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June 13, 2025 VIA ELECTRONIC FILING

Tony Marino, Deputy Director
Office of Energy Infrastructure Safety
715 P Street, 20th Floor
Sacramento, CA 95814

RE: MUSSEY GRADE ROAD ALLIANCE COMMENTS ON THE 2026 TO 2028 UPDATE OF THE WILDFIRE MITIGATION PLANS OF SDG&E

Dear Deputy Director Marino,

The Mussey Grade Road Alliance (MGRA or Alliance) files these comments pursuant to the February 24th Revised 2026-2028 Base Wildfire Mitigation Plan Update Schedule[1] provided by the Office of Energy Infrastructure Safety (OEIS or Energy Safety) which authorizes public comment for SDG&E's Wildfire Mitigation Plan (WMP) by June 13, 2025.

The Mussey Grade Road Alliance is pleased to be able to continue to participate and provide substantive feedback on the Large IOU Wildfire Mitigation Plans.

For any reader curious as to how the Mussey Grade Road Alliance, a grass-roots citizen-based organization located in Ramona, California has become involved in reviewing and improving utility power line fire safety in California over the last 17 years we would refer them to our last full description of our history and activities in the 2020 Wildfire Mitigation Plans.[2] MGRA has been involved in every WMP since their start, and in fact was the only intervenor providing comment on the "Fire Prevention Plans" early in the 2010's.

[1] Docket 2026-2028-WMPs; Office of Energy Infrastructure Safety; 2026-2028 Wildfire Mitigation Plan Update Schedule; p. 2; TN15409_20250224T170637_Revised_20262028_Base_WMP_Schedule.pdf (2025 Updated Schedule)

[2] MUSSEY GRADE ROAD ALLIANCE COMMENTS ON 2020 WILDFIRE MITIGATION PLANS OF SDG&E, PG&E, SCE; April 7, 2020; pp. 1-3. (MGRA 2020 WMP Comments) https://energysafety.ca.gov/wp-content/uploads/docs/misc/wmp/public-comments/mussey-grade-comments-2020-wmp.pdf

The Alliance comments are authored by the Alliance expert, Joseph W. Mitchell, Ph.D.[3] Many of the topics he raised in the previous years – wind and wildfire risk, power shutoff and shortcomings in utility modeling tools – remain active topics of discussion within both Energy Safety and CPUC frameworks. Dr. Mitchell presents additional data and analysis this year based on new data provided by the utilities.

While utilities continue to refine their risk models under additional constraint and guidance by Energy Safety, MGRA continues to focus on the shortcomings of these models and their basic assumptions. Many of these issues remain the same as those MGRA has raised in the past, such as the effect of extreme winds on ignition risk, and to some extent OEIS has accommodated some of the MGRA inputs.

SDG&E's has just released its RAMP filing as the initial stage of its 2027-2030 GRC cycle[4] and additionally is planning to put in an application for a ten-year undergrounding plan, possibly as early as the end of this year.[5] Many of the issues SDG&E raises in this WMP are designed to lay the groundwork for this major new set of activities and potentially major new capital projects. MGRA has analyzed these areas with a critical eye, as it and other stakeholders has historically identified inherent preferences for undergrounding solutions.

MGRA members are SDG&E customers, and furthermore live in a high wildfire threat district. The neighborhood lost 60-70% of its homes in the 2003 Cedar fire and was threatened by the 2007 Witch/Guejito fire which originated from SDG&E power lines. The Mussey Grade neighborhood is economically diverse, with many residents having low incomes, and for whom the burden of utility rates is significant. MGRA has always, therefore, supported cost-effective wildfire safety, and that continues to be our focus.

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[3] M-bar Technologies and Consulting, LLC; http://www.mbartek.com; Email: jwmitchell@mbartek.com. Dr. Mitchell is also the Secretary of the Mussey Grade Road Alliance.

