

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 11TH OF FEBRUARY at SAN DIEGO, California.
(Date) (Name of city)

 VICE PRESIDENT - ELECTRIC SYSTEM OPERATIONS
(Signature and Title of Corporate Officer)

Utility Wildfire Mitigation Maturity Survey – January 2020

[utility] Utility San Diego Gas & Electric

[CONTACT] -Contact Info-

- [CONTACT.r1] Utility Name SDG&E
 - [CONTACT.r2] Name Kirstie Raagas
 - [CONTACT.r3] Email Address KRaagas@sdge.com
 - [CONTACT.r4] Phone Number 6196995003
-

[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 iv. Risk for various weather scenarios can be reliably estimated
- [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 v. Asset-based
- [Q.A.Ic.r2] 3 years from now (by end of year 2022) v. Asset-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 iii. Mostly ($\geq 50\%$)
- [Q.A.Id.r2] 3 years from now (by end of year 2022) iii. Mostly ($\geq 50\%$)

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

- [Q.A.Ie.r1] Today v. Weather measured at the circuit level, how weather effects failure modes and propagation, existing hardware, level of vegetation
- [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 iii. Basic temperature modeling used to estimate effects of a changing climate on future weather and risk, taking into account difference in geography and vegetation

- [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
-

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

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

[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 iii. Mostly ($\geq 50\%$)
- [Q.A.IIb.r2] 3 years from now (by end of year 2022) iii. Mostly ($\geq 50\%$)

[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.IIdr1c3] iii. Through real-time learning (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.IIdr2c3] iii. Through real-time learning (yes)

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

- [Q.A.IIe.r1] Today i. $>60\%$, or no quantified confidence interval
 - [Q.A.IIe.r2] 3 years from now (by end of year 2022) ii. $>80\%$
-

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

[Q.A.IIIId] 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.IIIId.r1] Today **iii. Mostly (>=50%)**
- [Q.A.IIIId.r2] 3 years from now (by end of year 2022) **iii. Mostly (>=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.IIIIf] How are the outputs of the ignition risk impact assessment tool evaluated?

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

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

- [Q.A.IV a.r1] Today **iii. Approach reliably estimates risk reduction potential of initiatives on an interval scale (e.g. specific quantitative units)**
- [Q.A.IV a.r2] 3 years from now (by end of year 2022) **iii. Approach reliably estimates risk reduction potential of initiatives on an interval scale (e.g. specific quantitative units)**

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

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

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

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

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

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

- [Q.A.IV e.r1] Today **v. Existing hardware type and condition, including operating history; level and condition of vegetation; weather; and combination of initiatives already deployed**

- [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
-

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

- [Q.A.Va.r1] Today iii. Risk mapping algorithms updated continuously in real time
- [Q.A.Va.r2] 3 years from now (by end of year 2022) iii. Risk mapping algorithms updated continuously in real time

[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 iii. Mostly ($\geq 50\%$)
- [Q.A.Vb.r2] 3 years from now (by end of year 2022) iii. Mostly ($\geq 50\%$)

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

- [Q.A.Vc.r1] Today iii. Semi-automated process
- [Q.A.Vc.r2] 3 years from now (by end of year 2022) iii. Semi-automated process

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

- [Q.A.Vd.r1] Today ii. Independently evaluated by experts
- [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
-

[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
-

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

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

[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 iv. Span-based
- [Q.B.IIc.r2] 3 years from now (by end of year 2022) iv. Span-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
-

[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) 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

[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 iv. Span-based
- [Q.B.IIIc.r2] 3 years from now (by end of year 2022) iv. Span-based

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

- [Q.B.III d.r1] Today iii. Criteria for option (ii) met, and forecasted results are subsequently error checked against measured weather data
- [Q.B.III d.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 ($\geq 50\%$)
 - [Q.B.IIIe.r2] 3 years from now (by end of year 2022) iii. Mostly ($\geq 50\%$)
-

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

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

- [Q.B.IVc.r1] Today ii. Weather data is used to produce a combined weather 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
-

