

PACIFIC GAS AND ELECTRIC COMPANY
PG&E Ref. DRU15684-Case-EUP-SB 884
Data Request CPUC Safety Policy Division
Requester DR No. Wildfire Benefit Cost Analysis Tool Follow-up
(SPD-PGE-SB884-018)

Requester: Emrani, Amin
Request Date: May 05, 2025
Response Date: May 16, 2025

Question No. 001:

In PG&E's data request response titled "WMP-Discovery2026-2028_DR_SPD_001-Q024.pdf", PG&E's response to Question 24.e.iv states that "Public Safety Risk is based on PG&E's PCEEE Bowtie for distribution overhead assets. This total risk is allocated across primary overhead line miles and distributed to each circuit segment based on the primary overhead line miles therein."

- a. Explain why PG&E is incorporating a Public Safety component into a tool titled the "Wildfire Benefit Cost Analysis" tool.
- b. Is the Public Safety component of the WBCA Tool modular? Explain.
- c. Describe how PG&E intends to present the Public Safety component of the WBCA Tool in its EUP submission to Energy Safety.
 - i. Explain how the Public Safety component of the WBCA Tool will inform PG&E's calculation of:
 1. Ignition Risk
 2. Outage Program Risk
 3. Overall Utility Risk
 - ii. Use Figure 1 on pg. 13 and Figure 2 on pg. 33 of Energy Safety's 10-Year Electrical Undergrounding Plan Guidelines to explain where the Public Safety component of the WBCA will inform PG&E's EUP.

Response to Question No. 001 Response No. 001:

- a. The Wildfire Cost Benefit Analysis (WBCA) is aimed at providing circuit segment specific Cost Benefit Ratio (CBR) values by weighing the mitigation benefit against the mitigation cost estimate. PG&E's approach to calculating the CBR within the WBCA is consistent with the Risk-Based Decision Making Framework.

The Risk-Based Decision-Making Framework D.18-12-014, which was updated in December 2022 and subsequently in June 2024, outlines the approach for calculating CBR values. The requirements of the CBR approach are detailed in tables 'Step 1A – Building a Cost-Benefit Approach', 'Step 1B – Identify Risks for the Enterprise Risk Register', 'Step 2A – Risk Assessment and Risk Ranking in Preparation for RAMP', 'Step 2B – Selecting Enterprise Risks for RAMP' and 'Step 3 – Mitigation Analysis for Risks in RAMP.' These tables outline the requirement for the utility to develop CBRs of mitigations for risks in Enterprise Risk Register which summarizes the utility's main risks. As a result of these guidelines, PG&E determined Wildfire, Reliability - PSPS, Reliability - EPSS, Reliability - Normal Operation and Public

Safety Risk as corresponding to risks included in the Enterprise Risk Register.¹ These risks form the basis of the CBR calculation within the WBCA.²

- b. For the purpose of this question, PG&E interprets “modular” to be an element of the calculation, which could be disaggregated from the analysis.

Yes, Public Safety could technically be disaggregated from CBR calculations. However, if Public Safety risks were to be excluded, the resulting CBR would no longer be compliant with D.18-12-014 as the resulting CBR value would not incorporate all enterprise risks identified by PG&E (Wildfire, Reliability - PSPS, Reliability - EPSS, Reliability - Normal Operation and Public Safety Risk) as required by D.18-12-014.

- c. Public Safety as defined in PG&E’s Public Contact with Intact Energized Electrical Equipment (PCEEE) Bowtie model is currently included in the CBR calculations in the WBCA model as per the CPUC requirements in the Risk Based Decision Making Framework.
 - i. PCEEE Public Safety Risks do not inform the Ignition Risk, Outage Risk or Overall Utility Risk calculations.
 - ii. Public Safety is included in the Project Comparison diamond of Screen 2 and the CBR recalculation step in Screen 4 of *Figure 1: Project Acceptance Framework Flowchart* as this corresponds to the CBR calculations. See below figure which highlights the relevant process steps within the EUP project acceptance framework.

Figure 2: Example Enterprise Diagram for Risk Modelling Methodology illustrates the risk modeling methodology for overall utility risk. The PCEEE Public Safety Risks do not inform Overall Utility Risk calculations and therefore it is not included in Figure 2.

Please note that the response above describes PG&E’s current approach to incorporating Public Safety into the WBCA tool, but this approach is subject to change until our final Electric Undergrounding Plan (EUP) is submitted to Energy Safety.

