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Melissa Semcer
Deputy Director, Electric Infrastructure Directorate
Office of Energy Infrastructure Safety
715 P Street, 20th Floor
Sacramento, CA 95814

Re: **Pacific Gas & Electric Company's Comments on the Draft 2023-2025 Electrical Corporation Wildfire Mitigation Maturity Survey**

Dear Deputy Director Semcer:

Pacific Gas and Electric Company (PG&E) submits the following comments and feedback on the Draft 2023-2025 Electrical Corporation Wildfire Mitigation Maturity Survey (Draft Maturity Survey) from the Office of Energy Infrastructure Safety (Energy Safety).

In order to respond in the most efficient and effective manner, our feedback and comments are organized in the same order as the questions, while also grouping together questions where similar feedback applies, when possible. Please also note that, given the extremely large number of questions in the draft survey, we are not able to provide comments on every proposed question. However, to that end, we appreciate Energy Safety's inclusion of a comment box in each section of questions where we can provide feedback and insight into how we determined our responses.

General Question for Responding to Questions Requiring Group Answers

As an initial matter, we would appreciate Energy Safety's guidance on how we should respond to questions requiring answers from multiple groups. For example, a number of questions in Section 3 involving asset inspections and maintenance require answers from more than one group, such as Distribution, Transmission, and Substation. In some instances, each of these groups may offer a different perspective and response to the question. Given this variance, any guidance on how to consolidate the differing responses for this type of question would be helpful.

Procedural Recommendation to Allow for Continuous Improvement

Given the vast scope of the proposed maturity survey, we believe it would be beneficial to institute a joint Energy Safety/utility working group to allow for discussion of the questions and allow the utilities to understand what is being sought by each question. Given the importance of the survey, and with over 1,100 proposed questions, a regularly scheduled working group

would help ensure that Energy Safety receives the best possible answer for each question and that the utilities will continue to improve in maturity year over year.

Questions 1.1.1.Q1 to 1.1.1.Q4

In questions 1.1.1.Q1 to 1.1.1.Q4, Energy Safety asks whether the utilities consider population growth in the Wildland Urban Interface ("WUI") and climate change effects as part of our risk assessment and strategy.[1] As used in these requests, we believe the term "consider" is unclear because considerations differ from model inputs. For example, climate model outputs for future precipitation trends may be considered while simultaneously being too inconsistent and speculative for use in actual modeling. Accordingly, risk model maturity would not reflect the use of such models. In addition, it would be helpful if Energy Safety, or another State agency, provided standardized population growth materials so that all stakeholders are reviewing the same data.

Questions 1.1.2.Q6 and 1.1.2.Q8

Energy Safety refers to "statistical weather conditions" occurring over 300-year return intervals in questions 1.1.2.Q6 and 1.1.2.Q8.[2] It does not appear that "statistical weather conditions" is defined in the 2023-2025 Guidelines, which could cause the answers of the utilities to vary since there is no standard definition for this term. Additionally, it is unclear what Energy Safety means by "300-year return intervals." We would appreciate clarification on these two items.

Question 1.1.2.Q9

Question 1.1.2.Q9 of the Draft Maturity Survey asks the utilities if they include fire service activities as inputs in their risk modeling.[3] Based on a review of the survey and the 2023-2025 WMP Draft Guidelines, it is unclear whether this means fire suppression activities only or also controlled burns. Clarity on this issue would provide superior responses from the utilities. In addition, incorporating fire suppression availability into risk modeling may require visibility into state and local emergency personnel that is not currently available.

Question 1.1.2.Q10

Energy Safety asks the utilities whether they include community-specific vegetation plans throughout the service territory in question 1.1.2.Q10.[4] To the extent we are aware of such actions, we support using this type of data in our risk modeling. However, in order to obtain the most accurate responses, we believe the modeling should only include plans that have been completed in the field and are, therefore, detectable through satellite imagery.

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[1] Draft Maturity Survey, pp 3-4.

[2] Draft Maturity Survey, pp. 5-6.

[3] Draft Maturity Survey, pp. 6-7.

[4] Draft Maturity Survey, p. 7.

Question 1.1.2.Q11

In question 1.1.2 Q11, Energy Safety asks whether the utilities are using models to output air quality effects, including GHG emissions and population health impacts.[5] This is an emerging issue which involves a fair amount of uncertainty. Given this uncertainty, we recommend that a working group be set up to address this issue. Additional insight from the California Air and Resources Board may also be helpful.