[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) iv. Well-defined equipment for detecting ignitions along grid, including remote detection equipment including cameras, and satellite monitoring

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

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

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

- [Q.B.Vd.r1] Today ii. Ignition detection software in cameras used to augment ignition detection procedures
 - [Q.B.Vd.r2] 3 years from now (by end of year 2022) ii. Ignition detection software in cameras used to augment ignition detection procedures
-

[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 iii. Grid topology exceeds design requirements, designed based on accurate understanding of drivers of utility ignition risk
 - [Q.C.IIa.r2] 3 years from now (by end of year 2022) iii. Grid topology exceeds design requirements, designed based on accurate understanding of drivers of utility ignition risk

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

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

- [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) iii. n-1 redundancy covering at least 70% of customers in HFTD

- [Q.C.IIIc] What level of sectionalization does the utility's distribution architecture have?
- [Q.C.IIIc.r1] Today iv. Switches in HFTD areas to individually isolate circuits, such that no more than 1000 customers sit within one switch
 - [Q.C.IIIc.r2] 3 years from now (by end of year 2022) iv. Switches in HFTD areas to individually isolate circuits, such that no more than 1000 customers sit within one switch

- [Q.C.IIIId] How does the utility consider egress points in its grid topology?
- [Q.C.IIIId.r1] Today ii. Egress points used as an input for grid topology design
 - [Q.C.IIIId.r2] 3 years from now (by end of year 2022) 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
-

- [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 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.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) iii. **Circuit-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 iv. **All**
- [Q.C.IVd.r2] 3 years from now (by end of year 2022) iv. **All**

[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) i. **No**
-

[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) 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**

[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 iii. **Yes, extensively with industry, academia, and other utilities**
- [Q.C.Vb.r2] 3 years from now (by end of year 2022) iii. **Yes, extensively with industry, academia, and other utilities**

[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) ii. **Yes**
-

[Q.D.Ia] What information is captured in the equipment inventory database?

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

[Q.D.Ib] How frequently is the condition assessment updated?

- [Q.D.Ib.r1] Today iii. **Quarterly**
- [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) ii. A system and approach are in place to 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
-

[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 ii. Based on up-to-date static maps of equipment types and environment
- [Q.D.IIb.r2] 3 years from now (by end of year 2022) ii. Based on up-to-date static maps of equipment types and environment

[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 ii. Based on up-to-date static maps of equipment types and environment
- [Q.D.IIe.r2] 3 years from now (by end of year 2022) ii. Based on up-to-date static maps of equipment types and environment

[Q.D.IIf] What are the inputs to scheduling detailed inspections?

- [Q.D.IIf.r1] Today i. At least annually updated or verified static maps of equipment and environment
- [Q.D.IIf.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.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 ii. Based on up-to-date static maps of equipment types and environment
- [Q.D.IIh.r2] 3 years from now (by end of year 2022) ii. Based on up-to-date static maps of equipment types and environment

[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
-

[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 v. At the asset level
 - [Q.D.IIIc.r2] 3 years from now (by end of year 2022) v. At the asset level
-

[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
-

[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 iii. QA/QC information is used to identify systemic deficiencies in quality of work and inspections, and recommend training based on weaknesses
- [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) 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

[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
-

[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) iii. Risk, as determined by predictive modeling of vegetation growth and growing conditions

[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) iii. Predictive modeling of vegetation growth
-

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

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

- [Q.E.IIIc.r1] Today v. At the asset level
 - [Q.E.IIIc.r2] 3 years from now (by end of year 2022) v. At the asset level
-

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

- [Q.E.IVa.r1] Today iii. Utility exceeds minimum statutory and regulatory clearances around all lines and equipment
- [Q.E.IVa.r2] 3 years from now (by end of year 2022) iii. Utility exceeds 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 iii. None of the above
- [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 i. Species growth rates and species limb failure rates
- [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 ii. **Yes**
- [Q.E.IVh.r2] 3 years from now (by end of year 2022) ii. **Yes**

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

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

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

[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) iii. **Through an established and demonstrably functioning audit process to manage and confirm work completed by subcontractors, where contractor activity is subject to semi-automated audits using technologies**

capable of sampling the contractor's work (e.g., LiDAR scans, photographic evidence)

[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 **iii. QA/QC information is used to identify systemic deficiencies in quality of work and inspections, and recommend training based on weaknesses**
- [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**
-

[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) **iii. Fully 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 i. During any conditions
 - [Q.F.IId.r2] 3 years from now (by end of year 2022) i. During any conditions
-

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

- [Q.F.IIIa.r1] Today iv. PPS 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. PPS 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 PPS events?

