SOUTHERN CALIFORNIA EDISON®
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February 10, 2020

VIA Email

Melissa K. Semcer
California Public Utilities Commission
Wildfire Safety Division
melissa.semcer@cpuc.ca.gov

Re: SCE's 2020-2022 Wildfire Mitigation Plan - Utility Wildfire Mitigation Maturity Survey

Dear Ms. Semcer;

Please find attached:

1. Verification for the Utility Wildfire Mitigation Maturity Survey

2. SCE Responses to Utility Wildfire Mitigation Maturity Survey

   SCE has verified the output of our responses. They are correct with one exception: For [**Q.A.IVa**] "How is risk reduction impact estimated?", SCE's response for 3 years from now (by end of year 2022) should be **iii. Approach reliably estimates risk reduction potential of initiatives on an interval scale (e.g. specific quantitative units)**

3. SCE's detailed responses to Utility Wildfire Mitigation Maturity Survey

Thank you,

Shinjini C. Menon
Director of Energy Policy
Southern California Edison
Shinjini.Menon@sce.com

Verification for the Utility Wildfire Mitigation Maturity Survey

Utilities shall complete the following verification, attached to a PDF of their electronic survey responses, following completion of the electronic survey. This document will be shared with the utilities for completion within one business day of completing the electronic survey.

Complete the following verification for the Utility Wildfire Mitigation Maturity Survey 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 responses in the attached survey are true of my own knowledge.

I declare that the foregoing is true and correct.

Executed on 2/10/2020 at Pomona, California.
(Date) (Name of city)

Senior Vice President
(Signature and Title of Corporate Officer)

Utility Wildfire Mitigation Maturity Survey – January 2020

[utility] Utility Southern California Edison

[CONTACT] -Contact Info-

- [CONTACT.r1] Utility Name Southern California Edison
- [CONTACT.r2] Name Shinjini Menon
- [CONTACT.r3] Email Address Shinjini.Menon@sce.com
- [CONTACT.r4] Phone Number 6263023377

[Q.A.Ia] How sophisticated is utility's ability to estimate the risk of weather scenarios

Clarification: Determining wildfire risk requires the utility to understand the probability of ignition and the consequences of such an ignition while taking various conditions into account (e.g., weather, fuel levels, etc.). Categorizing level of risk requires a set of calculations and judgements to group areas by wildfire risk level whereas quantitatively estimating risk refers to accurately quantifying risk on a continuous spectrum based on a host of wildfire risk drivers (e.g., as a function of ignition probability, propagation scenarios, and communities located in the propagation path).

- [Q.A.Ia.r1] Today ii. Wildfire risk can be reliably determined based on weather and its impacts
- [Q.A.Ia.r2] 3 years from now (by end of year 2022) iv. Risk for various weather scenarios can be reliably estimated

[Q.A.Ib] How are scenarios assessed

Clarification: Per the instructions, please only indicate that you meet a given response option if you meet all the characteristics described within that response option). So, hypothetically, if you do support your scenarios assessment by historical data of incidents and near misses and conduct internal assessments, but don't have an independent expert assessment, you would select (ii).

- [Q.A.Ib.r1] Today iii. Independent expert assessment, supported by historical data of incidents and near misses
- [Q.A.Ib.r2] 3 years from now (by end of year 2022) iii. Independent expert assessment, supported by historical data of incidents and near misses

[Q.A.Ic] How granular is utility's ability to model scenarios?

- [Q.A.Ic.r1] Today iii. Circuit-based
- [Q.A.Ic.r2] 3 years from now (by end of year 2022) iii. Circuit-based

[Q.A.Id] How automated is the tool

Clarification: For clarification on level of automation please refer to the 'level of systematization and automation' in Table 2 of the Maturity Model. (i) in this case corresponds to level 0; (ii) corresponds to level 1 or 2; (iii) corresponds to level 3; and (iv) corresponds to level 4

- [Q.A.Id.r1] Today i. Not automated
- [Q.A.Id.r2] 3 years from now (by end of year 2022) ii. Partially (<50%)

[Q.A.Ie] What additional information is used to estimate model weather scenarios and their risk?

- [Q.A.Ie.r1] Today iv. Weather measured at the circuit level, how weather effects failure modes and propagation, existing hardware
- [Q.A.Ie.r2] 3 years from now (by end of year 2022) v. Weather measured at the circuit level, how weather effects failure modes and propagation, existing hardware, level of vegetation

[Q.A.If] To what extent is future change in climate taken into account for future risk estimation?

- [Q.A.If.r1] Today i. Future climate change not accounted for in estimating future weather and resulting risk

- [Q.A.If.r2] 3 years from now (by end of year 2022) iv. Modeling with multiple scenarios used to estimate effects of a changing climate on future weather and risk, taking into account difference in geography and vegetation, and considering increase in extreme weather event frequency

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[Q.A.IIa] How is ignition risk calculated?

- [Q.A.IIa.r1] Today 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
- [Q.A.IIa.r2] 3 years from now (by end of year 2022) 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

[Q.A.IIb] How automated is the ignition risk calculation tool

Clarification: For clarification on level of automation please refer to the 'level of systematization and automation' in Table 2 of the Maturity Model. (i) in this case corresponds to level 0; (ii) corresponds to level 1 or 2; (iii) corresponds to level 3; and (iv) corresponds to level 4

- [Q.A.IIb.r1] Today ii. Partially (<50%)
- [Q.A.IIb.r2] 3 years from now (by end of year 2022) ii. Partially (<50%)

[Q.A.IIc] How granular is the tool?

- [Q.A.IIc.r1] Today v. Asset-based
- [Q.A.IIc.r2] 3 years from now (by end of year 2022) v. Asset-based

[Q.A.IId.r1] Today - How is risk assessment confirmed? Select all that apply.

- [Q.A.IIdr1c1] i. By experts (yes)
- [Q.A.IIdr1c2] ii. By historical data (yes)

[Q.A.IId.r2] 3 years from now (by end of year 2022) - How is risk assessment confirmed? Select all that apply.

- [Q.A.IIdr2c1] i. By experts (yes)
- [Q.A.IIdr2c2] ii. By historical data (yes)

[Q.A.IIe] What confidence interval, in percent, does the utility use in its wildfire risk assessments?

- [Q.A.IIe.r1] Today iv. >95%
- [Q.A.IIe.r2] 3 years from now (by end of year 2022) iv. >95%

[Q.A.IIIa] How is estimated consequence of ignition relayed?

- [Q.A.IIIa.r1] Today iv. Consequence of ignition events quantitatively, accurately, and precisely estimated
- [Q.A.IIIa.r2] 3 years from now (by end of year 2022) iv. Consequence of ignition events quantitatively, accurately, and precisely estimated

[Q.A.IIIb] What metrics are used to estimate the consequence of ignition risk?

- [Q.A.IIIb.r1] Today ii. As a function of at least potential fatalities, and one or both of structures burned, or area burned
- [Q.A.IIIb.r2] 3 years from now (by end of year 2022) ii. As a function of at least potential fatalities, and one or both of structures burned, or area burned

[Q.A.IIIc] Is the ignition risk impact analysis available for all seasons?

- [Q.A.IIIc.r1] Today i. No
- [Q.A.IIIc.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.A.IIId] How automated is the ignition risk estimation process

Clarification: For clarification on level of automation please refer to the 'level of systematization and automation' in Table 2 of the Maturity Model. (i) in this case corresponds to level 0; (ii) corresponds to level 1 or 2; (iii) corresponds to level 3; and (iv) corresponds to level 4

- [Q.A.IIId.r1] Today i. Not automated
- [Q.A.IIId.r2] 3 years from now (by end of year 2022) ii. Partially (<50%)

[Q.A.IIIe] How granular is the ignition risk estimation process?

- [Q.A.IIIe.r1] Today v. Asset-based
- [Q.A.IIIe.r2] 3 years from now (by end of year 2022) v. Asset-based

[Q.A.IIIf] How are the outputs of the ignition risk impact assessment tool evaluated?

- [Q.A.IIIf.r1] Today iii. Outputs independently assessed by experts and confirmed by historical data
- [Q.A.IIIf.r2] 3 years from now (by end of year 2022) iv. Outputs independently assessed by experts and confirmed based on real time learning, for example, using machine learning

[Q.A.IIIg] What other inputs are used to estimate impact?

- [Q.A.IIIg.r1] Today i. Level and conditions of vegetation and weather
- [Q.A.IIIg.r2] 3 years from now (by end of year 2022) iii. Level and conditions of vegetation and weather, including the vegetation specifies immediately surrounding the ignition site and up-to-date moisture content, local weather patterns

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[Q.A.IVa] How is risk reduction impact estimated?

- [Q.A.IVa.r1] Today ii. Approach accurately estimates risk reduction potential of initiatives categorically (e.g. High, Medium, Low)
- [Q.A.IVa.r2] 3 years from now (by end of year 2022) iv. Approach reliably estimates risk reduction potential of initiatives on an interval scale (e.g. specific quantitative units) with a quantitative confidence interval

[Q.A.IVb] How automated is your ignition risk reduction impact assessment tool

Clarification: For clarification on level of automation please refer to the 'level of systematization and automation' in Table 2 of the Maturity Model. (i) in this case corresponds to level 0; (ii) corresponds to level 1 or 2; (iii) corresponds to level 3; and (iv) corresponds to level 4

- [Q.A.IVb.r1] Today ii. Partially (<50%)
- [Q.A.IVb.r2] 3 years from now (by end of year 2022) ii. Partially (<50%)

[Q.A.IVc] How granular is the ignition risk reduction impact assessment tool?

- [Q.A.IVc.r1] Today ii. Regional
- [Q.A.IVc.r2] 3 years from now (by end of year 2022) v. Asset-based

[Q.A.IVd] How are ignition risk reduction impact assessment tool estimates assessed?

- [Q.A.IVd.r1] Today iii. Independent expert assessment
- [Q.A.IVd.r2] 3 years from now (by end of year 2022) iii. Independent expert assessment

[Q.A.IVe] What additional information is used to estimate risk reduction impact?

- [Q.A.IVe.r1] Today iii. Existing hardware type and condition, including operating history
- [Q.A.IVe.r2] 3 years from now (by end of year 2022) v. Existing hardware type and condition, including operating history; level and condition of vegetation; weather; and combination of initiatives already deployed

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[Q.A.Va] What is the protocol to update risk mapping algorithms?

- [Q.A.Va.r1] Today ii. Risk mapping algorithms updated based on detected deviations of risk model to ignitions and propagation
- [Q.A.Va.r2] 3 years from now (by end of year 2022) ii. Risk mapping algorithms updated based on detected deviations of risk model to ignitions and propagation

[Q.A.Vb] How automated is the mechanism to determine whether to update algorithms based on deviations
Clarification: For clarification on level of automation please refer to the 'level of systematization and automation' in Table 2 of the Maturity Model. (i) in this case corresponds to level 0; (ii) corresponds to level 1 or 2; (iii) corresponds to level 3; and (iv) corresponds to level 4

- [Q.A.Vb.r1] Today i. Not automated
- [Q.A.Vb.r2] 3 years from now (by end of year 2022) i. Not automated

[Q.A.Vc] How are deviations from risk model to ignitions and propagation detected?

- [Q.A.Vc.r1] Today ii. Manually
- [Q.A.Vc.r2] 3 years from now (by end of year 2022) ii. Manually

[Q.A.Vd] How are decisions to update algorithms evaluated?

- [Q.A.Vd.r1] Today iii. Independently evaluated by experts and historical data
- [Q.A.Vd.r2] 3 years from now (by end of year 2022) iii. Independently evaluated by experts and historical data

[Q.A.Ve] What other data is used to make decisions on whether to update algorithms?

- [Q.A.Ve.r1] Today iii. Current and historic ignition and propagation data; near-miss data
- [Q.A.Ve.r2] 3 years from now (by end of year 2022) iv. Current and historic ignition and propagation data; near-miss data; data from other utilities and other sources

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[Q.B.Ia] What weather data is currently collected?

- [Q.B.Ia.r1] Today iii. Range of accurate weather variables (e.g. humidity, precipitation, surface and atmospheric wind conditions) that impact probability of ignition and propagation from utility assets
- [Q.B.Ia.r2] 3 years from now (by end of year 2022) iii. Range of accurate weather variables (e.g. humidity, precipitation, surface and atmospheric wind conditions) that impact probability of ignition and propagation from utility assets

[Q.B.Ib] How are measurements validated?

- [Q.B.Ib.r1] Today ii. Manual field calibration measurements
- [Q.B.Ib.r2] 3 years from now (by end of year 2022) ii. Manual field calibration measurements

[Q.B.Ic] Are elements that cannot be reliably measured in real time being predicted (e.g., fuel moisture content)?

- [Q.B.Ic.r1] Today ii. Yes
- [Q.B.Ic.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.B.Id] How many sources are being used to provide data on weather metrics being collected?

- [Q.B.Id.r1] Today iii. More than one
- [Q.B.Id.r2] 3 years from now (by end of year 2022) iii. More than one

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[Q.B.IIa] How granular is the weather data that is collected?

- [Q.B.IIa.r1] Today ii. Weather data has sufficient granularity to reliably measure weather conditions in HFTD areas

- [Q.B.IIa.r2] 3 years from now (by end of year 2022) ii. Weather data has sufficient granularity to reliably measure weather conditions in HFTD areas

[Q.B.IIb] How frequently is data gathered?

- [Q.B.IIb.r1] Today iv. At least six times per hour
- [Q.B.IIb.r2] 3 years from now (by end of year 2022) iv. At least six times per hour

[Q.B.IIc] How granular is the tool?

- [Q.B.IIc.r1] Today iii. Circuit-based
- [Q.B.IIc.r2] 3 years from now (by end of year 2022) iii. Circuit-based

[Q.B.IId] How automated is the process to measure weather conditions

Clarification: For clarification on level of automation please refer to the 'level of systematization and automation' in Table 2 of the Maturity Model. (i) in this case corresponds to level 0; (ii) corresponds to level 1 or 2; (iii) corresponds to level 3; and (iv) corresponds to level 4

- [Q.B.IId.r1] Today iv. Fully
- [Q.B.IId.r2] 3 years from now (by end of year 2022) iv. Fully

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[Q.B.IIIa] How sophisticated is the utility's weather forecasting capability?

- [Q.B.IIIa.r1] Today iii. Utility has the ability to use a combination of accurate weather stations and external weather data to make accurate forecasts
- [Q.B.IIIa.r2] 3 years from now (by end of year 2022) iii. Utility has the ability to use a combination of accurate weather stations and external weather data to make accurate forecasts

[Q.B.IIIb] How far in advance can accurate forecasts be prepared?

- [Q.B.IIIb.r1] Today i. Less than two weeks in advance
- [Q.B.IIIb.r2] 3 years from now (by end of year 2022) i. Less than two weeks in advance

[Q.B.IIIc] At what level of granularity can forecasts be prepared?

- [Q.B.IIIc.r1] Today iii. Circuit-based
- [Q.B.IIIc.r2] 3 years from now (by end of year 2022) iii. Circuit-based

[Q.B.IIId] How are results error-checked?

- [Q.B.IIId.r1] Today iii. Criteria for option (ii) met, and forecasted results are subsequently error checked against measured weather data
- [Q.B.IIId.r2] 3 years from now (by end of year 2022) iii. Criteria for option (ii) met, and forecasted results are subsequently error checked against measured weather data

[Q.B.IIIe] How automated is the forecast process

Clarification: For clarification on level of automation please refer to the 'level of systematization and automation' in Table 2 of the Maturity Model. (i) in this case corresponds to level 0; (ii) corresponds to level 1 or 2; (iii) corresponds to level 3; and (iv) corresponds to level 4

- [Q.B.IIIe.r1] Today iii. Mostly (>=50%)
- [Q.B.IIIe.r2] 3 years from now (by end of year 2022) iii. Mostly (>=50%)

[Q.B.IVa] What source does the utility use for weather data?

- [Q.B.IVa.r1] Today 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
- [Q.B.IVa.r2] 3 years from now (by end of year 2022) 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

[Q.B.IVb] How is weather station data checked for errors?

- [Q.B.IVb.r1] Today ii. Mostly manual processes for error checking weather stations with external data sources
- [Q.B.IVb.r2] 3 years from now (by end of year 2022) ii. Mostly manual processes for error checking weather stations with external data sources

[Q.B.IVc] For what is weather data used?

- [Q.B.IVc.r1] Today iii. Weather data is used to create a single visual and configurable live map that can be used to help make decisions
- [Q.B.IVc.r2] 3 years from now (by end of year 2022) iii. Weather data is used to create a single visual and configurable live map that can be used to help make decisions

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[Q.B.Va] Are there well-defined procedures for detecting ignitions along the grid?

- [Q.B.Va.r1] Today ii. Yes
- [Q.B.Va.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.B.Vb] What equipment is used to detect ignitions?

- [Q.B.Vb.r1] Today iii. Well-defined equipment for detecting ignitions along grid, including remote detection equipment including cameras
- [Q.B.Vb.r2] 3 years from now (by end of year 2022) iii. Well-defined equipment for detecting ignitions along grid, including remote detection equipment including cameras

[Q.B.Vc] How is information on detected ignitions reported?

- [Q.B.Vc.r1] Today iii. Procedure exists for notifying suppression forces and key stakeholders
- [Q.B.Vc.r2] 3 years from now (by end of year 2022) iii. Procedure exists for notifying suppression forces and key stakeholders

[Q.B.Vd] What role does ignition detection software play in wildfire detection?

- [Q.B.Vd.r1] Today i. Ignition detection software not currently deployed
- [Q.B.Vd.r2] 3 years from now (by end of year 2022) i. Ignition detection software not currently deployed

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[Q.C.Ia] How are wildfire risk reduction initiatives prioritized?

- [Q.C.Ia.r1] Today iv. Plan prioritizes wildfire risk reduction initiatives at the span level based on i) risk modeling driven by local geography and climate/weather conditions, fuel loads and moisture content and topography ii) detailed wildfire and PSPS risk simulations across individual circuits
- [Q.C.Ia.r2] 3 years from now (by end of year 2022) v. Plan prioritizes wildfire risk reduction initiatives at the asset level based on i) risk modeling driven by local geography and climate/weather conditions, fuel loads and moisture content and topography ii) risk estimates across individual circuits, including estimates of actual consequence, and iii) taking power delivery uptime into account (e.g. reliability, PSPS, etc.)

[Q.C.IIa] Does grid design meet minimum G095 requirements and loading standards in HFTD areas?

- [Q.C.IIa.r1] Today ii. Yes
- [Q.C.IIa.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.C.IIb] Does the utility provide micro grids or islanding where traditional grid infrastructure is impracticable and wildfire risk is high?

- [Q.C.IIb.r1] Today i. No

- [Q.C.IIb.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.C.IIc] Does routing of new portions of the grid take wildfire risk into account?
- [Q.C.IIc.r1] Today ii. No
- [Q.C.IIc.r2] 3 years from now (by end of year 2022) ii. No

[Q.C.IId] Are efforts made to incorporate the latest asset management strategies and new technologies into grid topology?
- [Q.C.IId.r1] Today iii. Yes, across the entire service area
- [Q.C.IId.r2] 3 years from now (by end of year 2022) iii. Yes, across the entire service area

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[Q.C.IIIa] What level of redundancy does the utility's transmission architecture have?
- [Q.C.IIIa.r1] Today ii. n-1 redundancy for all circuits subject to PSPS
- [Q.C.IIIa.r2] 3 years from now (by end of year 2022) ii. n-1 redundancy for all circuits subject to PSPS

[Q.C.IIIb] What level of redundancy does the utility's distribution architecture have?
- [Q.C.IIIb.r1] Today ii. n-1 redundancy covering at least 50% of customers in HFTD
- [Q.C.IIIb.r2] 3 years from now (by end of year 2022) ii. n-1 redundancy covering at least 50% of customers in HFTD

[Q.C.IIIc] What level of sectionalization does the utility's distribution architecture have?
- [Q.C.IIIc.r1] Today v. Switches in HFTD areas to individually isolate circuits, such that no more than 200 customers sit within one switch
- [Q.C.IIIc.r2] 3 years from now (by end of year 2022) v. Switches in HFTD areas to individually isolate circuits, such that no more than 200 customers sit within one switch

[Q.C.IIId] How does the utility consider egress points in its grid topology?
- [Q.C.IIId.r1] Today i. Does not consider
- [Q.C.IIId.r2] 3 years from now (by end of year 2022) i. Does not consider

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[Q.C.IVa] Does the utility have an understanding of the risk spend efficiency of hardening initiatives
Clarification: 'Hardening initiatives' refers to all initiatives implemented by utility or by other utilities in California
- [Q.C.IVa.r1] Today ii. Utility has an accurate understanding of the relative cost and effectiveness of different initiatives
- [Q.C.IVa.r2] 3 years from now (by end of year 2022) 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

[Q.C.IVb] At what level can estimates be prepared?
- [Q.C.IVb.r1] Today ii. Regional

- [Q.C.IVb.r2] 3 years from now (by end of year 2022) v. Asset-based

[Q.C.IVc] How frequently are estimates updated?
- [Q.C.IVc.r1] Today iii. Annually or more frequently
- [Q.C.IVc.r2] 3 years from now (by end of year 2022) iii. Annually or more frequently

[Q.C.IVd] What grid hardening initiatives does the utility include within its evaluation
Clarification: 'All Hardening initiatives' refers to all initiatives implemented by utility or by other utilities in California

- [Q.C.IVd.r1] Today iii. Most
- [Q.C.IVd.r2] 3 years from now (by end of year 2022) iii. Most

[Q.C.IVe] Can the utility evaluate risk reduction synergies from combination of various initiatives?
- [Q.C.IVe.r1] Today i. No
- [Q.C.IVe.r2] 3 years from now (by end of year 2022) ii. Yes

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[Q.C.Va] How are new hardening solution initiatives evaluated?
- [Q.C.Va.r1] Today iii. New initiatives evaluated based on installation into grid and measuring direct reduction in ignition events, and measuring reduction impact on near-miss metrics
- [Q.C.Va.r2] 3 years from now (by end of year 2022) iii. New initiatives evaluated based on installation into grid and measuring direct reduction in ignition events, and measuring reduction impact on near-miss metrics

[Q.C.Vb] Are results of pilot and commercial deployments, including project performance, project cost, geography, climate, vegetation etc. shared in sufficient detail to inform decision making at other utilities?
- [Q.C.Vb.r1] Today ii. Yes, with a limited set of partners
- [Q.C.Vb.r2] 3 years from now (by end of year 2022) ii. Yes, with a limited set of partners

[Q.C.Vc] Is performance of new initiatives independently audited?
- [Q.C.Vc.r1] Today i. No
- [Q.C.Vc.r2] 3 years from now (by end of year 2022) i. No

[Q.D.Ia] What information is captured in the equipment inventory database?
- [Q.D.Ia.r1] Today 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
- [Q.D.Ia.r2] 3 years from now (by end of year 2022) 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

[Q.D.Ib] How frequently is the condition assessment updated?
- [Q.D.Ib.r1] Today iv. Monthly
- [Q.D.Ib.r2] 3 years from now (by end of year 2022) iv. Monthly

[Q.D.Ic] Does all equipment in HFTD areas have the ability to detect and respond to malfunctions?
- [Q.D.Ic.r1] Today ii. A system and approach are in place to reliably detect incipient malfunctions likely to cause ignition
- [Q.D.Ic.r2] 3 years from now (by end of year 2022) iii. Sensorized, continuous monitoring equipment is in place to determine the state of equipment and reliably detect incipient malfunctions likely to cause ignition

[Q.D.Id] How granular is the inventory?
- [Q.D.Id.r1] Today iii. At the asset level
- [Q.D.Id.r2] 3 years from now (by end of year 2022) iii. At the asset level

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[Q.D.IIa] How frequent are your patrol inspections?
- [Q.D.IIa.r1] Today iii. Above minimum regulatory requirements, with more frequent inspections for highest risk equipment

- [Q.D.IIa.r2] 3 years from now (by end of year 2022) iii. Above minimum regulatory requirements, with more frequent inspections for highest risk equipment

[Q.D.IIb] How are patrol inspections scheduled?
- [Q.D.IIb.r1] Today i. Based on annual or periodic schedules
- [Q.D.IIb.r2] 3 years from now (by end of year 2022) i. Based on annual or periodic schedules

[Q.D.IIc] What are the inputs to scheduling patrol inspections?
- [Q.D.IIc.r1] Today i. At least annually updated or verified static maps of equipment and environment
- [Q.D.IIc.r2] 3 years from now (by end of year 2022) i. At least annually updated or verified static maps of equipment and environment

[Q.D.IId] How frequent are detailed inspections?
- [Q.D.IId.r1] Today iii. Above minimum regulatory requirements, with more frequent inspections for highest risk equipment
- [Q.D.IId.r2] 3 years from now (by end of year 2022) iii. Above minimum regulatory requirements, with more frequent inspections for highest risk equipment

[Q.D.IIe] How are detailed inspections scheduled?
- [Q.D.IIe.r1] Today iii. Risk, as determined by predictive modeling of equipment failure probability and risk causing ignition
- [Q.D.IIe.r2] 3 years from now (by end of year 2022) iii. Risk, as determined by predictive modeling of equipment failure probability and risk causing ignition

[Q.D.IIf] What are the inputs to scheduling detailed inspections?
- [Q.D.IIf.r1] Today ii. Predictive modeling of equipment failure probability and risk
- [Q.D.IIf.r2] 3 years from now (by end of year 2022) ii. Predictive modeling of equipment failure probability and risk

[Q.D.IIg] How frequent are your other inspections?
- [Q.D.IIg.r1] Today iii. Above minimum regulatory requirements, with more frequent inspections for highest risk equipment
- [Q.D.IIg.r2] 3 years from now (by end of year 2022) iii. Above minimum regulatory requirements, with more frequent inspections for highest risk equipment

[Q.D.IIh] How are other inspections scheduled?
- [Q.D.IIh.r1] Today i. Based on annual or periodic schedules
- [Q.D.IIh.r2] 3 years from now (by end of year 2022) i. Based on annual or periodic schedules

[Q.D.IIi] What are the inputs to scheduling other inspections?
- [Q.D.IIi.r1] Today i. At least annually updated or verified static maps of equipment and environment
- [Q.D.IIi.r2] 3 years from now (by end of year 2022) i. At least annually updated or verified static maps of equipment and environment

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[Q.D.IIIa] What items are captured within inspection procedures and checklists?
- [Q.D.IIIa.r1] Today 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
- [Q.D.IIIa.r2] 3 years from now (by end of year 2022) 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

[Q.D.IIIb] How are procedures and checklists determined?

