PACIFIC GAS AND ELECTRIC COMPANY

2020 WILDFIRE MITIGATION PLAN

ATTACHMENT 5

ADDITIONAL DETAIL ON

PG&E'S UTILITY SURVEY RESPONSES

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Overview and Supplement to Utility Wildfire Mitigation Maturity Model

As part of a substantially revised 2020 Wildfire Mitigation Plan (WMP) process, the CPUC Wildfire Safety Division (WSD) directed California utilities to complete a supplementary self-assessment of Wildfire Mitigation Capabilities. The self-assessment is based on a WSD developed model, the Utility Wildfire Mitigation Maturity Model (UWMMM or Maturity Model), which describes a methodology and provides a framework that can be used to assess utility capabilities in reducing wildfire risk and corresponding maturity levels. As outlined by the WSD, the UWMMM is intended to provide the CPUC and the public with a view of the utility's wildfire mitigation capabilities and identify leading practices that may be shared across California utilities.

The UWMMM is comprised of 52 distinct "capabilities" organized into 10 categories. In addition, the WSD provided a Utility Survey containing 247 questions that map into the 52 capabilities. Each California utility is required to self-assess itself along all 247 questions on both its current (January 2020) and future state (January 2023) – these answers have been recorded and submitted through a digital survey alongside the 2020 WMP submission, on February 7, 2020. A print-out of those responses is included as Attachment 4 to PG&E's 2020 WMP.

Utility Survey Supplemental Information

To support PG&E's Maturity Model and Survey submission, PG&E is including the following information to provide additional background and detail on how we approached the survey and challenges identified in responding to it. PG&E understands that, as the WSD has stated previously, this Maturity Model and associated assessments against it are valuable and iterative. PG&E is providing this supplemental information to improve understanding and information sharing about how PG&E responded to this survey and to help inform this vital process going forward.

PG&E's Approach to Survey

In responding to the multiple-choice Utility Survey questions, PG&E approached each one as literally as possible while also erring on the conservative side when an

answer fell between two options (i.e., PG&E would choose the lower score). PG&E further relied on the guidance given in the Survey Response Instructions, which state that a utility shall indicate that they meet a given response option if they meet all of the characteristics described within that response option, across all instances where the question is valid. From PG&E's perspective, this standard was particularly impactful with "binary" (i.e., only two options) survey questions given that the two options were usually at opposite ends of a possible spectrum and a simple yes or no response does not accurately reflect PG&E's actual capabilities. In some of these instances, PG&E had to rely on the professional judgement of Subject Matter Experts (SME) to best interpret the spirit, intent and specifics of a question; for example, survey question G.I.a asks "does the utility have a centralized database of situational, operational, and risk data" with the simple options: no or yes. PG&E answered "yes" to this question, because, although this data is actually housed in multiple databases, the data is centralized in a way that is easily accessible and makes sense for various data traits across multiple databases.

PG&E enlisted the inputs from many internal SMEs to answer the questions within their expertise. All answers were then reviewed by the Electric Operations Leadership (including both Category-specific Responsible Directors as well as more senior Leaders), Legal, and Regulatory teams. PG&E understands that the survey questions, in combination with other inputs, will be translated by the WSD into maturity "scores" for each of the 52 capabilities in the UWMMM.

Finally, when self-assessing future state scores, PG&E typically identified a higher maturity level than the current state in the cases where an established plan with line of sight supports the future score. In addition, in areas where the answer and/or maturity score did not change, PG&E is not necessarily stating that no actions will be taken to improve; there are levels of maturity within each option. Moreover, in some cases improvements are planned that do not precisely align with a higher answer level (e.g., PG&E is improving in a way that may be different than what is identified in the survey answer rubric), or, in other cases, technology, tools, and other actions are being evaluated or implemented but it is not fully clear at this point how, if or when those activities will increase performance to the higher answer. PG&E takes answering the questions to improve the wildfire capability seriously and it will continue to pursue a wide array of improvements for those goals that do and do not fully align with the WSD's Maturity Model for all of California's utilities.

Scoring Challenges

As mentioned above, PG&E read each question as literally as possible and answered conservatively each survey question. Even when applying those principles, PG&E ran into several issues that could cause confusion or misinterpretation of the answer.

Survey questions and answer choices were often rigid, highly specific, and may or may not align with leading practices. For example, multiple survey questions (e.g., F.III.b, I.III.b, I.III.c) ask about % of customers contacted during events and suggest that the leading practice is contacting greater than 99.9% of customers. However, PG&E does not have up-to-date contact information for its entire customer base as customers have ultimate control of their contact information—this is a common issue in the utility industry. Therefore, regardless of amount of effort, attaining the top score in this type of question is likely unattainable.

In the survey itself, questions with binary answers oftentimes are not connected to other questions or comment fields that would provide further insight into the response. For example, survey question E.IV.f asks "does the utility remove vegetation waste along its right of way across the entire grid" while providing the options: no or yes. PG&E does remove vegetation waste along some of its right of ways, but it does not remove all vegetation waste along every right of way across the grid. To be conservative, PG&E answered no for both current and future state, which is not truly reflective of the situation.

Finally, while PG&E understands that the WSD will compute the final maturity scores for each capability using the survey responses alongside other inputs, there will likely be multiple instances where one survey question will have a disproportionate impact on a maturity score for one or more of the 52 capabilities that may not truly reflect PG&E's level of maturity. As an example, on survey question J.V.a (Capability 52) regarding fuel management,[1] a strict interpretation of the answers requires PG&E to submit the lowest answer, which is expected to result in the entire capability being graded a '0'. Matching back to the maturity model, a '0' score on capability 52 reads broadly as "Utility does not collaborate with other agencies conducting non-emergency wildfire planning and initiatives to reduce wildfire risk."

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[1] Question J.V.a asks "where does the utility conduct substantial fuel management?" with the options: utility does not conduct fuel management, utility conducts fuel management along rights of way, or utility conducts fuel management throughout service area.

If scored in that way (a “0” on capability 52 because of question J.V.a), this maturity assessment would not be accurate as there are several aspects to collaboration on “wildfire planning and initiative to reduce wildfire risk” that are not being incorporated into the response due to one score on a single question.

While PG&E appreciates the challenges inherent in creating a model to assess a concept as complex as utility wildfire mitigation activities, PG&E has some concerns about public perception issues given some of the scoring challenges outlined above. Moreover, the UWMMM was designed as a “one size fits all” model for all California utilities, and some of the practices that the WSD defines as leading or at a higher maturity level may not be the most prudent or impactful in reducing wildfire risk as it specifically pertains to PG&E and its service territory.

Future Evolution

PG&E is supportive of a statewide approach to wildfire mitigation maturity and agrees that the related benchmarking and best practices conversations will be beneficial. PG&E is looking forward to robust conversations and idea sharing with the WSD, other utilities, community partners, and the broader public on how continue to evolve and improve the Maturity Model tool and overall wildfire risk reduction going forward.

The tables that follow provide additional background and details on the Utility Survey responses that were officially provided to the WSD through an online tool. A download of those responses from the online survey tool has been provided in Attachment 4.

Utility Survey Responses

Category/Capability Info				Question Info		Scores		Final Deliverable	
Category Letter	Category Name	Capability #	Capability Name	Question Name	Question	Current State Score	Future State Score	Assumption	Explanation
A	Risk Mapping and Simulation	1	Climate scenario modeling and sensitivities	A.I.a	How sophisticated is utility's ability to estimate the risk of weather scenarios?	i	ii	None	PG&E does not incorporate climate scenarios into its risk modeling at this time. In the future, PG&E plans to apply the best available climate information when conducting infrastructure work, and developing design and construction standards. Ultimately, PG&E would like to have its risk modeling and the overall asset strategy consider wind patterns and temperature of transformers.
A	Risk Mapping and Simulation	1	Climate scenario modeling and sensitivities	A.I.b	How are scenarios assessed?	i	ii	"Independent" means either internal (independent from accountable team) or external.	PG&E does not follow a formal assessment process when looking at climate scenarios. PG&E does consider climate change and its impacts on PG&E's territory, but this concept has not been fully operationalized. PG&E has hired a third-party to conduct an independent expert assessment, which will solidify a formal assessment process in the future.
A	Risk Mapping and Simulation	1	Climate scenario modeling and sensitivities	A.I.c	How granular is utility's ability to model scenarios	ii	iii	None	PG&E currently models scenarios at a regional level using California Energy Commission (CEC) climate scenario analyses, which are mapped by county. PG&E has, and will continue to make efforts to model scenarios at the circuit level.
A	Risk Mapping and Simulation	1	Climate scenario modeling and sensitivities	A.I.d	How automated is the tool?	i	i	None	PG&E's climate scenario modeling tool is not automated, and this is not foreseen to change in the immediate future.
A	Risk Mapping and Simulation	1	Climate scenario modeling and sensitivities	A.I.e	What additional information is used to estimate model weather scenarios and their risk?	i	iii	None	PG&E currently looks at failure modes in asset management, spread analysis in Technosylva, and weather scenarios to help inform the basis of inspections. In the future, PG&E plans to integrate these three components into a single model to estimate risk.
A	0	1	Climate scenario modeling and sensitivities	A.I.f	To what extent is future change in climate taken into account for future risk estimation?	i	ii	None	PG&E does not take future climate change in account when estimating future weather and resulting risk. In future scenario modeling, PG&E plans to take into account higher risk across the entire service territory caused by the changing climate.
A	Risk Mapping and Simulation	2	Ignition Risk Estimate	A.II.a	How is ignition risk calculated?	ii	iii	Quantitative means relative risk	PG&E currently uses a variety of tools and processes to reliably categorize the risk of ignition across the grid into at least two categories for both transmission and distribution. PG&E plans to enhance some of its tools (e.g., REAX, Technosylva) to allow for quantitative and accurate assessment of the risk of ignition across the grid based on characteristics and condition of lines, equipment, surrounding vegetation, and localized weather patterns.
A	Risk Mapping and Simulation	2	Ignition Risk Estimate	A.II.b	How automated is the ignition risk calculation tool?	i	ii	None	Current ignition risk calculations are manual, as PG&E must pull information from several disparate databases to assess risk. In the future, PG&E aims to develop an interface that integrates such data (e.g., outage history, asset characteristics and conditions) to partially automate and streamline the risk calculation process.
A	Risk Mapping and Simulation	2	Ignition Risk Estimate	A.II.e	How granular is the tool?	iii	iii	Granularity at the asset level is based on asset condition as an input	PG&E currently calculates ignition risk at a protection zone level of granularity for its distribution system. Protection zones are more granular than circuit level, but less granular than span level. Transmission ignition risk is assessed at the asset level by using component type, condition, and characteristics as inputs. PG&E does not anticipate being able incorporate unique weather conditions at the equipment level into ignition risk estimates by 2023.
A	Risk Mapping and Simulation	2	Ignition Risk Estimate	A.II.d	How is risk assessment confirmed? Select all that apply.	i and ii	i, ii and iii	PG&E interprets "real time learning" as incorporating lessons from past events very quickly, albeit, not instantaneously Experts can be internal or external parties.	PG&E primarily utilizes experts and historical data to confirm past risk assessments. PG&E also leverages learnings from past events when confirming its risk assessments but believes it can do so at a quicker pace. Moving forward, PG&E aims to incorporate learnings from past risk assessments at a quicker cadence than before.
A	Risk Mapping and Simulation	2	Ignition Risk Estimate	A.II.e	What confidence interval, in percent, does the utility use in its wildfire risk assessments?	i	i	Quantitative means relative	PG&E assesses wildfire risk using a relative risk methodology that does not include the use of a quantified confidence interval. Specifically, PG&E calculates risk scores by multiplying the expected consequence of a risk event by the likelihood of an risk event occurring (consistent with D.18-12-014). PG&E also factors in high consequence, low relative frequency events (i.e., tail events) using a Multi-Attribute Value Function that associates up to 10 times more "importance" to tail events than relatively common events. In the future, PG&E plans to continue using this methodology.

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Category Letter	Category Name	Capability #	Capability Name	Question Name	Question	Current State Score	Future State Score	Assumption	Explanation
A	Risk Mapping and Simulation	3	Estimation of wildfire consequences for communities	A.III.a	How is estimated consequence of ignition relayed?	ii	ii	None	PG&E categorizes ignition events either as a low or high risk to communities and will continue doing so. PG&E is also always looking for appropriate ways to identify ignition risk such as ranking the risk of circuits.
A	Risk Mapping and Simulation	3	Estimation of wildfire consequences for communities	A.III.b	What metrics are used to estimate the consequence of ignition risk?	i	ii	Catastrophic event means at least one fatality	PG&E currently uses REAX and Technosylva to estimate consequence of ignition risk using potential population impacted, number of structures and number of acres burned. These tools do not include the number of potential fatalities. In the future, PG&E plans on improving its estimation model but does not anticipate having air quality and GHG analyses being incorporated in the estimation by 2023.
A	Risk Mapping and Simulation	3	Estimation of wildfire consequences for communities	A.III.c	Is the ignition risk impact analysis available for all seasons?	ii	ii	None	PG&E's ignition risk impact analysis is available throughout all seasons of the year.
A	Risk Mapping and Simulation	3	Estimation of wildfire consequences for communities	A.III.d	How automated is the ignition risk estimation process?	i	ii	None	PG&E's current ignition risk estimation process is not automated. In the future, PG&E plans on automating the processes as much as practically feasible through integration of different data sources.
A	Risk Mapping and Simulation	3	Estimation of wildfire consequences for communities	A.III.e	How granular is the ignition risk estimation process?	iii	iii	None	Granularity for ignition risk estimation processes are done at the asset level for distribution and at the circuit level for transmission. No change is expected in the future.
A	Risk Mapping and Simulation	3	Estimation of wildfire consequences for communities	A.III.f	How are the outputs of the ignition risk impact assessment tool evaluated?	i	iii	Independent - can either be an internal assessment (independent from responsible/accountable team) or an external third party	PG&E currently evaluates outputs of the ignition risk impact assessment tool, but the evaluation is done by the responsible team, not an independent expert. In the future, PG&E plans to incorporate independent assessment through either external third party or an internal assessment team that is independent of the team responsible/accountable for executing the risk impact analysis.
A	Risk Mapping and Simulation	3	Estimation of wildfire consequences for communities	A.III.g	What other inputs are used to estimate impact?	i	i	Vegetation and weather are used to estimate consequence or spread, not likelihood of ignition.	PG&E uses vegetation and weather to estimate the consequence (aka spread) of a wildfire should an ignition take place. These two inputs, along with others such as moisture types, help inform the Technosylva outputs. PG&E is working on developing solutions with Technosylva that when overlaid with additional weather data, could help identify vegetation species or strike trees. This data has been collected in Tier 2/3 HFTD.
A	Risk Mapping and Simulation	4	Estimation of wildfire and PSPS risk-reduction impact	A.IV.a	How is risk reduction impact estimated?	i	iii	None	PG&E currently has an SME informed process to estimate the potential risk reduction by initiative, but does not have enough operational history to validate the effectiveness of the risk reduction by initiative with the exception of PSPS. PG&E calculates a PSPS de-energiziation scoping criteria estimated risk reduction percentage that is based on historical outage data. In the future, PG&E will validate its risk reduction estimation process through actual performance of the circuits.
A	Risk Mapping and Simulation	4	Estimation of wildfire and PSPS risk-reduction impact	A.IV.b	How automated is your ignition risk reduction impact assessment tool?	i	ii	None	PG&E's current ignition risk reduction impact assessment is not automated. In the future, PG&E plans on automating the assessment as much as practically feasible, through integration of different data sources.
A	Risk Mapping and Simulation	4	Estimation of wildfire and PSPS risk-reduction impact	A.IV.c	How granular is the ignition risk reduction impact assessment tool?	i	iii	None	PG&E's current process for estimation of wildfire risk-reduction impact uses SMAP which is less granular than regional. PG&E's process for estimating PSPS risk reduction impact yields a higher level of granularity, looking at the scope for de-energization vs. the actual for previous PSPS events. In the future, PG&E plans to improve its estimation of wildfire and PSPS risk-reduction impact to the circuit level.
A	Risk Mapping and Simulation	4	Estimation of wildfire and PSPS risk-reduction impact	A.IV.d	How are ignition risk reduction impact assessment tool estimates assessed?	i	iii	"Independent" can either be an internal assessment (independent from responsible/accountable team) or an external third party.	PG&E assess its estimates of ignition risk reduction impacts with limited formal evidence. In the future, PG&E plans on utilizing expert assessments.