[4] A.25-05-013; APPLICATION OF SAN DIEGO GAS & ELECTRIC COMPANY (U 902 M) TO SUBMIT ITS 2025 RISK ASSESSMENT AND MITIGATION PHASE REPORT; May 15, 2025. (SDG&E GRC).

[5] 2026-2028 Base Wildfire Mitigation Plan Workshop; May 23, 2025. Jonathan Woldemariam stated this estimate in response to a question from MGRA representative Joseph Mitchell.

We thank Energy Safety for the opportunity to provide these comments and in particular its staff who diligently work through the massive quantity of utility filings, data request responses, and stakeholder comments.

Respectfully submitted this 13th day of June, 2025,

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On behalf of the Mussey Grade Road Alliance.

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WILDFIRE MITIGATION PLAN COMMENTS ON BEHALF OF THE MUSSEY GRADE ROAD ALLIANCE

The Mussey Grade Road Alliances' (MGRA or Alliance) Wildfire Mitigation Plan comments are authored by MGRA's expert witness Joseph W. Mitchell, Ph.D.[6]

1. INTRODUCTION AND SUMMARY

The Mussey Grade Road Alliance provides comment on the 2026-2028 Wildfire Mitigation Plan (WMP) for San Diego Gas and Electric Company (SDG&E).[7]

Thanks to the more expansive and prescriptive guidance by OEIS the utility WMPs have become easier to review and process. For the sake of brevity, MGRA's comments do not address the many significant additions and improvements to SDG&E's WMP and wildfire safety program. MGRA comments concentrate on areas where improvements are needed, or where serious issues have arisen that merit Energy Safety attention and possibly intervention. As noted in the previous section, the SDG&E WMPs provide a basis for the SDG&E RAMP filing (filed May 15, 2025) and soon-to-be-issued 10 year undergrounding plan. SDG&E has the potential to shift risk and revenues between its rate case and the undergrounding application, so the WMPs, data requests, comments, and OEIS findings form a factual basis that will prove extremely valuable when examining SDG&E's upcoming revenue requests.

1.1. Organization

Sections generally follow the numbering scheme laid out in Energy Safety guidelines.

MGRA is including utility data request responses as Appendix A of these comments. Even when we are not fully able to explore every issue that these cover in the comments, we hope that Energy Safety will review these responses from the utilities as well in order to inform its own evaluation.

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[6] M-bar Technologies and Consulting, LLC; http://www.mbartek.com; Email: jwmitchell@mbartek.com. Dr. Mitchell is also Secretary of the Mussey Grade Road Alliance.

[7] Docket 2026-2028-BASE-WMPS; SDG&E; Wildfire Mitigation Base Plan; version R0; May 2, 2025.

MGRA Workpapers can be found at:
https://github.com/jwmitchell/Workpapers/

Additional code, specifically that related to MGRA's weather analysis may be found at:
https://github.com/jwmitchell/mbar-weather

Tools used in the preparation of workpapers and analysis include Microsoft Excel, Python 3.8.10 and additional open source modules, ESRI ArcMap 8, and OpenAI ChatGPT 4.0. All methodology suggested and code generated by AI was independently verified and customized.

1.2. Comparison with 2025 SDG&E WMP Update

MGRA made a number of recommendations as part of its comments on the 2025 WMP Update.[8] Some of these were acted upon by OEIS, either in its review of the WMP or in its comments on the utility quarterly report. Other recommendations may have been in one way or other implemented by utility actions. Some of MGRA's recommendations were not addressed and remain valid concerns. MGRA's primary 2025 Update recommendations are summarized below:

Recommendation	**OEIS Action**	**Utility Action**	**Status**
Utilities should use field data and continue to develop their estimates of covered conductor effectiveness.	IOUs must continue CC effectiveness workstream and include in-field effectiveness.	SDG&E has not yet deployed sufficient covered conductor to measure effectiveness.	MGRA evaluates additional SCE field data and confirms higher CC effectiveness.
MGRA put a third party review of SDG&E risk modeling into the record and incorporated recommendations	SDGE-23-07.	SDG&E is implementing third party recommendations.	SDG&E has not evaluated new methodology since 2022.
MGRA raised the issue that SDG&E's fire spread model did not model larger wildfires.	None	SDG&E now is using both 24 and 8 hour simulations.	Resolved.
Utility risk models do not adequately represent correlation between ignition	Energy Safety now requires	SDG&E does not adopt Energy Safety requirement.	MGRA finds current wind gust correction does not adjust for

[8] MUSSEY GRADE ROAD ALLIANCE COMMENTS ON THE 2025 UPDATE OF THE WILDFIRE MITIGATION PLANS OF PG&E, SCE, AND SDG&E; May 7, 2024.

and spread due to extreme wind drivers.	extreme scenario evaluation. SDGE-23B-04	It has a wind correction in its probability model but this does not scale with outages.	outage rate increase. Section 5.2.1.2. MGRA suggests framing for SDG&E extreme event scenarios. Section 5.3.
MGRA noted slow deployment of advanced technologies that can be used to compliment covered conductor: REFCL, EFD, FCP, DCD, EPSS, Fast trip. Also SDG&E did not provide combined portfolio of mitigations.	SDGE-25U-04. Continuation of Grid Hardening Joint Studies	SDG&E continued to participate in the Joint Covered Conductor working group. SDG&E's 'CCC' option includes FCP and EFD.	Resolved, though effect of combined mitigations still underestimated. Section 8.2.1.2.
SDG&E calculated an accelerated degradation rate for efficiency loss of covered conductor, which MGRA showed is erroneous.	None	Still in supplemental documents, though not currently used.[9]	Dormant. Any CC degradation correction added in the future will need full justification.
MGRA examined SDG&E's planned and completed undergrounding projects and showed that undergrounding was an extremely expensive mitigation for PSPS, often rendering off-grid solutions less expensive.	None.	SDG&E undergrounding reduced by CPUC GRC decision.	Further analysis of CMI costs based on SDG&E table data. See Section 7.3.

Table 1 - MGRA recommendations made as part of the 2025 WMP Update review, Energy Safety and utility action on these topics, and current status.

1.3. Significant Findings in the 2026-2028 Wildfire Mitigation Plans

A number of significant issues were identified in SDG&E's 2026-2028 WMP and will be addressed at length in the remainder of these comments. To summarize the most important of these issues identified in the MGRA review:

- SDG&E's "risk averse scaling function" artificially amplifies risk, on the average by a factor of 7 and sometimes by a much greater factor. It also amplifies the difference

[9] During the May 21, 2025 WMP workshop, the SDG&E SME Joaquim Sebastian Peral stated that covered conductor degradation is not currently included in SDG&E's risk analysis, but that they are looking into the question.

in calculated residual risk between covered conductor and undergrounding. While basing its approach on findings in the available literature SDG&E errs significantly in applying an exponentially increasing aversion function to financial losses and not solely fatalities.

- SDG&E's wind gust correction applied to its ignition rate is flawed and applied to the wrong drivers. It also does not take into account the increased frequency of outages under high wind that can lead to ignition.
- SDG&E has correctly increased its wildfire simulations to 24 hours, but its conversion of structures burned to potential fatalities needs improvement.
- SDG&E has introduced what may be a sophisticated egress model but does not explain whether or how its results are incorporated into its risk framework.
- PG&E discovered that age may be an important factor in potential fatalities and SDG&E should explore incorporating this and other AFN factors into its consequence model.
- SDG&E has removed wildfire smoke fatality projections from its consequence model. It should improve and reincorporate a wildfire smoke consequence model.
- SDG&E and PG&E both ignored OEIS direction and did not address extreme event scenarios.
- Damage was caused to SDG&E infrastructure during the December 2024 PSPS event. This damage, much of it to cross arms, did not occur on circuits that fall in SDG&E's top risk tiers.
- PSPS frequency, scope, and duration can be significantly reduced by raising wind gust thresholds after the installation of covered conductor. This should be incorporated into risk modeling.
- For estimated reliability consequences, SDG&E may be using a much smaller ratio between residential and commercial customers than was used by PG&E or supported by the ICE 1.0 model.
- SDG&E finds an ignition reduction efficiency of 68% for covered conductor and 86% when it is combined with FCD+EFD. Nevertheless SDG&E estimates *risk* reduction for covered conductor at 58%, and fails to adequately explain the discrepancy between ignition reduction and risk reduction.