- [Q.F.IIIb.r1] Today iii. PPS event are communicated to >98% of affected customers and >99.5% of medical baseline customers in advance of PPS action
- [Q.F.IIIb.r2] 3 years from now (by end of year 2022) iii. PPS event are communicated to >98% of affected customers and >99.5% of medical baseline customers in advance of PPS action

[Q.F.IIIc] During PPS 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.IIIId] During PPS events, does the utility's website go down?

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

[Q.F.IIIe] During PPS 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) ii. Less than 1 hour

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

[Q.F.IVb] Does the utility have explicit thresholds for activating a PPS?

- [Q.F.IVb.r1] Today ii. Utility has explicit policies and explanation for the thresholds above which PPS is activated as a measure of last resort
- [Q.F.IVb.r2] 3 years from now (by end of year 2022) ii. Utility has explicit policies and explanation for the thresholds above which PPS 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 PPS decisions? Select all that apply.

- [Q.F.IVb.r1c1] 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

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

- [Q.F.Va.r1] Today iii. Existing process for accurately inspecting de-energized sections of the grid prior to re-energization, augmented with sensors and aerial tools
- [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 iii. Mostly automated ($\geq 50\%$)
- [Q.F.Vb.r2] 3 years from now (by end of year 2022) iii. Mostly automated ($\geq 50\%$)

[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) iv. Within 12 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 ii. Some probability estimates exist
 - [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
-

[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 v. All criteria in option (iii) met and apply to contractors as well as utility workers
- [Q.F.VIb.r2] 3 years from now (by end of year 2022) v. All criteria in option (iii) met and apply to contractors as well as utility workers

[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
-

[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 ii. Yes
- [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 iii. Yes, for both short term and long-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 sensed 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 ii. **Yes**
- [Q.G.Id.r2] 3 years from now (by end of year 2022) ii. **Yes**

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

- [Q.G.Ie.r1] Today iii. **Yes, with plans to incorporate these into centralized database of situational, operational and risk data**
- [Q.G.Ie.r2] 3 years from now (by end of year 2022) iii. **Yes, with plans to incorporate these into centralized database of situational, operational and risk data**

[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 cataloging 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 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**
- [Q.G.IId.r2] 3 years from now (by end of year 2022) 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**

[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 iii. **Yes, disclosed publicly in WMP upon request**
 - [Q.G.IIe.r2] 3 years from now (by end of year 2022) iii. **Yes, disclosed publicly in WMP upon request**
-

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

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

[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**
-

- [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 ii. Utility provides an accurate high-risk reduction and low risk reduction scenario, and the projected cost and total risk reduction potential
 - [Q.H.Ia.r2] 3 years from now (by end of year 2022) ii. Utility provides an accurate high-risk reduction and low risk reduction 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) iii. Circuit 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 ii. Yes
 - [Q.H.Ic.r2] 3 years from now (by end of year 2022) ii. Yes

- [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 iii. All commercial initiatives and emerging initiatives
 - [Q.H.IIb.r2] 3 years from now (by end of year 2022) iii. All commercial initiatives and emerging 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 iii. Yes, including the expected overall reduction in risk and estimates of impact on reliability factors
 - [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) iii. Circuit level
-

- [Q.H.IIIa] How accurate of a risk spend efficiency calculation can the utility provide?
- [Q.H.IIIa.r1] Today iii. Utility has accurate quantitative understanding of 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.IIIId] What vegetation management initiatives does the utility include within its evaluation?