¹ Wildfire, Reliability - PSPS, and Reliability – EPSS belong to Wildfire with PSPS and EPSS risk in PG&E’s ERR; Reliability - Normal Operation belongs to Failure of Electric Distribution Overhead Assets (DOVHD) risk in the ERR; and Public Safety belongs to the Public Contact with Intact Energized Electrical Equipment (PCEEE) risk in the ERR.

² R. 20-07-013, [Appendix A: Risk Based Decision Making Framework](#)

Figure 1. Project Acceptance Framework Flowchart

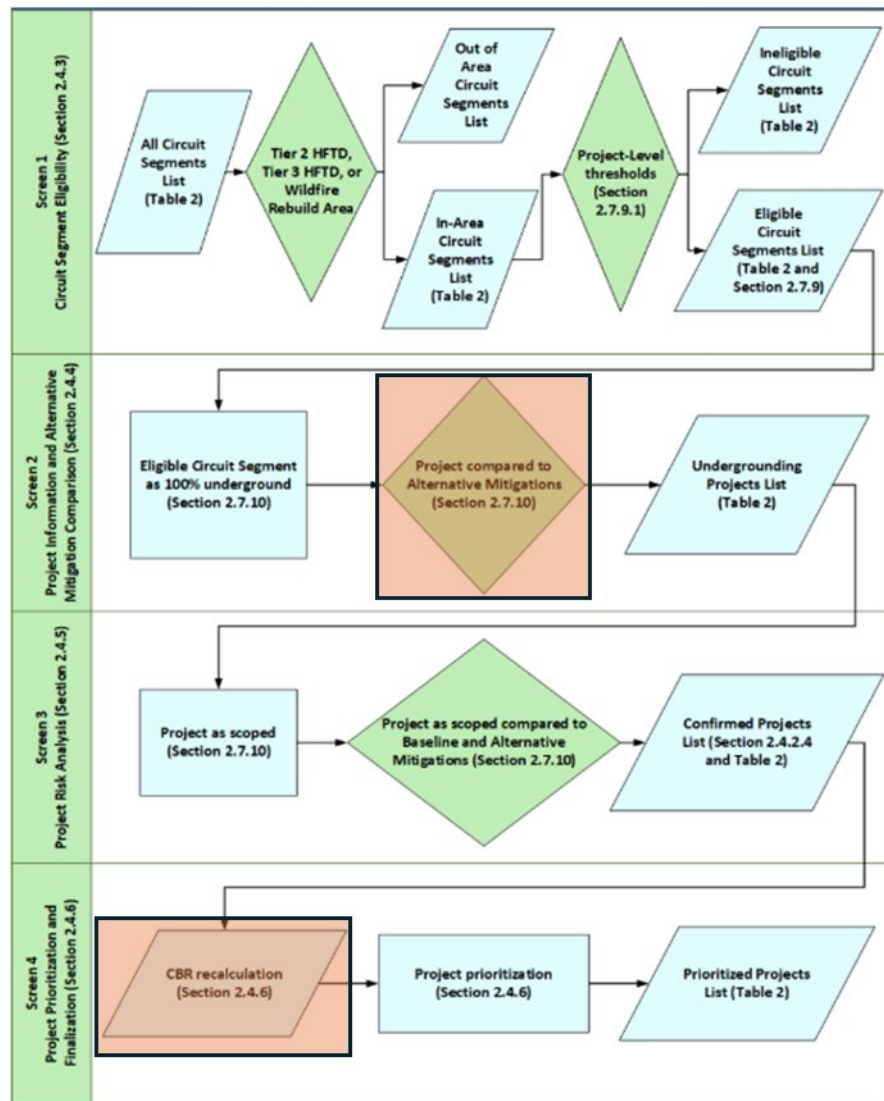
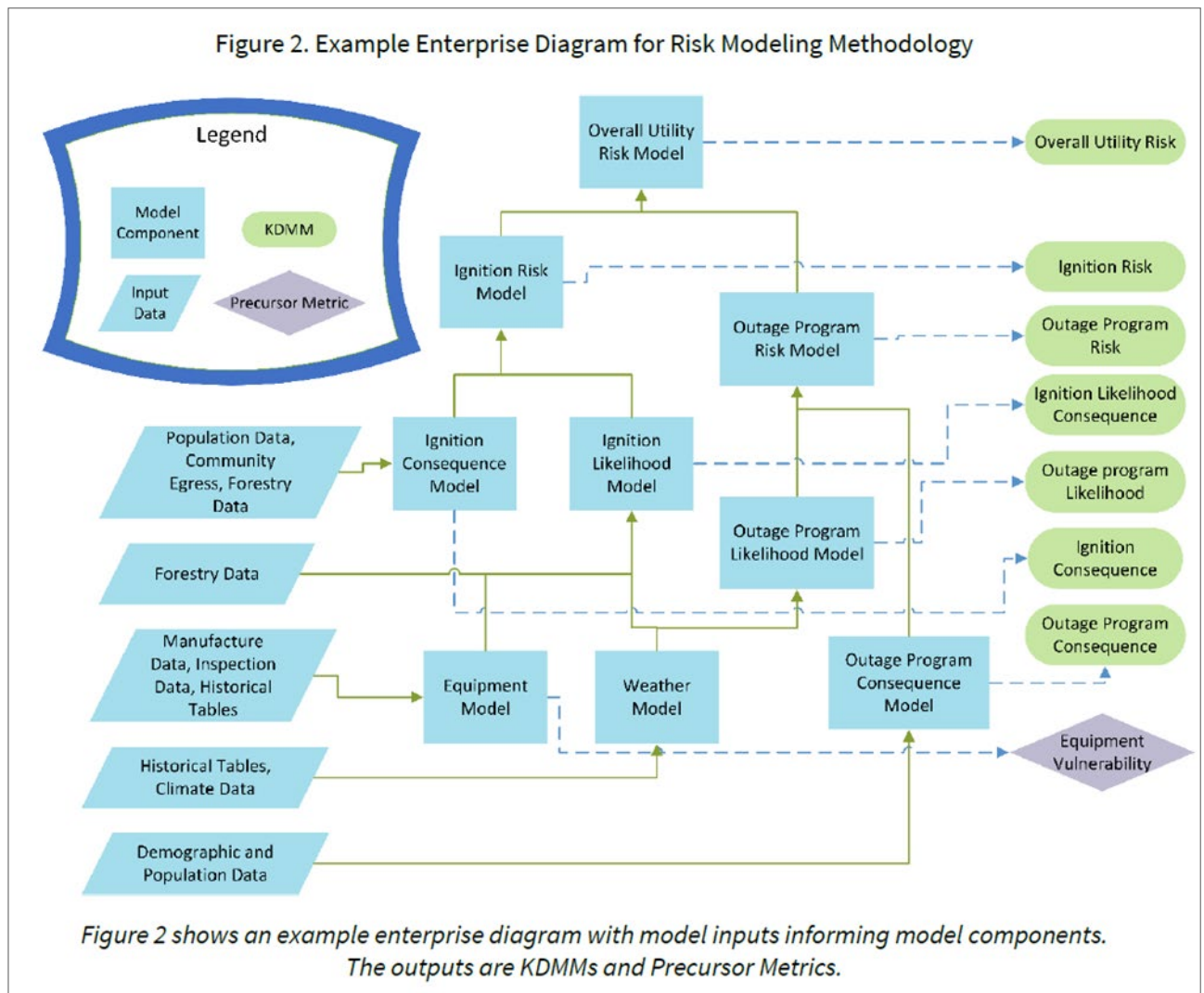


