identified, or other aspects of inspection or records kept.
	Other discretionary inspection of transmission electric lines and	Inspections of overhead electric distribution lines, equipment, and right-of-way that exceed or otherwise go beyond those mandated by rules and regulations, including GO

	equipment, beyond inspections mandated by rules and regulations	165, in terms of frequency, inspection checklist requirements or detail, analysis of and response to problems identified, or other aspects of inspection or records kept.
	Patrol inspections of distribution electric lines and equipment	In accordance with GO 165, simple visual inspections of overhead electric distribution lines and equipment that is designed to identify obvious structural problems and hazards. Patrol inspections may be carried out in the course of other company business.
	Patrol inspections of transmission electric lines and equipment	Simple visual inspections of overhead electric transmission lines and equipment that is designed to identify obvious structural problems and hazards. Patrol inspections may be carried out in the course of other company business.
	Pole loading assessment program to determine safety factor	Calculations to determine whether a pole meets pole loading safety factor requirements of GO 95, including planning and information collection needed to support said calculations. Calculations shall consider many factors including the size, location, and type of pole; types of attachments; length of conductors attached; and number and design of supporting guys, per D.15-11-021.
	Quality assurance / quality control of inspections	Establishment and function of audit process to manage and confirm work completed by employees or subcontractors, including packaging QA/QC information for input to decision-making and related integrated workforce management processes.
	Substation inspections	In accordance with GO 175, inspection of substations performed by qualified persons and according to the frequency established by the utility, including record-keeping.
E. Vegetation management and inspection	Additional efforts to manage community and environmental impacts	Plan and execution of strategy to mitigate negative impacts from utility vegetation management to local communities and the environment, such as coordination with communities to plan and execute vegetation management work or promotion of fire-resistant planting practices
	Detailed inspections of vegetation around distribution electric lines and equipment	Careful visual inspections of vegetation around the right-of-way, where individual trees are carefully examined, visually, and the condition of each rated and recorded.
	Detailed inspections of vegetation around transmission electric lines and equipment	Careful visual inspections of vegetation around the right-of-way, where individual trees are carefully examined, visually, and the condition of each rated and recorded.
	Emergency response vegetation management due to red flag warning or other urgent conditions	Plan and execution of vegetation management activities, such as trimming or removal, executed based upon and in advance of forecast weather conditions that indicate high fire threat in terms of ignition probability and wildfire consequence.
	Fuel management and reduction of "slash" from vegetation management activities	Plan and execution of fuel management activities that reduce the availability of fuel in proximity to potential sources of ignition, including both reduction or adjustment of live fuel (in terms of species or otherwise) and of dead fuel, including "slash" from vegetation

		management activities that produce vegetation material such as branch trimmings and felled trees.
	Improvement of inspections	Identifying and addressing deficiencies in inspections protocols and implementation by improving training and the evaluation of inspectors.
	LiDAR inspections of vegetation around distribution electric lines and equipment	Inspections of right-of-way using LiDAR (Light Detection and Ranging, a remote sensing method that uses light in the form of a pulsed laser to measure variable distances).
	LiDAR inspections of vegetation around transmission electric lines and equipment	Inspections of right-of-way using LiDAR (Light Detection and Ranging, a remote sensing method that uses light in the form of a pulsed laser to measure variable distances).
	Other discretionary inspections of vegetation around distribution electric lines and equipment	Inspections of rights-of-way and adjacent vegetation that may be hazardous, which exceeds or otherwise go beyond those mandated by rules and regulations, in terms of frequency, inspection checklist requirements or detail, analysis of and response to problems identified, or other aspects of inspection or records kept.
	Other discretionary inspections of vegetation around transmission electric lines and equipment	Inspections of rights-of-way and adjacent vegetation that may be hazardous, which exceeds or otherwise go beyond those mandated by rules and regulations, in terms of frequency, inspection checklist requirements or detail, analysis of and response to problems identified, or other aspects of inspection or records kept.
	Patrol inspections of vegetation around distribution electric lines and equipment	Visual inspections of vegetation along rights-of-way that is designed to identify obvious hazards. Patrol inspections may be carried out in the course of other company business.
	Patrol inspections of vegetation around transmission electric lines and equipment	Visual inspections of vegetation along rights-of-way that is designed to identify obvious hazards. Patrol inspections may be carried out in the course of other company business.
	Quality assurance / quality control of vegetation inspections	Establishment and function of audit process to manage and confirm work completed by employees or subcontractors, including packaging QA/QC information for input to decision-making and related integrated workforce management processes.
	Recruiting and training of vegetation management personnel	Programs to ensure that the utility is able to identify and hire qualified vegetation management personnel and to ensure that both full-time employees and contractors tasked with vegetation management responsibilities are adequately trained to perform vegetation management work, according to the utility's wildfire mitigation plan, in addition to rules and regulations for safety.
	Remediation of at-risk species	Actions taken to reduce the ignition probability and wildfire consequence attributable to at-risk vegetation species, such as trimming, removal, and replacement.
	Removal and remediation of trees with strike potential to electric lines and equipment	Actions taken to remove or otherwise remediate trees that could potentially strike electrical equipment, if adverse events such as failure at the ground-level of the tree or branch breakout within the canopy of the tree, occur.
	Substation inspection	Inspection of vegetation surrounding substations, performed by qualified persons and according to the frequency established by the utility, including record-keeping.

	Substation vegetation management	Based on location and risk to substation equipment only, actions taken to reduce the ignition probability and wildfire consequence attributable to contact from vegetation to substation equipment.
	Vegetation inventory system	Inputs, operation, and support for centralized inventory of vegetation clearances updated based upon inspection results, including (1) inventory of species, (2) forecasting of growth, (3) forecasting of when growth threatens minimum right-of-way clearances ("grow-in" risk) or creates fall-in/fly-in risk.
	Vegetation management to achieve clearances around electric lines and equipment	Actions taken to ensure that vegetation does not encroach upon the minimum clearances set forth in Table 1 of GO 95, measured between line conductors and vegetation, such as trimming adjacent or overhanging tree limbs.
F. Grid operations and protocols	Automatic recloser operations	Designing and executing protocols to deactivate automatic reclosers based on local conditions for ignition probability and wildfire consequence.
	Crew-accompanying ignition prevention and suppression resources and services	Those firefighting staff and equipment (such as fire suppression engines and trailers, firefighting hose, valves, and water) that are deployed with construction crews and other electric workers to provide site-specific fire prevention and ignition mitigation during on-site work
	Personnel work procedures and training in conditions of elevated fire risk	Work activity guidelines that designate what type of work can be performed during operating conditions of different levels of wildfire risk. Training for personnel on these guidelines and the procedures they prescribe, from normal operating procedures to increased mitigation measures to constraints on work performed.
	Protocols for PSPS re-energization	Designing and executing procedures that accelerate the restoration of electric service in areas that were de-energized, while maintaining safety and reliability standards.
	PSPS events and mitigation of PSPS impacts	Designing, executing, and improving upon protocols to conduct PSPS events, including development of advanced methodologies to determine when to use PSPS, and to mitigate the impact of PSPS events on affected customers and local residents.
	Stationed and on-call ignition prevention and suppression resources and services	Firefighting staff and equipment (such as fire suppression engines and trailers, firefighting hose, valves, firefighting foam, chemical extinguishing agent, and water) stationed at utility facilities and/or standing by to respond to calls for fire suppression assistance.
G. Data governance	Centralized repository for data	Designing, maintaining, hosting, and upgrading a platform that supports storage, processing, and utilization of all utility proprietary data and data compiled by the utility from other sources.
	Collaborative research on utility ignition and/or wildfire	Developing and executing research work on utility ignition and/or wildfire topics in collaboration with other non-utility partners, such as academic institutions and research groups, to include data-sharing and funding as applicable.

	Documentation and disclosure of wildfire-related data and algorithms	Design and execution of processes to document and disclose wildfire-related data and algorithms to accord with rules and regulations, including use of scenarios for forecasting and stress testing.
	Tracking and analysis of near miss data	Tools and procedures to monitor, record, and conduct analysis of data on near miss events.
H. Resource allocation methodology	Allocation methodology development and application	Development of prioritization methodology for human and financial resources, including application of said methodology to utility decision-making.
	Risk reduction scenario development and analysis	Development of modelling capabilities for different risk reduction scenarios based on wildfire mitigation initiative implementation; analysis and application to utility decision-making.
	Risk spend efficiency analysis	Tools, procedures, and expertise to support analysis of wildfire mitigation initiative risk-spend efficiency, in terms of MAVF and/ or MARS methodologies.
I. Emergency planning and preparedness	Adequate and trained workforce for service restoration	Actions taken to identify, hire, retain, and train qualified workforce to conduct service restoration in response to emergencies, including short-term contracting strategy and implementation.
	Community outreach, public awareness, and communications efforts	Actions to identify and contact key community stakeholders; increase public awareness of emergency planning and preparedness information; and design, translate, distribute, and evaluate effectiveness of communications taken before, during, and after a wildfire, including Access and Functional Needs populations and Limited English Proficiency populations in particular.
	Customer support in emergencies	Resources dedicated to customer support during emergencies, such as website pages and other digital resources, dedicated phone lines, etc.
	Disaster and emergency preparedness plan	Development of plan to deploy resources according to prioritization methodology for disaster and emergency preparedness of utility and within utility service territory (such as considerations for critical facilities and infrastructure), including strategy for collaboration with Public Safety Partners and communities.
	Preparedness and planning for service restoration	Development of plans to prepare the utility to restore service after emergencies, such as developing employee and staff trainings, and to conduct inspections and remediation necessary to re-energize lines and restore service to customers.
	Protocols in place to learn from wildfire events	Tools and procedures to monitor effectiveness of strategy and actions taken to prepare for emergencies and of strategy and actions taken during and after emergencies, including based on an accounting of the outcomes of wildfire events.
J. Stakeholder cooperation and community engagement	Community engagement	Strategy and actions taken to identify and contact key community stakeholders; increase public awareness and support of utility wildfire mitigation activity; and design, translate, distribute, and evaluate effectiveness of related communications. Includes specific strategies and actions taken to address concerns and serve needs of Access and Functional Needs populations and Limited English Proficiency populations in particular.

	Cooperation and best practice sharing with agencies outside CA	Strategy and actions taken to engage with agencies outside of California to exchange best practices both for utility wildfire mitigation and for stakeholder cooperation to mitigate and respond to wildfires.
	Cooperation with suppression agencies	Coordination with CAL FIRE, federal fire authorities, county fire authorities, and local fire authorities to support planning and operations, including support of aerial and ground firefighting in real-time, including information-sharing, dispatch of resources, and dedicated staff.
	Forest service and fuel reduction cooperation and joint roadmap	Strategy and actions taken to engage with local, state, and federal entities responsible for or participating in forest management and fuel reduction activities; and design utility cooperation strategy and joint stakeholder roadmap (plan for coordinating stakeholder efforts for forest management and fuel reduction activities).

5.4 Methodology for enterprise-wide safety risk and wildfire-related risk assessment

Describe methodology for identifying and evaluating enterprise wide safety risk and wildfire related risk, and how that methodology is consistent with the methodology used by other electric utilities or electrical corporations. If the risk identification and evaluation methodology is different, the utility shall explain why in this section.

5.5 Planning for workforce and other limited resources

Include a showing that the utility has an adequately sized and trained workforce to promptly restore service after a major event, taking into account employees of other utilities pursuant to mutual aid agreements and employees of entities that have entered into contracts with the utility.

5.6 Expected outcomes of 3-year plan

5.6.1 Planned utility infrastructure construction and upgrades

Explain how the utility expects the geographic location of transmission and distribution lines to shift over the three-year plan period and discuss its impact on 1) the utility's risk exposure and 2) the utility's wildfire mitigation strategy. Outline portions of grid within HFTD that are highest cost to serve, by highlighting circuits or portions of circuits that exceed $0.5M per customer in capital cost required to harden. Provide justification for the level of hardening required and why the lowest cost path to harden this equipment exceeds $0.5M per customer, including by describing the various alternatives that were considered to reduce ignition probability and estimated wildfire consequence. For each of these sections of the grid, outline any analysis that was conducted around islanding, serving with microgrids, or providing backup generation, all to reduce the impact of PSPS events and reduce ignition probability and estimated wildfire consequence at the lowest possible cost.

Discuss how the utility wildfire mitigation strategy influenced its plan for infrastructure construction (in terms of additions or removal of overhead lines, including undergrounding of overhead lines) as detailed in Section 3.4.2. Discuss how the utility wildfire mitigation strategy influenced its plan for upgrades to overhead lines and substations as detailed in the Section 3.4.2.

Instructions for Table 31:

Assume weather patterns for each year are as consistent with the 5-year historical average and that wildfire mitigation initiatives are implemented according to plan. Report change in drivers of ignition probability based on WMP implementation according to whether or not near misses of that type are tracked, the number of incidents anticipated per year (e.g., all instances of animal contact regardless of whether they caused an outage, an ignition, or neither), the rate at which those incidents (e.g., object contact, equipment failure, etc.) are anticipated to cause an ignition in the column, and the number of ignitions that those incidents are anticipated to cause by category. List additional risk drivers tracked in the "other" row and additional rows as needed.

Table 31: Change in drivers of ignition probability taking into account planned initiatives, for each year of plan

Incident type by ignition probability driver	Detailed risk driver	Are near misses tracked?	Number of incidents per year			Average percentage likelihood of ignition per incident			Number of ignitions per year		
			2020	2021	2022	2020	2021	2022	2020	2021	2022
Contact from object	All types of object contact										
	Animal contact										
	Balloon contact										
	Vegetation contact										
	Vehicle contact										

All types of equipment / facility failure	All types										
	Capacitor bank failure										
	Conductor failure—all										
	Conductor failure—wires down										
	Fuse failure—all										
	Fuse failure—conventional blown fuse										
	Lightning arrestor failure										
	Switch failure										
	Transformer failure										
Wire-to-wire contact / contamination											
Other											

5.6.2 Protocols on Public Safety Power Shut-off

Describe protocols on Public Safety Power Shut-off (PSPS or de-energization), to include:

1. Strategy to minimize public safety risk during high wildfire risk conditions and details of the considerations, including but not limited to list and description of community assistance locations and services provided during a de-energization event.
2. Outline of tactical and strategic decision-making protocol for initiating a PSPS/de-energization (e.g., decision tree).
3. Strategy to provide for safe and effective re-energization of any area that was de-energized due to PSPS protocol.
4. Company standards relative to customer communications, including consideration for the need to notify priority essential services – critical first responders, public safety partners, critical facilities and infrastructure, operators of telecommunications infrastructure, and water utilities/agencies. This section, or an appendix to this section, shall include a complete listing of which entities the electrical corporation considers to be priority essential services. This section shall also include description of strategy and protocols to ensure timely notifications to customers, including access and functional needs populations, in the languages prevalent within the utility's service territory.
5. Protocols for mitigating the public safety impacts of these protocols, including impacts on first responders, health care facilities, operators of telecommunications infrastructure, and water utilities/agencies.

6 Utility GIS attachments

6.1 Recent weather patterns

6.2 Recent drivers of ignition probability

6.3 Recent use of PSPS

6.4 Current baseline state of service territory and utility equipment

6.5 Location of planned utility equipment additions or removal

6.6 Planned 2020 WMP initiative activity by end-2022

III. Cross reference §8386(c) to 2020 WMP Guidelines

Summary
The Wildfire Mitigation Plan (WMP) Guidelines outline the data and narrative that utilities are expected to include in their WMPs for the 2020 WMP process. This builds upon the template used in the 2019 WMP process and incorporates lessons learned.

Changes relative to 2019 guidelines
The 2020 WMP Guidelines seek to build upon the 2019 WMP template by adding requirements to report additional information on utility wildfire risk exposure and wildfire mitigation outcomes performance and by incorporating templates into the guidelines where possible to standardize reporting of data and other information.

The goal of the 2020 WMP Guidelines is to collect detailed information about:

1. Utilities' wildfire mitigation performance according to metrics and underlying data,
2. Utilities' baseline ignition probability and wildfire risk exposure,
3. Inputs to utilities' plans, including current and directional vision for wildfire risk exposure,
4. Wildfire mitigation activity for each year of the 3-year WMP term, including expected outcomes of the 3-year plan.

The annual updates can then focus on any adjustments to (1) and (2) and reporting on actual outcomes for (3).

See Table 1 below for a mapping of the required WMP sections from California Public Utilities Code §8386(c) to the 2019 WMPs and the 2020 WMP Guidelines.

Table 1: Mapping of WMP requirements to 2020 Guidelines

Code Reference §8386(c)	2019 WMP section	Section of 2020 WMP Guidelines
(1) An accounting of the responsibilities of persons responsible for executing the plan.	VI. Performance Metrics and Monitoring A. Accounting of responsibilities	1 Persons responsible for executing the WMP
(2) The objectives of the plan.	I. Objectives consistent with §8386(a) A. Categorized by following timeframes: A. Before upcoming wildfire season B. Before next Plan filing C. Within next 5 years	4.1 The objectives of the plan
(3) A description of the preventive strategies and programs to be adopted by the electrical corporation to minimize the risk of its	II. Description of preventive strategies and programs B. Categorized by following timeframes:	5.1 Wildfire mitigation strategy

electrical lines and equipment causing catastrophic wildfires, including consideration of dynamic climate change risks.	A. Before upcoming wildfire season B. Before next Plan filing C. Within next 5 years	
(4) A description of the metrics the electrical corporation plans to use to evaluate the plan's performance and the assumptions that underlie the use of those metrics.	(Section VI) B. Description of metrics and assumptions	2.4 Description of metrics
(5) A discussion of how the application of previously identified metrics to previous plan performances has informed the plan.	(Section VI) C. Discussion on how previous metrics performance has informed current plan	2.1 Lessons learned: how tracking metrics on the 2019 plan has informed the 2020 plan
(6) Protocols for disabling reclosers and de-energizing portions of the electrical distribution system that consider the associated impacts on public safety, as well as protocols related to mitigating the public safety impacts of those protocols, including impacts on critical first responders and on health and communication infrastructure.	IV. Wildfire Prevention Strategies and Programs D. Operational practices	5.3.6 Grid operations and protocols 5.3.9 Emergency planning and preparedness 5.3.10 Stakeholder cooperation and community engagement
(7) Appropriate and feasible procedures for notifying a customer who may be impacted by the de-energizing of electrical lines. The procedures shall consider the need to notify, as a priority, critical first responders, health care facilities, and operators of telecommunications infrastructure.	(Section IV) I. De-energization protocol	5.6.2 Protocols on Public Safety Power Shut-off 5.3.6 Grid operations and protocols 5.3.9 Emergency planning and preparedness 5.3.10 Stakeholder cooperation and community engagement
(8) Plans for vegetation management.	(Section IV) G. Vegetation management plan	5.3.5 Vegetation management and inspections
(9) Plans for inspections of the electrical corporation's electrical infrastructure.	(Section IV) E. Inspection and maintenance plans	5.3.4 Asset management and inspections
(10) A list that identifies, describes, and prioritizes all wildfire risks, and drivers for those risks, throughout the electrical corporation's service territory, including all relevant wildfire risk and risk mitigation information that is part of Safety Model Assessment Proceeding and Risk Assessment Mitigation Phase filings. The list shall include, but not be limited to, both of the following: (A) Risks and risk drivers associated with design, construction, operations, and maintenance of the electrical corporation's equipment and facilities. (B) Particular risks and risk drivers associated with topographic and climatological risk factors throughout the different parts of the electrical corporation's service territory.	(Section III) B. Wildfire risks and drivers list C. Listed in the following categories: 1. Design and Construction 2. Inspection and Maintenance 3. Operational Practices 4. Situational/Conditional Awareness 5. Response and Recovery	4.4 Directional vision for future ignition probability drivers

(11) A description of how the plan accounts for the wildfire risk identified in the electrical corporation's Risk Assessment Mitigation Phase filing.	(Section III) C. Description of how plan accounts for wildfire risk identified in RAMP	5.3 Detailed wildfire mitigation programs
(12) A description of the actions the electrical corporation will take to ensure its system will achieve the highest level of safety, reliability, and resiliency, and to ensure that its system is prepared for a major event, including hardening and modernizing its infrastructure with improved engineering, system design, standards, equipment, and facilities, such as undergrounding, insulation of distribution wires, and pole replacement.	IV. Wildfire Prevention Strategies and Programs D. Operational practices E. Inspection and maintenance plans F. System hardening to achieve highest level of safety, reliability, and resiliency G. Vegetation management plan H. Situational awareness protocols and determination of local conditions I. De-energization protocol J. Alternative technologies K. Post-incident recovery, restoration, and remediation activities	5.3.3 Grid design and system hardening
(13) A showing that the utility has an adequate sized and trained workforce to promptly restore service after a major event, taking into account employees of other utilities pursuant to mutual aid agreements and employees of entities that have entered into contracts with the utility.	(Section V) 3. Workforce adequacy showing	5.5 Planning for workforce and other limited resources
(14) Identification of any geographic area in the electrical corporation's service territory that is a higher wildfire threat than is currently identified in a CPUC fire threat map, and where the CPUC may consider expanding the high fire threat district based on new information or changes in the environment.	(Section III) D. Service territory fire-threat evaluation	4.2.1 Service territory fire-threat evaluation
(15) A methodology for identifying and presenting enterprise-wide safety risk and wildfire-related risk that is consistent with the methodology used by other electrical corporations unless the Commission determines otherwise.	III. Risk Analysis and Risk Drivers A. Safety and wildfire risk identification and assessment methodology	5.4 Methodology for enterprise-wide safety risk and wildfire-related risk
(16) A description of how the plan is consistent with the electrical corporation's disaster and emergency preparedness plan prepared pursuant to Section 768.6, including both of the following: (A) Plans to prepare for, and to restore service after, a wildfire, including workforce mobilization and prepositioning equipment and employees. (B) Plans for community outreach and public awareness before, during, and after a wildfire, including language notification in English,	V. Emergency Preparedness and Response A. General description of overall plan B. Description of consistency with emergency preparedness and response plan 1. Service restoration plan 2. Emergency communications	5.3.9 Emergency planning and preparedness

Spanish, and the top three primary languages used in the state other than English or Spanish, as determined by the Commission based on the United States Census data.		
(17) A statement of how the electrical corporation will restore service after a wildfire.	(Section V) 1. Service restoration plan	5.3.9 Emergency planning and preparedness
(18) Protocols for compliance with requirements adopted by the Commission regarding activities to support customers during and after a wildfire, outage reporting, support for low-income customers, billing adjustments, deposit waivers, extended payment plans, suspension of disconnection and nonpayment fees, repair processing and timing, access to utility representatives, and emergency communications.	(Section V) C. Customer support in emergencies 1.1.1. Protocols for compliance with CPUC requirements	5.3.9 Emergency planning and preparedness
(19) A description of the processes and procedures the electrical corporation will use to do all of the following: (A) Monitor and audit the implementation of the plan. (B) Identify any deficiencies in the plan or the plan's implementation and correct those deficiencies. (C) Monitor and audit the effectiveness of electrical line and equipment inspections, including inspections performed by contractors, carried out under the plan and other applicable statutes and Commission rules.	(Section VI) D. Processes and procedures for: 1. Plan monitoring and auditing 2. Identifying and correcting Plan deficiencies 3. Monitoring and auditing effectiveness of equipment and line inspections	5.2 Wildfire Mitigation Plan implementation
(20) Any other information that the Commission may require.	VII. Any other information the CPUC may require A. Cost information	5.3 Detailed wildfire mitigation programs

(END OF ATTACHMENT 1)

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ATTACHMENT 2

(Utility Wildfire Mitigation Maturity Model)

Utility Wildfire Mitigation Maturity Model

1 Utility Wildfire Mitigation Maturity Model

1.1 Approach to Utility Wildfire Mitigation Maturity Assessment

The Utility Wildfire Mitigation Maturity Model is a method to assess utility wildfire risk reduction capabilities and examine the relative maturity of the wildfire mitigation programs. When leveraged with requirements to increase maturity over time, the maturity assessment can be used to drive continuous improvement in utility wildfire mitigation. Implementation of the maturity assessment will help to identify and share best practices amongst the utilities and to establish a continually improving suite of best practices and lessons learned to combat the growing risk of utility-caused wildfires.

This assessment evaluates maturity, the capacity to address wildfire risk displayed by a utility. The maturity assessment is not designed to assess performance or regulatory compliance, which should be conducted separately. The maturity assessment will be applied by the Wildfire Safety Division (WSD) to track each utility's maturity using the following process:

1. **In the 2020 WMP review, the WSD will assess maturity** by comparing the utility's practices to an absolute reference using self-reported data—subject to verification and audit—from the utility's maturity survey, wildfire mitigation plan, and other relevant data sources. On an annual basis, the WSD will require each utility to complete the maturity survey that asks utilities to report their current activities, capabilities and plans, a copy of which is outlined below.
2. **The WSD will score the utility's projected maturity** for the next 3 years, assuming full implementation of each of the elements of the utility's WMP. The WSD will evaluate each utility's maturity based on four data sources: its response to the survey, additional data requests, selected deep-dive audits into the utility's capability, and the utility's other filings, including their WMP.
3. **After WMP approvals, the WSD will annually re-evaluate each utility's maturity** to track progress against WMP-projected maturity. The WSD will require each utility to report their current activities, capabilities, and plans using the maturity survey, a copy of which is outlined below.
4. **Finally, every three years, the maturity model rubrics** are expected to be updated, in order to drive continued improvement over the longer term. The WSD will periodically adjust the scale and re-define the maturity scoring such that there is room for this utility to continuously improve. By way of example, a utility that improves on the scale from a 1 (meets minimum rules and regulations) to a 4 (improvement over current best practices) should continue to improve over time. In contrast, a utility that scores a 3 should not necessarily expect the same score in the future without additional improvements.

The maturity assessment scores each utility against a total of 52 capabilities, organized in 10 categories. Each capability is scored into one of five possible levels of maturity. Table 1 below summarizes the capabilities being assessed.

	Category	I. Capability	II. Capability	III. Capability	IV. Capability	V. Capability	VI. Capability
	A. Risk assessment and mapping	1. Climate scenario modeling	2. Ignition risk estimation	3. Estimation of wildfire consequences for communities	4. Estimation of wildfire and PSPS risk-reduction impact	5. Risk maps and simulation algorithms	
	B. Situational awareness and forecasting	6. Weather variables collected	7. Weather data resolution	8. Weather forecasting ability	9. External sources used in weather forecasting	10. Wildfire detection processes and capabilities	
	C. Grid design and system hardening	11. Approach to prioritizing initiatives across territory	12. Grid design for minimizing ignition risk	13. Grid design for resiliency and minimizing PSPS	14. Risk-based grid hardening and cost efficiency	15. Grid design and asset innovation	
	D. Asset management and inspections	16. Asset inventory and condition assessments	17. Asset inspection cycle	18. Asset inspection effectiveness	19. Asset maintenance and repair	20. QA/QC for asset management	
	E. Vegetation management and inspections	21. Vegetation inventory and condition assessments	22. Vegetation inspection cycle	23. Vegetation inspection effectiveness	24. Vegetation grow-in mitigation	25. Vegetation fall-in mitigation	26. QA/QC for vegetation management
	F. Grid operations and protocols	27. Protective equipment and device settings	28. Incorporating ignition risk factors in grid control	29. PSPS op. model and consequence mitigation	30. Protocols for PSPS initiation	31. Protocols for PSPS re-energization	32. Ignition prevention and suppression
	G. Data governance	33. Data collection and curation	34. Data transparency and analytics	35. Near-miss tracking	36. Data sharing with research community		
	H. Resource allocation methodology	37. Scenario analysis across different risk levels	38. Presentation of relative risk spend efficiency for portfolio of initiatives	39. Process for determining risk spend efficiency of vegetation management initiatives	40. Process for determining risk spend efficiency of system hardening initiatives	41. Portfolio-wide initiative allocation methodology	42. Portfolio-wide innovation in new wildfire initiatives
	I. Emergency planning and preparedness	43. Wildfire plan integrated with overall disaster/ emergency plan	44. Plan to restore service after wildfire related outage	45. Emergency community engagement during and after wildfire	46. Protocols in place to learn from wildfire events	47. Processes for continuous improvement after wildfire and PSPS	
	J. Stakeholder cooperation and community engagement	48. Cooperation and best practice sharing with other utilities	49. Engagement with communities on utility wildfire mitigation initiatives	50. Engagement with LEP and AFN populations	51. Collaboration with emergency response agencies	52. Collaboration on wildfire mitigation planning with stakeholders	

Table 1: Description of capabilities

Category	Capability	Capability description
A. Risk mapping and simulation	1. Climate scenario modeling and sensitivities	For planning purposes, the ability of the utility to reliably model various climate scenarios. The ability to understand how changing weather patterns impact wildfire and PSPS risk across their grid. Higher scores are achieved for incorporating a wider range of inputs and having more granularity.
	2. Ignition risk estimation	Having tools and capabilities to assess ignition risk across the utility's grid based on the combination of electric lines and equipment, vegetation, and weather/climate. Higher scores are achieved for having greater automation, with tools that take utilize a wider range variables to more accurately estimate ignition risk.
	3. Estimation of wildfire consequences for communities	Having tools and capabilities to assess how communities would be affected, given an ignition. Higher scores are achieved for having more highly-automated tools that take into account more variables and more granular data to accurately estimate the consequence of wildfire.
	4. Estimation of wildfire and PSPS risk-reduction impact	The ability of the utility to estimate the consequence of various initiatives in reducing wildfire and PSPS risk to communities. Higher scores are achieved for being able to estimate risk reduction at a more granular level and for taking into account the specific existing lines and equipment, vegetation, weather/climate, and other factors specific to the location in which the initiative is being undertaken.
	5. Risk maps and simulation algorithms	Having established processes to update risk maps and wildfire simulation algorithms, based deviations of estimates from measured results. Higher scores are achieved by having more robust mechanisms for detecting deviations, and for more frequent updates.
B. Situational awareness and forecasting	6. Weather variables collected	The completeness of weather data variables collected. Higher scores are achieved by collecting a greater scope of reliable and relevant weather data and have more processes to validate the readings on each of these variables.
	7. Weather data resolution	The spatial and temporal resolution with which relevant weather data is collected, with higher scores achieved for collecting more data at a resolution that helps them understand the specific conditions at a finer resolution across the grid and in time.
	8. Weather forecasting ability	The ability of the utility to accurately predict weather across its grid. Higher scores are awarded for utilities that are able to forecast more accurately, at higher spatial and temporal resolution, and at a longer range.