- [Q.D.IIIb.r1] Today ii. Based on predictive modeling based on vegetation and equipment type, age, and condition
- [Q.D.IIIb.r2] 3 years from now (by end of year 2022) ii. Based on predictive modeling based on vegetation and equipment type, age, and condition

[Q.D.IIIc] At what level of granularity are the depth of checklists, training, and procedures customized?

- [Q.D.IIIc.r1] Today i. Across the service territory
- [Q.D.IIIc.r2] 3 years from now (by end of year 2022) i. Across the service territory

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[Q.D.IVa] What level are electrical lines and equipment maintained at?

- [Q.D.IVa.r1] Today 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
- [Q.D.IVa.r2] 3 years from now (by end of year 2022) 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

[Q.D.IVb] How are service intervals set?

- [Q.D.IVb.r1] Today i. Based on wildfire risk in relevant area
- [Q.D.IVb.r2] 3 years from now (by end of year 2022) ii. Based on wildfire risk in relevant circuit

[Q.D.IVc] What do maintenance and repair procedures take into account?

- [Q.D.IVc.r1] Today ii. Wildfire risk, performance history, and past operating conditions
- [Q.D.IVc.r2] 3 years from now (by end of year 2022) ii. Wildfire risk, performance history, and past operating conditions

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[Q.D.Va] How is contractor activity audited?

- [Q.D.Va.r1] Today ii. Through an established and functioning audit process to manage and confirm work completed by subcontractors
- [Q.D.Va.r2] 3 years from now (by end of year 2022) ii. Through an established and functioning audit process to manage and confirm work completed by subcontractors

[Q.D.Vb] Do contractors follow the same processes and standards as utility's own employees?

- [Q.D.Vb.r1] Today ii. Yes
- [Q.D.Vb.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.D.Vc] How frequently is QA/QC information used to identify deficiencies in quality of work performance and inspections performance?

- [Q.D.Vc.r1] Today iv. Regularly
- [Q.D.Vc.r2] 3 years from now (by end of year 2022) iv. Regularly

[Q.D.Vd] How are work and inspections that do not meet utility-prescribed standards remediated?

- [Q.D.Vd.r1] Today ii. QA/QC information is used to identify systemic deficiencies in quality of work and inspections
- [Q.D.Vd.r2] 3 years from now (by end of year 2022) iii. QA/QC information is used to identify systemic deficiencies in quality of work and inspections, and recommend training based on weaknesses

[Q.D.Ve] Are workforce management software tools used to manage and confirm work completed by subcontractors?

- [Q.D.Ve.r1] Today ii. Yes
- [Q.D.Ve.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.E.Ia] What information is captured in the inventory?

- [Q.E.Ia.r1] Today iv. Centralized inventory of vegetation clearances, including individual vegetation species and their expected growth rate, as well as individual high risk-trees across grid
- [Q.E.Ia.r2] 3 years from now (by end of year 2022) iv. Centralized inventory of vegetation clearances, including individual vegetation species and their expected growth rate, as well as individual high risk-trees across grid

[Q.E.Ib] How frequently is inventory updated?

- [Q.E.Ib.r1] Today v. Within 1 day of collection
- [Q.E.Ib.r2] 3 years from now (by end of year 2022) v. Within 1 day of collection

[Q.E.Ic] Are inspections independently verified by third party experts?

- [Q.E.Ic.r1] Today ii. Yes
- [Q.E.Ic.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.E.Id] How granular is the inventory?

- [Q.E.Id.r1] Today iv. Asset-based
- [Q.E.Id.r2] 3 years from now (by end of year 2022) iv. Asset-based

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[Q.E.IIa] How frequent are all types of vegetation inspections?

- [Q.E.IIa.r1] Today iii. Above minimum regulatory requirements, with more frequent inspections for highest risk areas
- [Q.E.IIa.r2] 3 years from now (by end of year 2022) iii. Above minimum regulatory requirements, with more frequent inspections for highest risk areas

[Q.E.IIb] How are vegetation inspections scheduled?

- [Q.E.IIb.r1] Today ii. Based on up-to-date static maps of predominant vegetation species and environment
- [Q.E.IIb.r2] 3 years from now (by end of year 2022) ii. Based on up-to-date static maps of predominant vegetation species and environment

[Q.E.IIc] What are the inputs to scheduling vegetation inspections?

- [Q.E.IIc.r1] Today ii. Up to date, static maps of vegetation and environment, as well as data on annual growing conditions
- [Q.E.IIc.r2] 3 years from now (by end of year 2022) ii. Up to date, static maps of vegetation and environment, as well as data on annual growing conditions

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[Q.E.IIIa] What items are captured within inspection procedures and checklists?

- [Q.E.IIIa.r1] Today 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
- [Q.E.IIIa.r2] 3 years from now (by end of year 2022) 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

[Q.E.IIIb] How are procedures and checklists determined?

- [Q.E.IIIb.r1] Today ii. Based on predictive modeling based on vegetation and equipment type, age, and condition
- [Q.E.IIIb.r2] 3 years from now (by end of year 2022) ii. Based on predictive modeling based on vegetation and equipment type, age, and condition

[Q.E.IIIc] At what level of granularity are the depth of checklists, training, and procedures customized?

- [Q.E.IIIc.r1] Today ii. Across a region
- [Q.E.IIIc.r2] 3 years from now (by end of year 2022) ii. Across a region

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[Q.E.IVa] How does utility clearance around lines and equipment perform relative to expected standards?

- [Q.E.IVa.r1] Today ii. Utility meet minimum statutory and regulatory clearances around all lines and equipment
- [Q.E.IVa.r2] 3 years from now (by end of year 2022) ii. Utility meet minimum statutory and regulatory clearances around all lines and equipment

[Q.E.IVb] Does utility meet or exceed minimum statutory or regulatory clearances during all seasons?

- [Q.E.IVb.r1] Today ii. Yes
- [Q.E.IVb.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.E.IVc] What modeling is used to guide clearances around lines and equipment?

- [Q.E.IVc.r1] Today ii. Ignition and propagation risk modeling
- [Q.E.IVc.r2] 3 years from now (by end of year 2022) ii. Ignition and propagation risk modeling

[Q.E.IVd] What biological modeling is used to guide clearance around lines and equipment?

- [Q.E.IVd.r1] Today ii. Species growth rates and species limb failure rates, cross referenced with local climatological conditions
- [Q.E.IVd.r2] 3 years from now (by end of year 2022) ii. Species growth rates and species limb failure rates, cross referenced with local climatological conditions

[Q.E.IVe] Are community organizations engaged in setting local clearances and protocols?

- [Q.E.IVe.r1] Today ii. Yes
- [Q.E.IVe.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.E.IVf] Does the utility remove vegetation waste along its right of way across the entire grid?

- [Q.E.IVf.r1] Today ii. Yes
- [Q.E.IVf.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.E.IVg] How long after cutting vegetation does the utility remove vegetation waste along right of way?

- [Q.E.IVg.r1] Today iv. On the same day
- [Q.E.IVg.r2] 3 years from now (by end of year 2022) iv. On the same day

[Q.E.IVh] Does the utility work with local landowners to provide a cost-effective use for cutting vegetation?

- [Q.E.IVh.r1] Today i. No
- [Q.E.IVh.r2] 3 years from now (by end of year 2022) i. No

[Q.E.IVi] Does the utility work with partners to identify new cost-effective uses for vegetation, taking into consideration environmental impacts and emissions of vegetation waste?

- [Q.E.IVi.r1] Today i. No
- [Q.E.IVi.r2] 3 years from now (by end of year 2022) i. No

[Q.E.Va] Does the utility have a process for treating vegetation outside of right of ways?

- [Q.E.Va.r1] Today iv. Utility systematically removes vegetation outside of right of way, informing relevant communities of removal
- [Q.E.Va.r2] 3 years from now (by end of year 2022) iv. Utility systematically removes vegetation outside of right of way, informing relevant communities of removal

[Q.E.Vb] How is potential vegetation that may pose a threat identified?

- [Q.E.Vb.r1] Today 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
- [Q.E.Vb.r2] 3 years from now (by end of year 2022) 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

[Q.E.Vc] Is vegetation removed with cooperation from the community?

- [Q.E.Vc.r1] Today ii. Yes
- [Q.E.Vc.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.E.Vd] Does the utility remove vegetation waste outside its right of way across the entire grid?

- [Q.E.Vd.r1] Today ii. Yes
- [Q.E.Vd.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.E.Ve] How long after cutting vegetation does the utility remove vegetation waste outside its right of way?

- [Q.E.Ve.r1] Today iv. On the same day
- [Q.E.Ve.r2] 3 years from now (by end of year 2022) iv. On the same day

[Q.E.Vf] Does the utility work with local landowners to provide a cost-effective use for cutting vegetation?

- [Q.E.Vf.r1] Today i. No
- [Q.E.Vf.r2] 3 years from now (by end of year 2022) i. No

[Q.E.Vg] Does the utility work with partners to identify new cost-effective uses for vegetation, taking into consideration environmental impacts and emissions of vegetation waste?

- [Q.E.Vg.r1] Today i. No
- [Q.E.Vg.r2] 3 years from now (by end of year 2022) i. No

[Q.E.VIa] How is contractor and employee activity audited?

- [Q.E.VIa.r1] Today ii. Through an established and functioning audit process to manage and confirm work completed by subcontractors
- [Q.E.VIa.r2] 3 years from now (by end of year 2022) ii. Through an established and functioning audit process to manage and confirm work completed by subcontractors

[Q.E.VIb] Do contractors follow the same processes and standards as utility's own employees?

- [Q.E.VIb.r1] Today ii. Yes
- [Q.E.VIb.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.E.VIc] How frequently is QA/QC information used to identify deficiencies in quality of work performance and inspections performance?

- [Q.E.VIc.r1] Today iv. Regularly
- [Q.E.VIc.r2] 3 years from now (by end of year 2022) iv. Regularly

[Q.E.VId] How is work and inspections that do not meet utility-prescribed standards remediated?

- [Q.E.VId.r1] Today ii. QA/QC information is used to identify systemic deficiencies in quality of work and inspections
- [Q.E.VId.r2] 3 years from now (by end of year 2022) iii. QA/QC information is used to identify systemic deficiencies in quality of work and inspections, and recommend training based on weaknesses

[Q.E.VIe] Are workforce management software tools used to manage and confirm work completed by subcontractors?

- [Q.E.VIe.r1] Today ii. Yes
- [Q.E.VIe.r2] 3 years from now (by end of year 2022) ii. Yes

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[Q.F.Ia] How are grid elements adjusted during high threat weather conditions?

- [Q.F.Ia.r1] Today iv. Utility increases sensitivity of risk reduction elements during high threat weather conditions based on risk mapping and monitors near misses
- [Q.F.Ia.r2] 3 years from now (by end of year 2022) iv. Utility increases sensitivity of risk reduction elements during high threat weather conditions based on risk mapping and monitors near misses

[Q.F.Ib] Is there an automated process for adjusting sensitivity of grid elements and evaluating effectiveness

Clarification: For clarification on level of automation please refer to the 'level of systematization and automation' in Table 2 of the Maturity Model. (i) in this case corresponds to level 0; (ii) corresponds to level 1 or 2; (iii) corresponds to level 3 or 4

- [Q.F.Ib.r1] Today ii. Partially automated process
- [Q.F.Ib.r2] 3 years from now (by end of year 2022) ii. Partially automated process

[Q.F.Ic] Is there a predetermined protocol driven by fire conditions for adjusting sensitivity of grid elements?

- [Q.F.Ic.r1] Today ii. Yes
- [Q.F.Ic.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.F.IIa] Does the utility have a clearly explained process for determining whether to operate the grid beyond current or voltage designs?

- [Q.F.IIa.r1] Today ii. Yes
- [Q.F.IIa.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.F.IIb] Does the utility have systems in place to automatically track operation history including current, loads, and voltage throughout the grid at the circuit level?

- [Q.F.IIb.r1] Today ii. Yes
- [Q.F.IIb.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.F.IIc] Does the utility use predictive modeling to estimate the expected life and make equipment maintenance, rebuild, or replacement decisions based on grid operating history, and is that model reviewed?

- [Q.F.IIc.r1] Today ii. Modeling is used, but not evaluated by external experts
- [Q.F.IIc.r2] 3 years from now (by end of year 2022) ii. Modeling is used, but not evaluated by external experts

[Q.F.IId] When does the utility operate the grid above rated voltage and current load?

- [Q.F.IId.r1] Today iii. Never
- [Q.F.IId.r2] 3 years from now (by end of year 2022) iii. Never

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[Q.F.IIIa] How effective is PSPS event forecasting?

- [Q.F.IIIa.r1] Today iv. PSPS event generally forecasted accurately with fewer than 25% of predictions being false positives
- [Q.F.IIIa.r2] 3 years from now (by end of year 2022) iv. PSPS event generally forecasted accurately with fewer than 25% of predictions being false positives

[Q.F.IIIb] What share of customers are communicated to regarding forecasted PSPS events?

- [Q.F.IIIb.r1] Today ii. PSPS event are communicated to >95% of affected customers and >99% of medical baseline customers in advance of PSPS action
- [Q.F.IIIb.r2] 3 years from now (by end of year 2022) v. PSPS event are communicated to >99.9% of affected customers and 100% of medical baseline customers in advance of PSPS action

[Q.F.IIIc] During PSPS events, what percent of customers complain?

- [Q.F.IIIc.r1] Today iii. Less than 0.5%
- [Q.F.IIIc.r2] 3 years from now (by end of year 2022) iii. Less than 0.5%

[Q.F.IIId] During PSPS events, does the utility's website go down?

- [Q.F.IIId.r1] Today i. No
- [Q.F.IIId.r2] 3 years from now (by end of year 2022) i. No

[Q.F.IIIe] During PSPS events, what is the average downtime per customer?

- [Q.F.IIIe.r1] Today ii. Less than 1 hour
- [Q.F.IIIe.r2] 3 years from now (by end of year 2022) iii. Less than 0.5 hours

[Q.F.IIIf] Are specific resources provided to all affected customers to alleviate the impact of the power shutoff (e.g., providing backup generators, supplies, batteries, etc.)?

- [Q.F.IIIf.r1] Today ii. Yes
- [Q.F.IIIf.r2] 3 years from now (by end of year 2022) ii. Yes

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[Q.F.IVa] Does the utility have explicit thresholds for activating a PSPS?

- [Q.F.IVa.r1] Today ii. Utility has explicit policies and explanation for the thresholds above which PSPS is activated as a measure of last resort
- [Q.F.IVa.r2] 3 years from now (by end of year 2022) ii. Utility has explicit policies and explanation for the thresholds above which PSPS is activated as a measure of last resort

[Q.F.IVb.r1] Today - Which of the following does the utility take into account when making PSPS decisions? Select all that apply.

- [Q.F.IVbr1c1] i. SME opinion (yes)
- [Q.F.IVbr1c2] ii. A partially automated system which recommends circuits for which PSPS should be activated and is validated by SMEs (yes)

[Q.F.IVb.r2] 3 years from now (by end of year 2022) - Which of the following does the utility take into account when making PSPS decisions? Select all that apply.

- [Q.F.IVbr2c1] i. SME opinion (yes)
- [Q.F.IVbr2c2] ii. A partially automated system which recommends circuits for which PSPS should be activated and is validated by SMEs (yes)

[Q.F.IVc.r1] Today - Under which circumstances does the utility de-energize circuits? Select all that apply.

- [Q.F.IVcr1c1] i. Upon detection of damaged conditions of electric equipment (yes)
- [Q.F.IVcr1c2] ii. When circuit presents a safety risk to suppression or other personnel (yes)

- [Q.F.IVcr1c3] iii. When equipment has come into contact with foreign objects posing ignition risk (yes)
- [Q.F.IVcr1c4] iv. Additional reasons not listed (yes)

[Q.F.IVc.r2] 3 years from now (by end of year 2022) - Under which circumstances does the utility de-energize circuits? Select all that apply.

- [Q.F.IVcr2c1] i. Upon detection of damaged conditions of electric equipment (yes)
- [Q.F.IVcr2c2] ii. When circuit presents a safety risk to suppression or other personnel (yes)
- [Q.F.IVcr2c3] iii. When equipment has come into contact with foreign objects posing ignition risk (yes)
- [Q.F.IVcr2c4] iv. Additional reasons not listed (yes)

[Q.F.IVd] Given the condition of the grid, with what probability does the utility expect any large scale PSPS events affecting more than 10,000 people to occur in the coming year?

- [Q.F.IVd.r1] Today ii. Greater than 5% - Grid condition paired with risk indicates that PSPS may be necessary in 2020 in some areas
- [Q.F.IVd.r2] 3 years from now (by end of year 2022) ii. Greater than 5% - Grid condition paired with risk indicates that PSPS may be necessary in 2020 in some areas

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[Q.F.Va] Is there a process for inspecting de-energized sections of the grid prior to re-energization?

- [Q.F.Va.r1] Today ii. Existing process for accurately inspecting de-energized sections of the grid prior to re-energization
- [Q.F.Va.r2] 3 years from now (by end of year 2022) iii. Existing process for accurately inspecting de-energized sections of the grid prior to re-energization, augmented with sensors and aerial tools

[Q.F.Vb] How automated is the process for inspecting de-energized sections of the grid prior to re-energization

Clarification: For explanation on level of automation please refer to the 'level of systematization and automation' in Table 2 of the Maturity Model. (i) in this case corresponds to level 0; (ii) corresponds to level 1 or 2; (iii) corresponds to level 3; and (iv) corresponds to level 4

- [Q.F.Vb.r1] Today i. Manual process, not automated at all
- [Q.F.Vb.r2] 3 years from now (by end of year 2022) ii. Partially automated (<50%)

[Q.F.Vc] What is the average amount of time that it takes you to re-energize your grid from a PSPS once weather has subsided to below your de-energization threshold??

- [Q.F.Vc.r1] Today iv. Within 12 hours
- [Q.F.Vc.r2] 3 years from now (by end of year 2022) v. Within 8 hours

[Q.F.Vd] What level of understanding of probability of ignitions after PSPS events does the utility have across the grid?

- [Q.F.Vd.r1] Today iii. Utility has accurate quantitative understanding of ignition risk following re-energization, by asset, validated by historical data and near misses
- [Q.F.Vd.r2] 3 years from now (by end of year 2022) iii. Utility has accurate quantitative understanding of ignition risk following re-energization, by asset, validated by historical data and near misses

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[Q.F.VIa] Does the utility have defined policies around the role of workers in suppressing ignitions?

- [Q.F.VIa.r1] Today iii. Utilities have explicit policies about the role of crews, including contractors and subcontractors, at the site of ignition

- [Q.F.VIa.r2] 3 years from now (by end of year 2022) iii. Utilities have explicit policies about the role of crews, including contractors and subcontractors, at the site of ignition

[Q.F.VIb] What training and tools are provided to workers in the field?

- [Q.F.VIb.r1] Today iii. All criteria in option (ii) met; In addition, suppression tools and training to suppress small ignitions caused by workers or in immediate vicinity of workers are provided
- [Q.F.VIb.r2] 3 years from now (by end of year 2022) iii. All criteria in option (ii) met; In addition, suppression tools and training to suppress small ignitions caused by workers or in immediate vicinity of workers are provided

[Q.F.VIc] In the events where workers have encountered an ignition, have any Cal/OSHA reported injuries or fatalities occurred in in the last year
Clarification: For this year, please identify whether any major injuries or fatalities have occurred in 2019. For three years from now, please specify whether you think there is a chance that major injuries or fatalities could occur in 2022.

- [Q.F.VIc.r1] Today i. No
- [Q.F.VIc.r2] 3 years from now (by end of year 2022) i. No

[Q.F.VId] 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
Clarification: An example of workers outside utility industry might be workers at a vegetation management company who prune trees near utility equipment

- [Q.F.VId.r1] Today ii. Yes
- [Q.F.VId.r2] 3 years from now (by end of year 2022) ii. Yes

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[Q.G.Ia] Does the utility have a centralized database of situational, operational, and risk data
Clarification: Question is asking whether utility centralizes most of its situational, operational, and risk data in a single database

- [Q.G.Ia.r1] Today i. No
- [Q.G.Ia.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.G.Ib] Is the utility able to use advanced analytics on its centralized database of situational, operational, and risk data to make operational and investment decisions
Clarification: In this case, advanced analytics refers to analysis integrating different types of data from this centralized database in a sufficiently reliable way to create a detailed, quantitative and holistic picture of tradeoffs to be weighed in operational or investment decisions

- [Q.G.Ib.r1] Today ii. Yes, but only for short term decision making
- [Q.G.Ib.r2] 3 years from now (by end of year 2022) iii. Yes, for both short term and long-term decision making

[Q.G.Ic] Does the utility collect data from all sensored portions of electric lines, equipment, weather stations, etc.?

- [Q.G.Ic.r1] Today ii. Yes
- [Q.G.Ic.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.G.Id] 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?

- [Q.G.Id.r1] Today i. No
- [Q.G.Id.r2] 3 years from now (by end of year 2022) i. No

[Q.G.Ie] Does the utility identify highest priority additional data sources to improve decision making?

- [Q.G.Ie.r1] Today ii. Yes
- [Q.G.Ie.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.G.If] Does the utility share best practices for database management and use with other utilities in California and beyond?

- [Q.G.If.r1] Today ii. Yes
- [Q.G.If.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.G.IIa] Is there a single document cataloguing all fire-related data and algorithms, analyses, and data processes?

- [Q.G.IIa.r1] Today i. No
- [Q.G.IIa.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.G.IIb] Is there an explanation of the sources, cleaning processes, and assumptions made in the single document catalog?

- [Q.G.IIb.r1] Today i. No
- [Q.G.IIb.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.G.IIc] Are all analyses, algorithms, and data processing explained and documented?

- [Q.G.IIc.r1] Today ii. Analyses, algorithms, and data processing are documented
- [Q.G.IIc.r2] 3 years from now (by end of year 2022) iii. Analyses, algorithms, and data processing are documented and explained

[Q.G.IId] Is there a system for sharing data in real time across multiple levels of permissions?

- [Q.G.IId.r1] Today i. No system capable of sharing data in real time across multiple levels of permissions
- [Q.G.IId.r2] 3 years from now (by end of year 2022) i. No system capable of sharing data in real time across multiple levels of permissions

[Q.G.IIe] Are the most relevant wildfire related data algorithms disclosed

Clarification: Question is asking whether all algorithms or decision making process used to inform decision making around investment choices, risk mitigation choices, and emergency response are disclosed

- [Q.G.IIe.r1] Today ii. Yes, disclosed to regulators and other relevant stakeholders upon request
- [Q.G.IIe.r2] 3 years from now (by end of year 2022) ii. Yes, disclosed to regulators and other relevant stakeholders upon request

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[Q.G.IIIa] Does the utility track near miss data for all near misses with wildfire ignition potential

Clarification: Recall that near miss is defined as an event with significant probability of ignition, including wires down, contacts with objects, line slap, events with evidence of significant heat generation, and other events that cause sparking or have the potential to cause ignition.

- [Q.G.IIIa.r1] Today ii. Yes
- [Q.G.IIIa.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.G.IIIb] 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?

- [Q.G.IIIb.r1] Today i. No
- [Q.G.IIIb.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.G.IIIc] Does the utility capture data related to the specific mode of failure when capturing near-miss data?

- [Q.G.IIIc.r1] Today i. No
- [Q.G.IIIc.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.G.IIId] Is the utility able to predict the probability of a near miss in causing an ignition based on a set of event characteristics?

- [Q.G.IIId.r1] Today i. No
- [Q.G.IIId.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.G.IIIe] Does the utility use data from near misses to change grid operation protocols in real time?

- [Q.G.IIIe.r1] Today i. No
- [Q.G.IIIe.r2] 3 years from now (by end of year 2022) ii. Yes

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[Q.G.IVa] Does the utility make disclosures and share data

Clarification: In this case, 'disclosures' refer to disclosures to the CPUC and to the public

- [Q.G.IVa.r1] Today iii. Utility makes required disclosures and shares data beyond what is required
- [Q.G.IVa.r2] 3 years from now (by end of year 2022) iii. Utility makes required disclosures and shares data beyond what is required

[Q.G.IVb] Does the utility in engage in research

Clarification: Here, 'research' broadly refers to collaborative research (e.g. with other utilities, academics, or the government) or to independent research where the findings are made available outside parties (such as academics, other utilities, the government or the public).

- [Q.G.IVb.r1] Today iv. Utility funds and participates in both independent and collaborative research, and ensures that research, where possible, is abstracted and applied to other utilities
- [Q.G.IVb.r2] 3 years from now (by end of year 2022) iv. Utility funds and participates in both independent and collaborative research, and ensures that research, where possible, is abstracted and applied to other utilities

[Q.G.IVc] What subjects does utility research address?