Figure 1 illustrates the Project Acceptance Framework process.



Question No. 002:

Does the PCEEE Risk Bowtie and the WLD FR Risk Bowtie share overlapping drivers?

- a. In an excel spreadsheet, provide a list of the PCEEE and WLD FR drivers. Note which are overlapping and which are not.
- b. For the overlapping drivers note which are mutually exclusive and which are not.
 - i. For each set of overlapping drivers that are not mutually exclusive, provide a narrative explanation as to why they are not and how PG&E addresses this issue in the WBCA Tool; provide a mathematical proof to support this narrative explanation.
 - ii. For each set of overlapping drivers that are mutually exclusive, provide a narrative explanation for how PG&E determined that the overlapping drivers are mutually exclusive. Provide evidence for each overlapping set of drivers discussed.

Response to Question No. 002 Response No. 001:

The PCEEE and WLD FR Risk Bowties do not share any of the same drivers. There is potential for overlap between similar drivers, however, consequences do not overlap. For example, a PCEEE event which results in an ignition could be associated with both PCEEE and WLD FR. However, the Serious Injuries or Fatalities (SIFs) associated with contact of energized conductors would be assigned to PCEEE and the ignition would be assigned to WLD FR.

- a. Please see attachment “*DRU15684_EUP_SPD-PGE-SB884-018_DR_CPUC_D001-Q002Atch01.xlsx*” for a list of the PCEEE Risk Bowtie Drivers and WLDR Risk Bowtie Drivers. As noted above, there is no overlap of consequences between the two risks, however, the attachment outlines a potential mapping between drivers which could be associated with the same event.
- b. The consequences of drivers in PCEEE and WLDR are all mutually exclusive.

Question No. 003:

In PG&E’s data request response titled “WMP-Discovery2026-2028_DR_SPD_001-Q026.pdf”, PG&E’s response to Question 26.a.i states that “Starting this year, the inputs of PG&E’s WBCA are being used to inform the cost-benefit analysis for scoping using the System Hardening Project Scoping Decision Tree and Process (shown in Figures PG&E-8.2.1-1, PG&E-8.2.1-2, and PG&E-8.2.1-3) for work that will be completed in 2027, and included in our Test Year 2027 GRC and our EUP.”

- a. Using Figures PG&E-8.2.1-1, PG&E-8.2.1-2, and PG&E-8.2.1-3 from PG&E’s 2026-2028 Base Wildfire Mitigation Plan, demonstrate where in each step PG&E will use the WBCA.
- b. For each location where PG&E intends to use the WBCA as presented in its response to Question 3a., provide a detailed description of how the WBCA will be used.
- c. For each location where PG&E intends to use the WBCA as presented in its response to Question 3a., explain if, and if so how, the Public Safety component of the WBCA will inform PG&E’s decision at that location.

Response to Question No. 003 Response No. 001:

- a. PG&E is not using the WBCA tool to scope the 2027 projects. As indicated in our “*DRU15548_EUP_SPD-PGE-SB884-017_DR_CPUC_D001.pdf*” response, the WBCA tool is still in its final stages of development and will not be used until we are selecting projects to be used and useful in the first year of an approved EUP. Starting this year, inputs of the WBCA tool will be used to inform the cost-benefit analysis completed in the decision tree. The System Hardening Project Scoping Decision tree (Figures 8.2.1-1, 8.2.1-2, 8.2.1-3) steps that use the WBCA inputs have been outlined in red in the figures below.

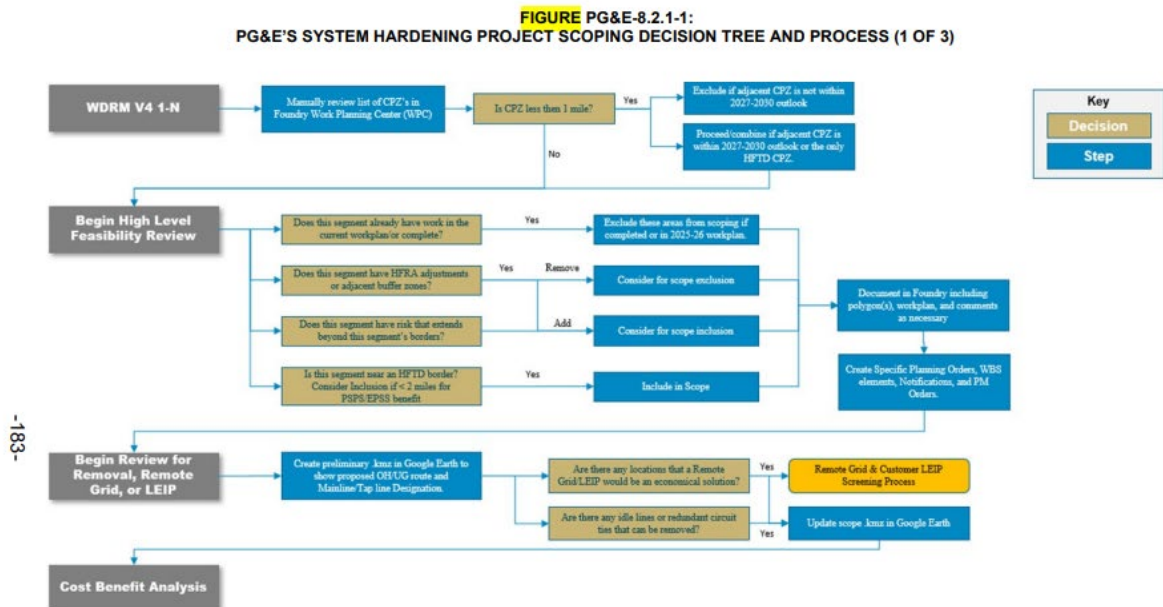


FIGURE PG&E-8.2.1-2:
PG&E'S SYSTEM HARDENING PROJECT SCOPING DECISION TREE AND PROCESS (2 OF 3)