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A	Risk Mapping and Simulation	4	Estimation of wildfire and PSPS risk-reduction impact	A.IV.e	What additional information is used to estimate risk reduction impact?	ii	iii	"Estimate" includes a relative prioritization scale from low to high and this informs our work prioritization.	PG&E currently uses existing hardware type and condition to estimate risk reduction impact. For transmission, PG&E also uses an Operability Assessment model that factors in maintenance tags / equipment condition. PG&E has structured its work management in a way that prioritizes risk reduction impact, but does not quantify it. In the future, PG&E plans to gather additional data that can be incorporated into calculations used to estimate risk reduction impact.
A	Risk Mapping and Simulation	5	Risk maps and simulation algorithms	A.V.a	What is the protocol to update risk mapping algorithms?	i	ii	None	PG&E does not follow a well defined process for updating risk mapping algorithms. PG&E plans on creating a well defined processes in the future. PG&E does view deviations (mapped in ERWIN) and Technosylva acts on deviations.
A	Risk Mapping and Simulation	5	Risk maps and simulation algorithms	A.V.b	How automated is the mechanism to determine whether to update algorithms based on deviations?	ii	ii	None	PG&E uses a partially automated process to determine whether to update algorithms based on deviations. Specifically, Technosylva is linked to the CAL FIRE fire alert system. This allows PG&E to automatically access and process burn footprint data with machine learning to update its spread estimation algorithms. PG&E uses partial automation when estimating likelihood of ignition and does not anticipate increased automation in this capacity.
A	Risk Mapping and Simulation	5	Risk maps and simulation algorithms	A.V.c	How are deviations from risk model to ignitions and propagation detected?	i	ii	None	PG&E's propagation detections are calculated semi automatically, but ignitions deviations are not calculated. In the future, PG&E will be manually calculating ignitions deviations.
A	Risk Mapping and Simulation	5	Risk maps and simulation algorithms	A.V.d	How are decisions to update algorithms evaluated?	i	iii	"Independent" can either be an internal assessment (independent from responsible/accountable team) or an external third party.	PG&E currently has the ability to check historical ignition data and subsequently adjust fuel ignitions, because models receive inputs from CAL FIRE. Additionally, decisions to update algorithms are being evaluated by the responsible team. In the future, PG&E plans to use independent assessment to evaluate decisions to update algorithms.
A	Risk Mapping and Simulation	5	Risk maps and simulation algorithms	A.V.e	What other data is used to make decisions on whether to update algorithms?	i	iii	None	PG&E currently uses historic ignition and propagation data to update algorithms. PG&E uses Technosylva, which also has contracts with CAL FIRE and other utilities. In the future, PG&E plans to leverage data from other utilities and other sources, but anticipates it being difficult to establish this data sharing and interchangeability by 2023.
B	Situational awareness and forecasting	6	Weather variables collected	B.I.a	What weather data is currently collected?	ii	iii	None	PG&E currently collects weather data from over 600 installed weather stations. PG&E currently captures humidity, precipitation, and atmospheric wind conditions. This year, PG&E will improve its mapping of surface fuels that coexist with overhead assets, which will then serve as an input for the fire spread model for Technosylva.
B	Situational awareness and forecasting	6	Weather variables collected	B.I.b	How are measurements validated?	ii	ii	"Measurements" refers to measurements taken from PG&E's weather stations.	PG&E measures actual weather data to forecasted data. There is a prescribed calibration for hardware weather stations that is a manual process that requires dispatch of an operator. PG&E believes the industry best practice is manual at this time and therefore has no plans to advance beyond this response. Existing industry best practices are not yet automated because the weather stations use physical rotating devices that must be manually manipulated to receive an output from the sensors.
B	Situational awareness and forecasting	6	Weather variables collected	B.I.c	Are elements that cannot be reliably measured in real time being predicted (e.g., fuel moisture content)?	ii	ii	None	PG&E's Meteorology team uses a high resolution in-house mesoscale forecast model (POMMS) to generate important fire weather parameters including wind speed, temperature, relative humidity, and precipitation at a 3-kilometer (km) resolution. Outputs from POMMS are used as inputs to the National Fire Danger Rating System, the Nelson Dead Fuel Moisture (DFM) model, and a proprietary Live Fuel Moisture (LFM) model. In order to improve the Live Fuel Moisture data, PG&E has sent out its Safety Infrastructure Protection Teams (SIPT) to clip samples of plants and ship to a lab to measure the moisture in an area. To better understand and forecast the potential of an outage, PG&E also developed and then operationally deployed the Outage Producing Wind (OPW) model. See section 5.3.2.1 - Advanced weather monitoring and weather stations of the WMP for more information on PG&E's weather data variable collection process.
B	Situational awareness and forecasting	6	Weather variables collected	B.I.d	How many sources are being used to provide data on weather metrics being collected?	iii	iii	None	PG&E collects over a terabyte of weather data. See section 5.3.2.1 in the WMP - Advanced weather monitoring and weather stations of the WMP for more information on PG&E's weather data variable collection process.

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B	Situational awareness and forecasting	7	Weather data resolution	B.II.a	How granular is the weather data that is collected?	iii	iv	Weather data collected is only from weather stations.	PG&E's weather data collection includes measurements from over 600 weather stations which are calibrated into high resolution models. Although, PG&E is the largest operator of utility owned weather stations, it does not currently have enough weather penetration to identify ridgelines and wind corridors in a systematic fashion and instead relies on an ad hoc process. In order to better predict weather on the grid, PG&E is moving to a 2/km resolution model which includes 52 vertical layers in the atmosphere.
B	Situational awareness and forecasting	7	Weather data resolution	B.II.b	How frequently is data gathered	iv	iv	Weather data collected is only from weather stations.	PG&E's weather stations are currently reporting data every 10 minutes (or 6 times per hour). PG&E plans to improve the frequency of weather data collected, but does not anticipate having the ability to advance to every minute within 3 years.
B	Situational awareness and forecasting	7	Weather data resolution	B.II.c	How granular is the tool?	ii	iii	Granularity of the tool refers to the actual weather measurements obtained through PG&E weather stations	PG&E's weather station network is point based and aggregates up to a regional level but can be extrapolated to circuit level. PG&E's significantly vast service area makes it challenging to aggregate at the circuit level. PG&E plans to continue to install more weather stations and move to a 2km resolution by this fire season, which will increase weather data granularity.
B	Situational awareness and forecasting	7	Weather data resolution	B.II.d	How automated is the process to measure weather conditions?	iv	iv	Weather data collected is only from weather stations.	PG&E's process to measure weather conditions is fully automated. Data from PG&E weather stations is fed directly into a public website.
B	Situational awareness and forecasting	8	Weather forecasting ability	B.III.a	How sophisticated is the utility's weather forecasting capability?	iii	iii	None	PG&E's weather forecasting capabilities use a combination of weather stations and external weather data to make accurate forecasts as indicated in section 5.3.2.1 - Advanced weather monitoring and weather stations of the WMP. PG&E does not currently use real-time, machine learning capabilities; however, most of its models are built on machine learning capabilities that gives PG&E the ability to potentially leverage in the future.
B	Situational awareness and forecasting	8	Weather forecasting ability	B.III.b	How far in advance can accurate forecasts be prepared?	i	i	Weather can only be "accurately" forecasted less than two weeks in advance.	PG&E believes that an accurate weather forecast can only be predicted less than two weeks in advance. For this reason, PG&E does not have any plans to achieve a score above a (i) in this case. PG&E would value the opportunity to engage with an entity that has the ability to accurately forecast the weather at least two weeks in advance.
B	Situational awareness and forecasting	8	Weather forecasting ability	B.III.c	At what level of granularity can forecasts be prepared?	iii	iii	Weather data collected for forecasts is only from weather stations.	PG&E is currently able to forecast at the circuit level of granularity. In the future, PG&E will have a 2km resolution grid but will not be able to support a span level of granularity. PG&E will continue to forecast at the circuit level as additional granularity to the span level will not lead to improved operational actions.
B	Situational awareness and forecasting	8	Weather forecasting ability	B.III.d	How are results error-checked?	iii	iii	None	PG&E currently checks weather forecasting results through comparison against historical weather patterns and use of the National Center for Environmental Prediction Model Evaluation Tool (NCEP MET). This tool compares measured weather data from weather stations and performs automatic error checking. In the future, PG&E plans to continue checking weather forecasting results for errors.
B	Situational awareness and forecasting	8	Weather forecasting ability	B.III.e	How automated is the forecast process?	iii	iii	None	PG&E's forecasting process is a mostly automated process. It is not a fully automated process due to the fact that the team has to take the outputs from multiple automated processes (e.g., derivative forecast models) and perform a manual reconciliation. PG&E does not anticipate being fully automated by 2023.
B	Situational awareness and forecasting	9	External sources used in weather forecasting	B.IV.a	What source does the utility use for weather data?	iii	iii	None	PG&E currently uses a combination of accurate weather stations and external weather data sources as mentioned in section 5.3.2.1 - Advanced weather monitoring and weather stations of the WMP. In the future, PG&E plans to start correlating which weather data has the highest accuracy, but does not anticipate achieving the necessary level of programming to implement this in the next 3 years.
B	Situational awareness and forecasting	9	External sources used in weather forecasting	B.IV.b	How is weather station data checked for errors?	ii	ii	None	PG&E's weather station data is currently processed manually by an external vendor using automated tools. PG&E does not believe that validating the location of its numerous weather stations is the most effective use of meteorology resources in the next three years.
B	Situational awareness and forecasting	9	External sources used in weather forecasting	B.IV.c	For what is weather data used?	iii	iii	None	PG&E's weather data is used to create a single visual and configurable live map (POMMS) that is used to help make decisions. See section 5.3.2.1 - Advanced weather monitoring and weather stations of the WMP for more information.
B	Situational awareness and forecasting	10	Wildfire detection processes and capabilities	B.V.a	Are there well-defined procedures for detecting ignitions along the grid?	ii	ii	None	PG&E's current procedures for detecting ignitions along the grid include use of satellites, radio monitoring, verbal records from personnel in the field, and the dispatch system for CAL FIRE in the WSOC.

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B	Situational awareness and forecasting	10	Wildfire detection processes and capabilities	B.V.b	What equipment is used to detect ignitions?	iv	iv	None	PG&E's WSOC uses its Outage Management Tool and the GOES 16/17 satellite software, to detect ignitions. Detected ignitions are reported to and monitored by the WSOC's 24/7 team. The WSOC then applies its remotely operated cameras to further analyse and investigate any reported ignitions.
B	Situational awareness and forecasting	10	Wildfire detection processes and capabilities	B.V.c	How is information on detected ignitions reported?	iii	iii	None	PG&E uses a mostly automated process in reporting detected ignitions. For example, PG&E currently has an automated email notification generated from satellite detection of ignition that is distributed to suppression forces but not necessarily key stakeholders. PG&E's human detection reporting procedure directs personnel to dial 911, which then involves fire suppression forces. PG&E personnel in the WSOC have to generate and sends email alerts to key internal stakeholders when a new fire is identified by a human. PG&E's Customer Care team is developing a tool that will be hosted on the PG&E website and will share alerts with the public.
B	Situational awareness and forecasting	10	Wildfire detection processes and capabilities	B.V.d	What role does ignition detection software play in wildfire detection?	ii	ii	PG&E is making the assumption that "ignition detection software in cameras" does not mean software has to be physically in the actual cameras, but PG&E uses cameras for further investigation of any detectors identified by the satellite software.	PG&E uses the GOES 16/17 software in satellites to detect wildfires, which then alerts PG&E's 24/7 WSOC, which uses remote cameras to further investigate the situation. This is currently not an automated processes. PG&E does not plan to change this detection process in the near future.
C	Grid design and system hardening	11	Approach to prioritizing initiatives across territory	C.I.a	How are wildfire risk reduction initiatives prioritized?	ii	iii	None	PG&E's current plan focuses on the performance of the grid and prioritizes wildfire risk reduction initiatives at the protection zone (more granular than circuit) level. PG&E does not yet take into account local geographies and climate/weather conditions. In the future, PG&E plans to prioritize wildfire risk reduction initiatives targeting the protection zone level, based on risk modeling driven by local geography and climate/weather conditions, fuel loads and moisture content and topography. Note: PG&E has some PSPS mitigations that impact non HFTD areas.
C	Grid design and system hardening	12	Grid design for minimizing ignition risk	C.II.a	Does grid design meet minimum G095 requirements and loading standards in HFTD areas?	ii	iii	None	PG&E's current grid design meets minimum GO 95 requirements and loading standards in HFTD areas. PG&E recognizes that circuits on ridge lines may need different design centers and plans to improve grid topology design requirements in the future by incorporating designs based on an understanding of drivers of utility ignition risk.
C	Grid design and system hardening	12	Grid design for minimizing ignition risk	C.II.b	Does the utility provide micro grids or islanding where traditional grid infrastructure is impracticable and wildfire risk is high?	ii	ii	Microgrids includes temporary generation facilities.	PG&E currently provides micro grids where traditional grid infrastructure is impracticable and wildfire risk is high. For example, during the PSPS events that took place between October 26-29 2019, PG&E provided temporary generation in the form of micro grids. These temporary generation solutions helped keep power on for approximately 4,860 customers across portions of Angwin, Calistoga, Grass Valley, and Placerville. PG&E plans to continue and expand the stand up of micro grids for the foreseeable future.
C	Grid design and system hardening	12	Grid design for minimizing ignition risk	C.II.c	Does routing of new portions of the grid take wildfire risk into account?	i	i	None	PG&E's current process for routing new portions of the grid involves a pre-walk done with engineering. The system hardening protocol takes wildfire risk into account by involving a Public Safety Specialist (PSS) to remove assets when necessary and deemed feasible. PG&E's protocol is to rebuild in design, so when it is not deemed feasible to remove an asset, PG&E will put it underground or re-route it.
C	Grid design and system hardening	12	Grid design for minimizing ignition risk	C.II.d	Are efforts made to incorporate the latest asset management strategies and new technologies into grid topology?	ii	iii	None	PG&E currently makes efforts to incorporate the latest asset management strategies and new technologies into the grid topology. For example, at the end of 2019, PG&E worked on testing the most effective and fire resilient poles for system hardening with a third party laboratory. In the future, PG&E plans to incorporate asset management strategies and technologies across the entire service territory based on risk spend efficiency.
C	Grid design and system hardening	13	Grid design for resiliency and minimizing PSPS	C.III.a	What level of redundancy does the utility's transmission architecture have?	i	i	None	PG&E's level of redundancy for transmission architecture is not entirely n-1 redundant, although majority of all circuits are. PG&E is minimizing PSPS impacts through microgrids, transmission line exclusion, increasing ROW clearance, and installing transmission line switches. PG&E feels these mitigation efforts make more sense than building out parallel transmission lines to increase redundancy.
C	Grid design and system hardening	13	Grid design for resiliency and minimizing PSPS	C.III.b	What level of redundancy does the utility's distribution architecture have?	i	i	None	PG&E's level of redundancy for distribution architecture is not n-1 redundant. PG&E is minimizing PSPS impacts through microgrids, distribution segmentation, and increasing right of way clearance. PG&E feels these mitigation efforts are the most practical strategy.
C	Grid design and system hardening	13	Grid design for resiliency and minimizing PSPS	C.III.c	What level of sectionalization does the utility's distribution architecture have?	ii	ii	None	PG&E aims to use switches in HFTD areas to individually isolate circuits such that no more than 2,000 customers sit within one switch, however in some parts of its service territory, in particular those that are radially fed, it cannot isolate less than 2,000 customers within one switch. Also, PG&E cannot minimize impact to customers just on sectionalization, another supply source is needed.