- [Q.G.IVc.r1] Today ii. Utility ignited wildfires and risk reduction initiatives
- [Q.G.IVc.r2] 3 years from now (by end of year 2022) ii. Utility ignited wildfires and risk reduction initiatives

[Q.G.IVd] Does the utility promote best practices based on latest independent scientific and operational research

Clarification: Promoting best practices could take various forms – for example, writing and publicly releasing a report or detailing results achieved when a new method of tool was piloted, including which techniques were more or less effective

- [Q.G.IVd.r1] Today ii. Yes
- [Q.G.IVd.r2] 3 years from now (by end of year 2022) ii. Yes

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[Q.H.Ia] For what risk scenarios is the utility able to provide projected cost and total risk reduction potential?

- [Q.H.Ia.r1] Today iii. Utility provides an accurate high-risk reduction and low risk reduction scenario, in addition to their proposed scenario, and the projected cost and total risk reduction potential
- [Q.H.Ia.r2] 3 years from now (by end of year 2022) iii. Utility provides an accurate high-risk reduction and low risk reduction scenario, in addition to their proposed scenario, and the projected cost and total risk reduction potential

[Q.H.Ib] For what level of granularity is the utility able to provide projections for each scenario?

- [Q.H.Ib.r1] Today ii. Region level
- [Q.H.Ib.r2] 3 years from now (by end of year 2022) v. Asset level

[Q.H.Ic] 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?

- [Q.H.Ic.r1] Today i. No
- [Q.H.Ic.r2] 3 years from now (by end of year 2022) i. No

[Q.H.Id] Does the utility provide an estimate of impact on reliability factors in its scenarios
Clarification: Reliability factors here refer to factors impacting reliability of service to customers

- [Q.H.Id.r1] Today ii. Yes
- [Q.H.Id.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.H.IIa] Does the utility present accurate qualitative rankings for its initiatives by risk spend efficiency?

- [Q.H.IIa.r1] Today ii. Yes
- [Q.H.IIa.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.H.IIb] What initiatives are captured in the ranking of risk spend efficiency?

- [Q.H.IIb.r1] Today ii. All commercial initiatives
- [Q.H.IIb.r2] 3 years from now (by end of year 2022) ii. All commercial initiatives

[Q.H.IIc] Does the utility include figures for present value cost and project risk reduction impact of each initiative, clearly documenting all assumptions (e.g. useful life, discount rate, etc.)?

- [Q.H.IIc.r1] Today ii. Yes
- [Q.H.IIc.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.H.IId] Does the utility provide an explanation of their investment in each particular initiative
Clarification: Reliability factors here refer to factors impacting reliability of service to customers

- [Q.H.IId.r1] Today ii. Yes, including the expected overall reduction in risk
- [Q.H.IId.r2] 3 years from now (by end of year 2022) iii. Yes, including the expected overall reduction in risk and estimates of impact on reliability factors

[Q.H.IIe] At what level of granularity is the utility able to provide risk efficiency figures?

- [Q.H.IIe.r1] Today ii. Region level
- [Q.H.IIe.r2] 3 years from now (by end of year 2022) v. Asset level

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[Q.H.IIIa] How accurate of a risk spend efficiency calculation can the utility provide?

- [Q.H.IIIa.r1] Today ii. Utility has an accurate relative understanding of the cost and effectiveness to produce a reliable risk spend efficiency estimate
- [Q.H.IIIa.r2] 3 years from now (by end of year 2022) iii. Utility has accurate quantitative understanding of cost and effectiveness to produce a reliable risk spend efficiency estimate

[Q.H.IIIb] At what level can estimates be prepared?

- [Q.H.IIIb.r1] Today ii. Regional
- [Q.H.IIIb.r2] 3 years from now (by end of year 2022) iii. Circuit-based

[Q.H.IIIc] How frequently are estimates updated?

- [Q.H.IIIc.r1] Today iii. Annually or more frequently
- [Q.H.IIIc.r2] 3 years from now (by end of year 2022) iii. Annually or more frequently

[Q.H.IIId] What vegetation management initiatives does the utility include within its evaluation?

- [Q.H.IIId.r1] Today ii. Some
- [Q.H.IIId.r2] 3 years from now (by end of year 2022) iii. Most

[Q.H.IIIe] Can the utility evaluate risk reduction synergies from combination of various initiatives?

- [Q.H.IIIe.r1] Today i. No
- [Q.H.IIIe.r2] 3 years from now (by end of year 2022) ii. Yes

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[Q.H.IVa] How accurate of a risk spend efficiency calculation can the utility provide?

- [Q.H.IVa.r1] Today ii. Utility has accurate relative understanding of cost and effectiveness to produce a reliable risk spend efficiency estimate
- [Q.H.IVa.r2] 3 years from now (by end of year 2022) iii. Utility has accurate quantitative understanding of cost and effectiveness to produce a reliable risk spend efficiency estimate

[Q.H.IVb] At what level can estimates be prepared?

- [Q.H.IVb.r1] Today ii. Regional
- [Q.H.IVb.r2] 3 years from now (by end of year 2022) v. Asset-based

[Q.H.IVc] How frequently are estimates updated?

- [Q.H.IVc.r1] Today iii. Annually or more frequently
- [Q.H.IVc.r2] 3 years from now (by end of year 2022) iii. Annually or more frequently

[Q.H.IVd] What grid hardening initiatives are included in the utility risk spend efficiency analysis?

- [Q.H.IVd.r1] Today iv. All commercially available grid hardening initiatives
- [Q.H.IVd.r2] 3 years from now (by end of year 2022) iv. All commercially available grid hardening initiatives

[Q.H.IVe] Can the utility evaluate risk reduction effects from the combination of various initiatives?

- [Q.H.IVe.r1] Today i. No
- [Q.H.IVe.r2] 3 years from now (by end of year 2022) ii. Yes

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[Q.H.Va] To what extent does the utility allocate capital to initiatives based on risk-spend efficiency (RSE)?

- [Q.H.Va.r1] Today ii. Utility considers estimates of RSE when allocating capital
- [Q.H.Va.r2] 3 years from now (by end of year 2022) iii. Accurate RSE estimates for all initiatives are used to determine capital allocation within categories only (e.g. to choose the best vegetation management initiative)

[Q.H.Vb] What information does the utility take into account when generating RSE estimates?

- [Q.H.Vb.r1] Today i. Average estimate of RSE by initiative category
- [Q.H.Vb.r2] 3 years from now (by end of year 2022) iii. Specific information by initiative at the asset level, including state of specific assets and location where initiative will be implemented

[Q.H.Vc] How does the utility verify RSE estimates?

- [Q.H.Vc.r1] Today ii. RSE estimates are verified by historical or experimental pilot data
- [Q.H.Vc.r2] 3 years from now (by end of year 2022) ii. RSE estimates are verified by historical or experimental pilot data

[Q.H.Vd] Does the utility take into consideration impact on safety, reliability, and other priorities when making spending decisions?

- [Q.H.Vd.r1] Today ii. Yes
- [Q.H.Vd.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.H.VIa] How does the utility develop and evaluate the efficacy of new wildfire initiatives?

- [Q.H.VIa.r1] Today iv. Utility uses pilots, followed by in-field testing, measuring reduction in ignition events and near-misses.

- [Q.H.VIa.r2] 3 years from now (by end of year 2022) iv. Utility uses pilots, followed by in-field testing, measuring reduction in ignition events and near-misses.

[Q.H.VIb] How does the utility develop and evaluate the risk spend efficiency of new wildfire initiatives
Clarification: TCO is total cost of ownership over the expected useful life of an asset, including purchase, operation and maintenance. In this question, total cost of ownership refers to the spend portion of the evaluation of risk spend efficiency, while risk reduction is evaluated separately.
- [Q.H.VIb.r1] Today i. No program in place
- [Q.H.VIb.r2] 3 years from now (by end of year 2022) ii. Utility uses total cost of ownership

[Q.H.VIc] At what level of granularity does the utility measure the efficacy of new wildfire initiatives?
- [Q.H.VIc.r1] Today v. Asset
- [Q.H.VIc.r2] 3 years from now (by end of year 2022) v. Asset

[Q.H.VId] Are the reviews of innovative initiatives audited by independent parties
Clarification: Reviews here refer to findings evaluating innovative initiatives which would assist another utility in making a decision about whether to implement that initiative or help them determine how to do so effectively. Criteria might include but are not limited to the following: technical feasibility, effectiveness, risk spend efficiency, ease of implementation and comparison to alternative options
- [Q.H.VId.r1] Today i. No
- [Q.H.VId.r2] 3 years from now (by end of year 2022) i. No

[Q.H.VIe] Does the utility share the findings of its evaluation of innovative initiatives with other utilities, academia, and the general public?
- [Q.H.VIe.r1] Today ii. Yes
- [Q.H.VIe.r2] 3 years from now (by end of year 2022) ii. Yes

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[Q.I.Ia] Is the wildfire plan integrated with overall disaster and emergency plans
Clarification: If the utility's wildfire mitigation plan is an integrated component of an overall disaster and emergency plan then the overall plan considers at least the compound effects of risks in both directions – for example, the additional risk of fire posed by an earthquake and how to manage any compounding effects
- [Q.I.Ia.r1] Today iii. Wildfire plan is an integrated component of overall plan
- [Q.I.Ia.r2] 3 years from now (by end of year 2022) iii. Wildfire plan is an integrated component of overall plan

[Q.I.Ib] Does the utility run drills to audit the viability and execution of its wildfire plans?
- [Q.I.Ib.r1] Today ii. Yes
- [Q.I.Ib.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.I.Ic] Is the impact of confounding events or multiple simultaneous disasters considered in the planning process?
- [Q.I.Ic.r1] Today ii. Yes
- [Q.I.Ic.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.I.Id] Is the plan integrated with disaster and emergency preparedness plans of other relevant stakeholders (e.g., CAL FIRE, Fire Safe Councils, etc.)?
- [Q.I.Id.r1] Today ii. Yes
- [Q.I.Id.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.I.Ie] Does the utility take a leading role in planning, coordinating, and integrating plans across stakeholders?

- [Q.I.Ie.r1] Today ii. Yes
- [Q.I.Ie.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.I.IIa] Are there detailed and actionable procedures in place to restore service after a wildfire related outage?
- [Q.I.IIa.r1] Today ii. Yes
- [Q.I.IIa.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.I.IIb] Are employee and subcontractor crews trained in, and aware of, plans?
- [Q.I.IIb.r1] Today ii. Yes
- [Q.I.IIb.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.I.IIc] To what level are procedures to restore service after a wildfire-related outage customized?
- [Q.I.IIc.r1] Today iii. Circuit level
- [Q.I.IIc.r2] 3 years from now (by end of year 2022) iii. Circuit level

[Q.I.IId] Is the customized procedure to restore service based on topography, vegetation, and community needs?
- [Q.I.IId.r1] Today ii. Yes
- [Q.I.IId.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.I.IIe] Is there an inventory of high risk spend efficiency resources available for repairs
Clarification: Question is asking whether the resources, components and tools that the utility has available for repairs, maintenance, and unexpected replacement are the most risk spend efficient options on the market
- [Q.I.IIe.r1] Today ii. Yes
- [Q.I.IIe.r2] 3 years from now (by end of year 2022) ii. Yes

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[Q.I.IIIa] Does the utility provide clear and substantially complete communication of available information relevant to affected customers
Clarification: Does the utility provide all available information which could be relevant to affected customers in a way that customers can receive in real time and easily understand?
- [Q.I.IIIa.r1] Today ii. Yes
- [Q.I.IIIa.r2] 3 years from now (by end of year 2022) iii. Yes, along with referrals to other agencies

[Q.I.IIIb] What percent of affected customers receive complete details of available information?
- [Q.I.IIIb.r1] Today v. >99.9% of customers
- [Q.I.IIIb.r2] 3 years from now (by end of year 2022) v. >99.9% of customers

[Q.I.IIIc] What percent of affected medical baseline customers receive complete details of available information?
- [Q.I.IIIc.r1] Today v. >99.9% of medical baseline customers
- [Q.I.IIIc.r2] 3 years from now (by end of year 2022) v. >99.9% of medical baseline customers

[Q.I.IIId] How does the utility assist where helpful with communication of information related to power outages to customers?
- [Q.I.IIId.r1] Today ii. Through availability of relevant evacuation information and links on website and toll-free telephone number, and assisting disaster response professionals as requested
- [Q.I.IIId.r2] 3 years from now (by end of year 2022) ii. Through availability of relevant evacuation information and links on website and toll-free telephone number, and assisting

disaster response professionals as requested

[Q.I.IIIe] How does the utility with engage other emergency management agencies during emergency situations?

- [Q.I.IIIe.r1] Today iii. Utility has detailed and actionable established protocols for engaging with emergency management organizations
- [Q.I.IIIe.r2] 3 years from now (by end of year 2022) iii. Utility has detailed and actionable established protocols for engaging with emergency management organizations

[Q.I.IIIf] Does the utility communicate and coordinate resources to communities during emergencies (e.g., shelters, supplies, transportation etc.)?

- [Q.I.IIIf.r1] Today ii. Yes
- [Q.I.IIIf.r2] 3 years from now (by end of year 2022) ii. Yes

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[Q.I.IVa] Is there a protocol in place to record the outcome of emergency events and to clearly and actionably document learnings and potential process improvements?

- [Q.I.IVa.r1] Today ii. Yes
- [Q.I.IVa.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.I.IVb] Is there a defined process and staff responsible for incorporating learnings into emergency plan?

- [Q.I.IVb.r1] Today ii. Yes
- [Q.I.IVb.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.I.IVc] Once updated based on learnings and improvements, is the updated plan tested using "dry runs" to confirm its effectiveness?

- [Q.I.IVc.r1] Today ii. Yes
- [Q.I.IVc.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.I.IVd] Is there a defined process to solicit input from a variety of other stakeholders and incorporate learnings from other stakeholders into the emergency plan?

- [Q.I.IVd.r1] Today ii. Yes
- [Q.I.IVd.r2] 3 years from now (by end of year 2022) ii. Yes

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[Q.I.Va] Does the utility conduct an evaluation or debrief process after a wildfire?

- [Q.I.Va.r1] Today ii. Yes
- [Q.I.Va.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.I.Vb] Does the utility conduct a customer survey and utilize partners to disseminate requests for stakeholder engagement?

- [Q.I.Vb.r1] Today iii. Both
- [Q.I.Vb.r2] 3 years from now (by end of year 2022) iii. Both

[Q.I.Vc] In what other activities does the utility engage?

- [Q.I.Vc.r1] Today iv. Public listening sessions, debriefs with partners, and others
- [Q.I.Vc.r2] 3 years from now (by end of year 2022) iv. Public listening sessions, debriefs with partners, and others

[Q.I.Vd] Does the utility share with partners findings about what can be improved?

- [Q.I.Vd.r1] Today ii. Yes
- [Q.I.Vd.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.I.Ve] Are feedback and recommendations on potential improvements made public?

- [Q.I.Ve.r1] Today ii. Yes
- [Q.I.Ve.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.I.Vf] Does the utility conduct proactive outreach to local agencies and organizations to solicit additional feedback on what can be improved?
- [Q.I.Vf.r1] Today ii. Yes
- [Q.I.Vf.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.I.Vg] Does the utility have a clear plan for post-event listening and incorporating lessons learned from all stakeholders?
- [Q.I.Vg.r1] Today ii. Yes
- [Q.I.Vg.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.I.Vh] Does the utility track the implementation of recommendations and report upon their impact Clarification: Recommendations here refer to recommendations from customers, local agencies, organizations and other stakeholders received following a wildfire or PSPS event
- [Q.I.Vh.r1] Today i. No
- [Q.I.Vh.r2] 3 years from now (by end of year 2022) i. No

[Q.I.Vi] 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?
- [Q.I.Vi.r1] Today ii. Yes
- [Q.I.Vi.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.J.Ia] Does the utility actively work to identify best practices from other utilities through a clearly defined operational process?
- [Q.J.Ia.r1] Today iii. Yes, from other global utilities
- [Q.J.Ia.r2] 3 years from now (by end of year 2022) iii. Yes, from other global utilities

[Q.J.Ib] Does the utility successfully adopt and implement best practices identified from other utilities?
- [Q.J.Ib.r1] Today ii. Yes
- [Q.J.Ib.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.J.Ic] Does the utility seek to share best practices and lessons learned in a consistent format?
- [Q.J.Ic.r1] Today ii. Yes
- [Q.J.Ic.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.J.Id] Does the utility share best practices and lessons via a consistent and predictable set of venues/media?
- [Q.J.Id.r1] Today ii. Yes
- [Q.J.Id.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.J.Ie] Does the utility participate in annual benchmarking exercises with other utilities to find areas for improvement?
- [Q.J.Ie.r1] Today ii. Yes
- [Q.J.Ie.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.J.If] Has the utility implemented a defined process for testing lessons learned from other utilities to ensure local applicability?
- [Q.J.If.r1] Today i. No
- [Q.J.If.r2] 3 years from now (by end of year 2022) i. No

[Q.J.IIa] Does the utility have a clear and actionable plan to develop or maintain a collaborative relationship with local communities?

- [Q.J.IIa.r1] Today ii. Yes
- [Q.J.IIa.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.J.IIb] Are there communities in HFTD areas where meaningful resistance is expected in response to efforts to mitigate fire risk (e.g. vegetation clearance)?

- [Q.J.IIb.r1] Today ii. Yes
- [Q.J.IIb.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.J.IIc] What percent of landowners are non-compliant with utility initiatives (e.g., vegetation management)?

- [Q.J.IIc.r1] Today i. More than 5%
- [Q.J.IIc.r2] 3 years from now (by end of year 2022) i. More than 5%

[Q.J.IId] What percent of landowners complain about utility initiatives (e.g., vegetation management)?

- [Q.J.IId.r1] Today iv. Less than 1 %
- [Q.J.IId.r2] 3 years from now (by end of year 2022) iv. Less than 1 %

[Q.J.IIe] Does the utility have a demonstratively cooperative relationship with communities containing >90% of the population in HFTD areas (e.g. by being recognized by other agencies as having a cooperative relationship with those communities in HFTD areas)?

- [Q.J.IIe.r1] Today ii. Yes
- [Q.J.IIe.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.J.IIf] Does utility have records of landowners throughout communities containing >90% of the population in HFTD areas reaching out to notify of risks, dangers or issues in the past year Clarification: For this year, please identify whether the question holds true for 2019. For three years from now, specify whether you expect the question to hold true in 2022.

- [Q.J.IIf.r1] Today ii. Yes
- [Q.J.IIf.r2] 3 years from now (by end of year 2022) ii. Yes

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[Q.J.IIIa] Can the utility provide a plan to partner with organizations representing Limited English Proficiency (LEP) and Access & Functional Needs (AFN) communities?

- [Q.J.IIIa.r1] Today ii. Yes
- [Q.J.IIIa.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.J.IIIb] Can the utility outline how these partnerships create pathways for implementing suggested activities to address the needs of these communities?

- [Q.J.IIIb.r1] Today ii. Yes
- [Q.J.IIIb.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.J.IIIc] 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?

- [Q.J.IIIc.r1] Today ii. Yes
- [Q.J.IIIc.r2] 3 years from now (by end of year 2022) ii. Yes

[Q.J.IIId] Does the utility have a specific annually-updated action plan further reduce wildfire and PSPS risk to LEP & AFN communities?

- [Q.J.IIId.r1] Today i. No
- [Q.J.IIId.r2] 3 years from now (by end of year 2022) ii. Yes

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[Q.J.IVa] What is the cooperative model between the utility and suppression agencies?

- [Q.J.IVa.r1] Today ii. Utility cooperates with suppression agencies by notifying them of ignitions
- [Q.J.IVa.r2] 3 years from now (by end of year 2022) ii. Utility cooperates with suppression agencies by notifying them of ignitions

[Q.J.IVb] In what areas is the utility cooperating with suppression agencies?

- [Q.J.IVb.r1] Today iii. Throughout utility service areas
- [Q.J.IVb.r2] 3 years from now (by end of year 2022) iii. Throughout utility service areas

[Q.J.IVc] Does the utility accurately predict and communicate the forecasted fire propagation path using available analytics resources and weather data?

- [Q.J.IVc.r1] Today i. No
- [Q.J.IVc.r2] 3 years from now (by end of year 2022) i. No

[Q.J.IVd] Does the utility communicate fire paths to the community as requested?

- [Q.J.IVd.r1] Today i. No
- [Q.J.IVd.r2] 3 years from now (by end of year 2022) i. No

[Q.J.IVe] Does the utility work to assist suppression crews logistically, where possible?

- [Q.J.IVe.r1] Today ii. Yes
- [Q.J.IVe.r2] 3 years from now (by end of year 2022) ii. Yes

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[Q.J.Va] Where does the utility conduct substantial fuel management?

- [Q.J.Va.r1] Today ii. Utility conducts fuel management along rights of way
- [Q.J.Va.r2] 3 years from now (by end of year 2022) ii. Utility conducts fuel management along rights of way

[Q.J.Vb] Does the utility engage with other stakeholders as part of its fuel management efforts?

- [Q.J.Vb.r1] Today iii. Utility shares fuel management plans with other stakeholders and works with other stakeholders conducting fuel management concurrently
- [Q.J.Vb.r2] 3 years from now (by end of year 2022) iii. Utility shares fuel management plans with other stakeholders and works with other stakeholders conducting fuel management concurrently

[Q.J.Vc] Does the utility cultivate a native vegetative ecosystem across territory that is consistent with lower fire risk?

- [Q.J.Vc.r1] Today i. No
- [Q.J.Vc.r2] 3 years from now (by end of year 2022) i. No

[Q.J.Vd] Does the utility fund local groups (e.g., fire safe councils) to support fuel management?

- [Q.J.Vd.r1] Today ii. Yes
- [Q.J.Vd.r2] 3 years from now (by end of year 2022) ii. Yes

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[uuid] Participant identifier wc16yya5e2wwwqfq
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SCE’S DETAILED RESPONSES TO UTILITY WILDFIRE MITIGATION MATURITY SURVEY

SCE Wildfire Mitigation Maturity Survey Response Overview

1) Introduction

SCE appreciates the opportunity to provide its responses to the Commission's Wildfire Mitigation Maturity Utility Survey ("Survey"). SCE understands the importance of the Survey as a tool for gauging the state of the utilities' wildfire mitigation capabilities, and for assessing future improvement in these areas. Accordingly, in addition to the online intake form for providing responses to the Survey, SCE includes this attachment which explains any interpretations we made and the basis for our selected responses. SCE intends this additional material to summarize the major learnings to be gleaned from SCE's Survey responses, highlight areas where SCE approach and processes differ from the capability progression outlined in the survey as potential considerations for future refinement of the Survey, and provide the information necessary for a more complete understanding of SCE's responses.

2) Major Takeaways from SCE's Survey Responses

SCE made significant progress in developing its wildfire mitigation capabilities in 2019 and continues to refine its wildfire risk modeling and operational practices. The concurrently filed 2020-2022 Wildfire Mitigation Plan (WMP) provides SCE's proposals for further maturity in wildfire mitigation capabilities. The 2020 and 2023 responses to the Survey questions reflect these past and upcoming enhancements, respectively. Notably, because SCE's 2020 responses already incorporate improvements made in the past few years, and because of the relatively large steps and longer timelines needed to improve along the current Maturity Model spectrum, in some categories SCE will not show a scoring change between its maturity in 2020 and its maturity in 2023. Below, SCE provides key takeaways from its Survey responses for each of the 10 capability categories, highlighting areas where increased maturity is expected in the next three years and areas where we do not expect substantial changes to be apparent in the next three years.

A. Risk Mapping and Simulation

SCE has been actively working on and has made significant progress in moving beyond enterprise level risk models to asset level models. By targeting specific assets and locations, we can more effectively allocate constrained labor resources to reduce risk to beyond what is expected from system level averages. We are also incorporating risk analysis in our approach to PSPS events and resilience. For example, for the asset level risk analysis, SCE currently estimates ignition consequence developed by Reax. Though this is based on generally accepted fire modeling methodologies, there are several limitations to this analysis. These limitations include: the inability to model fire spread through developed or urban areas; dated - structure, population, wind, weather and vegetation information; a static view of fire propagation, fire response and suppression efforts; as well as a lack of certain qualitative risk factors, such as the ability of a population to egress from a location. In 2020, SCE is transitioning to a more refined risk simulation technology to inform its wildfire mitigation strategy, known as the Technosylva Wildfire Risk Reduction Module (WRRM). This is a GIS-enabled software solution for wildfire protection planning. SCE will develop 32+ weather scenarios simulations, each simulation running for approximately 15 hours and resulting in hundreds of millions of simulations throughout SCE's service territory. Over time, by comparing the daily risk forecasts to observed data, and updating the models, over time, this new capability will further improve SCE's consequence modeling capability to target locations for deploying wildfire mitigations. Please see descriptions in Chapters 4 and 5 of the WMP for more information.

B. Situational Awareness and Forecasting

SCE's situational awareness and weather forecasting capabilities are improving due to deployment of additional weather stations throughout the service territory. SCE currently collects a range of weather variables from multiple sources multiple times every hour. These sources include its own weather stations and available external sources, and SCE can create forecasts at the circuit-level. In addition, SCE utilizes cameras to detect and report ignitions near its facilities. However, advancement in maturity based on the scale provided requires collecting data at higher level of granularity. For example, the

survey assesses maturity on situational awareness and forecasting based on increases in the frequency of weather data collection (at least 60 times per hour versus 10 times per hour), and the asset-level collection of weather data and forecasting data. While SCE plans to more than quadruple the number of its weather stations, at a certain point, additional deployment of (and collection of data from) such weather stations will not increase maturity (e.g., there is limited additional risk reduction value in deploying even more weather stations). In such instances, increased maturity does not necessarily mean increased risk reduction.