- SCE's field data continues to support an estimate of 85% risk reduction for covered conductor and this should be used as a baseline for other utilities as well.
- For the circuits SDG&E proposes for mitigation in the 2026-2028 period, neither undergrounding nor covered conductor has a BCR > 1.0 unless SDG&E applies its faulty "risk averse scaling function" and other questionable assumptions. Its 55 year apportionment of O&M costs needs to be closely examined.

2. RELATED ACTIVITY AT THE PUBLIC UTILITIES COMMISSION

2.1. Other Utility 2026-2028 Wildfire Mitigation Plans

2.1.1. MGRA Comments on PG&E 2026-2028 WMP

Energy Safety has already received MGRA's Comments on PG&E's 2026-2028 Wildfire Mitigation Plan.[10] The following sections are relevant to SDG&E's WMP and will be cited as appropriate. Unless otherwise noted the same section numbers will apply in this document.

Section 5.1 – Risk Attitude: PG&E has adopted a "risk averse" scaling function, just as SDG&E has. PG&E's chooses an entirely different basis for determining this scaling function, which the MGRA comments demonstrates to be flawed. While utilities are allowed by the CPUC to choose convex risk scaling functions, they are also required to present "risk neutral" risk calculations, and it is important for Energy Safety to rely on "risk neutral" functions in order to avoid utility biases and errors in their scaling functions.

Section 5.2.1 – Likelihood of Ignition: MGRA Comments show an analysis of large wildfires in the PG&E service area and demonstrate that there is a relationship between ignition of wildfires that become large and wind gusts that is statistically different for power line wildfires and wildfires from other causes. PG&E's machine learning (ML) model does not adequately capture the

[10] Docket: 2026-2028-Base-WMPs; MUSSEY GRADE ROAD ALLIANCE COMMENTS ON THE 2025 UPDATE OF THE WILDFIRE MITIGATION PLANS OF PG&E; May 23, 2025. (MGRA PG&E WMP Comments)
https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=58534
TN15885_20250523T090028_MGRA_20262028_WMP_PGE_Comments.pdf

relationship between wind and ignitions. SDG&E's WiNGS model, on the other hand, applies wind gust corrections to ignition probability.

Section 5.2.2 – Consequences of Wildfire Risk Event: PG&E increased its simulation time to 24 hours, and includes data supporting this decision. SDG&E has also started incorporating 24 hour wildfire simulations, but does not provide support for this decision. PG&E's third-party review (E3 consultants) suggested that their modeling should incorporate wildfire smoke health effects. However, SDG&E's WiNGS model has abandoned its attempt to incorporate wildfire smoke health effects.

Section 5.2.3 – Design Basis Scenarios: PG&E avoids providing design basis scenarios required by Energy Safety. MGRA notes this omission, and suggests examples of frameworks that would address extreme risk event scenarios. SDG&E also avoids these scenarios, also claiming that they are already incorporated into its risk modeling, and these comments repeat the examples that were provided in MGRA's PG&E comments.

Section 7.3 – PSPS and Shutoff Thresholds: MGRA comments show that the frequency, duration, and extent of PSPS events drops rapidly as a function of shutoff wind gust threshold. The MGRA PG&E comments show this for PG&E weather station data, while these comments show the same effect for SDG&E weather station data.