Question 1.1.2.Q12

Draft Maturity Survey question 1.1.2 Q12 is unclear and may provide unintentionally disparate answers from the utilities.[6] If it meets the intent of the question, we recommend that this question be revised to: "What maturity level does the electrical corporation's statistical weather, climate, and wildfire model inputs meet for climate change in this capability?"

Questions 1.1.3.Q1 – 1.1.3.Q4, 1.4.5.Q1, 3.2.1.Q1 – 3.2.1.Q6, 3.2.2.Q1 – 3.2.2.Q3 & 3.2.23.Q1 – 3.2.3.Q5

There are multiple questions with the same numbers for 1.1.3.Q1 to 1.1.3.Q4, 1.4.5.Q1, 3.2.1.Q1 to 3.2.1.Q6, 3.2.2.Q1 to 3.2.2.Q3 and 3.2.23.Q1 to 3.2.3.Q5. These numbers are repeated in the survey, resulting in more than one question with each of these question numbers/identifiers.

Questions 1.1.4.Q3 - 1.1.4.Q10 & 1.1.5.Q1 – 1.1.5.Q3

Questions 1.1.4 Q3 to 1.1.4.Q10 and questions 1.1.5 Q1 to 1.1.5.Q3 ask about the use of various modules and models as part of statistical weather, climate, and wildfire modeling.[7] It is unclear whether Energy Safety will be providing definitions for these different types of modules and models, or if they are to be defined by the utilities. For example, what is a "synoptic scale weather module?" We request clarification, perhaps in an Energy Safety workshop, to make sure stakeholders have similar understandings regarding these modules. Also, Energy Safety asks whether modeling software includes a large eddy scale weather module. We note that these models are very expensive to run across an entire service territory. Therefore, it may not be wise to judge maturity based on the large eddy scale weather module.

Questions 1.1.6.Q3, 1.1.6.Q6 & 1.1.6.Q7

In questions 1.1.6.Q3, 1.1.6.Q6, and 1.1.6.Q7, Energy Safety asks about model updates and whether they take place during the year a WMP is submitted or the following year.[8] These

[5] Draft Maturity Survey, p. 7.

[6] Draft Maturity Survey, p. 7.

[7] Draft Maturity Survey, pp. 12-15.

[8] Draft Maturity Survey, pp. 16-17.

questions are unclear and could result in disparate responses because models are typically developed a year before they are employed. In addition, it is unclear, based on the most recent draft WMP guidelines, whether a WMP update will be needed in 2024. We suggest that these questions be revised to focus on how often a utility routinely updates its models.

Questions 1.1.7.Q2 – 1.1.7.Q6 & 1.2.6.Q6

Questions 1.1.7.Q2 to 1.1.7.Q6 and question 1.2.6.Q6 seek to understand whether various types of model technical verification, performance data, and source code are made available to the public.[9] We suggest that public availability of this type of information should not be used to measure risk assessment maturity because some model/software information may be proprietary or belong to third parties. This fact does not cast doubt on the maturity of the models/software themselves or their results. Also, question 1.1.7.Q5 is unclear when it asks whether utilities "share relevant nonspatial data with the community." It is not apparent what constitutes "relevant" nonspatial data and what stakeholders constitute "the community." Therefore, we request that this question be clarified.

Questions 1.1.8.Q4 – 1.1.8.Q8 & 1.1.9.Q9

In questions 1.1.8.Q4 to 1.1.8.Q8 and question 1.1.9.Q9, Energy Safety asks about uncertainty in modeling and decision making and whether any uncertainties are known and documented.[10] We are concerned with these questions because identifying these types of uncertainties and related issues is not always possible with machine learning models. In addition, the statistical approach described in question 1.1.9.Q9 does not work for all models. Accordingly, maturity may not be accurately calculated when using models without these capabilities.

Questions 1.2.1.Q1, Q1.2.1.Q3 & 1.2.7.Q2

Questions 1.2.1.Q1, 1.2.1.Q3, and 1.2.7Q2, ask whether certain modeling capabilities or findings are automated and/or automatic.[11] It is unclear what Energy Safety means by these terms. Automatic or automated may mean that a certain finding or code is repeatable. While it may be possible to re-run a certain model with requested changes, that does not necessarily mean that model updates are run automatically. We request that these terms be clarified in these questions.