C. Grid Design and System Hardening

SCE's design and system hardening capabilities are expected to substantially increase in the next few years, many to best in class or beyond. SCE has a long history of piloting, testing and deploying innovative grid equipment and architecture. SCE is building on this foundation with the increased analytical capabilities described in Category A to further understand the benefits and costs of potential initiatives and prioritize those initiatives within the HFRA. SCE is aggressively working to minimize the risk of wildfire and the number and scale of future PSPS events through continued deployment of grid hardening initiatives such as sectionalization, covered conductor or undergrounding. Beyond traditional approaches, SCE actively leading the evaluation of microgrids and will gain significant engineering, construction and operational knowledge through the deployment of one or more microgrids by Fall 2020. Lastly, SCE plans to accomplish these things through active engagement with other utilities, across industry groups, and in partnership with academic and government research groups to ensure that we remain on the forefront of possibility with regards to wildfire and PSPS mitigation.

D. Asset Management and Inspections

Based on significant progress made in 2019, SCE's asset management and inspection capabilities are generally beyond minimum compliance requirements. For example, SCE's inspection schedules are more frequent than the GO 165 minimum requirements related to patrol, detail, and all other inspections. For example, in its WMP, SCE is proposing to prioritize the inspection of structures that have higher risk profiles based on the probability of ignition and consequence, and perform detail inspections on an

annual basis. This process is beyond the current regulatory requirement of five-year inspection cycles for distribution assets, and SCE proposes this process until other mitigation measures have reduced ignition risks sufficiently to warrant further adjustments. Detailed inspection programs are designed to identify specific equipment conditions that are potential ignition risks. Therefore, predictive analysis and risk-informed schedules are most applicable to these inspection programs as compared to other inspection programs.

E. Vegetation Management and Inspections

Based on significant progress made in 2019, SCE's vegetation management and inspections capabilities are currently beyond minimum compliance requirements. SCE has implemented a robust vegetation inspection and management program designed to meet or exceed the clearance requirement. SCE maintains a granular vegetation inventory which includes an assessment of the growth rate by species. SCE has adopted the Commission's recommended clearances at time of trim, which are beyond regulatory requirement, and is systematically identifying and removing trees outside of SCE's right-of-ways which pose a fall-in hazard to our infrastructure. To validate that the program is functioning as intended, SCE has implemented a tiered QC/QA structure with review of numerous activities. SCE notes, however, that further maturity based on CPUC's scale may not necessarily enhance SCE's ability to mitigate wildfire risk or represent an operationally beneficial alternative. For example, SCE has defined vegetation inspection checklists, training, and procedures at the HFRA level and has elected to further differentiate based on tree species, rather than geographic granularity. SCE has taken this approach because any specific geographic location contains multiple species and the same species can be found in multiple locations.

F. Grid Protocols and Operations

SCE is prioritizing grid hardening initiatives to reduce wildfire risks and limit the number of PSPS events, lower the duration of such events when they do occur, and reduce the time necessary for re-energization. In addition, SCE has well-defined procedures for adjusting grid elements during high threat weather conditions. However, as defined in the Survey, some of these activities are not recognized as

increased levels of capability maturity. Additionally, SCE does not believe increased maturity is desirable in certain areas set forth for these capabilities. For example, SCE manually patrols de-energized equipment before deciding to re-energize. SCE does this to ensure that it is safe to re-energize. This manual process systematically ensures the greatest degree of public safety and therefore should not be automated for the foreseeable future.

G. Data Governance

SCE is enhancing its data governance processes and systems and is working to further integrate these through 2023. This includes activities such as gathering data from sensored assets, documenting all analyses required for wildfire mitigation decision making, and tracking near misses. SCE believes improving data quality, data integration, data accessibility and data analytics are more critical for risk reduction than one centralized database or document. SCE also openly shares information with other utilities and third parties as appropriate, engages in research and development related to technologies and strategies that benefit our customers.

H. Resource Allocation Methodology

Similar to SCE's responses to the questions related to Risk Mapping and Simulation, SCE expects to progress significant in its resource allocation methodology by 2023. The risk-spend efficiency (RSE) calculations included in this WMP were developed using a similar methodology to what SCE employed in the 2018 RAMP and 2021 GRC filings. One key feature of that methodology is that the RSEs represent a system-level calculation, which SCE has historically used as one input into the capital allocation process. Through the WRRM, SCE plans to perform both broader scenario analysis and asset-level RSE calculations to support the prioritization of mitigation initiatives in the future.

I. Emergency Planning and Preparedness

SCE has well-defined, mature practices and a wildfire plan that is fully integrated with its emergency response plans. SCE's incident management structure has formally been in place since 2012 and follows the Department of Homeland Security's federal incident management standards such as ICS and NIMS. Additionally, SCE's incident management team members are credentialled through a rigorous training

and exercise program that ensures their ability to respond to a range of incidents. SCE strives to continuously improve its policies and procedures and has robust processes in place to incorporate lessons learned and share best practices with stakeholders.

J. Stakeholder Cooperation and Community Engagement

SCE has well-defined processes in place regarding stakeholder cooperation and community engagement. SCE actively works with other utilities and stakeholders to share best practices and lessons learned. SCE also has actively engaged with LEP and AFN communities, federal, state, fire agencies and local governments to coordinate on wildfire-related activities. In addition, to the extent appropriate, SCE assists fire suppression agencies with training and will share information if requested. For example, SCE has a cooperative model in place, and routinely works with federal, state, and local fire agencies to provide training related to electric safety. SCE's fire managers also participate in Fire Safe councils, other fire suppression and safety organizations, and deploy to fire incident management post to act as liaisons between the utility and stakeholders. At the same time, we recognize that there is an opportunity to do more to strengthen our partnerships and better serve our customers, particularly vulnerable populations, to help them prepare for emergencies.

3) Opportunities for Survey Refinement

As SCE developed its Survey responses, it found that in some cases the Survey associated capabilities that may not add substantial value in reducing wildfire risk with higher maturity levels. In these instances, SCE's maturity levels are not accurately captured. For several of the areas listed below, SCE does not agree with the scales provided. Accordingly, SCE recommends that the Commission consider initiating a public process for refinement of the Survey, so that more accurate assessments of maturity levels that are aligned with increased capabilities of mitigating wildfire risks can be made in the future. Some thematic areas that SCE believes could benefit from public discussion are:

1. The relationship between automation and higher maturity levels: In some cases, expert analysis and judgment are required, therefore manual processes are prudent.

2. The relationship between centralized databases and higher maturity levels: SCE believes that robust data governance procedures can include multiple integrated databases and repositories.
3. The relationship between higher granularity in utility practices (e.g., weather forecasting, inspections, etc.) and higher maturity levels: In some instances, SCE believes it is appropriate to have standardized procedures, checklists, and training across the system, rather than defined more granularly. Moreover, increased levels of granularity in data capture and analytics do not necessarily yield higher risk mitigation benefits, as in the frequency and resolution of weather data capture.
4. The role of external experts and independent audits/reviews and higher maturity levels: SCE supports transparency and is open to discussions with the Commission and appropriate stakeholders about potential roles of external experts and the value that could bring in terms of higher levels of maturity in wildfire risk mitigation capability.

4) Conclusion

SCE has made great strides in developing our wildfire mitigation capabilities, going beyond minimum regulatory requirements in several key areas, increasingly relying on data and advanced analytics to plan and prioritize resource allocation for wildfire risk mitigation, and establishing robust operational processes for planning, preparedness and customer/stakeholder engagement. Though we continually look for ways to refine and improve in all categories, we will be prioritizing some areas over others for increased maturity in the next three years, informed by our current capabilities and where additional progress would most enhance our ability to reduce wildfire and related risks.

SCE supports the development and use of a practical and focused wildfire mitigation capability maturity model as a way to understand, track, benchmark and improve the way we and the state combat the growing risk of utility-caused wildfires. SCE looks forward to a public process working with the WSD to modify and refine this survey and the scoring mechanism for subsequent cycles to better

align with a shared understanding of the necessary evolution of wildfire mitigation capabilities in California.

Table of Contents

I. SCE Survey Responses

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?				
Clarification: Determining wildfire risk requires the utility to understand the probability of ignition and the consequences of such an ignition while taking various conditions into account (e.g., weather, fuel levels, etc.). Categorizing level of risk requires a set of calculations and judgements to group areas by wildfire risk level whereas quantitatively estimating risk refers to accurately quantifying risk on a continuous spectrum based on a host of wildfire risk drivers (e.g., as a function of ignition probability, propagation scenarios, and communities located in the propagation path).				
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**
2020 Year Beginning (YB) Response: ii *2023 YB Response: iv* *Comments: SCE's Wildfire Risk Model (discussed in SCE's 2021 GRC and in use today) leverages Reax Engineering's methodology for fire propagation. The methodology, or weather scenario (attached as a work paper to GRC, SCE 01, Vol 2) utilized a twenty-year fire weather climatology to develop historical fire-weather days across SCE's service territory. SCE plans to implement a more dynamic fire simulation module, Technosylva's Wildfire Risk Reduction Module (WRRM). This model will provide SCE the capability to estimate wildfire risk associated with a greater number of weather scenarios. The WRRM will also share weather and vegetation data with other Technosylva tools, FireCast and FireSim, to ensure consistency between real-time operational planning and system wide mitigation deployment.* *In addition to developing risk scores for known current weather conditions, SCE plans to enhance the WRRM to develop future-facing "what if" climate scenarios based on future projected climate conditions. SCE intends to work with the California Energy Commission (CEC) and stakeholders in other proceedings, such as the Commission's Climate Change Adaptation Order Instituting Ratemaking (R.18-04-019), to better understand climate models that may need to be developed through an iterative working process. These longer-term future-facing models are anticipated to be used to inform SCE's wildfire mitigation strategies and programs.* *See WMP section 4.3 additional support for Capability 1.*				

A.I.b How are scenarios assessed?				
Clarification: Per the instructions, please only indicate that you meet a given response option if you meet all the characteristics described within that response option. So, hypothetically, if you do support your scenarios assessment by historical data of incidents and near misses and conduct internal assessments, but don't have an independent expert assessment, you would select (ii).				
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**	
2020 YB Response: iii *2023 YB Response: iii* *Comments: REAX, an industry expert in fire science and modelling, helped support the development of our current capabilities and selected our current weather scenario based on historical bad weather days. SCE will enhance this capability through the deployment of the Technosylva-based WRRM which will enable SCE to update weather scenarios using data from the previous fire weather season on an annual or semi-annual basis.* *SCE will have elements of iv-level via FireCast and FireSim which are able to update the weather inputs to the WRRM model based on real-time conditions.*				

A.I.c How granular is utility's ability to model scenarios?				
i. Less granular than regional, or no tool at all	ii. Regional	iii. Circuit-based	iv. Span-based	v. Asset-based
2020 YB Response: iii *2023 YB Response: iii* *Comments: SCE uses outputs of these propagation simulations to quantify the consequence localized to 300 meter by 300 meter Reax grid square, which is between circuit and span in granularity. SCE will continue to evaluate the appropriate resolution needed to inform strategic and operational decisions in the future but does not currently anticipate increasing the resolution to the span or asset level. While it is possible for SCE to conduct granular scenarios down to the asset level for a probability of*				

failure/ignition, there are technical data and computing limitations in dynamically downscaling weather and vegetation data to a more granular level.

A.I.d How automated is the tool?				
Clarification: For clarification on level of automation please refer to the 'level of systematization and automation' in Table 2 of the Maturity Model. (i) in this case corresponds to level 0; (ii) corresponds to level 1 or 2; (iii) corresponds to level 3; and (iv) corresponds to level 4				
i. Not automated	ii. Partially (<50%)	iii. Mostly (>=50%)	iv. Fully	
2020 YB Response: i *2023 YB Response: ii* *Comments: As described in A.1.b above, SCE uses the REAX tool today. It is a single, static model and updates are not automated. As SCE implements the Technosylva – based WRRM, SCE will identify automation opportunities where appropriate and has conservatively assessed a level ii capability at this time.*				

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**
2020 YB Response: iv *2023 YB Response: v* *Comments: Today, the REAX model is combined with the Probability of Failure / Ignition Likelihood (PIL) module that uses asset failure modes and the state of existing assets at the circuit level or more granular level. Currently, vegetation impacts, such as fall-ins, are modeled separately. By 2023 SCE expects to integrate its vegetation inventory with the PIL module, which means the level of vegetation will be an input into SCE's overall understanding of wildfire risk.*				

A.I.f To what extent is future change in climate taken into account for future risk estimation?			
i. Future climate change not accounted for in estimating future weather and resulting risk	ii. Future risk estimates take into account generally higher risk across entire service territory	iii. Basic temperature modeling used to estimate effects of a changing climate on future	iv. Modeling with multiple scenarios used to estimate effects of a changing climate on future weather and risk, taking into account difference in geography and vegetation, and considering increase in extreme weather event frequency.
2020 YB Response: i *2023 YB Response: iv* *Comments: SCE's current REAX simulation does not account for future, potential impacts of climate change. By 2023, SCE's plans to enhance the WRRM to develop future facing, "what if" climate scenarios based on future projected weather conditions. These granular climate models may need to be developed through an iterative process in conjunction with stakeholders in other proceedings, such as the Commission's Climate Change Adaptation Order Instituting Ratemaking (R.18-04-019) and the California Energy Commission (CEC).*			

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**	
2020 YB Response: ii *2023 YB Response: iii* *Comments: Currently, SCE forecasts ignition risk for the HFRA using its PIL module where developed. SCE has achieved elements set forth in maturity levels iii and iv (e.g., flying debris, animal intrusion, etc.) today, but is still working to mature the quantitative and accurate assessment of risk of ignition. SCE expects its PIL module will meet the specifications in iii by 2023.* *SCE will refer to the PIL module throughout the remainder of section A.II.* *See WMP Section 4.3, 5.3.1 and for additional support detail for capability 2*				

A.II.b How automated is the ignition risk calculation tool?				
Clarification: For clarification on level of automation please refer to the 'level of systematization and automation' in Table 2 of the Maturity Model. (i) in this case corresponds to level 0; (ii) corresponds to level 1 or 2; (iii) corresponds to level 3; and (iv) corresponds to level 4				
i. Not automated	ii. Partially (<50%)	iii. Mostly (>=50%)	iv. Fully	
2020 YB Response: ii *2023 YB Response: ii*				

Comments: SCE does not envision material benefit from further automating the model at this time, and instead plans to focus on improving the predictive capability of the model per Question A.II.a. SCE may update the model automatically with new data in the future, but expects this functionality to be available after 2023. The reasons for not automating the data at this time is the need to manually inspect new data for abnormalities so that bad data does not corrupt the model, and because the amount of new data collected during short time periods (daily or weekly, monthly) is small relative to the historical data used to construct the models therefore having limited impact in the near term.

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

2020 YB Response: v
2023 YB Response: v
Comments: SCE used machine learning algorithms to assess the likelihood or probability that a piece of equipment will experience a fault resulting in a spark from either an EFF or a CFO, and the probability that fault will result in an ignition event. SCE used an extensive series of input variables including historical asset performance, weather, environmental, and geographical data to develop the predictive models. The Probability of Failure/Ignition Likelihood module contains individual sub-models for each type of asset (wire, transformer, etc.), and thus total ignition probability at a structure (pole or tower) is calculated as the sum of the probabilities of ignition across the assets at that location.

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	

2020 YB Response: i, ii
2023 YB Response: i, ii
Comments: The machine learning models are developed using internal subject matter expertise and trained on historical data to predict future events. For probability of failure calculations, real-time learning may not have a significant impact on model results as the volume of incidents each day or even month (faults, fires, etc.) is very small relative to the data set used to create the model so would not materially change the probability of failure at the asset level. Therefore the models are refreshed with new data when there is a sufficient amount of new data available to have an impact on the model As these models are less than one year old, our current plan is to refresh each 12 months unless it becomes clear that a more frequent refresh cycle would add value so would not materially change the probability of failure at the asset level. Therefore, the models are refreshed with new data when a sufficient amount of new data is available to have an impact on model results.

Additionally, although SCE does not explicitly leverage real-time learning directly into its probability of failure calculations, SCE investigates and analyzes every ignition in its territory and incorporates lessons learned as soon as possible based on the findings. These lessons learned have produced information on new variables (features) that are in the process of being included in the ignition models. For example, the angle between two wires crossing perpendicular from two different circuits on a single structure was identified as a potential factor in a 2019 ignition. We are now in the process of identifying all locations in HFA that have that condition. Once gathered, these locations will be included in the model as a new feature and the model will determine the importance of that feature relative to the other drivers of probability of ignition such as wire age, length, wind force, etc.. This activity is performed in real time as new information becomes available and is not subject to the 12-month cycle mentioned above.

A.II.e What confidence interval, in percent, does the utility use in its wildfire risk assessment?

>60%, or no quantified confidence interval	>80%	>90%	>95%

2020 YB Response: N/A
2023 YB Response: N/A
Comments: SCE has selected iv in the online survey due to requirement to respond to each question but would have otherwise selected N/A. SCE's PIL module uses machine learning algorithms, where confidence intervals are not part of running the model. The model performance is measured by AUC (area-under-curve), which is an output of the model. This curve is a measure of how well the model built using the training set of records was able to predict an outage creating a spark in the testing set of the records. This serves to help understand the predictive power of the model in a relative sense. SCE's PIL module currently has an AUC of over 0.8 whereas a value of 0.5 would indicate no predictive power and a value of 1.0 would indicate a perfect prediction.

For more information on AUC please refer to: Fawcett, Tom. "An introduction to ROC analysis." "Pattern Recognition Letters." 27 (2006) 861-874.
https://www.math.ucdavis.edu/~saito/data/roc/fawcett-roc.pdf

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**	
2020 YB Response: iv *2023 YB Response: iv* *Comments: SCE interprets this question to relate to fire propagation and impact modules.* *As highlighted in A.I.a, SCE currently uses Reax Engineering's methodology to estimate potential ignition consequence across SCE's HFRA area with 300 meter x 300 meter resolution. SCE's WRRM will further enhance SCE's understanding of consequence by allowing for robust scenario analysis.* *See WMP Section 4.3 and 5.3.1 for Capability 3*				

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:** structures burned, potential fatalities, or area burned	ii. As a function **of at least** potential fatalities, and one or both of structures burned, or area burned	iii. As a function of at least potential fatalities, structures burned, area burned, **monetary damages, impact on air quality, and impact on GHG reduction goals**		
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE's fire propagation and impact modules determine the expected area burned, number of structures impacted and potential impacts to safety, including fatalities, but has not incorporated impact on air quality or GHG reduction goals. SCE is open to partnering with stakeholders to determine if adding the additional capabilities in level iii aids utilities in addressing wildfire risk.*				

A.III.c Is the ignition risk impact analysis available for all seasons?

i. No	ii. Yes			

2020 YB Response: i
2023 YB Response: ii
Comments: As highlighted above, SCE's current propagation model leverages a subset of the worst historical weather, which does not explicitly account for seasonable variations. SCE is looking to incorporate potential seasonal variations for key model features during the implementation of the WRRM.

A.III.d How automated is the ignition risk estimation process?

Clarification: For clarification on level of automation please refer to the 'level of systematization and automation' in Table 2 of the Maturity Model. (i) in this case corresponds to level 0; (ii) corresponds to level 1 or 2; (iii) corresponds to level 3; and (iv) corresponds to level 4

i. Not automated	ii. Partially (<50%)	iii. Mostly (>=50%)	iv. Fully	

2020 YB Response: i
2023 YB Response: ii
Comments: SCE's fire propagation and impact modules generate a static output at this time. SCE anticipates that the implementation of the WRRM will enable a more automated process with more consistent updates. SCE will find opportunities to automate this tool where appropriate and has conservatively assessed its maturity at the ii level at this time.

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

2020 YB Response: v
2023 YB Response: v
Comments: SCE associates a consequence risk value to every asset in the HFRA. Note that consequence is calculated at a resolution of 300 meter x 300 meter via the REAX model and each asset is assigned the reax score within a given square. SCE is evaluating alternatives to the level shape and level of granularity to incorporate into the implementation of the WRRM module.

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**	
2020 YB Response: iii *2023 YB Response: iv* *Comments: REAX helped support the development of our current capabilities and selected our current weather scenario based on historical bad weather days. SCE is partnering with Technoslyva to enhance this capability through the deployment of the WRRM which will enable SCE to update weather scenarios using data from the previous fire weather season on an annual or semi-annual basis. Additionally, SCE will have elements of iv via FireCast and FireSim which are able to update the weather inputs to the WRRM model based on real-time conditions.* *REAX and Technosylva are both considered to be industry experts in the field of fire science and modelling.*				

A.III.g What other inputs are used to estimate impact?				
i. Level and conditions of **vegetation and weather**	ii. Level and conditions of **vegetation and weather, including the vegetation specifies immediately surrounding the ignition site**	iii. Level and conditions of **vegetation and weather, including the vegetation specifies immediately surrounding the ignition site and up-to-date moisture content, local weather patterns**	iv. None of the above	

2020 YB Response: i
2023 YB Response: iii
Comments: SCE currently uses static vegetation and weather information as inputs into the REAX model. For example, SCE uses LANDFIRE from the USFS which is based on 2014 data.
By 2023, the WRRM will utilize weather data calibrated to SCE's service territory to better inform the Fire Potential Index (FPI), an internal tool used to estimate wildfire potential based on forecast weather and fuel conditions. Inputs in to the FPI include wind, the dryness of the air near the ground, and vegetation moisture. Additionally, the WRRM will include a more up to date, dynamic, and granular vegetation data set to inform fire propagation analyses.

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 categorically (e.g. High, Medium, Low)	iii. Approach reliably estimates risk reduction potential of initiatives, on an ordinal scale (e.g. 1-5)	iv. Approach reliably estimates risk reduction potential of initiatives on an interval scale (e.g. specific quantitative units)	v. Approach reliably estimates risk reduction potential of initiatives on an interval scale (e.g. specific quantitative units) with a quantitative confidence interval

2020 YB Response: ii
2023 YB Response: iv
Comments: As outlined in WMP section 4.3, SCE uses two risk models for risk analysis on assets and mitigation effectiveness activities. SCE developed a risk framework and model which aligns with the requirements of its 2018 RAMP Report. The RAMP Model is used to assess risks across the company at a portfolio level using a common framework and for assessing the effectiveness of mitigation programs in terms of risk reduction and Risk Spend Efficiency (RSE). This model was used for the 2018 RAMP Report, and subsequently for the 2021 GRC, to calculate RSEs which are an input into determining the volume of work for a mitigation initiative. This model was enhanced for use in developing RSEs for the 2020 WMP.

SCE has also implemented a REAX-based Wildfire Risk Model (WRM) to identify and quantify wildfire risk score at a circuit/segment/structure level to inform the deployment locations and selection of mitigation programs. As discussed in SCE-01, Vol 2 of the 2021 GRC and WMP section 4.3, the WRM is comprised of three modules which it uses to estimate risk at the asset level: the PIL module, the Fire Propagation Module and Fire Impact Module.

SCE will base its 2020 response on the RAMP Model, although SCE has already developed many of the higher maturity levels through the REAX-based WRM, and its 2023 response on the WRRM throughout the remainder of section A.IV.

Note that from a PSPS resilience standpoint, SCE is prioritizing circuits and circuit-segments based on risk analysis that accounts for frequency of PSPS events, total number of customers, types of customer (for example, critical care, medical baseline, low income), critical facilities, and sectionalizing ability, among other things.

See WMP Sections 4.3, 5.3.1, 5.3.2 and 5.3.6 for details related to Capability 4

A.IV.b How automated is ignition risk reduction impact assessment tool?				
Clarification: For clarification on level of automation please refer to the 'level of systematization and automation' in Table 2 of the Maturity Model. (i) in this case corresponds to level 0; (ii) corresponds to level 1 or 2; (iii) corresponds to level 3; and (iv) corresponds to level 4				
i. Not automated	ii. Partially (<50%)	iii. Mostly (>=50%)	iv. Fully	
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE's RAMP model requires subject matter expertise and manual processing of data to form inputs to a Monte-Carlo simulation which generates risk and risk reduction outputs.* *SCE will likely increase the automation of the risk reduction tool through transition to the WRRM but has conservatively maintained a level ii response at this time.*				

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
2020 YB Response: ii *2023 YB Response: v* *Comments: SCE interprets "regional" to be a subset of its service territory. Risk reduction calculations for wildfire mitigations are performed at a portfolio level for the HFRA area, not the entire service territory so we have selected ii. As has been described previously, SCE intends to have asset level granularity by 2023 through the evolution of the WRRM.*				

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**	

2020 YB Response: iii
2023 YB Response: iii
Comments: SCE currently calculates risk reduction impact as the difference between baseline risk and the mitigated risk as calculated by SCE's RAMP model. SCE combines elements of iv (e.g., historical data), with qualitative analysis based on SME input in order to determine mitigation effectiveness assumptions per initiative. SCE notes that it has received feedback from external stakeholders through its RAMP proceedings and expects that external stakeholders will remain engaged in future RAMP proceedings. SCE anticipates that various stakeholders will remain actively involved through the RAMP process and will provide feedback on the WRRM when appropriate. Depending upon the ultimate definition of near misses, SCE may be able to reach a level iv maturity by 2023.

