Pacific Gas and Electric Company

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BY ENERGY SAFETY E-FILING

Caroline Thomas Jacobs, Director
Office of Energy Infrastructure Safety
California Natural Resources Agency
715 P Street, 15th Floor
Sacramento, CA 95814

Re: Reply Comments of Pacific Gas and Electric Company on its 2026-2028 Wildfire Mitigation Plan
Docket: *2026-2028-WMPs*

Dear Director Thomas Jacobs:

On May 23, 2025, four stakeholders submitted comments on Pacific Gas and Electric Company (PG&E) 2026-2028 Wildfire Mitigation Plan (WMP).[1] We submit these reply comments addressing specific issues raised by these four stakeholders. Please note that, while we did our best to address the important issues raised in the opening comments, given the length of the comments received and the limited time for reply comments, we were not able to address all the issues raised. Should the Office of Energy Infrastructure Safety (Energy Safety) or the commenting parties wish to meet to discuss any issues raised in the opening or reply comments, we would be happy to do so.

I. PG&E'S SYSTEM HARDENING AND MITIGATION SELECTION PROCESSES PROPERLY EVALUATE ALL POTENTIAL MITIGATIONS

GPI, MGRA, and TURN commented on our system hardening decision-making and prioritization in the 2026-2028 WMP, where they assert that our grid hardening selection process is biased towards undergrounding and fails to properly assess alternative mitigations such as covered conductor combined with Enhanced Powerline Safety Settings (EPSS) and Public Safety Power Shutoffs (PSPS).[2]

We strongly disagree that our process is biased. Our 2026-2028 WMP incorporates multi-variable risk modeling, local conditions, constructability, and both cost and timeline factors. We continue to implement hybrid solutions that combine overhead and underground options where appropriate. Our decision-making is guided by a process that is rooted in data, consistent with regulatory guidance, and designed to provide the greatest long-term safety and reliability benefit for each unique circuit condition.

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[1] The Green Power Institute (GPI), The Utility Reform Network (TURN), the Rural County Representatives of California (RCRC), and the Mussey Grade Road Alliance (MGRA).

[2] GPI Opening Comments at 33-44; MGRA Opening Comments at 59-67; and TURN Opening Comments at 2-5.

A. PG&E's Decision Tree Appropriately Selects Mitigations with the Highest Absolute Risk Reduction, Addresses Specific Risks Based on Location, and Sufficiently Considers Alternate and Combination Mitigations

TURN, MGRA, and GPI argue that our decision tree is flawed because it starts with undergrounding as the preferred mitigation if the cost-benefit ratio (CBR) is above 1 and is within 50% of the highest alternate CBR.[3] This is not a flaw. This decision tree is applied to the highest wildfire risk circuit segments and is designed to select the mitigation with the highest absolute risk reduction. This approach reflects our stance that maximum risk reduction should be our starting point, and that CBR should be a factor in that decision-making process, but not the only factor.

We acknowledge that the 50% CBR requirement was discretionary, but that is not to say it was arbitrary, as TURN claims.[4] We determined the 50% figure to be consistent with our prior selection methodology and to enable the selection of mitigations that address the specific risks for that circuit segment and location.[5] Computational models cannot always adequately quantify qualitative engineering concerns such as ingress and egress risk. Thus, those risks must be included in the decision tree, and the CBR requirement must be set so that those risks can be considered and mitigated. Establishing a band of flexibility around the initially calculated CBR for different mitigations is an appropriate method for the entire decision tree to incorporate location-specific factors when selecting the ultimate mitigation for a circuit segment. Some of the parties contend that the decision tree should start with a binary CBR threshold in favor of mitigation with the highest CBR.[6] We disagree because, as we work to mitigate wildfire risk, we cannot be blindly limited by just a single factor, CBR. By its nature, CBR skews towards projects with lower upfront costs, but that tends to drive selection of projects with lower permanent risk reduction and higher on-going maintenance costs. In order to mitigate the most wildfire risk in High-Fire Threat Districts (HFTD) on the highest risk circuits, establishing an allowable undergrounding CBR within 50% enables us to consider the magnitude of the absolute risk reductions of the mitigation alternatives.

We also disagree with the parties' argument that we are not sufficiently considering alternate mitigations, and combinations of mitigations in particular.[7] We are currently preparing our 10-year Electrical Undergrounding Plan (EUP), and the WMP decision tree reflects many of the priorities and requirements identified by Energy Safety and the California Public Utilities Commission (CPUC) Safety Policy Division (SPD) in the EUP-related guidelines, including the requirement to consider at least three alternate mitigations to undergrounding. As such, our decision tree does include comparison of multiple mitigations, including combinations of

[3] MGRA Opening Comments at 60-61; TURN Opening Comments at 2-4; GPI Opening Comments at 35 & 38-40.