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C	Grid design and system hardening	13	Grid design for resiliency and minimizing PSPS	C.III.d	How does the utility consider egress points in its grid topology?	ii	ii	None	PG&E currently uses egress points as an input for grid topology. In 2019, PG&E conducted a macro level of analysis for egress. In the future, PG&E is working to perform higher precision analyses with egress as an input to grid topology, but does not anticipate getting to the point of estimating an exact evacuation time for every customer.
C	Grid design and system hardening	14	Risk-based grid hardening and cost efficiency	C.IV.a	Does the utility have an understanding of the risk spend efficiency of hardening initiatives?	ii	ii	"Accurate" means as close to accurate as possible.	PG&E has clear understanding of the relative cost and effectiveness of different initiatives. Accuracy may not always be achieved in every circumstance, but that is PG&E's goal. Although it may not be achieved in the next three years, PG&E is working towards and thrives to get to an ultimate goal of tailored circumstances of different locations, as every circuit protection zone should be evaluated for risk spend efficiency.
C	Grid design and system hardening	14	Risk-based grid hardening and cost efficiency	C.IV.b	At what level can estimates be prepared?	iii	iii	None	While PG&E can currently prepare risk based grid hardening and cost efficiency estimates at the protection zone level (which can be a subset of a circuit), PG&E has a standard approach for comparing initiatives and does not always estimate at the circuit level. PG&E believes increasing granularity to the span or asset base in the future would not be appropriate and presents difficulty in estimating risk levels. PG&E plans to use a circuit based risk estimate or more granular as necessary (e.g. protection zone).
C	Grid design and system hardening	14	Risk-based grid hardening and cost efficiency	C.IV.c	How frequently are estimates updated?	ii	iii	This is measured at the wildfire mitigation level and is not only at the grid hardening program level.	PG&E currently estimates wildfire mitigation risk spend efficiency estimates less frequently than annually and aims to achieve annual updates.
C	Grid design and system hardening	14	Risk-based grid hardening and cost efficiency	C.IV.d	What grid hardening initiatives does the utility include within its evaluation?	ii	iii	None	PG&E currently includes some grid hardening initiatives within its risk spend efficiency evaluation. For example, replacing non-exempt equipment with system hardening. In the future, PG&E will focus on identifying the components that yield the highest risk and will include more initiatives that are aimed to remediate these high risks in its risk spend efficiency evaluation.
C	Grid design and system hardening	14	Risk-based grid hardening and cost efficiency	C.IV.e	Can the utility evaluate risk reduction synergies from combination of various initiatives?	i	ii	None	PG&E does not evaluate risk reduction synergies from combining various initiatives at this time because more precision is needed. In the future, evaluating risk spend efficiency on synergy initiatives will be achievable at the asset level.
C	Grid design and system hardening	15	Grid design and asset innovation	C.V.a	How are new hardening solution initiatives evaluated?	ii	iii	None	PG&E currently evaluates new hardening solution initiatives based on installation into grid and measuring direct reduction in ignition events. For example, PG&E is conducting a pilot in Calistoga using Rapid Earth Fault Current Limiter (REFCL) program which has been conducted with Siemens and a utility in Australia. PG&E has an ATS team that is very adept in assessing viability of initiatives. Moving forward, PG&E will leverage independent third party evaluation when deemed appropriate. For example, PG&E is testing an ultrasound inspection methodology in South Korea that is being evaluated by a third party.
C	Grid design and system hardening	15	Grid design and asset innovation	C.V.b	Are results of pilot and commercial deployments, including project performance, project cost, geography, climate, vegetation etc. shared in sufficient detail to inform decision making at other utilities?	i	ii	None	PG&E does not share pilot and commercial deployment project data with other utilities. In the future, PG&E will focus on sharing such data with the state and utilities with similar operating environments (e.g., Australia). PG&E will continue to share information with industry and academia, but not extensively drive socialization.
C	Grid design and system hardening	15	Grid design and asset innovation	C.V.c	Is performance of new initiatives independently audited?	i	i	None	PG&E is currently required to receive independent audits as part of probation, but this does not specifically cover new initiatives. PG&E has a technically adept ATP team that is able to provide a significant amount of oversight internally to understand the effectiveness (or lack thereof) of new initiatives. In the future, PG&E will continue to use independent audits when deemed necessary and financially appropriate for new initiatives.
D	Asset management and inspections	16	Asset inventory and condition assessments	D.I.a	What information is captured in the equipment inventory database?	ii	iii	1) No asset management program is 100% accurate - there is an assumed margin of error. 2) The expected lifecycle is not at the component level.	PG&E currently maintains an inventory of equipment that may contribute to wildfire risk. The inventory reports equipment age, condition, and life cycle. In the future, PG&E plans to further digitize this effort to include equipment inspection records and repairs in one central database.
D	Asset management and inspections	16	Asset inventory and condition assessments	D.I.b	How frequently is the condition assessment updated?	ii	iii.	"Condition assessment" means the time it takes to update the systems after the inspections are completed.	PG&E does not update condition assessments in the database system outside the HFTDs. In the HFTDs, PG&E updates the system after inspections and on an annual basis. In the future, PG&E plans to update the system on a quarterly basis.
D	Asset management and inspections	16	Asset inventory and condition assessments	D.I.c	Does all equipment in HFTD areas have the ability to detect and respond to malfunctions?	ii	ii	"All equipment" does not include every attribute (e.g. component manufacturer), for every component of the asset.	PG&E has a system and approach in place to reliably detect malfunctions likely to cause ignition in the HFTD areas. Continuous monitoring of equipment is not likely due to the fact that PG&E's service territory is quite extensive.

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D	Asset management and inspections	16	Asset inventory and condition assessments	D.I.d	How granular is the inventory?	iii	iii	None	PG&E currently tracks inventory at the asset level. Each pole has an equipment ID in SAP. PG&E plans to continue maintaining an inventory at the asset level in the future. It is important to note that not all attributes are known at the asset level. For example, component manufacturer may not be known.
D	Asset management and inspections	17	Asset inspection cycle	D.II.a	How frequent are your patrol inspections?	ii	iii	None	PG&E currently performs patrol inspections on transmission and distribution assets annually. This frequency is consistent with minimum regulatory requirements. In the future, the program is moving from a prescriptive time cycle frequency to an approach driven by risk, with the highest risk assets requiring more frequent and in-depth inspections than lower risk assets. Risk is driven by asset health and consequences of asset failures.
D	Asset management and inspections	17	Asset inspection cycle	D.II.b	How are patrol inspections scheduled?	i	ii	None	PG&E currently schedules patrol inspections based on annual schedules outlined in guidance documents and in accordance with regulatory requirements GO 165. PG&E will be scheduling patrol inspections on up-to date static maps of equipment types and environment and is working towards developing predictive modeling capabilities.
D	Asset management and inspections	17	Asset inspection cycle	D.II.c	What are the inputs to scheduling patrol inspections?	i	i	Patrol schedules are driven by the regulatory requirement.	PG&E currently updates the patrols schedule annually (based on the minimum regulatory requirement) with future plans to move to a more dynamic and risk-based approach that will eventually allow PG&E to implement predictive modeling of equipment failure probability and risk.
D	Asset management and inspections	17	Asset inspection cycle	D.II.d	How frequent are detailed inspections?	iii	iii	None	PG&E currently performs detailed inspections of transmission and distribution lines above minimum regulatory requirements in HFTD, with more frequent inspections for highest risk equipment. As emerging technology becomes available, PG&E will continue to evaluate its effectiveness for improving inspections.
D	Asset management and inspections	17	Asset inspection cycle	D.II.e	How are detailed inspections scheduled?	i	ii	None	PG&E currently performs detailed inspections of transmission and distribution lines based on a periodic schedule. In the future, PG&E will implement an analytical risk informed approach that will enable a predictive capability for scheduling detailed inspections.
D	Asset management and inspections	17	Asset inspection cycle	D.II.f	What are the inputs to scheduling detailed inspections?	i	i	None	PG&E's current inputs to scheduling detailed inspections are based on up-to date static maps of equipment types and environment. PG&E is working towards developing predictive modeling capabilities of equipment failures and risk.
D	Asset management and inspections	17	Asset inspection cycle	D.II.g	How frequent are your other inspections?	ii	ii	The frequency of Pole Test & Treat (PT&T) inspections follows the 10 year regulatory requirement.	PG&E currently performs several types of other inspections. The cadence of these other inspections vary, but are aligned with or above minimum regulatory requirements. For example, Pole Test & Treat inspections are conducted every ten years, as required by regulatory requirement. Other inspections are performed above the minimum regulatory requirement as there is currently no regulations guiding the frequency of these other inspections. There are different guidance documents governing the different types of inspections (PT&T, infrared, LiDAR, CoronaCam, etc). PG&E will continue to perform other inspections as necessary and in or exceeding compliance with any regulatory standards.
D	Asset management and inspections	17	Asset inspection cycle	D.II.h	How are other inspections scheduled?	i	ii	None	PG&E's other inspections are currently scheduled based on annual or periodic schedules, depending on the type of inspection. In the future, PG&E will be scheduling other inspections on up-to date static maps of equipment types and environment.
D	Asset management and inspections	17	Asset inspection cycle	D.II.i	What are the inputs to scheduling other inspections?	i	i	None	PG&E currently performs several types of other inspections (PT&T, infrared, LiDAR, CoronaCam, etc). The inputs determining the frequency of these other inspections vary as they are supplementary inspections that may not be governed by regulatory requirements. There are different guidance documents governing the different types of inspections and their schedule. In the future, PG&E will use predictive modeling of equipment failure probability and risk to do determine the inspection cycles.

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D	Asset management and inspections	18	Asset inspection effectiveness	D.III.a	What items are captured within inspection procedures and checklists?	ii	iii	PG&E answered under the assumption that different inspection types have checklists with different levels of detail.	PG&E's current patrol, detailed, enhanced, and other inspection procedures and checklists include all items required by statute and regulations. The inspection checklists are usually attachments to the standard or procedure. The factors currently dictating the inspection checklists are linked to the asset type, modality and technology. In future, PG&E plans to includes lines and equipment typically responsible for ignitions and near misses in the checklists in order to increase asset inspection effectiveness to be more a risk based process.
D	Asset management and inspections	18	Asset inspection effectiveness	D.III.b	How are procedures and checklists determined?	i	i	Assumption - the question is asking for a different procedure and/or checklist for each inspection	PG&E currently determines procedures and checklist based on statute and regulatory guidelines. PG&E feels that the procedures and checklist that are currently in use are comprehensive enough to cover the assets being inspected. PG&E has built additional inspection criteria to assist in detecting failure modes that could lead to ignitions.
D	Asset management and inspections	18	Asset inspection effectiveness	D.III.c	At what level of granularity are the depth of checklists, training, and procedures customized?	i	i	None	PG&E currently customizes checklists, trainings, and procedures across its service territory. PG&E uses different methods for access, however the inspection tasks are consistent. In the future, PG&E would like to move to a 'smart form' approach, which would be more conditions driven rather than geographically driven as they don't believe geographically driven variability leads to greater execution risk.
D	Asset management and inspections	19	Asset maintenance and repair	D.IV.a	What level are electrical lines and equipment maintained at?	i	ii	None	PG&E aims to maintain its electrical lines and equipment as required. However, PG&E recognizes that it needs to work to improve the progress towards that goal. PG&E has prepared a compliance plan, which it has presented to the CPUC, which PG&E will attempt to execute. PG&E does and will continue to do additional maintenance in areas of grid with the highest wildfire risk.
D	Asset management and inspections	19	Asset maintenance and repair	D.IV.b	How are service intervals set?	i	ii	None	PG&E sets service intervals based on wildfire risk in relevant areas as stated in the WSIP plan. Additionally, in the WSIP Compliance plan, PG&E performed a multi-factor relative risk ranking for every single maintenance tag - this will help in 2020, as PG&E moves towards a circuit based strategy for setting service intervals.
D	Asset management and inspections	19	Asset maintenance and repair	D.IV.c	What do maintenance and repair procedures take into account?	i	ii	The word "procedure" is interchangeable with "strategy". The question was interpreted as being about asset strategy and not procedure level.	Current PG&E maintenance and repair strategies take into account wildfire risk. PG&E will be adding performance history, and past operating conditions to its asset repair and maintenance strategies in accordance with its manuals.
D	Asset management and inspections	20	QA/QC for asset management	D.V.a	How is contractor activity audited?	ii	iii	None	PG&E currently audits contractor work through an established and functioning audit process to manage and confirm work completed by subcontractors. PG&E has an Electric quality assurance group and a system inspections group. Internal audit also conducts random sampling. In the future, PG&E plans to move to a more digital platform for inspections and construction closure. This will allow the utility to assess performance with a more centralized and formalized process of monitoring and sampling contractor work.
D	Asset management and inspections	20	QA/QC for asset management	D.V.b	Do contractors follow the same processes and standards as utility's own employees?	ii	ii	None	Contractors are expected to adhere to PG&E standards and processes. PG&E is only allowed to train external personnel on PG&E technology that contractors will using for their job. PG&E applies appropriate restraint with respect to co-employment. This means that contractors may follow their own processes as long those processes are not conflicting with PG&E's standards and procedures and final work is compliant.
D	Asset management and inspections	20	QA/QC for asset management	D.V.c	How frequently is QA/QC information used to identify deficiencies in quality of work performance and inspections performance?	iii	iv	None	QA/QC information is used on ad hoc basis to identify deficiencies in quality of work performance and inspection performance. PG&E is continuing to transition to more digital workpapers which will allow for PG&E to regularly use QA/QC information to identify deficiencies in the future.
D	Asset management and inspections	20	QA/QC for asset management	D.V.d	How is work and inspections that do not meet utility-prescribed standards remediated?	ii	iii	None	PG&E currently uses QA/QC information to identify systemic deficiencies in quality of work inspections. The remediation varies based on the type of defect or non-conformance. Work and inspections that do not meet utility-prescribed standards may be resolved immediately, generated as a corrective notification in SAP, called for ad hoc reinspection, or may be captured in a separate planned inspection activity. In the future, PG&E plans to implement a more systematic process for recommending trainings based on weaknesses identified through the QA/QC process.
D	Asset management and inspections	20	QA/QC for asset management	D.V.e	Are workforce management software tools used to manage and confirm work completed by subcontractors?	ii	ii	None	PG&E currently uses workforce management software tools, SAP and ARCOS, to manage and confirm work completed by subcontractors. In the future, PG&E will continue to use workforce management software tools, although the technology solutions may differ across programs.