Category	Capability	Capability description
	9. External sources used in weather forecasting	The external sources and validation processes the utility uses to obtain and validate its weather data. Higher scores are awarded for utilities that use external weather data to error check utility collected data.
	10. Wildfire detection processes and capabilities	The ability of utilities to detect ignitions and wildfire within their territory, particularly along the utility's lines and equipment. Higher scores are awarded for greater automated in its detection, and having more means of detection.
C. Grid design and system hardening	11. Approach to prioritizing initiatives across territory	The effectiveness of the utility's approach to prioritizing initiatives to the areas along their grid that would most benefit from wildfire risk reduction initiatives. Higher scores are awarded for utilities that can prioritize geographically at a higher granularity and take into account evolving impact on communities and surrounding environment.
	12. Grid design for minimizing ignition risk	The parameters of the utility's grid that minimize ignition risk. Higher scores are awarded for strategic grid design and localization (e.g., including solutions such as microgrids and minigrids, as well as geographically-targeted hardening initiatives and locating lines away from highest risk areas of landscape).
	13. Grid design for resiliency and minimizing PSPS	The level of redundancy and resilience in the utility's grid to avoid leaving customers without any electricity supply, should a line be de-energized, and to confine any PSPS to a limited number of customers. Higher scores are awarded for more redundant grid topologies, and for greater sectionalization.
	14. Risk-based grid hardening and cost efficiency	The degree to which the utility's grid is built using ignition prevention equipment. Higher scores are awarded to utilities that use more risk spend efficient ignition prevention equipment.
	15. Grid design and asset innovation	The program in place by the utility to evaluate and develop new design and hardening initiatives. Higher scores are awarded to utilities that have more robust processes for evaluating new technologies and evaluating their risk spend efficiency.
D. Asset management and inspections	16. Asset inventory and condition assessments	Having an accurate inventory database of utility lines and equipment by asset type across the grid, as well as the condition of each component. Higher scores are achieved by recording more wildfire-related attributes of each piece of equipment, with greater frequency.
	17. Asset inspection cycle	How the utility determines the cycle with which inspections of the utility's grid are conducted. Higher scores are achieved by understanding equipment failure probability, and timing inspections accordingly to

Category	Capability	Capability description
		maximize risk mitigation efficacy.
	18. Asset inspection effectiveness	The depth and detail to which inspections are performed and recorded. Higher scores are achieved by having greater ability to identify higher risk areas and assets and conducting more in-depth inspections to maximize risk mitigation efficacy.
	19. Asset maintenance and repair	The approach taken by the utility to maintain and repair equipment in higher risk areas. Higher scores are awarded to utilities that maintain equipment in better condition in areas with the highest wildfire risk.
	20. QA/QC for asset management	Having established processes for monitoring the quality of inspection and maintenance work across the grid. Higher scores are achieved for having robust processes, trainings, and leveraging technologies to monitor and validate work performed.
E. Vegetation management and inspection	21. Vegetation inventory and condition assessments	Having an accurate inventory database of vegetation along rights of way, and vegetation with strike potential, including the condition of each vegetation. Higher scores are achieved by more granular information and having a more up-to-date database.
	22. Vegetation inspection cycle	How the utility determines the cycle with which inspections of the vegetation are conducted. Higher scores are achieved by understanding vegetation growth, characteristics, and failure probability and timing inspections accordingly to maximize risk mitigation efficacy.
	23. Vegetation inspection effectiveness	The depth and detail to which inspections are performed and recorded. Higher scores are achieved by having greater ability to identify higher risk areas and vegetation and conducting more in-depth inspections to maximize risk mitigation efficacy.
	24. Vegetation grow-in mitigation	The utility's standards and actions for treating vegetation that has grow-in potential around lines and equipment. Higher scores are awarded for utilities that use ignition risk modeling and vegetation growth rates to determine appropriate vegetation clearances and trim cycles.
	25. Vegetation fall-in mitigation	The utility's processes for treating vegetation that has strike potential on its grid. Higher scores are awarded to utilities that treat vegetation based on a granular understanding of individual vegetation strike potential.
	26. QA/QC for vegetation management	Having established processes for monitoring the quality of inspection and treatment work across the grid. Higher scores are achieved for having robust processes, trainings, and leveraging technologies to monitor and validate work performed.

Category	Capability	Capability description
F. Grid operations and protocols	27. Protective equipment and device settings	The utilities procedures for adjusting the sensitivity of grid elements that can reduce wildfire risk. For example, this includes the utility's approach to adjusting reclosers by limiting or disabling reclosers in high fire threat districts. Higher scores are awarded for more automated processes.
	28. Incorporating ignition risk factors in grid control	The utility's process for determining when to operate electric lines and equipment above rated nameplate capacity. Higher scores are awarded for utilities that have clearly defined and explained protocols for operating equipment above nameplate capacity and incorporate understanding of incremental wildfire risk associated with operating conditions.
	29. PSPS operating model and consequence mitigation	The utility's ability to implement PSPS events including accurate predictions, customer communication, and mitigation activities. Higher scores are awarded to utilities that better predict, communicate, and mitigate consequences of PSPS.
	30. Protocols for PSPS initiation	The utility's approach to determining the thresholds for activating PSPS events. Highest scores are awarded to utilities that do not use PSPS; average scores are awarded to utilities that have well-defined PSPS protocols, and whose decisions are supported by risk assessing algorithms.
	31. Protocols for PSPS re-energization	The utility's approach to inspecting circuits after they have been de-energized and prior to a re-energization. Higher scores are awarded to utilities that have faster inspection processes and use technologies to complete these inspections cost-effectively.
	32. Ignition prevention and suppression	The utility personnel's ability to prevent and suppress ignitions caused by their activities. Higher scores are awarded for utilities that provide personnel with more robust training, tools, and explicit policies about what activities that they should be undertaking.
G. Data governance	33. Data collection and curation	The ability of the utility to track and retrieve a variety of situational, operational, and risk data to drive decisions. Higher scores are awarded for utilities that have the capabilities needed to handle large amounts of data, conduct sophisticated analytics, & share real time data.
	34. Data transparency and analytics	The utility's organization and openness toward sharing data listed in a centralized catalogue. Higher scores are awarded for utilities with a comprehensive catalogue of data, analyses, and algorithms and that can share data across multiple permissions levels.
	35. Near-miss tracking	The utility's approach to tracking events that had the potential to result in ignition. Higher scores are awarded

Category	Capability	Capability description
		to utilities that track near misses and accurately estimate their potential to cause ignition.
	36. Data sharing with research community	The level of involvement and support that utilities provide those in the research community. Higher scores are provided for utilities that participate in research that addresses utility-ignited wildfire.
H. Resource allocation methodology	37. Scenario analysis across different risk levels	The ability of the utility to understand and explain the incremental risk reduction potential that incremental funding would enable. Higher scores are provided to utilities that are able to show the incremental risk reduction potential at a more granular level.
	38. Presentation of relative risk spend efficiency for portfolio of initiatives	The utility's ability to estimate the degree of wildfire risk reduction achieved by specific wildfire risk management initiatives and weigh these reductions against the cost of those initiatives, across the utility's grid. Higher scores are provided for increased granularity by location and the frequency with which these estimates are updated.
	39. Process for determining risk spend efficiency of vegetation management initiatives	The utility's ability to estimate the degree of wildfire risk reduction achieved by specific vegetation management initiatives and weigh these reductions against the cost of those initiatives, across the utility's grid. Higher scores are provided for increased granularity by location and the frequency with which these estimates are updated.
	40. Process for determining risk spend efficiency of system hardening initiatives	The utility's ability to estimate the degree of wildfire risk reduction achieved by specific system hardening initiatives and weigh these reductions against the cost of those initiatives, across the utility's grid. Higher scores are provided for increased granularity by location and the frequency with which these estimates are updated.
	41. Portfolio-wide initiative allocation methodology	The utility's ability to efficiently and effectively decide which initiatives should be applied and to which part of its grid. Higher scores are provided for increased granularity and use of risk spend efficiency calculations.
	42. Portfolio-wide innovation in new wildfire initiatives	The program in place by the utility to evaluate and develop new initiatives across the entire portfolio, including inspection, grid operations, simulation, etc. Higher scores are awarded to utilities that have more robust processes for evaluating new technologies and evaluating their risk spend efficiency.
I. Emergency planning and preparedness	43. Wildfire plan integrated with overall disaster / emergency plan	The extent of coordination and synchronization between the utility's wildfire mitigation plan and emergency operations plans of the State and local jurisdictions. Higher scores are awarded for additional stakeholder engagement and for the use of simulations to stress-test plans.
	44. Plan to restore	The extent and sophistication of utility's plans to restore

Category	Capability	Capability description
	service after wildfire related outage	electric service after a wildfire-related outage. Higher scores are awarded for a greater granularity at which plans are customized.
	45. Emergency community engagement during and immediately after wildfire	The utility's ability to clearly and effectively communicate information to affected communities. Higher scores are awarded for the utility's ability to reach vulnerable populations, the use of multiple channels, and the relevance and usefulness of the information communicated.
	46. Protocols in place to learn from wildfire events	The processes used by a utility to undertake after-action reviews following wildfire events. Higher scores are awarded for more extensive documentation, and the extent to which the lessons learned are used to update capital and operational plans.
	47. Processes for continuous improvement after wildfire and PSPS events	The utility's application of continuous improvement processes, and incorporation of performance benchmarks and stakeholder feedback, to update capital and operational plans. Higher scores are awarded for more formalized review procedures, more extensive benchmarking, and more sophisticated stakeholder engagement.
J. Stakeholder cooperation and community engagement	48. Cooperation and best practice sharing with other utilities	The extent and sophistication of the utility's incorporation of lessons learned by peers, including those outside the State. Higher points are awarded for greater formalization of learning processes.
	49. Engagement with communities on utility wildfire mitigation initiatives	The extent and sophistication of the utility's engagement with the communities that it serves (and in which its assets are located), including key stakeholder groups. Higher scores are awarded for more successful engagement of landowners, other potential partners.
	50. Engagement with LEP and AFN populations	The extent of the utility's relationship with stakeholders representing Limited English Proficiency (LEP) and Access and Functional Needs (AFN) populations, and the utility's ability to reach these populations, both proactively and during emergencies. Higher scores are awarded for the ability of the utility to utilize these relationships to minimize the consequence of PSPS, and other wildfire mitigation measures on these populations.
	51. Collaboration with emergency response agencies	The extent and sophistication of the utility's engagement with suppression and other emergency planning agencies and stakeholder groups involved in wildfire response. Higher scores are awarded for broader engagement and deeper planning processes.
	52. Collaboration on wildfire mitigation	The extent and sophistication of the utility's engagement with non-emergency planning agencies and

Category	Capability	Capability description
	planning with stakeholders	stakeholder groups involved in wildfire risk reduction initiatives. Higher scores will be awarded for broader engagement, a more comprehensive planning processes (e.g., including environmental values as well as wildfire risk), and greater financial involvement in plan implementation.

The utility's maturity is then graded across each of these categories from a score of 0 at the low end to a score of 4 at the high end. Scores are generally awarded according to the following philosophy:

0. Below regulatory requirements or expected standards
1. Meets minimum regulatory requirements or expected standards
2. Beyond minimum regulatory requirements but not consistent with best practice
3. Consistent with best practice
4. Improvement over best practice

Additional descriptions that may represent typical scores are provided in the table below.

Table 2: Illustrative descriptions that may represent typical maturity levels

		Maturity →				
		0	**1**	**2**	**3**	**4**
	Scoring philosophy	**Below regulatory requirements** or expected standards	**Meets minimum regulatory requirements** or expected standards (e.g., GO-95, FERC)	**Beyond minimum regulatory requirements** but not consistent with best practices	**Consistent with best practice**	**Improvement over best practice**
	Typical characteristics	• Fails to establish consistent procedures or policies that meet minimum regulations	• Basic collaboration with other agencies	• Utility coordinates closely with other agencies	• Utility leads efforts with other agencies in all areas where appropriate	• Utility leads efforts with other agencies and develops new protocols to reduce wildfire risk
	Typical data validation and granularity	• Sporadic or inconsistent data validation • Generally, little granularity across grid	• Ad-hoc data validation by experts • Regional granularity across grid	• Systematic data validation using historical measurements and expert input • Circuit-level granularity	• Systematic validation using historical measurements and expert input • Span-level granularity	• Systematic validation using historical measurements and expert input • Real-time machine learning • Asset-level granularity

 **Level of systematization and automation**	• Little systematization • No automation	• Basic systems in place for workflow management • Some automated processes to support decision makers	• Detailed and tested workflow systems • Semi-automated processes exist to support decision makers in key decisions	• Detailed and tested workflow systems • Automated and vetted processes exist for to support decision makers in nearly all circumstances	• Detailed and tested workflow systems • Automated processes competently handle most decisions and actions without manual intervention
 **Typical approach to learning and updates**	• Insufficient structures to incorporate learnings in updated processes	• Basic systems and methods in place to manually incorporate learnings into new processes • Subject matter experts review decision-making and manually incorporate learnings into new decision-making	• Detailed systems and methods in place to manually incorporate learnings into processes • Subject matter experts review decision-making and incorporate learnings into future decisions using defined processes	• Well-defined systems and methods in place to frequently incorporate most learnings into processes • Subject matter experts review decision-making and incorporate learnings into automated processes to support decision makers	• Tested systems and methods to automatically and continuously update processes and tools in real time • Subject matter experts review decision-making and incorporate learnings into fully automated decision-making processes and algorithms

Category A: Risk assessment and mapping

Illustrative descriptions that may represent typical grades—not comprehensive

	Maturity level				
Capability	**0**	**1**	**2**	**3**	**4**
1. Climate scenario modeling	No clear ability to understand incremental risk under various weather scenarios	Ability to reliably determine wildfire risk i) across each region of the grid ii) based on weather and estimates of how the weather affects failure modes and fire propagation	i) Partially automated tools and process to reliably categorize weather scenarios by level of risk ii) across each circuit of the grid, iii) based on existing hardware, and weather and estimates of how the weather affects failure modes and fire propagation, and iv) independently assessed by experts	i) Mostly automated tools and process to reliably estimate risk of various weather scenarios ii) for each span of the grid, iii) based on level of vegetation, weather as measured at circuit level, existing hardware, and estimates of how the weather affects failure modes and fire propagation, and iv) independently assessed by experts and supported by historical data of incidents and near misses	i) Fully automated tools and processes to accurately and quantitatively estimate incremental risk of foreseeable weather scenarios ii) for each asset of the grid, iii) based on level of vegetation, weather measured at the circuit level, and existing hardware, and estimates of how the weather affects failure modes and fire propagation, iv) independently assessed by experts and verified by historical evidence of near misses and incidents, and v) updated based on real-time learning during weather event
2. Ignition risk estimation	No reliable tool or process to estimate risk across sections of the	i) Partially automated tools and processes to reliably categorize	i) Mostly automated tools and processes to reliably categorize ii)	i) Fully automated tools and processes to ii) quantitatively and	i) Fully automated tools and processes to ii) accurately and

Capability	Maturity level 0	1	2	3	4
	grid based on characteristics and condition of lines and equipment and vegetation	regions of the grid as ii) high or low risk based on iii) at least characteristics and condition of lines and equipment and surrounding vegetation, with iv) subjective assessment of areas by experts	individual circuits into iii) high or low risk based on iv) at least characteristics and condition of lines and equipment, surrounding vegetation, and area weather patterns, with v) assessment risk confirmed based on historical data	accurately assess the risk of ignition at iii) span level across entire grid based on characteristics including surrounding vegetation, weather patterns at individual span, and other factors, with iv) assessment risk confirmed based on historical data	quantitatively assess the risk of ignition iii) across entire grid iv) at asset level resolution within individual circuits, v) based on characteristics including surrounding vegetation, weather patterns at individual circuit, flying debris probability, and other factors, vi) with probability estimated based on understanding of specific failure modes and top contributors to those failure modes with vii) assessment risk confirmed based on historical data
3. Estimation of wildfire consequences on communities	No translation of ignition risk estimates to potential consequences for communities	i) Partially automated tools to reliably categorize ignition events as high or low risk to communities ii) as a function of at least one of structures burned, potential fatalities, area burned, or damages for each region of the grid,	i) Mostly automated tools to reliably categorize ignition events in 5 or more levels of risk to communities ii) as a function of at least potential fatalities, and one of structures burned or area burned or damages, for each circuit	i) Fully automated tools and processes to accurately and quantitatively estimate consequence ii) as a function of at least potential fatalities and structures burned or area burned or damages, iii) the damage to communities for ignition	i) Fully automated tools and processes to ii) accurately and quantitatively estimate consequence from ignition iii) as a function of at least potential fatalities, structures burned or monetary damages, area burned, and consequence air

Capability	Maturity level 0	1	2	3	4
		iii) independently assessed by experts	of the grid, iii) based on level and conditions of vegetation and weather, and iv) independently assessed by experts	events at each individual span across the grid iv) across all seasons of the year, v) based on vegetation species and weather, vi) independently assessed by experts & confirmed by historical data	quality and GHG reduction goals, across entire grid iv) at asset level resolution within individual circuits, v) based on characteristics including surrounding vegetation species and up-to-date moisture content, weather patterns at individual circuit, across all seasons, vi) independently assessed by experts & confirmed updated based on real time learning
 **4. Estimation of wildfire and PSPS risk-reduction impact of initiatives**	No clear estimation of risk reduction potential across most initiatives	Mostly manual approach to i) accurately estimate risk reduction potential of initiatives averaged across the territory where such initiatives could be installed for each region, ii) with evidence and logical reasoning to support estimates	i) Automated tools and process to support subject matter experts in ii) accurately categorizing initiatives by risk reduction potential iii) for each circuit of the grid, iv) based on existing hardware, and v) independently assessed by third-party experts	i) Mostly automated tools and process to ii) reliably and accurately estimate risk reduction potential of initiatives iii) for each span of the grid, iv) based on level and condition of vegetation, weather, and existing hardware type and condition including operating history, and v) independently assessed by third-party experts	i) Fully automated tools and processes to ii) accurately and quantitatively estimate risk reduction potential of initiatives iii) for each asset on the grid, iv) based on level and condition of vegetation, weather, and existing hardware, v) and considering the combination of initiatives already

Capability	Maturity level 0	1	2	3	4
					deployed, and vi) independently assessed by experts and verified by historical evidence
5. Risk maps and simulation algorithms	No defined process for updating risk mapping algorithms	Risk mapping algorithms i) updated at least bi-annually based on ii) manually detected deviations of risk model to actual ignitions and wildfire propagation	i) Partially automated tools and process to reliably determine whether risk map and simulations should be updated ii) based on semi-automated detection of deviations of risk model from iii) actual ignition and propagation data, and iv) independently assessed by experts	i) Mostly automated tools and process to reliably determine whether risk map and simulations should be updated ii) based on semi-automated detection of deviations of risk model from iii) near miss and actual ignition and propagation data, and iv) independently assessed by experts and historical data	i) Fully automated tools and process to accurately and quantitatively update risk map and simulations substantially continuously in real-time ii) based on automated detection of deviations of risk model using iii) both near miss and actual ignition and propagation data, iv) including data derived from other utilities or other sources, and v) independently assessed by experts and historical data

Category B: Situational awareness and forecasting

Illustrative descriptions that may represent typical grades—not comprehensive

Capability	Maturity level 0	1	2	3	4
6. Weather variables collected	Weather data being collected insufficient to properly understand risks along grid	Wind, temperature, and relative humidity being accurately measured along grid	i) Range of accurate weather variables collected including at least wind, temperature, and relative humidity, that ii) affect risk of ignition and propagation from utility assets; iii) manual field calibration measurements taken to validate measurement hardware	i) Range of accurate weather variables collected including at least wind, temperature, and relative humidity, that ii) impact risk of ignition from utility assets and propagation; iii) manual field calibration measurements taken to validate measurement hardware; iv) accurate predictions made of the status of elements that cannot reliably be measured in real time (e.g., fuel moisture content); v) further data collected to measure physical impact of weather on grid (e.g., sway in lines, sway in vegetation, etc.)	i) Range of accurate weather variables collected, including at least wind, temperature, and relative humidity, that ii) impact risk of ignition from utility assets and propagation; iii) automatic field calibration measurements taken to validate measurement hardware; iv) accurate predictions made of the status of elements that cannot reliably be measured in real time (e.g., fuel moisture content), v) further data collected to measure physical impact of weather on grid (e.g., sway in lines, sway in vegetation, etc.), vi) with each collected from multiple sources
7. Weather data resolution	Weather data collected does not accurately	Gather weather data with i) sufficient	Gather weather data with i) sufficient	Gather weather data with i) sufficient	Gather weather data with i) sufficient

	Maturity level				
Capability	**0**	**1**	**2**	**3**	**4**
	reflect local weather conditions across grid infrastructure	granularity to reliably measure weather conditions ii) independently for each area of the grid iii) at least on an hourly basis	granularity to reliably measure weather conditions using a partially automated process ii) independently for each circuit mile of the grid iii) at least 4 times per hour	granularity to reliably measure weather conditions using a mostly automated process ii) independently and sufficient to reliably estimate conditions at each span of the grid iii) at least 6 times per hour; iv) along the entire grid and in all areas needed to predict weather on the grid	granularity to reliably measure weather conditions using a completely automated process ii) independently and sufficient to estimate conditions around each span and each asset that may cause wildfire iii) at least 60 times per hour; iv) along the entire grid and in all areas needed to predict weather on the grid; v) including wind estimations at various atmospheric altitudes relevant to risk of wildfire ignition and consequence
8. Weather forecasting ability	No reliable independent weather forecasting ability	Weather forecasting ability sufficiently accurate to fulfill PSPS requirements at circuit level	Utility i) uses a combination of accurate weather stations and ii) external weather data to make partially automated and accurate forecasts iii) at least 1 week in advance iv) at circuit level; v) which are error-checked against historical weather patterns	Utility i) uses a combination of accurate weather stations and ii) external weather data to make mostly automated and accurate forecasts iii) at least 1 week in advance iv) at individual span level; v) which are error-checked against historical weather	Utility i) uses a combination of accurate weather stations and ii) external weather data to make mostly automated and accurate forecasts iii) at least 2 weeks in advance iv) at individual span level and around each asset with potential to cause ignition; v) which are

Capability	Maturity level 0	1	2	3	4
				patterns and subject matter expert input	error checked against historical weather patterns and subject matter expert input; and vi) adjusted in real-time based on a learning algorithm and updated weather inputs
9. External sources used in weather forecasting	Utility does not use external weather data	Utility i) uses external data ii) where direct measurements from the utility's own weather stations are not available	Utility i) uses a combination of accurate weather stations and ii) external weather data to make decisions, and iii) has reliable, defined, and mostly manual processes for error checking weather stations with external data sources	Utility i) uses a combination of accurate weather stations and ii) external weather data to iii) automatically produce a combined weather map, and iv) has reliable, defined, and mostly automated processes for combining and error checking weather stations with external data sources, v) and electing to use the data set that, as a whole or in composite is most accurate	Utility i) uses a combination of accurate weather stations and ii) external weather data to iii) automatically produce a combined weather map, and iv) has reliable, defined, and completely automated processes for combining and error checking weather stations with external data sources into a single visual and configurable live map, v) and where the utility builds new weather stations or verifies the accuracy of existing stations and calibrates stations where possible based on these error checking processes

Capability	Maturity level 0	1	2	3	4
10. Wildfire detection processes and capabilities	No reliable equipment or procedures for detecting ignitions along grid	i) Well-defined procedures and equipment for detecting ignitions along grid, including ii) remote detection equipment, including cameras	i) Well-defined procedures and equipment for detecting ignitions along grid, including ii) remote detection equipment, including cameras iii) augmented by ignition detection algorithms or software, and iv) including a procedure for notifying suppression forces	i) Well-defined procedures and equipment for detecting ignitions along grid, including ii) remote detection equipment, including cameras that are iii) augmented with automated ignition detection algorithms or software, in which iv) satellite monitoring of utility territory to detect utility ignitions automatically, in which v) detection is reported to key stakeholders including suppression forces vi) automatically, accurately, and in real time	i) Well-defined procedures and equipment for detecting ignitions along grid, including ii) remote detection equipment, including cameras that are iii) fully operated using automated ignition detection algorithms or software, and iv) satellite monitoring of utility territory to detect utility ignitions automatically, in which v) detection is reported to key stakeholders including suppression forces automatically, and vi) propagation paths are tracked and reported to suppression forces accurately and in real time

Category C: Grid design and system hardening

Illustrative descriptions that may represent typical grades—not comprehensive

Capability	Maturity level 0	1	2	3	4
11. Approach to prioritizing initiatives across territory	Plan does not clearly prioritize initiatives geographically to focus on highest risk areas	Plan prioritizes wildfire risk reduction initiatives to within only HFTD areas	Plan prioritizes wildfire risk reduction initiatives at the circuit level based on local geography and climate/weather conditions within HFTD areas	Plan prioritizes wildfire risk reduction initiatives at the span level based on i) risk modeling driven by local geography and climate/weather conditions, fuel loads and moisture content and topography ii) detailed wildfire and PSPS risk simulations across individual circuits,	Plan prioritizes wildfire risk reduction initiatives at the asset level based on i) risk modeling driven by local geography and climate/weather conditions, fuel loads and moisture content and topography ii) risk estimates across individual circuits, including estimates of actual consequence, and iii) taking power delivery uptime into account (e.g. reliability, PSPS, etc.)
12. Grid design for minimizing ignition risk	Grid topology does not meet minimal design standards in areas with high wildfire risk	Grid topology meets minimal design standards in areas with high wildfire risk, and routing of new portions of grid takes wildfire risk into account	Grid topology i) demonstrates an understanding of the drivers of utility ignition risk, and ii) is designed in a way to substantially address it, exceeding design requirements, with routing of new portions of grid taking wildfire risk into account	Grid topology designed in a manner that incorporates the latest principles of asset management, utilizes new technologies, and reflects an aggressive commitment to minimizing utility ignition by providing the utility control over its assets	Grid topology sets planned using wildfire risk as a key driver for minimizing ignition risk through its use of innovative technologies and asset management strategies, and routing of new portions of grid takes wildfire risk into account, including by

Capability	Maturity level 0	1	2	3	4
				during periods of high fire risk, with routing of new portions of grid taking wildfire risk into account	providing microgrids or islanding in situations where traditional grid infrastructure is impracticable and at high wildfire risk
13. Grid design for resiliency and minimizing PSPS	Grid design and architecture has many single points of failure	Grid architecture i) includes n-1 redundancy for transmission circuits subject to PSPS ii) and switches in HFTD areas to individually isolate circuits	Grid architecture i) includes n-1 redundancy for transmission circuits subject to PSPS and n-1 redundancy for distribution subject to PSPS covering at least 50% of customers in HFTD ii) and switches in HFTD areas to isolate individual circuits such that no more than 2000 customers sit within one switch iii) with egress points used as an input for grid topology design	Grid architecture i) includes n-1 redundancy for transmission circuits subject to PSPS and n-1 redundancy for distribution subject to PSPS covering at least 70% of customers in HFTD ii) and switches in HFTD areas to isolate individual circuits such that no more than 1000 customers sit within one switch iii) with egress points available and mapped for each customer, with potential traffic mapped based on traffic simulation and taken into consideration for grid topology design	Grid architecture i) includes n-1 redundancy for transmission circuits subject to PSPS and n-1 redundancy for distribution subject to PSPS covering at least 85% of customers in HFTD ii) and switches in HFTD areas to isolate individual circuits such that no more than 200 customers sit on one switch iii) with egress points available and mapped for each customer, with potential traffic simulated and taken into consideration for grid topology design, and iv) microgrids or other means to reduce consequence for customers at frequent risk of PSPS

Capability	Maturity level 0	1	2	3	4
14. Risk-based grid hardening and cost efficiency	Utility has no clear understanding of the relative risk spend efficiency of hardening initiatives	Utility has i) accurate relative understanding of the ii) cost, and iii) feasibility of producing a iv) reliable risk spend efficiency estimate of v) commonly-deployed and commercially available grid hardening initiatives vi) in each area of the utility's grid	Utility has i) accurate relative understanding of the ii) cost, and iii) feasibility of producing a iv) reliable risk spend efficiency estimate of v) commonly-deployed and commercially available grid hardening initiatives vi) for each **circuit** of the utility's grid vii) updated on an annual basis	Utility has i) accurate quantitative understanding of the ii) cost, including sensitivities, and iii) feasibility of producing a iv) reliable risk spend efficiency estimate of v) all commercially available grid hardening initiatives vi) for each **span** along the utility's grid vii) updated on an annual basis	Utility has i) accurate quantitative understanding of the ii) cost, including sensitivities, and iii) feasibility of producing a iv) reliable risk spend efficiency estimate of v) all commercially available grid hardening initiatives, vi) and those initiatives that are lab-tested, vii) for each **asset** along the utility's grid viii) updated on an annual basis, ix) including risk reduction effect from the combination of various initiatives to reduce risk to communities
15. Grid design and asset innovation	No established program for evaluating the wildfire risk and risk spend efficiency of new hardening initiatives	New initiatives developed and evaluated based on i) installation of hardening initiatives into grid and ii) measuring direct reduction in ignition events	New initiatives developed and evaluated based on i) installation of hardening initiatives into grid and ii) measuring direct reduction in ignition events and iii) measuring reduction impact on near-miss metrics; iv) including an	New initiatives i) developed and independently evaluated using lab facilities by a trained team of grid innovation specialists, followed by ii) field testing based on installation into grid and iii) measuring direct reduction in ignition	New initiatives i) developed and independently evaluated using lab facilities by a trained team of grid innovation specialists, ii) field testing done by installation into grid and iii) measuring direct reduction in ignition events and iv) measuring

	Maturity level				
Capability	**0**	**1**	**2**	**3**	**4**
			evaluation of the total cost of the initiative	events at a span level and iv) measuring reduction impact on near-miss metrics; v) including an evaluation of the total cost of the initiative	reduction impact on near-miss metrics v) independent auditing of performance in grid; vi) extensive data sharing with industry, academia, and other utilities utilizing the same initiatives to share results; vii) including an evaluation of the total cost of initiative

Category D: Asset management and inspections

Illustrative descriptions that may represent typical grades—not comprehensive

Capability	Maturity level 0	1	2	3	4
16. Asset inventory and condition assessments	Lack of inventory of all electric lines and equipment and their state of wear or disrepair across the service territory	Accurate i) inventory database that is updated within 90 days of equipment inventory or conditions being collected of ii) equipment that may contribute to wildfire risk, iii) including age, state of wear, and expected lifecycle	Accurate i) inventory database that is updated within 30 days of equipment inventory or conditions being collected of ii) equipment that may contribute to wildfire risk, iii) including age, state of wear, and expected lifecycle, iv) and records of all inspections and repairs conducted	Accurate i) at least monthly-updated inventory database that is updated within 7 days of equipment inventory or conditions being collected of ii) all components that may contribute to wildfire ignition, iii) including age, state of wear, operating history, expected lifecycle, and probability of failure, iv) and records of all inspections and repairs conducted, v) up to date work plans on expected future repairs and replacements, vi) wherein repairs are independently audited, vii) and a system and approach are in place to reliably detect incipient malfunctions likely to cause ignition	Accurate and i) substantially real-time inventory database that is updated within 1 day of equipment inventory or conditions being collected of ii) all components that may contribute to wildfire ignition, iii) including age, state of wear, operating history, expected lifecycle, and probability of failure, iv) and records of all inspections and repairs conducted, v) inputs from sensorized equipment that substantially continuously monitors the state of electric lines and equipment, vi) up to date work plans on expected future repairs and replacements, vii) wherein repairs and

