



OFFICE OF ENERGY INFRASTRUCTURE SAFETY

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TRANSMITTED VIA ELECTRONIC MAIL

DATA REQUEST

Request Date: December 22, 2023

Response Due: January 8, 2024

To: Dan Blair (D7BD@pge.com)
Regulatory Relations Advocacy Manager
Pacific Gas and Electric (PG&E)
77 Beale St, Mail Code B23A San Francisco, CA 94105

Originator: Stefan C. Schonscheck
Research Data Specialist| Data Analytics Division |Analytics Unit|
Office of Energy Infrastructure Safety
Stefan.Schonscheck@energysafety.ca.gov

Data Request Number: Energy Safety-DR-EUP-23-01

Subject: Models and Metrics for Senate Bill (“SB”) 884

Request Number	Subject	Relevant SB 884 Clause
Q01.	Regarding PG&E’s framework for measuring risk landscape	8388.5 (C)(2) and (D)(2)
Q02.	Regarding PG&E’s models used to evaluate wildfire risk	8388.5 (C)(4) and (D)(2)
Q03.	Regarding PG&E’s models used to evaluate (D)(2) reliability risk	8388.5 (C)(4) and (D)(2)
Q04.	Regarding PG&E’s evaluations of the efficacy of undergrounding	8388.5 (D)(2)
Q05.	Regarding PG&E’s methods used to predict the cost of undergrounding projects	8388.5 (D)(2)
Q06.	Regarding PG&E’s evaluations of the efficacy of overhead hardening	8388.5 (D)(2)
Q07.	Regarding PG&E’s methods used to predict the cost of above ground hardening projects	8388.5 (D)(2)



Q08.	Regarding PG&E’s methods used to evaluate “other alternative mitigation strategy[s]” relevant to SB 884	8388.5 (C)(2)
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INSTRUCTIONS

- a. Provide all information in your possession, custody, or control, or the possession, custody, and/or control of your affiliates or agents, that is responsive to these data requests by the due date identified above.
- b. Responses and documents may be produced and served electronically, but they shall be fully machine-readable and searchable.
- c. If you have any questions about the meaning or scope of the data requests herein, direct such questions to the Energy Safety staff identified as the “Originator” of this request at your earliest opportunity.
 - i. Lack of clarity on meaning or scope of requests, without prior request for clarification from the “Originator,” will not be a permissible reason for incomplete responses and will be regarded as non-compliance with the request.
- d. Identify the personnel (employees, consultants, agents, etc.) who provided information responsive to each of the data requests below. As used in this context herein, “identify” means to provide the full name, business address, email, and title of each employee, consultant, or agent who provided such information.
- e. If you do not know the exact answer to any of the requests below, please indicate so and provide your best estimate.
- f. Provide data in its original format (i.e., PDF, Excel, GIS shapefile, etc.), unless otherwise specified in the request.
- g. Send your response to Stefan C. Schonscheck (Stefan.Schonscheck@energysafety.ca.gov), and include a copy to:
 - i. compliance@energysafety.ca.gov
 - ii. Jenni.Reed@energysafety.ca.gov
 - iii. Kristin.RalffDouglas@energysafety.ca.gov



REQUEST

Q01. Regarding Pacific Gas and Electric Company’s (“PG&E”) framework for measuring risk landscape

Please describe in a narrative format, PG&E’s methodology for evaluating risk with respect to wildfires and reliability that are relevant to California Public Utilities Code § 8388.5 (d)(2) (4-5 sentences each). Specify what risks are formally quantified and what metrics and outputs are used in model-informed decision-making. Additionally, list any SB 884-related risks that PG&E addresses through non-numerical techniques means.

Lastly, please include:

- a) An entity relation diagram of the system(s) used for quantifying wildfire risk.
- b) An entity relation diagram of the system(s) used for (d)(2) reliability risks.

Q02. Regarding PG&E’s models used to evaluate wildfire risk and consequence

Please provide a list of models used to evaluate wildfire risks and consequences. This list should be at least as granular as the entity relation diagram from **Q01.a**. Then, for each model, detail the following in a narrative format (2-5 sentences each):

1. **Model Usage** – The model’s scope, how often the model is invoked, and what subsections of the network are measured by this model. If multiple models are used to compute the same factors on different parts of the network, please describe them here.
2. **Model Type** – The model’s taxonomy, particularly the quantitative nature of the calculations. Also, comprehensively describe the computational costs of querying the model.
3. **Key Inputs** – The data that is fed into a calibrated model, including a description of the original data collection when applicable. These may be in summary form (e.g., the electrical corporation may list “equipment properties” rather than listing out equipment age, maintenance history, etc.). Training data should not be mentioned here.
4. **Model Solution** – The method used to calibrate, train, simulate, optimize, or implement the model from a mathematical standpoint. If the model is based on a learning algorithm, briefly describe the optimization procedure, including the training data.