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E	Vegetation management and inspections	21	Vegetation inventory and condition assessments	E.I.a	What information is captured in the inventory?	ii	iii	None	PG&E maintains a centralized inventory of vegetation clearances based on the most recent inspections. PG&E is aware of the top 10 most problematic species, and by using hyperspectral imaging techniques, should be able to identify where those species grow. In the future, LiDAR can be used to monitor high risk-trees across grid.
E	Vegetation management and inspections	21	Vegetation inventory and condition assessments	E.I.b	How frequently is inventory updated?	ii	iii	None	PG&E currently employs an annual pruning cycle, and, as a result, holistically updates the its Vegetation Management Database (VMD) on an annual basis. However, in some cases, the inventory can be updated more often frequently (e.g., for the Enhanced Vegetation Management program which uses more mobile data capture methods). In the future, PG&E projects that it will evolve to monthly updates more consistently, as the utility aims to utilize mobile data capture in both its Routine and Enhanced Vegetation Management programs.
E	Vegetation management and inspections	21	Vegetation inventory and condition assessments	E.I.c	Are inspections independently verified by third party experts?	ii	ii	None	PG&E uses a third party vendor to conduct audits and plans to continue doing so in the foreseeable future.
E	Vegetation management and inspections	21	Vegetation inventory and condition assessments	E.I.d	How granular is the inventory?	iv	iv	1. The question pertains to routine vegetation management (i.e., not enhanced vegetation management). 2. The "asset" is the tree.	PG&E tracks inventory at the individual tree level (asset-based) and plans to continue doing so in the foreseeable future.
E	Vegetation management and inspections	22	Vegetation inspection cycle	E.II.a	How frequent are all types of vegetation inspections?	ii	iii	None	PG&E has three types of vegetation inspection programs; routine, EVM, and tree mortality inspection. The programs are deployed based on the conditions of the service area. In the future, PG&E plans to increase inspections above current inspection cycles, with more frequent inspections for highest risk areas.
E	Vegetation management and inspections	22	Vegetation inspection cycle	E.II.b	How are vegetation inspections scheduled?	i	i	"Environment" means scheduling around high elevation snow, orchard bloom periods and limited operating periods for agency lands.	PG&E inspections are performed annually to allow adherence to the annual pruning cycle. PG&E will pursue a continued evolution of its vegetation management program (including routine inspections, tree mortality inspections and EVM) to further support risk-informed decision making, but annual inspections are expected to remain as the inspection cycle.
E	Vegetation management and inspections	22	Vegetation inspection cycle	E.II.c	What are the inputs to scheduling vegetation inspections?	i	i	None	PG&E inspections are performed annually to allow adherence to the annual pruning cycle. PG&E will pursue a continued evolution of its vegetation management program (including routine inspections, tree mortality inspections and EVM) to further support risk-informed decision making, but annual inspections are expected to remain as the inspection cycle.
E	Vegetation management and inspections	23	Vegetation inspection effectiveness	E.III.a	What items are captured within inspection procedures and checklists?	ii	iii	None	PG&E's inspections capture the current requirements defined by GO95, Rule 35, and PRC 4292 and 4293. In the future, PG&E will continue to explore and better understand vegetation types typically responsible for ignitions and near misses.
E	Vegetation management and inspections	23	Vegetation inspection effectiveness	E.III.b	How are procedures and checklists determined?	i	i	None	Procedures and checklists are determined by the requirements of GO95, Rule 35, and PRC 4292 & 4293. PG&E eventually plans to develop a predictive modeling capability that would include data analytics and creating a risk informed process, but this is not likely to be in production by 2023.
E	Vegetation management and inspections	23	Vegetation inspection effectiveness	E.III.c	At what level of granularity are the depth of checklists, training, and procedures customized?	i	i	None	PG&E currently uses standardized checklists, trainings, and procedures in its vegetation inspection process. In the future, PG&E would like to move to a 'smart form' approach, which would be more conditions driven rather than geographically driven, as PG&E does not believe a geographically driven variability leads to greater execution risk.
E	Vegetation management and inspections	24	Vegetation grow-in mitigation	E.IV.a	How does utility clearance around lines and equipment perform relative to expected standards?	ii	ii	None	PG&E currently follows the minimum regulatory standards on clearance around lines and equipment (outlined in GO 95) with its recommended clearance targets, where possible. In some cases, more clearance is achieved. PG&E recognizes that it is not always possible to hit set targets due to vegetation growth rates.

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E	Vegetation management and inspections	24	Vegetation grow-in mitigation	E.IV.b	Does utility meet or exceed minimum statutory or regulatory clearances during all seasons?	ii	ii	None	PG&E must meet or exceed minimum regulatory clearances during all seasons to maintain an annual pruning cycle. PG&E plans on maintaining an annual pruning cycle through 2023, and therefore, will continue to meet or exceed the regulatory clearance.
E	Vegetation management and inspections	24	Vegetation grow-in mitigation	E.IV.c	What modeling is used to guide clearances around lines and equipment?	iii	iii	None	PG&E adheres to CPUC standards when determining clearances around lines and equipment. PG&E uses ignition risk modeling for fall-in and blow-in scenarios. PG&E species growth rates utilizes modeling for vegetation grow-in mitigation, and will continue to do so for the foreseeable future.
E	Vegetation management and inspections	24	Vegetation grow-in mitigation	E.IV.d	What biological modeling is used to guide clearance around lines and equipment	iii	i	None	PG&E uses forrester analysis instead of biological modeling to guide clearance. Forresters meet ANSI A300 standards and primarily utilizes Parts 1 and 9 of the standards when assessing clearance around lines and equipment. PG&E does plan to conduct biological modeling as a more centralized, systematic, and formalized manner to guide clearance in the future.
E	Vegetation management and inspections	24	Vegetation grow-in mitigation	E.IV.e	Are community organizations engaged in setting local clearances and protocols?	i	i	None	Although PG&E regularly engages with communities in its service territory, the company ultimately adheres to standards and protocols set by the CPUC (i.e., GO 95, PRC 4292 and 4293, ESRB-4 SEMA standard). PG&E follows a set of standards and believes decentralized oversight would not be best practice since technical authority may be absent. Therefore, different variables may be weighed differently depending on location.
E	Vegetation management and inspections	24	Vegetation grow-in mitigation	E.IV.f	Does the utility remove vegetation waste along its right of way across the entire grid?	i	i	"Across the entire grid" means all of PG&E's service territory.	PG&E attempts to remove waste in HFTDs; however, there are unique circumstances, such as property owners and terrain, that make it infeasible or impractical to remove vegetation waste across the entire grid. PG&E does not expect these cases to change by 2023.
E	Vegetation management and inspections	24	Vegetation grow-in mitigation	E.IV.g	How long after cutting vegetation does the utility remove vegetation waste along right of way?	ii	ii	This question applies to areas where PG&E performs waste removal.	PG&E is able to remove some waste within a week, however, there are constraints that make removing vegetation within the week across the entire grid unobtainable. For example, if permitting is required to remove waste, the removal may take over a week.
E	Vegetation management and inspections	24	Vegetation grow-in mitigation	E.IV.h	Does the utility work with local landowners to provide a cost-effective use for cutting vegetation?	i	i	None	PG&E does seek ways to remove cost from vegetation management, but does not proactively provide a cost-effective use for cut vegetation to the landowners. PG&E does work with landowners to provide them with the option for PG&E to remove the vegetation waste or leave it for the landowner to use.
E	Vegetation management and inspections	24	Vegetation grow-in mitigation	E.IV.i	Does the utility work with partners to identify new cost-effective uses for vegetation, taking into consideration environmental impacts and emissions of vegetation waste?	ii	ii	This question applies to all vegetation waste created during vegetation management activities.	PG&E regularly gives away wood chips/wood and sends waste to co-generation plants. PG&E also connects with bio mass facilities to use vegetation waste as a fuel supplier. PG&E will continue this behavior and will explore new ways to mitigate environmental impacts and emissions in the future.
E	Vegetation management and inspections	25	Vegetation fall-in mitigation	E.V.a	Does the utility have a process for treating vegetation outside of right of ways?	iii	iv	1. "Systematically" means efforts are dictated by a process and not exhaustively. 2. "Communities"means stakeholders.	PG&E uses a systematic approach to treat vegetation outside of right of ways: 1) identify vegetation near conductors that is in need of work, out of compliance, or that is a safety risk, 2) identify a prescription of work, 3) and classify a priority and schedule. If a prescription of tree removal is identified and the tree falls outside of PG&E rights of way, PG&E identifies the underlying fee parcel owner, identifies current land rights, and identifies next steps based on input from PG&E's Land department and Legal Counsel. Through its Local Customer Experience team, PG&E works directly with the property owner to determine next steps based on all factors and input from the owner. In the future, PG&E has plans to engage more actively with communities regarding tree removal.
E	Vegetation management and inspections	25	Vegetation fall-in mitigation	E.V.b	How is potential vegetation that may pose a threat identified?	ii	ii	None	PG&E's vegetation management personnel identify potentially threatening vegetation and add it to the online ARCGIS tool. In the future, PG&E will explore using LiDAR to identify strike potential with hyperspectral techniques and Technoslyva to overlap the spread risk to model risk.
E	Vegetation management and inspections	25	Vegetation fall-in mitigation	E.V.c	Is vegetation removed with cooperation from the community?	ii	ii	None	While PG&E does not always receive complete cooperation when engaging with local communities and landowners, the utility strives to develop and maintain proactive communications with customers (e.g., mailers), and has a formal process for those who refuse the vegetation management.
E	Vegetation management and inspections	25	Vegetation fall-in mitigation	E.V.d	Does the utility remove vegetation waste outside its right of way across the entire grid?	i	i	"Across the entire grid" means all of PG&E's service territory.	PG&E does not remove vegetation waste across the entire grid. PG&E does remove waste from certain portions of the system, but there are instances in which it is infeasible (e.g., when waste resides on private property, it is technically landowner property). PG&E does not expect this to change by 2023.
E	Vegetation management and inspections	25	Vegetation fall-in mitigation	E.V.e	How long after cutting vegetation does the utility remove vegetation waste outside its right of way?	ii	ii	This question applies to areas where PG&E performs waste removal.	PG&E is able to remove some waste within a week, however, there are constraints that make removing vegetation within the week across the entire grid unobtainable. For example, if permitting is required to remove waste, the removal will take over a week.
E	Vegetation management and inspections	25	Vegetation fall-in mitigation	E.V.f	Does the utility work with local landowners to provide a cost-effective use for cutting vegetation?	i	i	None	PG&E does seek ways to remove cost from vegetation management, but does not proactively provide a cost-effective use for cut vegetation to the landowners. PG&E does work with landowners to provide them with the option for PG&E to remove the vegetation waste or leave it for the landowner to use.
E	Vegetation management and inspections	25	Vegetation fall-in mitigation	E.V.g	Does the utility work with partners to identify new cost-effective uses for vegetation, taking into consideration environmental impacts and emissions of vegetation waste?	ii	ii	This question does not refer to all vegetation waste created during vegetation management activities.	PG&E regularly gives away wood chips/wood and sends waste to co-generation plants. PG&E also connects with bio mass facilities to use vegetation waste as a fuel supplier. PG&E will continue this behavior and will explore new ways to mitigate environmental impacts and emissions in the future.