Capability	Maturity level 0	1	2	3	4
					sensor outputs are independently audited, viii) and a system and approach are in place to reliably detect incipient malfunctions likely to cause ignition, including in real time and with the ability to de-activate electric lines and equipment exhibiting incipient failure
17. Asset inspection cycle	Inspections less frequent than regulations require	Detailed inspection and patrol inspection frequency consistent with minimum regulatory requirements	Detailed inspections and patrol inspections of electric lines and equipment scheduled based on: i) an up-to-date static map of equipment type and environment, ii) with more frequent inspections for highest risk equipment in areas with fire potential, and all equipment in HFTD areas	Detailed inspections and patrol inspections i) scheduled based on risk, and ii) demonstrated to be determined by accurate predictive modeling of equipment failure probability and risk of failure causing ignition; iii) where failure probability is assessed via analysis of early indicators and actual failures; additional inspection types (i.e., beyond routine patrols and detailed) implemented as needed	Detailed inspections and patrol inspections i) scheduled based on risk, with ii) each inspection type (e.g., ground-based, aerial, subsurface, etc.) iii) demonstrated to be determined independently by accurate predictive modeling of equipment failure probability and risk of failure causing ignition, iv) where failure probability is assessed via analysis of early indicators and actual failures, and v) continuous monitoring

Capability	Maturity level 0	1	2	3	4
					by sensors to monitor the condition of electric lines and equipment areas with fire risk
18. Asset inspection effectiveness	Patrol, detailed, enhanced, and other inspection procedures and checklists do not include all items required by statute and regulations	Patrol, detailed, enhanced, and other inspection procedures and checklists include all items required by statute and regulations	Procedures and checklists for patrol, detailed, enhanced, and other inspections each determined according to: i) wildfire risk estimated via accurate predictive modeling, ii) for each circuit of the service territory, iii) based on equipment type and age, iv) which includes inspections for electric lines and equipment responsible for wildfire ignitions and near misses	Procedures and checklists for patrol, detailed, enhanced, and other inspections i) determined according to wildfire risk estimated via accurate predictive modeling ii) for each span iii) based on equipment type, age, and condition iv) which includes inspections for electric lines and equipment responsible for wildfire ignitions and near misses, v) validated by independent experts, and vi) providing basic training and conducting spot inspections to identify vegetation-based risk drivers	Inspection procedures and checklists for patrol, detailed, enhanced, and other inspections determined i) according to wildfire risk estimated via accurate predictive modeling, and ii) adjusted dynamically and in real time based on number and severity of deficiencies found during inspection iii) for each asset iv) based on equipment type, age, condition, and operating history v) which includes inspections for electric lines and equipment responsible for wildfire ignitions and near misses, and vi) based on predictive modeling based on equipment type, age, and condition and validated by independent experts,

	Maturity level				
Capability	**0**	**1**	**2**	**3**	**4**
					with dynamic adjustments in real time based on deficiencies found during inspection, and vi) asset inspection personnel being trained to conduct vegetation patrol inspections to identify vegetation-based risk drivers, including logging relevant risk drivers and in a vegetation management system
 **19. Asset maintenance and repair**	Electric lines and equipment not consistently maintained at required condition over multiple circuits	Electric lines and equipment maintained as required by applicable rules and regulations	Electric lines and equipment maintained as required by regulations, and additional maintenance done in circuits at highest wildfire risk based on detailed risk mapping	Electric lines and equipment maintained as required by regulations, and additional maintenance done in spans at highest wildfire risk based on detailed risk mapping, with service intervals of equipment being set based on wildfire risk in the relevant area, with maintenance and repair procedures taking into account wildfire risk	Electric lines and equipment maintained as required by regulations, and additional maintenance done on assets at highest wildfire risk based on detailed risk mapping, with service intervals of equipment being set based on wildfire risk in the relevant circuit, as well as real-time monitoring from sensors, with maintenance and repair procedures taking into account wildfire risk, performance history and past operating conditions

	Maturity level				
Capability	**0**	**1**	**2**	**3**	**4**
20. QA/QC for asset management	Lack of any one of i) established controls for ii) maintenance or inspection work, iii) post construction inspections of employee and contractor work, iv) follow-up and correction process and documentation, and v) auditing work completed including deep-dive spot inspections, whether conducted by employees or sub-contractors	Established and demonstrably functioning i) maintenance and inspection work, ii) post construction inspections of employee and contractor work, iii) follow-up and correction process and documentation, and audit process to manage and confirm work completed by employees or subcontractors, and iv) QA/QC information is used periodically to identify deficiencies in quality of work and inspections	Established and demonstrably functioning i) maintenance and inspection work, ii) post construction inspections of employee and contractor work, iii) follow-up and correction process and documentation, and audit process to manage and confirm work completed by subcontractors, iv) where subcontractors follow same processes and standards as utility's own employees, and v) QA/QC information is regularly used to identify systematic deficiencies in quality of work and inspections	Established and demonstrably functioning i) maintenance and inspection work, ii) post construction inspections of employee and contractor work, iii) follow-up and correction process and documentation, and audit process to manage and confirm work completed by subcontractors, and where subcontractors follow same processes and standards as utility's own employees iv) where contractor activity is subject to semi-automated audits (e.g., using photographic evidence, LiDAR scans, etc.), and v) a defined procedure is in place to use QA/QC information to identify systematic deficiencies in quality of work and inspections, and recommend training based on weaknesses	Established and demonstrably functioning i) maintenance and inspection work, ii) post construction inspections of employee and contractor work, iii) follow-up and correction process and documentation, and audit process to manage and confirm work completed by employees and subcontractors, iv) where subcontractors follow same processes and standards as utility's own employees, v) use integrated workforce management processes and tools vi) where contractor activity is subject to automated audits (e.g., using photographic evidence, LiDAR scans, etc.), and vii) real-time QA/QC information is used to identify systematic deficiencies, grade individuals, and recommend specific pre-made and tested training based on weaknesses

Category E: Vegetation management and inspections

Illustrative descriptions that may represent typical grades—not comprehensive

Capability	Maturity level 0	1	2	3	4
21. Vegetation inventory and condition assessments	Lack of vegetation inventory sufficient to determine vegetation clearances across grid at time of last inspection	i) Centralized and accurate ii) inventory database of vegetation clearances that is updated within 90 days of vegetation inventory or conditions being collected ii) across each region based on most recent inspection	i) Centralized and accurate inventory database of vegetation clearances that is updated within 30 days of vegetation inventory or conditions being collected ii) across each circuit based on most recent inspection, including iii) inventory of predominant vegetation species at each circuit, and iv) individual high-risk trees (e.g., those within striking distance) across grid	i) Centralized and accurate inventory of vegetation clearances that is updated within 7 days of vegetation inventory or conditions being collected ii) across each span based on most recent inspection, iii) inventory of individual vegetation species around each span, and iv) including expected growth rates and v) individual high-risk trees (e.g., those within striking distance) across grid vi) wherein inspections are independently audited, vii) and including capturing tree health and other vegetation risk factors	i) Accurate centralized inventory database of ii) real-time vegetation clearances that is updated within 1 day of vegetation inventory or conditions being collected ii) across each asset based on most recent inspection, with iii) inventory of vegetation types and species around each asset, iv) individual high-risk trees (e.g., those with strike potential) across entire grid, and v) up-to-date tree health and moisture content at the time of last inspection to determine risk of ignition and propagation; vi) wherein inspections are independently audited vi) and including capturing tree health and other vegetation risk

Capability	Maturity level 0	1	2	3	4
					factors
 **22. Vegetation inspection cycle**	Inspections less frequent than regulations require	All inspection frequency consistent with minimum regulatory requirements	All inspections scheduled based on i) a static vegetation map of predominant vegetation species and environments across the utility territory, with ii) more frequent inspections for areas with fastest growing vegetation based on typical growth rates	All inspections i) scheduled based on risk, ii) demonstrated to be determined by predictive modeling of vegetation growth iii) assessed via vegetation species and iv) growing conditions (e.g., precipitation, temperature, etc.), v) and considering tree health and other vegetation risk factors for more frequent inspections in less healthy areas	All inspections i) scheduled based on risk, with ii) each inspection type (e.g., ground-based, aerial, subsurface, etc.) iii) demonstrated to be determined independently by predictive modeling of vegetation growth iv) assessed via vegetation species, growing conditions (e.g., precipitation, temperature, etc.), and failure characteristics, v) continuous sampling of sensor data, vi) and considering tree health and other vegetation risk factors for more frequent inspections in less healthy areas

	23. Vegetation inspection effectiveness	Patrol, detailed, enhanced, and other inspection procedures and checklists do not include all items required by statute and regulations	Patrol, detailed, enhanced, and other inspection procedures and checklists include all items required by statute and regulations	Procedures and checklists for patrol, detailed, enhanced, and other inspections each determined according to: i) wildfire risk estimated via accurate predictive modeling, ii) for each circuit of the service territory, iii) based on vegetation density and equipment type and age, iv) which includes inspections for electric lines and equipment responsible for wildfire ignitions and near misses	Procedures and checklists for patrol, detailed, enhanced, and other inspections i) determined according to wildfire risk estimated via accurate predictive modeling ii) for each span iii) based on vegetation and equipment type, age, and condition iv) which includes inspections for electric lines and equipment responsible for wildfire ignitions and near misses, and v) validated by independent experts; vi) vegetation inspection personnel being trained to conduct simple equipment patrol inspections and logging faults into the utility's asset management tool	Inspection procedures and checklists for patrol, detailed, enhanced, and other inspections determined i) according to wildfire risk estimated via accurate predictive modeling, and ii) adjusted dynamically and in real time based on number and severity of deficiencies found during inspection iii) for each asset iv) based on vegetation species, condition, environment and equipment type, age, condition, and operating history v) which includes inspections for electric lines and equipment responsible for wildfire ignitions and near misses, and vi) based on predictive modeling based on vegetation and equipment type, age, and condition and validated by independent experts, with dynamic adjustments in real time

Capability	Maturity level 0	1	2	3	4
					based on deficiencies found during inspection; vii) vegetation inspection personnel being trained to conduct equipment patrol inspections, particularly in areas of highest risk to identify and prioritize faults for the utility's asset management tool
24. Vegetation grow-in mitigation	Utility often fails to maintain minimum statutory and regulatory clearances around lines and equipment. Utility does not remove vegetation waste along right of ways.	Utility maintains vegetation around lines and equipment according to minimum statutory and regulatory clearances. Utility i) removes vegetation waste along right of ways ii) within 1 week of cutting vegetation across entire grid	Utility meets or exceeds minimum statutory and regulatory clearances during all seasons around electric lines and equipment in the HFTD at circuit level. Utility i) removes vegetation waste along right of ways ii) within 3 days of cutting vegetation across entire grid, and iii) works with landowners to ensure wood removed from potential ignition areas	Utility meets or exceeds minimum statutory and regulatory clearances where relevant based on input from ignition risk modeling during all seasons around electric lines and equipment in the HFTD, with clearances also determined by species growth rates and species limb failure estimates at the span level, and engages with communities on clearances protocols. Utility i) removes vegetation waste along	Utility meets or exceeds minimum statutory and regulatory clearances, with clearances being determined based on species growth rates, species limb failure rates cross-referenced with local climatological conditions, and an accurate ignition and propagation risk modeling, and works with community organizations to cooperatively set local clearances and protocols. Utility i) removes vegetation waste along right of ways on ii) same

	Maturity level				
Capability	**0**	**1**	**2**	**3**	**4**
				right of ways ii) on same day as cutting vegetation	day as cutting vegetation; iii) utility collaborates with local landowners to provide a use for cutting vegetation across entire grid; iv) utility works with partners to identify new cost-effective uses for vegetation waste and v) takes into consideration environmental consequences and emissions of vegetation waste
 **25. Vegetation fall-in mitigation**	Utility does not remove vegetation outside of right of way. Utility does not remove vegetation waste along right of ways.	Utility i) removes some vegetation outside of right of ways but ii) does not have a specific process in place to systematically identify trees likely to pose a risk Utility iii) removes vegetation waste outside right of ways ii) within 1 week of cutting vegetation across entire grid	Utility i) systematically removes vegetation outside of right of ways ii) based on the height of trees with potential to make contact with electric lines and equipment and iii) informs communities about vegetation removal. Utility iv) removes vegetation waste outside of right of ways v) within 3 days of cutting vegetation across entire grid, and vi) works	Utility i) systematically removes vegetation outside of right of ways ii) based on the probability and consequence for electric lines and equipment iii) based on risk modeling and iv) engages with communities on vegetation removal. Utility v) removes vegetation waste outside of right of ways vi) on same day as cutting vegetation	Utility i) conducts regular and ii) accurate systematic inspections for individual trees outside the right of way to identify high risk trees and considers iii) environmental or climatological conditions contributing to increased risk and removes this vegetation, the with cooperation from community. Utility iv) removes vegetation waste along right of ways

	Maturity level				
Capability	**0**	**1**	**2**	**3**	**4**
			with landowners to ensure wood removed from potential ignition areas.		on ii) same day as cutting vegetation; v) utility collaborates with local landowners to provide a use for cutting vegetation across entire grid; vi) utility works with partners to identify new cost-effective uses for vegetation waste and vi) takes into consideration environmental consequences and emissions of vegetation waste
	26. QA/QC for vegetation management	Lack of any one of i) established controls for ii) vegetation management or vegetation inspection work, iii) post vegetation management inspections of employee and contractor work, iv) follow-up and correction process and documentation, and v) auditing work completed including deep-dive spot inspections, whether	Established and demonstrably functioning i) vegetation management and inspection work, ii) post vegetation management inspections of employee and contractor work, iii) follow-up and correction process and documentation, and audit process to manage and confirm work completed by employees or subcontractors, and	Established and demonstrably functioning i) vegetation management and inspection work, ii) post vegetation management inspections of employee and contractor work, iii) follow-up and correction process and documentation, and audit process to manage and confirm work completed by subcontractors, iv)	Established and demonstrably functioning i) vegetation management and inspection work, ii) post vegetation management inspections of employee and contractor work, iii) follow-up and correction process and documentation, and audit process to manage and confirm work completed by subcontractors, and	Established and demonstrably functioning i) vegetation management and inspection work, ii) post vegetation management inspections of employee and contractor work, iii) follow-up and correction process and documentation, and audit process to manage and confirm work completed by employees and subcontractors, iv)

	Maturity level				
Capability	**0**	**1**	**2**	**3**	**4**
	conducted by employees or sub-contractors	iv) QA/QC information is used periodically to identify deficiencies in quality of work and inspections	where subcontractors follow same processes and standards as utility's own employees, and v) QA/QC information is regularly used to identify systematic deficiencies in quality of work and inspections	where subcontractors follow same processes and standards as utility's own employees iv) where contractor activity is subject to semi-automated audits (e.g., using photographic evidence and analytics, , LiDAR scans, etc.), and v) a defined procedure is in place to use QA/QC information to identify systematic deficiencies in quality of work and inspections, and recommend training based on weaknesses	where subcontractors follow same processes and standards as utility's own employees, v) use integrated workforce management processes and tools vi) where contractor activity is subject to automated audits (e.g., using photographic evidence and analytics, LiDAR scans, satellite and aerial imagery, etc.), and vii) real-time QA/QC information is used to identify systematic deficiencies, grade individuals, and recommend specific pre-made and tested training based on weaknesses

Category F: Grid operations and protocols

Illustrative descriptions that may represent typical grades—not comprehensive

Capability	Maturity level 0	1	2	3	4
27. Protective equipment and device settings	Utility does not make changes to adjustable equipment in response to high wildfire threat conditions	Utility i) increases sensitivity of risk reduction elements ii) during high threat weather conditions	Utility i) increases sensitivity of risk reduction elements ii) during high threat weather conditions and iii) monitors near-misses in a iv) partially automated process to set sensitivity of grid elements	Utility i) increases sensitivity of risk reduction elements ii) during high threat weather conditions based on risk mapping and iii) monitors near-misses in a iv) partially automated process to set sensitivity of grid elements and via v) mostly predetermined protocol driven by fire risk conditions	Utility i) automatically increases sensitivity of risk reduction elements ii) during high threat weather conditions based on risk mapping and iii) monitors near-misses in a iv) fully automated process to set sensitivity of grid elements via v) predetermined protocol driven by fire risk conditions
28. Incorporating risk factors in grid control	Utility has no clearly defined and explained process for incorporating wildfire risk when determining electric control limits of the grid beyond equipment nameplate capacities (e.g., exceeding rated current or voltage design) or does not track detailed electric operational history when	Utility has i) clearly defined and explained process for incorporating wildfire risk when determining electric control limits of the grid beyond equipment nameplate capacities (e.g., exceeding rated current or voltage design) and ii) has systems in place to automatically track and	Utility has i) clearly defined and explained process for incorporating wildfire risk when determining electric control limits of the grid beyond equipment nameplate capacities (e.g., exceeding rated current or voltage design) and ii) has systems in place to	Utility has i) clearly defined and explained process for incorporating wildfire risk when determining electric control limits of the grid beyond equipment nameplate capacities (e.g., exceeding rated current or voltage design) and ii) has systems in place to automatically track and record detailed electric operational history when	Utility has i) clearly defined and explained process for incorporating wildfire risk when determining electric control limits of the grid beyond equipment nameplate capacities (e.g., exceeding rated current or voltage design) and ii) has systems in place to automatically track and record detailed electric

	operating equipment above nameplate capacities	record detailed electric operational history when operating equipment above nameplate capacities at the circuit level.	automatically track and record detailed electric operational history when operating equipment above nameplate capacities at the circuit level. iii) Utility uses predictive modeling to shorten the expected life of equipment based on grid operating history	operating equipment above nameplate capacities at the circuit level. iii) Utility uses predictive modeling to shorten the expected life of equipment based on grid operating history, iv) and the utility has the predictive model reviewed by external experts and verified using historical data	operational history when operating equipment above nameplate capacities at the circuit level. iii) Utility uses predictive modeling to shorten the expected life of equipment based on grid operating history, iv) and the utility has the predictive model reviewed by external experts and verified using historical data, v) and never operates grid above rated capacities in HFTD areas
29. PSPS operating model and consequence mitigation	PSPS event frequently forecasted incorrectly and poorly communicated to affected customers	PSPS event i) generally forecasted accurately with fewer than 50% of predictions being false positives where ignition would not have been likely to occur, ii) and communicated to >95% of affected customers iii) and >99% of medical baseline customers in advance of PSPS action, iv) no website downtime, v) and fewer than 1 hrs. of average PSPS time per customer per year, vi) utility has developed	PSPS event i) generally forecasted accurately with fewer than 33% of predictions being false positives where ignition would not have been likely to occur, ii) and communicated to >98% of affected customers iii) and >99.5% of medical baseline customers in advance of PSPS action, iv) with fewer than 0.5% of customers complaining, and v) no website downtime, vi)	PSPS event i) generally forecasted accurately with fewer than 33% of predictions being false positives where ignition would not have been likely to occur, ii) and communicated to >99% of affected customers iii) and >99.9% of medical baseline customers in advance of PSPS action, iv) with fewer than 0.5% of total customers complaining, and v) no website downtime, and vi) specific resources provided to	PSPS event i) generally forecasted accurately with fewer than 25% of predictions being false positives where ignition would not have been likely to occur, ii) and communicated to >99.9% of affected customers iii) and 100% of medical baseline customers in advance of PSPS action, iv) with fewer than 0.5% of total customers complaining, and v) no website downtime, and vi)

			resources to mitigate PSPS consequence, including providing water, phone charging, other resources to all affected by PSPS	and fewer than 0.5 hrs. of average PSPS per customer per year, vii) utility has developed resources to mitigate PSPS consequence, including providing water, phone charging, and other resources to all affected by PSPS	customers to alleviate the consequence of the power shutoff (e.g., providing backup generators, supplies, batteries, etc.), and vii) fewer than 0.25 hrs. of PSPS per customer per year, viii) utility has developed resources to mitigate PSPS consequence, including providing water, phone charging, and other resources to all affected by PSPS	specific resources provided to customers to alleviate the consequence of the power shutoff (e.g., providing backup generators, supplies, batteries, etc.), and vii) and fewer than 0.1 hrs. of PSPS per customer per year
!	**30. Protocols for PSPS initiation**	Utility has no well-defined and clearly explained threshold for PSPS activation	Utility has i) explicit policies and explanation for the thresholds above which PSPS is activated as a measure of last resort, ii) SME opinion is used as an input into PSPS decisions.	Utility has i) explicit, objective policies and explanation for the thresholds above which PSPS is activated as a measure of last resort, ii) PSPS decisions are supported by a partially automated system that recommends circuits for which PSPS should be activated, which is validated by SMEs.	Utility i) de-energizes circuits only upon detection of damaged condition of electric lines and equipment or contact with foreign objects or when suppression or when the circuit presents a safety risk to suppression and other personnel.	Utility i) maintains grid in sufficiently low risk condition to not require any PSPS events and ii) the only circuits de-energized are those with sufficient redundancy to create no disruption in energy supply to customers, iii) utility may de-energize specific circuits upon detection of damaged condition of electric lines and equipment or contact with foreign objects.

 **31. Protocols for PSPS re-energization**	Inadequate process for inspecting de-energized sections of the grid prior to re-energization	i) Manual process to accurately inspect de-energized sections of the grid prior to re-energization, ii) ensure grid is returned to service within 24 hours after weather has returned to below utility's PSPS threshold.	i) Partially automated process (e.g., using drones, LiDAR, etc.) to accurately inspect de-energized sections of the grid prior to re-energization, ii) ensure grid is returned to service within 18 hours after de-energization weather has returned to below utility's PSPS threshold iii) and causing 0 after-event ignitions.	i) Mostly automated process (e.g., using drones, LiDAR, etc.) augmented ii) with sensors and aerial tools to accurately inspect de-energized sections of the grid prior to re-energization to iii) ensure grid is returned to service within 12 hours after de-energization weather has returned to below utility's PSPS threshold, iv) and causing 0 after-event ignitions	i) Primarily automated process (e.g., using drones, LiDAR, etc.) augmented ii) with sensors and aerial tools to accurately inspect de-energized sections of the grid prior to re-energization to iii) ensure grid is returned to service within 8 hours after de-energization weather has returned to below utility's PSPS threshold, iv) and causing 0 after-event ignitions
 **32. Ignition prevention and suppression**	Utility has no policies governing what personnel roles are in suppressing ignitions, and personnel are untrained	Utilities have i) explicit policies about the role of personnel at the site of ignition, ii) including providing training and communication tools to immediately report ignitions caused by workers or in immediate vicinity of workers, iii) with no major injuries or fatalities to workers	Utilities have i) explicit policies about the role of personnel, including contractors and subcontractors at the site of ignition, ii) including providing training, suppression tools, and communication tools, iii) to suppress ignitions caused by workers or in immediate vicinity of workers, iv) with no OSHA reportable	Utilities have i) explicit policies about the role of personnel, including contractors and subcontractors at the site of ignition, ii) including providing training provided by suppression professionals, a variety of suppression tools, and robust communication tools that function without cell reception, iii) to suppress ignitions caused by workers or in immediate vicinity of	Utilities have i) explicit policies about the role of personnel, including contractors and subcontractors at the site of ignition, ii) including providing training provided by suppression professionals, a variety of suppression tools, and robust communication tools that function without cell reception, and requiring contractors to provide

			injuries or fatalities to workers	workers, iv) with no major injuries or fatalities to workers	the same, iii) to suppress small ignitions caused by workers or in immediate vicinity of workers, iv) with no major injuries or fatalities to workers; v) and share risk reduction and suppression training materials and techniques with other utilities

Category G: Data collection and reporting

Illustrative descriptions that may represent typical grades—not comprehensive

Capability	Maturity level 0	1	2	3	4
33. Data collection and curation	Situational, operational, and risk data not collected in a centralized database	Utility has i) centralized repository of accurate situational, operational, and risk data, ii) but does not use them to make short-term/operational and long-term/ investment decisions	Utility has centralized repository of i) accurate situational, operational, and other data relevant to wildfire risk and PSPS, ii) collects data from all sensored portions of electric lines and equipment, weather stations, etc., and iii) is able to utilize advanced analytics to drive decision-making in short term	Utility has centralized repository of i) accurate situational, operational, and risk data, ii) collects data from all sensored portions of electric lines and equipment, weather stations, etc., iii) is able to utilize advanced analytics to drive decision-making in short and long-term, iv) is able to ingest and share data using real-time API protocols with a wide variety of stakeholders	Utility has centralized repository of i) accurate situational, operational, and risk data, and ii) collects data from all sensored portions of electric lines and equipment, weather stations, etc. iii) is able to utilize advanced analytics to drive decision-making in short and long-term, iv) identify new sources of data needed for decision making, v) and to share best practices with other utilities in California and beyond, vi) is able to ingest and share data using real-time API protocols with a wide variety of stakeholders
34. Data transparency and analytics	No central catalogue of all wildfire-related data and algorithms, analyses, and data processes	All wildfire-related data and algorithms used by utilities i) catalogued in a single document, ii)	All wildfire-related data and algorithms used by utilities i) catalogued in a single document, ii)	All wildfire-related data and algorithms used by utilities i) catalogued in a single document, ii)	All wildfire-related data and algorithms used by utilities i) catalogued in a single document, ii)

	Maturity level				
Capability	**0**	**1**	**2**	**3**	**4**
		including an explanation of the sources, and assumptions made; and iii) all analysis and algorithms documented	including an explanation of the sources and assumptions made; iii) all wildfire-related analyses, algorithms, and data processing explained and documented; and iv) an IT system for sharing data in real time across at least two levels of permissions, including a. utility-regulator permissions, b. first responder permissions.	including an explanation of the sources and assumptions made, cleaning processes, and assumptions made in the data; iii) all analyses, algorithms, and data processing explained and documented, iv) most relevant wildfire related data and algorithms disclosed to regulators and other relevant stakeholders, v) an IT system for sharing data in real time across at least three levels of permissions, including a. utility-regulator permissions, b. first responder permissions, and c. public data sharing.	including an explanation of the sources and assumptions made, cleaning processes, and assumptions made in the data; iii) all analyses, algorithms, and data processing explained and documented, with iv) sensitivities disclosed for each type of analysis and data to at least the regulator; v) most relevant wildfire related data and algorithms disclosed publicly in WMP; and vi) an IT system for sharing data in real time across at least three levels of permissions, including a. utility-regulator permissions, b. first responder permissions, and c. public data sharing.
	**35. Near-miss tracking**	No tracking of near miss data	Tracking of near miss data for all near misses with wildfire ignition potential and associated event characteristics,	Tracking of i) near miss data for all near misses with wildfire ignition potential, ii) event characteristics and fuel	Tracking of i) near miss data for all near misses with wildfire ignition potential, ii) event characteristics to enable	Tracking of i) near miss data for all near misses with wildfire ignition potential, ii) event characteristics to enable

Capability	Maturity level 0	1	2	3	4
		including capturing data related to the specific mode of failure	loads and moisture to enable simulation of wildfire potential given an ignition, iii) including capturing data related to the specific mode of failure	simulation of wildfire potential given an ignition, iii) and predicting the probability of such a near miss in causing an ignition, iv) including capturing data related to the specific mode of failure	simulation of wildfire potential given an ignition, iii) and predicting the probability of such a near miss in causing an ignition, iv) using data from near misses to change grid operation protocols in real time, v) including capturing data related to the specific mode of failure
36. Data sharing with research community	Utility fails to share data or participate in research	Utility does not share data beyond disclosures required by rules and regulations, nor does it participate in collaborative research	Utility participates in i) collaborative research that ii) addresses utility-ignited wildfires	Utility i) funds and ii) participates in both independent and collaborative research that iii) addresses utility-ignited wildfires, and risk reduction initiatives	Utility i) funds and ii) participates in both independent and collaborative research that iii) addresses utility-ignited wildfires, and risk reduction initiatives, iv) and promotes best practices, based on the latest independent scientific and operational research, and v) ensures that research, where possible, is abstracted to apply to other utilities

Category H: Resource allocation methodology, business case, and sensitivities

Illustrative descriptions that may represent typical grades—not comprehensive

Capability	Maturity level 0	1	2	3	4
37. Scenario analysis across different risk levels	Utility does not project proposed initiatives or costs across different levels of risk scenarios	Utility i) provides at least an accurate high-risk reduction and a low risk reduction scenario and ii) projected cost and total risk reduction potential for each region	Utility i) provides at least an accurate high-risk reduction and a low risk reduction scenario in addition to ii) their proposed scenario and iii) shows the projected cost and total risk reduction iv) potential for each circuit	Utility i) provides at least an accurate high-risk reduction and a low risk reduction scenario in addition to ii) their proposed scenario and iii) shows the projected cost and total risk reduction iv) potential for each scenario within each span	Utility i) provides at least an accurate high risk reduction and a low risk reduction scenario in addition to ii) their proposed scenario and iii) shows the projected cost and total risk reduction iv) potential for each scenario at each asset, v) and includes a long-term (e.g. 6-10 year) risk estimate taking into account macro factors (climate change, etc.) as well as planned risk reduction initiatives, and vi) utility includes estimate of impact on reliability factors
38. Presentation of relative risk spend efficiency for portfolio of initiatives	Utility does not present relative risk spend efficiency figures across initiatives	Utility provides i) accurate qualitative ranking of ii) common commercial initiatives by risk spend efficiency, and iii) includes figures for estimated cost and projected risk reduction	Utility provides i) accurate qualitative ranking of ii) all commercial initiatives by risk spend efficiency, and iii) includes figures for estimated cost and	Utility provides i) accurate qualitative ranking of ii) all commercial initiatives by risk spend efficiency, and iii) includes figures for estimated PV cost and projected risk reduction	Utility provides i) accurate qualitative ranking of ii) all commercial initiatives and emerging initiatives by risk spend efficiency, and iii) includes figures for estimated cost and

Capability	Maturity level 0	1	2	3	4
		impact of each initiative, iv) for each region, and v) explanation of their investment in each initiative	projected risk reduction impact of each initiative, iv) in each circuit of their grid, and v) explanation of their investment in each particular initiative	impact of each initiative, iv) in each span, and v) explanation of their investment in each particular initiative, and vi) the expected overall reduction in risk	projected risk reduction impact of each initiative, iv) for each asset, and v) explanation of their investment in each particular initiative and vi) the expected overall reduction in risk from each asset and the grid overall and vii) utility includes estimate of impact on SAIDI factors
39. Process for determining risk spend efficiency of vegetation management initiatives	Utility has no clear understanding of the relative risk spend efficiency of various clearances and types of vegetation management initiatives	Utility has i) accurate relative understanding of the ii) cost, and iii) effectiveness to produce a iv) reliable risk spend efficiency estimate of v) commonly-deployed vegetation management initiatives vi) in each area of the utility's grid	Utility has i) accurate relative understanding of the ii) cost, and iii) effectiveness to produce a iv) reliable risk spend efficiency estimate of v) all vegetation management initiatives deployed in California vi) for each circuit of the utility's grid vii) updated on an annual basis	Utility has i) accurate quantitative understanding of the ii) cost, including sensitivities, and iii) effectiveness to produce a iv) accurate risk spend efficiency estimate of v) all feasible vegetation management initiatives vi) for each span along the utility's grid vii) updated on an annual basis	Utility has i) accurate quantitative understanding of the ii) cost, including sensitivities, and iii) effectiveness to produce a iv) accurate risk spend efficiency estimate of v) all feasible vegetation management initiatives, vi) supported by independent testing, vii) around each asset along the utility's grid viii) updated on an annual basis, ix) including risk reduction effect from the combination of various initiatives