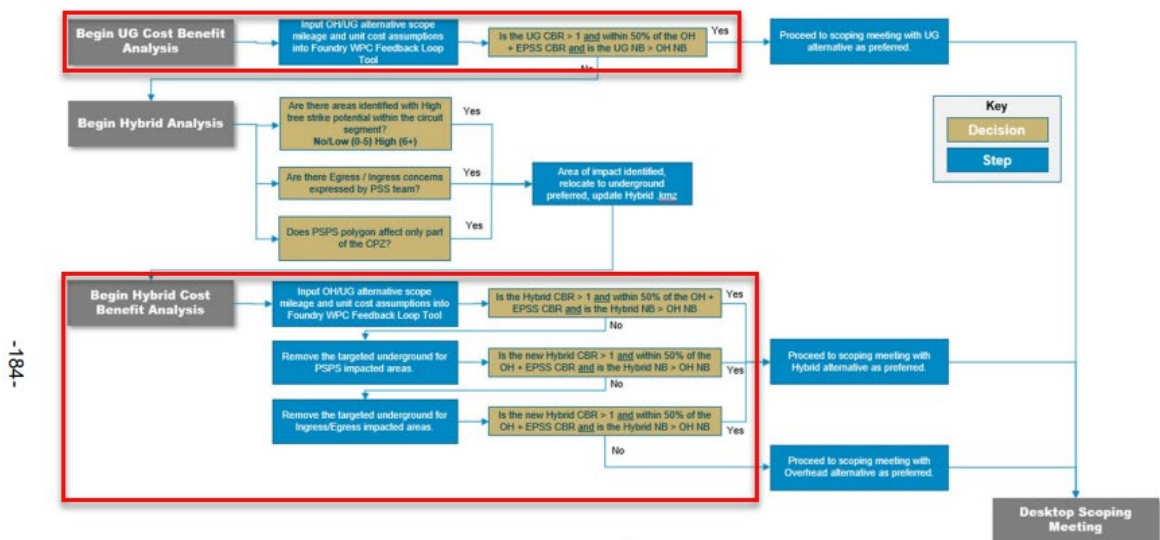
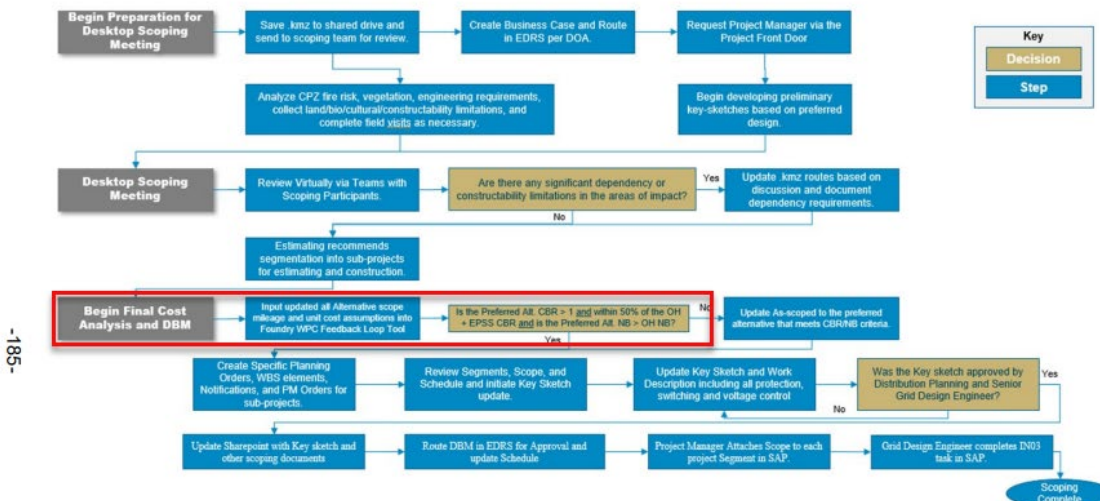


FIGURE PG&E-8.2.1-3:
PG&E'S SYSTEM HARDENING PROJECT SCOPING DECISION TREE AND PROCESS (3 OF 3)



- b. PG&E is not using the WBCA tool to scope the 2027 projects. As indicated in our “*DRU15548_EUP_SPD-PGE-SB884-017_DR_CPUC_D001.pdf*” response, the WBCA tool is still in its final stages of development and will not be used until we are selecting projects to be used and useful in the first year of an approved EUP.
- c. The Public Safety component is one of several inputs in the WBCA, specifically it is part of the cost benefit analysis. Public safety is one of the key risks identified in the Enterprise Risk Register. Together with Risk Attributes, these Risks form the basis for compiling mitigation benefits and mitigation costs within the CBR calculation.