Category/Capability Info				Question Info		Scores		Final Deliverable	
Category Letter	Category Name	Capability #	Capability Name	Question Name	Question	Current State Score	Future State Score	Assumption	Explanation
E	Vegetation management and inspections	26	QA/QC for vegetation management	E.VI.a	How is contractor and employee activity audited?	ii	ii	None	PG&E has an audit process to manage and confirm work completed by contractors and subcontractors. This process applies to both pre-inspection and tree work. PG&E is in the process of scheduling semi-automated audits using technologies such as ground based LiDAR scans.
E	Vegetation management and inspections	26	QA/QC for vegetation management	E.VI.b	Do contractors follow the same processes and standards as utility's own employees?	ii	ii	None	PG&E requires contractors to follow the same processes and standards as its employees. PG&E does not plan on changing this requirement before 2023.
E	Vegetation management and inspections	26	QA/QC for vegetation management	E.VI.c	How frequently is QA/QC information used to identify deficiencies in quality of work performance and inspections performance?	iv	iv	None	PG&E systematically and regularly uses QA/QC information to identify deficiencies in quality of work and inspections performance.
E	Vegetation management and inspections	26	QA/QC for vegetation management	E.VI.d	How is work and inspections that do not meet utility-prescribed standards remediated?	ii	ii	None	PG&E systematically uses QA/QC information to identify deficiencies in quality of work and inspections performance. PG&E may make recommendations based on identified weaknessess in an ad hoc and as needed manner, but does not plan on needing to recommend trainings to all of its thousands of contractors by 2023.
E	Vegetation management and inspections	26	QA/QC for vegetation management	E.VI.e	Are workforce management software tools used to manage and confirm work completed by subcontractors?	i	ii	PG&E is interpreting this question as using workforce management software tools to confirm a "sampling" of work completed by subcontractors.	PG&E currently uses a software-based workforce management tool, and routine vegetation work will be included in that tool by 2023.
F	Grid operations and protocols	27	Protective equipment and device settings	F.I.a	How are grid elements adjusted during high threat weather conditions?	iv	iv	"Near miss" means an event that happened in PG&E's system but did not cause an ignition.	PG&E currently adjusts grid elements during high threat weather conditions by increasing sensitivity of risk reduction elements and monitoring near misses. In addition, PG&E patrols the outage area and can leverage risk mapping. PG&E will continue to do this in the future.
F	Grid operations and protocols	27	Protective equipment and device settings	F.I.b	Is there an automated process for adjusting sensitivity of grid elements and evaluating effectiveness?	ii	ii	None	PG&E grid operations has the ability to group cut-out devices that are linked electronically (i.e., partial automation) on the distribution side. Adjusting sensitivity is still manually with regards to transmission. PG&E does not believe it to be in the best interest of public safety and reliability to implement a fully automated solution in this capacity.
F	Grid operations and protocols	27	Protective equipment and device settings	F.I.c	Is there a predetermined protocol driven by fire conditions for adjusting sensitivity of grid elements?	ii	ii	None	PG&E adjusts system operations (e.g. re-closing) when meteorology identifies R4 and/or R5 weather conditions. PG&E plans to maintain this practice, and will continue to consider other potential adjustments through 2023.
F	Grid operations and protocols	28	Incorporating ignition risk factors in grid control	F.II.a	Does the utility have a clearly explained process for determining whether to operate the grid beyond current or voltage designs?	ii	ii	None	PG&E transmission follows procedure 1400 and distribution follows procedure 2700. This practice is expected to continue through 2023. PG&E is not to exceed emergency ratings even in contingencies. If, on the transmissions side, there was a need to operate the grid beyond current or voltage designs, PG&E would need to go through a special process to evaluate operations done outside emergency ratings.
F	Grid operations and protocols	28	Incorporating ignition risk factors in grid control	F.II.b	Does the utility have systems in place to automatically track operation history including current, loads, and voltage throughout the grid at the circuit level?	i	i	None	PG&E currently has systems in place to track operation history including current, loads, and voltage throughout the grid, but does not have 100% visibility. Distribution operation history is tracked in SCADA and transmission operation history is tracked in EMS and/or PI. In the future, PG&E will continue to expand its tracking of operation history, but does not anticipate having a fully automated process by 2023.

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Category Letter	Category Name	Capability #	Capability Name	Question Name	Question	Current State Score	Future State Score	Assumption	Explanation
F	Grid operations and protocols	28	Incorporating ignition risk factors in grid control	F.II.c	Does the utility use predictive modeling to estimate the expected life and make equipment maintenance, rebuild, or replacement decisions based on grid operating history, and is that model reviewed?	ii	iii	None	PG&E uses predictive modeling to assess asset health and provide potential asset failure information based on wind conditions. Historical maintenance is one component in asset health. This model, along with other factors, is used to assess any replacements, rebuilds or maintenance requirements. The model has been used, reviewed, and co-developed by consultants with experience in asset failure. The model has also been consulted through UCLA. In the future, PG&E will continue to use this model as well as leverage historical data.
F	Grid operations and protocols	28	Incorporating ignition risk factors in grid control	F.II.d	When does the utility operate the grid above rated voltage and current load?	ii	ii	PG&E interprets the term "conditions" are those that pertain to the system operations conditions, not external physical conditions (e.g., weather, climate)	PG&E's follows many operating standards and procedures on voltage and current ranges that must be maintained in the transmission standard. On occasion, the voltage may fluctuate out of a normal bound, for distribution in specific emergency circumstances that are within PG&E standard protocol. PG&E plans to maintain this industry practice in the future.
F	F. Grid operations and protocols	29	PSPS op. model and consequence mitigation	F.III.a	How effective is PSPS event forecasting?	iv	iv	PSPS forecast effectiveness is measured by comparing PSPS event forecasts as of EOC activation to actual number of PSPS events	When PG&E has activated the Emergency Operations Center (EOC) for a potential PSPS event, there were nearly always subsequent weather conditions that warranted PSPS. Beginning in 2018, of the 11 times PG&E has activated its EOC for a potential PSPS event, it has de-energized 10 of those times. Given the ongoing and planned initiatives at PG&E, the utility expects to maintain this level of forecast effectiveness through 2023 (see section 5.3.3 - Situational Awareness and Forecasting). PG&E does not believe forecast effectiveness should be determined by comparing forecast scope at the time of EOC activation to that at the time of de-energization, since PG&E deliberately employed a "start broad and narrow the scope" strategy in the 2019 wildfire season.
F	Grid operations and protocols	29	PSPS op. model and consequence mitigation	F.III.b	What share of customers are communicated to regarding forecasted PSPS events?	ii	iv	None	During the 2019 wildfire season, PSPS event forecasts were communicated to >95% of all affected customers and 99% of medical baseline customers in advance of de-energization. By 2023, PG&E aims to improve these metrics to >99% of all affected customers and 99.9% of medical baseline customers. Accurate, up-to-date customer contact information remains a challenge in this effort, however. PG&E plans on engaging other agencies and organizations that may have more relevant information than that contained in Customer Care and Billing records.
F	Grid operations and protocols	29	PSPS op. model and consequence mitigation	F.III.c	During PSPS events, what percent of customers complain?	iii	iii	PG&E includes both formal complaints to the CPUC and PSPS-related calls into the customer care line in its count of complaints.	During the 2019 wildfire season, <0.5% of PG&E customers complained during PSPS events. During this time period, PG&E received 136 such complaints. PG&E hopes to lower complaint rates year over year by collaborating more effectively with public agencies, developing more two-way dialogues with communities, and mitigating PSPS impacts in general.
F	Grid operations and protocols	29	PSPS op. model and consequence mitigation	F.III.d	During PSPS events, does the utility's website go down?	ii	i	None	During the 2019 wildfire season, the website went down two times. PG&E increased the use of redundancies, re-routing, and stress testing in response to these events and did not experience website downtime throughout the remainder of the wildfire season. PG&E plans to continue these practices and aims to avoid website downtime altogether in the future.
F	Grid operations and protocols	29	PSPS op. model and consequence mitigation	F.III.e	During PSPS events, what is the average downtime per customer?	v	v	This questions refers to website downtime across all events/ total customers for all events.	During the 2019 Wildfire Season there were two downtime events, resulting in a total website downtime of 2,982 minutes. Approximately 2 million customers were impacted by PSPS over this time. This translates to average customer downtime of less than 0.1 hours. PG&E increased the use of redundancies, re-routing, and stress testing in response to the downtime events and did not experience website downtime throughout the remainder of the wildfire season. PG&E plans to continue these practices and aims to avoid website downtime altogether in the future.
F	Grid operations and protocols	29	PSPS op. model and consequence mitigation	F.III.f	Are specific resources provided to customers to alleviate the impact of the power shutoff (e.g., providing backup generators, supplies, batteries, etc.)?	ii	ii	None	During the 2019 wildfire season, PG&E attempted to alleviate PSPS impact through its customer resource centers (CRCs). While amenities varied by event, example resources included mobile device charging, ice, and blankets, and, as the season progressed, PG&E increased collaboration with counties to evolve its CRC amenities and protocols (e.g., ADA access, hours of operation). Moving forward, PG&E will continue to increase collaboration with counties and tribal agencies to improve the CRC customer experience and integrate CRC operations more cohesively with county emergency operations (e.g., pre-identify more CRC locations)
F	Grid operations and protocols	30	Protocols for PSPS initiation	F.IV.a	Does the utility have explicit thresholds for activating a PSPS?	ii	ii	None	PG&E has explicit thresholds for activating a PSPS, as a matter of last resort.

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F	Grid operations and protocols	30	Protocols for PSPS initiation	F.IV.b	Which of the following does the utility take into account when making PSPS decisions? Select all that apply	ii	ii	None	PG&E has a partially automated system which recommends circuits for PSPS and which is then validated by SMEs. PG&E will continue to use this process for the foreseeable future.
F	Grid operations and protocols	30	Protocols for PSPS initiation	F.IV.c	Under which circumstances does the utility de-energize circuits? Select all that apply.	i,ii,iii,iv	i,ii,iii,iv	None	PG&E will de-energize circuits for numerous reasons including, but not limited to: • Upon detection of damaged conditions of electric equipment, • When circuit presents a safety risk to suppression or other personnel and the suppression agency has requested de-energization, • When equipment has come into contact with foreign objects posing ignition risk and does not take itself out, • If circuits are overloaded, • When gas leaks are detected in a volatile atmosphere
F	Grid operations and protocols	30	Protocols for PSPS initiation	F.IV.d	Given the condition of the grid, with what probability does the utility expect any large scale PSPS events affecting more than 10,000 people to occur in the coming year?	ii	ii	None.	PG&E anticipates an average of 5-6 PSPS events per year. In the past, PG&E has not executed a PSPS event that affected less than 10,000 people. Although mitigation efforts will have an impact on the PSPS process, PG&E anticipates with a probability of greater than 5%, having large scale PSPS events affect more than 10,000 people in the coming year.
F	Grid operations and protocols	31	Protocols for PSPS re-energization	F.V.a	Is there a process for inspecting de-energized sections of the grid prior to re-energization?	ii	ii	None	PG&E does have a process for inspecting de-energized sections of the grid prior to re-energization after a PSPS event. There is currently an existing process (TD-1464B-02) for accurately inspecting de-energized sections of the grid. PG&E does have aerial tools, but not sensors. PG&E is making forward progress, but does not believe augmentation with sensors and aerial tools will be complete 2023.
F	Grid operations and protocols	31	Protocols for PSPS re-energization	F.V.b	How automated is the process for inspecting de-energized sections of the grid prior to re energization?	i	ii	None	PG&E's current process for inspecting de-energized sections of the grid prior to re energization is manual. In the future, PG&E plans to move to a partially automated process which may include the use of LiDAR, satellite imagery and programmable camera technology.
F	Grid operations and protocols	31	Protocols for PSPS re-energization	F.V.c	What is the average amount of time that it takes you to re-energize your grid from a PSPS once weather has subsided to below your de-energization threshold?	ii	iv	None	PG&E's average amount of time to re-energize the grid after the weather has subsided from a PSPS event is under twenty-four daylight hours. PG&E's goal is to achieve restoring in under daylight twelve hours. This goal will be achieved by understanding what lines can be patrolled by aerial resources and securing mutual aid early.
F	Grid operations and protocols	31	Protocols for PSPS re-energization	F.V.d	What level of understanding of probability of ignitions after PSPS events does the utility have across the grid?	ii	iii	PG&E is answering this question using the assumption that the ignition risk in question refers to "the risk of ignition from re-energizing after a PSPS patrol"	PG&E partrols lines impacted by PSPS conditions prior to reenergization and uses that information to inform about the probability of ignition.
F	Grid operations and protocols	32	Ignition prevention and suppression	F.VI.a	Does the utility have defined policies around the role of workers in suppressing ignitions?	iii	iii	None	PG&E has explicit policies about the role of crews including contractors and subcontractors at the site of ignition.
F	Grid operations and protocols	32	Ignition prevention and suppression	F.VI.b	What training and tools are provided to field workers?	iii	iii	None	PG&E provides training and communications tools to immediately report ignitions caused by workers or in immediate vicinity of workers. In addition, suppression tools and training to suppress small ignitions are provided to some workers. In the future, PG&E foresees the use of SIPT crew and/or public safety specialists as trainers; however, PG&E is not sure they will have communication tools functioning without cell reception and training by suppression professionals provided by 2023.
F	Grid operations and protocols	32	Ignition prevention and suppression	F.VI.c	In the event workers encounter an ignition, do any major injuries or fatalities occur? In the events where workers have encountered an ignition, have any Cal/OSHA reported injuries or fatalities occurred in in the last year?	i	i	None	In events where workers have encountered an ignition, PG&E has not reported any Cal/OSHA injuries or fatalities in the past year, as reported in the WMP.
F	Grid operations and protocols	32	Ignition prevention and suppression	F.VI.d	Does the utility provide training to other workers at other utilities and outside the utility industry on best practices to minimize, report and suppress ignitions?	i	i	None	PG&E currently trains mutual assistance crews before sending them out in PG&E territory. However, PG&E does not proactively provide training to other workers at other utilities and outside the utility industry on best practices to minimize, report and suppress ignitions.
G	Data governance	33	Data collection and curation	G.I.a	Does the utility have a centralized database of situational, operational, and risk data?	i	ii	"Centralized database" means common platform for data rather than complete integration of enterprise systems.	PG&E's customer data, asset data, work management data, GIS data, operations data and event data have traditionally been managed in separate systems, with independent data stores. PG&E has plans to integrate portions of its data, including the Electric Operations data - Asset Data Foundation (ADF).
G	Data governance	33	Data collection and curation	G.I.b	Is the utility able to use advanced analytics on its centralized database of situational, operational, and risk data to make operational and investment decisions?	i	iii	None	PG&E plans to use advanced analytics for short and long term decision making. In the short term, PG&E will use Technosylva to reduce real time operational risk. In the long term, PG&E plans to use advanced analytics to set inspection cycles and prioritize system hardening initiatives.