[4] TURN Opening Comments at 5.

[5] PG&E 2023-2025 WMP R8 (Feb. 13, 2025), Figures 23-05-6A and 6B, at 431-433.

[6] TURN Opening Comments at 5.

[7] GPI comments that "[a]t least two, and preferably three, alternative mitigation portfolios should be developed to directly compare the resulting residual reliability risk, wildfire risk, and total cost." GPI Opening Comments at 43. Similarly TURN comments that "PG&E continues to make insufficient use of combined mitigation efforts." TURN Opening Comments at 1.

mitigations and the holistic combination of covered conductor and Enhanced Powerline Safety Settings (EPSS) and Public Safety Power Shutoff (PSPS) events. Where party comments relate to elements of the decision tree informed by Senate Bill 884 and EUP regulatory guidance, it is more appropriate and efficient for this discussion to be conducted in Energy Safety's EUP proceeding after submission of the EUP.

B. While EPSS and PSPS are Effective Wildfire Mitigation Methods, they Should Not Be Considered Permanent or Long-Term Strategies

TURN comments that we should consider operational initiatives (i.e., EPSS and PSPS) as long-term wildfire mitigation strategies because of their risk reduction effectiveness.[8] We agree with TURN on the success of our operational initiatives in reducing wildfire risk. However, we do not agree that a mitigation with such significant reliability impacts to our customers should be relied upon as a long-term wildfire mitigation strategy. We do not view operational mitigations as long-term solutions because, like SDG&E, we have a goal of eliminating risk, not simply managing it.[9] As noted by RCRC, despite the safety and operational benefits, there are significant difficulties for customers resulting from PSPS and EPSS events, and these impacts are disproportionately experienced by rural communities.[10] This concept is codified in the California Public Utilities Code, which requires all utilities to provide both "safe and reliable service."[11] In furtherance of this goal, the CPUC recently opened a rulemaking focused on the reliability of electrical distribution systems.[12] We are committed to improving and implementing long-term solutions that prioritize both reliability and safety. While PSPS and EPSS undoubtedly enhance safety, it is equally indisputable that these programs have a detrimental impact on reliability for our customers and, thus, should not be considered permanent mitigations.

TURN also requests that PG&E "clarify whether its PSPS consequence calculations incorporate the presence of facility backup power" and seems to suggest that outage program consequences should be considered less impactful, and therefore weighted less, for critical customers (CC1) who have backup power. [13] We disagree with this characterization. While backup generators may be able to keep the lights on in a medical facility, for example, a PSPS outage for that facility could result in delays in critical treatments or life-saving surgery. It would be neither possible nor reasonable for us to calculate PSPS impacts differently for every customer depending on whether or how much back-up generation they may have for any particular outage event.

C. PG&E's Covered Conductor Effectiveness Data Is Robust and Reflects the Highly Specific Characteristics of its Service Territory

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[8] TURN Opening Comments at 9-10.

[9] SDG&E 2026-2028 WMP R0 (May 2, 2025) at 9.

[10] RCRC Opening Comments at 2-3.

[11] Public Utilities Code § 854.2(a)(2) ("Safe and reliable electric and gas utility service is vital to public health, public safety, air quality, and reducing emissions of greenhouse gases.")

[12] Rulemaking 24-05-023.

[13] TURN Opening Comments at 7.

MGRA's comment that we should be required to recalculate our WMP using covered conductor effectiveness data from SCE's territory, or from the study conducted by the joint utilities, is misplaced.[14] This would be incredibly harmful to the safety of our customers, and we urge Energy Safety to reject MGRA's request. Our covered conductor data is robust, and the effectiveness figures are in line with the findings of the study conducted by the joint utilities. In our 2026 WMP, we cite a covered conductor effectiveness of 62% (overall utility risk reduction), 67% (wildfire risk reduction), 79% (wildfire risk reduction when combined with EPSS and DCD) and 97% (wildfire risk reduction when combined with EPSS and PSPS).[15] The high percentages of all of these figures demonstrates that we recognize the effectiveness of covered conductor, especially in combination with operational and system controls. As demonstrated in our WMP—where we propose to mitigate over 700 miles with covered conductor in the 2026-2028 WMP period—we support implementing covered conductor where it is the appropriate solution to mitigate risk for that circuit.[16] In addition, requiring a utility to utilize another utility's field data would be harmful and produce less accurate results. Local factors including terrain, weather patterns, and the size and density of vegetation can heavily influence the effectiveness of covered conductor. In the short time since its broad-scale deployment, we have already experienced multiple reportable ignitions due to large vegetation failures that broke through covered conductors, resulting in wire-down incidents that ignited ground fuels. Utilizing limited field data based on broadly disparate field conditions would not properly account for the risks present in our service territory and may overlook the potential for such events. Furthermore, we developed a sophisticated method for assessing detailed, location specific mitigation effectiveness estimates which would be lost in adopting a superficial value from another source.

