

PACIFIC GAS AND ELECTRIC COMPANY
Wildfire Mitigation Plans
Rulemaking 18-10-007
Data Response

PG&E Data Request No.:	WSD_010-Q10		
PG&E File Name:	WildfireMitigationPlans_DR_WSD_010-Q10		
Request Date:	March 15, 2021	Requester DR No.:	WSD to PGE – Data Request – 20210315
Date Sent:	March 22, 2021	Requesting Party:	Wildfire Safety Division
PG&E Witness:		Requester:	Ryan Arba

QUESTION 10

At the 2/22/21 Workshop, PG&E stated that it does not have a model for PSPS impacts, but takes PSPS into account after receiving model outputs, “including frequency and number of customers impacted by PSPS in 2019 and 2020.” Provide more detail regarding how PG&E takes PSPS into account, including:

- a. How does PG&E currently take PSPS into account when determining which mitigations to deploy?
- b. How does PG&E currently take PSPS into account when determining where to deploy mitigations?
- c. Does PG&E have a certain threshold for frequency of PSPS events to determine if a specific area should be prioritized for mitigation?
 - i. If so, what is that threshold and how is it used?
 - ii. If not, how does PG&E take frequency of PSPS events into account?
- d. Does PG&E have a certain threshold for number of customers impacted by a PSPS events to determine if a specific area should be prioritized for mitigation?
 - iii. If so, what is that threshold and how is it used?
 - iv. If not, how does PG&E take number of customers impacted into account
- e. Does PG&E does take system hardening into consideration when determining PSPS events?
 - i. If so, how will PSPS thresholds change as a result of system hardening?
 - ii. If not, explain why PG&E does not consider the utilization of system hardening sufficient for changing PSPS thresholds.
- f. When turning off circuit segments during PSPS events, what is the probability in which an ignition would occur on that circuit segment if the segment was not shut off.
 - i. To what confidence does PG&E have that an ignition would occur on that particular segment?
 - ii. How do each of the initiatives affect the probability that an ignition would occur?

- iii. Does PG&E change thresholds based on diminishing likelihood of ignition due to implementation of initiatives on a circuit segment?

ANSWER 10

PG&E understands that the portion of the workshop referenced in the introduction to the data request was addressing system hardening. Thus, our response is focused on PG&E's System Hardening Program as described in Section 7.3.3.17.1 of the 2021 Wildfire Mitigation Plan (WMP). With this in mind, with regard to the System Hardening Program, PG&E provides the following responses:

- a. PG&E described how System Hardening Program alternatives are evaluated, in part, based on PSPS impacts in our 2021 WMP. For convenience, two excerpts from Section 7.3.3.17.1 are provided below:

Once a circuit segment is targeted for system hardening, a project is launched for a segment that is no larger than 10-miles long. PG&E's Distribution Planning Engineers develop three primary alternatives for construction: (1) all overhead; (2) all underground; and (3) a hybrid alternative utilizing the specific hardening alternative thought to be the best fit for each section in the project. Line removal options are also considered during this scoping phase and, if feasible, thoroughly evaluated as generally the fastest and lowest-cost approach.

The system hardening project design options are brought to a scoping desktop review team made up of various experts to discuss and analyze additional risks such as tree strike potential, ingress and egress, localized fuel types and past fire history, land constraints, environmental risks, PSPS impacts, and general constructability concerns. (2021 WMP at p. 553)

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Projected PSPS impacts are also analyzed by meteorology team and provided to the project scoping team to aid in the understanding of past potential frequency and customer impact. In areas where greater than an average of one PSPS event per year has been modeled, or greater than 5,000 customer meters are projected to be impacted, the design alternative for undergrounding is strongly recommended due to the potential PSPS mitigation benefits. This benefit can still be difficult to capture in all cases due to the radial (i.e. "one-way") nature of the majority of PG&E's distribution system. If lines that are targeted for hardening are undergrounded, but the source of electricity is still coming from overhead lines that are likely to be de-energized, the PSPS savings may not be realized until significantly more work is done.

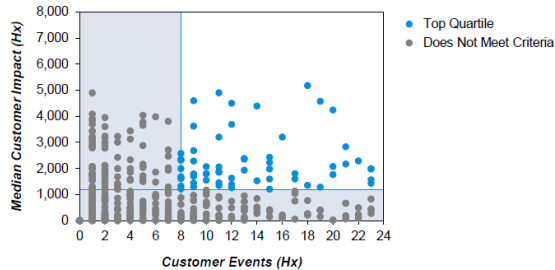
Utilizing all of this information, the field scoping team will review the design alternatives provided, make changes as necessary, and provide a final field scope document to the estimating team. An estimator then performs a field check to analyze the assumptions made during the field scoping desktop meeting to confirm viability of the constructability and execution risks associated with the mitigations chosen. (2021 WMP at p. 555)

Please note, however, that we have refined our evaluation of PSPS impacts with regard to System Hardening Program project scoping and consideration of alternatives. These refinements, which are discussed in more detail below in subparts (b) and (c), have resulted in a modification to the threshold of 1 PSPS event or greater than 5,000 customers described in the excerpt above from the 2021 WMP.