Questions 1.2.10.Q4 & 1.2.10.Q5

Energy Safety asks whether the utility models include injury and loss of life as potential outputs in questions 1.2.10.Q4 to 1.2.10.Q5.[12] We would like to confirm that these questions

[9] Draft Maturity Survey, pp. 19-20, 41.

[10] Draft Maturity Survey, pp. 21-22, 25.

[11] Draft Maturity Survey, pp. 28, 42.

[12] Draft Maturity Survey, p. 30.

refer to model outputs overall and not *every* model output. Not all models will result in an output prediction of injury or loss of life.

Questions 1.2.7.Q8, 1.3.8.Q8, 1.4.9.Q8, 1.6.8.Q8, 2.1.10.Q8 & 2.3.9.Q8

These six questions all ask the same question in relation to the questions preceding them: "If the answer to all previous questions is YES, the maturity in this subsection is 4."[13] We would appreciate any clarity on the purpose of these questions. Given the length of the survey, we wonder if these questions are necessary and whether they simply could be included as part of the instructions to their respective sections.

Questions 1.2.10.Q12 & 1.2.10.Q14

In questions 1.2.10 Q12 & 14, Energy Safety asks about wildfire and PSPS models and the use of ingress and egress and containment and suppression difficulty data.[14] In each question, Energy Safety asks about whether the identified information are "inputs" for the models. However, given the other questions within this portion of the Maturity Survey, it is unclear whether the words "input" should be "output" in each instance. We would like to confirm Energy's Safety's intention with these two questions.

Questions 2.2.1.Q1, 2.2.2.Q2, 2.2.2.Q10, 2.2.2.Q12 & 2.2.2.Q16

Each of questions 2.2.1.Q1, 2.2.2.Q2, 2.2.2.Q10, 2.2.2.Q12 and 2.2.2.Q16 asks about a utility's ability to generate short-term weather forecasts.[15] These questions define short-term weather forecasts as either a "3-10 days' time horizon" or "days to weeks," which could cause confusion since it deviates from the accepted definition in the scientific community. Therefore, we recommend that these questions be revised to use the accepted scientific definition of "short-term weather forecasts" or to change the language to refer to a longer time period. Per the National Weather Service (NWS) glossary, a short-term forecast is "a product used to convey information regarding weather or hydrologic events in the next few hours."[16]

Additionally, question 2.2.1.Q1 assumes that utilities should always generate their own forecasts, even though some forecasts are publicly available.[17] We recommend that this question be rephrased so that the word "generate" be replaced by the word "use" in the maturity level definitions so as to encompass the use of publicly available forecasts.

Question 2.2.2.Q3

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[13] Draft Maturity Survey, pp. 43, 61, 88, 116, 143, 197.

[14] Draft Maturity Survey, p. 32.

[15] Draft Maturity Survey, pp. 146-147, 149-151.

[16] *See* https://w1.weather.gov/glossary/index.php?word=short+term.

[17] Draft Maturity Survey, p. 146.

In question 2.2.2.Q3, Energy Safety seeks to determine whether a utility's "weather forecasting model inputs include local topography."[18] Given that local topography can refer to a broad scope of geographical features, we believe this question would benefit from clarifying what level of detail is intended by "local topography."

Question 2.2.4.Q5

Question 2.2.4.Q5 asks whether a utility's "databases of model inputs and outputs appropriately linked with each relevant electrical corporation database."[19] Due to its ambiguity, we believe this question could be improved by having the word "appropriate" defined in order to prevent potential variances in the utilities' responses.

Questions 2.2.5.Q1 – 2.2.5.Q7

Energy Safety seeks to understand, through questions 2.2.5.Q1 through 2.2.5.Q7, a utility's ability to generate accurate short-range forecasts through the use of ensemble weather modeling.[20] We would appreciate the opportunity to have a discussion around how the number of forecasts for each maturity level were determined (10, 30, 51, and 51, respectively).[21] We use an eight-member ensemble, which we believe is very mature but would be viewed unfavorably by these seven questions. We are surprised by the number of ensemble forecasts for each maturity level, particularly given the significant expense of conducting ensemble modeling.