Capability	Maturity level 0	1	2	3	4
40. Process for determining risk spend efficiency of system hardening initiatives	Utility has no clear understanding of the relative risk spend efficiency of hardening initiatives	Utility has i) accurate relative understanding of the ii) cost, and iii) effectiveness to produce a iv) reliable risk spend efficiency estimate of v) commonly-deployed and commercially available grid hardening initiatives vi) in each area of the utility's grid	Utility has i) accurate relative understanding of the ii) cost, and iii) effectiveness to produce a iv) reliable risk spend efficiency estimate of v) commonly-deployed and commercially available grid hardening initiatives vi) for each **circuit** of the utility's grid vii) updated on an annual basis	Utility has i) accurate quantitative understanding of the ii) cost, including sensitivities, and iii) effectiveness to produce a iv) reliable risk spend efficiency estimate of v) all commercially available grid hardening initiatives vi) for each **span** along the utility's grid vii) updated on an annual basis	Utility has i) accurate quantitative understanding of the ii) cost, including sensitivities, and iii) effectiveness to produce a iv) reliable risk spend efficiency estimate of v) all commercially available grid hardening initiatives, vi) and those initiatives that are lab-tested, vii) for each **asset** along the utility's grid viii) updated on an annual basis, ix) including risk reduction effect from the combination of various initiatives
41. Portfolio-wide initiative allocation methodology	Utility does not allocate capital to wildfire risk reduction initiatives based on wildfire risk spend efficiency	Utility i) allocates spend within each category of wildfire risk reduction initiative ii) by accurate risk spend efficiency estimates iii) but does not allocate spend across categories of initiatives (e.g. prioritizing between vegetation management and grid hardening)	Utility i) allocates spend across all categories of wildfire risk reduction initiatives ii) by accurate risk spend efficiency estimates iii) across various categories using an average estimate of risk spend efficiency for each initiative across the entire grid	Utility i) allocates spend across all categories of wildfire risk reduction initiatives ii) by accurate risk spend efficiency estimates iii) based on the current state of the utility’s equipment and the specific location or area of grid where the initiative is to be	Utility i) allocates spend across all categories of wildfire risk reduction initiatives ii) by accurate risk spend efficiency estimates iii) based on the current state of the utility’s equipment at the asset level where the initiative is to be implemented and iv)

Capability	Maturity level 0	1	2	3	4
				implemented; iv) which is verified by experimental data confirmed by experts and other utilities in CA	utility includes estimate of impact on reliability factors; v) which is verified by experimental data confirmed by experts and by other utilities in California or abroad
42. Portfolio-wide innovation in new wildfire initiatives	No established program for evaluating the wildfire risk and risk spend efficiency of new wildfire initiatives	New initiatives developed and evaluated based on i) piloting and ii) measuring direct reduction in ignition events	New initiatives developed and evaluated based on i) piloting initiatives and ii) measuring direct reduction in ignition events and iii) measuring reduction impact on near-miss metrics; iv) including an evaluation of the total cost of the initiative	New initiatives i) developed and independently evaluated using lab facilities by a trained team of innovation specialists, followed by ii) in-field testing based on piloting and iii) measuring direct reduction in ignition events at a span level and iv) measuring reduction in impact on near-miss metrics; v) including an evaluation of the total cost of the initiative	New initiatives i) developed and independently evaluated using lab facilities by a trained team of innovation specialists, ii) field testing done by piloting, and iii) measuring direct reduction in ignition events and iv) measuring reduction impact on near-miss metrics v) independent auditing of performance; vi) extensive data sharing with industry, academia, and other utilities utilizing the same initiatives to share results; vii) including an evaluation of the total cost of initiative

Category I: Emergency planning and preparedness

Illustrative descriptions that may represent typical grades—not comprehensive

Capability	Maturity level 0	1	2	3	4
43. Wildfire plan integrated with overall disaster / emergency plan	Wildfire plan not integrated with overall disaster and emergency preparedness plan	Wildfire plan i) a component of overall disaster and emergency preparedness plan; ii) running in drills to audit the viability and execution of plans	Wildfire plan i) an integrated component of overall disaster and emergency preparedness plan, with ii) consequence of confounding events or multiple simultaneous disasters considered in planning process, iii) running in drills to audit the viability and execution of plans across incident types	Wildfire plan i) an integrated component of overall disaster and emergency preparedness plan, with ii) consequence of confounding events or multiple simultaneous disasters considered in planning process, and iii) plan integrated with disaster and emergency preparedness plan of other relevant stakeholders (e.g. Cal Fire, Fire Safe Councils, etc.) iv) coordinating planning and integrating plans across stakeholders; and v) participating in drills to audit the viability and execution of plans across stakeholders	Wildfire plan i) an integrated component of overall disaster and emergency preparedness plan, with ii) consequence of confounding events or multiple simultaneous disasters considered in planning process, and iii) plan integrated with disaster and emergency preparedness plan of other relevant stakeholders (e.g. Cal Fire, Fire Safe Councils, etc.), iv) with utility taking a leading role in planning, coordinating, and integrating plans across stakeholders, and leading efforts to run drills to audit the viability and execution of plans across stakeholders

Capability	Maturity level 0	1	2	3	4
44. Plan to restore service after wildfire related outage	Wildfire plan not integrated with overall disaster and emergency preparedness plan	Wildfire plan i) a component of overall disaster and emergency preparedness plan; ii) running in drills to audit the viability and execution of plans	Wildfire plan i) an integrated component of overall disaster and emergency preparedness plan, with ii) consequence of confounding events or multiple simultaneous disasters considered in planning process, iii) running in drills to audit the viability and execution of plans across incident types	Wildfire plan i) an integrated component of overall disaster and emergency preparedness plan, with ii) consequence of confounding events or multiple simultaneous disasters considered in planning process, and iii) plan integrated with disaster and emergency preparedness plan of other relevant stakeholders (e.g. Cal Fire, Fire Safe Councils, etc.) iv) coordinating planning and integrating plans across stakeholders; and v) participating in drills to audit the viability and execution of plans across stakeholders	Wildfire plan i) an integrated component of overall disaster and emergency preparedness plan, with ii) consequence of confounding events or multiple simultaneous disasters considered in planning process, and iii) plan integrated with disaster and emergency preparedness plan of other relevant stakeholders (e.g. Cal Fire, Fire Safe Councils, etc.), iv) with utility taking a leading role in planning, coordinating, and integrating plans across stakeholders, and leading efforts to run drills to audit the viability and execution of plans across stakeholders
45. Emergency community engagement during and after wildfire	Little community engagement or poor communication during and after wildfire	i) Clear and substantially complete communication of available utility-related information ii) to >95%	i) Clear and substantially complete communication of available utility-related information ii) to >98%	Clear and substantially complete communication of utility-related information to >99% of	Utility i) communicates to >99.9% of affected customers ii) and 100% of affected medical baseline customers, iii)

	Maturity level				
Capability	**0**	**1**	**2**	**3**	**4**
		of affected customers, and iii) >99% of affected medical baseline customers, as well as referral to other agencies, iv) links to relevant evacuation information prominently on website and via toll-free phone number	of affected customers, and iii) >99.5% of affected medical baseline customers, as well as referral to other agencies, iv) availability of relevant evacuation information and links prominently on website and via toll-free phone number	affected customers ii) and >99.9% of affected medical baseline customers iii) has detailed and actionable established protocols for cooperation with emergency management organizations iv) availability of relevant evacuation information and links prominently on website and via toll-free phone number, v) and assists where helpful with communication of information related to power outages to customers, as well as partnering with other agencies to refer those affected to relevant assistance and resources	has detailed and actionable established protocols for cooperation with emergency management organizations iv) availability of relevant evacuation information and links prominently on website and via toll-free phone number and v) assists where helpful with communication of information related to power outages to customers, and vi) communicates and coordinates resources to communities during emergencies (e.g., shelters, supplies, transportation etc.)
	46. Protocols in place to learn from wildfire events	No defined protocols established to learn from wildfire events	Protocols in place to i) record outcome of emergency events and to ii) clearly and actionably document learnings and potential process improvements, iii) including a defined	Protocols in place to i) record outcome of emergency events and to ii) clearly and actionably document learnings and potential process improvements, iii) including a defined	Protocols in place to i) record outcome of emergency events and to ii) clearly and actionably document learnings and potential process improvements, iii) including a defined	Protocols in place to i) record outcome of emergency events and to ii) clearly and actionably document learnings and potential process improvements, iii) including a defined

Capability	Maturity level 0	1	2	3	4
		process and staff responsible for incorporating learnings into emergency plan	process and staff responsible for incorporating learnings into emergency plan, and iv) having subject matter experts assess the effectiveness of the updated plan	process and staff responsible for incorporating learnings into emergency plan, and iv) testing updated plan using "dry runs" and subject matter experts to confirm effectiveness of updated plan	process and staff responsible for incorporating learnings into emergency plan, and iv) testing updated plan using "dry runs" and subject matter experts to confirm effectiveness of updated plan; v) including a defined process to solicit input from variety of other stakeholders and defined process to incorporate learnings from other stakeholders into emergency plan
 **47. Processes for continuous improvement after wildfire and PSPS**	Utility does not conduct an evaluation or debrief process after a wildfire event.	Utility i) conducts a customer survey and utilized partners to disseminate ii) utility also debriefs with partners about what can be improved, iii) feedback and recommendations on potential improvements are made public.	Utility i) conducts a customer survey and utilized partners to disseminate ii) conducts proactive outreach to local agencies and organizations to solicit additional feedback on what can be improved iii) feedback and recommendations on potential improvements are made public.	Utility has i) a clear plan for post-event listening and incorporating lessons learned from all stakeholders, ii) activities include debriefs, public listening sessions, surveys, and additional measures available to the public, iii) feedback is compiled, written, and recommended actions are made public. Implementation of	Utility has i) a clear plan for post-event listening and incorporating lessons learned from all stakeholders, ii) activities include debriefs, public listening sessions, surveys, and additional measures available to the public, iii) feedback is compiled, written, and recommended actions are made public, implementation of

	Maturity level				
Capability	**0**	**1**	**2**	**3**	**4**
				recommendations is tracked and reported on	recommendations is reported on and tracked, iv) utility further has an established process to conduct reviews after wildfires in other the territory of other utilities and states to identify and address areas of improvement

Category J: Stakeholder cooperation and community engagement

Illustrative descriptions that may represent typical grades—not comprehensive

Capability	Maturity level 0	1	2	3	4
48. Cooperation and best practice sharing with other utilities	Utility does not adopt lessons learned from other utilities	Utility has a i) clearly defined operational process in place to ii) exchange best practices with other California utilities iii) tests lessons learned from other utilities to ensure local applicability	Utility i) actively seeks best practices from utilities, ii) successfully implements relevant best practices, and iii) seeks to share best practices and lessons learned in a consistent format iv) tests lessons learned from other utilities to ensure local applicability	Utility i) actively seeks best practices from utilities, ii) successfully implements relevant best practices, and iii) seeks to share best practices and lessons learned in a consistent format, and iv) via a consistent and predictable set of venues/media, v) and participates in annual benchmarking exercises with other utilities to find areas for improvement vi) implement a process for testing lessons learned from other utilities to ensure local applicability	Utility i) actively seeks best practices from utilities, ii) successfully implements relevant best practices, and iii) seeks to share best practices and lessons learned in a consistent format, and iv) via a consistent and predictable set of venues/media, v) and participates in annual benchmarking exercises with other utilities to find areas for improvement and vi) implement a defined process for testing and adapting lessons learned from other utilities to ensure local applicability
49. Engagement with communities on utility	Utility has poor relationship with local communities, impairing ability to implement initiatives	Utility has i) clear and actionable plan to develop or maintain a collaborative relationship with local	Utility has i) clear and actionable plan to develop or maintain a collaborative relationship with local	Utility has i) clear and actionable plan to develop or maintain a collaborative relationship with local	Utility has demonstrably cooperative relationship with local communities, and i) clear and actionable plan to

Capability	Maturity level 0	1	2	3	4
wildfire mitigation initiatives		communities, ii) enables utility to implement initiatives (e.g., conduct vegetation management) iii) with fewer than 10% of land owners in utility territory preventing or significantly hindering the utility's performance of reasonable vegetation work, and iv) complaints from fewer than 5% of landowners	communities, ii) enables utility to implement initiatives (e.g., conduct vegetation management) iii) with fewer than 3% of land owners in utility territory preventing or significantly hindering the utility's performance of reasonable vegetation work, and iv) complaints from fewer than 2% of landowners	communities, ii) enables utility to implement initiatives (e.g., conduct vegetation management) iii) with fewer than 2% of land owners in utility territory preventing or significantly hindering the utility's performance of reasonable vegetation work, and iv) complaints from fewer than 1% of landowners	develop or maintain a collaborative relationship with local communities, ii) enables utility to implement initiatives (e.g., conduct vegetation management) iii) with fewer than 1% of land owners in utility territory preventing or significantly hindering the utility's performance of reasonable vegetation work, and iv) complaints from fewer than 1% of landowners; and v) landowners periodically reach out to utility to notify of risks, dangers, or issues
50. Engagement with LEP and AFN populations	Utility has poor relationships with key organizations representing LEP and AFN communities, impairing ability to implement initiatives.	Utility has i) a plan for partnering with organizations representing LEP and AFN communities, and ii) is able to provide information about the nature of these partnerships	Utility has i) a clear and actionable plan to develop and maintain collaborative relationships with organizations representing LEP and AFN communities, with ii) pathways for implementing suggested	Utility has i) a clear and actionable plan to develop and maintain ii) demonstrably cooperative and codified relationships with organizations representing LEP and AFN communities, and iii) can point to clear examples of how those	Utility has i) a clear and actionable plan to develop and maintain ii) demonstrably cooperative and codified relationships with organizations representing LEP and AFN communities, and iii) can point to clear examples of how those

Capability	Maturity level 0	1	2	3	4
			activities to address population needs	relationships have driven the utility's ability to interact with and prepare these populations for wildfire mitigation activities.	relationships have driven the utility's ability to interact with and prepare these populations for wildfire mitigation activities, and has a specific annually-updated action plan further reduce wildfire and PSPS risk to these communities
51. Collaboration with emergency response agencies	Utility does not sufficiently cooperate with suppression agencies	Utility cooperates with suppression agencies by i) calling in ignitions detected along length of grid for ii) high risk areas	Utility cooperates with suppression agencies by i) calling in ignitions detected along length of grid ii) for all areas under utility control	i) Utility works cooperatively with suppression agencies to detect wildfires in the utility's service area, ii) alerts suppression resources, and iii) accurately predict and communicates the forecasted fire propagation path using available analytics resources and weather data	i) Utility works cooperatively with suppression agencies to detect wildfires in the utility's service area, ii) alerts suppression resources, and iii) accurately predict and communicates the forecasted fire propagation path using available analytics resources and weather data, iv) communicates fire path to community if requested, and v) utility works to assist suppression personnel logistically where possible

	Maturity level				
Capability	**0**	**1**	**2**	**3**	**4**
52. Collaboration on wildfire planning with stakeholders	Utility does not collaborate with other agencies conducting non-emergency wildfire planning and initiatives to reduce wildfire risk.	Utility i) coordinates on a regular basis with other agencies including all Fire Safe Councils within its territory and ii) conduct fuel management along right of ways but iii) is not coordinating with broader fuel management efforts by other stakeholders	Utility i) coordinates on a regular basis with other agencies including all Fire Safe Councils within its territory and ii) conducts substantial fuel management along right of ways and iii) shares fuel management plans with other stakeholders, iv) works with other stakeholders conducting fuel management concurrently	Utility i) coordinates on a regular basis with other agencies including all Fire Safe Councils within its territory and ii) conducts substantial fuel management along right of ways, iii) shares fuel management plans and iv) coordinates fuel management activities, including adjusting plans, to cooperate with other stakeholders state-wide to focus on areas that would have the biggest impact in reducing wildfire risk, v) cultivates a native vegetative ecosystem along right of ways that is consistent with lower fire risk, and work with stakeholders across its territory to cultivate a native vegetative ecosystem	Utility i) coordinates on a regular basis with other agencies including all Fire Safe Councils within its territory and ii) conducts substantial fuel management in service area, iii) shares fuel management plans and iv) pro-actively coordinates fuel management initiatives with other stakeholders to encourage state-wide to collaborate to focus on areas that would have the biggest impact in reducing wildfire risk, v) utility funds local groups (e.g. fire safe councils) to support fuel management, vi) cultivates a native vegetative ecosystem along right of ways that is consistent with lower fire risk and work with stakeholders across its territory to cultivate a native vegetative ecosystem

(END OF ATTACHMENT 2)

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ATTACHMENT 3

(Utility Survey)

Wildfire Mitigation Maturity Utility Survey

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Survey response instructions

As outlined above, the maturity assessment will be applied by the WSD to track the utility's maturity over time. The following survey, in addition to other inputs, will be used to inform the utility's maturity level to establish a baseline maturity in 2020, as well as establish a target maturity for 2023.

Utilities complete the following survey by:

1. indicating the most appropriate response option to each question based on the **presently employed practices and capabilities of the utility**
2. indicating your **expected response to each question by January 2023** based on your expected growth in your maturity over the 3 year period of your WMP to **set a 3-year target maturity**

Importantly, utilities shall only indicate that they meet a given response option if they meet **all** of the characteristics described within that response option, across **all** instances where that question is valid.

For example, if a utility meets all criteria for answer 2 of a given question and all but one criterion for answer 3, that utility must select answer 2. Similarly, if a utility meets all criteria for answer 2 of a given question over 60% of its territory but meets all criteria for answer 1 over 100% of its territory, the utility must select answer 1.

The answers to these questions will be used as one input in assessing utility maturity. The assessment of maturity will also leverage each utility's WMP submission, other supporting documents and disclosures, and select audits of relevant inputs where deemed necessary.

A Risk mapping and simulation

A.I Climate scenario modeling and sensitivities

Capability 1

A.I.a How sophisticated is utility's ability to estimate the risk of weather scenarios?				
i. **No clear ability** to understand incremental risk under various weather scenarios ☐	ii. Wildfire risk can be **reliably determined based on weather and its impacts** ☐	iii. Weather scenarios can be reliably **categorized by level of risk** ☐	iv. **Risk for various weather scenarios** can be reliably estimated ☐	v. **Incremental risk** of foreseeable weather scenarios can be **accurately and quantitatively estimated** ☐

A.I.b How are scenarios assessed?				
i. **No formal assessment process** ☐	ii. **Independent expert** assessment ☐	iii. Independent expert assessment, **supported by historical data of incidents and near misses** ☐	iv. Independent expert assessment, supported by historical data of incidents and near misses, **and updated based on real-time learning during weather event** ☐	

A.I.c How granular is utility's ability to model scenarios?				
1. Less granular than regional, or no tool at all ☐	ii. Regional ☐	iii. Circuit-based ☐	iv. Span-based ☐	v. Asset-based ☐

A.I.d How automated is the tool?				
i. Not automated ☐	ii. Partially (<50%) ☐	iii. Mostly (>=50%) ☐	iv. Fully ☐	

A.I.e **What additional information is used to estimate model weather scenarios and their risk?**				
i. None ☐	ii. **Weather, how weather effects failure modes and propagation** ☐	iii. Weather, how weather effects failure modes and propagation, **existing hardware** ☐	iv. Weather **measured at the circuit level**, how weather effects failure modes and propagation, existing hardware ☐	v. Weather measured at the circuit level, how weather effects failure modes and propagation, existing hardware, **level of vegetation** ☐

A.II Ignition risk estimation

Capability 2

A.II.a **How is ignition risk calculated?**				
i. **No reliable tool or process** to estimate risk across the grid based on characteristics and condition of lines, equipment, and vegetation ☐	ii. Tools and **processes can reliably categorize the risk of ignition** across the grid into at least two categories based on characteristics and condition of lines, equipment, surrounding vegetation, **and localized weather patterns** ☐	iii. Tools and processes **can quantitatively and accurately assess the risk of ignition** across the grid based on characteristics and condition of lines, equipment, surrounding vegetation, and localized weather patterns ☐	iv. Tools and processes **can quantitatively and accurately assess the risk of ignition** across the grid based on characteristics and condition of lines, equipment, surrounding vegetation, localized weather patterns, **and flying debris probability, with probability based on specific failure modes and top contributors to those failure modes** ☐	

A.II.b How automated is the ignition risk calculation tool?			
i. Not automated ☐	ii. Partially (<50%) ☐	iii. Mostly (>=50%) ☐	iv. Fully ☐

A.II.c How granular is the tool?				
i. Less granular than regional, or no tool at all ☐	ii. Regional ☐	iii. Circuit-based ☐	iv. Span-based ☐	v. Asset-based ☐

A.II.d How is risk assessment confirmed? Select all that apply.				
i. By experts ☐	ii. By historical data ☐	iii. Through real-time learning ☐	iv. None of the above ☐	

A.II.e What confidence interval, in percent, does the utility use in its risk assessment?							
>60%	☐	>80%	☐	>90%	☐	>95%	☐

A.III Estimation of wildfire consequences for communities

Capability 3

A.III.a How is estimated consequence of ignition relayed?				
i .**No translation** of ignition risk estimates to potential consequences for communities ☐	ii. Ignition events **categorized as low or high risk to communities** ☐	iii. Ignition events **categorized with 5 or more levels of risk to communities** ☐	iv. Consequence of ignition events **quantitatively, accurately, and precisely estimated** ☐	

A.III.b What metrics are used to estimate the consequence of ignition risk?				
i. As a function of **at least one of the following:**	ii. As a function **of at least** potential fatalities, and one	iii. As a function of at least potential fatalities,		

structures burned, potential fatalities, or area burned ☐	or both of structures burned, or area burned ☐	structures burned, area burned, **monetary damages, impact on air quality, and impact on GHG reduction goals** ☐		

A.III.c Is the ignition risk impact analysis available for all seasons?				
i. No ☐	ii. Yes ☐			

A.III.d How automated is the ignition risk estimation process?			
i. Not automated ☐	ii. Partially (<50%) ☐	iii. Mostly (>=50%) ☐	iv. Fully ☐

A.III.e How granular is the ignition risk estimation process?				
i. Less granular than regional, or no tool at all ☐	ii. Regional ☐	iii. Circuit-based ☐	iv. Span-based ☐	v. Asset-based ☐

A.III.f How are the outputs of the ignition risk impact assessment tool evaluated?				
i. Outputs **not evaluated** ☐	ii. Outputs **independently assessed by experts** ☐	iii. Outputs independently assessed by experts **and confirmed by historical data** ☐	iv. Outputs independently assessed by experts **and confirmed based on real time learning, for example, using machine learning** ☐	

A.III.g What other inputs are used to estimate impact?				
i. Level and	i. Level and	iii. Level and	iv. None of the	

conditions of **vegetation and weather** ☐	conditions of **vegetation and weather, including the vegetation specifies immediately surrounding the ignition site** ☐	conditions of **vegetation and weather, including the vegetation specifies immediately surrounding the ignition site and up-to-date moisture content, local weather patterns** ☐	above ☐	

A.IV Estimation of wildfire and PSPS risk-reduction impact

Capability 4

A.IV.a How is risk reduction impact estimated?				
i. **No clear estimation** of risk reduction potential across most initiatives ☐	ii. Approach accurately **estimates risk reduction potential of initiatives averaged across the territory** where such initiatives could be installed ☐	iii. Approach reliably **categorizes initiatives by risk reduction potential** ☐	iv. Approach reliably and accurately **estimates risk reduction of potential for each location** ☐	v. Approach reliably and **quantitatively** estimates risk reduction of potential for each location ☐

A.IV.b How automated is ignition risk reduction impact assessment tool?				
i. Not automated ☐	ii. Partially (<50%) ☐	iii. Mostly (>=50%) ☐	iv. Fully ☐	

A.IV.c How granular is the ignition risk reduction impact assessment tool?				
i. Less granular than regional, or no tool at all ☐	ii. Regional ☐	iii. Circuit-based ☐	iv. Span-based ☐	v. Asset-based ☐

A.IV.d	**How are ignition risk reduction impact assessment tool estimates assessed?**			
i. **No or limited formal evidence** or support for estimates ☐	ii. With **evidence and logical reasoning** ☐	iii. Independent **expert** assessment ☐	iv. Independent expert assessment, **supported by historical data of incidents and near misses** ☐	

A.IV.e	**What additional information is used to estimate risk reduction impact?**			
i. None ☐	ii. **Existing hardware type and condition** ☐	iii. Existing hardware type and condition, **including operating history** ☐	iv. Existing hardware type and condition, including operating history; **level and condition of vegetation; weather** ☐	v. Existing hardware type and condition, including operating history; level and condition of vegetation; weather; **and combination of initiatives already deployed** ☐

A.V Risk maps and simulation algorithms

Capability 5

A.V.a	**What is the protocol to update risk mapping algorithms?**			
i .No defined process for updating risk mapping algorithms ☐	ii. Risk mapping algorithms **updated based on detected deviations of risk model** to ignitions and propagation ☐	iii. Risk mapping algorithms **updated continuously in real time** ☐		

A.V.b	**How automated is the mechanism to determine whether to update algorithms based on deviations?**			
i. Not automated ☐	ii. Partially (<50%) ☐	iii. Mostly (>=50%) ☐	iv. Fully ☐	

A.V.c	**How are deviations from risk model to ignitions and propagation detected?**			
i. Not currently calculated ☐	ii. Manually ☐	iii. Semi-automated process ☐	iv. Fully automated process ☐	

A.V.d	**How are decisions to update algorithms evaluated?**			
i .Not currently evaluated ☐	ii. Independently **evaluated by experts** ☐	iii. Independently evaluated by experts **and historical data** ☐		

A.V.e	**What other data is used to make decisions on whether to update algorithms?**			
i. **Historic ignition and propagation data** ☐	ii. **Current** and historic ignition and propagation data ☐	iii. Current and historic ignition and propagation data; **near-miss data** ☐	iv. Current and historic ignition and propagation data; near-miss data; **data from other utilities and other sources** ☐	v. None of the above ☐

B Situational awareness and forecasting

B.I Weather variables collected

Capability 6

B.I.a What weather data is currently collected?				
i. Weather data being collected is **insufficient** to properly understand risks along grid ☐	ii. **Wind being measured** accurately along the grid ☐	iii. **Range of accurate weather variables** that impact risk of ignition and propagation from utility assets ☐	iv. Range of accurate weather variables that impact risk of ignition and propagation from utility assets; additional **data to measure physical impact of weather on grid collected** (e.g., sway in lines, sway in vegetation) ☐	

B.I.b How are measurements validated?				
i. Measurements **not currently validated** ☐	ii. **Manual** field calibration measurements ☐	iii. **Automatic** field calibration measurements ☐	iv. Measurements not currently validated ☐	

B.I.c Are elements that cannot be reliably measured in real time being predicted (e.g., fuel moisture content)?				
i. No ☐	ii. Yes ☐			

B.I.d How many sources are being used to provide data on weather metrics being collected?				
i. None ☐	ii. One ☐	iii. More than one ☐		

B.II Weather data resolution

Capability 7

B.II.a How granular is the weather data that is collected?				
i. Weather data collected **does not accurately reflect local weather conditions** across grid infrastructure ☐	ii. Weather data has sufficient granularity to **reliably measure weather conditions in selected area** ☐	iii. Weather data has sufficient granularity to reliably measure weather conditions in selected area, **and along the entire grid and in all areas needed to predict weather on the grid** ☐	iv. Weather data has sufficient granularity to reliably measure weather conditions in selected area, and along the entire grid and in all areas needed to predict weather on the grid. **Also includes wind estimations at various atmospheric altitudes** ☐	

B.II.b How frequently is data gathered				
i. Less frequently than hourly ☐	ii. At least hourly ☐	iii. At least four times per hour ☐	iv. At least six times per hour ☐	v. At least sixty times per hour ☐

B.II.c How granular is the tool?				
i. Less granular than regional, or no tool at all ☐	ii. Regional ☐	iii. Circuit-based ☐	iv. Span-based ☐	v. Asset-based ☐

B.II.d How automated is the process to measure weather conditions?			
i. Not automated ☐	ii. Partially (<50%) ☐	iii. Mostly (>=50%) ☐	iv. Fully ☐

B.III Weather forecasting ability

Capability 8

B.III.a How sophisticated is the utility's weather forecasting capability?				
i. **No reliable independent weather forecasting ability** ☐	ii. Utility has independent weather forecasting ability **sufficiently accurate to fulfill PSPS requirements** ☐	iii. Utility has the ability to **use a combination of accurate weather stations and external weather data** to make accurate forecasts ☐	iv. Utility has the ability to use a combination of accurate weather stations and external weather data to make accurate forecasts, **and adjusts them in real time based on a learning algorithm and updated weather inputs** ☐	

B.III.b How far in advance can accurate forecasts be prepared?				
i. Less than two weeks in advance ☐	ii. At least two weeks in advance ☐	iii. At least three weeks in advance ☐		

B.III.c At what level of granularity can forecasts be prepared?				
i. Less granular than regional, or no forecasts at all ☐	ii. Regional ☐	iii. Circuit-based ☐	iv. Span-based ☐	v. Asset-based ☐

B.III.d How are results error-checked?				
i. Results are **not error checked** ☐	ii. Results are **error checked against historical weather patterns** ☐	iii. **None of the above** ☐		

B.III.e How automated is the forecast process?			
i. Not automated ☐	ii. Partially (<50%) ☐	iii. Mostly (>=50%) ☐	iv. Fully ☐

B.IV External sources used in weather forecasting

Capability 9

B.IV.a What source does the utility use for weather data?				
i. Utility **does not use external weather data** ☐	ii. External data used where direct measurements from **utility's own weather stations are not available** ☐	iii. Utility **uses a combination** of accurate weather stations and external weather data ☐	iv. Utility uses a combination of accurate weather stations and external weather data, **and elects to use the data set, as a whole or in composite, that is most accurate** ☐	

B.IV.b How is weather station data checked for errors?				
i. Weather station data is **not checked for errors** ☐	ii. **Mostly manual** processes for error checking weather stations with external data sources ☐	iii. **Mostly automated** processes for error checking weather stations with external data sources ☐	iv. **Completely automated** processes for error checking weather stations with external data sources ☐	v. Completely automated processes for error checking weather stations with external data sources, **and where the utility builds new weather stations or calibrates existing stations, it is based on these error checking processes** ☐

B.IV.c For what is weather data used?				
i. Weather data is **used to make decisions** ☐	ii. Weather data is **used to produce a combined weather map** that can be used to help make decisions ☐	iii. Weather data is **used to create a single visual and configurable live map** that can be used to help make decisions ☐		

B.V Wildfire detection processes and capabilities

Capability 10

B.V.a Are there well-defined procedures for detecting ignitions along the grid?				
i. No ☐	ii. Yes ☐			