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**

2020 YB Response: iii
2023 YB Response: v
Comments: As highlighted in WMP section 4.2, SCE uses a risk bowtie to structure our understanding of risk drivers, risk, and outcomes. SCE has selected a current level of iii because existing hardware population, condition and operating history are implicitly included in the RAMP model via bowtie driver frequencies.

SCE's focus over the next three years will be to expand its PIL module to include more assets to prioritize resource allocation to the highest value locations and projects. Weather and vegetation information are incorporated in assessing the probability of ignition and consequence of ignition at an asset level. SCE currently does not dynamically include weather and vegetation data but does intend to evolve this capability through the evolution of the WRRM.

A.V Risk maps and simulation algorithms

Clarification on terminology: A risk map is a collection of data sufficient to represent the spatial distribution (e.g., across a geography) of a given type of risk (i.e., the probability of an event and its

consequence) and the spatial representation thereof. Risk maps may include maps of the probability of ignition along the utility's grid and may represent the consequences given ignition at various points along the grid. Risk maps may also combine these factors to show a weighted probability and consequence risk level across the utility's grid. Data inputs should include the variables and conditions used to calculate risk for a given point, line, or polygon. The risk mapping algorithm is a methodology or formula for interpreting a risk calculation from these data inputs.

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**		
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE updates its models at least once per year. The first Wildfire Risk Model used historical asset data and Reax data for fire propagation and impact modelling. Future iterations will refresh the asset data periodically. Additionally, fire propagation and impact modeling will be aligned with Technosylva, who maintains their models based on industry best practice.*				

A.V.b How automated is the mechanism to determine whether to update algorithms based on deviations?				
Clarification: For clarification on level of automation please refer to the 'level of systematization and automation' in Table 2 of the Maturity Model. (i) in this case corresponds to level 0; (ii) corresponds to level 1 or 2; (iii) corresponds to level 3; and (iv) corresponds to level 4				
i. Not automated	ii. Partially (<50%)	iii. Mostly (>=50%)	iv. Fully	
2020 YB Response: i *2023 YB Response: i* *Comments: SCE does not believe it is practical to automate the mechanism to update the algorithms because expert judgment and analysis is required. For example, if the model is predicting fewer failures than observed, SMEs have to analyze the deviations before making appropriate modeling or data input changes.*				

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	
2020 YB Response: ii *2023 YB Response: ii* *Comments: See response to A.V.b.*				

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**		
2020 YB Response: iii *2023 YB Response: iii* *Comments: Internal subject matter experts review any algorithm updates to SCE's risk models and any changes to the algorithms are vetted through SCE's risk governance team which currently includes executives from several organizations across the company. Algorithm updates take into consideration historical data as part of the update process.*				

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
2020 YB Response: iii *2023 YB Response: iv* *Comments: SCE currently uses historical ignition data, propagation data, and near-miss data to examine Distribution ignitions and fires. Because the frequency of ignitions originating from Transmission equipment is much less common, SCE considered information from all California IOU Transmission related ignitions reported to the CPUC. SCE would support the wider sharing and learning from ignition data and event studies with other utilities outside of California in the future.*				

B Situational awareness and forecasting

B.I Weather variables collected

Capability 6

B.I.a What weather data is currently collected?				
i. Wind data being collected is **insufficient** to properly understand risks along grid	ii. **Wind being measured** accurately enough along the grid to estimate ignition probability	iii. **Range of accurate weather variables (e.g. humidity, precipitation, surface and atmospheric wind conditions) that impact probability of ignition and propagation from utility assets**	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)	
2020 YB Response: iii *2023 YB Response: iii* *Comments: SCE takes the expected impact of weather such as conductor sway or flying debris and vegetation into consideration in estimating probability of asset failure or ignition risk, but currently does not have plans to extend modeling to include data regarding impact of weather on assets. SCE believes there may be value in technology that can produce accurate output at the asset level, but such technology does not exist today. SCE will evaluate any such technology as it becomes available.*				

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	
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE currently performs manual field calibrations on instrumentation. SCE aspires to reach automated field calibration in the future but has prioritized the other activities outlined throughout this WMP for deployment in the next few years.*				

B.I.c Are elements that cannot be reliably measured in real time being predicted (e.g., fuel moisture content)?				
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE estimates fuel moisture variables because real-time data is unavailable.*				

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		
2020 YB Response: iii *2023 YB Response: iii* *Comments: SCE uses multiple sources including weather stations and live fuel moisture sampling.*				

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 HFTD areas**	iii. Weather data has sufficient granularity to reliably measure weather conditions in HFTD areas, **and along the entire grid and in all areas needed to predict weather on the grid**	iv. Weather data has sufficient granularity to reliably measure weather conditions in HFTD areas, and along the entire grid and in all areas needed to predict weather on the grid. **Also includes wind estimations at various atmospheric altitudes** relevant to ignition risk	
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE does not have a weather station installed on every circuit across the grid at this time. However, SCE has been deploying additional weather stations to increase the granularity of weather condition data across the HFRA and will have at least one weather station installed on each circuit in the HFRA by 2023. SCE aspires to reach level iv but does not anticipate reaching that level until after 2023.*				

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
2020 YB Response: iv *2023 YB Response: iv* *Comments: Data is collected every ten minutes at weather stations. SCE does not believe increasing this frequency would significantly improve data modeling and forecasting because the existing collection frequency is already a reasonable reflection of real time weather conditions.*				

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
2020 YB Response: iii *2023 YB Response: iii* *Comments: SCE deploys weather stations at the circuit level. As noted in B.II.a, SCE does not yet have a weather station deployed on every circuit but plans to do so by 2023. SCE does aspire to collect weather data at the circuit segment level but does not have plans to do this prior to 2023.*				

B.II.d How automated is the process to measure weather conditions?				
Clarification: For clarification on level of automation please refer to the 'level of systematization and automation' in Table 2 of the Maturity Model. (i) in this case corresponds to level 0; (ii) corresponds to level 1 or 2; (iii) corresponds to level 3; and (iv) corresponds to level 4				
i. Not automated	ii. Partially (<50%)	iii. Mostly (>=50%)	iv. Fully	
2020 YB Response: iv *2023 YB Response: iv* *Comments: N/A*				

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**	
2020 YB Response: iii *2023 YB Response: iii* *Comments: SCE produces weather forecasts twice daily based on both internal and external weather data. SCE does not plan on increasing this frequency at this time. SCE is open to discussions with appropriate stakeholders to understand the potential benefits of the capabilities described in iv.*				

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		
2020 YB Response: i *2023 YB Response: i* *Comments: SCE produces a 5-day forecast with high resolution precision. SCE notes that reliable and specific weather data is not available from external or industry standard sources more than two 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

2020 YB Response: iii *2023 YB Response: iii* *Comments: SCEs forecasts are developed using data collected at the circuit level for all HFRA circuits. SCE aspires to increase the granularity of forecasts to the circuit segment level but does not currently have plans to do this prior to 2023. SCE believes that increasing the granularity of weather forecasts to span or asset level would offer little incremental value over a circuit-segment level.*

B.III.d How are results error-checked?				
i. Results are **not error checked**	ii. Results are **error checked against historical weather patterns**	iii. Criteria for option (ii) met, and forecasted results are subsequently error **checked against measured weather data**		
2020 YB Response: iii *2023 YB Response: iii* *Comments: Results are periodically calibrated against historical weather data based on model performance. This occurs when a sufficient number of weather stations are added to warrant a re-calibration or as significant forecast to actual deviations are identified.*				

B.III.e How automated is the forecast process?				
Clarification: For clarification on level of automation please refer to the 'level of systematization and automation' in Table 2 of the Maturity Model. (i) in this case corresponds to level 0; (ii) corresponds to level 1 or 2; (iii) corresponds to level 3; and (iv) corresponds to level 4				
i. Not automated	ii. Partially (<50%)	iii. Mostly (>=50%)	iv. Fully	
2020 YB Response: iii *2023 YB Response: iii* *Comments: SCE's vendor runs a series of scripts to gather external data. SCE runs its internal weather model which processes that data to produce SCE's weather forecasts.*				

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**	
2020 YB Response: iv *2023 YB Response: iv* *Comments: SCE uses proprietary and publicly available data sources for weather forecasting, and expert meteorologists use these various outputs to develop a more accurate, composite weather data set. Examples include: a proprietary weather model, NOAA Global Forecasting System, National American Mesoscale and the European Model.*				

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**

2020 YB Response: ii *2023 YB Response: ii* *Comments: Validating and performing QA/QC of weather station data is a manual process, which requires analysis and subject matter expertise. SCE aspires to reach levels of automation for these processes but has prioritized the other activities outlined throughout this WMP for deployment in the next few years.*

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		
2020 YB Response: iii *2023 YB Response: iii* *Comments: SCE routinely uses weather data to feed internal mapping tools and visual dashboards, which inform a variety of internal decisions. Some examples include, but are not limited to, when to activate an IMT, when to notify customers and stakeholders about potential PSPS events, and when to de-energize and re-energize customers during PSPS events. Weather data is additionally fed back into SCE's weather models to calibrate the model and inform future weather forecasts.*				

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			
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE receives wildland fire ignition reports through a variety of sources. The SCE Fire Management Team, SCE Grid Control Center (GCC), SCE Watch Office, SCE Distribution Operation Centers (DOCs) and SCE Switching Centers receive new fire start information from SCE employees in the field, fire agencies, news outlets, social media and ALERTWildfire cameras as ignitions occur. All reports are ultimately directed to the on-duty SCE Fire Management Officer. SCE Fire Management then contacts the jurisdictional fire agency to obtain location, acreage, direction and rate of spread to determine threat to SCE facilities and operations.* *SCE has not deployed fire detection technology, but SCE continues collaborate with and monitor industry for a viable machine learning solution which enables ignition detection, but one has not been deployed.*				

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**	
2020 YB Response: iii *2023 YB Response: iii* *Comments: SCE has deployed a system of cameras which allow first responder agencies and SCE to remotely validate reports of potential fire activity across SCE's service territory. Additionally, these cameras provide real-time situational awareness of fire activity once detected. Currently SCE has approximately 90% coverage across the HFRA. As highlighted in B.V.a, SCE aspires to enable camera detection capabilities via artificial intelligence but has not found a viable option to date and cannot predict when one will become available. SCE is open to continued adoption of new technologies, such as satellite monitoring in the future when commercially viable and prudent for our customers.*				

Additionally, SCE has highlighted the deployment of Meter Alarming for Down Energized Conductor (MADEC) in WMP Section 5.3.3, which we are piloting to remotely detect hazardous wire down conditions, and Distribution Fault Anticipation (DFA) and Early Fault Detection (EFD) technologies in WMP Section 5.3.2 which would allow SCE to preemptively identify potential grid failures.

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
2020 YB Response: iii *2023 YB Response: iii* *Comments: As described in B.V.a, SCE's Fire Management team contacts suppression forces and key stakeholders when a fire has been detected. SCE aspires to have an automatic process which accurately notifies suppression forces and key stakeholders in real time but does not expect to achieve that by 2023.*				

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		

2020 YB Response: i *2023 YB Response: i* *Comments: Currently, SCE does not have any active plans to deploy ignition detection software but will continue to monitor this technology for potential application in the future.*

C Grid design and system hardening

Clarification: 'Hardening' refers to grid hardening as defined in the WMP guidelines: 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.

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 prioritizes wildfire risk reduction initiatives at the span level based on i) risk modeling driven by local geography and climate/weather conditions, fuel loads and moisture content and topography ii) detailed wildfire and PSPS risk simulations across individual circuits	v. Plan prioritizes wildfire risk reduction initiatives at the asset level based on i) risk modeling driven by local geography and climate/weather conditions, fuel loads and moisture content and topography ii) risk estimates across individual circuits, including estimates of actual consequence, and iii) taking power delivery uptime into account (e.g. reliability, PSPS, etc.)

2020 YB Response: iv
2023 YB Response: v
Comments: Within the HFRA, SCE prioritizes deployment of wildfire mitigation activities using location-specific risk estimates and/or asset level probability of failure estimates where available. Note that elements of v. are in the process of being implemented this year. For example, we are developing work prioritization approaches to address PSPS impacts in 2020 by minimizing the frequency and scale of PSPS events. Please see WMP section 5.3.1 and 5.4 for additional detail for Capability 11.

C.II Grid design for minimizing ignition risk

Capability 12

C.II.a Does grid design meet minimum G095 requirements and loading standards in HFTD areas?				
i. No	ii. Yes	iii. Grid topology exceeds design		

2020 YB Response: ii
2023 YB Response: ii
Comments: SCE's design and maintenance standards are set to meet or exceed GO95 and loading standards. SCE performed an analysis of its service territory and designated certain areas as high wind areas, including portions of its HFTD areas. This analysis resulted in design standards using wind pressures of 12 pounds per square foot (psf), 18 psf and 24 psf, which exceed those specified in GO 95, which are 6 psf and 8 psf.

C.II.b Does the utility provide micro grids or islanding where traditional grid infrastructure is impracticable and wildfire risk is high?				
i. No	ii. Yes			

2020 YB Response: i
2023 YB Response: ii
Comments: SCE's 2020 PSPS Microgrid Pilot aims to deploy one or more microgrids by Fall 2020, pending evaluation of technical feasibility and cost effectiveness. The Pilot will help SCE gain an understanding of the technical/construction requirements and cost considerations of microgrid solutions. SCE is actively participating the CPUC's Microgrid OIR and anticipates that microgrids along with microgrid-related resiliency solutions may be cost-effective solutions to help mitigate PSPS impacts in the future.

C.II.c Does routing of new portions of the grid take wildfire risk into account?

i. Yes	ii. No			

2020 YB Response: ii
2023 YB Response: ii
Comments: Line routes are determined primarily by customer site specifics, future load growth, local ordinances, public streets, existing and planned Right-of-Ways and easement availability. Once the route has been identified, wildfire risk is taken into account when applying the design standards to ensure that the planned new construction is reducing wildfire risk to the greatest extent possible. Examples of such design standards choices include the use of covered conductor, FR poles and protection devices. Route selection for new construction of distribution lines does not take into consideration wildfire risk at this time.

SCE remains open to future discussions with the CPUC related to thoughts on how wildfire risk could potentially be added to routing considerations in the future.

C.II.d Are efforts made to incorporate the latest asset management strategies and new technologies into grid topology?

i. **No**	ii. Yes, some effort made in HFTD areas	iii. Yes, across the entire service area		

2020 YB Response: iii
2023 YB Response: iii
Comments: SCE actively monitors advancements by partner utilities, academia, and industry to incorporate new technologies and asset management strategies into our standards. SCE pilots new technologies on a limited scale to understand and assess the technical and construction requirements and, if successful, develops plans to deploy these technologies on a wider scale across the HFRA or service territory as appropriate. Please see WMP section 5.3.3 for examples of how SCE is incorporating new technologies into our mitigation plans.

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			
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE's transmission system is designed to protect the bulk electric system from N-2, and N-1-1 disturbances.*				

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	
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE interprets redundancy at the distribution level to mean quick restoration of service to customers from N-1 disturbances. At the distribution level, SCE's circuit design standards include circuit ties where feasible to neighboring circuits and isolating devices to allow load to be transferred to other circuits if needed. This design enables SCE to minimize the scale of outages during system failures. It is economically infeasible at this time for SCE to design a distribution system that is completely redundant, although SCE continues to investigate alternative grid architectures, including microgrids, which may further enhance the safety and reliability of our system. SCE is also increasing the number of circuit ties and automated switching devices to further minimize the impact of system failures in the future.* *The level ii assessment is based on SME judgement rather than a detailed circuit by circuit study which was infeasible in the short amount of time given to complete this survey. The response to this question can be further refined based on additional feedback and clarification on the intent of the question.*				

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	iii. **Switches** in HFTD areas to individually isolate circuits, such that no more than 2000 customers sit within one switch	iv. **Switches** in HFTD areas to individually isolate circuits, such that no more than 1000 customers sit within one switch	v. **Switches** in HFTD areas to individually isolate circuits, such that no more than 200 customers sit within one switch
2020 YB Response: v *2023 YB Response: v* *Comments: SCE plans the location of circuit ties and isolation devices based on load blocks and not specifically customer count. Across the ~1,100 distribution circuits within the HFTD, the median circuit value for the average number of customers (as measured by number of customer accounts) per switchable device on a circuit is 64. However, the average number of customers per switchable device on a circuit varies widely based for many factors including the topology and geography of the circuit. SCE is currently increasing the number of switches deployed throughout the HFTD, which will decrease the average number of customers per switch in the future. With this in mind, SCE has selected a v-level for this response, but notes that there are some circuits where there are more than 200 customers 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 mapped based on **traffic simulation** and taken into consideration for grid topology design	iv. Egress points available and mapped for each customer, with potential traffic simulated and taken into consideration for grid topology design, and **microgrids** or other means to reduce consequence for customers at frequent risk of PSPS	

2020 YB Response: i
2023 YB Response: i
Comments: SCE's current distribution design standards take the following features into consideration:

- *Climate zones: used to differentiate heat and coastal impacts on conductor and equipment*
- *Wind zones: used to differentiate wind gust conditions for proper pole loading*
- *Altitude: used to differentiate loading of OH equipment based on snow accumulation*
- *B322: used to identify proper selection of fusing and conductor spacing in high fire areas*
- *HR risk: used to identify proper fire-resistant pole type in proximity to high density areas (Q1 2020 release target)*
- *Vegetation proximity: used to identify proper splicing and dead ending of OH lines*
- *Traffic loading: used to identify proper structure selection based on vehicle or pedestrian traffic patterns*
- *Community zoning master plans: used to capture future load growth requirements*

These features are used in conjunction with planned and future kVA loading to ensure designs are prepared to maximize employee safety and system operability and reliability.

Egress is not currently used for grid topology but is used for PSPS planning purposes. For example, in its 2020 WMP, SCE is proposing selective undergrounding in areas that meet specific including limited egress routes. SCE will apply lessons learned on a going forward basis and is willing to discuss the potential use of egress points in future grid design.

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?				
Clarification: 'Hardening initiatives' refers to all initiatives implemented by utility or by other utilities in California				
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		
2020 YB Response: ii *2023 YB Response: iii* *Comments: See RSE calculations in Tables 21-30. SCE's transition to the PIL module will enable risk efficiency calculations specific to different locations across the grid by 2023.*				

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
2020 YB Response: ii *2023 YB Response: v* *Comments: The RSEs shown in the WMP are estimated across the HFRA region using the model used for SCE's RAMP and GRC filings. However, we are currently transitioning to the WRRM which we intend to be the basis for these calculations in the future. In this model, risk reduction can be estimated at asset level for certain asset-level mitigations and an average unit cost can be estimated at asset level. In some cases, it may be more appropriate to estimate the risk reduction and associated unit costs for a collection of assets instead of on an individual asset basis.*				

C.IV.c How frequently are estimates updated?

i. Never	ii. Less frequently than annually	iii. Annually or more frequently		
2020 YB Response: iii *2023 YB Response: iii* *Comments: N/A*				

C.IV.d What grid hardening initiatives does the utility include within its evaluation?				
Clarification: 'All Hardening initiatives' refers to all initiatives implemented by utility or by other utilities in California				
i. None	ii. Some	iii. Most	iv. All	v. All, supported by independent testing
2020 YB Response: iii *2023 YB Response: iii* *Comments: SCE prioritizes risk evaluation on major activities and asset strategies and is continuing to explore how best to incorporate risk analysis into the evaluations of emerging technologies and pilots.* *See WMP Tables 21-30 for more detail*				

C.IV.e Can the utility evaluate risk reduction synergies from combination of various initiatives?				
i. No	ii. Yes			
2020 YB Response: i *2023 YB Response: ii* *Comments: SCE has preliminarily explored risk reduction synergies and is continuing to search for more rigorous solutions. SCE welcomes further engagement with stakeholders in developing consistent methodologies by 2023.*				

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	
2020 YB Response: iii *2023 YB Response: iii* *Comments: SCE assesses the potential value of new initiatives based on industry knowledge, SME expertise, and testing, where practical. SCE field-tests these initiatives via limited scale pilots. When we pilot solutions, we evaluate success based on the intended function of the apparatus, which may not specifically be measured in terms of ignitions avoided. For example, performance for our wire-down detection algorithms may be measured in terms of the false positive and false negative rates of wire down detection instead of the quantity of ignitions avoided. Once we have sufficient data on outcome metrics to facilitate long term trend analysis, we can use results of analyses to modify/enhance our hardening initiatives. Note that we may not be able to evaluate the direct impact from our hardening solutions on ignitions or outcome metrics for several years as the number of ignitions is relatively small and it will take a number of years for SCE to widely deploy many key initiatives. SCE does not currently have plans for independent evaluation of new initiatives but is open to discussions with stakeholders on the potential benefits of such evaluation.*				

C.V.b Are results of pilot and commercial deployments, including project performance, project cost, geography, climate, vegetation etc. shared in sufficient detail to inform decision making at other utilities?				
i. No	ii. **Yes, with limited partners**	iii. Yes, **extensively with industry, academia, and other utilities**		

2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE shares appropriate information with some partners and industry parties (e.g. IEEE, EEI) if results of pilot and commercial deployments are deemed helpful and necessary to advancing or improving the technology. For example, SCE has been sharing technical information about covered conductor in multiple California IOU forums, as well as with organizations such as IEEE, EEI, etc. Additionally, SCE will look to share lessons learned from our Rapid Earth Fault Current Limiter (REFCL) pilot once completed. SCE is open to exploring how to improve sharing of appropriate information to support wildfire decision-making in the future.*

C.V.c Is performance of new initiatives independently audited?				
i. No	ii. Yes			
2020 YB Response: i *2023 YB Response: i* *Comments: SCE does not currently have plans for independent external audits on the performance of new initiatives but is open to discussions with stakeholders on the potential benefits such efforts.*				

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 territorywide 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**
2020 YB Response: iii *2023 YB Response: iv* *Comments: SCE maintains a centralized system for asset-related information, which includes maintenance requirements based on the latest inspection that indicates the state of wear for structures and equipment. The data housed in SCE's centralized system is a living dataset, that is constantly updated as the equipment is repaired, inspected, and replaced. In WMP Section 5.3.7, SCE highlights improvements that we intend to make in our data management and governance process which will improve the quality of, and access to, SCE's asset data. At this time, SCE anticipates that it will reach level iv by 2023.* *SCE is also enhancing its Work Management capabilities through the deployment of a new platform that will integrate a broader range of planned work activities, including both repairs and replacements, by 2023.* *SCE is also enhancing its Asset Management capabilities by developing asset class strategies which will include asset population and asset health. The strategies will integrate activities across an asset's*				

lifecycle to form a cohesive approach to inspection, maintenance, operations, upgrades or replacement aligned with defined objectives. As they relate to wildfire risk, these asset class strategies will incorporate key asset characteristics, managed under the data governance framework described in Category G, which drive probability and consequence of failure to determine appropriate inspection frequencies, maintenance requirements, operating restrictions and replacement rates. SCE does not currently have plans for independent audits but is open to discussions with stakeholders on the potential benefits of undertaking such audits.

D.I.b How frequently is the condition assessment updated?				
i. Never	ii. Annually	iii. Quarterly	iv. Monthly	v. Hourly
2020 YB Response: iv *2023 YB Response: iv* *Comments: SCE conservatively selected this response given the available response options. Based on inspection results, most condition assessment data is updated in the centralized system within days after field inspection is completed.*				

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**	

2020 YB Response: ii
2023 YB Response: iii
Comments: SCE has already deployed technologies that can detect and report potential malfunctions before they cause ignition. MADEC, an industry leading technology developed by SCE, which remotely detects wire down signatures and other system anomalies by examining AMI voltage data, enabling SCE operators to proactively isolate potential problems on SCE's distribution grid, has been applied broadly across SCE's service area. SCE is continuing to advance the detection algorithm used in MADEC. Please see WMP section 5.3.3 for additional details.

Additionally, SCE is piloting technologies such as Distribution Fault Anticipation (DFA) and Early Fault Detection (EFD) to proactively detect incipient malfunctions. As these technologies continue to mature, SCE will further expand their applications to increase our grid monitoring capability. SCE will also continue to evaluate additional technology which provides these capabilities. Please see WMP section 5.3.2 for additional details.

SCE notes that the operation of the grid is complex and has many interdependent factors that contribute to potential system anomalies. As such, de-energization of electric lines based on these emerging technologies without trained expert human judgement is not a desired state in the foreseeable future.

D.I.d How granular is the inventory?				
i. There is **no inventory**	ii. At the **span** level	iii. At the **asset** level		
2020 YB Response: iii *2023 YB Response: iii* *Comments: N/A*				

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		

2020 YB Response: iii
2023 YB Response: iii
Comments: In GO 165, patrol inspections are defined as a simple visual inspection, of applicable utility equipment and structures, that are designed to identify obvious structural problems and hazards.

SCE meets regulatory requirements by performing annual patrols of all assets and exceeds regulatory requirements by performing annual grid patrols in the rural areas. SCE hopes to work with the relevant CPUC divisions to evolve interval-based inspection schedules in the future.

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	

2020 YB Response: i
2023 YB Response: i
Comments: SCE operates its patrol program on a grid basis to increase operational efficiency. Inspecting on a grid basis means to inspect a group of assets in geographic proximity instead of by individual assets scattered across the service territory. This approach has helped to reduce travel time per inspection and levelize the number of inspections, and subsequent repairs, required each year. As noted, in response to D.II.a, patrols are simple visual inspections, and are required to be performed yearly.