Question No. 004:

In PG&E’s data request response titled “WMP-Discovery2026-2028_DR_SPD_001-Q026.pdf”, PG&E’s response to Question 26.c states that “For work planned for completion in 2027, we are using the decision tree (Figures PG&E-8.2.1-1, PG&E-8.2.1-2, and PG&E-8.2.1-3) in the 2026-2028 Base

WMP. This updated decision tree includes the Cost Benefit Ratio (CBR) and Net Benefit (NB) criteria as we revise our strategies to meet the requirements of the Electrical Undergrounding Plan (EUP). PG&E anticipates transitioning the undergrounding program to the EUP for 2028 and may need to adapt the project selection approach described in the decision tree outlined above to align with the final EUP guidelines and approval conditions after the EUP is approved and goes into effect.”

- a. Now that Energy Safety’s final EUP guidelines have been approved, what aspects of the decision trees need to be updated? Explain why.
 - i. If they need to be updated, how will that affect the WBCA Tool?
- b. How does the WBCA Tool incorporate the five “Conditions for Approval of Plan Costs” from SPD-15?
 - i. How do the five “Conditions for Approval of Plan Costs” from SPD-15 inform the decision-tree in Figures PG&E-8.2.1-1, PG&E-8.2.1-2, and PG&E-8.2.1-3 in the 2026-2028 Base WMP?
 - ii. SPD-15 includes the following condition “The average recorded CBR for all projects completed in any given two-year period (the current year, and the prior year) must equal or exceed the approved threshold CBR value for the current year.” Explain how the WBCA supports PG&E’s ability to demonstrate whether or not the EUP meets this condition.
 - iii. How does the calculation of Net Benefit within the WBCA Tool relate to the requirements and conditions within SPD-15?
 - iv. SPD-15 includes the following condition “Any further reasonable conditions supported by the record of the proceeding and adopted by the Commission in the Phase 2 Decision.” If a Phase 2 Decision were to adopt any additional conditions, how would the WBCA Tool incorporate those conditions?

Response to Question No. 004 Response No. 001:

- a. PG&E does not need to make changes to the WBCA based on the EUP technical guidelines adopted by Energy Safety in February 2025. However, we may need to adapt the decision tree based on the pending Energy Safety compliance guidelines, the EUP Phase 1 decision, updates to the CPUC cost recovery guidelines (SPD-15) and the CPUC Phase 2 decision.
 - i. The WBCA is not dependent on the decision tree. Rather, the WBCA informs our alternative mitigation evaluation, but does not impact the process outlined in the decision tree.
- b. The five Conditions for Approval of Plan Costs are:
 - (1) an annual cost cap for costs booked to the one-way balancing account;
 - (2) requiring all third-party funding received be applied to reduce the annual cost cap for the years in which third-party funding is received;
 - (3) establishing an annual unit cost cap condition for costs booked to the one-way balancing account to be evaluated based on a two-year average recorded unit cost for that year and the prior year;
 - (4) establishing an annual CBR condition for costs booked to the one-way balancing account be evaluated based on a two-year average recorded CBR for that year and the prior year; and
 - (5) any other conditions the Commission deems appropriate.
 - i. The five conditions for approval of plan costs do not directly inform the decision tree in Figures PG&E-8.2.1-1, PG&E-8.2.1-2, and PG&E-8.2.1-3 in the 2026-2028 Base WMP. Rather, PG&E considers *forecast* project costs and *forecast* project CBRs when evaluating mitigation alternatives. Third-party funding and annual costs are not considered as part of the process described by the decision tree.
 - ii. PG&E intends to use the WBCA as part of its decision-making process for evaluating mitigation alternatives based on forecast CBRs. After projects are complete PG&E will calculate and record the actual CBR based on final project costs and final risk reduction.