GPI comments that winter storm risk is out of scope for the WMP and thus that we should not be permitted to consider it "as a basis for mitigation selection."[17] This is a misunderstanding of our decision-making process as we do not use winter storm risk for mitigation selection. We focus the selection of grid resiliency projects in locations of high wildfire and/or outage program risk due to EPSS and PSPS and do not consider winter storm risk for this selection. However, when performing cost benefit analyses to inform the appropriate mitigation to apply in a targeted location, it is necessary to consider and quantify all direct benefits of each possible mitigation, to the extent possible. Because non-wildfire outages, especially lengthy ones during winter storms and atmospheric river events, impact customers similarly to EPSS and PSPS outages, it is prudent to consider those events in our risk and benefit analysis.

TURN comments that PG&E should update its cost-benefit risk modeling using the Wildfire Distribution Risk Model (WDRM) "highly granular and location-specific risk analysis that differentiates the probability of ignition by driver (e.g. vegetation vs. equipment failure, etc.), as well as wildfire consequence by location of utility assets."[18] As we clarified in response to a recent Public Advocates Office data request, while we maintain some pixel-level data, we

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[14] MGRA Opening Comments at 63.

[15] PG&E 2026-2028 WMP R0 at 128.

[16] *Id*. at 180-182.

[17] GPI Opening Comments at 31-32.

[18] TURN Opening Comments at 15-16.

discourage analytics at fine granularity for resiliency mitigation decision-making because risk values at the pixel-level have inherent uncertainty.[19] For example, when pixel-level risks are aggregated to larger regions containing multiple pixels, the reliability and interpretability of the findings improve significantly. In using the WDRM Version 3 or Version 4 for resiliency mitigation decision-making and planning, we use only the circuit segment-level risk values because the factors that drive risk—such as vegetation, topography, wind and weather patterns—do not necessarily align with pixel boundaries.

II. RISK MODELING

A. PG&E's Risk Scaling Function Fairly Assesses Risk and Risk Reduction Benefits

MGRA asserts that PG&E's risk scaling/risk attitude function amplifies wildfire risk and the cost benefit ratios of its programs. Risk-neutral scaling—essentially managing to average—is ill-suited to capture catastrophic risks, and there is no evidence that our customers are risk-neutral. Rather, adopting a risk-averse attitude is more reasonable and consistent with risk management approaches across the utility industry and other high-hazard industries. We have commented extensively on the need for risk scaling in the CPUC's Risk Rulemaking proceeding and in our 2027 General Rate Case (GRC) proceeding Opening Testimony.[20]

Our unmitigated wildfire risk for 2026 is $20 billion with risk-averse scaling and $4 billion without risk-averse scaling. With operational mitigations in place, our wildfire risk is $3.6 billion with risk-averse scaling and $0.9 billion without risk-averse scaling.[21] The recent Los Angeles fires, which have destroyed over 16,000 structures, underscore the ongoing catastrophic wildfire risk. Assuming a financial consequence of $1 million per structure, total financial consequence would exceed $16 billion. This highlights that even with mitigations in place, catastrophic wildfire risk is still present. It is unrealistic to believe that any risk-transfer parties would assume all of our wildfire risk (in the absence of insurance and a wildfire fund) at a price of $0.9 billion per year, as calculated using the risk-neutral scaling. This further supports our argument that risk-neutral scaling is unreasonable.

Additionally, Energy Safety should disregard MGRA's objections to PG&E's risk attitude function on the grounds that MGRA's assertions contain factual errors that lead to incorrect conclusions. MGRA first states that "PG&E multiplies its risk values by a factor of 7.5 when doing its cost/benefit analysis."[22] This is an oversimplification that is technically incorrect. Our risk scaling function consists of three segments, with only the final segment (what we term the catastrophic region) having a multiplier of 7.5.[23] MGRA's subsequent statements bear this out. The residual risk after mitigation is $3.6 billion—as MGRA highlights—but, using the risk

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[19] PG&E response to data request DRU15554_SystemHardening_DR_CPUC_D002-5.9.2025 Supplement.

[20] R.20-07-013, Opening Comments of Pacific Gas and Electric Company on Workshop #4 (Nov. 6, 2023); A.25-06-XXX, Exhibit (PG&E-2) Chapter 1, at 22-24.

[21] MGRA Opening Comments, Figure 1 and Figure 2, at13-14.