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G	Data governance	33	Data collection and curation	G.I.c	Does the utility collect data from all sensored portions of electric lines, equipment, weather stations, etc.?	ii	ii	"Collect data from all sensored portions" means that data is available to be collected.	PG&E collects data from all SCADA-enabled sensored portions of electric lines, equipment, and weather stations. However, not all sensors are SCADA-enabled.
G	Data governance	33	Data collection and curation	G.I.d	Is the utility's database of situational, operational, and risk data able to ingest and share data using real-time API protocols with a wide variety of stakeholders?	i	i	1) "Stakeholders" means internal stakeholders. 2) PG&E interprets "real time API protocols" as meaning that the database can integrate operational and risk data in real time or on a regular, frequent cadence	PG&E currently uses a SCADA Historian and PI system in its control centers. While PG&E does not believe real-time protocols will be feasible by 2023, the utility will work towards a more dynamic interface for asset performance in the future.
G	Data governance	33	Data collection and curation	G.I.e	Does the utility identify highest priority additional data sources to improve decision making?	ii	iii	"Database" is applied here with the assumption that there will still be a human element to this process.	PG&E identifies high-priority additional data sources to improve decision making, as seen with the acquisition of the high-resolution cameras, weather stations, and satellites. PG&E has not performed this assessment holistically across the utility.
G	Data governance	33	Data collection and curation	G.I.f	Does the utility share best practices for database management and use with other utilities in California and beyond?	i	i	PG&E assumes "database management" refers to how PG&E decides which types of data should be collected and how they should be collected, not how the database itself should be structured	PG&E is not currently sharing data around near misses, causes, or failures. This is largely due to the fact that PG&E is collecting different types of data than the other IOUS, making it hard to share on the data attribute level. PG&E is able to share event based data learnings. In the future, PG&E would need support to define consistent data attributes that can be captured and shared across the IOUS. PG&E and other IOUs will be collecting standardized data in fire spread modeling (using the same tool - Technosylva).
G	Data governance	34	Data transparency and analytics	G.II.a	Is there a single document cataloguing all fire-related data and algorithms, analyses, and data processes?	i	i	None	PG&E believes that a suite of clearly categorized documents is more effective than a single document in this instance. As such, PG&E has a suite of documents cataloguing fire related data, algorithms, sources, and assumptions. PG&E does not have future plans to consolidate the information into a single document because PG&E believes that having multiple documents that are easy to follow meets the intent of this question.
G	Data governance	34	Data transparency and analytics	G.II.b	Is there an explanation of the sources, cleaning processes, and assumptions made in the single document catalog?	i	i	None	PG&E has a suite of documents cataloguing fire related data, algorithms, sources, and assumptions. PG&E does not have future plans to consolidate the information into a single document because PG&E believes that having multiple documents that are easy to follow meets the intent of this question.
G	Data governance	34	Data transparency and analytics	G.II.c	Are all analyses, algorithms, and data processing explained and documented?	ii	iii	None	PG&E's analyses, algorithms, and data processes are documented in most cases, but may not be explained in all instance. PG&E plans on improving explanations of its documented analyses, algorithms and data processes in the future.
G	Data governance	34	Data transparency and analytics	G.II.d	Is there a system for sharing data in real time across multiple levels of permission?	iii	iii	"System" means a platform.	PG&E currently shares best practices for database management and use with other utilities in California and beyond via several platforms: 1) the ARCGIS portal shares real-time maps to counties, 2) the PSPS portal shares the customer impacted lists to local government, and 3) PG&E's website shares other public data. PG&E will continue to exercise this behavior in the foreseeable future.
G	Data governance	34	Data transparency and analytics	G.II.e	Are the most relevant wildfire related data algorithms disclosed?	iii	iii	"Algorithm" equates to the methodology used.	PG&E publicly discloses the methodology that supports the data algorithms but does not share the specific lines of code.
G	Data governance	35	Near-miss tracking	G.III.a	Does the utility track near miss data for all near misses with wildfire ignition potential?	i	ii	"Near miss" means an event that happened in PG&E's system but did not cause an ignition.	PG&E tracks near miss data (hazards and damages) during a PSPS event, because if energized, those near misses could have created a potential ignition. PG&E also captures outage and wires down information, and a subset of that data could be considered near-miss data. During normal operations, PG&E does not have a robust way to capture all near miss data at this time. In the future, PG&E will formalize a process to capture near miss data during normal operations.
G	Data governance	35	Near-miss tracking	G.III.b	Based on near miss data captured, is the utility able to simulate wildfire potential given an ignition based on event characteristics, fuel loads, and moisture?	i	ii	"Near miss" means an event that happened in PG&E's system but did not cause an ignition.	PG&E is able to simulate wildfire potential given an ignition via two models, Technosylva and REAX. These models utilize weather and environmental inputs from PG&E's internal high-resolution weather system, POMMS. While PG&E does not measure near misses explicitly, the utility measures outages and wires down instances, a subset which are considered near-misses. In the future, PG&E will implement a deliberate process to identify near misses.
G	Data governance	35	Near-miss tracking	G.III.c	Does the utility capture data related to the specific mode of failure when capturing near miss data?	i	ii	"Near miss" means an event that happened in PG&E's system but did not cause an ignition.	PG&E currently tries to capture the direct failure when capturing near miss data. PG&E will implement additional cause analysis to better explain the specific mode of failure why a failure occurred.

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G	Data governance	35	Near-miss tracking	G.III.d	Is the utility able to predict the probability of a near miss in causing an ignition based on a set of event characteristics?	i	ii	"Near miss" means an event that happened in PG&E's system but did not cause an ignition.	At this time, PG&E's is able to predict the probability of an ignition based on wind-related events only. PG&E's Transmission Operability Assessment (OA) model considers the likelihood of a specific transmission line asset failure under certain wind loading conditions. PG&E plans to continue to enhance the OA model. Also, PG&E's meteorology team uses an Outage Producing Wind (OPW) model, which predicts the probability of a ignition based on a set of wind- related characteristics. PG&E will evolve to a more holistic probability model in the future.
G	Data governance	35	Near-miss tracking	G.III.e	Does the utility use data from near misses to change grid operation protocols in real time?	i	i	"Near miss" means an event that happened in PG&E's system but did not cause an ignition.	PG&E's grid operators interpret data on a real-time basis as part of their normal course of business. PG&E does change grid operation protocols not necessarily based on real time data, but based on forecasted weather. For example, PG&E will disable reclosure operations throughout the fire season and will test them back in when it is low fire risk is forecasted. PG&E will use learnings that come out of the near miss analysis to adjust the grid operations protocols during the fire season in the future.
G	Data governance	36	Data sharing with the research community	G.IV.a	Does the utility make disclosures and share data?	ii	iii	None	PG&E is focused on sharing required data with the research community. PG&E currently shares the "correctives"found during the enhanced inspections process on its public-facing website, (which is beyond any requirements), and plans to share even more in the future. On occasion, PG&E receives and responds to requests beyond requirements from local governments (i.e., the distributed energy resource plan for PSPS mitigation).
G	Data governance	36	Data sharing with the research community	G.IV.b	Does the utility in engage in research?	iii	iii	None	PG&E participates in several research initiatives such as: 1) the Electric Program Investment Charge (EPIC) Program (PG&E provides funding to address emerging grid needs), 2) independent climate reports, and 3) partnering with the B. John Garrick Institute for the Risk Sciences, University of California Los Angeles (UCLA) to leverage the rigorous modeling used in the nuclear industry to perform thorough and complex wildfire risk assessments and management planning. PG&E will continue to fund independent and collaborative research and apply the research to other utilities, where possible.
G	Data governance	36	Data sharing with the research community	G.IV.c	What subjects does utility research address?	ii	ii	None	PG&E participates in several research initiatives such as: 1) the Electric Program Investment Charge (EPIC) Program (PG&E provides funding to address emerging grid needs), 2) independent climate reports, and 3) partnering with the B. John Garrick Institute for the Risk Sciences, University of California Los Angeles (UCLA) to leverage the rigorous modeling used in the nuclear industry to perform thorough and complex wildfire risk assessments and management planning. PG&E will continue to fund independent and collaborative research, where possible.
G	Data governance	36	Data sharing with the research community	G.IV.d	Does the utility promote best practices based on latest independent scientific and operational research?	i	ii	None	PG&E has written an internal white paper on evaluating the effectiveness of visual enhanced inspection with a drone vs. with a helicopter. PG&E's research found that the two are comparable for inspection of wood poles, but the drone is more effective for steel structures. While this example is currently internal, PG&E plans to continue to conduct scientific and operational research, and share best practices for the foreseeable future.
H	Resource allocation methodology	37	Scenario analysis across different risk levels	H.I.a	For what risk scenarios is the utility able to provide projected cost and total risk reduction potential?	i	iii	PG&E interprets this question as asking if there are business-case type analyses.	PG&E currently calculates total probability of risk reduction in its Risk Assessment Mitigation Phase (RAMP), however it does not include scenarios. In the future, PG&E will improve its calculations by including more data captured in the upgraded ERP system and increasing the level of granularity in its risk modeling by its next RAMP filing.
H	Resource allocation methodology	37	Scenario analysis across different risk levels	H.I.b	For what level of granularity is the utility able to provide projections for each scenario?	i	iii	None	PG&E's granularity in providing projections for different scenarios is done at the program level. PG&E plans to provide projections at the circuit level. This will be done by tracking operational and financial data differently.
H	Resource allocation methodology	37	Scenario analysis across different risk levels	H.I.c	Does the utility include a long term (e.g., 6-10 year) risk estimate taking into account macro factors (climate change, etc.) as well as planned risk reduction initiatives in its scenarios?	ii	ii	None	PG&E currently includes in its RAMP filing 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 analysis
H	Resource allocation methodology	37	Scenario analysis across different risk levels	H.I.d	Does the utility provide an estimate of impact on reliability factors in its scenarios?	i	ii	None	PG&E currently does not include reliability factors into scenario analysis, but plans on develop this capability in the future, which will require additional resources.
H	Resource allocation methodology	38	Presentation of relative risk spend efficiency for portfolio of initiatives	H.II.a	Does the utility present accurate qualitative rankings for its initiatives by risk spend efficiency?	ii	ii	Interpreting the word "accurate" as meaning reduction in the probability of a risky event	PG&E includes accurate qualitative risk spend efficiency rankings in various public filings, including the RAMP, GRC, and WMP. PG&E plans to continue this practice through 2023.

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H	Resource allocation methodology	38	Presentation of relative risk spend efficiency for portfolio of initiatives	H.II.b	What initiatives are captured in the ranking of risk spend efficiency?	i	ii	Commercial is defined as initiatives that are already market tested	PG&E captures common commercial initiatives in the ranking of risk spend efficiency. By 2023, controls and mitigations will be included.
H	Resource allocation methodology	38	Presentation of relative risk spend efficiency for portfolio of initiatives	H.II.c	Does the utility include figures for present value cost and project risk reduction impact of each initiative, clearly documenting all assumptions (e.g. useful life, discount rate, etc.)?	i	i	None	PG&E does not currently document all present value and risk reduction assumptions for its portfolio of risk reduction initiatives. While PG&E aims to progress to more circuit-level RSE estimates, these estimates do not necessarily map to project-level estimates. PG&E expects to evolve closer to project-level RSE estimates, which would enable documentation of project-level assumptions, however, this may not be feasible for all projects by 2023.
H	Resource allocation methodology	38	Presentation of relative risk spend efficiency for portfolio of initiatives	H.II.d	Does the utility provide an explanation of their investment in each particular initiative?	ii	iii	None	PG&E does provide an explanation of investments for each initiative, which includes expected overall reduction in risk. There are instances where PG&E has included the expected overall reduction in risk and estimates of impact on reliability factors. For example, PG&E did this when looking at reclosers and for PSPS customer outage hours.
H	Resource allocation methodology	38	Presentation of relative risk spend efficiency for portfolio of initiatives	H.II.e	At what level of granularity is the utility able to provide risk efficiency figures?	i	iii	None	PG&E currently provides risk efficiency figures for different scenarios at the program level, however, in the future, PG&E plans to increase RSE granularity to the circuit level. PG&E currently has the ability to estimate risk mitigation at the protection zone level (i.e., more granular than circuit level, but not as granular as span level), however, measuring cost at this level is a challenge. PG&E aims to attain this level of cost granularity by 2023.
H	Resource allocation methodology	39	Process for determining risk spend efficiency of vegetation management initiatives	H.III.a	How accurate of a risk spend efficiency calculation can the utility provide?	i	ii	None	PG&E can provide accurate risk spend efficiency calculations for most clearances and types of vegetation management initiatives. However, PG&E does not currently calculate RSE estimates for controls efforts. In the future, PG&E plans on including such controls efforts in RSE estimates and aims to produce accurate relative RSE figures for controls and risk mitigation initiatives.
H	Resource allocation methodology	39	Process for determining risk spend efficiency of vegetation management initiatives	H.III.b	At what level can estimates be prepared?	i	iii	None	PG&E currently evaluates vegetation management initiatives at the program level. In the future, PG&E plans to evaluate vegetation management initiatives at the circuit level. This is consistent with other PG&E goals with respect to RSE granularity.
H	Resource allocation methodology	39	Process for determining risk spend efficiency of vegetation management initiatives	H.III.c	How frequently are estimates updated?	iii	iii	None	PG&E annually updates risk spend efficiency of vegetation management initiatives. This frequency will continue in the future.
H	Resource allocation methodology	39	Process for determining risk spend efficiency of vegetation management initiatives	H.III.d	What vegetation management initiatives does the utility include within its evaluation?	iii	iv	"All" refers to all initiatives and controls specifically	PG&E currently includes all vegetation management risk reduction initiatives in its RSE evaluation. However, PG&E does not currently include vegetation management controls efforts in such evaluation. PG&E aims to include such controls efforts in future RSE evaluations by 2023.
H	Resource allocation methodology	39	Process for determining risk spend efficiency of vegetation management initiatives	H.III.e	Can the utility evaluate risk reduction synergies from combination of various initiatives?	i	ii	None	PG&E does not evaluate risk reduction synergies from combining various vegetation management initiatives at this time because more precision is needed. In the future, PG&E plans on evaluating risk spend efficiency on synergy initiatives will be achievable by improving modeling and data capabilities.
H	Resource allocation methodology	40	Process for determining risk spend efficiency of system hardening initiatives	H.IV.a	How accurate of a risk spend efficiency calculation can the utility provide?	ii	ii	Interpreting the word "accurate" as meaning reduction in the probability of a risky event	PG&E can provide accurate risk spend efficiency calculations based on its system hardening initiatives, as described in the WMP. However, PG&E does not currently calculate RSE estimates for controls efforts. In the future, PG&E plans on including such controls efforts in RSE estimates and aims to produce accurate relative RSE figures for controls and risk mitigation initiatives.
H	Resource allocation methodology	40	Process for determining risk spend efficiency of system hardening initiatives	H.IV.b	At what level can estimates be prepared?	i	iii	None	PG&E can prepare estimates for determining risk spend efficiency of system hardening initiatives at the project level. In the future, PG&E will be preparing estimates at the circuit level.