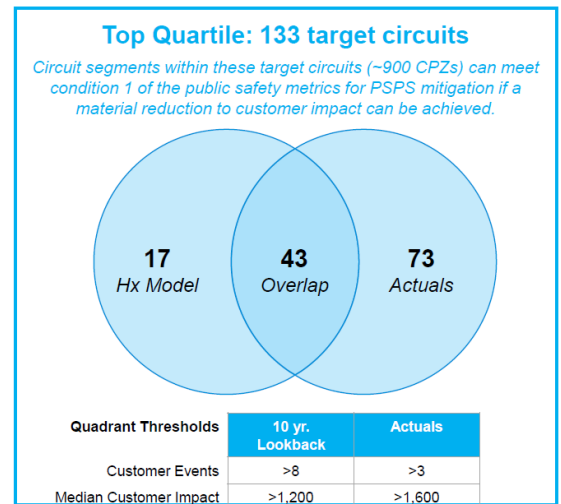
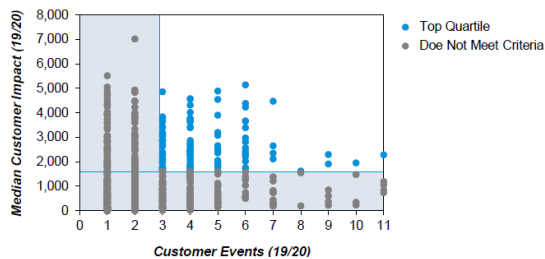
- b. As indicated in subpart (a) above, the consideration of PSPS impacts for System Hardening Program projects continues to be refined and is now evaluated based on PSPS Event Frequency and Impacted customer at both the 10-year look back and actuals for 2019-2020 – focusing on the overlap of those two views in the top quartile, as well as community resiliency projects proposed by agency and community partners.

PSPS Priorities were targeted based on a triangulation of top quartile event frequency and customer impact from a 10 year lookback, as well as '19/'20 actuals

PSPS Event Frequency and Impacted Customers (10 Year Lookback)¹



PSPS Event Frequency and Impacted Customers (Actuals '19/'20)²



DRAFT – FINAL NUMBERS NOT APPROVED TILL 2021 WMP FINALIZED

- c. (i) PG&E is targeting the top quartile of both the 10-year lookback (>8 customer events and >1,200 customers) and the 2019-2020 actuals (>1,600 customers and >3 events)
- (ii) Not applicable
- d. (i) Please see subpart c(i) above.
- (ii) Not applicable
- e. (i) As described in the response to PGE-16 (Class A) in PG&E's 2021 WMP, "in order to be considered for de-scoping, circuit segments will be pre-identified as meeting the criteria. The Distribution PSPS de-scoping criteria is met when a circuit segments has an adjusted Distribution Large Fire Potential (LFPD) value below the PSPS threshold and there are no strike potential trees or open maintenance tags

on the segment. As detailed in Section 4.2.A(c) – 4.2.A(g), the probability of the distribution line failing during a given weather event is based on historical performance of the line. For pre-identified lines, effectiveness factors to account for the improvement from hardening are determined. For example, if covered conductor is installed on a circuit segment this mitigation will reduce the probability of certain failure modes causing an ignition. The effectiveness factor represents the improvement to historical probability of ignition. These effectiveness factors are applied to the circuit segment within the PSPS tools. If the effectiveness factor reduces the historical probability of a catastrophic fire below the PSPS threshold, it is identified for de-scoping. The second part of the criteria concerning the absence of strike potential trees and open maintenance tags is confirmed by a review of LiDAR data and a site visit by Public Safety Specialists and Arborists.” (2021 WMP at p. 863)

(ii) Not Applicable

f.

- i. As PG&E has much more outage data as opposed to ignitions, we are more confident in modeling and forecasting the probability of experiencing a sustained or momentary power outage as it relates to PSPS purposes and acute weather events as opposed to dynamically modeling the increased probability of an ignition. The Outage Producing Wind Model that PG&E has developed is discussed in detail in section 4.2.A of the 2021 WMP. In addition, by analyzing the weather and fuel moisture data that was present in all recent catastrophic fires in the PG&E territory, PG&E has an understanding of the fuel moisture and weather conditions present during these fires. This review lead to the construction of PG&E’s minimum fire potential conditions, which are the weather and fuel moisture levels that must be met for PSPS to be considered. Furthermore, during PSPS events, Red Flag Warnings and other high-risk indicators from the federal agencies such as the Geographic Area Coordination Center and Storm Prediction Center are typically in place, which indicate there is an increased risk of ignitions and catastrophic fires. Therefore, when PG&E executes a PSPS event, it is typically during winds events where there is a high outage probability due to winds speeds, conditions that were present during past wildfires, and federal agency warnings in place around wildfire risks.

Annual ignition probability models have been constructed but are not able to be utilized at the hour-by-hour temporal scale that is required for PSPS execution. PG&E has attempted to understand the ignition to outage relationship by evaluating the ratio of outages that lead to wildfire ignition by analyzing PG&E’s CPUC reportable ignitions and PG&E’s outage data in space and time.

- ii. Theoretically, these programs would decrease the probability of both outages and ignitions to some degree. As the Outage Producing Wind Model in the PSPS framework is recalibrated every year, the model inherently learns about areas that have become more (or less) resilient based on actual weather events and actual grid performance. PG&E is also evaluating other

methodologies to adjust the probability of outages in models such as applying a subject-matter expert derived effectiveness-factor to locations where work has been performed. Another method is to determine the actual probability reduction based on actual performance achieved, such that these factors can be determined by actual event data and then applied to new areas.

- iii. Not at the present. For 2021 decision making, PG&E is evaluating methodologies described in item ii.