[22] *Id*. at 12.

[23] The other two segments, Routine, Elevated, have multipliers of 1.0 and 2.0 respectively. See PG&E's 2024 RAMP Report.

neutral value it is $0.9M,[24] for an overall multiplier of approximately 4. MGRA then goes on to summarize some perceived issues with our approach, which we address below.

- MGRA states that "PG&E claims that its risk adjustment is based upon a 'market-based' estimate of risk. This is not correct. Our risk multiplier value derives from a catastrophe (CAT) bond issued from a single vendor specific to its own business."[25] This is inaccurate. As we described in our Risk Assessment Mitigation Phase (RAMP) Report, we obtained publicly available CAT bond information from Artemis, an agency specializing in reporting on "catastrophe bond, insurance linked security (ILS), non-traditional reinsurance capital, insurance linked investments and associated alternative risk transfer markets." We collected the CAT Bond issuances specifically related to California wildfire risk as of our 2024 RAMP filing. The risk premiums (i.e., multipliers), as reported by Artemis, from these transactions ranged between 5.4 to 23. Based on these data points, we concluded that 7.5 is an appropriate multiplier to use as it was the actual value from our own CAT bond transaction (in August 2018, before the Camp Fire), and was within the range previously stated (and is in fact, towards the lower end of the range).

- MGRA further claims "[b]ecause the CAT bond vendor's methodology is proprietary, there is no way of validating whether its own methodology for determining risk for its own purposes is in any way relevant to the risk analysis performed by PG&E."[26] However, it does not matter whether the "vendor" models are proprietary or validated, because ultimately the ratio of market price and the disclosed expected loss value (i.e., risk-neutral value) is the indication of the magnitude of risk premium and that was used for our catastrophic risk multiplier.

- MGRA's third point states that "unless the CAT bond market is using the same truncated power law distribution that PG&E does for estimating enterprise risk, it is very likely that PG&E is 'double counting' (in fact double multiplying) risk values that inherently incorporate significant 'risk aversion'."[27] MGRA's argument appears to be based on the premise that our use of a truncated power law distribution adequately represent risk aversion on its own. However, the issue of risk aversion is not addressed by the use of one distribution over another. Risk aversion is principally about the ranking of different uncertain outcomes. Ultimately, a 'risk aversion' preference offers a way to rank any arbitrary number of probabilistic distributions. This is what the risk attitude function accomplishes. It is not simply a statement about any one probability distribution—it is a mechanism that allows PG&E to compare different probability distributions in a way that channels preference for ones that have a narrower range of plausible outcomes over ones that are wider and, hence, have a larger probability of catastrophic outcomes. Whether a truncated power law distribution is used or not is a matter of the properties of data itself. For example, if the data does not actually have heavy tails, it is inappropriate to use the truncated power law distribution. A curve fitting of a specific probability distribution on

[24] MGRA Opening Comments at 13-15.

[25] *Id*. at 16.

[26] *Id*.

[27] *Id*.

historical risk event data is simply not the right tool for reflecting risk aversion, which is also evident in the terminology 'risk aversion' itself. Therefore, it is still necessary to consider the risk adjustment or scaling when combining the tail and non-tail portion of the risk with mathematical expectation using its physical, real-world probabilities.

- MGRA also highlights that "[a]ccording to economic literature, risk premium traditionally is increased by 25-40% when uncertainty is incorporated. PG&E increases theirs by 650%. Even if uncertainty is amplified by the power law dependency, PG&E has done a sensitivity analysis with regard to its choice of power law truncation that would allow it to incorporate this as parametric uncertainty."[28] We believe that there is still considerable uncertainty and possibly an underestimation of risk due to the chosen truncation methodology and calibration approach. This further supports a need for a risk scaling function.

MGRA recommends Energy Safety require PG&E to use a risk-neutral scaling function in addition to its risk-averse scaling function when performing critical risk analyses. PG&E objects to this recommendation. MGRA argues that, in finding PG&E's risk scaling function satisfactory, the SPD is in error on this matter.[29] This is an inaccurate opinion of MGRA's, which we have refuted. MGRA appears to imply that the ALJ in PG&E's 2024 RAMP proceeding agrees with its conclusion, based on the Ruling issued on April 22, 2025. However, the Ruling directs PG&E to "us[e] risk-neutral, linear scaling function to *establish a neutral baseline for GRC stakeholders to compare the impacts of its risk-averse scaling function* on the selection decisions regarding risk mitigation."[30] The Ruling does not direct PG&E to abandon its risk-scaling function for a risk-neutral, linear function, but rather to present those values for comparison.

Finally, MGRA recommends "E3 to independently verify PG&E's approach to convex risk attitude functions."[31] PG&E welcomes independent verification by experts on this topic.