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	
2020 YB Response: i *2023 YB Response: i* *Comments: See response in D.II.b*				

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		
2020 YB Response: iii *2023 YB Response: iii* *Comments: In GO 165, detailed inspections are defined as inspections 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.* *SCE has historically maintained a detailed inspection frequency that met and/or exceeded regulatory requirements. In early 2020, SCE implemented a revised detailed inspection program in which SCE determines inspection frequency for each asset using an improved risk-informed approach. In the 2020 WMP, our objective is to prioritize the inspection of structures that present the highest risk, based on the probability of ignition and consequence, and to inspect them annually (going beyond the current regulatory requirement of five year inspection cycles for distribution assets and three year inspection cycles for transmission assets) until other mitigation measures are in place to warrant further adjustments. Please see the WMP Section 5.3.4 for additional details.* *Also, note that SCE performed inspections on all its distribution and transmission assets in 2019 to identify potential ignition risk associated with electric infrastructure. These inspections were incremental to SCE's detailed inspection program and were designed to proactively identify potential issues ahead of the 2019 fire season.*				

D.II.e How are detailed inspections scheduled?				
i. Based on annual or periodic **schedules**	ii. Based on **up-todate 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	
2020 YB Response: iii *2023 YB Response: iii* *Comments: As described in D.II.d, SCE is setting inspection frequency at an asset level utilizing a risk-informed approach. SCE is prioritizing the order of these inspections based on both the probability and consequence of ignition as calculated in the WRM, to be replaced by WRRM in the future. SCE will continue to promote operational efficiencies by grouping inspections together where feasible. In some cases, the expected inspection date in the new program won't occur until after the previous detailed inspection deadline. In these cases, SCE will meet existing overhead detail inspection deadlines until all assets are inspected under the new program. SCE also plans to exceed current program requirements and detail inspect transmission assets on an annual basis.*				

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	
2020 YB Response: ii *2023 YB Response: ii* *Comments: See response to D.II.e*				

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		
2020 YB Response: iii *2023 YB Response: iii* *Comments: SCE performs inspections to meet the minimum compliance frequency but goes beyond minimum requirements when deemed necessary and if resources are available. For example, GO165 requires a 20-year cycle for intrusive pole inspections, but based on our analysis, we have opted for a 10-year inspection frequency. In the 2020 WMP, we propose prioritizing the inspection of structures that represent highest risk based on the probability of ignition and consequence, and detail inspect them annually going beyond the current regulatory requirement of five year inspection cycles for distribution assets until other mitigation measures are in place to warrant further adjustments.*				

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	
2020 YB Response: i *2023 YB Response: i* *Comments: The criteria for how inspections beyond patrols and detailed inspections can vary by type of inspection taking several factors into account such as analysis of the effectiveness on inspection cycles in identifying structure or equipment degradation, work management efficiencies, and emergent issues. SCE's wood poles are intrusively inspected by grid at a 10-year interval to promote operational efficiencies. As mentioned in response D.II.a, SCE hopes to work with the relevant CPUC divisions to evolve interval-based inspection schedules in the future.*				

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	
2020 YB Response: i *2023 YB Response: i* *Comments: See comment to D.II.h*				

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**		
2020 YB Response: iii *2023 YB Response: iii* *Comments: SCE interprets this question to be about its detailed inspection program. SCE's detailed inspection checklists contain questions specific to equipment and lines relevant to understanding asset condition and minimizing the potential for ignitions. The checklists also contain data capture requirements for inspectors, so that SCE can advance the development of asset class strategies as it continues to seek to reduce the likelihood of ignitions associated with SCE facilities.*				

D.III.b How are procedures and checklists determined?				
i. Based on s**tatute 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**	

2020 YB Response: ii
2023 YB Response: ii
Comments: In 2019, SCE began shifting its approach from a compliance-based one toward a risk-informed one by developing enhanced inspection procedures and checklists.

SCE leveraged SME experience and engineering judgement to determine which information to collect during inspections to inform our understanding of asset condition. SCE is currently using different checklists for assets tailored to each asset class. Checklists have been designed to be "intelligent" so that questions are informed by answers to previous questions on the checklist. For instance, if the inspector selects that there is a transformer on a pole, the checklist will update to ask for the condition of the transformer. SCE has deployed this for distribution assets and is in the process of deploying this for transmission assets in 2020. Beginning in 2020, predictive modeling will help inform which assets are inspected first and the frequency with which they will be inspected on a going forward basis based on the underlying risk characteristics of the assets.

SCE does not currently have plans for validation by external experts, but is open to discussions with stakeholders on the potential benefits of such engagement.

Please see WMP section 5.3.4 for additional details.

D.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

2020 YB Response: i
2023 YB Response: i
Comments: SCE has standardized training for overhead inspectors across the service territory which covers the range of assets they're deployed to inspect. This approach enables our distribution and transmission inspectors to reliably perform inspections on a diverse set of assets across SCE's territory. Providing training at more granular levels would be impractical and inefficient. Therefore, SCE is unclear about the value of customized granular training and procedures. At this time, SCE does not plan to further customize trainings at the levels of granularity presented in the available responses.

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**		
2020 YB Response: iii *2023 YB Response: iii* *Comments: SCE is identifying and completing additional maintenance in the HFRA by performing inspections on a more frequent basis than required by GO 165. SCE is also implementing alternative types of inspections (e.g. aerial, infrared) in the HFRA which are identifying additional maintenance requirements beyond what can be identified from ground-based inspections alone.*				

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	
2020 YB Response: i *2023 YB Response: ii* *Comments: See answer to D.IV.a.* *Note that SCE may have elements of iii-level capabilities due to the deployment of the DFA and EFD pilots described in WMP Section 5.3.2. If these pilots are successful, SCE will be able to remediate latent issues prior to equipment failure.*				

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		
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE's maintenance and repair procedures are driven by inspection results, field observations, and equipment performance issues. Repairs and remediations are prioritized for completion in accordance with GO 95 Rule 18 timeframes based on reliability, safety or wildfire risks posed by equipment/structure operations or conditions.* *SCE's maintenance and repair procedures also take field conditions into account. While performing repairs, SCE has clearly defined work-restrictions which take effect under conditions more prone to wildfires. While in effect, SCE and contract crews are required to have mitigations in place to suppress an incipient fire or are prohibited from performing repairs altogether. SCE uses these work restrictions to further ensure that it does not unintentionally cause an ignition.*				

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 semiautomated 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)	
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE uses a combination qualified electrical workers and other SCE personnel to perform independent field quality reviews of completed work performed by SCE personnel and contractors. SCE is not intending to automate this practice in the next few years.*				

D.V.b Do contractors follow the same processes and standards as utility's own employees?				
i .No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: Contractors perform work in accordance with SCE standards and requirements.*				

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
2020 YB Response: iv *2023 YB Response: iv* *Comments: QA/QC on SCE crew and contractor work is performed regularly and the results from quality reviews are shared with SCE employees and contractors on a regular basis. In some instances, Crew Foremen and Supervisors provide real time feedback. SCE believes that regular feedback is sufficient to meet the objectives of the QA/QC program at this time.*				

D.V.d How is work and inspections that do not meet utility-prescribed standards remediated?				
i **.Lack of effective remediation** for ineffective inspections or low-quality work	ii. **QA/QC information is used to identify systemic deficiencies** in quality of work and inspections	iii. QA/QC information is used to identify systemic deficiencies in quality of work and inspections, **and recommend training based on weaknesses**	iv. QA/QC 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	
2020 YB Response: ii *2023 YB Response: iii* *Comments: Work deficiencies that need remediation are tracked as non-conformances until resolved. SCE is planning to further enhance the feedback mechanism between QA/QC findings and future inspection trainings within the next few years, but at this time does not anticipate use of customized or specific pre-made and tested training by 2023.*				

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

2020 YB Response: ii
2023 YB Response: ii
Comments: SCE interprets this question to refer to all contractors. SCE's asset management system is SAP which tracks work completed by all crews including contractors.

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**
2020 YB Response: iv *2023 YB Response:* iv *Comments: SCE categorizes vegetation species by slow, medium, and fast expected annual growth rates. There are no predominant species in our service territory outside of forests, which represent less than 10% of our service territory. Thus, "high risk" relates to growth rate, species, and location rather than categorized by individual trees. Given the volume of trees in our service territory, SCE does not believe it is practical to collect individual tree health and moisture content for all trees in SCE's service territory in the future.*				

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

2020 YB Response: v *2023 YB Response:* v *Comments: N/A*

E.I.c Are inspections independently verified by third party experts?				
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response:* ii *Comments: SCE's contracted tree trimmers provide an implicit check on the inspection process by adding trees to the work list that weren't originally flagged by inspectors. Subsequently, SCE maintains a contracted QC program which reviews a sample of trees to validate inspection and trimming activities.*				

E.I.d How granular is the inventory?				
i. Regional	ii. Circuit-based	iii. Span-based	iv. Asset-based	
2020 YB Response: iv *2023 YB Response: iv* *Comments: SCE does not specifically tie trees to assets within the inventory. However, SCE maintains geolocation information for both trees and assets and can determine proximity for each tree to the closest asset. Therefore, SCE rated itself to the asset-based level.*				

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		
2020 YB Response: iii *2023 YB Response: iii* *Comments: The CPUC requires that SCE maintains adequate line clearance with vegetation but does not require a specific inspection frequency. FERC requirements include an annual inspection, which SCE's program meets. SCE's vegetation management program (inspection frequency and trim distance) has been structured to promote compliance with mandated clearance requirements for at least one year, until SCE returns for the next inspection. In addition to annual inspections that formally document tree conditions, SCE inspects all inventory midway through the cycle (after 6 months) to identify trees that cannot maintain conformance for the remainder of the cycle.*				

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	
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE maintains a map-based database of tree inventory that documents each tree's species. Inspections are based on the defined inspection frequency and grouped for operational efficiency. Because the majority of SCE's territory includes a variety of tree species with different growth rates, it is not efficient to schedule inspections based on predominant species and we have opted to maintain an inspection schedule that addresses the typical growth rates of the fast growing species. Rather than adjust inspection frequency, SCE varies the pruning distance and frequency to match the inspection cycle. SCE believes there would be value in advanced predictive modeling technology that takes into*				

account species growth rates, soil content, weather, thus enabling SCE to further refine its schedule process. This technology does not exist today, but SCE would evaluate any such technology as it becomes available.

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**
2020 YB Response: ii *2023 YB Response: ii* *Comments: Currently, scheduling of vegetation inspections is not based on annual growing conditions or weather-related geographical data due to limited resources to perform the inspections. However, SCE does conduct supplemental inspections based on such conditions. For example, in 2019 additional "summer readiness" patrols were instituted during the summer growth season in part because of the preceding wet winter. In addition, tree pruning is based on growth rates, and may be modified based on weather conditions (e.g., may trim 10 inches in a high rainfall year versus 6 inches in prior years). See also SCE's response to E.II.b. SCE notes that E.II.b and E.II.c can potentially be combined in future surveys.*				

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**		
2020 YB Response: iii *2023 YB Response: iii* *Comments: There is no statute or regulation that specifies procedures and checklists. Current regulations require maintaining minimum clearance and mitigating hazardous trees. SCE's utility vegetation management procedures include information on vegetation types and procedures for how to handle each type.*				

E.III.b How are procedures and checklists determined?				
i. Based on s**tatute 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	

2020 YB Response: ii
2023 YB Response: ii
Comments: There is no statute or regulation that applies to vegetation inspections, but SCE has developed standard checklists, training, and procedures for use across its service territory. Although SCE does not have a machine learning-based predictive model, SCE uses a tree growth rate model based on an expected H/M/L growth rate by species to help guide appropriate pruning distance. Additionally, procedures document different pruning standards based on conductor type. SCE does not currently have plans for external evaluation but is open to discussions with stakeholders on the potential benefits of such engagement.

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

2020 YB Response: ii
2023 YB Response: ii
Comments: SCE interprets "region" to be a subset of its service territory. SCE has standard checklists, training, and procedures defined for the HFRA (distinct from what is defined for the non-HFRA). Accordingly, SCE selected level ii maturity for this response. SCE's work includes remediation customized by species and different pruning standards based on whether the tree is in a HFRA or non-HFRA. SCE believes that this level of customization of checklists, training, and procedures by species is more relevant to the work being performed than geographic granularity. This is because there are various tree species in the same geographic regions for the majority of SCE's service territory. Therefore, SCE does not have plans to develop checklists, training, and procedures focused around geographic granularity.

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 equipment	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		
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE is in substantial compliance with minimum statutory and regulatory requirements related to clearance around lines and equipment. As issues are identified between the applicable clearance cycles, there is a process in place to perform the required remediation. Since the HFTD Decision D.17-12-024, SCE adopted the Commission's recommended clearances (which exceed minimum standards) in its HFRA as achievable. SCE has conservatively selected a level ii maturity for this response.*				

E.IV.b	**Does utility meet or exceed minimum statutory or regulatory clearances during all seasons?**			
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: See response to E.IV.a*				

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		

2020 YB Response: ii
2023 YB Response: ii
Comments: SCE has adopted the Commission's recommended clearance around lines and equipment in HFRA at the time of trimming as established in GO 95, Rule 35, Appendix E. The recommendation was made in conjunction with the redrawing of Tier 2 and 3 map boundaries that were determined by ignition and propagation risk modeling.

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		

2020 YB Response: ii
2023 YB Response: ii
Comments: See response to E.I.a. Additionally, SCE modifies the clearance distance standards in accordance with expected growth rates for a particular tree's circumstances. For example, a tree located near a year-round water source may require deeper pruning than a tree of the same species in a location where it does not receive water.

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

2020 YB Response: ii
2023 YB Response: ii
Comments: SCE's clearance distances are based upon regulation requirement. Though SCE adopted Commission recommended clearances at the time of trim in HFRA, some communities limit us from meeting the CPUC-recommended clearance levels, which exceed the regulation requirement. In the case of these exceptions, SCE does engage with communities with regard to protocols for when and how tree pruning is performed. Note that SCE is obligated to trim trees, regardless of community preference, if the tree will infringe upon the regulatory clearance requirement and will continue to pursue discretionary clearance distances that support public safety goals.

E.IV.f Does the utility remove vegetation waste along its right of way across the entire grid?

i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: N/A*				

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 week	iii. Within 1 week or less	iv. On the same day	
2020 YB Response: iv *2023 YB Response: iv* *Comments: SCE's procedures and expectations are that vegetation waste will be removed on the same day as cutting. However, in some limited cases, this time may extend to up to one week (e.g., large trees may take longer for removal).*				

E.IV.h	**Does the utility work with local landowners to provide a cost-effective use for cutting vegetation?**			
i. No	ii. Yes			
2020 YB Response: i *2023 YB Response: i* *Comments: SCE interprets this question to relate to the act of cutting vegetation. SCE's contractors select the most efficient means for managing vegetation which complies with ANSI pruning standards.*				

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			
2020 YB Response: i *2023 YB Response: i* *Comments: SCE's pruning contractors are incentivized to identify cost-effective uses for vegetation waste through the competitive bidding process. However, SCE does not actively seek out alternatives on behalf of its contractors. SCE does not currently have plans to work with partners on this issue, but is open to discussions with stakeholders on the potential benefits of such engagement.*				

E.V Vegetation fall-in mitigation

Capability 25

E.V.a Does the utility have a process for treating vegetation outside of rights-of-way?				
i. Utility **does not remove** vegetation outside of right of way	ii. Utility **removes some** vegetation outside of rights-of-way	iii. Utility **systematically removes** vegetation outside of right of way	iv. Utility systematically removes vegetation outside of right of way, informing relevant communities of removal	
2020 YB Response: iv *2023 YB Response: iv* *Comments: SCE has a Hazard Management Tree Program (HTMP) to identify hazardous trees outside of rights-of-way. Through this program, SCE is systematically removing trees outside of its rights-of-way that are assessed to be a hazard. SCE aspires to provide communications to property owners and communicates in as many cases as possible. Accordingly, SCE has conservatively selected a level iv maturity for this response. See WMP Section 5.3.5 for additional details.*				

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	

2020 YB Response: iv
2023 YB Response: iv
Comments: This information is identified in SCE's HTMP. In HFRA, trained personnel assess trees for strike potential and structural integrity, including numerous tree and site attributes. SCE began the program in 2019 and over the next number of years will complete the HFRA. In addition, SCE's Dead, Dying, and Diseased tree removal program has been in place since 2003, and includes conducting patrols 2-4 times/year. See WMP Section 5.3.5 for additional details.

E.V.c Is vegetation removed with cooperation from the community?

i. No	ii. Yes			

2020 YB Response: ii
2023 YB Response: ii
Comments: SCE engages with local governments and property owners but sometimes encounters resistance regarding vegetation removal. This resistance often takes the form of local governments not granting SCE access to removing hazard trees within their jurisdiction or property owners inhibiting SCE from removing trees from their property.

E.V.d Does the utility remove vegetation waste outside its right of way across the entire grid?

i. No	ii. Yes			

2020 YB Response: ii
2023 YB Response: ii
Comments: N/A

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	

2020 YB Response: iv
2023 YB Response: iv

Comments: See response to E.IV.g. SCE notes that some of the questions for this capability may be combined with the previous one going forward.

E.V.f Does the utility work with local landowners to provide a cost-effective use for cutting vegetation?				
i. No	ii. Yes			
2020 YB Response: i *2023 YB Response: i* *Comments: See response to E.IV.h*				

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			
2020 YB Response: i *2023 YB Response: i* *Comments: See response to E.IV.i.*				

E.VI QA/QC for vegetation management

Capability 26

E.VI.a How is contractor and employee 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 semiautomated 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)	
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE's quality control and assurance process uses a tiered strategy to verify contractors are performing in accordance with SCE's standards. The first level of defense is a sample of contractors' work which is reviewed by internal vegetation operations personnel. A second level is performed by independent contractors at a higher sample rate. Vegetation work (pre-inspection, pruning, HTMP) are all performed by contractors and therefore SCE does not audit employees. In the future, if SCE uses employees to perform these activities, auditing employee activities will be included in the oversight program. There is no current plan to automate the audit process, however if technology becomes available that could assist SCE in audit capability, SCE will evaluate the feasibility of using such technology.*				

E.VI.b Do contractors follow the same processes and standards as utility's own employees?				
i .No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii*				

Comments: Note that all vegetation work (pre-inspection, pruning, HTMP) is performed by contractors at this time.

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

2020 YB Response: iv
2023 YB Response: iv
Comments: Results of QC inspections are reviewed monthly and feedback is provided to contractors on a monthly basis in order to drive performance improvement. SCE currently does not plan on implementing real-time QA/QC reviews.

E.VI.d How is work and inspections that do not meet utility-prescribed standards remediated?

i **.Lack of effective remediation** for ineffective inspections or lowquality work	ii. **QA/QC information is used to identify systemic deficiencies** in quality of work and inspections	iii. QA/QC information is used to identify systemic deficiencies in quality of work and inspections, **and recommend training based on weaknesses**	iv. QA/QC 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	

2020 YB Response: ii
2023 YB Response: iii
Comments: When QA/QC identifies work that does not meet utility-prescribed standards, the required work to correct the deficiency is prescribed and performed. As the QA/QC program matures, trending of performance data will identify performance gap areas where appropriate training can be provided to close any identified performance gaps.

E.VI.e Are workforce management software tools used to manage and confirm work completed by subcontractors?

i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE interprets the question to apply to all contractors.*				

F Grid operations and protocols

F.I Protective equipment and device

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	
2020 YB Response: iv *2023 YB Response: iv* *Comments: During National Weather Service Red Flag Warnings or SCE issued Fire Weather Threats, SCE blocks reclosing devices and employs fast-curve settings on protective equipment. The fast curve settings have a study mode which runs during PSPS events and monitors a device's sensitive settings to determine if a relay operation would have occurred had the settings not been activated.* *Additionally, SCE identifies near misses before and after PSPS events, during pre- and post-PSPS patrols, and prior to PSPS re-energizations. Additionally, SCE has and will continue to evaluate and deploy emerging technologies which will allow SCE to de-energize conductors prior to causing an ignition in the future. See WMP sections 5.3.2 and 5.3.3 for additional details.*				

F.I.b Is there an automated process for adjusting sensitivity of grid elements and evaluating effectiveness?			
Clarification: For clarification on level of automation please refer to the 'level of systematization and automation' in Table 2 of the Maturity Model. (i) in this case corresponds to level 0; (ii) corresponds to level 1 or 2; (iii) corresponds to level 3 or 4			
i. No automated process	ii. Partially automated process	iii. Fully automated process	
2020 YB Response: ii			

2023 YB Response: ii *Comments: SCE's operators manually trigger a fully automated process for adjusting sensitivity of grid devices. This means that an operator sends a command to a group of devices to automatically change their sensitivity levels. SCE will continue to monitor technology advancements but does not anticipate a technological solution allowing full automation to be in place by 2023. Accordingly, SCE has conservatively selected a level ii maturity for this response.*

F.I.c Is there a predetermined protocol driven by fire conditions for adjusting sensitivity of grid elements?				
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: Yes, SCE adjusts sensitivity and recloser settings during NWS Red Flag Warnings or SCE issued Fire Weather Threats conditions pursuant to SCE's System Operating Bulletin (SOB) 322 which outlines the operational protocols within HFRA. Please see WMP section 5.3.3 for additional details.*				

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			
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE operates its equipment with planned loading limits and emergency loading limits which specify magnitude and duration of acceptable overcurrent. SCE operates the distribution system within a specified voltage band and has protection devices to proactively protect against voltage and current spikes.*				

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			
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE tracks both current and loading at the circuit level. SCE tracks voltage at the substation (i.e. bus) level and also tracks voltage at the AMI level.*				

F.II.c	**Does the utility use predictive modeling to estimate the expected life and make equipment maintenance, rebuild, or replacement decisions based on grid operating history, and is that model reviewed?**			
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** and verified by historical data		
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE uses predictive models for equipment failures for specific categories of equipment (such as distribution cable, switches, and overhead conductors). These models identify probabilities of failure at the individual asset level and are used as part of asset failure risk analysis. This can both "shorten" the expected life of some equipment (i.e., high-risk assets identified for pre-emptive replacement) and*				

"lengthen" the expected life of other equipment (i.e., low risk assets allowed to remain operational). Additional discussion of SCE's predictive models for equipment failure is provided in SCE's 2021 GRC (SCE-02 Volume 01 pages 8-11). Where SCE has developed predictive models to prioritize system investment based on expected risk of failure, SCE incorporates operating history into its predictive models, by "training" these models in a manner similar to that described in SCE's comments to question A.II.e above. SCE does not measure the specific amount of life lost (or gained) based on operating history alone. SCE does not currently have plans for conducting external evaluations but is open to discussions with stakeholders on the potential benefits of engagement with 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 wildfire	iii. Never		
2020 YB Response: iii *2023 YB Response: iii* *Comments: SCE interprets rating to be defined as our short and long-term emergency loading limits or defined voltage band. SCE does not purposely operate beyond these limits and takes operational steps necessary in order to stay within these limits.*				

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	
2020 YB Response: iv *2023 YB Response: iv* *Comments: SCE interprets this question to mean the percent of customers who were de-energized when the underlying PSPS wind threshold wasn't exceeded. SCE works to minimize that number by basing de-energization on based on real-time conditions (e.g. observed weather or imminent hazards observed in the field) instead of on an initial forecast.* *Please note that SCE notifies our customers based on an initial forecast of expected future wind conditions, which can lead to circumstances where we notify customers, but ultimately do not de-energize them. The forecasting process is used for preparational and notification purposes. In 2019, 24% of circuits where we forecast to have PSPS events (and whose customers were ultimately notified) were subsequently de-energized.*				

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

2020 YB Response: ii
2023 YB Response: v
Comments: In the most recent PSPS event, SCE notified all customers based on the contact information and notification preferences that they have provided to us. We note however, there are instances in which the weather or field conditions rapidly change that lead to de-energization events without sufficient time to notify customers ahead of de-energization. SCE has not included the additional customers impacted by PSPS due to rapid weather changes in its calculation. SCE also notes, that though SCE achieved a high contact rate with customers in some of the PSPS events in 2019, there were significant challenges in others, especially during the October 2019 event. SCE has analyzed and improved its performance in this area since then, and is further improving operational processes to maintain the highest level of communication with all customers impacted by PSPS, and especially the medical baseline customers. SCE aspires to reach level v by 2023.

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

2020 YB Response: iii
2023 YB Response: iii
Comments: SCE provides data on customer complaints in its ESRB-8 reports, which includes total customer complaints received through the CPUC related to PSPS events.

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

2020 YB Response: i
2023 YB Response: i
Comments: SCE's website did not go down during past PSPS events. In addition, in response to increased website traffic during PSPS events, SCE enhanced cloud network capability to increase capacity, established an alternate PSPS site that is available and on standby, and has created a continuous improvement plan that focuses on cloud infrastructure and SCE.com PSPS communication enhancements.

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

2020 YB Response: ii
2023 YB Response: iii
Comments: SCE interprets "downtime" to mean the system SAIDI-equivalent time for customers affected by actual PSPS de-energization events. SCE experienced approximately 48 minutes of system-level SAIDI in 2019 due to PSPS activities. Note that a significant portion of this downtime occurred while the fire hazard conditions which originally caused the de-energization persisted. It is difficult for SCE to estimate future downtime as it depends on exogenous factors such as weather conditions, but SCE is refining its protocols and processes and expects to improve in this area. If weather conditions in 2023 are like 2019, it seems reasonable that we would be able to achieve a reduction to less than 30 minutes of SAIDI by further limiting the frequency and scale of future PSPS de-energizations.

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			

2020 YB Response: ii
2023 YB Response: ii
Comments: SCE has provided resources to mitigate the impacts of PSPS de-energization events, including community resource centers, community crew vehicles and targeted locations for backup generators. SCE continues to evaluate solutions to alleviate the impact of PSPS events, including prioritization of grid hardening investments on PSPS circuits, further sectionalization and microgrids.