- The recorded CBR for each project will be used to calculate the two-year average recorded CBRs. This calculation will be done outside of the WBCA.
- iii. Net Benefit is an additional data point PG&E intends to consider when we evaluate mitigation alternatives. While Net Benefit is not one of the five conditions for recovery set forth in SPD-15, it is aligned with the fundamental goals of selecting projects that significantly reduce ignition and reliability risk and are cost efficient, which was discussed in PG&E's responses to Safety Policy Division's Post-Workshop Questions for Stakeholders Regarding the CPUC SB 884 Guidelines (pg. 11). PG&E noted that the Commission has stated that "the utility is not bound to select its mitigation strategy based solely on the CBRs produced by the Cost-Benefit Approach,"³ which supports PG&E's use of CBR plus other factors to select mitigation alternatives. PG&E considers multiple factors in selecting alternatives because an over-emphasis on CBR devalues projects that are both high cost and high benefit. CBR does not consider the absolute benefits and holistic value of permanent risk mitigation and, when used as the sole criteria, results in situations where significant risk is permanently left on the system, including on circuit segments where the benefits of undergrounding are greater than those of overhead hardening.
 - iv. PG&E will have to evaluate any other conditions that are adopted and then determine if we would use the WBCA to demonstrate compliance with those conditions or if we would use a different tool or approach.

Question No. 005:

In PG&E's data request response titled "WMP-Discovery2026-2028_DR_SPD_001-Q026.pdf", PG&E's response to Question 26.d states that "The final WBCA tool that will be used for the purpose of calculating cost-benefit ratios and that will meet the EUP requirements is not complete. The methodology, tool development and input values are being finalized, before quality assurance can be completed. The final version of the WBCA tool will be used for project selection for the 2027 GRC and the upcoming EUP."

- a. Provide a timeline for when the WBCA will be complete.
- b. Provide a timeline for when PG&E intends to submit an EUP to Energy Safety.

Response to Question No. 005 Response No. 001:

- a. PG&E anticipates that the WBCA will not be fully completed until updates to the CPUC cost recovery guidelines (SPD-15), the EUP Phase 1 decision, and the CPUC Phase 2 decision are issued. However, it is expected that a functional version of WBCA will be available in July 2025 using available data and assumptions based on Resolution SPD-15 issued March 8th, 2024.
- b. The timeline for which PG&E intends to file the EUP is dependent upon when Energy Safety issues final compliance guidelines and when the CPUC updates its cost recovery guidelines (SPD-15) to more closely align to the final Energy Safety EUP guidelines (referred to as Resolution SPD-15 2.0).

PG&E's preferred approach was to complete the undergrounding work authorized in the 2023 GRC in December 2026 and begin cost recovery for undergrounding work via an approved EUP in January 2027. However, final Energy Safety EUP Guidelines were issued much later than

³ Decision (D.) 22-12-027, Appendix A, Row 26.

expected and have pushed back the feasible timing for PG&E to submit the EUP. As a result, based on the information that is currently available (i.e., pending revisions to SPD-15 and issuance of Energy Safety compliance guidelines), PG&E intends to file its EUP in 2025 (at the earliest), which means EUP approval would not occur until mid to late 2027, at the earliest.

If final Energy Safety Compliance Guidelines and CPUC Resolution SPD-15 2.0 are delayed, PG&E estimates filing its EUP 3 to 9 months after both guidelines are issued, which varies based on the uncertainty in the scope of the final guidelines.

Question No. 006:

In PG&E's data request response titled "WMP-Discovery2026-2028_DR_SPD_001-Q024.pdf", PG&E's response to Question 24.c, PG&E states that "PG&E relies on a convex scaling function in its analysis, as detailed in its 2024 RAMP application. PG&E will also be able to provide supplemental Risk-Adjusted Attribute Levels based on using a linear scaling function with the WBCA; however, linearly scaled values are not used to calculate CBRs in the tool."

- a. Explain why the WBCA tool is incapable of providing supplemental CBRs that are informed by the supplemental Risk-Adjusted Attribute Levels based on using a linear scaling function. What prevents the WBCA tool from making this calculation?
- b. Explain how the WBCA tool's use of a convex scaling function will inform PG&E's EUP submission to Energy Safety.
- c. In an Administrative Law Judge Ruling dated April 22, 2025 in the PG&E 2024 RAMP Proceeding (A.24-05-008), PG&E was directed to conduct a parallel risk evaluation using a risk-neutral, linear scaling function in preparation for PG&E's 2027 GRC Rate Case. Since the WBCA tool uses a convex scaling function, explain how PG&E will use the WBCA tool when complying with the Administrative Law Judge Ruling.

Response to Question No. 006 Response No. 001:

- a. The WBCA is not incapable of providing supplemental CBR values using a linear scaling function. In response to WMP-Discovery2026-2028_DR_SPD_001-Q024, Question 24(c) we said:

PG&E relies on a convex scaling function in its analysis, as detailed in its 2024 RAMP application. PG&E will also be able to provide supplemental Risk-Adjusted Attribute Levels based on using a linear scaling function with the WBCA; however, linearly scaled values are not used to calculate CBRs in the tool.