Questions 2.2.9.Q2 – 2.2.9.Q6

These five questions, 2.2.9.Q2 through 2.2.9.Q6, seek to determine whether information on weather forecasting is being shared publicly.[22] However, given that a significant amount of this forecasting is done with the assistance of third parties and that this information may be proprietary and confidential, it may not be possible for it to be shared publicly. This is similar to the issues raised above for questions 1.1.7.Q2 to 1.1.7.Q6, and 1.2.6.Q6. Consequently, we believe these questions should not be included in the maturity survey given that they would not accurately assess utility maturity due to intellectual property constraints.

Questions 2.2.10.Q5, 2.2.10.Q7 & 2.2.10.Q8

Energy Safety, in questions 2.2.10.Q5, 2.2.10.Q7 & 2.2.10.Q8, looks to assess a utility's ability to perform short-range forecasts.[23] However, we believe the term "design percentiles" is

[18] Draft Maturity Survey, p. 147.

[19] Draft Maturity Survey, p. 153.

[20] Draft Maturity Survey, pp. 154-155.

[21] Draft Maturity Survey, pp. 154-155.

[22] Draft Maturity Survey, pp. 166-167.

[23] Draft Maturity Survey, pp. 168-169.

ambiguous and an explanation as to this term would likely lead to better answers to these questions by the utilities.

Question 2.2.11.Q7

Question 2.2.11.Q7 seeks information on annual blind model validation.[24] We would appreciate further clarity on this question as our subject matter experts do not believe this process is a standard in the weather model field.

Question 2.2.11.Q9

This question, 2.2.11.Q9, attempts to determine model performance on each key metric.[25] Given the potential ambiguity of the term "key metric," this question would benefit from clarity as to what is a "key metric," since this can encompass a broad variety of items and cause disparate responses from the utilities.

Question 2.3.1.Q4

Question 2.3.1.Q4 asks whether a utility shares its wildfire spread forecasting with the public.[26] However, we do not believe an agency such as Cal Fire would want us to share our internal fire forecasting with the public, as it may conflict with their own forecasting, cause confusion, and negatively impact public safety. Given this, we do not believe this would be an accurate gauge of a utility's maturity in this area.

Question 2.3.1.Q10

Energy Safety seeks to gather information about "discrepancies between wildfire spread forecasts and observations" in question 2.3.1.Q10.[27] Since the term "observations" is vague, we believe this question could be improved if the term were defined so as to prevent unintentional variation in the responses from the utilities.

Question 2.3.1.Q13

Question 2.3.1.Q13 requests information about weather forecasting automation requirements.[28] As with questions 1.2.1.Q1, 1.2.1.Q3, and 1.2.7Q2 above, we believe this question is unclear and could benefit from a more complete description in order to ensure the best possible responses.

Question 2.3.2.Q2

[24] Draft Maturity Survey, p. 171.

[25] Draft Maturity Survey, p. 172.

[26] Draft Maturity Survey, p.175.

[27] Draft Maturity Survey, p. 177.

[28] Draft Maturity Survey, p. 178.

This question, 2.3.2.Q2, asks about whether wildfire spread model inputs include local topography.[29] Given that the term "local topography" can mean a lot of things, we believe a definition of what is meant by "local topography" would be beneficial in order to obtain the best responses from the utilities.

Question 2.3.2.Q3 & 2.3.2.Q4

Questions 2.3.2.Q3 and 2.3.2.Q4 seek information about whether models include information on local vegetation types.[30] Given the broad scope of this term, we believe this question would benefit from a definition of what is meant by "local vegetation" to ensure standardization in answers.

Questions 2.3.2.Q8 - 2.2.3.Q12

Energy Safety seeks information on wildfire spread model inputs in questions 2.3.2.Q8 through 2.2.3.Q12.[31] However, given the cost of this work, we question whether requiring utilities to run these simulations is the most efficient use of resources and an accurate barometer of maturity.

Questions 3.2.1.Q1 – 3.2.1.Q11, 3.2.2.Q1 – 3.2.2.Q3 & 3.2.3.Q1 – 3.2.3.Q5

This series of questions requests information about asset inspections.[32] We would like clarity as to whether substation inspections should be included in these inspections. Additionally, as described above, we would appreciate clarification on how to respond to questions such as these that may require disparate answers from multiple groups, such as Transmission and Distribution.