B. PG&E's Suppression Model Properly Uses Available Data and Has Documented Predictive Power

Energy Safety should disregard MGRA's argument that the PG&E suppression model should be rejected.[32] The suppression model is an empirical model based on structure loss outcomes due to historical fires. The unit of analysis is a fire and the inputs are the local characteristics captured by Terrain Difficulty Index (TDI), 300m wind speed, and live fuel moisture. The primary determinant of wildfire damages is whether it escapes early suppression, and the variables used in the suppression model are geared toward that question. Although MGRA may prefer a simulated/mechanistic approach based on building attributes gathered at a

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[28] *Id*.

[29] *Id*.

[30] A.24-05-008, ALJ Ruling at 8 (emphasis added).

[31] MGRA Opening Comments at 17.

[32] *Id*. at 42.

fine scale, such data is not available for use and any such simulation-based approach would still require calibration to historical outcomes.

The model has documented predictive power and spatially locates consequences in locations where historical fires have been, or would have been, more difficult to suppress. The impacts speculated upon by MGRA are assertions without evidence.

C. The Wildfire Consequence Model Is Properly Documented

GPI's statement that PG&E's Wildfire Consequence (WFC) Model failed to include methodological reporting as required by the WMP Guidelines is incorrect.[33] Our WFC Modeling team received Multi-Attribute Variable Function (MAVf) and Fire Potential Index (FPI) values as predetermined external inputs. The team neither developed nor altered these inputs from their current and publicly documented forms and, therefore, did not reproduce or modify their separate documentation. However, Section 2.4.4 of the WFC Version 4 document provides input values used in the MAVf. The WFC Version 4 documentation provides discussion of the model development process and validation steps, including examples and comparison figures. On balance, all the updates improved the model's performance in ranking historical fires by consequence, as documented in Figure 5 of the WFC Version 4 model documentation.

Similarly, GPI's argument that the WFC should be required to include the vintage of forecasted fuel layers misunderstands the WFC model.[34] The FPI model is not based on a vintaged fuels layer in the same way wildfire simulations are. Instead, it takes time varying inputs on fuel conditions and fuel types derived from meteorological data. The list of variables used in the FPI model are provided in the WMP documentation related the FPI model.

D. Simulations Are Calibrated Against Existing Historic Fires

GPI argues that "more work should be done to elucidate the correlation between Technosylva 24-h[our] versus 8-h[our] simulations and historic fires as it relates to utility wildfire risk planning model applications, relative versus absolute risk, and downstream CBR application."[35] The WFC Modeling team agrees that the 24-hour simulations are only modestly more predictive of acres burned than the 8-hour simulations. Wildfire simulation models are only approximations of what would happen in the real world and need to be interpreted as such. In some cases, longer simulation times compound divergence with real world outcomes as opposed to closing the gap. This is why the team calibrates the simulation outputs against actual destructive fires rather than taking them as literal predictions of outcomes.

E. 24-Hour Simulations Were Implemented Based on Stakeholder Feedback

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[33] GPI Opening Comments at 20-21.

[34] *Id*. at 20.

[35] *Id*. at 22.

GPI incorrectly states that the "primary issue" with the WFC is that it sources granular consequence values on binned and averaged historical wildfire outcomes.[36] However, the binned and averaged values referenced are part of a figure used for discussion that played a role in determining that we would commission 24-hour instead of 8-hour simulations for use as WFC Version 4 inputs. Those bins play no role in the model itself. The decision to adopt 24-hour simulations was responsive to stakeholder comments filed in response to the WFC Version 3 consequence modeling asserting that 8-hour simulation were too short to capture outcome-relevant dynamics.

Similarly, Energy Safety should dismiss GPI's argument against the use of 24-hour simulations.[37] Neither simulated acres burned nor structure damaged correlate well with historical outcomes in either 8 or 24-hour simulations. The modeling team did not find them to be predictive of historical outcomes. The fact that the 24-hour simulations feature modestly better correlation with acres burned suggests that the weather conditions experiences after 8 hours was cited as supporting the adopting of 24-hour simulations, and that improvement alone does support the conclusion that the longer simulations have greater fidelity to historical outcomes. However, the choice was also made based on the first principles argument that more than 8 hours of post-ignition weather conditions should be accounted for in the simulations—an argument made by both stakeholders and external reviewers that the modeling team took to heart.

Contrary to GPI's assertion, there is not a reliable repository of flame length and rate of spread for historical fires, making the suggested comparison not practically achievable.[38] However, we know from first principles that winds in particular govern rate of spread and the exposure of simulated wildfires to 16 additional hours of weather conditions creates additional opportunity to capture wind-driven fire consequence that would be missed with 8-hr simulations.