5. **Model Outputs** – The data produced by the model is fed into other models or used by PG&E to make risk-related decisions. Please comment on the type of output (ex: distribution, average value, score, probability) as well as the spatial resolution (ex: per circuit, per segment, per county) and temporal resolution (ex: per day, per season, per year).
6. **Toy Problem** – Please describe 3 examples of data input/output using synthetic data. One input should lead to a low-risk (or low-probability, low-consequence) output, one for a medium-risk case, and one for a high-risk case. In each case describe the magnitude of the inputs and outputs.
7. **Shelf Life** – Describe the length or period of time the model is expected to be valid. Describe if/how the model is expected to be updated, both regarding new calibration data and new project input data. Describe if/when the model is expected to be retired or replaced by another model.

Q03. Regarding PG&E’s models used to (d)(2) reliability risks and consequences

Please provide a list of models used to evaluate (d)(2) reliability risks and consequences. This list should be at least as granular the entity level diagram from **Q01.b**. Then, for each model, describe the following:

1. **Model Usage** – The model’s scope, how often the model is invoked, and what subsections of the network are measured by this model. If multiple models are used to compute the same factors on different parts of the network, please describe them here.
2. **Model Type** – The model’s taxonomy, particularly the quantitative nature of the calculations. Also, comment on the computational costs of querying the model.
3. **Key Inputs** – The data that is fed into a calibrated model, including a description of the original data collection when appropriate. These may be in summary form (e.g., the electrical corporation may list “equipment properties” rather than listing out equipment age, maintenance history, etc.). Training data shall not be mentioned here.
4. **Model Solution** – The method used to calibrate, train, simulate, optimize, or implement the model from a mathematical standpoint. If the model is based on a learning algorithm, briefly describe the optimization procedure, including the training data.
5. **Model Outputs** – The data produced by the model is fed into other models or used by PG&E to make risk-related decisions. Please comment on the type of output (ex: distribution, average value, score, probability) as well as the spatial resolution (ex: per



circuit, per segment, per county) and temporal resolution (ex: per day, per season, per year).

6. **Toy Problem** – Please describe 3 examples of data input/output using synthetic data. One should input should lead to a low-risk (or low-probability, low-consequence) output. One for a medium-risk case and one for a high-risk case. In each case be sure to comment on the magnitude(s) of the inputs and outputs.
7. **Shelf Life** – What is the length or period of time the model expected to be valid? Describe if/how the model is expected to be updated, both regarding new calibration data and new project input data. Describe if/when the model is expected to be retired or replaced by another model.

Q04. Regarding PG&E’s evaluations of the efficacy of undergrounding

Please describe in a narrative format how PG&E values the efficacy of undergrounding a circuit in terms of wildfire and (d)(2) reliability risk models. Address which risk models described in **Q03** and **Q04** may be impacted by undergrounding projects. Specify which inputs and outputs to the risk models which may change after a circuit (or segment) is undergrounded and indicate the direction and scale of the expected change(s). Be sure to specifically detail how undergrounding a circuit affects ignition risk.

Q05. Regarding PG&E’s methods used to predict the cost of undergrounding projects

Please describe in a narrative format how PG&E predicts costs for undergrounding projects. Describe what basic units are used as inputs to the cost model and the resolution of the predictions. Additionally, describe the scope, frequency, and resolution of these evaluations. Lastly, comment on how these do or do not align with the frequency and resolution of risk model evaluations.

Q06. Regarding PG&E’s evaluations of the efficacy of aboveground hardening

Please describe in a narrative format how PG&E predicts costs for above ground hardening. Describe what basic units are used as inputs to the cost model and the resolution of the predictions. Additionally, describe the scope, frequency, and resolution of these evaluations. Lastly, comment on how these do or do not align with the frequency and resolution of risk model evaluations.

Q07. Regarding PG&E’s methods used to predict the cost of aboveground hardening

Please describe in a narrative format how PG&E predicts costs for aboveground hardening projects. Describe what basic units are used as inputs to the cost model and the resolution of



the predictions. Additionally, describe the scope, frequency, and resolution of these evaluations. Lastly, comment on how these do or do not align with the frequency and resolution of risk model evaluations.

Q08. Regarding PG&E’s methods used to evaluate efficacy and costs for “other alternative mitigation strategy[s]” relevant to SB 884

Please comment on any “alternative mitigation strategies” (California Public Utilities Code § 8388.5(c)(4)) including covered conductor, vegetation management, EPS and combinations of the above, which PG&E may consider in their 884 plan. When possible, please detail the modeled efficacy and cost predictions as in **Q04.** and **Q05.**

END OF REQUEST