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 as a measure of last resort	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 deenergize specific circuits upon detection of damaged condition of electrical lines and equipment, or contact with foreign objects**		
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE maintains circuit level thresholds which it uses, in conjunction with real-time field conditions, to inform de-energization decisions. SCE interprets response iii. to mean that the utility will not utilize PSPS activities in the future. Based on this interpretation, SCE selected response ii. Though the frequency and scope of PSPS events are expected to lessen as more of our WMP mitigations are deployed, PSPS will continue to be a tool to mitigate wildfire risk during severe weather and high Fire Potential Index (FPI) events.*				

F.IV.b Which of the following does the utility take into account when making PSPS decisions? Select all that apply				
i. SME opinion	ii. A partially automated system which recommends circuits for which			

	PSPS should be activated and is validated by SMEs			
2020 YB Response: i and ii *2023 YB Response: i and ii* *Comments: SCE utilizes a calculation for every circuit in scope which gives a potential de-energization windspeed. SCE also has a partially automated dashboard that displays the calculated de-energization trigger, Fire Potential Index, and continuously updated live windspeeds. Based on this information, SCE personnel determines whether to de-energize the circuit.*				

F.IV.c Under which circumstances does the utility de-energize circuits? Select all that apply.				
i. Upon detection of damaged conditions of electric equipment	ii. When circuit presents a safety risk to suppression or other personnel	iii. When equipment has come into contact with foreign objects posing ignition risk	iv. Additional reasons not listed	
2020 YB Response: i, ii, iii, iv *2023 YB Response: i, ii, iii, iv* *Comments: SCE is working to minimize the use of PSPS as a wildfire mitigation tool. SCE will de-energize circuits when equipment damage or contact with foreign objects are detected. These incidents increase the potential for sparks and could present safety risks to suppression or other personnel. In addition, when wind speed becomes extreme, damage to equipment or contact with foreign objects would become more likely, therefore SCE would preemptively de-energize to prevent the potential for sparks and ignitions.*				

F.IV.d Given the condition of the grid, with what probability does the utility expect any large scale PSPS events affecting more than 10,000 people to occur in the coming year?				
Clarification: For the 2020 response option, please take "the coming year" as 2020. For the 'in three years' response option, please take "the coming year" as 2023.				
i. Less than 5 % - Grid is in sufficiently low risk condition that PSPS events will not be required, and the only circuits which may require de-energization have	ii. Greater than 5% - Grid condition paired with risk indicates that PSPS may be necessary in 2020 in some areas			

sufficient redundancy that energy supply to customers will not be disrupted				
2020 YB Response: ii *2023 YB Response: ii* Comments: *Although SCE expects to continue to grid hardening activities, sectionalization, and other advancements to prevent PSPS events, extreme weather conditions are still likely to occu,r and SCE will take the necessary steps to promote public safety. SCE cannot estimate how many customers will be affected and the likelihood of such events occurring, but has conservatively selected option ii at this time.*				

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 deenergized sections of the grid prior to re-energization	ii. **Existing process** for accurately inspecting deenergized sections of the grid prior to re-energization	iii. Existing process for accurately inspecting deenergized sections of the grid prior to re-energization, **augmented with sensors and aerial tools**		
2020 YB Response: ii *2023 YB Response: iii* *Comments: SCE patrols each circuit prior to re-energization. In certain instances, SCE leverages aerial systems where SCE is unable to patrol on foot. As highlighted in WMP section 5.3.3, SCE piloted the use of drone technology in 2019 to augment traditional pre- and post-PSPS event patrols. SCE will continue to explore the use of drone applications to help expedite the patrol process and provide real-time information via live video feeds.*				

F.V.b How automated is the process for inspecting de-energized sections of the grid prior to reenergization?				
Clarification: For explanation on level of automation please refer to the 'level of systematization and automation' in Table 2 of the Maturity Model. (i) in this case corresponds to level 0; (ii) corresponds to level 1 or 2; (iii) corresponds to level 3; and (iv) corresponds to level 4				
i. Manual process, not automated at all	ii. Partially automated (<50%)	iii. Mostly automated (>=50%)	iv. Primarily automated, minimal manual inputs	
2020 YB Response: i *2023 YB Response: ii* *Comments: SCE believes that a manual process is necessary for inspecting de-energized sections of the grid prior to reenergization. It is critical that qualified workers assess line conditions prior to re-energization given the magnitude of the potential public safety risk, rather than to rely on an automated or semi-automated process. SCE is exploring the use of unmanned aerial systems (drones) and other detection technologies using artificial intelligence and machine learning to complement SCE's manual inspection process.*				

F.V.c What is the average amount of time that it takes you to re-energize your grid from a PSPS once weather has subsided to below your de-energization threshold?				
i. Longer than 24 hours	ii. Within 24 hours	iii. Within 18 hours	iv. Within 12 hours	v. Within 8 hours
2020 YB Response: iv *2023 YB Response: v* *Comments: SCE tracked this data for a small number of events towards the end of 2019; at that time the average re-energization time was approximately 8 hours. SCE expects that the average re-energization time prior to those events were likely higher, thus has conservatively selected option iv for the 2020 response. The amount of time it takes to re-energize is contingent upon the amount of time it takes to patrol the circuit and the amount of damage found from patrols. However, SCE expects to reduce the amount of time it takes to re-energize circuitry in the future as it implements additional grid hardening and sectionalization activities, thus expects re-energization time to be within 8 hours by 2023.*				

F.V.d What level of understanding of probability of ignitions after PSPS events does the utility have across the grid?				
i. No probability estimate of after event ignitions	ii. Some probability estimates exist	iii. Utility has accurate quantitative understanding of ignition risk following re-energization, by asset, validated by historical data and near misses		
2020 YB Response: iii *2023 YB Response: iii* *Comments: SCE interprets this question to ask if we quantitatively assess the probability of ignition resulting from re-energization. As highlighted above and in WMP section 3.5.6, SCE conducts detailed patrols of our lines that have been de-energized to help ensure the risk of ignition associated with re-energization has been removed or remediated. As such, SCE expects PIL module outputs to reflect the underlying ignition risk following re-energization.*				

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		
2020 YB Response: iii *2023 YB Response: iii* *Comments: SCE and contract crews are required to carry fire suppression equipment when working under Fire Weather Threat conditions.*				

F.VI.b What training and tools are provided to workers in the field?				
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. All criteria in option (ii) met; In addition, suppression tools and training to suppress small ignitions caused by workers or in immediate vicinity of workers are provided	iv. All criteria in option (iii) met; In addition, communication tools function without cell reception and training by suppression professionals is provided	v. All criteria in option (iii) met and apply to contractors as well as utility workers
2020 YB Response: iii *2023 YB Response: iii* *Comments: SCE provides workers with basic fire suppression tools and training to extinguish incipient stage ignitions.*				

F.VI.c In the events where workers have encountered an ignition, have any Cal/OSHA reported injuries or fatalities occurred in in the last year?

Clarification: For this year, please identify whether any major injuries or fatalities have occurred in 2019. For three years from now, please specify whether you think there is a chance that major injuries or fatalities could occur in 2022.				
i. No	ii. Yes			
2020 YB Response: i *2023 YB Response: i* *Comments: SCE assumes question refers to injuries or fatalities of SCE or contract line workers. To date, SCE has not experienced any major injury or fatality associated with encountering an ignition in the field.*				

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?				
Clarification: An example of workers outside utility industry might be workers at a vegetation management company who prune trees near utility equipment				
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE shares best practices with other utilities and trains fire suppression professionals on how to work around our equipment/facilities.*				

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?				
Clarification: Question is asking whether utility centralizes most of its situational, operational, and risk data in a single database				
i. No	ii. Yes			
2020 YB Response: i *2023 YB Response: ii* *Comments: SCE interprets the question to mean that central repositories exist for use of situational, operational and risk data consistently across the enterprise. Currently data is captured and stored by various organizations and in various locations, in multiple centralized databases. SCE is currently working to integrate access to the various databases to support overall corporate needs but doesn't believe all data needs to be housed in a single physical database. Developing the appropriate IT solutions that can pull data together from the various sources in a consistent manor meets the same end state.* *As part of data governance improvements, SCE's is integrating and automating data pipelines to create 360º views of assets using aerial and ground imagery, inspection, and remediation information to facilitate faster and integrated decision making for asset and vegetation management. SCE believes this is higher value than centralizing data and documents into a single database and meets the spirit of this question. See WMP section 5.3.7 for additional details.*				

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?				
Clarification: In this case, advanced analytics refers to analysis integrating different types of data from this centralized database in a sufficiently reliable way to create a detailed, quantitative and holistic picture of tradeoffs to be weighed in operational or investment decisions				
i. No	ii. **Yes, but only for short term decision making**	iii. Yes, **for both short term and long-term decision making**		

2020 YB Response: ii for some processes
2023 YB Response: iii for some processes
Comments: For this question, SCE assumes "long-term" to mean 3 or more years into the future.

SCE is able to run advanced analytics on data from multiple sources, but as stated above we don't have a single physical centralized database. SCE leverages its various repositories for advanced analytics (e.g. PIL module) in many key decision-making processes. For example, SCE's outage database (ODRM), ADS for weather data, SAP HANA for asset data, cGIS for geospatial data and Hadoop for smart meter data are centralized sources of key information that are pulled into our advanced analytics models. As highlighted elsewhere, SCE is using the REAX-based WRM to inform the short-term prioritization of work within key initiatives. SCE aspires to leverage these advance analytics for long-termer decisions, such as how many units to deploy within an initiative based on a desired performance level, by 2023.

G.I.c Does the utility collect data from all sensored portions of electric lines, equipment, weather stations, etc.?

i. Yes	ii. Yes			

2020 YB Response: ii
2023 YB Response: ii
Comments: Yes, SCE collects data from all sensored assets. As an example, weather station readings from SCE installed stations are transmitted to a central database every 10 minutes. Newer fault indicators where installed, are capable of relaying information automatically in real time. Smart meters send real time alerts (ex. voltage thresholds, meter on/off notices, etc.) as well as capturing 15-minute interval data for both voltage and usage and transmit this data to a central repository daily. For all SCADA enable devices, data is transmitted in real time to the EDNA historian system.

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			

2020 YB Response: i
2023 YB Response: i
Comments: SCE interprets this question to refer to a wide variety of internal and external stakeholders. SCE has the capability to deploy real-time APIs to share data, but we have not yet developed this and in general our policy is not to share this data externally. SCE does not allow external stakeholders access to internal situational, operational and risk data through an API. One exception is that SCE has collaborated to deploy real time video feeds in our high fire areas to external organizations. SCE is working on some real time notifications to customers and government agencies with various technology companies.

G.I.e Does the utility identify highest priority additional data sources to improve decision making?				
i. No	ii. Yes	iii. Yes, with plans to incorporate these into a centralized database of situational, operational, and risk data		
2020 YB Response: ii. *2023 YB Response: ii.* *Comments: SCE continuously uses new sources of data for decision making, this occurs both through cause evaluations as well as subject matter expertise that leads to the acquisition of new data sources to include in the appropriate database.* *In 2019, SCE actively identified new data sources which we anticipate will enhance our analytical capabilities to predict wildfire ignition and consequence risk across the HFRA. SCE plans to integrate these new data sources into our distributed database structure.*				

G.I.f Does the utility share best practices for database management and use with other utilities in California and beyond?				
i. No	ii. Yes	iii. Yes, with specific processes to do so in place		
2020 YB Response: ii. *2023 YB Response: ii.* *Comments: SCE informally benchmarks with other utilities at industry conferences and on an ad hoc basis as specific needs are identified. SCE would be open to exploring if a more defined process would be appropriate in the future.*				

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			
2020 YB Response: i *2023 YB Response: ii* *Comments: SCE does not have a single document at this time. However, SCE is working to implement a single repository for this information under a data governance framework which will be in use by 2023. SCE believes the spirit of this question is about a single repository, not strictly a single document. SCE describes this further in 5.3.7.*				

G.II.b	**Is there an explanation of the sources, cleaning processes, and assumptions made in the single document catalog?**			
i. No	ii. Yes			
2020 YB Response: i *2023 YB Response: ii* *Comments: See response above.*				

G.II.c	**Are all analyses, algorithms, and data processing explained and documented?**

i. Analyses, algorithms, and data processing **are not** documented	ii. Analyses, algorithms, and data processing **are** documented	iii. Analyses, algorithms, and data processing are documented **and explained**	iv. Analyses, algorithms, and data processing are documented and explained, **including sensitivities for each type of analysis and data**	
2020 YB Response: ii *2023 YB Response: iii* *Comments: All analysis needed for wildfire related decision making is documented, however the documentation used for decision making does not typically include detailed information/explanations on algorithms used, the data gathering, or processing elements. When needed, these details are provided and explained by the developer of the analysis. SCE is working on more systematic documentation of relevant analyses, algorithms and data processes and expects completion and maintenance by 2023.*				

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		

2020 YB Response: i *2023 YB Response: i* *Comments: SCE does not currently have a system for sharing data in real time across multiple levels of permissions. SCE is open to discussion on the right type and approach to sharing data in real-time in the future.*

G.II.e Are the most relevant wildfire related data algorithms disclosed?				
Clarification: Question is asking whether all algorithms or decision making process used to inform decision making around investment choices, risk mitigation choices, and emergency response are disclosed				
i. No	ii. **Yes, disclosed to regulators and other relevant stakeholders** upon request	iii. Yes, **disclosed publicly in WMP** upon request	iv. Disclosed publicly as information becomes available (regardless of regulatory request)	
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE notes that SCE's decision making for investment choices, risk mitigation choices and emergency response are not algorithm-based though quantitative and qualitative analyses inform these decisions. Decision making processes routinely involve discussions and approvals at various dedicated operational and management forums. SCE routinely fields discovery requests for non-privileged information relevant to investment or risk-based decisions, and it will often include this information in its own direct or rebuttal testimony in connection with a broad evidentiary record. SCE strongly believes the current process should continue in the future. SCE supports transparent sharing of information, but underscores that managing an operating an electric utility is a complex undertaking and sharing all decision-making processes publicly is complicated and often not feasible.*				

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?				
Clarification: Recall that near miss is defined as an event with significant probability of ignition, including wires down, contacts with objects, line slap, events with evidence of significant heat generation, and other events that cause sparking or have the potential to cause ignition.				
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: As SCE highlights in WMP section 5.3.7, SCE has a robust process for identifying near misses, and SCE tracks all identified near-miss data in a variety of datasets including the Wire Down Database, Fire Investigation Preliminary Analysis (FIPA) Tracker / FIPA SharePoint and CPUC Reportable Ignitions. Additionally, SCE tracks faults detected in a database related to unplanned outages (ODRM). SCE uses these datasets to help identify opportunities and new ways to address wildfire ignition risk in the future. Note that conditions identified through the inspection process that have immediate spark potential are remedied through our priority 1 maintenance process and documented in SAP.*				

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			
2020 YB Response: i *2023 YB Response: ii* *Comments: Technosylva will enable us to simulate the wildfire potential at any location within high fire areas with dynamic data.*				

G.III.c Does the utility capture data related to the specific mode of failure when capturing near miss data?				
i. No	ii. Yes			
2020 YB Response: i *2023 YB Response: ii* *Comments: SCE captures some failure related information in the datasets described in G.III.a. For example, SCE tracks the type of equipment reported to have caused an unplanned outage in the ODRM. However, to determine a specific mode of failure will require an analysis similar to what SCE*				

currently performs for all ignitions which is time and resource intensive. SCE will need to determine which near misses warrant such analyses to refine wildfire mitigation analysis and decision making.

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			
2020 YB Response: i *2023 YB Response: ii* *Comments: SCE's PIL module calculates the probability of a spark at each structure. For mitigation prioritization, SCE currently assumes the probability of a spark resulting in a fire is 100% and calculates risk score as the product of the probability of a spark, the probability of ignition (100%), and the consequence. Therefore, currently the estimated probability of a near miss is the same as the probability of a spark. SCE is refining its models to calculate the probability of ignition when a spark occurs based on the fire potential index, which will allow us to estimate the probability of near-misses.*				

G.III.e Does the utility use data from near misses to change grid operation protocols in real time?				
i. No	ii. Yes			
2020 YB Response: i *2023 YB Response: ii* *Comments: As mentioned in response to G.III.a, SCE routinely uses near miss data to improve our wildfire risk mitigation capabilities, but this is currently not done in real time. Following the full implementation of Technosylva along with the definition of a metric quantifying a near miss, SCE will have the capability to make real time changes to operational protocols. If SCE's DFA or EFD pilots are successful, SCE may also be able to proactively change grid operation protocols based on anticipated events until the underlying condition has been remediated.*				

G.IV Data sharing with the research community

Capability 36

G.IV.a Does the utility make disclosures and share data?				
Clarification: In this case, 'disclosures' refer to disclosures to the CPUC and to the public				
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**		
2020 YB Response: iii *2023 YB Response: iii* *Comments: SCE shares data with third parties when required, requested and when appropriate to support wildfire mitigation.*				

G.IV.b Does the utility in engage in research?				
Clarification: Here, 'research' broadly refers to collaborative research (e.g. with other utilities, academics, or the government) or to independent research where the findings are made available outside parties (such as academics, other utilities, the government or the public).				
i. Utility **does not participate** in collaborative research	ii. Utility **participates** in collaborative research	iii. Utility **funds** and participates in both independent and collaborative research	iv. Utility funds and participates in both independent and collaborative research, **and ensures that research, where possible, is abstracted and applied to other utilities**	
2020 YB Response: iv *2023 YB Response: iv* *Comments: Per Commission direction, SCE may only seek funding for research and development (R&D), so long as the utilities meet the criteria and burden of proof set forth in D. 12-05-037. While this limits the ability for SCE to perform research activities as defined in D.12-05-037, SCE does engage in a*				

broader set of activities closely related to the tenets of R&D work, including studying, evaluating, demonstrating, and deploying technologies and strategies for the benefit of customers. SCE also routinely engages with industry and academic research communities on various research and development topics. For purposes of this question, SCE responds using this broader interpretation of research activities.

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		
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE responds to this question using the same broad interpretation of research activities as was used in our response to Question G.IV.b.*				

G.IV.d Does the utility promote best practices based on latest independent scientific and operational research?				
Clarification: Promoting best practices could take various forms – for example, writing and publicly releasing a report or detailing results achieved when a new method of tool was piloted, including which techniques were more or less effective				
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE closely follows best practices for opportunities to incorporate in our operations, grid design and maintenance programs.*				

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 potential	iii. Utility provides an accurate high risk reduction and low risk reduction scenario, in addition to their proposed scenario, and the projected cost and total risk reduction potential		
2020 YB Response: iii *2023 YB Response: iii* *Comments: In SCE's 2018 RAMP Report, SCE provided a portfolio level approach to estimating both cost and risk reduction for a proposed mitigation scenario as well as two alternative scenarios. SCE intends to further evolve this capability through implementation of the WRRM model which provide a more granular understanding of risk. Please see WMP sections 4, 5.3 and 5.4 for additional details.*				

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
2020 YB Response: ii *2023 YB Response: v* *Comments: SCE interprets "region level" to be a subset of its service territory. Risk reduction and RSE calculations for wildfire mitigations are performed at a portfolio level for the HFRA area, not the entire service territory so we have selected ii-level. As described in WMP section 5.4, SCE intends to be able to provide more granular projections in the future with implementation of the WRRM.*				

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			
2020 YB Response: i *2023 YB Response: i* *Comments: SCE has incorporated a longer-term horizon in the risk analysis presented in this WMP but has not incorporated macro-factor sensitivities into this risk analysis. However, SCE is actively engaged in key proceedings, such as the Climate Change OIR, where these issues are being addressed. Additionally, SCE recently published Pathway 2045[1] which lays out the necessary steps the state must take in order to meet its 2045 energy and environmental goals.*				

H.I.d Does the utility provide an estimate of impact on reliability factors in its scenarios?				
Clarification: Reliability factors here refer to factors impacting reliability of service to customers				
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: Reliability is a fundamental attribute included in SCE's Multi-Attribute Value Function (MAVF) which forms the basis for SCE's risk reduction and RSE calculations as used in 2018 RAMP, 2021 GRC, and this 2020 WMP. Please see WMP section 4.2 for additional details.*				

1 See https://www.edison.com/home/our-perspective/pathway-2045.html

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			
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE provided RSEs at program and portfolio level in its 2018 RAMP Report. The RSEs for specific risk mitigation program (i.e. Wildfire, Contact with Energized Equipment, Underground Equipment Failure) were updated in the 2021 GRC; and also updated using a refined RSE calculation for this 2020 WMP. Please see WMP Tables 21-30 for additional details.*				

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	
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE provided RSE calculations for commercial initiatives in the 2018 RAMP filing and refined those calculations for inclusion in the 2021 WMP. SCE will continue to explore how best to utilize RSE calculations in the evaluation of emerging initiatives but has conservatively selected ii at this time. Please see WMP tables 21-30 for list of initiatives for which SCE provided risk spend efficiency calculations.*				

H.II.c Does the utility include figures for present value cost and project risk reduction impact of each initiative, clearly documenting all assumptions (e.g. useful life, discount rate, etc.)?				
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE is using 2019 constant dollars for RSEs presented in this WMP which represents the PV of future expenditures. SCE is planning to calculate a present value for the stream of benefits gained throughout the life of the program for deployment years in 2020-2023 which will include clear documentation of assumptions*				

H.II.d Does the utility provide an explanation of their investment in each particular initiative?				
Clarification: Reliability factors here refer to factors impacting reliability of service to customers				
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 factors**		
2020 YB Response: ii *2023 YB Response: iii* *Comments: SCE modeled the mitigation effectiveness and RSE for each program using its MAVF (MARS) methodology. In the current methodology, Reliability is one of four consequence dimensions (along with Fatalities, Injuries and Financial). While adverse consequences to Reliability are considered in the event of a wildfire, "upside risk" (e.g. improvements to Reliability by deploying System Hardening programs such as Covered Conductor) are not considered in the current framework, the focus being on wildfire risk reduction. SCE will consider evaluating this enhancement for future evolutions of the Wildfire Risk Model. Please refer to H.I.d and see WMP section 4.2 for additional details.*				

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
2020 YB Response: ii *2023 YB Response: v* *Comments: SCE interprets "region level" to be a subset of its service territory. Risk reduction and RSE calculations for wildfire mitigations are performed at a portfolio level for the HFRA area, not the entire service territory so we have selected ii-level. As described in WMP section 5.4, SCE intends to be able to provide more granular projections in the future with implementation of the WRRM.*				

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 estimate	
2020 YB Response: ii *2023 YB Response: iii* *Comments: SCE provided a preliminary vegetation mitigation program RSE at a portfolio level within its 2018 RAMP Report. Since then, SCE has further developed initial mitigation effectiveness estimates for sub programs, such as its Hazard Tree Removal Program and pole brush clearing activities. SCE will further integrate these estimates into its WRRM by 2023, which will enhance SCE's quantitative understanding of RSE. Also, though risk analysis is guiding some line clearance activities, the line clearance scope in HFRA is driven by Commission requirement and recommendations to mitigate wildfire risks and not informed by RSE estimates.*				

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
2020 YB Response: ii *2023 YB Response: iii* *Comments: SCE interprets "regional" to be a subset of its service territory. Risk reduction and RSE calculations are performed at a portfolio level for the HFRA area, not the entire service territory so we have selected ii. By 2023, SCE will provide estimates at a circuit level based upon the WRRM. SCE believes it is appropriate to provide vegetation management RSE's at this level as it more closely mirrors how we operationalize the program.*				

H.III.c How frequently are estimates updated?

i. Never	ii. Less frequently than annually	iii. Annually or more frequently		

2020 YB Response: iii
2023 YB Response: iii
Comments: N/A

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

2020 YB Response: ii
2023 YB Response: iii
Comments: SCE has developed initial mitigation effectiveness estimates for its Hazard Tree Removal Program and Pole Vegetation Removal Program. By 2023, SCE plans to expand risk assessment estimates to additional vegetation programs, including trimming and expanded clearances within HFRA and non-HFRA.

H.III.e Can the utility evaluate risk reduction synergies from combination of various initiatives?

i. No	ii. Yes			

2020 YB Response: i
2023 YB Response: ii
Comments: As mentioned in C.IV.e, SCE has preliminarily explored risk reduction synergies and is continuing to search for more rigorous solutions. SCE welcomes further engagement with stakeholders in developing consistent methodologies by 2023.