GPI's recommendation that Energy Safety issue a Revision Notice on the issue of 8-hour vs 24-hour simulations should be rejected.[39] The flame length and rate of spread values adopted for each simulated fire are the maximal values from the simulation period. Fires whose maximum values occur during the first 8 hours have unchanged outputs. Fires that experience higher max values between hours 8 and 24 of the simulation move up and to the right compared to the 2023-2025 WMP Figure PG&E-6.2.2-7. Those moves are not sufficient to alter the "full recall" thresholds, and the results are qualitatively similar between 8 and 24-hour simulation. In other words, there is not a large difference in the relevant data sets and their impacts on "predictive destructive" conditions. For this reason, the choice between 8 and 24-hour simulations does not have a large practical impact and was not covered in the documentation in more detail. Reasonable people could likely disagree on which set of simulations should be preferred empirically, but stakeholders have been nearly unanimous in their requests for longer simulations in past comments, so the WFC Modeling team has taken their advice.

F. Model Uncertainty Is Always Present and Does Not Prevent a Model from Being Useful

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[36] *Id*.

[37] *Id*.

[38] *Id*.

[39] *Id*. at 22-23.

GPI approaches their evaluation of the WFC Version 4 with a set of assumptions that PG&E shared at the outset of the WFC modeling work.[40] Namely, that:

1. Granular site details, including fuels and structure characteristics, are key determinants of destructive wildfire outcomes;
2. As a corollary, simulation models, due to their use of "granular fuels, structure, and other data sets should directly inform wildfire consequence;" and
3. Logically, the larger a fire becomes the greater its potential for destruction, and all buildings that land within a fire's footprint must be threatened.

However, the process of producing predictive models involves the testing of hypotheses and discarding updating those that are challenged by empirical data. Our modeling team found evidence that challenges all three of the above assumptions and made adjustments to model structure accordingly. These changes were based on empirical evidence from historical fires that improved the fidelity of model results to real world outcomes. Specifically, Figure 5 in the model documentation, reproduced below, provides a side-by-side comparison of how well the Version 4 model does at ranking historically destructive fires compared to the Version 3 model. The steeper the lines, the closer to top rank historically destructive fires were. It can be easily verified that the Version 4 model, inclusive of all the characteristics that GPI is critical of, outperforms the Version 3 model in terms of fire size, structures destroyed, and fatalities. This fidelity to historical fire outcomes was and remains the model team's primary goal.

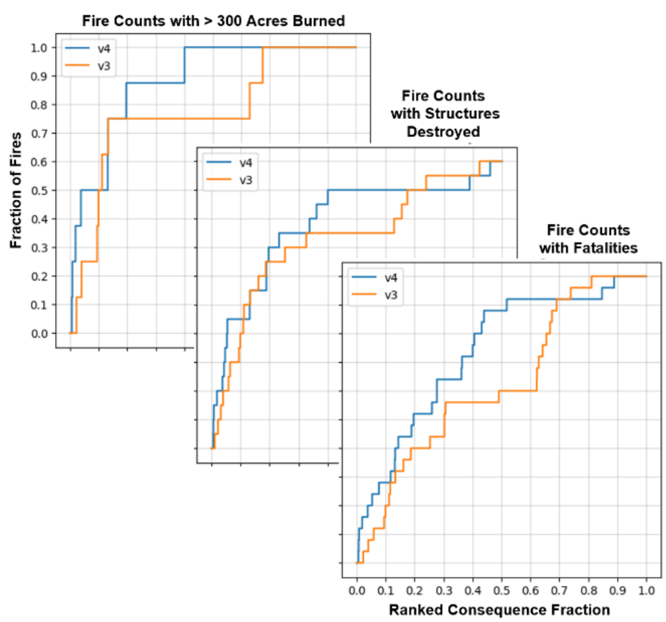

Figure 5 from the WFC Version 4 documentation

[40] *Id*. at 23-29.

The WFC Version 4 documentation attempts to provide the empirical evidence the team relied upon to produce these performance gains, which GPI does not appear to accept. However, predictive modeling is not a matter of opinion. It can be quantitatively evaluated.

First, it is important to clarify that the model team believes that the single most important question to ask about an ignition when attempting to determine its destructive potential is whether or not it escapes suppression, particularly in the critical early stages of suppression known as "initial attack." The vast majority of utility-caused fires are contained during initial attack and those that escape initial attack represent the overwhelming majority of destructive outcomes. This is a matter of common sense, but it is also borne out in the California Department of Forestry and Fire Protection's (CAL FIRE) annual redbook data, which catalogs all fire outcomes each year. Fires that prove difficult to suppress share characteristics that contribute to potential for destructive behavior: difficult conditions for accessing or fighting the fire (i.e., elevated TDI), rapid spread and/or intense burning (aka elevated flame length and rate of spread), weather and fuel conditions that favor growth and intensity of fire (aka elevated wind speed and FPI R-score).