- [Q.H.IIIId.r1] Today **iv. All**
- [Q.H.IIIId.r2] 3 years from now (by end of year 2022) **iv. All**

[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) **i. No**
-

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

- [Q.H.IVa.r1] Today **iii. Utility has accurate quantitative 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) **iii. Circuit-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) **v. All commercially available grid hardening initiatives, as well as those initiatives that are lab tested**

[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) **i. No**
-

[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) **iv. Accurate RSE estimates for all initiatives are used to determine capital allocation across portfolio (e.g. prioritizing between vegetation management and grid hardening)**

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

- [Q.H.Vb.r1] Today **ii. Specific information by initiative, including state of equipment and location where initiative will be implemented**
- [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) **iii. RSE estimates are verified by historical or experimental pilot data and confirmed by independent experts or other utilities in CA**

[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 **iii. Utility uses pilots and measures direct reduction in ignition events and near-misses.**
- [Q.H.VIa.r2] 3 years from now (by end of year 2022) **iii. Utility uses pilots and measures direct 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 **ii. Utility uses total cost of ownership**
- [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 **iii. Circuit**
- [Q.H.VIc.r2] 3 years from now (by end of year 2022) **iii. Circuit**

[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) **ii. Yes**

[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**
-

[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 iv. **Span level**
- [Q.I.IIc.r2] 3 years from now (by end of year 2022) iv. **Span 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**
-

[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 iii. **Yes, along with referrals to other agencies**
- [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.IIIId] How does the utility assist where helpful with communication of information related to power outages to customers?

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

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

[Q.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?

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

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

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

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

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

[Q.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?

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

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

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

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

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

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

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

[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**
-

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

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

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

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

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

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

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

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

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

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

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

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

[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) **iii. Utility conducts fuel management throughout service area**

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

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

[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) ii. **Yes**

[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**

[record] Record number 794

[uuid] Participant identifier hpbhg1wk9wt0tp0u

[date] Completion time and date 02/10/2020 15:08

**San Diego Gas & Electric Company
Interpretive Guide to 2020 Wildfire Mitigation
Maturity Model Utility Survey**

INTERPRETIVE GUIDE TO SAN DIEGO GAS & ELECTRIC COMPANY'S 2020 WILDFIRE MITIGATION MATURITY MODEL UTILITY SURVEY

As part of Wildfire Mitigation Plan (WMP) Guidelines issued by the Administrative Law Judge in Rulemaking 18-10-007 on December 16, 2019, the Wildfire Safety Division (WSD) and Safety and Enforcement Division (SED) promulgated a Utility Wildfire Mitigation Maturity Model (Maturity Model) to assess utility capabilities in reducing wildfire risk and corresponding maturity levels. To gauge those capabilities and maturity levels, the WMP Guidelines also included a Utility Survey.

The WSD and SED facilitated a series of working group meetings with the electric utilities, to discuss and clarify various requirements and instructions set forth in the WMP Guidelines. As a result of these meetings, the WSD issued clarification documents on January 15, 2020 and on January 29, 2020,¹ which responded to issues and questions posed by the electric utilities with respect to both the WMP Guidelines and the Utility Survey.

In preparing its 2020 Utility Survey submission, San Diego Gas & Electric Company (SDG&E) has attempted to comply with the Utility Survey instructions, as well as the Clarification Document. Given that this is the first year in which a Utility Survey is a component of the WMP submission and given the short period of time SDG&E has had to work with the Utility Survey and Clarification Document, SDG&E has necessarily made assumptions or interpretations regarding the questions and criteria within the Utility Survey.

SDG&E has prepared this interpretive guide to identify instances where it made such assumptions or interpretations, as well as what those assumptions or interpretations were. While this interpretive guide is not required by the WMP Guidelines or the Utility Survey, SDG&E has prepared it in order to assist reviewers of SDG&E's Utility Survey.

This interpretive guide is organized as follows:

1. General Discussion on the Maturity Model
2. Risk Assessment Process
3. Public Safety Power Shut-off Approach
4. Data Transparency
5. Risk Mapping Algorithms
6. Fire Detection Capabilities
7. Grid Design and Operations
8. Asset Management
9. Items Beyond the Scope of the Utility's Responsibility

¹ WSD, "Follow-Up Clarification Document From 1/27 Utility Working Group" (Clarification Document).