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Category Letter	Category Name	Capability #	Capability Name	Question Name	Question	Current State Score	Future State Score	Assumption	Explanation
H	Resource allocation methodology	40	Process for determining risk spend efficiency of system hardening initiatives	H.IV.c	How frequently are estimates updated?	iii	iii	None	PG&E annually updates risk spend efficiency of system hardening initiatives. This frequency will continue in the future.
H	Resource allocation methodology	40	Process for determining risk spend efficiency of system hardening initiatives	H.IV.d	What grid hardening initiatives are included in the utility risk spend efficiency analysis?	ii	iv	Initiative level refers to a mitigation program	PG&E's grid hardening initiatives are currently grouped by underground, overhead, and asset removal. Some grid hardening initiatives have risk spend efficiency analysis at the individual initiative such as system hardening (which includes covered conductor, pole replacement, open wire secondary, and non-exempt equipment replacement) and lightning/surge arrestors. In the future state, PG&E intends to conduct risk spend efficiency analysis for each mitigation program.
H	Resource allocation methodology	40	Process for determining risk spend efficiency of system hardening initiatives	H.IV.e	Can the utility evaluate risk reduction effects from the combination of various initiatives?	i	ii	Initiative level refers to a mitigation program	PG&E currently does not take a synergistic view of its portfolio of system hardening initiatives. In the future, PG&E plans to do so through improvements to its modeling capabilities and additional data on newer programs, such as the effectiveness of system hardening.
H	Resource allocation methodology	41	Portfolio-wide innovation in new wildfire initiatives	H.V.a	To what extent does the utility allocate capital to initiatives based on risk-spend efficiency (RSE)?	i	ii	None	PG&E uses the RIBA 2.0 process to allocate budget across initiatives, which does not align with how risk spend efficiency is used to assess initiatives. PG&E sees the benefit to estimate of risk spend efficiency when allocating capital and will consider these estimates moving forward.
H	Resource allocation methodology	41	Portfolio-wide innovation in new wildfire initiatives	H.V.b	What information does the utility take into account when generating RSE estimates?	i	ii	None	PG&E currently takes into account the average estimate by initiative category. PG&E plans to get to the circuit level, so estimates in the future, should provide specific information, including state of equipment and location where initiative will be implemented.
H	Resource allocation methodology	41	Portfolio-wide innovation in new wildfire initiatives	H.V.c	How does the utility verify RSE estimates?	i	i	Verifying is a more substantial process than checking/briefly reviewing estimates	PG&E does not verify RSE estimates for portfolio-wide innovation in new wildfire initiatives. PG&E does check them, but verifying is more substantial. PG&E is still in the beginning stages of determining root causes for some failures. This makes it challenging to verify RSE estimates holistically. PG&E is working towards RSE estimates being verified with historical data, but may not be able to achieve this in the next three years.
H	Resource allocation methodology	41	Portfolio-wide innovation in new wildfire initiatives	H.V.d	Does the utility take into consideration impact on safety, reliability, and other priorities when making spending decisions?	ii	ii	None	PG&E currently uses the RIBA 2.0 process managed by Enterprise Risk Management to score projects against safety, reliability and other priorities when making decisions. In the future, PG&E plans to continue to score across safety, reliability, and other attributes consistent with S-MAP decisions.
H	Resource allocation methodology	41	Portfolio-wide innovation in new wildfire initiatives	H.V.e	Are the risk spend efficiency estimates verified by experimental data confirmed by experts and other utilities in California or abroad?	i	i	None	PG&E does not see risk spend efficiency estimates verified by experimental data being confirmed by experts or other utilities now or in the immediate future. This is largely due to logistical barriers such as an alignment in definitions of appropriate risk.
H	Resource allocation methodology	42	Portfolio-wide innovation in new wildfire initiatives	H.VI.a	How does the utility develop and evaluate the efficacy of new wildfire initiatives?	ii	iii	None	PG&E currently uses pilots and measures reduction in ignition events when assessing the efficacy of new wildfire initiatives. Recent efforts related to PG&E's re-closer reduction initiative illustrate this practice. Similarly, future efforts related to the REFCL initiative will measure direct reduction ignition events. However, PG&E does not currently measure near-misses in a deliberate manner (see explanation for G.III.b). Consistent with other goals outlined in this survey, PG&E aims to develop more deliberate measurement of near-miss events and will incorporate such data in future assessments of wildfire initiative efficacy.
H	Resource allocation methodology	42	Portfolio-wide innovation in new wildfire initiatives	H.VI.b	How does the utility develop and evaluate the risk spend efficiency of new wildfire initiatives?	i	i	"New wildfire initiatives" means pilot programs	PG&E does not evaluate risk spend efficiency of new wildfire initiatives, since PG&E is still in the pilot stage. Utilities in California are experimenting with new technology and as such, it is difficult to estimate costs without operational history.
H	Resource allocation methodology	42	Portfolio-wide innovation in new wildfire initiatives	H.VI.c	At what level of granularity does the utility measure the efficacy of new wildfire initiatives?	ii	iii	None	PG&E's level of granularity to measure the efficacy of new wildfire initiatives is done at the program level for the entire territory. In the future, PG&E plans to measure the efficacy of new wildfire initiatives at the circuit level.
H	Resource allocation methodology	42	Portfolio-wide innovation in new wildfire initiatives	H.VI.d	Are the reviews of innovative initiatives audited by independent parties?	i	i	Independent can refer to internal (e.g., internal audit) or external entities	PG&E's reviews of innovative initiatives are usually audited by independent parties, but this is not always the case for every review. PG&E will continue on this case-by-case basis.
H	Resource allocation methodology	42	Portfolio-wide innovation in new wildfire initiatives	H.VI.e	Does the utility share the findings of its evaluation of innovative initiatives with other utilities, academia, and the general public?	ii	ii	None	PG&E will continue to share findings of new wildfire initiatives. PG&E shares findings in different forums including through EPIC and related annual reports, ongoing benchmarking calls, and various meetings.

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I	Emergency planning and preparedness	43	Wildfire plan integrated with overall disaster/ emergency plan	I.I.a	Is the wildfire plan integrated with overall disaster and emergency plans?	iii	iii	"Wildfire plan" means wildfire response plan, not Wildfire Mitigation Plan.	PG&E's Company Emergency Response Plan (CERP) is considered an "all-hazards" plan, which is supplemented by numerous "Annexes" that integrate hazard-specific contingencies (e.g., Wildfire, Cyber Incidents, Earthquakes, etc.). Each of these documents is reviewed and updated annually in accordance with the General Order.
I	Emergency planning and preparedness	43	Wildfire plan integrated with overall disaster/ emergency plan	I.I.b	Does the utility run drills to audit the viability and execution of its wildfire plans?	i	ii	"Wildfire plan" means wildfire response plan, not Wildfire Mitigation Plan.	PG&E does not run company-wide wildfire simulations (like it does for earthquakes PSPS training). PG&E will hold drills for wildfire simulations in the future because it recognizes the importance of a viable wildfire response plan.
I	Emergency planning and preparedness	43	Wildfire plan integrated with overall disaster/ emergency plan	I.I.c	Is the impact of confounding events or multiple simultaneous disasters considered in the planning process?	i	ii	None	PG&E does not comprehensively consider the impact of confounding events or multiple simultaneous disasters in its planning process. PG&E is dedicated to following and training on ICS, and as such, will follow ICS guidelines on the planning for multiple, simultaneous disasters. In the future, such scenarios will be considered crucial since multiple events do happen (as was the case with PSPS and Kincade).
I	Emergency planning and preparedness	43	Wildfire plan integrated with overall disaster/ emergency plan	I.I.d	Is the plan integrated with disaster and emergency preparedness plans of other relevant stakeholders (e.g., CAL FIRE, Fire Safe Councils, etc.)?	i	ii	"Wildfire plan" means wildfire response plan, not Wildfire Mitigation Plan.	PG&E's wildfire plan does not integrate the disaster and emergency preparedness plans of all relevant stakeholders. PG&E's plan does include many aspects of the California State Emergency Plan, and follows the same application of the ICS standard. PG&E will be integrating additional stakeholders' emergency preparedness plans in the future.
I	Emergency planning and preparedness	43	Wildfire plan integrated with overall disaster/ emergency plan	I.I.e	Does the utility take a leading role in planning, coordinating, and integrating plans across stakeholders?	i	ii	"Wildfire plan" means wildfire response plan, not Wildfire Mitigation Plan.	PG&E does not take a leading role in planning, coordinating, and integrating plans across stakeholders. In the future, PG&E plans on taking a more leading role with planning, coordinating, and integrating wildfire plans across stakeholders.
I	Emergency planning and preparedness	44	Plan to restore service after wildfire related outage	I.II.a	Are there detailed and actionable procedures in place to restore service after a wildfire related outage?	ii	ii	PG&E assumes that the guidelines laid out in its CERP (Company Emergency Response Plan) and the Electric Annex that inform the Incident Command Center are detailed enough to lead to actionable plans	PG&E currently works with engineers to assess damage after wildfire outages and follows ICS when facilitating the restoration processes. These processes are built through the creation of daily Incident Action Plans that are created every day during an incident. These plans provide customized direction that takes into account vegetation, topography and local needs (e.g., prioritizing electricity to hospital) and also address whether to repair or replace assets
I	Emergency planning and preparedness	44	Plan to restore service after wildfire related outage	I.II.b	Are employee and subcontractor crews trained in, and aware of, plans?	ii	ii	None	PG&E provides a standard onboarding document to all employees working a restoration that covers topics such as contact and reporting information, camp location, and where to pick up daily Incident Action Plans. The IAPs are the daily plan that provide specific direction on how to obtain overall recovery objectives.
I	Emergency planning and preparedness	44	Plan to restore service after wildfire related outage	I.II.c	To what level are procedures to restore service after a wildfire-related outage customized?	i	i	None	PG&E restoration procedures point back to the CERP plan which is territory wide. PG&E's restoration plans are managed through the ICS process which is leveraged from one region to another.
I	Emergency planning and preparedness	44	Plan to restore service after wildfire related outage	I.II.d	Is the customized procedure to restore service based on topography, vegetation, and community needs?	ii	ii	Incident action plans are customized to a specific incident and built on a daily basis	PG&E customizes its incident action plans to the specific needs, priorities, and objectives of a restoration on a daily basis including taking into account topography, vegetation, and community needs. While the operating procedures themselves are not customized, each incident's response is customized via the incident action plan.
I	Emergency planning and preparedness	44	Plan to restore service after wildfire related outage	I.II.e	Is there an inventory of high risk spend efficiency resources available for repairs?	i	ii	Risk spend efficiency is defined as the calculated risk reduction for each mitigation per dollar spent on an initiative, and considers the most cost effective and most qualified initiatives.	PG&E has not identified any risk spend efficiencies at this time. In the future, PG&E will identify which resources (between mutual aid, contractors, employees) are the most effective in terms of quality, safety, and timeliness compared to their cost.
I	Emergency planning and preparedness	45	Emergency community engagement during and after wildfire	I.III.a	Does the utility provide clear and substantially complete communication of available information relevant to affected customers?	ii	ii	None	PG&E provides clear and complete communication of available information relevant to affected customers. For example, in an event where EOC is activated, there are instances when customers are notified of an outage, especially in the case of a large event (Camp Fire). This notification includes reference to a consumer protection website and an advice letter in relation to consumer protections. PG&E does not provide customers with referrals to other agencies for PSPS events.
I	Emergency planning and preparedness	45	Emergency community engagement during and after wildfire	I.III.b	What percent of affected customers receive complete details of available information?	ii	iv	"Customers" means PG&E customers affected by a wildfire, with up-to-date customer accounts.	Greater than 95% of affected customers receive complete details of available information during and after a wildfire. In the future, PG&E plan to obtain more complete and updated data, and will enhance public messaging, so this percentage should surpass 99% by 2023.

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I	Emergency planning and preparedness	45	Emergency community engagement during and after wildfire	I.III.c	What percent of affected medical baseline customers receive complete details of available information?	i	iv	"Customers" means PG&E customer with up-to-date customer accounts.	Less than 99% of affected medical baseline customers receive complete details of available information during and after a wildfire. The percentage is based on the known population of medical baseline customers in PG&E's customer system. To calculate this percentage, PG&E used PSPS data for medical baseline notification success rates. This is the same data that is used for wildfire notifications. In the future, PG&E expects this percentage will increase to over 99.9%, as some of the reported missed notifications were incorrectly tagged as 'missed'.
I	Emergency planning and preparedness	45	Emergency community engagement during and after wildfire	I.III.d	How does the utility assist where helpful with communication of information related to power outages to customers?	iii	ii	None	Currently, PG&E does not provide evacuation information to customers regarding a wildfire. Going forward, PG&E sees the value of improving communication efforts by sharing helpful, relevant evacuation information and will be adding links on PG&E's website and providing a toll-free telephone number during and after a wildfire. PG&E will also continue assisting disaster response professionals as requested.
I	Emergency planning and preparedness	45	Emergency community engagement during and after wildfire	I.III.e	How does the utility engage with other emergency management agencies during emergency situations?	ii	iii	None	PG&E does have some protocols in place to engage with agencies during an emergency, but in general, engages with agencies in an ad hoc manner (as was done during PSPS events when an invitation was extended to other emergency management agencies like Cal Fire). For example, there is a protocol to embed one of PG&E's leads in Cal Fire's EOC. In the future, PG&E plans to expand and identify additional engagement protocols with other identified emergency management organizations.
I	Emergency planning and preparedness	45	Emergency community engagement during and after wildfire	I.III.f	Does the utility communicate and coordinate resources to communities during emergencies (e.g., shelters, supplies, transportation etc.)?	ii	ii	None	PG&E communicates and coordinates resources to communities during emergencies. For example, PG&E coordinates with county officials to set up Community Resource Centers (CRC). Once a CRC is agreed to, communication goes out to the public including a list of services provided, such as water, electricity, blankets (upon request), and ice. This information is shared online and in the news.
I	Emergency planning and preparedness	46	Protocols in place to learn from wildfire events	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?	ii	ii	None	After events that lead to an activation of PG&E's Emergency Operations Center (EOC), for all hazards (including major wildfire incidents and PSPS events), PG&E's routinely conducts After Action Reviews (AARs) to identify, collect and address (where applicable) lessons learned from such incidents and events.
I	Emergency planning and preparedness	46	Protocols in place to learn from wildfire events	I.IV.b	Is there a defined process and staff responsible for incorporating learnings into emergency plan?	i	ii	None	PG&E's Emergency Preparedness and Response team is responsible for incorporating lessons learned into the emergency plan workstreams. PG&E a process to prioritize the learnings, however, there is not a robust and rigorous process to incorporate lessons learned into operations. PG&E will formalize a process in the future.
I	Emergency planning and preparedness	46	Protocols in place to learn from wildfire events	I.IV.c	Once updated based on learnings and improvements, is the updated plan tested using "dry runs" to confirm its effectiveness?	i	ii	None	PG&E conducts meetings with various lines of businesses to thoroughly discuss new processes. For example, staff involved with wildfires (such as EP&R and WSOC) have met to collaborate on the new plan (i.e., the wildfire kickoff meetings). Additional drills and trainings were identified as an area of improvement that came out of post-PSPS restoration discussions. In the future, PG&E will plan to consistently hold various dry runs and exercises.
I	Emergency planning and preparedness	46	Protocols in place to learn from wildfire events	I.IV.d	Is there a defined process to solicit input from a variety of other stakeholders and incorporate learnings from other stakeholders into the emergency plan?	i	ii	None	PG&E does not have a defined process to incorporate a variety of stakeholders' learnings into its emergency plan. PG&E does this through an After Action Review process and regular planning process for PSPS. PG&E invites external stakeholders to its kickoff of CERP (as it relates to PSPS), and their feedback is incorporated into the CERP. PG&E plans to expand its wildfire After Action Review process to include a variety of stakeholders and incorporate any feedback received.
I	Emergency planning and preparedness	47	Processes for continuous improvement after wildfire and PSPS	I.V.a	Does the utility conduct an evaluation or debrief process after a wildfire?	ii	ii	"Wildfire" includes wildfire and PSPS, as indicated in the capability title.	PG&E currently conducts, and will continue to conduct, an After Action Report for evaluation and internally hold debriefs after a wildfire.
I	Emergency planning and preparedness	47	Processes for continuous improvement after wildfire and PSPS	I.V.b	Does the utility conduct a customer survey and utilize partners to disseminate requests for stakeholder engagement?	i	iii	None	PG&E is currently conducting formal PSPS listening sessions with communities. PG&E will continue to conduct listening sessions with community leaders and plans to implement additional public listening sessions after wildfire events. PG&E plans to develop a focused plan for engaging the representative feedback from customers and utilize surveys in the future.
I	Emergency planning and preparedness	47	Processes for continuous improvement after wildfire and PSPS	I.V.c	In what other activities does the utility engage?	iii	iv	None	PG&E holds debriefs with partners to discuss continuous improvement after wildfires and PSPS events. For example, after PSPS events, partners are invited to join a debrief session. Partners have included the CPUC, Cal Fire, Cal OES, and county representatives. PG&E recognizes an opportunity to formalize and be more proactive in holding these the ongoing listening sessions. PG&E looks forward to implementing both outreach methods in a more fluid manner in the future.