B.V.b What equipment is used to detect ignitions?				
i. **No consistent set of equipment** for detecting ignitions along grid ☐	ii. **Well-defined equipment** for detecting ignitions along grid ☐	iii. Well-defined equipment for detecting ignitions along grid, **including remote detection equipment** including cameras ☐	iv. Well-defined equipment for detecting ignitions along grid, including remote detection equipment including cameras, **and satellite monitoring** ☐	

B.V.c How is information on detected ignitions reported?				
i. Detected ignitions are **not reported** ☐	ii. **Procedure exists** for notifying suppression forces ☐	iii. Procedure exists for notifying suppression forces **and key stakeholders** ☐	iv. Procedure **automatically, accurately, and in real time notifies** suppression forces and key stakeholders ☐	v. Procedure automatically, accurately, and in real time notifies suppression forces and key stakeholders, and tracks and reports propagation paths

				to suppression forces in accurately and real time ☐

B.V.d What role does ignition detection software play in wildfire detection?				
i. Ignition detection software **not currently deployed** ☐	ii. Ignition detection software in cameras **used to augment** ignition detection procedures ☐	iii. Ignition detection software in cameras **operates automatically** as part of ignition detection procedures ☐		

C Grid design and system hardening

C.I Approach to prioritizing initiatives across territory

Capability 11

C.I.a How are wildfire risk reduction initiatives prioritized?				
i. Plan **does not clearly prioritize** initiatives geographically to focus on highest risk areas ☐	ii. Plan **prioritizes** risk reduction initiatives to **within only HFTD areas** ☐	iii. Plan prioritizes wildfire risk reduction initiatives **based on local geography and conditions** within only HFTD areas ☐	iv. Plan priorities wildfire risk reduction initiatives across **individual circuits based on local geography and risk estimates** ☐	v. Plan prioritizes wildfire risk reduction initiatives across individual circuits based on local geography and risk estimates, **including estimates of actual impact and taking power delivery uptime into account (e.g., PSPS, reliability, etc.)** ☐

C.II Grid design for minimizing ignition risk

Capability 12

C.II.a Does the grid design and architecture use higher risk equipment and grid architectures, and lead to many single points of failure?				
i. Grid design and architecture **does use** higher risk equipment and grid architectures, which lead to many single points of failure ☐	ii. Grid design and architecture **does not use** higher risk equipment and grid architectures, which lead to many single points of failure ☐			

C.II.b Redundancy exists in grid architecture for circuits of how many customers or more?			
i. 1000 customers ☐	ii. 500 customers ☐	iii. 100 customers ☐	iv. 10 customers ☐

C.II.c Switches in high risk areas are designed such that individual circuits have no more than how many customers on one switch?				
i. More than 1000 customers ☐	ii. No more than 1000 customers ☐	iii. No more than 500 customers ☐	iv. No more than 100 customers ☐	

C.II.d What considerations are taken into accounts in grid topology?				
i. **Egress points** taken into consideration ☐	ii. Egress points **available and mapped** for each customer, **or potential traffic mapped** based on traffic simulation and taken into consideration ☐	iii. Egress points available and mapped for each customer, **and** potential traffic mapped based on traffic simulation and taken into consideration ☐	iv. Egress points available and mapped for each customer, and potential traffic mapped based on traffic simulation and taken into consideration; **microgrids or other means included in architecture to**	v. None of the above ☐

			reduce impact for customers at frequent risk of PSPS ☐	

C.III Grid design for resiliency and minimizing PSPS

Capability 13

C.III.a What level of redundancy does the utility's transmission architecture have?				
i. **Many single points of failure** ☐	ii. **n-1 redundancy** for all circuits subject to PSPS ☐			

C.III.b What level of redundancy does the utility's distribution architecture have?				
i. **Many single points of failure** ☐	ii. **n-1 redundancy** covering at least 50% of customers in HFTD ☐	iii. **n-1 redundancy** covering at least 70% of customers in HFTD ☐	iv. **n-1 redundancy** covering at least 85% of customers in HFTD ☐	

C.III.c What level of sectionalization does the utility's distribution architecture have?				
i. **Many single points of failure** ☐	ii. **Switches** in HFTD areas to individually isolate circuits ☐	ii. **Switches** in HFTD areas to individually isolate circuits, such that no more than 2000 customers sit within one switch ☐	ii. **Switches** in HFTD areas to individually isolate circuits, such that no more than 1000 customers sit within one switch ☐	ii. **Switches** in HFTD areas to individually isolate circuits, such that no more than 200 customers sit within one switch ☐

C.III.d How does the utility consider egress points in its grid topology?				
i. **Does not consider** ☐	ii. Egress points used as an **input** for grid topology design ☐	iii. Egress points **available** and **mapped** for each customer, with potential traffic	iv. Egress points available and mapped for each customer, with potential traffic	

		mapped based on **traffic simulation** and taken into consideration for grid topology design ☐	simulated and taken into consideration for grid topology design, and **microgrids** or other means to reduce consequence for customers at frequent risk of PSPS ☐	

C.IV Risk-based grid hardening and cost efficiency

Capability 14

C.IV.a Does the utility have an understanding of the risk spend efficiency of hardening initiatives?				
i. Utility has no clear understanding of the relative risk spend efficiency of hardening initiatives ☐	ii. Utility has an accurate understanding of the relative cost and effectiveness of different initiatives ☐	iii. Utility has an accurate understanding of the relative cost and effectiveness of different initiatives, tailored to the circumstances of different locations on its grid ☐		

C.IV.b At what level can estimates be prepared?				
i. Less granular than regional, or not at all ☐	ii. Regional ☐	iii. Circuit-based ☐	iv. Span-based ☐	v. Asset-based ☐

C.IV.c How frequently are estimates updated?				
i. Never ☐	ii. Less frequently than annually ☐	iii. Annually or more frequently ☐		

C.IV.d What grid hardening initiatives does the utility include within its evaluation?				
i. None ☐	ii. Some ☐	iii. Most ☐	iv. All ☐	v. All, supported by independent testing ☐

C.IV.e Can the utility evaluate risk reduction synergies from combination of various initiatives?				
i. No ☐	ii. Yes ☐			

C.V Grid design and asset innovation

Capability 15

C.V.a How are new hardening solution initiatives evaluated?				
i. **No established program** for evaluating the risk spend efficiency of new hardening initiatives ☐	ii. **New initiatives evaluated based** on installation into grid and measuring direct reduction in ignition events ☐	iii. New initiatives evaluated based on installation into grid and measuring direct reduction in ignition events, **and measuring reduction impact on near-miss metrics** ☐	iv. New initiatives **independently** evaluated, **followed by field testing** based on installation into grid and measuring direct reduction in ignition events, and measuring reduction impact on near-miss metrics ☐	

C.V.b Are results of initiatives shared?				
i. No ☐	ii. **Yes, with limited partners** ☐	iii. Yes, **extensively with industry, academia, and other utilities** ☐		

C.V.c Is performance of new initiatives independently audited?				
i. No ☐	ii. Yes ☐			

D Asset management and inspections

D.I Asset inventory and condition assessments

Capability 16

D.I.a What information is captured in the equipment inventory database?				
i. There is **no service territory-wide inventory** of electric lines and equipment including their state of wear or disrepair ☐	ii. There is an **accurate inventory of equipment** that may contribute to wildfire risk, including age, state of wear, and expected lifecycle ☐	iii. There is an accurate inventory of equipment that may contribute to wildfire risk, including age, state of wear, and expected lifecycle, **including records of all inspections and repairs** ☐	iv. There is an accurate inventory of equipment that may contribute to wildfire risk, including age, state of wear, and expected lifecycle, including records of all inspections and repairs **and up-to-date work plans on expected future repairs and replacements** ☐	v. There is an accurate inventory of equipment that may contribute to wildfire risk, including age, state of wear, and expected lifecycle, including records of all inspections and repairs and up-to-date work plans on expected future repairs and replacements **wherein repairs and sensor outputs are independently audited** ☐

D.I.b How frequently is the condition assessment updated?				
i. Never ☐	ii. Annually ☐	iii. Quarterly ☐	iv. Monthly ☐	v. Hourly ☐

D.I.c	**Does all equipment in HFTD areas have the ability to detect and respond to malfunctions?**			
i. **No system and approach are in place** to detect or respond to malfunctions ☐	ii. A system and approach **are in place to reliably detect incipient malfunctions** likely to cause ignition ☐	iii. **Sensorized, continuous monitoring equipment** is in place to determine the state of equipment and reliably detect incipient malfunctions likely to cause ignition ☐	iv. Sensorized, continuous monitoring equipment is in place to determine the state of equipment and reliably detect incipient malfunctions likely to cause ignition, **with the ability to de-activate electric lines and equipment exhibiting such failure** ☐	

D.I.d	**How granular is the inventory?**			
i. There is **no inventory** ☐	ii. At the **span** level ☐	iii. At the **asset** level ☐		

D.II Asset inspection cycle

Capability 17

D.II.a	**How frequent are your patrol inspections?**			
i. **Less frequent** than regulations require ☐	ii. **Consistent** with minimum regulatory requirements ☐	iii. **Above** minimum regulatory requirements, with more frequent inspections for highest risk equipment ☐		

D.II.b How are patrol inspections scheduled?				
i. Based on annual or periodic **schedules** ☐	ii. Based on **up-to-date static maps** of equipment types and environment ☐	iii. **Risk, as determined by predictive modeling** of equipment failure probability and risk causing ignition ☐	iv. Risk, **independently determined** by predictive modeling of equipment failure probability and risk causing ignition ☐	

D.II.c What are the inputs to scheduling patrol inspections?				
i. At least annually updated or verified **static maps** of equipment and environment ☐	ii. **Predictive modeling** of equipment failure probability and risk ☐	iii. Predictive modeling **supplemented with continuous monitoring by sensors** ☐	iv. Outdated static maps ☐	

D.II.d How frequent are detailed inspections?				
i. **Less frequent** than regulations require ☐	ii. **Consistent** with minimum regulatory requirements ☐	iii. **Above** minimum regulatory requirements, with more frequent inspections for highest risk equipment ☐		

D.II.e How are detailed inspections scheduled?				
i. Based on annual or periodic **schedules** ☐	ii. Based on **up-to-date static maps** of equipment types and environment ☐	iii. **Risk, as determined by predictive modeling** of equipment failure probability and risk causing ignition ☐	iv. Risk, **independently determined** by predictive modeling of equipment failure probability and risk causing ignition ☐	

D.II.f	**What are the inputs to scheduling detailed inspections?**			
i. At least annually updated or verified **static maps** of equipment and environment ☐	ii. **Predictive modeling** of equipment failure probability and risk ☐	iii. Predictive modeling **supplemented with continuous monitoring by sensors** ☐	iv. Outdated static maps ☐	

D.II.g	**How frequent are your other inspections?**			
i. **Less frequent** than regulations require ☐	ii. **Consistent** with minimum regulatory requirements ☐	iii. **Above** minimum regulatory requirements, with more frequent inspections for highest risk equipment ☐		

D.II.h	**How are other inspections scheduled?**			
i. Based on annual or periodic **schedules** ☐	ii. Based on **up-to-date static maps** of equipment types and environment ☐	iii. **Risk, as determined by predictive modeling** of equipment failure probability and risk causing ignition ☐	iv. Risk, **independently determined** by predictive modeling of equipment failure probability and risk causing ignition ☐	

D.II.i	**What are the inputs to scheduling other inspections?**			
i. At least annually updated or verified **static maps** of equipment and environment ☐	ii. **Predictive modeling** of equipment failure probability and risk ☐	iii. Predictive modeling **supplemented with continuous monitoring by sensors** ☐	iv. Outdated static maps ☐	

D.III Asset inspection effectiveness

Capability 18

D.III.a What items are captured within inspection procedures and checklists?				
i. Patrol, detailed, enhanced, and other inspection procedures and checklists **do not include all items required** by statute and regulations ☐	ii. Patrol, detailed, enhanced, and other inspection procedures and checklists **include all items required** by statute and regulations ☐	iii. Patrol, detailed, enhanced, and other inspection procedures and checklists include all items required by statute and regulations, **and includes lines and equipment typically responsible for ignitions and near misses** ☐		

D.III.b How are procedures and checklists determined?				
i. Based on **statute and regulatory guidelines** only ☐	ii. Based on **predictive modeling** based on vegetation and equipment type, age, and condition ☐	iii. Based on predictive modeling based on equipment type, age, and condition **and validated by independent experts** ☐	iv. Based on predictive modeling based on equipment type, age, and condition and validated by independent experts, **with dynamic adjustments in real time based on deficiencies found during inspection** ☐	

D.III.c At what level of granularity are the depth of checklists, training, and procedures customized?				
i. Across the	ii. Across a **region**	iii. At the **circuit**	iv. At the **span**	v. At the **asset**

service territory ☐	☐	level ☐	level ☐	level ☐

D.IV Asset maintenance and repair

Capability 19

D.IV.a What level are electrical lines and equipment maintained at?				
i. Electric lines and equipment **not consistently maintained** at required condition over multiple circuits ☐	ii. Electrical lines and equipment **maintained as required by regulation** ☐	iii. Electrical lines and equipment maintained as required by regulation, **and additional maintenance done in areas of grid at highest wildfire risk based on detailed risk mapping** ☐		

D.IV.b How are service intervals set?				
i. Based on wildfire risk in relevant **area** ☐	ii. Based on wildfire risk in relevant **circuit** ☐	iii. Based on wildfire risk in relevant circuit, **as well as real-time monitoring from sensors** ☐	iv. None of the above ☐	

D.IV.c What do maintenance and repair procedures take into account?				
i. Wildfire risk ☐	ii. Wildfire risk, **performance history, and past operating conditions** ☐	iii. None of the above ☐		

D.V QA/QC for asset management

Capability 20

D.V.a How is contractor activity audited?				
i. **Lack of controls** for auditing work completed, including inspections, for employees or subcontractors ☐	ii. Through an established and functioning audit process to manage and confirm work completed by subcontractors ☐	iii. Through an established and demonstrably functioning audit process to manage and confirm work completed by subcontractors, **where contractor activity is subject to semi-automated audits using technologies capable of sampling the contractor's work** (e.g., LiDAR scans, photographic evidence) ☐	iv. Through an established and demonstrably functioning audit process to manage and confirm work completed by subcontractors, where contractor activity is subject to **automated** audits **using technologies capable of sampling the contractor's work** (e.g., LiDAR scans, photographic evidence) ☐	

D.V.b Do contractors follow the same processes and standards as utility's own employees?				
i .No ☐	ii. Yes ☐			

D.V.c How frequently is QA/QC information used to identify deficiencies in quality of work performance and inspections performance?				
i. Never ☐	ii. Sporadically ☐	iii. On an ad hoc basis ☐	iv. Regularly ☐	v. Real-time ☐

D.V.d How is work and inspections that do not meet utility-prescribed standards remediated?				
i **.Lack of effective**	ii. **QA/QC**	iii. QA/QC	iv. QA/QC	

remediation for ineffective inspections or low-quality work	**information is used to identify systemic deficiencies** in quality of work and inspections	information is used to identify systemic deficiencies in quality of work and inspections, **and recommend training based on weaknesses**	information is used to identify systemic deficiencies in quality of work and inspections, **grade individuals**, and recommend **specific pre-made and tested** training based on weaknesses	

D.V.e	**Are workforce management software tools used to manage and confirm work completed by subcontractors?**			
i. No	ii. Yes			

E Vegetation management and inspections

E.I Vegetation inventory and condition assessments

Capability 21

E.I.a	**What information is captured in the inventory?**			
i. There is **no vegetation inventory** sufficient to determine vegetation clearances across the grid at the time of the last inspection	ii. **Centralized inventory** of vegetation clearances based on most recent inspection	iii. Centralized inventory of vegetation clearances, **including predominant vegetation species and individual high risk-trees across grid**	iv. Centralized inventory of vegetation clearances, including **individual** vegetation species **and their expected growth rate**, as well as individual high risk-trees across grid	v. Centralized inventory of vegetation clearances, including individual vegetation species and their expected growth rate, as well as individual high risk-trees across grid. **Includes up-to-date tree health and moisture**

				content to determine risk of ignition and propagation ☐

E.I.b	**How frequently is inventory updated?**			
i. Never ☐	ii. Annually ☐	iii. Within 1 month of collection ☐	iv. Within 1 week of collection ☐	v. Within 1 day of collection ☐

E.I.c	**Are inspections independently verified by third party experts?**			
i. No ☐	ii. Yes ☐			

E.I.d	**How granular is the inventory?**			
i. Regional ☐	ii. Circuit-based ☐	iii. Span-based ☐	iv. Asset-based ☐	

E.II Vegetation inspection cycle

Capability 22

E.II.a	**How frequent are all types of vegetation inspections?**			
i. **Less frequent** than regulations require ☐	ii. **Consistent** with minimum regulatory requirements ☐	iii. **Above** minimum regulatory requirements, with more frequent inspections for highest risk areas ☐		

E.II.b How are vegetation inspections scheduled?				
i. Based on annual or periodic **schedules** ☐	ii. Based on up-to-date **static maps** of predominant vegetation species and environment ☐	iii. **Risk, as determined by predictive modeling** of vegetation growth and growing conditions ☐	iv. **Need, as independently determined by predictive modeling** of vegetation growth and growing conditions ☐	

E.II.c What are the inputs to scheduling vegetation inspections?				
i. At least annually-updated **static maps** of vegetation and environment ☐	ii. Up to date, static maps of vegetation and environment, **as well as data on annual growing conditions** ☐	iii. **Predictive modeling** of vegetation growth ☐	iv. Predictive modeling of vegetation growth **supplemented with continuous monitoring by sensors** ☐	iv. Predictive modeling of vegetation growth supplemented with continuous monitoring by sensors and **considering tree health and other vegetation risk factors for more frequent inspections in less healthy areas** ☐

E.III Vegetation inspection effectiveness

Capability 23

E.III.a What items are captured within inspection procedures and checklists?				
i. Patrol, detailed, enhanced, and other inspection procedures and checklists **do not include all items required** by statute and regulations	ii. Patrol, detailed, enhanced, and other inspection procedures and checklists **include all items required** by statute and regulations	iii. Patrol, detailed, enhanced, and other inspection procedures and checklists include all items required by statute and regulations, **and includes vegetation types**		

		typically responsible for ignitions and near misses		

E.III.b How are procedures and checklists determined?				
i. Based on **statute and regulatory guidelines** only	ii. Based on **predictive modeling** based on vegetation and equipment type, age, and condition	iii. Based on predictive modeling based on vegetation and equipment type, age, and condition **and validated by independent experts**	iv. Based on predictive modeling based on vegetation type, age, and condition and validated by independent experts, **with dynamic adjustments in real time based on deficiencies found during inspection**	

E.III.c At what level of granularity are the depth of checklists, training, and procedures customized?				
i. Across the **service territory**	ii. Across a **region**	iii. At the **circuit** level	iv. At the **span** level	v. At the **asset** level

E.IV Vegetation grow-in mitigation

Capability 24

E.IV.a How does utility clearance around lines and equipment perform relative to expected standards?				
i. Utility often **fails to maintain minimum** statutory and regulatory clearances around all lines and	ii. Utility **meet minimum** statutory and regulatory clearances around all lines and equipment	iii. Utility **exceeds minimum** statutory and regulatory clearances around all lines and equipment		

equipment ☐	☐	☐		

E.IV.b	**Does utility meet or exceed minimum statutory or regulatory clearances during all seasons?**			
i. No ☐	ii. Yes ☐			

E.IV.c	**What modeling is used to guide clearances around lines and equipment?**			
i. Ignition risk modeling ☐	ii. Ignition and propagation risk modeling ☐	iii. None of the above ☐		

E.IV.d	**What biological modeling is used to guide clearance around lines and equipment**			
i. Species growth rates and species limb failure rates ☐	ii. Species growth rates and species limb failure rates, cross referenced with local climatological conditions ☐	iii. None of the above ☐		

E.IV.e	**Are community organizations engaged in setting local clearances and protocols?**			
i. No ☐	ii. Yes ☐			

E.IV.f	**Does the utility remove vegetation waste along its right of way across the entire grid?**			
i. No ☐	ii. Yes ☐			

E.IV.g	**How long after cutting vegetation does the utility remove vegetation waste along right of way?**			
i. Not at all	ii. Longer than 1	iii. Within 1 week	iv. On the same	

	☐ week	☐ or less	☐ day	☐

E.IV.h	Does the utility work with local landowners to provide a cost-effective use for cutting vegetation?			
i. No ☐	ii. Yes ☐			

E.IV.i	Does the utility work with partners to identify new cost-effective uses for vegetation, taking into consideration environmental impacts and emissions of vegetation waste?			
i. No ☐	ii. Yes ☐			

E.V Vegetation fall-in mitigation

Capability 25

E.V.a Does the utility have a process for treating vegetation outside of right of ways?				
i. Utility **does not remove** vegetation outside of right of way ☐	ii. Utility **removes some** vegetation outside of right of ways ☐	iii. Utility **systematically removes** vegetation outside of right of way ☐		

E.V.b How is potential vegetation that may pose a threat identified?				
i. **No specific process** in place to systematically identify trees likely to pose a risk ☐	ii. **Based on the height of trees** with potential to make contact with electric lines and equipment ☐	iii. **Based on the probability and consequences of impact** on electric lines and equipment as **determined by risk modeling** ☐	iv. Based on the probability and consequences of impact on electric lines and equipment as determined by risk modeling, **as well as regular and accurate systematic inspections for high-risk trees outside the right of way or environmental and climatological conditions contributing to increased risk** ☐	

E.V.c Is vegetation removed with cooperation from the community?				
i. No ☐	ii. Yes ☐			

E.V.d	Does the utility remove vegetation waste outside its right of way across the entire grid?			
i. No ☐	ii. Yes ☐			

E.V.e	How long after cutting vegetation does the utility remove vegetation waste outside its right of way?			
i. Not at all ☐	ii. Longer than 1 week ☐	iii. Within 1 week or less ☐	iv. On the same day ☐	

E.V.f	Does the utility work with local landowners to provide a cost-effective use for cutting vegetation?			
i. No ☐	ii. Yes ☐			

E.V.g	Does the utility work with partners to identify new cost-effective uses for vegetation, taking into consideration environmental impacts and emissions of vegetation waste?			
i. No ☐	ii. Yes ☐			

E.VI QA/QC for vegetation management

Capability 26

E.VI.a How is contractor activity audited?				
i. **Lack of controls** for auditing work completed, including inspections, for employees or subcontractors ☐	ii. Through an established and functioning audit process to manage and confirm work completed by subcontractors ☐	iii. Through an established and demonstrably functioning audit process to manage and confirm work completed by subcontractors, **where contractor activity is subject to semi-automated audits using technologies capable of sampling the contractor's work** (e.g., LiDAR scans, photographic evidence) ☐	iv. Through an established and demonstrably functioning audit process to manage and confirm work completed by subcontractors, where contractor activity is subject to **automated** audits **using technologies capable of sampling the contractor's work** (e.g., LiDAR scans, photographic evidence) ☐	

E.VI.b Do contractors follow the same processes and standards as utility's own employees?				
i .No ☐	ii. Yes ☐			

E.VI.c How frequently is QA/QC information used to identify deficiencies in quality of work performance and inspections performance?				
i. Never ☐	ii. Sporadically ☐	iii. On an ad hoc basis ☐	iv. Regularly ☐	v. Real-time ☐

E.VI.d How is work and inspections that do not meet utility-prescribed standards remediated?				
i **.Lack of effective**	ii. **QA/QC**	iii. QA/QC	iv. QA/QC	

remediation for ineffective inspections or low-quality work ☐	**information is used to identify systemic deficiencies** in quality of work and inspections ☐	information is used to identify systemic deficiencies in quality of work and inspections, **and recommend training based on weaknesses** ☐	information is used to identify systemic deficiencies in quality of work and inspections, **grade individuals**, and recommend **specific pre-made and tested** training based on weaknesses ☐	

E.VI.e	**Are workforce management software tools used to manage and confirm work completed by subcontractors?**			
i. No ☐	ii. Yes ☐			

F Grid operations and protocols

F.I Protective equipment and device settings

Capability 27

F.I.a	**How are grid elements adjusted during high threat weather conditions?**			
i. Utility **does not make changes to adjustable equipment** in response to high wildfire threat conditions ☐	ii. Utility **increases sensitivity of risk reduction elements** during high threat weather conditions ☐	iii. Utility increases sensitivity of risk reduction elements during high threat weather conditions **and monitors near misses** ☐	iv. Utility increases sensitivity of risk reduction elements during high threat weather conditions **based on risk mapping** and monitors near misses ☐	

F.I.b	**Is there an automated process for adjusting sensitivity of grid elements and evaluating effectiveness?**			
i. No automated	ii. Partially	iii. Fully automated		

process ☐	automated proce☐	process ☐		

F.I.c	**I`s there a predetermined protocol driven by fire conditions for adjusting sensitivity of grid elements?**			
i. No ☐	ii. Yes ☐			

Processes to incorporate

F.II Incorporating ignition risk factors in grid control

Capability 28

F.II.a	**Does the utility have a clearly explained process for determining whether to operate the grid beyond current or voltage designs?**			
i. No ☐	ii. Yes ☐			

F.II.b	**Does the utility have systems in place to automatically track operation history including current, loads, and voltage throughout the grid at the circuit level?**			
i. No ☐	ii. Yes ☐			

F.II.c	**Does the utility use predictive modeling to shorten the expected life of equipment based on grid operating history, and is that model reviewed?**			
i. **Modeling is not used** ☐	ii. **Modeling is used**, but not evaluated by external experts ☐	iii. Modeling is used, **and the model is evaluated by external experts** ☐		
F.II.d	**When does the utility operate the grid above rated voltage and current load?**			
i. During any conditions	ii. Only in conditions that are unlikely to cause	iii. Never		

☐	wildfire ☐	☐		

F.III PSPS op. model and consequence mitigation

Capability 29

F.III.a How effective is PSPS event forecasting?				
i. PSPS event **frequently forecasted incorrectly** ☐	ii. PSPS event **generally forecasted accurately** with **fewer than 50% of predictions being false positives** ☐	iii. PSPS event generally forecasted accurately with **fewer than 33%** of predictions being false positives ☐	iv. PSPS event generally forecasted accurately with **fewer than 25%** of predictions being false positives ☐	

F.III.b What share of customers are communicated to regarding forecasted PSPS events?				
i. Affected customers are **poorly communicated to,** with a significant portion not communicated to at all ☐	ii. PSPS event are communicated to **>95% of affected customers and >99% of medical baseline** customers in advance of PSPS action ☐	iii. PSPS event are communicated to **>98% of affected customers and >99.5% of medical baseline** customers in advance of PSPS action ☐	iv. PSPS event are communicated to **>99% of affected customers and >99.9% of medical baseline customers** in advance of PSPS action ☐	v. PSPS event are communicated to **>99.9% of affected customers and 100% of medical baseline customers** in advance of PSPS action ☐

F.III.c During PSPS events, what percent of customers complain?				
i. 1% or more ☐	ii. Less than 1% ☐	iii. Less than 0.5% ☐		

F.III.d During PSPS events, does the utility's website go down?				
i. No ☐	ii. Yes ☐			

F.III.e	**During PSPS events, what is the average downtime per customer?**			
i. More than 1 hour ☐	ii. Less than 1 hour ☐	iii. Less than 0.5 hours ☐	iv. Less than 0.25 hours ☐	v. Less than 0.1 hours ☐

F.III.f	**Are specific resources provided to customers to alleviate the impact of the power shutoff (e.g., providing backup generators, supplies, batteries, etc.)?**			
i. No ☐	ii. Yes ☐			

F.IV Protocols for PSPS initiation

Capability 30

F.IV.a	**Does the utility have explicit thresholds for activating a PSPS?**			
i. Utility has **no clearly explained threshold** for PSPS activation ☐	ii. Utility **has explicit policies and explanation** for the thresholds above which PSPS is activated ☐	iii. Utility has explicit policies and explanation for the thresholds above which PSPS is activated, **but maintains grid in sufficiently low risk condition to not require any PSPS activity, though may de-energize specific circuits upon detection of damaged condition of electrical lines and equipment, or contact with foreign objects** ☐		

F.IV.b	Has the utility provided resources to mitigate PSPS impact, including providing water, phone charging, and other resources to all those affected by PSPS?			
i. No ☐	ii. Yes ☐			

F.IV.c	What is total PSPS duration for those customers affected?			
i. More than 48 hours on average per year ☐	ii. Less than 48 hours on average per year ☐	iii. Less than 36 hours on average per year ☐	iv. Less than 24 hours on average per year ☐	

F.IV.d	What share of customers are effect by PSPS events in a given year?			
i. Greater than 5 % ☐	ii. Less than 5% ☐	iii. Less than 1% ☐	iv. Less than 0.5% ☐	

F.V Protocols for PSPS re-energization

Capability 31

F.V.a	Is there a process for inspecting de-energized sections of the grid prior to re-energization?			
i. **Inadequate process** for inspecting de-energized sections of the grid prior to re-energization ☐	ii. **Existing process** for accurately inspecting de-energized sections of the grid prior to re-energization ☐	iii. Existing process for accurately inspecting de-energized sections of the grid prior to re-energization, **augmented with sensors and aerial tools** ☐		

F.V.b	How automated is the process for inspecting de-energized sections of the grid prior to re-energization?			
i. Manual process, not automated at all ☐	ii. Partially automated (<50%) ☐	iii. Mostly automated (>=50%) ☐	iv. Primarily automated, minimal manual inputs ☐	

F.V.c How long after de-energization weather has subsided can the grid be returned to service?				
i. Longer than 24 hours ☐	ii. Within 24 hours ☐	iii. Within 12 hours ☐	iv. Within 4 hours ☐	v. Within 2 hours ☐

F.V.d Are any after-event ignitions caused following re-energization of de-energized sections?				
i. No ☐	ii. Yes ☐			

F.VI Ignition prevention and suppression

Capability 32

F.VI.a Does the utility have defined policies around the role of workers in suppressing ignitions?				
i. Utility has **no policies** governing what crews' roles are in suppressing ignitions ☐	ii. Utilities have **explicit policies** about the role of crews at the site of ignition ☐	iii. Utilities have explicit policies about the role of crews, **including contractors and subcontractors**, at the site of ignition ☐		

F.VI.b What training and tools are provided to workers?				
i. Crews are **untrained** ☐	ii. **Training and communications tools** are provided to **immediately report ignitions** caused by workers or in immediate vicinity of workers ☐	iii. Training, **suppression tools**, and communication tools, are provided to **suppress small ignitions** caused by workers or in immediate vicinity of workers, and to immediately report ignitions are provided ☐	iv. Training **by suppression professionals**, suppression tools, and communication tools, to suppress small ignitions caused by workers or in immediate vicinity of workers, and to immediately report ignitions are	

			provided ☐	

F.VI.c	In the event workers encounter an ignition, do any major injuries or fatalities occur?			
i. No ☐	ii. Yes ☐			

F.VI.d	Does the utility provide training to other workers at other utilities and outside the utility industry on best practices to minimize, report and suppress ignitions?			
i. No ☐	ii. Yes ☐			

G Data governance

G.I Data collection and curation

Capability 33

G.I.a	Does the utility have a centralized database of situational, operational, and risk data?			
i. No ☐	ii. Yes ☐			