While the WBCA is currently set up to calculate CBRs using a non-linear scaling function, it can be modified so that we can produce CBRs using both a non-linear and linear scaling function.

- b. PG&E currently plans to use a non-linear scaling function to calculate CBRs in the WBCA. We will then report these CBRs in our EUP submittal to Energy Safety. Specifically, CBRs will be reported in: (1) the CPUC SPD-15 Data Appendix 1 that is provided to Energy Safety when the EUP is submitted (Energy Safety Guidelines, Section 2.4.4); (2) Table C.11 (Screen 2 Table); (3) Table C. 13 (Screen 3 Table); and (4) Table C.15 (Project Index Table).

PG&E also plans to incorporate a non-linear scaling function in its Net Benefit calculation. Net Benefit will inform PG&E's mitigation alternative decision-making process. PG&E's System

Hardening Project Scoping Decision Tree and Process is provided in our 2026-2028 Base WMP, R0, Figure PG&E-8.2.1-1.

Please note that the response above describes PG&E's current approach to the WBCA tool's use of a convex scaling function, but this approach is subject to change until our final EUP is submitted to Energy Safety.

- c. PG&E will comply with the Administrative Law Judge's Ruling in PG&E's 2024 RAMP that directs PG&E to conduct a parallel risk evaluation using a risk-neutral, linear scaling function in preparation for our Test Year 2027 GRC. In our GRC we will report CBRs for mitigation and control programs using a risk-neutral scaling function to aid in understanding the impact of the linear scaling function. While we will report the CBR values using a non-linear scaling function, PG&E will not use these CBR values in our decision-making because 1) risk-neutral scaling is ill-suited to capture catastrophic outcomes, 2) risk-neutral attitude does not consider the possibility of ruin or irrecoverable harm from catastrophic risks, 3) there is no evidence to suggest that our customers are risk-neutral while there are a wide range of evidence that risk-averse attitude is reasonable as demonstrated in PG&E's 2024 RAMP. Phase 2 Risk OIR Decision (D.22-12-027) allows utilities to use a non-linear scaling function when calculating CBRs. SPD reviewed the non-linear scaling function PG&E uses in calculating CBRs as part of its evaluation of our 2024 RAMP and stated:

PG&E constructed a new risk-averse risk scaling function based on risk premium ratios calculated from insurance products or catastrophe bonds it purchases to transfer risks associated with low-frequency, high-consequence events to reinsurers and the capital market. SPD evaluated this approach and concluded that it is valid. (Safety Policy Division Evaluation Report on PG&E 2024 RAMP Application (A.24-05-008), pg. 3.)

Question No. 007:

In an Administrative Law Judge Ruling dated April 22, 2025 in the PG&E 2024 RAMP Proceeding (A.24-05-008), PG&E was directed to provide a parallel reliability cost calculation using the disaggregated approach recommended in the SPD Evaluation Report on PG&E's 2024 RAMP Application in preparation for PG&E's 2027 GRC Rate Case. Will PG&E use the Interruption Cost Estimator Calculator 2.0 when it presents its disaggregated approach in PG&E's 2027 GRC Rate Case?

- a. When does PG&E anticipate completing and submitting its parallel reliability cost calculation in PG&E's 2027 GRC Rate Case?
- b. Does PG&E intend to use the Interruption Cost Estimator Calculator 2.0 to inform decision-making in its EUP?

Response to Question No. 007 Response No. 001:

Yes, PG&E will use the Interruption Cost Estimator Calculator 2.0 in the disaggregated approach.

- a. PG&E anticipates completing the calculation by June 20, 2025 as stated in PG&E's 2027 GRC Application, Exhibit (PG&E-2), Chapter 1: *"On April 22nd, 2025, the ALJ assigned to PG&E's 2024 RAMP docket issued a ruling that required PG&E to provide cost benefit analysis based on the disaggregated (and optionally, aggregated) approach to Electric reliability values. Concomitantly, in late April 2025 LBNL released version 2.0 of the ICE Calculator for Phase 1 utilities. Accordingly, and consistent with D.22 12 027 OP 2(b), PG&E will provide the analysis*

required in the ALJ Ruling utilizing the “most current version” of ICE Calculator (i.e., version 2.0, Phase 1) by June 20th, 2025, as directed.”

- b. Yes, PG&E intends to use ICE 2.0 to inform decision-making into its EUP.