General Comments on the Maturity Model

While SDG&E supports the directional vision that the Maturity Model provides, it is important to note that this is the first of its kind model, and no other utility has been evaluated against this new framework. The framework establishes several key elements to describe common industry practices in wildfire mitigation, but best practices across the globe are still evolving. There is no established, recognized standard as to what a globally leading utility looks like from a wildfire mitigation standpoint. Furthermore, the Maturity Model fails to recognize the level of effort and resources, including costs, that may be required to achieve the highest maturity levels, and whether or not the use of those resources in such a manner is warranted. SDG&E believes it is important to carefully evaluate the benefit of moving up the maturity levels and the associated impacts to customers.

According to the overall process described by the CPUC in its Maturity Model guidance, the rubrics are expected to be updated every three years. SDG&E proposes an earlier assessment of the Maturity Model to capture lessons learned from this initial implementation and to improve the Maturity Model for the 2021 re-evaluation. For instance, there are several areas in the Maturity Model and Utility Survey that are broad and open-ended that can lead to various interpretations, which likely defeats the purpose of comparability across utilities. As such, SDG&E welcomes the opportunity to collaborate with the WSD and stakeholders through a series of workshops to refine the Maturity Model before next year's filing.

Risk Assessment Process

Throughout the survey, there are several questions that relate to the assessment of risk reduction, calculation of risk spend efficiencies (RSEs) and the use of confidence intervals for those assessments. The comments in this section pertain to those areas and are directly related to Capabilities 2, 4, 14, 37, 38, 39 and 40.

While the concept of cost-benefit analysis in the form of RSEs is not new, it is important to recognize that its application is relatively immature and is still evolving under new guidelines set forth by the CPUC in the Safety Model Assessment Proceeding (S-MAP). As mentioned in SDG&E's 2019 Risk Assessment Mitigation Phase (RAMP) filing:

In theory, RSEs are a mechanism that can help IOUs and the Commission understand risks and mitigations better and compare mitigations in addressing risks. Conceptually, RSEs could be a useful tool to assist in decision-making, but even when they were first suggested to the Commission, RSEs had critical shortcomings – shortcomings that continue with their most recent iteration. Because of these continuing deficiencies (and newer ones that have been discovered as RSEs have evolved and expanded), RSEs remain a data point for utilities to consider, but not the deciding factor for mitigation selection – a fact that is recognized by SED, the IOUs, and even the Commission in Decision (D.) 18-12-014, the Safety Model Assessment Proceeding (S-MAP) Settlement Agreement Decision (SA Decision).²

² Investigation (I.) 19-11-010, SDG&E's 2019 RAMP at RAMP-E-1.

With regard to survey questions that pertain to the level of granularity of risk assessments (questions A.IV.c, C.IV.b, H.I.b, H.II.e, H.III.b, H.IV.b), SDG&E notes that it utilizes varying degrees of granularity across a suite of tools to support risk-informed decision-making. This is because SDG&E believes that the level of sophistication in modeling should be driven by the need and value of that modeling, as well as data availability. Most RSEs are developed by averaging likelihoods and impacts at some level of precision, rather than at specific locations. In some cases, SDG&E has consequence information at each asset (e.g., electric reliability, wildfire spread), but the likelihoods might be averaged on a set of assumptions. As information becomes more precise, through efforts of asset management, engineering, meteorology, and risk management, further usages of RSEs will also become more precise. But there will still be a large amount of uncertainty. For example, utilities will never know exactly the true failure rate of a piece of equipment given its unique location, environmental factors, operating history, and workmanship.