G.I.b	Is the utility able to use advanced analytics on its centralized database of situational, operational, and risk data to make operational and investment decisions?			
i. No ☐	ii. **Yes, but only for short term decision making** ☐	iii. Yes, **for both short term and long-term decision making** ☐		

G.I.c	Does the utility collect data from all sensored portions of electric lines, equipment, weather stations, etc.?			
i. No ☐	ii. Yes ☐			

G.I.d	Is the utility's database of situational, operational, and risk data able to ingest and share data using real-time API protocols with a wide variety of stakeholders?			
i. No ☐	ii. Yes ☐			

G.I.e	Can the utility's database of situational, operational, and risk data identify new sources of data needed for decision making?			
i. No ☐	ii. Yes ☐			

G.I.f	Is the utility's database of situational, operational, and risk data able to share best practices with other utilities in California and beyond?			
i. No ☐	ii. Yes ☐			

G.II Data transparency and analytics

Capability 34

G.II.a	Is there a single document cataloguing all fire-related data and algorithms, analyses, and data processes?			
i. No ☐	ii. Yes ☐			

G.II.b	Is there an explanation of the sources, cleaning processes, and assumptions made in the single document catalog?			
i. No ☐	ii. Yes ☐			

G.II.c	Are all analyses, algorithms, and data processing explained and documented?			
i. Analyses, algorithms, and data processing **are not**	ii. Analyses, algorithms, and data processing **are** documente ☐	iii. Analyses, algorithms, and data processing are documented	iv. Analyses, algorithms, and data processing are documented	

documented		**and explained**	and explained, **including sensitivities for each type of analysis and da**	

G.II.d	**Is there a system for sharing data in real time across multiple levels of permissions?**			
i. No system capable of sharing data in real time across multiple levels of permissions	ii. System is capable of sharing across at least two levels of permissions, including a.) utility-regulator permissions, and b.) first responder permissions	iii. System is capable of sharing across at least three levels of permissions, including a.) utility-regulator permissions, b.) first responder permissions, and c.) public data sharing		

G.II.e	**Are the most relevant wildfire related data algorithms disclosed?**			
i. No	ii. **Yes, disclosed to regulators and other relevant stakeholders**	iii. Yes, **disclosed publicly in WMP**		

G.III Near-miss tracking

Capability 35

G.III.a	**Does the utility track near miss data for all near misses with wildfire ignition potential?**			
i. No	ii. Yes			

G.III.b	Based on near miss data captured, is the utility able to simulate wildfire potential given an ignition based on event characteristics, fuel loads, and moisture?			
i. No ☐	ii. Yes ☐			

G.III.c	Does the utility capture data related to the specific mode of failure when capturing near-miss data?			
i. No ☐	ii. Yes ☐			

G.III.d	Is the utility able to predict the probability of a near miss in causing an ignition based on a set of event characteristics?			
i. No ☐	ii. Yes ☐			

G.III.e	Does the utility use data from near misses to change grid operation protocols in real time?			
i. No ☐	ii. Yes ☐			

G.IV Data sharing with the research community

Capability 36

G.IV.a	Does the utility make disclosures and share data?			
i. Utility **fails to make disclosures** ☐	ii. Utility **makes required disclosures**, but does not share data beyond what is required ☐	iii. Utility makes required disclosures **and shares data beyond what is required** ☐		

G.IV.b	Does the utility in engage in research?			
i. Utility **does not participate** in	ii. Utility **participates** in	iii. Utility **funds** and participates in	iv. Utility funds and participates in	

collaborative research ☐	collaborative research ☐	both independent and collaborative research ☐	both independent and collaborative research, **and ensures that research, where possible, is abstracted and applied to other utilities** ☐	

G.IV.c	**What subjects does utility research address?**			
i. Utility ignited wildfires ☐	ii. Utility ignited wildfires **and risk reduction initiatives** ☐	iii. None of the above ☐		

G.IV.d	**Does the utility promote best practices based on latest independent scientific and operational research?**			
i. No ☐	ii. Yes ☐			

H Resource allocation methodology

H.I Scenario analysis across different risk levels

Capability 37

H.I.a	**For what risk scenarios is the utility able to provide projected cost and total risk reduction potential?**			
i. Utility does not project proposed initiatives or costs across different levels of risk scenarios ☐	ii. Utility provides an accurate high-risk reduction and low risk reduction scenario, and the projected cost and total risk reduction	iii. Utility provides an accurate high-risk reduction and low risk reduction scenario, in addition to their proposed scenario,		

	potential ☐	and the projected cost and total risk reduction potential ☐		

H.I.b	**For what level of granularity is the utility able to provide projections for each scenario?**			
i. Territory-level or greater ☐	ii. Region level ☐	iii. Circuit level ☐	iv. Span level ☐	v. Asset level ☐

H.I.c	**Does the utility include a long term (e.g., 6-10 year) risk estimate taking into account macro factors (climate change, etc.) as well as planned risk reduction initiatives in its scenarios?**			
i. No ☐	ii. Yes ☐			

H.I.d	**Does the utility provide an estimate of impact on reliability factors in its scenarios?**			
i. No ☐	ii. Yes ☐			

H.II Presentation of relative risk spend efficiency for portfolio of initiatives

Capability 38

H.II.a	**Does the utility present accurate qualitative rankings for its initiatives by risk spend efficiency?**			
i. No ☐	ii. Yes ☐			

H.II.b	**What initiatives are captured in the ranking of risk spend efficiency?**			
i. Common commercial initiatives ☐	ii. All commercial initiatives ☐	iii. All commercial initiatives and emerging initiatives ☐	iv. None of the above ☐	

H.II.c	**Does the utility include figures for PV cost and project risk reduction impact of each initiative?**			
i. No ☐	ii. Yes ☐			

H.II.d	**Does the utility provide an explanation of their investment in each particular initiative?**			
i. No ☐	ii. **Yes, including the expected overall reduction in risk** ☐	iii. Yes, including the expected overall reduction in risk **and estimates of impact on reliability facto** ☐		

H.II.e	**At what level of granularity is the utility able to provide risk efficiency figures?**			
i. Territory-level or greater ☐	ii. Region level ☐	iii. Circuit level ☐	iv. Span level ☐	v. Asset level ☐

H.III Process for determining risk spend efficiency of vegetation management initiatives

Capability 39

H.III.a	**How accurate of a risk spend efficiency calculation can the utility provide?**			
i. Utility has **no clear understanding** of the relative risk spend efficiency of various clearances and types of vegetation management initiatives ☐	ii. Utility has **an accurate relative understanding** of the cost and effectiveness to **produce a reliable risk spend efficiency estimate** ☐	iii. Utility has accurate **quantitative** understanding of cost and effectiveness to produce a reliable risk spend efficiency estimate ☐	iv. Utility has accurate quantitative understanding of cost**, including sensitivities** and effectiveness to produce a reliable risk spend efficiency estir ☐	

H.III.b At what level can estimates be prepared?				
i. Less granular than regional, or not at all ☐	ii. Regional ☐	iii. Circuit-based ☐	iv. Span-based ☐	v. Asset-based ☐

H.III.c How frequently are estimates updated?				
i. Never ☐	ii. Less frequently than annually ☐	iii. Annually or more frequent ☐		

H.III.d What vegetation management initiatives does the utility include within its evaluation?				
i. None ☐	ii. Some ☐	iii. Most ☐	iv. All ☐	v. All, supported by independent testing ☐

H.III.e Can the utility evaluate risk reduction synergies from combination of various initiatives?				
i. No ☐	ii. Yes ☐			

H.IV Process for determining risk spend efficiency of system hardening initiatives

Capability 40

H.IV.a How accurate of a risk spend efficiency calculation can the utility provide?				
i. Utility has **no clear understanding** on the relative risk spend efficiency of hardening initiatives ☐	ii. Utility has accurate **relative understanding** of cost and effectiveness to **produce a reliable risk spend efficiency estimate** ☐	iii. Utility has accurate **quantitative** understanding of cost and effectiveness to produce a reliable risk spend efficiency estimate ☐	iv. Utility has accurate quantitative understanding of cost, **including sensitivities**, and effectiveness to produce a reliable risk spend efficiency estir ☐	

H.IV.b	**At what level can estimates be prepared?**			
i. Less granular than regional, or not at all ☐	ii. Regional ☐	iii. Circuit-based ☐	iv. Span-based ☐	v. Asset-based ☐

H.IV.c	**How frequently are estimates updated?**			
i. Never ☐	ii. Less frequently than annually ☐	iii. Annually or more frequent ☐		

H.IV.d	**What grid hardening initiatives are included in the utility risk spend efficiency analysis?**			
i. None ☐	ii. **Some commercially available** grid hardening initiatives ☐	iii. **Most** commercially available grid hardening initiatives ☐	iv. **All** commercially available grid hardening initiatives ☐	v. All commercially available grid hardening initiatives, **as well as those initiatives that are lab te** ☐

H.IV.e	**Can the utility evaluate risk reduction effects from the combination of various initiatives?**			
i. No ☐	ii. Yes ☐			

H.V Portfolio-wide innovation in new wildfire initiatives

Capability 41

H.V.a	**How does the utility develop and evaluate the risk spend efficiency of new wildfire initiatives?**			
i. No program in place ☐	ii. Utility uses **total cost of owner** ☐			

H.V.b	**Are the risk spend efficiency estimates verified by experimental data confirmed by innovation specialists?**			
i. No ☐	ii. Yes ☐			

H.V.c	**Are the reviews of innovative initiatives audited by independent parties?**			
i. No ☐	ii. Yes ☐			

H.V.d	**Does the utility share the findings of its evaluation of innovative initiatives with other utilities, academia, and the general public?**			
i. No ☐	ii. Yes ☐			

H.V.e	**Are the risk spend efficiency estimates verified by experimental data confirmed by experts and other utilities in California or abroad?**			
i. No ☐	ii. Yes ☐			

H.VI Portfolio-wide innovation in new wildfire initiatives

Capability 42

H.VI.a	**How does the utility develop and evaluate the efficacy of new wildfire initiatives?**			
i. No program in place ☐	ii. Utility uses **pilots** and **measures** direct reduction in ignition events ☐	iii. Utility uses **pilots** and **measures** direct reduction in ignition events and near-misses. ☐	iii. Utility uses pilots, followed by in-field testing, measuring reduction in ignition events and near-misses. ☐	

H.VI.b	**How does the utility develop and evaluate the risk spend efficiency of new wildfire initiatives?**			
i. No program in place ☐	ii. Utility uses total **cost of owners** ☐			

H.VI.c	At what level of granularity does the utility measure the efficacy of new wildfire initiatives?									
i. None	☐	ii. Entire territo	☐	iii. Circuit	☐	iv. Span	☐	v. Asset	☐

H.VI.d	Are the reviews of innovative initiatives audited by independent parties?				
i. No	☐	ii. Yes	☐		

H.VI.e	Does the utility share the findings of its evaluation of innovative initiatives with other utilities, academia, and the general public?				
i. No	☐	ii. Yes	☐		

I Emergency planning and preparedness

I.I Wildfire plan integrated with overall disaster/ emergency plan

Capability 43

I.I.a	Is the wildfire plan integrated with overall disaster and emergency plans?								
i. No	☐	ii. **Wildfire plan is a component of overall plan**	☐	iii. Wildfire plan is an **integrated component** of overall plan	☐				

I.I.b	Does the utility run drills to audit the viability and execution of its wildfire plans?				
i. No	☐	ii. Yes	☐		

I.I.c	Is the impact of confounding events or multiple simultaneous disasters considered in the planning process?				
i. No	☐	ii. Yes	☐		

I.I.d	Is the plan integrated with disaster and emergency preparedness plans of other relevant stakeholders (e.g., CAL FIRE, Fire Safe Councils, etc.)?				
i. No	☐	ii. Yes	☐		

I.I.e	Does the utility take a leading role in planning, coordinating, and integrating plans across stakeholders?				
i. No	☐	ii. Yes	☐		

I.II Plan to restore service after wildfire related outage

Capability 44

I.II.a	Are there detailed and actionable procedures in place to restore service after a wildfire related outage?				
i. No	☐	ii. Yes	☐		

I.II.b	Are employee and subcontractor crews trained in, and aware of, plans?				
i. No	☐	ii. Yes	☐		

I.II.c	To what level are procedures to restore service after a wildfire-related outage customized?									
i. Territory-wid	☐	ii. Region level	☐	iii. Circuit level	☐	iv. Span level	☐	v. Asset level	☐	

I.II.d	Is the customized procedure to restore service based on topography, vegetation, and community needs?				
i. No	☐	ii. Yes	☐		

I.II.e	Is there an inventory of high risk spend efficiency resources available for repairs?				
i. No	☐	ii. Yes	☐		

I.III Emergency community engagement during and after wildfire

Capability 45

I.III.a	Does the utility provide clear and substantially complete communication of available information?			
i. No ☐	ii. Yes ☐	iii. Yes, **along with referrals to other agencies** ☐		

I.III.b	What percent of affected customers receive complete details of available information?			
i. <=95% of customers ☐	ii. >95% of customers ☐	iii. >98% of customers ☐	iv. >99% of customers ☐	v. >99.9% of customers ☐

I.III.c	What percent of affected medical baseline customers receive complete details of available information?			
i. <=99% ☐	ii. >99% of medical baseline customers ☐	iii. >99.5% of medical baseline customers ☐	iv. >99.9% of medical baseline customers ☐	v. >99.9% of medical baseline customers ☐

I.III.d	How does the utility assist where helpful with communication of information related to power outages to customers?			
i. Through availability of relevant evacuation information and links on website and toll-free telephone number ☐	ii. Through availability of relevant evacuation information and links on website and toll-free telephone number, **and assisting disaster response professionals as requested** ☐	iii. None of the above ☐		

I.III.e	How does the utility engage other agencies in the process?			
i. Utility does not engage with other agencies ☐	ii. **Utility engages with other agencies in an ad hoc manner** ☐	iii. Utility **has detailed and actionable established protocols for engaging** with emergency management organizations ☐		

I.III.f	Does the utility provide resources to communities during emergencies (e.g., shelters, supplies, transportation, etc.)?			
i. No ☐	ii. Yes ☐			

I.IV Protocols in place to learn from wildfire events

Capability 46

I.IV.a	Is there a protocol in place to record the outcome of emergency events and to clearly and actionably document learnings and potential process improvements?			
i. No ☐	ii. Yes ☐			

I.IV.b	Is there a defined process and staff responsible for incorporating learnings into emergency plan?			
i. No ☐	ii. Yes ☐			

I.IV.c	Once updated based on learnings and improvements, is the updated plan tested using "dry runs" to confirm its effectiveness?			
i. No ☐	ii. Yes ☐			

I.IV.d	Is there a defined process to solicit input from a variety of other stakeholders and incorporate learnings from other stakeholders into the emergency plan?			
i. No ☐	ii. Yes ☐			

I.V Processes for continuous improvement after wildfire and PSPS

Capability 47

I.V.a	Does the utility conduct an evaluation or debrief process after a wildfire?			
i. No ☐	ii. Yes ☐			

I.V.b	Does the utility conduct a customer survey and utilize partners to disseminate requests for stakeholder engagement?			
i. No ☐	ii. One or the o ☐	iii. Both ☐		

I.V.c	In what other activities does the utility engage?			
i. None ☐	ii. Public listening sessions ☐	iii. Debriefs with partners ☐	iv. Other ☐	

I.V.d	Does the utility share with partners findings about what can be improved?			
i. No ☐	ii. Yes ☐			

I.V.e	Are feedback and recommendations on potential improvements made public?			
i. No ☐	ii. Yes ☐			

I.V.f	Does the utility conduct proactive outreach to local agencies and organizations to solicit additional feedback on what can be improved?				
i. No	☐	ii. Yes	☐		

I.V.g	Does the utility have a clear plan for post-event listening and incorporating lessons learned from all stakeholders?				
i. No	☐	ii. Yes	☐		

I.V.h	Does the utility track the implementation of recommendations and report upon their impact?				
i. No	☐	ii. Yes	☐		

I.V.i	Does the utility have a process to conduct reviews after wildfires in other the territory of other utilities and states to identify and address areas of improvement?				
i. No	☐	ii. Yes	☐		

J Stakeholder cooperation and community engagement

J.I Cooperation and best practice sharing with other utilities

Capability 48

J.I.a	Does the utility actively work to identify best practices from other utilities through a clearly defined operational process?				
i. No	☐	ii. Yes, from other California utilit	☐	iii. Yes, from other global utilities ☐	

J.I.b	Does the utility successfully adopt and implement best practices identified from other utilities?				
i. No	☐	ii. Yes	☐		

J.I.c	Does the utility seek to share best practices and lessons learned in a consistent format?				
i. No	☐	ii. Yes	☐		

J.I.d	Does the utility share best practices and lessons via a consistent and predictable set of venues/media?				
i. No	☐	ii. Yes	☐		

J.I.e	Does the utility participate in annual benchmarking exercises with other utilities to find areas for improvement?				
i. No	☐	ii. Yes	☐		

J.I.f	Has the utility implemented a defined process for testing lessons learned from other utilities to ensure local applicability?				
i. No	☐	ii. Yes	☐		

J.II Engagement with communities on utility wildfire mitigation initiatives

Capability 49

J.II.a	Does the utility have a clear and actionable plan to develop or maintain a collaborative relationship with local communities?				
i. No	☐	ii. Yes	☐		

J.II.b	Does the utilities' plan to develop or maintain a collaborative relationship with local communities enable the utility to implement initiatives (e.g., vegetation management)?				
i. No	☐	ii. Yes	☐		

J.II.c	What percent of landowners are non-compliant with utility initiatives (e.g., vegetation management)?									
i. More than 5%	☐	ii. Less than 5%	☐	iii. Less than 2%	☐	iv. Less than 1	☐	v. Less than 0.5	☐	

J.II.d	What percent of landowners complain about utility initiatives (e.g., vegetation management)?									
i. More than 5%	☐	ii. Less than 5%	☐	iii. Less than 2%	☐	iv. Less than 1	☐			

J.II.e	Does the utility have a demonstrably cooperative relationship with local communities?									
i. No	☐	ii. Yes	☐							

J.II.f	Do landowners periodically reach out to the utility to notify it of risks, dangers, or issues?									
i. No	☐	ii. Yes	☐							

J.III Engagement with LEP and AFN populations

Capability 50

J.III.a	Can the utility provide a plan to partner with organizations representing Limited English Proficiency (LEP) and Access & Functional Needs (AFN) communities?									
i. No	☐	ii. Yes	☐							

J.III.b	Can the utility outline how these partnerships create pathways for implementing suggested activities to address the needs of these communities?									
i. No	☐	ii. Yes	☐							

J.III.c	Can the utility point to clear examples of how those relationships have driven the utility's ability to interact with and prepare LEP & AFN communities for wildfire mitigation activities?			
i. No ☐	ii. Yes ☐			

J.III.d	Does the utility have a specific annually-updated action plan further reduce wildfire and PSPS risk to LEP & AFN communities?			
i. No ☐	ii. Yes ☐			

J.IV Collaboration with emergency response agencies

Capability 51

J.IV.a	What is the cooperative model between the utility and suppression agencies?			
i. Utility **does not sufficiently cooperate** with suppression agencies ☐	ii. Utility **cooperates with suppression agencies** by notifying them of ignitions ☐	iii. Utility cooperates with suppression agencies by **working cooperatively with them to detect ignitions**, in addition to notifying them of ignitions as needed ☐		

J.IV.b	In what areas is the utility cooperating with suppression agencies			
i. High risk areas ☐	ii. All areas under utility control ☐	iii. Throughout utility service a ☐	iv. None of the above ☐	

J.IV.c	Does the utility accurately predict and communicate the forecasted fire propagation path using available analytics resources and weather data?			
i. No ☐	ii. Yes ☐			

J.IV.d	Does the utility communicate fire paths to the community as requested?			
i. No ☐	ii. Yes ☐			

J.IV.e	Does the utility work to assist suppression crews logistically, where possible?			
i. No ☐	ii. Yes ☐			

J.V Collaboration on wildfire mitigation planning with stakeholders

Capability 52

J.V.a	Where does the utility conduct substantial fuel management?			
i. Utility **does not conduct** fuel management ☐	ii. Utility conducts fuel management **along rights of way** ☐	iii. Utility conducts fuel management throughout **service area** ☐		

J.V.b	Does the utility engage with other stakeholders as part of its fuel management efforts?			
i. Utility **does not coordinate** with broader fuel management efforts by other stakeholders ☐	ii. Utility **shares fuel management plans** with other stakeholders ☐	iii. Utility shares fuel management plans with other stakeholders **and works with other stakeholders conducting fuel management concurrently** ☐	iv. Utility shares fuel management plans with other stakeholders, **and coordinates fuel management activities, including adjusting plans, to cooperate with other stakeholders state-wide to focus on areas**	v. Utility shares fuel management plans with other stakeholders, and **pro-actively** coordinates fuel management activities, including adjusting plans, to cooperate with other stakeholders state-wide to focus on areas that

			that would have the biggest impact in reducing wildfire risk ☐	would have the biggest impact in reducing wildfire risk ☐

J.V.c	**Does the utility cultivate a native vegetative ecosystem across territory that is consistent with lower fire risk?**			
i. No ☐	ii. Yes ☐			

J.V.d	**Does the utility fund local groups (e.g., fire safe councils) to support fuel management?**			
i. No ☐	ii. Yes ☐			

(END OF ATTACHMENT 3)

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ATTACHMENT 4
(WMP Metrics)

Progress and outcome metrics

Contents

1 Background

The 2019 utility WMP submissions did not use a consistent set of metrics to track the outcome of utility mitigation programs. Metrics proposed by utilities primarily tracked the utility's progress to their own WMP activity targets and were more accurately termed "Program Targets" that did not actually measuring the wildfire mitigation outcomes generated by that plan. Moreover, the lack of consistent metrics used across utilities created challenges for comparing the outcomes of each utility's plan.

Metrics

The WSD will adopt three sets of metrics:

1. Progress metrics that are designed to track concrete actions toward reducing wildfire risk. Progress metrics include absolute metrics (e.g., number of grid condition findings per circuit mile)
2. Program targets, which outline utility progress toward the utility's own specific targets identified in their WMP
3. Outcome metrics that track wildfire and PSPS related outcomes on impacted communities. Outcome metrics include leading and lagging indicators of wildfire and PSPS risk and while they describe utility risk reduction, they may be collected from a variety of sources including utilities themselves, CAL FIRE, Cal OES, and others

The metrics below follow six key principles:

1. Taken together, metrics should provide a complete picture of utility's contribution to and impact on WSD and overall CPUC longer-term objectives
2. A good metric should track information that can be used to inform action, such as grid operations or capital allocation
3. Metrics should include both lagging indicators, to understand past incidents and help prevent recurrence, and also leading indicators, to understand near-misses and help avoid potential incidents
4. Going forward, data analysis should be used to determine which metrics best predict and/or reflect wildfire risk to update the list of metrics accordingly
5. Each metric should be provided in consistent units and normalized by relevant factors across utilities to ensure comparability across years and across service territories
6. Metrics should be auditable, such that the WSD and potentially third parties can independently verify all utility-reported metrics

2 Glossary of defined terms

Term	Definition
10-hour dead fuel moisture content	Moisture content of small dead vegetation (e.g. grass, leaves, which burn quickly but not intensely), which can respond to changes in atmospheric moisture content within 10 hours.
Access and functional needs populations	Per Government Code § 8593.3 and D.19-05-042, individuals who have developmental or intellectual disabilities, physical disabilities, chronic conditions, injuries, limited English proficiency or who are non-English speaking, older adults, children, people living in institutionalized settings, or those who are low income, homeless, or transportation disadvantaged, including, but not limited to, those who are dependent on public transit or those who are pregnant.
Authority Having Jurisdiction	AHJ, party with assigned responsibility, depending on location and circumstance.
Asset (utility)	Electric lines, equipment, or supporting hardware.
At-risk species	Species of vegetation that are particularly likely to contact power lines in the event of high winds and/or ignite if they catch a spark.
Baseline (ignition probability, maturity)	A measure, typically of the current state, to establish a starting point for comparison.
Carbon dioxide equivalent	Tons of greenhouse gases (GHG) emitted, multiplied by the global warming potential relative to carbon dioxide.
Contractor	Any individual in the temporary and/or indirect employ of the utility whose limited hours and/or time-bound term of employment are not considered as "full-time" for tax and/or any other purposes.
Critical facilities and infrastructure	In accordance with the interim definition adopted in D.19-05-042, those facilities and infrastructure that are essential to the public safety and that require additional assistance and advance planning to ensure resiliency during de energization events, namely: emergency services sector (police stations, fire stations, emergency operations centers), government facilities sector (schools, jails, prisons), healthcare and public health sector (public health departments, medical facilities, including hospitals, skilled nursing facilities, nursing homes, blood banks, health care facilities, dialysis centers and hospice facilities), energy sector (public and private utility facilities vital to maintaining or restoring normal service, including, but not limited to, interconnected publicly owned utilities and electric cooperatives), water and wastewater systems sector (facilities associated with the provision of drinking water or processing of wastewater including facilities used to pump, divert, transport, store, treat and deliver water or wastewater), communications sector (communication carrier infrastructure including selective routers, central offices, head ends, cellular switches, remote terminals and cellular sites), and chemical sector (facilities associated with the provision of manufacturing, maintaining, or distributing hazardous materials and chemicals).

Customer hours	Total number of customers, multiplied by the average number of hours (e.g. of power outage).
Data cleaning	Calibrating raw data to remove errors (including typographical and numerical mistakes).
Dead fuel moisture content	Moisture content of dead vegetation, which responds solely to current environmental conditions and is critical in determining fire potential.
Detailed inspection	In accordance with GO 165, an inspection where individual pieces of equipment and structures are carefully examined, visually and through use of routine diagnostic test, as appropriate, and (if practical and if useful information can be so gathered) opened, and the condition of each rated and recorded.
Enhanced inspection	Inspection whose frequency and thoroughness exceeds the requirements of the detailed inspection, particularly if driven by risk calculations.
Evacuation impact	Number of people evacuated, with the duration for which they are evacuated, from homes and businesses, due to wildfires.
Evacuation zone	Areas designated by CAL FIRE and local fire agency evacuation orders, to include both "voluntary" and "mandatory" in addition to other orders such as "precautionary" and "immediate threat".
Fuel density	Mass of fuel (vegetation) per area which could combust in a wildfire.
Fuel management	Removing or thinning vegetation to reduce the potential rate of propagation or intensity of wildfires.
Fuel moisture content	Amount of moisture in a given mass of fuel (vegetation), measured as a percentage of its dry weight.
Full-time employee	Any individual in the ongoing and/or direct employ of the utility whose hours and/or term of employment are considered as "full-time" for tax and/or any other purposes.
Greenhouse gas (GHG) emissions	Health and Safety Code 38505 identifies seven greenhouse gases that ARB is responsible to monitor and regulate in order to reduce emissions: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), sulfur hexafluoride (SF6), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and nitrogen trifluoride (NF3).
GO 95 nonconformance	Condition of a utility asset that does not meet standards established by General Order 95.
Grid hardening	Actions (such as equipment upgrades, maintenance, and planning for more resilient infrastructure) taken in response to the risk of undesirable events (such as outages) or undesirable conditions of the electrical system in order to reduce or mitigate those events and conditions, informed by an assessment of the relevant risk drivers or factors.
Grid topology	General design of an electric grid, whether looped or radial, with consequences for reliability and ability to support de-energization (e.g., being able to deliver electricity from an additional source).
High Fire Threat District	Per D.17-01-009, areas of the State designated by the CPUC and CAL FIRE to have elevated wildfire risk, indicating where utilities must take additional action (per GO 95, GO 165, and GO 166) to mitigate wildfire risk.
Highly rural region	In accordance with 38 CFR 17.701, "highly rural" shall be defined as those areas with a population of less than 7 persons per square mile.
Ignition probability	The relative possibility that an ignition will occur, probability is quantified as a number between 0% and 100% (where 0% indicates impossibility and 100% indicates certainty). The higher the probability of an event, the more certainty there is that the event will occur. (Often informally referred to as likelihood or chance).

Ignition-related deficiency	Any condition which may result in ignition or has previously resulted in ignition, even if not during the past five years.
Impact of ignitions	The effect or outcome of a wildfire ignition, affecting objectives, which may be expressed by terms including, although not limited to health, safety, reliability, economic and/or environmental damage.
Initiative	Measure or activity proposed or in process designed to reduce the consequences and/or probability of wildfire or PSPS.
Inspection protocol	Documented procedures to be followed in order to validate that a piece of equipment is in good condition and expected to operate safely and effectively.
Invasive species	Non-native species whose proliferation increases the risk of catastrophic wildfires.
Level 1 finding	In accordance with GO 95, an immediate safety and/or reliability risk with high probability for significant impact.
Level 2 finding	In accordance with GO 95, a variable (non-immediate high to low) safety and/or reliability risk.
Level 3 finding	In accordance with GO 95, an acceptable safety and/or reliability risk.
Life expectancy	Anticipated years that a piece of equipment can be expected to meet safety and performance requirements.
Limited English Proficiency (LEP)	Populations with limited English working proficiency based on the International Language Roundtable scale.
Live fuel moisture content	Moisture content within living vegetation, which can retain water longer than dead fuel.
Lost energy	Energy that would have been delivered were it not for an outage.
Major roads	Interstate highways, U.S. highways, state and county routes.
Match drop simulation	Wildfire simulation method that takes an arbitrary ignition and forecasts propagation and impact.
Member of the public	Any individual not employed by the utility.
Multi-attribute value function	Risk calculation methodology introduced during CPUC's S-MAP and RAMP proceedings.
Near miss	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.
Near-miss simulation	Simulation of what the consequence would have been of an ignition had it occurred.
Need for PSPS	When utilities' criteria for utilizing PSPS are met.
Noncompliant clearance	Rights-of-way whose vegetation is not trimmed in accordance with the requirements of GO 95.
Outages of the type that could ignite a wildfire	Outages that, in the judgement of the utility, could have ignited a wildfire.
Outcome metrics	Measurements of the performance of the utility and its service territory in terms of both leading and lagging indicators of wildfire, PSPS, and other consequences of wildfire risk, including the potential unintended consequences of wildfire mitigation work, such as acreage burned by utility-ignited wildfire.