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 estimate	
2020 YB Response: ii *2023 YB Response: iii* *Comments: SCE provided initial system hardening program RSEs at a portfolio level within its 2018 RAMP Report. Since then, SCE has further refined mitigation effectiveness estimates and updated RSE calculations in this WMP. SCE expects the WRRM model will provide a more quantitative basis for system hardening RSEs than we currently have with the RSEs provided in this WMP. SCE will likely explore some amount of sensitivity analysis via the WRRM but has conservatively assessed a iii-level at this time.* *Please see WMP Section 5.3.8 for additional discussion on RSEs.*				

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
2020 YB Response: ii *2023 YB Response: v* *Comments: SCE interprets "regional" to be a subset of its service territory. Risk reduction and RSE calculation are performed at a portfolio level for the HFRA area, not the entire service territory so we have selected ii. SCE intends to model and measure risk reduction and RSE at an asset level by 2023 through the WRRM.* *See above in H.II.e*				

H.IV.c How frequently are estimates updated?				
i. Never	ii. Less frequently than annually	iii. Annually or more frequently		
2020 YB Response: iii *2023 YB Response: iii* *Comments: N/A*				

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 tested**
2020 YB Response: iv *2023 YB Response: iv* *Comments: SCE provided RSE calculations for commercial initiatives in the 2018 RAMP filing and refined those calculations for inclusion in the 2021 WMP. SCE interprets lab-tested to indicate that the initiative is pre-commercial, which we take to mean the same as emergent in this context. As noted in response H.II.b, SCE is evaluating many emerging technologies for the 2020 WMP and may not be able to evaluate them all by 2023. Please see WMP tables 21-30 for list of initiatives for which SCE provided risk spend efficiency calculations.*				

H.IV.e Can the utility evaluate risk reduction effects from the combination of various initiatives?				
i. No	ii. Yes			
2020 YB Response: i *2023 YB Response: ii* *Comments: As provided in response to C.IV.e. and H.III.e, SCE has preliminarily explored risk reduction synergies and is continuing to search for more rigorous solutions. SCE welcomes further engagement with stakeholders in developing consistent methodologies by 2023.*				

H.V Portfolio-wide initiative allocation methodology

Capability 41

H.V.a To what extent does the utility allocate capital to initiatives based on risk-spend efficiency (RSE)?				
i. Utility does not base capital allocation on RSE	ii. Utility considers estimates of RSE when allocating capital	iii. Accurate RSE estimates for all initiatives are used to determine capital allocation within categories only (e.g. to choose the best vegetation management initiative)	iv. Accurate RSE estimates for all initiatives are used to determine capital allocation across portfolio (e.g. prioritizing between vegetation management and grid hardening)	
2020 YB Response: ii *2023 YB Response: iii* *Comments: SCE uses RSE calculations as an important input into the capital allocation process but must consider many other inputs as well. It is important to recognize that RSEs are not and should not be the only factor used to develop a risk mitigation plan. The RSE metric does not incorporate certain operational realities, resource constraints, work management efficiencies, an activity's total risk reduction potential on targeted areas of the system, and regulatory compliance that SCE must consider in the development of its plan. For example, while PSPS has a relatively high RSE, we working to minimize the use of PSPS as a wildfire mitigation tool because there are direct and negative impacts to our customers. SCE anticipates that the wildfire risk model will be able to provide RSEs for prioritization by the 2023 timeframe.*				

H.V.b What information does the utility take into account when generating RSE estimates?				
i. Average estimate of RSE by initiative category	ii. Specific information by initiative, including state of equipment and location where initiative will be implemented	iii. Specific information by initiative at the asset level, including state of specific assets and location where initiative		

		will be implemented		
2020 YB Response: i *2023 YB Response: iii* *Comments: SCE has calculated and provided HFRA-region RSE averages in this WMP. SCE intends to calculate asset level RSEs in the future which are based on location and asset condition through the WRRM by 2023.*				

H.V.c How does the utility verify RSE estimates?				
i. Utility does not verify RSE estimates	ii. RSE estimates are verified by historical or experimental pilot data	iii. RSE estimates are verified by historical or experimental pilot data and confirmed by independent experts or other utilities in CA		
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE bases key assumptions underlying its RSE calculations using a combination of historical information and subject matter expertise.*				

H.V.d Does the utility take into consideration impact on safety, reliability, and other priorities when making spending decisions?				
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: See response in H.II.d*				

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.	iv. Utility uses pilots, followed by in-field testing, measuring reduction in ignition events and near-misses.	
2020 YB Response: iv *2023 YB Response: iv* *Comments: SCE assesses the potential value of new initiatives based on industry knowledge, SME expertise and testing, where practical. SCE field-tests these initiatives via limited scale pilots. When we pilot solutions, we evaluate success based on the intended function of the apparatus, which may not specifically be measured in terms of ignitions avoided. For example, performance for our wire-down detection algorithms may be measured in terms of the false positive and false negative rates of wire down detection instead of the quantity of ignitions avoided. Once we have sufficient data on outcome metrics to facilitate long term trend analysis, we can use results of analyses to modify/enhance our hardening initiatives. Note that we may not be able to evaluate the direct impact from our hardening solutions on ignitions or outcome metrics for several years as the number of ignitions is relatively small and it will take a number of years for SCE to widely deploy many key initiatives.*				

H.VI.b How does the utility develop and evaluate the risk spend efficiency of new wildfire initiatives?				
Clarification: TCO is total cost of ownership over the expected useful life of an asset, including purchase, operation and maintenance. In this question, total cost of ownership refers to the spend portion of the evaluation of risk spend efficiency, while risk reduction is evaluated separately.				
i. No program in place	ii. Utility uses **total cost of ownership**			
2020 YB Response: i *2023 YB Response: ii* *Comments: SCE has employed total cost of ownership principles to support specific asset-management decisions in the past but has only included the initial cost to deploy an initiative in RSE calculations included in this WMP. As mentioned in D.I.a, SCE is enhancing our asset management practices through the development of asset class strategies and will include total cost of ownership as an input to those strategies by 2023.*				

H.VI.c At what level of granularity does the utility measure the efficacy of new wildfire initiatives?				
i. None	ii. Entire territory	iii. Circuit	iv. Span	v. Asset
2020 YB Response: v *2023 YB Response: v* *Comments: New wildfire initiatives are introduced on a pilot basis before determination of a broader deployment strategy. Given the scale of our service territory and volume of initiatives, SCE anticipates that it will continue to evaluate pilots for general application in the future. However, SCE notes that once a pilot is deemed successful, SCE seeks to determine the specific applications at the circuit, span or asset level in which the initiative will be most effective. SCE intends to use the WRRM in the future to aid in the determination of circuit, span or asset level efficacy.*				

H.VI.d Are the reviews of innovative initiatives audited by independent parties?				
Clarification: Reviews here refer to findings evaluating innovative initiatives which would assist another utility in making a decision about whether to implement that initiative and help them determine how to do so effectively. Criteria might include but are not limited to the following: technical feasibility, effectiveness, risk spend efficiency, ease of implementation and comparison to alternative options				
i. No	ii. Yes			
2020 YB Response: i *2023 YB Response: i* *Comments: See response to H.V.e.*				

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			
2020 YB Response: ii *2023 YB Response: ii* *Comments: See response in C.V.b*				

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?				
Clarification: If the utility's wildfire mitigation plan is an integrated component of an overall disaster and emergency plan then the overall plan considers at least the compound effects of risks in both directions – for example, the additional risk of fire posed by an earthquake and how to manage any compounding effects				
i. No	ii. **Wildfire plan is a component of overall plan**	iii. Wildfire plan is an **integrated component** of overall plan		
2020 YB Response: iii *2023 YB Response: iii* *Comments: SCE has an emergency management structure in place that is used for all hazards, including wildfires, earthquakes, and other hazards.*				

I.I.b Does the utility run drills to audit the viability and execution of its wildfire plans?				
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE conducts multiple drills over the course of the year integrating stakeholders from local, state, and federal agencies. SCE utilizes state and national standards in conducting these drills and provides training for all employees in its IMT.*				

I.I.c Is the impact of confounding events or multiple simultaneous disasters considered in the planning process?				
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: This is included in SCE's emergency management structure. SCE utilizes a nationally recognized incident management system that includes teams that have operated in PSPS, damage assessments, and remediation from wildfire and storm damage concurrently.*				

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			
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE routinely interfaces CalFire, Fire Safe Councils and other entities, and we have standards associated with these interactions. These entities also have a presence in our EOC during events.*				

I.I.e	Does the utility take a leading role in planning, coordinating, and integrating plans across stakeholders?			
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: Yes, SCE facilitates quarterly critical lifelines working group with other IOUs, state, local governments, and the Board of California Utilities Association. In addition, SCE conducts bi-weekly calls with counties, and during PSPS activations, representatives from counties and state governments have a presence in our EOC, and/or we provide liaisons to their EOCs. SCE also provide ICS training to county emergency managers.*				

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			

2020 YB Response: ii
2023 YB Response: ii
Comments: See comments to I.I.c.

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

2020 YB Response: ii
2023 YB Response: ii
Comments: SCE crews, contractors and field supervisor are aware and well-trained in-service restoration after wildfire and PSPS events. There are robust processes in place to develop and share plans before, during, and after events with relevant personnel across the company. SCE also provides training on restoration and recovery plans at the district level and have utilized these processes after emergencies. SCE also has new training in place for PSPS restoration for SCE crews and contractors. SCE has routinely used this process as part of its All Hazards plan since 2015.

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

2020 YB Response: iii
2023 YB Response: iii
Comments: Service restoration procedures are customized at circuit-segment level relative to the specifics of each circuit and event. This may mean that SCE restores service at the span and asset level, but there are no specific procedures defined to that level. We are continuing to add more sectionalization to be more precise on outage restoration.

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

2020 YB Response: ii
2023 YB Response: ii
Comments: As highlighted in I.II.c, SCE's procedures are defined to the circuit-segment level relative to the specifics of each circuit and event. SCE incorporates grid topography, adjacent vegetation, and community needs as key inputs into the plan for restoration relative to each event.

I.II.e Is there an inventory of high risk spend efficiency resources available for repairs?

Clarification: Question is asking whether the resources, components and tools that the utility has available for repairs, maintenance, and unexpected replacement are the most risk spend efficient options on the market

i. No	ii. Yes			

2020 YB Response: ii
2023 YB Response: ii

Comments: SCE interprets this question to mean carrying an inventory of high-RSE value materials associated with selected WMP mitigations that can be deployed on an emergency basis.
SCE maintains a large inventory of equipment for rapid restoration of power to our customers. This inventory meets the latest standard of wildfire risk-reducing equipment (e.g. fire-resistant poles, covered conductor) and the incremental cost to deploy these measures during restoration is often less than the cost to install this equipment proactively. SCE's internal and contract labor resources assigned to service restoration are also highly trained to remove hazards and efficiently complete necessary tasks in the field. SCE does not compute risk spend efficiencies for resources, components or tools, but selects tools, equipment and resources based on their effectiveness and cost.

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 relevant to affected customers?**			
Clarification: Does the utility provide all available information which could be relevant to affected customers in a way that customers can receive in real time and easily understand?				
i. No	ii. Yes	iii. Yes, **along with referrals to other agencies**		
2020 YB Response: ii *2023 YB Response: iii* *Comments: SCE currently interfaces with emergency management communities during and after wildfire events. SCE also provides information on its website regarding outages, including status of outages and restoration. Providing evacuation procedures and information on basic public safety is the responsibility of public safety and county officials. SCE occasionally includes referrals to other agencies through its communications but will look to broaden this practice in the future.*				

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
2020 YB Response: N/A *2023 YB Response: N/A* *Comments: SCE has selected v in the online survey due to requirement to respond to each question but would have otherwise selected N/A. SCE is unable to quantify the number of affected customers that receive complete and available information. However, SCE strives to provide available information to all affected customers through multiple channels (e.g., social media, SCE.com, Next Door, mobile alerts), and SCE intends to send information to 100% of customers affected by PSPS. In addition, SCE deploys employees to local assistance centers and IMTs to provide information. Providing other emergency and public safety information is the responsibility of counties and safety officials.*				

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
2020 YB Response: N/A *2023 YB Response: N/A* *Comments: SCE has selected v in the online survey due to requirement to respond to each question but would have otherwise selected N/A. See response above in I.III.b.*				

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		
2020 YB Response: ii *2023 YB Response: ii* *Comments: See response to I.III.b.*				

I.III.e How does the utility engage with other emergency management agencies during emergency situations?				
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		

2020 YB Response: iii *2023 YB Response: iii* *Comments: See response to I.I.e.*

I.III.f	**Does the utility communicate and coordinate resources to communities during emergencies (e.g., shelters, supplies, transportation, etc.)?**			
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE sends personnel to local assistance centers on an ad-hoc basis when other agencies are standing up shelters. SCE also provides philanthropic support to organizations establishing these shelters. SCE does not provide shelters or provide transportation, which is the responsibility of local governments. SCE does provide Community Resource Centers and Community Crew Vehicles during PSPS events, which provides information, charging capabilities, and snacks. Please see WMP Section 5.3.9 for additional details.*				

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			
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE has a formal After Action Review process to record the outcome emergency events and actionably document learnings and potential process improvements for exercises and emergencies.*				

I.IV.b	**Is there a defined process and staff responsible for incorporating learnings into emergency plan?**			
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: See response above. SCE's Business Resiliency Department is responsible for governing and administering the After Action Review process.*				

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			
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE validates all of our procedures through drills and exercises described in I.I.b.*				

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			
2020 YB Response: ii *2023 YB Response: ii*				

Comments: SCE performs drills, engages with key stakeholders (see previous comments), holds regular calls with stakeholders. SCE also routinely benchmarks with other state, national and international utilities across country and state for how to more effectively respond to events. SCE works with CBOs as well to help mitigate impacts for those affected by PSPS and wildfire. SCE also performs after action reviews with public safety partners like water agencies and telecom providers.

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			
2020 YB Response: ii *2023 YB Response: ii* *Comments: See response to I.IV.a*				

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 other	iii. Both		
2020 YB Response: iii *2023 YB Response: iii* *Comments: SCE conducts surveys on customers who were affected by PSPS and has held meetings with CBOs. SCE initiated this process in 2018 and is in the process of making process improvements.*				

I.V.c In what other activities does the utility engage?				
i. None	ii. Public listening sessions	iii. Debriefs with partners	iv. Public listening sessions, debriefs with partners, and others	
2020 YB Response: iv *2023 YB Response: iv* *Comments: SCE participates in numerous meetings such as community meetings, post-PSPS meetings, meetings with CBOs, local governments, counties, tribes, regulators, legislators, and other agencies. In addition, SCE participates in a quarterly Critical Lifeline working group meeting, and SCE's philanthropy organization conducted a forum with access and functional needs communities*.				

I.V.d Does the utility share with partners findings about what can be improved?

i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: The meetings and forums described in the previous response include discussions on improvements.*				

I.V.e	**Are feedback and recommendations on potential improvements made public?**			
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE files a public ERSB-8 report after each PSPS event.*				

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			
2020 YB Response: ii *2023 YB Response: ii* *Comments: After each event, SCE publishes ESRB-8 reports on sce.com/wildfire and the report is posted to the appropriate service list by SCE's legal department. Once it is posted and served, a copy is sent to county Operational Areas and impacted jurisdictions with a request to review and provide feedback.*				

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			
2020 YB Response: ii *2023 YB Response: ii* *Comments: See above*				

I.V.h	**Does the utility track the implementation of recommendations and report upon their impact?**

Clarification: Recommendations here refer to recommendations from customers, local agencies, organizations and other stakeholders received following a wildfire or PSPS event				
i. No	ii. Yes			
2020 YB Response: i *2023 YB Response: i* *Comments: SCE tracks the implementation of recommendations with internal reporting but does not provides external reports. SCE performs a qualitative assessment on the effectiveness of the recommendation and are working on quantitative assessment of effectiveness.*				

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			
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE works with state and national utilities, EEI, international organizations and participates in a quarterly joint California utility forum. SCE also analyzes information from events in other utilities' territories to determine changes and improvements if appropriate and relevant to our service territory.*				

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 utilities	iii. Yes, from other global utilities		
2020 YB Response: iii *2023 YB Response: iii* *Comments: See response to I.V.i.*				

J.I.b	**Does the utility successfully adopt and implement best practices identified from other utilities?**			
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE adopts best practices from other utilities on a case-by-case basis as appropriate. SCE interacts with other utilities in the process for joint meetings discussed previously, and implements improvements based on the effectiveness for SCE's service territory.*				

J.I.c Does the utility seek to share best practices and lessons learned in a consistent format?				
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE uses forums described in the comments to J.I.b to share lessons learned with other parties.*				

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

2020 YB Response: ii *2023 YB Response: ii* *Comments: See previous responses.*

J.I.e	**Does the utility participate in annual benchmarking exercises with other utilities to find areas for improvement?**			
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: Benchmarking activities occur through forums described in the responses in this section. In addition, utility executives on the CUEA board meets quarterly to share best practices.*				

J.I.f	**Has the utility implemented a defined process for testing lessons learned from utilities to other ensure local applicability?**			
i. No	ii. Yes			
2020 YB Response: i *2023 YB Response: i* *Comments: SCE relies on the expertise of SMEs to determine applicability of lessons learned to SCE's service territory.*				

J.IIEngagement 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			
2020 YB Response: ii *2023 YB Response: ii* *Comments: As described in SCE's 2020 WMP attribute 1 (Initiative Description and Implementation Overview) SCE meets with every local government and tribe in HFRA. SCE also engages with all cities every two years on our emergency management plans that includes wildfire and PSPS. SCE will also conduct outreach with every local government after SCE files its WMP. In 2018 and 2019 (and will continue through 2023) SCE will continue to hold community meetings to solicit input on wildfire activities, and SCE will implement an online forum as well. SCE has also held meetings with homeowners' associations, community organizations, municipal utilities, and CCAs.*				

J.II.b Are there communities in HFTD areas where meaningful resistance is expected in response to efforts to mitigate fire risk (e.g. vegetation clearance)?				
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE appreciates the inconveniences that some of the wildfire mitigation activities may cause customers, but given the outsized wildfire risks, SCE must take these important and necessary steps to protect our communities.* *Significant barriers to vegetation management exist across SCE's territory. These include situations where communities are concerned about changing the character of their neighborhoods and/or do not agree that the clearance distances are warranted. Also, government agencies in many locations have established onerous requirements to obtain work permits, these range from detailed application and review processes associated with environmental regulations to restrictions on working days and hours. Lastly, although many customers and communities understand and appreciate the need and benefits of PSPS, others have expressed significant concerns.* *SCE is continuing outreach to provide information and receive feedback along with undertaking efforts to reduce the customer impact of these wildfire mitigation activities.*				

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%

2020 YB Response: N/A
2023 YB Response: N/A
Comments: SCE has selected i in the online survey due to requirement to respond to each question but would have otherwise selected N/A. SCE assumes this question is referring to the proportion of landowners who do not allow SCE to perform vegetation management per SCE guidelines which may be beyond minimum regulatory requirements. SCE currently does not track this information in the format requested. SCE has established processes to trim trees to meet minimum regulatory requirements when SCE guidelines are refused. In some areas, SCE is forced to increase inspection and trim frequency to maintain minimum compliance due to property owner resistance. In such instances, SCE tracks the work at the tree level but does not track the number of customers. Although SCE will continue to work collaboratively with individual landowners and, where appropriate, exercise legal rights to execute initiatives, the level of current resistance is moderately high.

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 %	

2020 YB Response: iv
2023 YB Response: iv
Comments: Based on customer complaints statistics, less than one percent of SCE customers file complaints with the CPUC related to utility initiatives including vegetation management. SCE does not track on a case-by-case basis complaints made through other mechanisms (e.g., individual dissatisfied comments made to SCE employees) on vegetation management or any other initiative. SCE tracks complaints associated with PSPS de-energizations through PUC records and SCE Customer Affairs. These are published in the ESRB-8 Report.

J.II.e	Does the utility have a demonstratively cooperative relationship with communities containing >90% of the population in HFTD areas (e.g. by being recognized by other agencies as having a cooperative relationship with those communities in HFTD areas)?			
i. No	ii. Yes			

2020 YB Response: ii
2023 YB Response: ii
Comments: See response to J.II.a

J.II.f	Does utility have records of landowners throughout communities containing >90% of the population in HFTD areas reaching out to notify of risks, dangers or issues in the past year?			
Clarification: For this year, please identify whether the question holds true for 2019. For three years from now, specify whether you expect the question to hold true in 2022.				
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: Customers reach SCE's through various channels (e.g., call center, social media) regarding safety issues. SCE immediately responds to safety issues raised by customers.*				

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			
2020 YB Response: ii *2023 YB Response: ii* *Comments: SCE has a CBO partner strategy for AFN communities and philanthropic partnerships which interacts with LEP and AFN communities. SCE is also updating its website to accommodate multi-lingual and accessibility needs for wildfire-related issues.*				

J.III.b	Can the utility outline how these partnerships create pathways for implementing activities suggested to address the needs of these communities?			
i. No	ii. Yes			
2020 YB Response: ii *2023 YB Response: ii* *Comments: See previous response. SCE plans in these areas continuing to evolve, and is partnering with the state and CBOs to refine these plans.*				

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			

2020 YB Response: ii
2023 YB Response: ii
Comments: Through SCE's interactions with LEP and AFN communities, SCE implemented numerous enhancements such as providing notifications through customers' preferred channels, increased website accessibility, provide training and developing CBOs for supporting populations they serve, and increased engagement with organizations that support LEP-specific communities. SCE also provides translation services at our community events, and have added representatives to our consumer advisory panel from the AFN community. SCE is also launching programs that help those that are medically vulnerable sustain during prolonged power outages.

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			

2020 YB Response: i
2023 YB Response: ii
Comments: SCE is working with the LEP and AFN communities as well as local communities to help better prepare these vulnerable communities during events. WMP includes strategies for how to minimize impact for all customers, which includes LEP and AFN, but we are also developing other strategies to assist LEP and AFN communities specifically. These include supporting these communities so they do not experience undue impacts (e.g., providing water, wood, charging capabilities for medical devices) and expanding partnerships with 211 which helps direct these populations to available resources during emergencies.

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		

2020 YB Response: ii
2023 YB Response: ii
Comments: SCE has employed permanent Fire Management Officers since 1952 who are specialized experts with fire service and electrical backgrounds that are dedicated to building these relationships, specifically with fire agencies. One successfully strategy has involved the development and delivery of Electrical Safety for First Responders Awareness Training which was provided to over 60 city and county fire agencies in 2019 alone. A version of this training has been offered to first responders since 1994 and have been continuously improved over time.

These officers maintain a 24/7 rotating watch schedule where they monitor, respond to and provide information on fires affecting, or determined to have the potential to affect, SCE infrastructure. These personnel represent SCE during fire incidents, often embedding in the fire management structure and serving as a liaison to it. They help coordinate SCE's response to fires by providing information to manage the bulk electric system, repair damage, restore the electric system, and safely gain access to begin restoration work.

SCE has a system of cameras which allow first responder agencies and SCE to remotely validate reports of potential fire activity across SCE's service territory. Additionally, these cameras provide real-time situational awareness of fire activity once detected. Currently SCE has approximately 90% coverage across the HFRA. As highlighted in B.V.a, SCE aspires to enable camera detection capabilities via artificial intelligence but has not found a viable option to date and cannot predict when one will become available. SCE is open to continued adoption of new technologies, such as satellite monitoring in the future when commercially viable and prudent for our customers.

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 areas	iv. None of the above	

2020 YB Response: iii
2023 YB Response: iii
Comments: SCE fire managers routinely work with federal, state and local fire agencies to provide training related to electric safety during non-fire periods. SCE fire managers participate in Fire Safe councils and other fire suppression and safety organizations. During operations, SCE fire managers deploy to fire incident management posts and act as a liaison between utility and stakeholders to provide electrical safety advice and help drive firefighting activities related to SCE infrastructure and support restoration activities.

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			

2020 YB Response: i
2023 YB Response: i
Comments: SCE makes available the weather data from its weather sensors publicly through Mesowest, but the fire community generates their own fire propagation paths.

J.IV.d Does the utility communicate fire paths to the community as requested?

i. No	ii. Yes			

2020 YB Response: i
2023 YB Response: i
Comments: Communicating fire paths to the community is not the role of the utility. CalFire leadership has made clear that state fire agencies are responsible for communicating fire paths and fire risks.

J.IV.e Does the utility work to assist suppression crews logistically, where possible?

i. No	ii. Yes			

2020 YB Response: ii
2023 YB Response: ii
Comments: SCE provides support to suppression crews related to electrical safety issues and access to power during restoration activities. SCE partners with the fire community to provide mutual support during response and restoration activities.

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**		
2020 YB Response: ii *2023 YB Response: ii* *Comments: Beyond SCE's vegetation management practices in its rights-of-way, SCE conducts a variety of fuels management activities on its private forest lands at Shaver Lake. SCE does not intend to expand its fuel management practices throughout the service territory at this time.*				

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

2020 YB Response: iii
2023 YB Response: iii
Comments: SCE engages with stakeholders, including Cal Fire and private landowners, when preparing for and conducting our fuel management activities on SCE's private forest lands at Shaver Lake. In addition, SCE Fire Management cooperates with fire agencies when the agencies plan and conduct their fuels management projects outside of Shaver Lake. Fuel management outside of SCE's rights-of-way is generally the responsibility of fire agencies, local government agencies, and landowners.

J.V.c Does the utility cultivate a native vegetative ecosystem across territory that is consistent with lower fire risk?

i. No	ii. Yes			

2020 YB Response: i
2023 YB Response: i
Comments: SCE works to maintain vegetation clearance requirements and proactively remove hazardous vegetation to, among other things, mitigate wildfire risk. Additionally, as described in SCE's 2020 WMP, SCE is exploring the use of Integrated Vegetation Management (IVM) which promotes desirable, stable, low-growing and native plant communities that will resist invasion from tall growing tree species through appropriate, environmentally sound, and cost-effective control methods. The goal of IVM is to develop a sustainable shrub or grassy areas that do not interfere with overhead powerlines, pose a fire hazard, or restrict access on SCE transmission rights-of-way or applicable distribution easements. SCE does not have plans to systematically change the vegetative ecosystem.

J.V.d Does the utility fund local groups (e.g., fire safe councils) to support fuel management?

i. No	ii. Yes			

2020 YB Response: ii
2023 YB Response: ii
Comments: SCE funds local groups such as the Fire Safe Councils, California Conservation Corps Foundation, California Fire Foundation, and the National Forest Foundation to provide philanthropy for various activities including fuel management. SCE has also funded a pilot program with Orange County related to night aerial firefighting resources, which is made available to SCE's service territory.

(END OF ATTACHMENT 3)