Question 3.2.1.Q2

Question 3.2.1.Q2 seeks to determine the maturity of a utility's asset maintenance and repair program.[33] However, we disagree with the underlying premise that "lower inspection times between findings and maintenance are indicative of a more mature system."[34] There are many reasons why a particular finding may take a longer or shorter time to repair, such as supply chain issues or the complexity of the repair to be performed, and it is often uncorrelated with the maturity of the maintenance program.

[29] Draft Maturity Survey, p. 179.

[30] Draft Maturity Survey, pp. 179-180.

[31] Draft Maturity Survey, p. 181.

[32] Draft Maturity Survey, pp. 242-247.

[33] Draft Maturity Survey, p. 242.

[34] Draft Maturity Survey, p. 242.

Question 5.1.1.Q1

This question asks whether a utility automatically set the sensitivity of grid elements and protective equipment.[35] This question is unclear and conflate the engineering of the protective elements with remote programming (e.g., making a circuit EPSS capable for enablement). We believe clarification of this question would allow the utilities to better understand the intent of the question and whether it is focused on a utility's ability to remotely adjust settings based on real time conditions.

Question 5.1.1Q2 & 5.1.1.Q4

Questions 5.1.1Q2 and 5.1.1.Q4 seek to understand whether a utility has multiple sets of thresholds for grid elements and protective equipment, or thresholds assigned based on RFW and area-wide fuel moisture conditions.[36] These questions are unclear because they assume multiple thresholds are necessary. However, our EPSS criteria are based on our Fire Potential Index ratings, which incorporates thresholds for weather, dead fuel moisture, topography, and fuel model type conditions.

Question 5.1.1.Q5

This question, 5.1.1.Q5, asks whether grid elements and protective equipment thresholds are assigned to individual circuit segments.[37] Similar to questions 5.1.1.Q2 and Q4, we believe this question is unclear because our EPSS enablement criteria are not based on thresholds assigned to individual circuits, but rather on the Fire Potential Index ratings in the area a circuit is geographically located.

Question 5.1.5.Q1

Question 5.1.5.Q1 refers to the "fraction of the territory" where a utility incorporates protective equipment and device settings.[38] We feel this maturity survey question is ambiguous because our EPSS program covers circuits within our high fire risk areas which incorporates High Fire Threat Districts and High Fire Risk Areas.

Question 5.1.6.Q2

This question refers to the electric corporation having a predetermined protocol for determining the sensitivity of grid elements and protective equipment based on fire risk conditions.[39] Since our protective device settings are designed to be enabled under conditions

[35] Draft Maturity Survey, p. 322.

[36] Draft Maturity Survey, p. 322-323.

[37] Draft Maturity Survey, p. 323.

[38] Draft Maturity Survey, p. 329.

[39] Draft Maturity Survey, p. 330.

based on our Fire Potential Index criteria and thresholds it is unclear as to what is meant by "predetermined protocol."

Question 5.4.1.Q1

Question 5.4.1.Q1 asks for "the fraction of de-energized circuits that are inspected using automated processes (e.g. drones, LIDAR) prior to re-energization."[40] The term "automated processes" is ambiguous and could lead to unintentionally disparate responses. Although Energy Safety provided examples of drones and LiDAR as "automated processes," neither drones nor LIDAR are automated processes.[41] Our PSPS patrol and inspection processes include the use of patrol vehicles and aerial resources including helicopters and fixed wing planes. Post-PSPS event patrols and inspections cannot be automated and require experienced and trained field personnel to visually inspect potential hazards and damages caused by a significant wind event. Aerial patrols conducted by helicopters and fixed wing planes allow us to expedite the patrols and inspections, especially at locations that are difficult to access due to geographical and topographical challenges.

Question 6.3.1.Q2

This question seeks to determine whether a utility is able to "automatically communicate the location and extent of the wildfire perimeter to the Public and Public Safety Partners."[42] However, as described above, we do not believe Cal Fire and other government agencies want utilities to provide information on wildfire perimeters to the public, as this could cause confusion and safety issues if the information differs from that provided by Cal Fire.