With respect to questions in the Utility Survey that pertain to the use of confidence intervals (questions A.II.e and A.IV.a), SDG&E does not currently use confidence intervals in its assessments. There are at least two types of risk assessments that occur at SDG&E: the first focuses on the amount of risk present, and the second focuses on how to reduce risk. The first type of risk assessment typically uses Monte Carlo modeling to estimate outcomes, and that type of assessment inherently has confidence intervals present. The second type uses expected values to estimate the effectiveness of a project and does not use confidence intervals. Per the RAMP guidance, SDG&E conducted probabilistic risk assessments, analyzing a range of potential consequences to determine the expected value, and utilizing that expected value to estimate changes from applied mitigations. As such, SDG&E has the ability to communicate confidence intervals for overall risk, such as the annual impact from wildfires but does not currently believe there is a need to incorporate confidence intervals into project effectiveness scoring and prioritization.

Public Safety Power Shut-off Approach

The Survey asks questions regarding the utility's current approach to PSPS and future use of PSPS to minimize wildfire risks. The comments in this section pertain to those areas and are directly related to Capability 29.

While SDG&E's goal is to reduce the need for PSPS as much as possible, it is important to recognize that factors beyond its control, such as evolving climate trends, may hinder the ability to achieve that goal. As such, reaching those higher maturity levels, where no PSPS events take place, must be recognized as an aspirational goal subject to evolving future risks.

Additionally, with regard to question F.III.e pertaining to the duration of outages during PSPS events, it is very difficult to reach the maturity level for "less than 0.1 hours" because most wind-related events last more than a few hours, and the time it takes to re-energize is a lengthy process. For reference, When SDG&E's weather forecasts indicate that winds will not re-accelerate at or above dangerous levels and the decision has been made to re-energize, all lines that have been de-energized are inspected for damage before re-energization may occur. Once

a line is patrolled and any needed repairs are made the area will be patrolled again and then be re-energized.

Data Transparency

The Maturity Model requires the presence of a single document cataloguing all fire-related data, algorithms, analyses and processes in order to achieve minimum maturity levels and does not provide any room to recognize any level of documentation that is currently in place (questions G.II.a and G.II.b); the questions are binary “yes” or “no” questions. Although SDG&E does not currently have a single document that captures all the required information, it does adequately document the relevant information based on its various needs and where it adds the most value. Additionally, it is important to recognize that there are no set regulatory requirements or standards to have a single document as described in the Maturity Model. Accordingly, a “no” answer to the single document question creates a false appearance that a utility is below applicable regulatory requirements.

Risk Mapping Algorithms

The survey asks several questions related to risk mapping. The comments in this section pertain to those areas and are directly related to Capability 5.

Over the last several years, SDG&E has developed and continues to refine a primarily automated risk assessment and mapping methodology referred to as the Wildfire Risk Reduction Model (WRRM). The WRRM project is a collaboration between SDG&E and Technosylva Inc. SDG&E has further enhanced this model into an operational system (WRRM-Ops) by developing a fully automated process to ingest daily weather and fuel moisture data from its supercomputers and re-calculate risk levels to support emergency operations.

With regards to the survey questions around updating risk mapping (question A.V.a), it is important to note that the WRRM-Ops is fairly new in the industry. The WRRM-Ops fire spread algorithm uses a long standing and widely accepted model to predict the rate and extent of fire spread.³ SDG&E has an automated process to update weather information daily (including fuels), which is then sent to a server to update the fire spread model based on the updated environmental conditions. As subject matter experts observe deviations in fire spread modelling compared to real-life fire behavior, SDG&E initiates research and development into more accurate fuels and weather data modelling. As the new science becomes available, it is instituted into the WRRM-Ops model.

Fire Detection Capabilities

The survey asks several questions related to fire detection processes and tools. The comments in this section pertain to those areas and are directly related to Capability 10. In Capability 10, the highest level of maturity involves remote detection equipment, including cameras and satellite monitoring.

³ Rothermel, 1972 https://www.fs.fed.us/rm/pubs_int/int_rp115.pdf.

SDG&E utilizes the Alert SDG&E Camera network as a means to monitor wildfire activity and enhance situational awareness. SDG&E has also closely monitored and tested the capability of fire detection software algorithms and experienced significant over-detection of wildfire activity. SDG&E thus determined that the technology was not yet optimal for operational deployment. Additionally, while higher maturity levels require the use of satellite-based wildfire detection, it is important to recognize that the current camera networks in SDG&E's service territory have effectively provided situational awareness on wildfire activity before satellite-based systems were able to detect the fire. That said, SDG&E is continuing work in this area, focusing on technology which includes the integration of advanced analytics into the development of a satellite-based wildfire detection system and the amalgamation with SDG&E's forecasting systems.