Overcapacity	When the energy transmitted by utility equipment exceeds that of its nameplate capacity.
Patrol inspection	In accordance with GO 165, a simple visual inspection of applicable utility equipment and structures that is designed to identify obvious structural problems and hazards. Patrol inspections may be carried out in the course of other company business.
Percentile conditions	Top X% of a particular set (e.g. wind speed), based on a historical data set with sufficient detail.
Planned outage	Electric outage announced ahead of time by the utility.
Preventive maintenance (PM)	The practice of maintaining equipment on a regular schedule, based on risk, elapsed time, run-time meter readings, or number of operations. The intent of PM is to "prevent" maintenance problems or failures before they take place by following routine and comprehensive maintenance procedures. The goal is to achieve fewer, shorter, and more predictable outages.
Priority essential services	Critical first responders, public safety partners, critical facilities and infrastructure, operators of telecommunications infrastructure, and water utilities/agencies.
Program targets	Measurements of activity identified in WMPs and subsequent annual updates, in terms of volume or scope of work, such as number trees trimmed or miles of power lines hardened.
Progress metrics	Measurements that track how much utility wildfire mitigation activity has changed the conditions of utility wildfire risk exposure or utility ability to manage wildfire risk exposure, in terms of leading indicators of ignition probability and wildfire consequences.
Property	Private and public property, buildings and structures, infrastructure, and other items of value that were destroyed by wildfire, including both third-party property and utility assets.
PSPS risk	The potential for the occurrence of a PSPS event expressed in terms of a combination of various outcomes of the event and their associated probabilities.
PSPS weather	Weather that exceeds a utility's risk threshold for initiating a PSPS.
Red Flag Warning	RFW, level of wildfire risk from weather as declared by the National Weather Service.
RFW Circuit Mile Day	Sum of miles of utility grid subject to Red Flag Warning each day (e.g. 2 RFW circuit mile days could come from an RFW on 2 miles for 1 day, or from 1 mile on 2 separate days).
Risk-spend efficiency	An estimate of the cost-effectiveness of initiatives, calculated by dividing the mitigation risk reduction benefit by the mitigation cost estimate based on the full set of risk reduction benefits estimated from the incurred costs.
Rule	Section of public utility code requiring a particular activity or establishing a particular threshold.
Run-to-failure	A maintenance approach that replaces equipment only when it fails.
Rural region	In accordance with GO 165, "rural" shall be defined as those areas with a population of less than 1,000 persons per square mile as determined by the United States Bureau of the Census.
Safety Hazard	A condition that poses a significant threat to human life or property.
Simulated wildfire	Propagation and impact of a wildfire ignited at a particular point ('match drop'), as simulated by fire spread software.

Span	The space between adjacent supporting poles or structures on a circuit consisting of electric line and equipment. "Span level" refers to asset-scale granularity.
System Average Interruption Duration Index (SAIDI)	System-wide total number of minutes per year of sustained outage per customer served.
Third-party contact	Contact between a piece of electrical equipment and another object, whether natural (tree branch) or human (vehicle).
Time to expected failure	Time remaining on the life expectancy of a piece of equipment.
Top 30% of proprietary fire potential index	Top 30% of FPI or equivalent scale (e.g., "Extreme" on SCE's FPI; "extreme", 15 or greater, on SDG&E's FPI; and 4 or above on PG&E's FPI).
Trees with strike potential / hazard trees	Trees that could either 'fall in' to a power line, or have branches detach and 'fly in' to contact a power line in high-wind conditions.
Unplanned outage	Electric outage that occurs with no advance notice from the utility (e.g. blackout).
Urban region	In accordance with GO 165, "urban" shall be defined as those areas with a population of more than 1,000 persons per square mile as determined by the United States Bureau of the Census.
Utility-ignited wildfire	Wildfires ignited by utility infrastructure or employees, including all wildfires determined by AHJ investigation to originate from ignition caused by utility infrastructure.
Vegetation risk index	Risk index indicating the probability of vegetation-related outages along a particular circuit, based on the vegetation species, density, height, and growth rate.
Vegetation management	Trimming and clearance of trees, branches, and other vegetation that poses the risk of contact with electric equipment.
Weather normalization	Adjusting metrics based on relative weather risk, with RFW circuit mile days as the normalization factor
Wildfire consequence	The effect or outcome of a wildfire affecting objectives, which may be expressed, by terms including, although not limited to health, safety, reliability, economic and/or environmental damage.
Wildfire risk	The potential for the occurrence of a wildfire event expressed in terms of a combination of various outcomes of the wildfire and their associated probabilities.
Wildfire-only WMP programs	Activities, practices, and strategies that are only necessitated by wildfire risk, unrelated to or beyond that required by minimum reliability and/or safety requirements. Such programs are not indicated or in common use in areas where wildfire risk is minimal (e.g., territory with no vegetation or fuel) or under conditions where wildfires are unlikely to ignite or spread (e.g., when rain is falling).
Wildland urban interface (WUI)	A geographical area identified by the state as a "Fire Hazard Severity Zone", or other areas designated by the enforcing agency to be a significant risk from wildfires, established pursuant to Title 24, Part 2, Chapter 7A.
Wire down	Instance where an electric transmission or distribution conductor is broken and falls from its intended position to rest on the ground or a foreign object.

3 Progress metrics to track implementation

All progress metrics are based on information that is proprietary to the utility or shall be collected and reported by the utility. All progress metrics are also leading indicators of ignition probability and/or wildfire consequence, such that they can produce insights into the likelihood and/or impact of potential near-misses or incidents and provide some guidance about options to mitigate against them and/or the unintended consequences of efforts to mitigate against them.

Table 1 Progress metrics to track implementation

#	Progress metric name	Unit(s)	Sources	Collection frequency	Example options for audit
1	Grid condition findings from inspection	Number of Level 1, 2, and 3 findings per mile of circuit in HFTD, and per total miles of circuit for each of the following inspection types: 1. Patrol inspections 2. Detailed inspections 3. Other inspection types	Utility reporting	Monthly	Deep-dive audits of select portions of utility grid
2	Vegetation clearance findings from inspection	Percentage of right-of-way with noncompliant clearance based on applicable rules and regulations at the time of inspection	Utility reporting	Monthly	Deep-dive audits of select portions of right-of-way
3	Extreme weather prediction accuracy	Percentage of total PSPS predictions that are false positives or false negatives 2 days before a potential PSPS event	Utility reporting	Post-event	NWS, UCSD, CAL FIRE Predictive Services
4	Extent of grid modularization	Number of sectionalizing devices per circuit mile and number of automated grid control equipment in: 1. HFTD 2. Non-HFTD	Utility reporting	Quarterly	Deep-dive audits of select portions of utility grid
5	Equipment operating load above nameplate capacity	Number of circuit hours operated above nameplate capacity in HFTD areas	Utility reporting	Quarterly	Deep-dive audits of select portions of utility grid, CAISO

#	Progress metric name	Unit(s)	Sources	Collection frequency	Example options for audit
		Average % above nameplate capacity when equipment operated above nameplate capacity in HFTD areas			
6	Risk-spend efficiency of resources deployed towards wildfire mitigation efforts	Dollars per incremental life saved Dollars invested per estimated dollars of rebuilt structures avoided Dollars per customer hour of PSPS avoided	Utility reporting	Quarterly	Calculation inputs and methodology for re-computing by third-party
7	Extent of hardening across grid	Percent of all grid assets in HFTD areas using proven and demonstrated wildfire-resistant equipment	Utility reporting	Monthly	Deep-dive audits of select portions of utility grid
8	Community engagement activity and effectiveness	Percent of residents made aware of PSPS and emergency response procedures in advance of events, according to post-event surveys Percent of residents agreeing to participate in utility wildfire risk-reduction activities (e.g., allowing access to property for utility hazard tree remediation)	Utility reporting	Quarterly	Resident survey, Fire Safety Councils, audit of wildfire risk reduction activity
9	Emergency planning and preparedness	Number of emergency response deficiencies reported by Cal OES, suppression agencies, and other emergency response personnel when plans tested or activated	Utility reporting	Post-event	CAL FIRE, Cal OES, employee survey, Fire Safety Councils
10	Data collection and reporting	Percent of data requested in SDR and WMP collected in initial submission Number of data elements shared publicly by utilities	Utility reporting	Quarterly	Database access and records, party listserv, and surveys

4 Outcome metrics to track wildfire risk reduction outcomes

The goal of outcome metrics is to track wildfire and PSPS-related outcomes on impacted communities, including monitoring for potential unintended consequences of wildfire mitigation activities. These metrics include leading indicators and lagging indicators and may be sourced directly from each utility or sourced from other agencies. Therefore, the outcome metrics are organized into four categories, as follows:

Group 1A: Generally sourced from utility, leading indicators
Group 1B: Generally sourced from utility, lagging indicators
Group 2A: Generally sourced from a variety of other stakeholders, leading indicators
Group 2B: Generally sourced from a variety of other stakeholders, lagging indicators

Source:	**Utility**	**Other stakeholders**
Leading	1A	2A
Lagging	1B	2B

Leading indicators can produce insights into the likelihood and/or impact of potential near-misses or other avoided wildfire and PSPS incidents. Leading indicators are particularly helpful in identifying trends before rare, high impact events like wildfires happen and help to understand the statistical significance of any actual events.

Lagging indicators quantify the impact of wildfires and/or wildfire mitigation actions by measuring actual impacts incurred, for example due to a wildfire or PSPS event. Lagging indicators can help generate insights about how to prevent or mitigate future events and/or the unintended consequences of efforts to mitigate against them.

Table 2 Outcome metrics to track wildfire risk reduction outcomes

Metric type	#	Outcome metric name	Unit(s)	Sources	Collection frequency	Example options for audit
Group 1A: Generally sourced from utility, leading indicators						
1. Near misses	1.a.	Number of all events (such as unplanned outages, faults, conventional blown fuses, etc.) that could result in ignition, by type according to utility-provided list (total)	Number per year	Utility reporting	Quarterly	Utility repair logs, smart meters, consumer surveys
	1.b.	Number of all events (such as unplanned outages, faults, conventional blown fuses, etc.) that could result in ignition, by type according to utility-provided list (normalized)	Number per RFW circuit mile day per year	Utility reporting	Quarterly	Utility repair logs, smart meters, consumer surveys
	1.c.	Number of wires down (total)	Number of wires down per year	Utility reporting	Quarterly	Utility repair logs, smart meters, consumer surveys
	1.d.	Number of wires down (normalized)	Number per RFW circuit mile day per year	Utility reporting	Quarterly	Utility repair logs, Smart meters, consumer surveys
2. Utility inspection findings	2.a.	Number of Level 1 findings that could increase the probability of ignition discovered per circuit mile	Average number of Level 1 findings that could increase the probability of ignition discovered by	Utility reporting	Quarterly	Deep-dive audits of select portions of utility grid; utility inspection logs

Metric type	#	Outcome metric name	Unit(s)	Sources	Collection frequency	Example options for audit
			all inspections per circuit mile per year			
	2.b.	Number of Level 2 findings that could increase the probability of ignition discovered per circuit mile	Average number of Level 2 findings that could increase the probability of ignition discovered by all inspections per circuit mile per year	Utility reporting	Quarterly	Deep-dive audits of select portions of utility grid; utility inspection logs
	2.c.	Number of Level 3 findings that could increase the probability of ignition discovered per circuit mile	Average number of Level 3 findings that could increase the probability of ignition discovered by all inspections per circuit mile per year	Utility reporting	Quarterly	Deep-dive audits of select portions of utility grid; utility inspection logs
3. Risk spend efficiency of WMP programs	3.a.	Average risk spend efficiency of all WMP programs being undertaken by utility	Incremental cost per grid-wide 1% reduction in utility ignition in HFTD areas	Utility reporting	Quarterly	GRC, wildfire memorandum accounts, third party recalculation
	3.b.	Average risk spend efficiency of wildfire-only WMP programs being undertaken by utility	Incremental cost per grid-wide 1% reduction in utility ignition in HFTD areas	Utility reporting	Quarterly	GRC, third party recalculation
4. Planned renewable energy procurement	4.a.	Contracts for future purchases of renewable energy	% of total estimated electricity procurement per year	Utility reporting	Quarterly	Contract review
5. Customer hours of PSPS based	5.a.	Percent of customers experiencing PSPS given 95th percentile fire weather conditions along	Percent of all customers	Utility reporting and modeling, using agreed	Annual	Third party expert evaluation using

Metric type	#	Outcome metric name	Unit(s)	Sources	Collection frequency	Example options for audit
on stress test conditions		entire grid using utility PSPS decision protocols		historical weather conditions		utility PSPS decision protocol
	5.b.	Percent of customers experiencing PSPS given 99th percentile fire weather conditions along entire grid using utility PSPS decision protocols	Percent of all customers	Utility reporting and modeling, using agreed historical weather conditions	Annual	Third party expert evaluation using utility PSPS decision protocol
Group 1B: Generally sourced from utility, lagging indicators						
6. Customer hours of PSPS and other outages	6.a.	Customer hours of planned outages including PSPS (total)	Total customer hours of planned outages per year	Utility reporting	Quarterly	Consumer survey, additional data from smart meters
	6.b.	Customer hours of planned outages including PSPS (normalized)	Total customer hours of planned outages per RFW circuit mile day per year	Utility reporting	Quarterly	Consumer survey, additional data from smart meters
	6.c.	Customer hours of unplanned outages, not including PSPS (total)	Total customer hours of unplanned outages per year	Utility reporting	Quarterly	Consumer survey, additional data from smart meters
	6.d.	Customer hours of unplanned outages, not including PSPS (normalized)	Total customer hours of unplanned outages per RFW circuit mile day per year	Utility reporting	Quarterly	Consumer survey, additional data from smart meters
	6.e.	Increase in System Average Interruption Duration Index (SAIDI)	Change in minutes compared to the previous year	Utility reporting	Quarterly collection	Third party auditor, consumer survey, smart meter data

Metric type	#	Outcome metric name	Unit(s)	Sources	Collection frequency	Example options for audit
7. Electricity cost to ratepayers	7.a.	Increase in electric costs to ratepayer due to wildfires (total)	Dollar value rates increase attributable to wildfires per year	Utility reporting	Collected at GRC cadence	TURN, utility reports, consumer surveys
	7.b.	Increase in electric costs to ratepayer due to wildfires (normalized)	Dollar value rates increase attributable to wildfires per RFW circuit mile per year	Utility reporting	Collected at GRC cadence	TURN, utility reports, consumer surveys
	7.c.	Increase in electric costs to ratepayer due to wildfire mitigation activities (total)	Dollar value rates increase attributable to WMPs per year	Utility reporting	Collected at GRC cadence	TURN, utility reports, consumer surveys
8. Actual renewable energy procurement	8.a.	Electricity procured from renewable sources	Percentage of total electricity procured per year	Utility reporting	Annual	Review of contracts with generation companies
Group 2A: Generally sourced from a variety of other stakeholders, leading indicators						
9. Impact of utility ignitions based on ignition simulation	9.a.	Potential impact of ignitions (total)	Number of people residing in evacuation zones of wildfires simulated for each ignition per year, based on in-house or contractors' fire spread models	CAL FIRE and utility reporting	Annual	Satellite data, Fire Safety Council interviews, utility ignition reporting and fire spread modelling
	9.b.	Potential impact of ignitions (normalized)	Number of people residing in evacuation zones of wildfires simulated for each	CAL FIRE and utility reporting	Annual	Satellite data, Fire Safety Council interviews, utility ignition reporting

Metric type	#	Outcome metric name	Unit(s)	Sources	Collection frequency	Example options for audit
			ignition per RFW circuit mile day per year			and fire spread modelling
	9.c.	Potential impact of ignitions in HFTD (subtotal)	Number of people residing in evacuation zones of wildfires simulated for each ignition in HFTD per year	CAL FIRE and utility reporting	Annual	Satellite data, Fire Safety Council interviews, utility ignition reporting and fire spread modelling
	9.c.i.	Potential impact of ignitions in HFTD Zone 1	Number of people residing in evacuation zones of wildfires simulated for each ignition in HFTD Zone 1 per year	CAL FIRE and utility reporting	Annual	Satellite data, Fire Safety Council interviews, utility ignition reporting and fire spread modelling
	9.c.ii.	Potential impact of ignitions in HFTD Tier 2	Number of people residing in evacuation zones of wildfires simulated for each ignition in HFTD Tier 2 per year	CAL FIRE and utility reporting	Annual	Satellite data, Fire Safety Council interviews, utility ignition reporting and fire spread modelling
	9.c.iii.	Potential impact of ignitions in HFTD Tier 3	Number of people residing in evacuation zones of wildfires simulated for each ignition in HFTD Tier 3 per year	CAL FIRE and utility reporting	Annual	Satellite data, Fire Safety Council interviews, utility ignition reporting and fire spread modelling

Metric type	#	Outcome metric name	Unit(s)	Sources	Collection frequency	Example options for audit
	9.d.	Potential impact of ignitions in HFTD (subtotal, normalized)	Number of people residing in evacuation zones of wildfires simulated for each ignition in HFTD per RFW circuit mile day per year	CAL FIRE and utility reporting	Annual	Satellite data, Fire Safety Council interviews, utility ignition reporting and fire spread modelling
	9.d.i.	Potential impact of ignitions in HFTD Zone 1 (normalized)	Number of people residing in evacuation zones of wildfires simulated for each ignition in HFTD Zone 1 per RFW circuit mile day per year	CAL FIRE and utility reporting	Annual	Satellite data, Fire Safety Council interviews, utility ignition reporting and fire spread modelling
	9.d.ii.	Potential impact of ignitions in HFTD Tier 2 (normalized)	Number of people residing in evacuation zones of wildfires simulated for each ignition in HFTD Tier 2 per RFW circuit mile day per year	CAL FIRE and utility reporting	Annual	Satellite data, Fire Safety Council interviews, utility ignition reporting and fire spread modelling
	9.d.iii.	Potential impact of ignitions in HFTD Tier 3 (normalized)	Number of people residing in evacuation zones of wildfires simulated for each ignition in HFTD Tier 3 per RFW circuit mile day per year	CAL FIRE and utility reporting	Annual	Satellite data, Fire Safety Council interviews, utility ignition reporting and fire spread modelling
	9.e.	Potential impact of ignitions in non-HFTD (subtotal)	Number of people residing in evacuation zones of wildfires	CAL FIRE and utility reporting	Annual	Satellite data, Fire Safety Council interviews, utility

Metric type	#	Outcome metric name	Unit(s)	Sources	Collection frequency	Example options for audit
			simulated for each ignition in non-HFTD per year			ignition reporting and fire spread modelling
	9.f.	Potential impact of ignitions in non-HFTD (normalized)	Number of people residing in evacuation zones of wildfires simulated for each ignition in non-HFTD per RFW circuit mile day per year	CAL FIRE and utility reporting	Annual	Satellite data, Fire Safety Council interviews, utility ignition reporting and fire spread modelling
Group 2B: Generally sourced from a variety of other stakeholders, lagging indicators						
10. Utility-ignited wildfire fatalities	10.a.	Fatalities due to utility-ignited wildfire (total)	Number of fatalities per year	Classification by fire authority having jurisdiction, utility reporting	Post-incident collection	Satellite data, Cal OES, CAL FIRE
	10.b.	Fatalities due to utility-ignited wildfire (normalized)	Number of fatalities per RFW circuit mile day per year	Classification by fire authority having jurisdiction, utility reporting	Post-incident collection	Satellite data, Cal OES, CAL FIRE
11. Fatalities from utility wildfire mitigation activities	11	Fatalities due to utility wildfire mitigation activities (total)	Number of fatalities per year	Utility OSHA reporting	Post-incident collection	OSHA, utility reporting
12. OSHA-reportable injuries from utility	12.a.	OSHA-reportable injuries due to utility wildfire mitigation activities (total)	Number of OSHA-reportable injuries per year	Utility OSHA reporting	Post-incident collection	OSHA, utility reporting

Metric type	#	Outcome metric name	Unit(s)	Sources	Collection frequency	Example options for audit
wildfire mitigation activities	12.b.	OSHA-reportable injuries due to utility wildfire mitigation activities (normalized)	Number of OSHA-reportable injuries per year per 1000 line miles of grid	Utility OSHA reporting	Post-incident collection	OSHA, utility reporting
13. Value of assets destroyed by utility-ignited wildfire, listed by asset type	13.a.	Value of assets destroyed by utility-ignited wildfire (total)	Dollars of damage or destruction per year	CAL FIRE reporting; financial experts	Post-incident collection	Satellite data, insurance claims, state funding claims
	13.b.	Value of assets destroyed by utility-ignited wildfire (normalized)	Dollars of damage or destruction per RFW circuit mile day per year	CAL FIRE reporting; financial experts	Post-incident collection	Satellite data, insurance claims, state funding claims
14. Structures damaged or destroyed by utility-ignited wildfire	14.a.	Number of structures destroyed by utility-ignited wildfire (total)	Number of structures destroyed per year	CAL FIRE reporting	Post-incident collection	Satellite data, insurance claims, state funding claims
	14.b.	Number of structures destroyed by utility-ignited wildfire (normalized)	Number of structures destroyed per RFW circuit mile day per year	CAL FIRE reporting	Post-incident collection	Satellite data, insurance claims, state funding claims
15. Public impacted by utility-ignited wildfire evacuation	15.a.	Number of people residing in evacuation zone of utility-ignited wildfire (total)	Number of people in evacuation zones of utility ignited wildfire	CAL FIRE and Cal OES reporting	Post-incident collection	State evacuation notices, population density map
	15.b.	Number of people residing in evacuation zone of utility-ignited wildfire (normalized)	Number of people per RFW circuit mile day per year	CAL FIRE and Cal OES reporting	Post-incident collection	State evacuation notices, population density map
	15.c.	Impact of evacuations for utility-ignited wildfire (total)	Person-hours per year	CAL FIRE and Cal OES reporting	Post-incident collection	State evacuation notices, population density map
	15.d.	Impact of evacuations for utility-ignited wildfire (normalized)	Person-hours per RFW circuit mile day per year	CAL FIRE and Cal OES reporting	Post-incident collection	State evacuation notices, population density map

Metric type	#	Outcome metric name	Unit(s)	Sources	Collection frequency	Example options for audit
16. Acreage burned by utility-ignited wildfire	16.a.	Acreage burned by utility-ignited wildfire (total)	Acres burned per year	CAL FIRE	Post-incident collection	Satellite data, post-incident investigation
	16.b.	Acreage burned by utility-ignited wildfire (normalized)	Acres burned per RFW circuit mile day per year	CAL FIRE	Post-incident collection	Satellite data, post-incident investigation
17. Number of utility wildfire ignitions	17.a.	Number of ignitions (total) according to existing ignition data reporting requirement	Number per year	CAL FIRE and utility reporting	Post-incident collection	Satellite data, Fire Safety Council interviews, utility ignition reporting
	17.b.	Number of ignitions (normalized)	Number per RFW circuit mile day per year	CAL FIRE and utility reporting	Post-incident collection	Satellite data, Fire Safety Council interviews, utility ignition reporting
	17.c.	Number of ignitions in HFTD (subtotal)	Number in HFTD per year	CAL FIRE and utility reporting	Post-incident collection	Satellite data, Fire Safety Council interviews, utility ignition reporting
	17.c.i.	Number of ignitions in HFTD Zone 1	Number in HFTD Zone 1 per year	CAL FIRE and utility reporting	Post-incident collection	Satellite data, Fire Safety Council interviews, utility ignition reporting
	17.c.ii.	Number of ignitions in HFTD Tier 2	Number in HFTD Tier 2 per year	CAL FIRE and utility reporting	Post-incident collection	Satellite data, Fire Safety Council interviews, utility ignition reporting
	17.c.iii.	Number of ignitions in HFTD Tier 3	Number in HFTD Tier 3 per year	CAL FIRE and utility reporting	Post-incident collection	Satellite data, Fire Safety Council interviews, utility ignition reporting

Metric type	#	Outcome metric name	Unit(s)	Sources	Collection frequency	Example options for audit
	17.d.	Number of ignitions in HFTD (subtotal, normalized)	Number in HFTD per RFW circuit mile day per year	CAL FIRE and utility reporting	Post-incident collection	Satellite data, Fire Safety Council interviews, utility ignition reporting
	17.d.i.	Number of ignitions in HFTD Zone 1 (normalized)	Number in HFTD Zone 1 per RFW circuit mile day per year	CAL FIRE and utility reporting	Post-incident collection	Satellite data, Fire Safety Council interviews, utility ignition reporting
	17.d.ii.	Number of ignitions in HFTD Tier 2 (normalized)	Number in HFTD Tier 2 per RFW circuit mile day per year	CAL FIRE and utility reporting	Post-incident collection	Satellite data, Fire Safety Council interviews, utility ignition reporting
	17.d.iii.	Number of ignitions in HFTD Tier 3 (normalized)	Number in HFTD Tier 3 per RFW circuit mile day per year	CAL FIRE and utility reporting	Post-incident collection	Satellite data, Fire Safety Council interviews, utility ignition reporting
	17.e.	Number of ignitions in non-HFTD (subtotal)	Number in non-HFTD per year	CAL FIRE and utility reporting	Post-incident collection	Satellite data, Fire Safety Council interviews, utility ignition reporting
	17.f.	Number of ignitions in non-HFTD (normalized)	Number in non-HFTD per RFW circuit mile day per year	CAL FIRE and utility reporting	Post-incident collection	Satellite data, Fire Safety Council interviews, utility ignition reporting
18. Estimated GHG emissions from utility-ignited wildfire	18.a.	GHG emissions from utility-ignited wildfires (total)	Estimated tons of carbon dioxide equivalent emitted per year	Cal ARB	Annual	CNRA calculations, USGS, independent analysis
	18.b.	GHG emissions from utility-ignited wildfires (normalized)	Estimated tons of carbon dioxide equivalent	Cal ARB	Annual	CNRA calculations, USGS, independent analysis

Metric type	#	Outcome metric name	Unit(s)	Sources	Collection frequency	Example options for audit
			emitted per RFW circuit mile day per year			
19. Transportation impacted by PSPS	19.a.	Critical transportation infrastructure impacted due to PSPS	Driver and rider-hours lost (in ridership per hour multiplied by incremental increase in commute time by hours closed) per year	Cal OES	Post-incident collection	California Transit Association, contemporary Google maps estimated travel time estimates
	19.b.	Major roads impacted due to PSPS (normalized)	Driver and rider-hours lost (in ridership per hour multiplied by incremental increase in commute time by hours closed) per RFW circuit mile day per year	Cal OES	Post-incident collection	California Transit Association, contemporary Google maps estimated travel time estimates
20. Critical infrastructure impacted	20.a.	Critical infrastructure impacted by PSPS	Number of critical infrastructure locations impacted per hour multiplied by hours offline per year	Utility, Cal OES	Post-incident collection	Utility data, Cal OES, survey of critical infrastructure personnel
	20.b.	Critical infrastructure impacted by PSPS (normalized)	Number of critical infrastructure locations impacted per hour multiplied by hours offline per RFW circuit mile day per year	Utility, Cal OES	Post-incident collection	Utility data, Cal OES, survey of critical infrastructure personnel

(END OF ATTACHMENT 4)

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ATTACHMENT 5

(Supplemental Data Request)

WMP Supplemental Data Request (SDR)

Background and Instructions

Scope: The information sought in this Supplemental Data Request (SDR) as relates to "utility ignitions" and "utility-ignited wildfire," includes all ignitions reportable to the CPUC per D.14-02-015 and all wildfires that are determined, by the fire authority having jurisdiction (AHJ), to be caused by utility infrastructure or equipment, regardless of the utilities' agreement with said findings. This focus reflects the Wildfire Safety Division's (WSD) perspective on wildfire risk as a product of ignition probability and wildfire consequence. Utilities play the core role of preventing potential wildfire ignitions from their grid, and also have an important role in limiting the consequences of those ignitions.

Should any portion of the SDR require information that the utility has not collected itself nor could ascertain based on information that the utility does collect, the utility shall work with federal, state, and local agencies, stakeholders, and partners to collect or compile the information.

Where the information in question is not collected by any stakeholder and cannot be collected by the utility, the utility shall indicate this in the comments and include a description of the most similar data point(s) that the utility and/or other stakeholders do track that most closely fits the requirement. The utility shall describe its plan to improve its data collection and/or cooperation with partners with the goal of collecting the required information, including the timeline to implementation.

In the event that any of the requested information is confidential, the utility shall provide 2 versions, 1 which includes all of the information and a second that does not include the confidential information.

Clarification of normalization calculation: For those metrics and other figures that are likely to vary year-to-year based on the prevalence of fire-weather conditions, instructions are included to report said metric or figure both 1) as a total for the year and 2) normalized by Red Flag Warning (RFW) circuit mile days. The denominator "RFW circuit mile days" 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. 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.

Detailed instructions for how to complete each portion of the template for the SDR are as included in the document itself.

Formatting: Provide responses to prompts in SDR guidelines in Word and PDF format, enclosing all completed tables in spreadsheets in Excel format or in database format. Use additional space, rows, and pages as needed to answer questions completely. Where the number of additional rows needed to report complete information exceeds 15 rows, provide spreadsheet or database in attachment. Provide other file types as needed for data, including shapefiles and images, as applicable. Submit all files containing text or numbers in a format that can be searched and copy-pasted.

Contents

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0 Glossary of defined terms

Term	Definition
10-hour dead fuel moisture content	Moisture content of small dead vegetation (e.g. grass, leaves, which burn quickly but not intensely), which can respond to changes in atmospheric moisture content within 10 hours.
Access and functional needs populations	Per Government Code § 8593.3 and D.19-05-042, individuals who have developmental or intellectual disabilities, physical disabilities, chronic conditions, injuries, limited English proficiency or who are non-English speaking, older adults, children, people living in institutionalized settings, or those who are low income, homeless, or transportation disadvantaged, including, but not limited to, those who are dependent on public transit or those who are pregnant.
Authority Having Jurisdiction	AHJ, party with assigned responsibility, depending on location and circumstance.
Asset (utility)	Electric lines, equipment, or supporting hardware.
At-risk species	Species of vegetation that are particularly likely to contact power lines in the event of high winds and/or ignite if they catch a spark.
Baseline (ignition probability, maturity)	A measure, typically of the current state, to establish a starting point for comparison.
Carbon dioxide equivalent	Tons of greenhouse gases (GHG) emitted, multiplied by the global warming potential relative to carbon dioxide.
Contractor	Any individual in the temporary and/or indirect employ of the utility whose limited hours and/or time-bound term of employment are not considered as "full-time" for tax and/or any other purposes.
Critical facilities and infrastructure	In accordance with the interim definition adopted in D.19-05-042, those facilities and infrastructure that are essential to the public safety and that require additional assistance and advance planning to ensure resiliency during de energization events, namely: emergency services sector (police stations, fire stations, emergency operations centers), government facilities sector (schools, jails, prisons), healthcare and public health sector (public health departments, medical facilities, including hospitals, skilled nursing facilities, nursing homes, blood banks, health care facilities, dialysis centers and hospice facilities), energy sector (public and private utility facilities vital to maintaining or restoring normal service, including, but not limited to, interconnected publicly owned utilities and electric cooperatives), water and wastewater systems sector (facilities associated with the provision of drinking water or processing of wastewater including facilities used to pump, divert, transport, store, treat and deliver water or wastewater), communications sector (communication carrier infrastructure including selective routers, central offices, head ends, cellular switches, remote terminals and cellular sites), and chemical sector (facilities associated with the provision of manufacturing, maintaining, or distributing hazardous materials and chemicals).
Customer hours	Total number of customers, multiplied by the average number of hours (e.g. of power outage).
Data cleaning	Calibrating raw data to remove errors (including typographical and numerical mistakes).
Dead fuel moisture content	Moisture content of dead vegetation, which responds solely to current environmental conditions and is critical in determining fire potential.
Detailed inspection	In accordance with GO 165, an inspection where individual pieces of equipment and structures are carefully examined, visually and through use of routine diagnostic test, as appropriate, and (if practical and if useful information can be so gathered) opened, and the condition of each rated and recorded.