The goal of the Predicted Destructive Potential (PDP) designation is to assess the conditions under which real world fires have been observed to be destructive, where destructive is defined as destroying at least one structure and/or causing at least one fatality, information captured from CAL FIRE redbook data. The unit of analysis of the WFC Version 4 is each fire, and the question it answers, via environmental thresholds, is under what conditions are fires capable of destructive outcomes. We find fire simulations, FPI model outputs, and weather and fuel conditions all fit for purpose in making this determination, but contrary to GPI's second assumption above, we do not find that simulations are *uniquely* good at making this determination. Additionally, contrary to the third assumption above, we do not find that fire size (actual or simulated) correlates well with destructive outcomes. Lastly, contrary to the first assumption above, we do not find that fine scale local characteristics make or break the spread for fast moving destructive fires. Thus, there is a kernel of truth behind each of the three assumptions, but models strongly adhering to these assumptions underperform those that follow the empirical patterns. The evidence for this finding is as follows:

1. In predictive modeling, a famous quotation is often invoked: "all models are wrong, but some are useful." Models should not be mistaken for reality. They need to be tested and interpreted to find where they are useful. Objectively, the number of structures actually burned in historical fires are very poorly correlated with the number of structures within corresponding simulation footprints. Wildfire simulation tools are simply not particularly good at reproducing the actual footprint of fires (and they do not even burn structures). There are likely many reasons this turns out to be the case (beyond the scope of this response) and it is an area of active research, but the lack of correlation is an empirical fact.
2. There is better correlation between simulated acres burned and historical, but the error is still quite high. However, here, another empirical fact becomes relevant: historically destructive outcomes are only weakly correlated with acres burned. The modeling team found much stronger correlation with fire characteristics related to rate of spread and burn intensity. This is no fluke. That finding has been confirmed by peer reviewed research into "fast fires." After analyzing the entire satellite history of wildfires in the

United States, Jennifer Balch, from the University of Colorado, and her co-authors found that fast moving fires "accounted for 78% of structures destroyed and 61% of suppression costs."[41]They find no such relationship with final fire size. All of this leads to the same conclusion: simulated flame length and rate of spread delineate destructive potential far better than other simulated fire characteristics

3. Fires that do escape initial suppression are more likely to be burning more intensely and/or travelling quickly. They are less likely to be shaped by fine scale fuel or topographic conditions and more likely to have left the conditions at their origin behind. For these reasons, such fires tend to be more influenced by larger scale patterns in weather and fuel conditions. The FPI model is trained on historical fire outcomes and has significant empirical skill at classifying final outcomes, given weather and fuel conditions, even though its weather and fuel moisture inputs are at 2-kilometer scale. One can and should worry about the degree to which FPI predictions are too spatially coarse to differentiate factors that should matter, but there are practical limits on the scale of weather inputs and predictive performance of the FPI model classifying historical fires has been empirically demonstrated by the modeling team that developed it.
4. We do not doubt that fine scale features impact fire outcomes, but we have found no empirical support for GPI's assumption that finer scale inputs into simulation models produce finer scale fidelity with actual outcomes.[42] On the contrary, we discussed the lack of simulation fidelity with destructive outcomes and observe significant spatial correlation (so called "spatial smoothing") in simulation outputs, likely due to the importance of (relatively coarse) weather and fuel moisture to simulation outcomes.

Despite GPI's criticism of our differences from some of the other utilities' models,[43] we are proud of our hard-earned deviation from the tendency to take simulation results literally and the means and methods we have developed to empirically test and calibrate the contribution of simulation results to the final modeled outputs. We offer substantial evidence for each of our individual choices and document the empirical performance of the final results. Standardization of methods based on an assumption-driven interpretation of simulation models, independent of empirical evaluation or calibration would not be a service to stakeholders.

III. DISTRIBUTED ENERGY RESOURCES ARE VALUABLE MITIGATIONS BUT SHOULD NOT BE CONFLATED WITH GRID HARDENING

We strongly disagree with GPI's argument that battery programs be considered a grid hardening, design and operations measure.[44] These are voluntary customer programs that offer outage mitigation solutions to a subset of customers that are most impacted by PSPS and EPSS outages. That being said, we agree with GPI about the value of integrating distributed energy resources (DERs), such as batteries, and we note that DERs are incorporated into localized

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[41] Jennifer K. Balch, *et al*., The fastest-growing and most destructive fires in the US (2001 to 2020). Science 386, 425-431 (Oct. 24, 2024), available at: https://www.science.org/doi/10.1126/science.adk5737.