Grid Design and Operations

The survey asks several questions related to grid design and operations. The comments in this section pertain to those areas and are directly related to Capabilities 13 and 28.

Redundancy in electric systems is more common on transmission systems. This is because transmission circuits are often a looped system (or network) designed to have one transmission line keep the power on for the loss of the other. The loss of a transmission line is known as a N-1 condition for which transmission reliability criteria, especially for regional transmission, require another transmission line to continue to serve the load. Contrary to distribution circuits, a single transmission circuit can carry hundreds of megawatts. Furthermore, networked systems are not common outside urban settings. SDG&E's distribution circuits in the HFTD are in a rural setting and therefore not a network or looped system. Industry standards have not commonly been to build rural circuits as network systems.

SDG&E does have ties between circuits even on its rural distribution circuits. These ties are normally open and used to transfer load from one circuit to another by closing the ties when a fault has been isolated on the circuit with the trouble. During PSPS events, it is not desirable to have ties used to transfer load off of a circuit shutdown for high winds. This is because the circuit that may be used as a backup circuit, if it is an overhead circuit, will more than likely be de-energized as well. Certainly, automated ties that allow for quicker transfer of load to a redundant circuit is even less desirable in high wind conditions as it could pose more fire risk. The only situation in which automated ties might make sense is if the circuits are underground which then has reduced fire risk.

Asset Management

The survey asks some questions around frequency of asset assessment updates and inventory updates. The comments in this section pertain to those areas and are directly related to Capability 16.

On question D.I.b. which asks how frequently the condition assessment is updated, SDG&E notes that its inspection program exceeds the minimum regulatory requirements and that every asset is inspected at-least once a year. In the context of the preceding question D.I.a,

SDG&E takes question D.I.b to refer to the frequency of updating the inventory database which occurs on a more frequent basis where it is updated quarterly.

Question D.I.c asks, Does all equipment in HFTD areas have the ability to detect and respond to malfunctions? The choice of responses are not sufficiently expansive to allow an answer that depicts the current status of SDG&E ability to detect faults. Response option (i) is “No system and approach are in place.” Response option (ii) is “A system and approach are in place to reliably detect incipient malfunctions likely to cause ignition.” These two responses do not provide an intermediate option, such as a utility that has a system and approach in place to detect faults and de-energize circuits or portions of circuits.

Items Beyond the Scope of the Utility’s Responsibility

The Maturity Model requires utilities to take on certain responsibilities beyond the scope of their operations in order to achieve higher maturity levels. These areas include potential interference with local emergency response agencies. The comments in this section pertain to those areas and are directly related to Capabilities 10, 13 and 45.

In the above-mentioned capabilities, the Maturity Model is steering the IOUs to take on certain responsibilities that belong to state and local emergency agencies in terms of evacuation, egress points and traffic mapping as well as ignition notifications to stakeholders. While such emergency notification and management activities are critical to the community, they are beyond the scope of what California utilities are authorized or required to do under state and federal law. SDG&E proudly works alongside first responders and emergency agencies who are experts in their field, but it does not interfere with the incident management practices they have in place. SDG&E is addressing these as follows:

- SDG&E considers egress on circuits and communities. While SDG&E supports and collaborates with the aforementioned agencies in evacuation planning, it is the responsibility of city and county first responders to develop, prepare, and implement evacuation plans.
- SDG&E has procedures in place for notifying suppression forces by calling 911 and working closely with first responder but the primary responsibility for notification of all stakeholders remains with 911 dispatch and county OES (question B.V.c).
- SDG&E communicates outage information and collaborates with first responders by providing trained fire coordinators to support emergency personnel as needed. However, the responsibility of communicating evacuation plans remains with emergency agencies (question I.III.d).