Enhanced inspection	Inspection whose frequency and thoroughness exceeds the requirements of the detailed inspection, particularly if driven by risk calculations.
Evacuation impact	Number of people evacuated, with the duration for which they are evacuated, from homes and businesses, due to wildfires.
Evacuation zone	Areas designated by CAL FIRE and local fire agency evacuation orders, to include both "voluntary" and "mandatory" in addition to other orders such as "precautionary" and "immediate threat".
Fuel density	Mass of fuel (vegetation) per area which could combust in a wildfire.
Fuel management	Removing or thinning vegetation to reduce the potential rate of propagation or intensity of wildfires.
Fuel moisture content	Amount of moisture in a given mass of fuel (vegetation), measured as a percentage of its dry weight.
Full-time employee	Any individual in the ongoing and/or direct employ of the utility whose hours and/or term of employment are considered as "full-time" for tax and/or any other purposes.
Greenhouse gas (GHG) emissions	Health and Safety Code 38505 identifies seven greenhouse gases that ARB is responsible to monitor and regulate in order to reduce emissions: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), sulfur hexafluoride (SF6), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and nitrogen trifluoride (NF3).
GO 95 nonconformance	Condition of a utility asset that does not meet standards established by General Order 95.
Grid hardening	Actions (such as equipment upgrades, maintenance, and planning for more resilient infrastructure) taken in response to the risk of undesirable events (such as outages) or undesirable conditions of the electrical system in order to reduce or mitigate those events and conditions, informed by an assessment of the relevant risk drivers or factors.
Grid topology	General design of an electric grid, whether looped or radial, with consequences for reliability and ability to support de-energization (e.g., being able to deliver electricity from an additional source).
High Fire Threat District	Per D.17-01-009, areas of the State designated by the CPUC and CAL FIRE to have elevated wildfire risk, indicating where utilities must take additional action (per GO 95, GO 165, and GO 166) to mitigate wildfire risk.
Highly rural region	In accordance with 38 CFR 17.701, "highly rural" shall be defined as those areas with a population of less than 7 persons per square mile.
Ignition probability	The relative possibility that an ignition will occur, probability is quantified as a number between 0% and 100% (where 0% indicates impossibility and 100% indicates certainty). The higher the probability of an event, the more certainty there is that the event will occur. (Often informally referred to as likelihood or chance).
Ignition-related deficiency	Any condition which may result in ignition or has previously resulted in ignition, even if not during the past five years.
Impact of ignitions	The effect or outcome of a wildfire ignition, affecting objectives, which may be expressed by terms including, although not limited to health, safety, reliability, economic and/or environmental damage.
Initiative	Measure or activity proposed or in process designed to reduce the consequences and/or probability of wildfire or PSPS.
Inspection protocol	Documented procedures to be followed in order to validate that a piece of equipment is in good condition and expected to operate safely and effectively.
Invasive species	Non-native species whose proliferation increases the risk of wildfires.
Level 1 finding	In accordance with GO 95, an immediate safety and/or reliability risk with high probability for significant impact.

Level 2 finding	In accordance with GO 95, a variable (non-immediate high to low) safety and/or reliability risk.
Level 3 finding	In accordance with GO 95, an acceptable safety and/or reliability risk.
Life expectancy	Anticipated years that a piece of equipment can be expected to meet safety and performance requirements.
Limited English Proficiency (LEP)	Populations with limited English working proficiency based on the International Language Roundtable scale.
Live fuel moisture content	Moisture content within living vegetation, which can retain water longer than dead fuel.
Lost energy	Energy that would have been delivered were it not for an outage.
Major roads	Interstate highways, U.S. highways, state and county routes.
Match drop simulation	Wildfire simulation method that takes an arbitrary ignition and forecasts propagation and impact.
Member of the public	Any individual not employed by the utility.
Multi-attribute value function	Risk calculation methodology introduced during CPUC's S-MAP and RAMP proceedings.
Near miss	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.
Near-miss simulation	Simulation of what the consequence would have been of an ignition had it occurred.
Need for PSPS	When utilities' criteria for utilizing PSPS are met.
Noncompliant clearance	Rights-of-way whose vegetation is not trimmed in accordance with the requirements of GO 95.
Outages of the type that could ignite a wildfire	Outages that, in the judgement of the utility, could have ignited a wildfire.
Outcome metrics	Measurements of the performance of the utility and its service territory in terms of both leading and lagging indicators of wildfire, PSPS, and other consequences of wildfire risk, including the potential unintended consequences of wildfire mitigation work, such as acreage burned by utility-ignited wildfire.
Overcapacity	When the energy transmitted by utility equipment exceeds that of its nameplate capacity.
Patrol inspection	In accordance with GO 165, a simple visual inspection of applicable utility equipment and structures that is designed to identify obvious structural problems and hazards. Patrol inspections may be carried out in the course of other company business.
Percentile conditions	Top X% of a particular set (e.g. wind speed), based on a historical data set with sufficient detail.
Planned outage	Electric outage announced ahead of time by the utility.
Preventive maintenance (PM)	The practice of maintaining equipment on a regular schedule, based on risk, elapsed time, run-time meter readings, or number of operations. The intent of PM is to "prevent" maintenance problems or failures before they take place by following routine and comprehensive maintenance procedures. The goal is to achieve fewer, shorter, and more predictable outages.
Priority essential services	Critical first responders, public safety partners, critical facilities and infrastructure, operators of telecommunications infrastructure, and water utilities/agencies.
Program targets	Measurements of activity identified in WMPs and subsequent annual updates, in terms of volume or scope of work, such as number trees trimmed or miles of power lines hardened.

Progress metrics	Measurements that track how much utility wildfire mitigation activity has changed the conditions of utility wildfire risk exposure or utility ability to manage wildfire risk exposure, in terms of leading indicators of ignition probability and wildfire consequences.
Property	Private and public property, buildings and structures, infrastructure, and other items of value that were destroyed by wildfire, including both third-party property and utility assets.
PSPS risk	The potential for the occurrence of a PSPS event expressed in terms of a combination of various outcomes of the event and their associated probabilities.
PSPS weather	Weather that exceeds a utility's risk threshold for initiating a PSPS.
Red Flag Warning	RFW, level of wildfire risk from weather as declared by the National Weather Service.
RFW Circuit Mile Day	Sum of miles of utility grid subject to Red Flag Warning each day (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).
Risk-spend efficiency	An estimate of the cost-effectiveness of initiatives, calculated by dividing the mitigation risk reduction benefit by the mitigation cost estimate based on the full set of risk reduction benefits estimated from the incurred costs.
Rule	Section of public utility code requiring a particular activity or establishing a particular threshold.
Run-to-failure	A maintenance approach that replaces equipment only when it fails.
Rural region	In accordance with GO 165, "rural" shall be defined as those areas with a population of less than 1,000 persons per square mile as determined by the United States Bureau of the Census.
Safety Hazard	A condition that poses a significant threat to human life or property.
Simulated wildfire	Propagation and impact of a wildfire ignited at a particular point ('match drop'), as simulated by fire spread software.
Span	The space between adjacent supporting poles or structures on a circuit consisting of electric line and equipment. "Span level" refers to asset-scale granularity.
System Average Interruption Duration Index (SAIDI)	System-wide total number of minutes per year of sustained outage per customer served.
Third-party contact	Contact between a piece of electrical equipment and another object, whether natural (tree branch) or human (vehicle).
Time to expected failure	Time remaining on the life expectancy of a piece of equipment.
Top 30% of proprietary fire potential index	Top 30% of FPI or equivalent scale (e.g., “Extreme” on SCE’s FPI; “extreme”, 15 or greater, on SDG&E’s FPI; and 4 or above on PG&E’s FPI).
Trees with strike potential / hazard trees	Trees that could either 'fall in' to a power line, or have branches detach and 'fly in' to contact a power line in high-wind conditions.
Unplanned outage	Electric outage that occurs with no advance notice from the utility (e.g. blackout).
Urban region	In accordance with GO 165, "urban" shall be defined as those areas with a population of more than 1,000 persons per square mile as determined by the United States Bureau of the Census.
Utility-ignited wildfire	Wildfires ignited by utility infrastructure or employees, including all wildfires determined by AHJ investigation to originate from ignition caused by utility infrastructure.
Vegetation risk index	Risk index indicating the probability of vegetation-related outages along a particular circuit, based on the vegetation species, density, height, and growth rate.
Vegetation management	Trimming and clearance of trees, branches, and other vegetation that poses the risk of contact with electric equipment.

Weather normalization	Adjusting metrics based on relative weather risk, with RFW circuit mile days as the normalization factor
Wildfire consequence	The effect or outcome of a wildfire affecting objectives, which may be expressed, by terms including, although not limited to health, safety, reliability, economic and/or environmental damage.
Wildfire risk	The potential for the occurrence of a wildfire event expressed in terms of a combination of various outcomes of the wildfire and their associated probabilities.
Wildfire-only WMP programs	Activities, practices, and strategies that are only necessitated by wildfire risk, unrelated to or beyond that required by minimum reliability and/or safety requirements. Such programs are not indicated or in common use in areas where wildfire risk is minimal (e.g., territory with no vegetation or fuel) or under conditions where wildfires are unlikely to ignite or spread (e.g., when rain is falling).
Wildland urban interface (WUI)	A geographical area identified by the state as a "Fire Hazard Severity Zone", or other areas designated by the enforcing agency to be a significant risk from wildfires, established pursuant to Title 24, Part 2, Chapter 7A.
Wire down	Instance where an electric transmission or distribution conductor is broken and falls from its intended position to rest on the ground or a foreign object.

1 Recent wildfire mitigation performance and underlying data

Instructions: Report performance on the following progress and outcome metrics within the utility's service territory over the past five years. Where a utility does not collect its own data for a given metric, that utility shall work with the relevant sources to collect the information for its service territory, and clearly identify the owner and dataset used to provide the response in "Comments" column.

Progress metrics, listed below, track how much utility wildfire mitigation activity has managed to change the conditions of utility wildfire risk exposure in terms of drivers of ignition probability.

Outcome metrics measure the performance of a utility and its service territory in terms of both leading and lagging indicators of wildfire risk, PSPS risk, and other direct and indirect consequences of wildfire and PSPS, including the potential unintended consequences of wildfire mitigation work.

In the 2019 WMPs, utilities proposed sets of "program targets" that enable tracking implementation of proposed wildfire mitigation activities against the scope of those activities as laid out in the WMPs but do not track the efficacy of those activities.

1.1 Recent performance on progress metrics, last 5 years

Instructions for Table 1:

Report performance on the following metrics within the utility's service territory over the past five years. Where the utility does not collect its own data on a given metric, the utility shall work with the relevant state agencies to collect the relevant information for its service territory, and clearly identify the owner and dataset used to provide the response in the "Comments" column.

Table 1: Recent performance on progress metrics, last 5 years

#	Progress metric name	Annual performance					Unit(s)	Comments
		2015	2016	2017	2018	2019		
1	Extreme weather prediction accuracy						Percentage of total PSPS predictions that are false positives (where the utility's situational awareness indicates that the upcoming risk level will exceed the threshold for PSPS, but it eventually does not do so) or false negatives (where the utility's situational awareness indicates that the	

#	Progress metric name	Annual performance					Unit(s)	Comments
		2015	2016	2017	2018	2019		
							upcoming risk level will *not* exceed the threshold for PSPS, but it eventually *does* do so) 2 days before a potential PSPS event	
2	Equipment operating load above nameplate capacity						Number of circuit hours operated above nameplate capacity in HFTD areas Average % above nameplate capacity when equipment operated above nameplate capacity in HFTD areas	
3	Risk-spend efficiency of resources deployed towards wildfire mitigation efforts						Dollars per incremental life saved Dollars invested per estimated dollars of rebuilt structures avoided Dollars per customer hour of PSPS avoided	
4	Extent of hardening across grid						Percent of all grid assets in HFTD areas using proven and demonstrated wildfire-resistant equipment	
5	Community engagement activity and effectiveness						Percent of residents made aware of PSPS and emergency response procedures in advance of events, according to post-event surveys Percent of residents agreeing to participate in utility wildfire risk-reduction activities (e.g., allowing access to property for utility hazard tree remediation)	
6	Emergency planning and preparedness						Number of emergency response deficiencies reported by Cal OES, suppression agencies, and other emergency response personnel when plans tested or activated	

1.2 Recent performance on outcome metrics, annual and normalized for weather, last 5 years

Instructions for Table 2:

Report performance on the following metrics within the utility's service territory over the past five years. Where the utility does not collect its own data on a given metric, the utility shall work with the relevant state agencies to collect the relevant information for its service territory, and clearly identify the owner and dataset used to provide the response in "Comments" column.

Table 2: Recent performance on outcome metrics, last 5 years

Metric type	#	Outcome metric name	Annual performance					Unit(s)	Comments
			2015	2016	2017	2018	2019		
1. Risk spend efficiency of WMP programs	1.a.	Average risk spend efficiency of all WMP programs being undertaken by utility						Incremental cost per grid-wide 1% reduction in utility ignition risk in HFTD areas	
	1.b.	Average risk spend efficiency of wildfire-only WMP programs being undertaken by utility						Incremental cost per grid-wide 1% reduction in utility ignition risk in HFTD areas	
2. Customer hours of PSPS based on stress test conditions	2.a.	Percent of customers experiencing PSPS given 95th percentile fire weather conditions along entire grid using utility PSPS decision protocols						Percent of all customers	
	2.b.	Percent of customers experiencing PSPS given 99th percentile fire weather conditions along entire grid using utility PSPS decision protocols						Percent of all customers	
	3.a.	Increase in electric costs to ratepayer due to wildfires (total)						Dollar value rates increase attributable to wildfires per year	

Metric type	#	Outcome metric name	Annual performance					Unit(s)	Comments
			2015	2016	2017	2018	2019		
3. Electricity cost to ratepayers	3.b.	Increase in electric costs to ratepayer due to wildfires (normalized)						Dollar value rates increase attributable to wildfires per RFW circuit mile per year	
	3.c.	Increase in electric costs to ratepayer due to wildfire mitigation activities (total)						Dollar value rates increase attributable to WMPs per year	
4. Actual renewable energy procurement	4.a.	Electricity procured from renewable sources						Percentage of total electricity procured per year	
5. Impact of utility ignitions based on ignition simulation	5.a.	Potential impact of ignitions (total)						Number of people residing in evacuation zones of wildfires simulated for each ignition per year, based on in-house or contractors' fire spread models	
	5.b.	Potential impact of ignitions (normalized)						Number of people residing in evacuation zones of wildfires simulated for each ignition per RFW circuit mile day per year	
	5.c.	Potential impact of ignitions in HFTD (subtotal)						Number of people residing in evacuation zones of wildfires simulated for each ignition in HFTD per year	
	5.c.i.	Potential impact of ignitions in HFTD Zone 1						Number of people residing in evacuation zones of wildfires simulated for each ignition in HFTD Zone 1 per year	
	5.c.ii.	Potential impact of ignitions in HFTD Tier 2						Number of people residing in evacuation zones of wildfires simulated for each ignition in HFTD Tier 2 per year	
	5.c.iii.	Potential impact of ignitions in HFTD Tier 3						Number of people residing in evacuation zones of wildfires	

Metric type	#	Outcome metric name	Annual performance					Unit(s)	Comments
			2015	2016	2017	2018	2019		
								simulated for each ignition in HFTD Tier 3 per year	
	5.d.	Potential impact of ignitions in HFTD (subtotal, normalized)						Number of people residing in evacuation zones of wildfires simulated for each ignition in HFTD per RFW circuit mile day per year	
	5.d.i.	Potential impact of ignitions in HFTD Zone 1 (normalized)						Number of people residing in evacuation zones of wildfires simulated for each ignition in HFTD Zone 1 per RFW circuit mile day per year	
	5.d.ii.	Potential impact of ignitions in HFTD Tier 2 (normalized)						Number of people residing in evacuation zones of wildfires simulated for each ignition in HFTD Tier 2 per RFW circuit mile day per year	
	5.d.iii.	Potential impact of ignitions in HFTD Tier 3 (normalized)						Number of people residing in evacuation zones of wildfires simulated for each ignition in HFTD Tier 3 per RFW circuit mile day per year	
	5.e.	Potential impact of ignitions in non-HFTD (subtotal)						Number of people residing in evacuation zones of wildfires simulated for each ignition in non-HFTD per year	
	5.f.	Potential impact of ignitions in non-HFTD (normalized)						Number of people residing in evacuation zones of wildfires simulated for each ignition in non-HFTD per RFW circuit mile day per year	

Metric type	#	Outcome metric name	Annual performance					Unit(s)	Comments
			2015	2016	2017	2018	2019		
6. Public impacted by utility-ignited wildfire evacuation	6.a.	Number of people residing in evacuation zone of utility-ignited wildfire (total)						Number of people in evacuation zones of utility ignited wildfire	
	6.b.	Number of people residing in evacuation zone of utility-ignited wildfire (normalized)						Number of people per RFW circuit mile day per year	
	6.c.	Impact of evacuations for utility-ignited wildfire (total)						Person-hours per year	
	6.d.	Impact of evacuations for utility-ignited wildfire (normalized)						Person-hours per RFW circuit mile day per year	
7. Estimated GHG emissions from utility-ignited wildfire	7.a.	GHG emissions from utility-ignited wildfires (total)						Estimated tons of carbon dioxide equivalent emitted per year	
	7.b.	GHG emissions from utility-ignited wildfires (normalized)						Estimated tons of carbon dioxide equivalent emitted per RFW circuit mile day per year	
8. Transportation impacted by PSPS	8.a.	Critical transportation infrastructure impacted due to PSPS						Driver and rider-hours lost (in ridership per hour multiplied by incremental increase in commute time by hours closed) per year	
	8.b.	Major roads impacted due to PSPS (normalized)						Driver and rider-hours lost (in ridership per hour multiplied by incremental increase in commute time by hours closed) per RFW circuit mile day per year	

1.3 Detailed information supporting outcome metrics

Instructions for

Table 3:

Enclose detailed information as requested for the metrics above. For utility-ignited wildfires over each of the past 5 years, report annual totals for the number of days an evacuation order was in effect in the utility's service territory, the number of people residing in evacuation zones, and the reported actual evacuation numbers of people evacuated during the period of evacuation.

Table 3: Annual evacuations for utility-ignited wildfire, last 5 years

Year	Total days evacuation order in effect	Number of people residing in evacuation zones	Evacuation actuals (total number of people)
2015			
2016			
2017			
2018			
2019			

Instructions for Table 4:
Use spreadsheet or database format to report 1) list of all occurred events per type listed as an "incident type", including those added by the utility in Section 1.6, and 2) wires down events, both over the last five years. Include as attachments to the SDR, Attachment 4.1 and Attachment 4.2, respectively.

Each attachment must include the column groups and columns listed in the following table at a minimum. Each logged event must be reported in an individual row, with data for that event reported according to each of the columns listed in the table below.

Table 4: Spreadsheet columns for lists of events, last 5 years

Column groups	Columns
Identifying information	Type of event
	Date
	Time
Location information	Latitude
	Longitude
	Circuit name
	Land use (rural / urban)
	Enhanced inspections and maintenance conducted according to 2019 WMP at location prior to event (Yes / No)
	Enhanced vegetation management conducted according to 2019 WMP at location prior to event (Yes / No)
Utility facility information	Type of equipment involved
	Facility identification
	Voltage
	Age of involved equipment
	Overhead or underground
	Covered conductor or other
	Other companies' equipment involved (or N/A)
Situational awareness information	Local temperature at time of event
	Local wind speed at time of event
	Nearest weather station by weather station ID
	Last inspection data of involved equipment
	Time-to-expected failure of involved equipment on date of incident (in number of days until the involved equipment was expected to fail)
	Overcapacity history of involved equipment (percent of time equipment operated over nameplate capacity)

Instructions for Table 5:

Use spreadsheet or database format to report the following information for each circuit ID. For each of the columns listed below, with the exception of "service territory location," report information for each circuit ID separately for years 2015, 2016, 2017, 2018, and 2019; calculate a 5-year historical average and include it in a sixth sub-column.

Each attachment must include information on each circuit reported in an individual row for each circuit ID reported by the column groups and columns listed in the following table at a minimum, with six sub-columns to report information on each of the five years and the historical average. See Table 6 for an example for the column group for "fire weather". Include as attachment to the SDR, Attachment 4.3.

Table 5: Spreadsheet columns for information reported by circuit, last 5 years and historical average

Column groups	Columns
Service territory location	HFTD rating (i.e., whether the circuit is in non-HFTD, HFTD Zone 1, HFTD Tier 2, or HFTD Tier 3)
Fire weather, last 5 years and historical average	Number of Red Flag Warning days
	Average annual proprietary fire potential index or similar fire risk index measure
	Annual maximum value reached in utility's proprietary fire potential index or similar fire risk index measure (i.e., the highest FPI that circuit experienced in a given year)
Number and impact of PSPS de-energizations, last 5 years and historical average	Number of PSPS de-energizations
	Number of customers located on de-energized circuit
	Number of affected customers on other circuits
	Customer hours of PSPS (i.e., the number of customers affected times the number of hours they were affected by PSPS)
	Customer hours of PSPS per RFW circuit mile day
Recent overcapacity, last 5 years and historical average	Hours operated above nameplate capacity
	Average load as a percent of nameplate capacity for the hours operated above nameplate capacity
Extreme weather near circuit	95th percentile wind conditions (average of all weather stations within 10 miles of a circuit)
	99th percentile wind conditions (average of all weather stations within 10 miles of a circuit)

Table 6: EXAMPLE - Fire weather over the last 5 years, by circuit ID

	Fire weather																	
Circuit ID	Number of Red Flag Warnings						Average annual proprietary fire potential index						Highest proprietary fire potential index of the year					
	2015	2016	2017	2018	2019	Average	2015	2016	2017	2018	2019	Average	2015	2016	2017	2018	2019	Average

1.4 Mapping recent, modelled, and baseline conditions

Instructions for Table 7:
Report underlying data for recent conditions (over the last five years) of the utility service territory in a downloadable shapefile GIS format, to include the following layers of data plotted on the utility service territory map as specified below, at a minimum. Provide information for each year; calculate and provide a five-year average. Name and attach files according to the table below.

Table 7: Map file requirements for recent and modelled conditions of utility service territory, last 5 years

Layer name	Measurements	Units	Attachment location
Recent weather patterns	Average annual number of fire risk ratings equal to the top 30% of proprietary fire potential index or similar fire risk index measure	Area, days, square mile resolution	3.1
	Difference between forecast and actual wind when either is projected to be or is at 95th percentile wind conditions	Area, miles per hour, at a square mile resolution or better, noting where measurements are actual or interpolated	
Recent fuel measurements	Average distribution and mass of fuel	Area, tons per square mile, square mile resolution, one layer for each month	3.2
	Average distribution and mass of fuel below 62% live fuel moisture content each month	Area, tons per square mile, square mile resolution, one layer for each month	

	Average distribution and mass of fuel below 5% live fuel moisture content	Area, tons per square mile, square mile resolution, one layer for each month	
Potential impact of ignitions	Date of recent ignitions and potential impact measured in number of people in evacuation zone of modeled fire spread	Point, GPS coordinate, days, number of people, square mile resolution	3.3
Implemented 2019 WMP initiative activity	Location of completed 2019 WMP initiative activity for each activity	Line, quarter mile resolution, one layer per initiative	3.4

Instructions for Table 8:
Report underlying data for baseline conditions (projected for 2020) of the utility service territory in a downloadable shapefile GIS format and database, to include the following layers of data plotted on the utility service territory map as specified below, at a minimum. Report more granular resolutions where available (e.g., asset-level instead of by circuit mile).

Table 8: Map file requirements for baseline condition of utility service territory projected for 2020

Layer name	Measurements / variables	Units	Appendix location
Current baseline risk maps	Ignition probability per year given 5-year historical average conditions	Line, quarter mile resolution	3.5
	Wildfire consequence to communities	Area, number of people affected, square mile resolution	
Result of stress test as defined in Section 2	Duration of PSPS events and area of the grid affected in customer hours per year	Area, customer hours, square mile resolution	3.6
	Number of ignitions and near misses	Line, circuit mile resolution	

1.5 Recent fuel measurements, last 5 years

Instructions for Table 9:
Report fuel measurements for live and dead fuel in terms of moisture content and density, in the units tracked by the utility and/or other source of fuel measurements. Specify said units in the "Unit(s)" column, and report source of information in the "Comments" row. List additional fuel information tracked in the "other" row and in additional rows as needed. Calculate and report 5-year historical average. Ensure underlying data is provided per Section 1.4.

Table 9: Fuel density and moisture, last 5 years

Fuel measurement	2015	2016	2017	2018	2019	5-year historical average	Unit(s)	Comments
Live fuel moisture content								
Dead fuel moisture content								
Live fuel density								
Dead fuel density								
Other								

Note: Add additional rows as needed.

1.6 Directional vision for future probability drivers

Instructions for Table 10:

Rank order the detailed ignition probability drivers anticipated to undergo the greatest change and have the greatest impact on ignition probability and estimated wildfire consequence (be it to increase or decrease ignition probability and estimated wildfire consequence) over the next ten years, in order from 1 to 15, where 1 means greatest anticipated change or impact and 15 means minimal change or impact on ignition probability and estimated wildfire consequence. In the columns titled "Change in risk impact by end-2022" and "Change in risk impact by year 10", indicate whether the impact is to significantly increase risk, moderately increase risk, have limited or no impact, moderately decrease risk, or significantly decrease risk by the end of the 3-year WMP term, assuming no implementation of WMP initiatives, and over the longer term. For each, include comments describing expected change and expected impact, using quantitative estimates wherever possible.

Table 10: Directional vision for evolution of risk drivers

Rank order 1-15	Incident type by ignition probability driver	Detailed risk driver	Change in risk impact by end-2022	Change in risk impact by year 10	Comments
	Contact from object	All types of object contact			
		Animal contact			
		Balloon contact			
		Vegetation contact			

		Vehicle contact			
	Equipment / facility failure	All types			
		Capacitor bank failure			
		Conductor failure—all			
		Conductor failure—wires down			
		Fuse failure—all			
		Fuse failure—conventional blown fuse			
		Lightning arrestor failure			
		Switch failure			
		Transformer failure			
	Wire-to-wire contact / contamination				
	Other				

2 Stress tests for PSPS, ignitions, and near misses

2.1 Pre-WMP stress test: Modelled need for PSPS if no additional wildfire mitigation activities implemented

Instructions for Table 11:
Calculate and indicate number of RFW circuit mile days under stress test weather conditions, defined as weather conditions reported for each circuit in the service territory that year that repeat the 5-year historical average of the 95th and 99th percentile wind conditions for that circuit over 2015-2019, including an assumption that a state-wide RFW was in effect each day. Use existing PSPS protocols to determine use of PSPS necessary under such stress test weather conditions:

1. the 5-year historical average of the 95th percentile wind conditions for that circuit over 2015-2019, with a Red Flag Warning in effect each day
2. the 5-year historical average of the 99th percentile wind conditions for that circuit over 2015-2019, with a Red Flag Warning in effect each day

Need for PSPS shall be reported in terms of the number and duration of PSPS events needed each year and normalized across stress test weather conditions (by dividing by the number of RFW circuit mile days). List additional PSPS characteristics tracked in the "other" row and additional rows as needed.

These estimates shall assume no additional wildfire mitigation implementation (i.e., continued business as usual in terms of safety and reliability activities, for example, but without the addition of wildfire-specific measures outlined in the WMP). Ensure underlying data is provided per Section 1.4.

Table 11: Stress test estimate of PSPS required to manage wildfire ignition probability of current baseline system

PSPS characteristic	95th percentile wind conditions	99th percentile wind conditions	Unit(s)
Frequency of PSPS events (total)			Number of instances where utility operating protocol requires de-energization of a circuit or portion thereof in order to reduce ignition probability, per year
Scope of PSPS events (total)			Circuit-events, measured in number of events multiplied by number of circuits targeted for de-energization per year
Duration of PSPS events (total)			Customer hours per year
Other			

2.2 Stress test: Modelled ignitions and near misses assuming 95th and 99th percentile conditions over the 3-year plan term

Instructions for Table 12:

Report modelled number of ignitions and near-misses for the entire service territory, by applying the following stress test assumptions for the weather conditions reported for each circuit in the service territory:

1. the 5-year historical average of the 95th percentile wind conditions for that circuit over 2015-2019, with a Red Flag Warning in effect each day
2. the 5-year historical average of the 99th percentile wind conditions for that circuit over 2015-2019, with a Red Flag Warning in effect each day

Assume no use of PSPS, but take into account implementation of other planned wildfire mitigation initiatives as planned each year and the granularity with which the utility monitors wind conditions. In the "Comments" column, include any other supporting information as needed to clarify the data provided in the below table, such as a description of the calculation or of subject matter expert input.

Table 12: Stress test modelled ignitions and near misses assuming 95th and 99th percentile conditions over the 3-year plan term

Stress test output	95th Observed	95th Expectation			99th Observed	99th Expectation			Unit(s)	Comments
	2019	2020	2021	2022	2019	2020	2021	2022		
Number of ignitions (total)									Number of ignitions	
Number of near misses (total)									Number of near misses	

2.3 Stress test: Modelled use of PSPS assuming 95th and 99th percentile conditions over the 3-year plan term

Instructions for Table 13:

Report modelled use of PSPS for the entire service territory, by applying the following stress test assumptions for the weather conditions reported for each circuit in the service territory:

1. the 5-year historical average of the 95th percentile wind conditions for that circuit over 2015-2019, with a Red Flag Warning in effect each day
2. the 5-year historical average of the 99th percentile wind conditions for that circuit over 2015-2019, with a Red Flag Warning in effect each day

Use existing PSPS methodology and the granularity with which the utility monitors wind conditions, assuming implementation of all planned wildfire mitigation initiatives as planned each year. Also list additional PSPS characteristics tracked in the "other" row and additional rows as needed. In the "Comments" column, include any other supporting information as needed to clarify the data provided in the below table, such as a description of the calculation or of subject matter expert input.

Table 13: Stress test modelled use of PSPS assuming 95th and 99th percentile conditions over the 3-year plan term

PSPS characteristics	95th Observed	95th Expectation			99th Observed	99th Expectation			Unit(s)	Comments
	2019	2020	2021	2022	2019	2020	2021	2022		
Frequency of PSPS events (total)									Number of instances where utility operating protocol requires de-energization of a circuit	

									or portion thereof in order to reduce ignition probability, per year	
Scope of PSPS events (total)									Circuit-events, measured in number of events multiplied by number of circuits targeted for de-energization per year	
Duration of PSPS events (total)									Customer hours per year	
Other										

3 Utility GIS attachments

3.1 Recent weather patterns

3.2 Recent fuel measurements

3.3 Potential impact of ignitions

3.4 Implemented 2019 WMP initiative activity

3.5 Current baseline risk maps

3.6 Result of stress tests as defined in Section 2

4 Other attachments required by utilities

4.1 List of events, last 5 years

4.2 List of wires down, last 5 years

4.3 Detailed information reported by weather station or circuit ID

(END OF ATTACHMENT 5)