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I	Emergency planning and preparedness	47	Processes for continuous improvement after wildfire and PSPS	I.V.d	Does the utility share with partners findings about what can be improved?	i	ii	None	PG&E shares findings about what can be improved with some partners (e.g.CPUC). For example, PG&E has a lessons learned section in the 10-day report that is published on the PG&E website. However, PG&E sees an opportunity to share these lessons with a broader audience, further socialize these lessons learned, and follow-up with communications on actions being taken based on the identified lessons learned.
I	Emergency planning and preparedness	47	Processes for continuous improvement after wildfire and PSPS	I.V.e	Are feedback and recommendations on potential improvements made public?	i	ii	None	PG&E shares findings about what can be improved with some partners (e.g.CPUC). For example, PG&E has a lessons learned section in the 10-day report that is published on the PG&E website. However, PG&E sees an opportunity to share these lessons with a broader audience, further socialize these lessons learned, and follow-up with communications on actions being taken based on the identified lessons learned.
I	Emergency planning and preparedness	47	Processes for continuous improvement after wildfire and PSPS	I.V.f	Does the utility conduct proactive outreach to local agencies and organizations to solicit additional feedback on what can be improved?	i	ii	None	PG&E conducts proactive outreach to local agencies and organizations to solicit additional feedback. Proactive outreach to receive feedback from the customers can be further developed for both PSPS and wildfires. PG&E's plans to organize and conduct community outreach more proactively in the future.
I	Emergency planning and preparedness	47	Processes for continuous improvement after wildfire and PSPS	I.V.g	Does the utility have a clear plan for post-event listening and incorporating lessons learned from all stakeholders?	i	ii	None	Post-event, PG&E engages in public listening sessions to receive feedback. This feedback, along with feedback received from other forums, become incorporated in as lessons learned in documents such as the After Action Reports. However, there is room for PG&E to improve its listening sessions to support more of a two-way dialogue and gain more customer engagement. PG&E plans to develop a clear and effective plan for post-event listening.
I	Emergency planning and preparedness	47	Processes for continuous improvement after wildfire and PSPS	I.V.h	Does the utility track the implementation of recommendations and report upon their impact?	i	ii	None	PG&E tracks and reports on the impacts of implemented wildfire recommendations. PG&E doesn't currently track the implementation of recommendations nor report upon their impacts for PSPS. However, PG&E will be able to do so in the future, because it is setting up metrics to report out progress.
I	Emergency planning and preparedness	47	Processes for continuous improvement after wildfire and PSPS	I.V.i	Does the utility have a process to conduct reviews after wildfires in other the territory of other utilities and states to identify and address areas of improvement?	i	ii	None	PG&E currently does not conduct reviews after wildfires in other territory of other utilities to identify and address areas of improvement. However, in the future, PG&E sees the imperative benefit of conducting such reviews. There are also opportunities to further engage with other utilities on wildfires and PSPS post events.
J	Stakeholder cooperation and community engagement	48	Cooperation and best practice sharing with other utilities	J.I.a	Does the utility actively work to identify best practices from other utilities through a clearly defined operational process?	i	iii	None	PG&E currently collaborates with other California utilities and shares best practices, but does not consider the existing level of engagement to be a "clearly defined operational process" at this time. PG&E plans to formalize the existing collaboration and include other global utilities (e.g., Australia) in the future.
J	Stakeholder cooperation and community engagement	48	Cooperation and best practice sharing with other utilities	J.I.b	Does the utility successfully adopt and implement best practices identified from other utilities?	ii	ii	None	PG&E has successfully adopted and implemented best practices identified from other utilities (i.e., PG&E uses the PSPS process, high-definition cameras, a weather station network and Technosylva practices that were shared by SDG&E). PG&E will continue to adopt and implement best practices in the future.
J	Stakeholder cooperation and community engagement	48	Cooperation and best practice sharing with other utilities	J.I.c	Does the utility seek to share best practices and lessons learned in a consistent format?	ii	ii	None	PG&E follows the ESRB-8 requirement, which is a consistent format for sharing lessons learned. PG&E also has a forum to share best practices, but does not follow a consistent format.
J	Stakeholder cooperation and community engagement	48	Cooperation and best practice sharing with other utilities	J.I.d	Does the utility share best practices and lessons via a consistent and predictable set of venues/media?	ii	ii	None	PG&E follows the ESRB-8 requirement, which is a consistent and predictable set of venues/media for sharing lessons learned. PG&E has a forum to share best practices, but does not consider that to be a consistent nor predictable set of venues /media.
J	Stakeholder cooperation and community engagement	48	Cooperation and best practice sharing with other utilities	J.I.e	Does the utility participate in annual benchmarking exercises with other utilities to find areas for improvement?	ii	ii	None	PG&E participates in benchmarking exercises with other utilities to find areas for improvement more frequently than annually, and will continue to do so in the future.
J	Stakeholder cooperation and community engagement	48	Cooperation and best practice sharing with other utilities	J.I.f	Has the utility implemented a defined process for testing lessons learned from other utilities to ensure local applicability?	i	ii	None	PG&E informally tests lessons learned from other utilities for local applicability, but does not have a "defined process" to do so at this time. PG&E will formalize this process in the future.
J	Stakeholder cooperation and community engagement	49	Engagement with communities on utility wildfire mitigation initiatives	J.II.a	Does the utility have a clear and actionable plan to develop or maintain a collaborative relationship with local communities?	ii	ii	None	PG&E has already executed many local community "PSPS Listening Sessions" to continue to build a collaborative relationship with the local communities impacted by the 2019 PSPS season. PG&E is in the process of evolving its existing community outreach plan to include more two-way communication opportunities. PG&E will continue to further formalize and mature this plan in the coming years.

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J	Stakeholder cooperation and community engagement	49	Engagement with communities on utility wildfire mitigation initiatives	J.II.b	Are there communities in HFTD areas where meaningful resistance is expected in response to efforts to mitigate fire risk (e.g. vegetation clearance)?	ii	ii	None	PG&E does work closely with communities on many of its wildfire mitigation efforts. There are communities (in HFTD areas) where resistance has been experienced (i.e., regulations in Santa Cruz prohibit PG&E from performing routine vegetation management) in response to efforts to mitigate fire risk. PG&E will continue to work with communities but doesn't foresee this changing in the future.
J	Stakeholder cooperation and community engagement	49	Engagement with communities on utility wildfire mitigation initiatives	J.II.c	What percent of landowners are non-compliant with utility initiatives (e.g., vegetation management)?	v	v	Landowner is defined as unique customers	Less that 0.5% of landowners are currently non-compliant with PG&E's initiatives. In order to answer this question, PG&E used its its total number of customer refusals in 2019 (~22,000) as the numerator and its total number of unique customers (~5.2 million) as the denominator to equal a number that is less than 0.5%.
J	Stakeholder cooperation and community engagement	49	Engagement with communities on utility wildfire mitigation initiatives	J.II.d	What percent of landowners complain about utility initiatives (e.g., vegetation management)?	iv	iv	A "complaint" is a formal complaint filed by a customer with the CPUC. Landowner is defined as unique customer accounts	Currently, less than 1% of landowners complain about utility initiatives. In future, PG&E does not expect this number to change
J	Stakeholder cooperation and community engagement	49	Engagement with communities on utility wildfire mitigation initiatives	J.II.e	Does the utility have a demonstratively cooperative relationship with communities containing >90% of the population in HFTD areas (e.g. by being recognized by other agencies as having a cooperative relationship with those communities in HFTD areas)?	i	ii	None	PG&E is evolving its existing community outreach plan to be more collaborative in nature, but currently does not consider itself to have a demonstratively cooperative relationship with all communities at this time. PG&E recognizes the value and importance of these relationships and has an action plan to continue to improve its outreach, partnership and collaboration activities with its local communities.
J	Stakeholder cooperation and community engagement	49	Engagement with communities on utility wildfire mitigation initiatives	J.II.f	Does utility have records of landowners throughout communities containing >90% of the population in HFTD areas reaching out to notify of risks, dangers or issues in the past year?	ii	ii	"Risks, dangers" are those stemming from utility owned assets, not property owner assets.	PG&E has records of over 90% of its landowners reaching out to PG&E to notify of risks, dangers or issues, but does not have a "consistent, repeatable" process to address the notifications.
J	Stakeholder cooperation and community engagement	50	Engagement with LEP and AFN populations	J.III.a	Can the utility provide a plan to partner with organizations representing Limited English Proficiency (LEP) and Access & Functional Needs (AFN) communities?	ii	ii	None	PG&E partners with organizations representing Limited English Proficiency (LEP) and Access & Functional Needs (AFN) communities. Notably, PG&E has an agreement in place with the California Foundation for Independent Living Centers (CFILC) to specifically engage with the AFN community. PG&E will continue to put forth considerable effort towards streamlining its communications to simplify coordination going forward, especially for the LEP groups.
J	Stakeholder cooperation and community engagement	50	Engagement with LEP and AFN populations	J.III.b	Can the utility outline how these partnerships create pathways for implementing suggested activities to address the needs of these communities?	ii	ii	None	PG&E's partnerships with the LEP and AFN communities create pathways for implementing suggested activities to address the needs of these communities. PG&E has provided funding to CFILC to provide revelant support to the communities they serve. PG&E is implementing an AFN advisory council, or similar input process, to get direction and guidance from communities members on how to best support and serve these communities.
J	Stakeholder cooperation and community engagement	50	Engagement with LEP and AFN populations	J.III.c	Can the utility point to clear examples of how those relationships have driven the utility's ability to interact with and prepare LEP & AFN communities for wildfire mitigation activities?	i	ii	None	PG&E has many examples of interactions with the LEP and AFN communities in regards to wildfire mitigation activities (see section 5.3.9.4 Language Access and Translations Strategy of the 2020 WMP). PG&E recognizes that it can apply more rigor and formality around its interactions to solicit feedback from those communities at this time. As such, PG&E plans to continue to strengthen its relationships with the LEP and AFN communities to be able to more effectively prepare LEP & AFN communities for wildfire mitigation activities in the future.
J	Stakeholder cooperation and community engagement	50	Engagement with LEP and AFN populations	J.III.d	Does the utility have a specific annually-updated action plan further reduce wildfire and PSPS risk to LEP & AFN communities?	i	ii	None	The utility has annually-updated action plans to further reduce wildfire and PSPS risks to ALL communities. With regard to PSPS this is particularly focused on the communities most likely to be frequently impacted. PG&E will continue to expand and evolve these annually-updated aciton plans to incorporate specific actions to support the LEP & AFN communities as noted in the two questions above.
J	Stakeholder cooperation and community engagement	51	Collaboration with emergency response agencies	J.IV.a	What is the cooperative model between the utility and suppression agencies?	ii	iii	None	PG&E currently works with suppression agencies and notifies them of ignitions. PG&E also shares its GOES 16/17 satellite capability with local agencies, when requested. PG&E will continue to evolve this relationship and, where appropriate, will engage with different entities to help them better detect ignitions.
J	Stakeholder cooperation and community engagement	51	Collaboration with emergency response agencies	J.IV.b	In what areas is the utility cooperating with suppression agencies	iii	iii	None	PG&E currently cooperates with suppression agencies throughout its service areas and will continue doing so going forward.
J	Stakeholder cooperation and community engagement	51	Collaboration with emergency response agencies	J.IV.c	Does the utility accurately predict and communicate the forecasted fire propagation path using available analytics resources and weather data?	i	ii	None	PG&E does not predict and communicate forecasted fire propagation path using available analytics resources and weather data, however we anticipate having the capability to do this in the future (through the Technosylva technology platform).

Category/Capability Info				Question Info		Scores		Final Deliverable	
Category Letter	Category Name	Capability #	Capability Name	Question Name	Question	Current State Score	Future State Score	Assumption	Explanation
J	Stakeholder cooperation and community engagement	51	Collaboration with emergency response agencies	J.IV.d	Does the utility communicate fire paths to the community as requested?	i	i	None	PG&E does not predict and communicate forecasted fire propagation path using available analytics resources and weather data, however may be able to do this in the future with its Technosylva technology. PG&E believes it is critical to understand who should provide community-wide notification of potential fire paths (and how); then, this process would need to be thoroughly discussed and aligned between PG&E, fire suppression agencies, community OES and other stakeholders.
J	Stakeholder cooperation and community engagement	51	Collaboration with emergency response agencies	J.IV.e	Does the utility work to assist suppression crews logistically, where possible?	ii	ii	None	PG&E currently assists suppression crews logistically (where possible) and will continue doing so in the foreseeable future.
J	Stakeholder cooperation and community engagement	52	Collaboration on wildfire mitigation planning with stakeholders	J.V.a	Where does the utility conduct substantial fuel management?	i	i	None	PG&E generally only conducts fuel management in areas where related regulations apply, namely PRC 4292. PG&E plans to allocate funding for a targeted, risk-based fuel management effort in the future, but such efforts may not qualify as addressing "substantial fuel management" work accross rights of way.
J	Stakeholder cooperation and community engagement	52	Collaboration on wildfire mitigation planning with stakeholders	J.V.b	Does the utility engage with other stakeholders as part of its fuel management efforts?	i	iii	None	PG&E engages with stakeholders regarding fuel management in an ad hoc manner, and does not share information in a consistent way. PG&E plans to implement a fuel management plan / program that will allow for effective engagement and coordination with stakeholders on fuel management activities.
J	Stakeholder cooperation and community engagement	52	Collaboration on wildfire mitigation planning with stakeholders	J.V.c	Does the utility cultivate a native vegetation ecosystem across territory that is consistent with lower fire risk?	i	i	None	PG&E does not currently cultivate a native vegetation ecosystem across territory consistent with lower fire risk because PG&E believes there are more effective ways to reduce this risk (e.g., fuel management).
J	Stakeholder cooperation and community engagement	52	Collaboration on wildfire mitigation planning with stakeholders	J.V.d	Does the utility fund local groups (e.g., fire safe councils) to support fuel management?	ii	ii	None	PG&E funds, and will continue to fund, local groups to support fuel management.