Section 8.2 – MGRA shows that PG&E underestimates covered conductor wildfire ignition reduction efficiency based on SCE field data observations. SDG&E's WMP states that risk reduction for covered conductor + FCD + EFD is only 58%, but its data shows that its SMEs project ignition reduction of 86% for this combination, a difference that is not adequately resolved.

2.2. California Public Utilities Commission Proceedings

2.2.1. D.24-12-074 – CPUC A.22-05-015 – SDG&E's 2024 General Rate Case

SDG&E's 2024 General Rate Case has been in process at the Commission since 2022. MGRA and other intervenors argued in that case that the dedication that SDG&E put into undergrounding as its solution, supported as it were with a decision tree that chose undergrounding

as a default solution unless other factors were involved, that it underrated the benefits of covered conductor.[11]

"*Furthermore, SDG&E's wildfire risk and the benefits of undergrounding may be even lower considering possible deficiencies in SDG&E's risk analysis discussed above, such as the limited number of tranches, an underestimation of the cost of undergrounding, an analytical bias toward undergrounding, and an underestimation of the risk reduction benefits of covered conductor. Given SDG&E's assessment of its wildfire risk, the Commission also does not find it reasonable to spend six times as much on undergrounding as on covered conductor in light of the cost-effectiveness of covered conductors*."[12]

SDG&E was ordered to pare back its spending on undergrounding during the 2024-2026 rate years and has therefore picked up the rated of its covered conductor deployment, which was minimal as of the last time they submitted their WMP. SDG&E plans to restore its undergrounding program, through the upcoming 2026-2028 rate case and also through a 10 year undergrounding application to be issued possibly later this year.[13]

2.2.2. A.25-05-013 – SDG&E RAMP

SDG&E's RAMP was released on May 15th, two weeks after their WMP was filed. Being that the RAMP and WMP documents are working with the same data and risk methodologies, they should be consistent. Nevertheless, the RAMP[14] contains additional detail not found in the SDG&E WMP, supplemental documentation, or data request responses and should be reviewed by Energy Safety during its review process.

SDG&E RAMP documents may be found here:
https://www.sdge.com/rates-and-regulations/proceedings/2025-Risk-Assessment-and-Mitigation-Phase-RAMP-Report

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[11] D.24-12-074; p. 477.
[12] Id.; p 481.
[13] See for example Figure 6.4; SDG&E WMP; p. 119.
[14] A.25-05-013; SoCal Gas/SDG&E; 2025 Risk Assessment Mitigation Phase; May 15, 2025. (SDG&E 2025 RAMP)
https://www.sdge.com/sites/default/files/regulatory/SDGE%202025%20RAMP%20Report_PDFA_0.pdf

MGRA has not reviewed the full RAMP filing, but has found detail on how SDG&E's "Risk Averse Scaling Function" was developed. This risk scaling function was used in various places throughout the WMP, Section 5.1 of these comments demonstrate that while SDG&E's justification for its risk scaling approach is reasonable, SDG&E's practical application of this scaling is in error and grossly overestimates risk values.

5. RISK METHODOLOGY AND ASSESSMENT

SDG&E first introduced its WiNGS risk modeling framework in 2020.[15] It has since developed multiple generations of this model which has been divided into WiNGS-Planning, used for long term mitigation and investment, and WiNGS-Ops, used for making operational decisions regarding PSPS and PEDS thresholds. One improvement reported in the current WMP is the adoption of a common probability model for both planning and operation,[16] derived from the operational model because it uses hourly rather than composite weather data. This allows submodels to be constructed that are specifically tied to wind effects, and SDG&E applies a wind gust correction to correct for local variations in wind speeds, though serious issues with its approach remain.[17]