[42] GPI Opening Comments at 23.

[43] *Id*. at 24.

[44] *Id*. at 52.

mitigation planning where feasible and cost-effective.[45] We are actively pursuing DER pilots and continuously evaluating how best to integrate non-wire alternatives into our long-term planning framework. However, battery programs are not a substitute for grid hardening.

GPI urges CBRs to be developed for permanent DER. We note that we already calculate CBRs for our battery programs targeting EPSS and PSPS outage mitigation.[46] The most recent CBRs are provided in our 2027 GRC.[47] We agree that permanent batteries installed for EPSS and PSPS outage mitigation can provide additional value and have made a proposal in our 2027 GRC that is designed to capture those additional values by transitioning to a utility-owned and operated battery program model in 2027.[48] This will both further reduce barriers for participating customers while enabling a more optimal battery operation to capture additional grid benefits.[49]

Despite GPI's statement that quantitative metrics for DER are missing,[50] we note that we report metrics for the RSI program, the Self-Generation Incentive Program (SGIP), and other programs that support customers impacted by wildfire safety outages in our Access and Functional Needs (AFN) Plan for PSPS Support, Quarterly Progress Report of Activities.[51] This is in addition to extensive reporting on the SGIP program, which is available at www.selfgenca.com.

In response to GPI's suggestions to improve the Residential Storage Initiative (RSI) program, we observe that we continue to evaluate different battery products available in the market to mitigate customer outages .[52] Considerations include average outage duration, number of customers impacted, and affordability. Beginning this year, low-income customers interested in installing whole home solutions can take advantage of the SGIP Residential Solar & Storage Equity budget, which provides incentives to cover the cost of a solar and storage solution. Qualified general market customers interested in installing larger batteries can work with their own installer and apply for a $7,500 rebate through our Permanent Battery Storage Rebate (PBSR) Program.

Regarding GPI's assertion that permanent battery installation targets are necessary, we emphasize that our permanent battery programs are targeted at customers most impacted by EPSS outages, offering fully subsidized solutions for Medical Baseline, low-income, and self-

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[45] *Id*. at 49.

[46] *Id*. at 53.

[47] *See* Section D of PG&E's 2027 General Rate Case, Exhibit 4, Ch. 6, available at: https://pgera.azurewebsites.net/Regulation/ValidateDocAccess?docID=827547.

[48] *Id*.

[49] *Id*.

[50] GPI Opening Comments at 52.

[51] The latest quarterly report is available at: https://www.pge.com/assets/pge/docs/outages-and-safety/safety/psps-afn-q1-report-043025.pdf.

[52] GPI Opening Comments at 50-53.

identified vulnerable customers and rebates for general market customers.[53] Participation is voluntary, and for a variety of reasons, ranging from site feasibility to customer interest in battery installation, not all customers on a circuit will participate. Permanent batteries provide quantifiable outage risk reduction but will not reduce the risk of wildfires.

IV. PG&E's VEGETATION MANAGEMENT DISTRIBUTION ROUTINE PATROL PROGRAM INCORPORATES PREVIOUS VEGETATION MANAGEMENT PROGRAMS

RCRC states that PG&E's 2026-2028 WMP does not clearly explain how the fully funded "One Veg" program approved in PG&E's 2023-2026 GRC relates to, or supersedes, existing VM initiatives such as Focused Tree Inspection (FTI), Tree Removal Inventory (TRI), and Vegetation Management for Operational Mitigations (VMOM).[54]

While we are no longer using the term "One Veg," what we referred to as One Veg in the 2023 GRC represented the strategy of consolidating smaller distribution VM programs into the Distribution Routine Patrol Program. As described in the 2026-2028 WMP, we plan to adjust the Distribution Routine Patrol Program by consolidating inspection procedures (Focused Tree Inspection, Tree Removal Inventory, Vegetation Management for Operational Mitigations) into other Distribution proactive and reactive inspection programs.[55] These proposed adjustments reflect efforts to improve customer sentiment by reducing customer touchpoints, address feedback from external stakeholders (i.e., areas of continuous improvement), and achieve operational efficiencies.

V. CONCLUSION

We appreciate this opportunity to provide reply comments on our 2026-2028 WMP and look forward to continuing to work with Energy Safety and interested parties to reduce wildfire risk throughout California. Should you have any questions, or need any additional information, please do not hesitate to reach out.

Very truly yours,

/s/ Jay Leyno

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[53] *Id*. at 54.

[54] RCRC Opening Comments at 2.

[55] PG&E 2026-2028 WMP R0 at 362-363.