Questions 6.3.4.Q10 – 6.3.4.Q12

Questions 6.3.4.Q10 to 6.3.4.Q12 seek to determine whether a utility notifies its customers about the perimeter of a wildfire.[43] Again, we do not believe Cal Fire and other government agencies want utilities to provide information on wildfire perimeters to the public, as this could cause confusion and safety issues.

Questions 6.3.4.Q14, 6.3.4.Q16 - 6.3.4.Q19, 6.3.4.Q22 & 6.3.4.Q29

These series of questions request information on various diverse issues including cyberattacks, loss of cell towers, and carriers redistributing communications.[44] For each of these, we do not believe a utility's maturity should be judged based on these criteria as it is not the place of an electric utility to provide this information, particularly during an emergency when resources should be focused on a utility's core energy services.

[40] Draft Maturity Survey, p. 353.

[41] Draft Maturity Survey, p. 353.

[42] Draft Maturity Survey, p. 391.

[43] Draft Maturity Survey, pp. 404-405.

[44] Draft Maturity Survey, pp. 405-409.

Question 6.5.1.Q7

This question, 6.5.1.Q7, seeks information about a utility's ability to provide "repair processing."[45] The term "repair processing" is ambiguous and clarifying this term will help create consistency in the responses from the utilities.

Questions 7.1.1 Q8, 7.3.1 Q12, and 7.4.1 Q5

Questions 7.1.1.Q8, 7.3.1.Q12, and 7.4.1.Q5, Energy Safety asks about the specific number of utility working relationships with community partners.[46] We agree that working relationships with community partners are important to addressing items of wildfire mitigation, especially when the mitigations affect Access and Functional Needs (AFN), medical baseline, and socially vulnerable populations. However, the number of working relationships is typically based on areas most impacted by wildfire mitigations, including PSPS events. Therefore, engagement will vary by location, and the same level of engagement may not exist with cities and counties outside the HFTD. Accordingly, we recommend that specific numerical thresholds should not be used across the service territory to evaluate maturity because this would not provide the best understanding of maturity.

Questions 7.3.1.Q1, 7.3.1.Q2, 7.3.1.Q6 & 7.3.1.Q13

In questions 7.3.1.Q1, 7.3.1.Q2, 7.3.1.Q6, and 7.3.1.Q13, Energy Safety asks about the utilities' efforts to identify and understand all AFN, medical baseline, and socially vulnerable populations in their service territories.[47] As stated above, we recognize that working with these groups is an essential part of our wildfire mitigation work. However, enrollment in the socially vulnerable and medical baseline programs is voluntary. Therefore, the utilities cannot confirm the identities of "all" the individuals in their service territories that fall into these groups. Responses to these maturity survey questions should be limited to the engagement with the self-identified members of these communities in order to obtain the most accurate responses from the utilities.

Question 7.4.1.Q9

Question 7.4.1.Q9 asks what percentage of community partners each utility establishes working relationships with, and provides support for, in conducting local wildfire mitigation planning.[48] It is unclear how each utility will be able to determine the percentage of community partners with which it has engaged because the total number of partners may be unknown or subject to different interpretations. Therefore, we suggest that this metric be modified to remove the percentage indicators, if possible, to increase the quality of the responses.

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[45] Draft Maturity Survey, p. 424.

[46] Draft Maturity Survey, pp. 437, 451, 458.

[47] Draft Maturity Survey, pp. 448-451.

[48] Draft Maturity Survey, p. 459.

Questions 7.5.1.Q1 - 7.5.1.Q8

Energy Safety asks questions about how the utilities benchmark with each other and share information about wildfire mitigation efforts in questions 7.5.1.Q1 to 7.5.1.Q8.[49] While we regularly meet with other utilities to discuss matters relevant to the WMP process, these questions are unclear because the term "benchmark" does not appear to be defined. The term may be subject to different interpretations and cause utilities' answers to be different. For example, does a particular process need to be adopted by another utility for "benchmarking" to have occurred? Or has benchmarking occurred when utilities have met together to discuss best practices? We request that the term "benchmarking" be clarified so that all stakeholders have the same understanding of the term.

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We greatly appreciate the opportunity to provide comments and feedback on this draft of the 2023-2025 Maturity Survey. Should you have any questions, please do not hesitate to contact the undersigned at jay.leyno@pge.com.

Very truly yours,

/s/ Jay Leyno

Jay Leyno

[49] Draft Maturity Survey, pp. 463-465.