In SDG&E's previous WiNGS model, used in its RAMP and GRC, the integrity of the WiNGS model was compromised by incorporating a "decision tree" that purportedly selected an optimized portfolio of mitigations but was biased in favor of undergrounding by selection of mitigations via a Risk-Spend analysis threshold.[18]

SDG&E's WiNGS-Planning no longer uses a "decision tree" but instead incorporates a "Risk Averse Scaling Function" that applies a negative bias toward large risks. While SDG&E presents reasonable justifications for its attitude function, it misapplies the concept and grossly overestimates catastrophic risk, as described in Section 5.1. SDG&E has also abandoned its attempt to incorporate wildfire smoke risk, which while highly uncertain and in some details erroneous was

[15] R.18-10-007; San Diego Gas & Electric Company's 2020 Wildfire Mitigation Plan Remedial Compliance Plan; July 27, 2020.
[16] SDG&E WMP; p. 36, Figure 5-6.
[17] Section 5.2.1.2.
[18] MGRA 2023 WMP Comments; pp. 20-23.

the only attempt of any of the utilities to incorporate what is expected to be a major public health risk. Section 5.2.2.5 describes why this omission was a mistake.

So while SDG&E continues to quantitatively improve its model, it has made design decisions that change model outputs significantly, sometimes to its detriment. Energy Safety should carefully evaluate these decisions and provide corrective measures and suggest improvements.

5.1. Enterprise Risk and Risk Attitude

The CPUC allows utilities to calculate risk using a convex risk scaling function for the purposes of their cost/benefit analysis, provided they provide risk estimates without a scaling function ("neutral") for the purposes of comparison:

"*When completing Rows 5 and 24 in the RDF, if a utility chooses to address tail risk using the power law or other statistical approach and chooses to present Risk-Adjusted Levels by relying on a convex scaling function, then it must supplement its analysis by also presenting Risk-Adjusted Attribute Levels by relying on a linear scaling function*."[19]

SDG&E has adopted this approach for the first time in its current WMP and also in its recently filed RAMP. PG&E also adopted a convex risk attitude function based on what it claims are bond market preferences, which the MGRA dismisses as erroneous in both its PG&E WMP comments and PG&E 2024 RAMP comments.[20] SDG&E's approach is quite different. Its origin is not described in its WMP filing,[21] but is explained in some detail in its 2025 RAMP filing.[22] Different risks are given different risk scaling by SDG&E, and Wildfire and PSPS are given a risk scaling – or multiplication factor - that averages greater than 6X.[23]

SDG&E's methodology uses a power law function derived from f—N curves (fatalities versus frequency) obtained from literature, which it then applies as a multiplier if the number of fatalities is greater than a threshold. The SDG&E scaling function is described by:

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[19] CPUC D.24-05-065; p. 98.
[20] MGRA PG&E WMP Comments; pp. 12-17.
MGRA 2024 RAMP Informal comments are cited in its WMP Comments, and salient portions are attached as Appendix B of MGRA's PG&E WMP Comments.
[21] SDG&E WMP; pp. 41-42.
[22] SDG&E 2025 RAMP; pp. RAMP-3-24 to RAMP-3-27.
[23] Id.; p. RAMP-1-12.

$$f(x) = \begin{cases} x & 0 \le x < 1 \\ x^{\alpha} & x \ge 1 \end{cases}$$

where α = -1.47, and x is the number of what SDG&E calls "equivalent fatalities", which will be discussed in depth below. SDG&E's WMP explains that "*this function converts the number of fatalities associated with an event into an adjusted figure that reflects SDG&E's risk aversion towards catastrophic events.*"[24] SDG&E's determination of the exponent is derived as an average from two sources that study risk tolerance attitudes in different industries and natural catastrophes.

As shown in Figure 5-7, this "Risk Aversion Function" causes a dramatic increase in SDG&E's scaled risk as baseline risk increases.

Figure 5-7: SDG&E Convex Risk Aversion Function

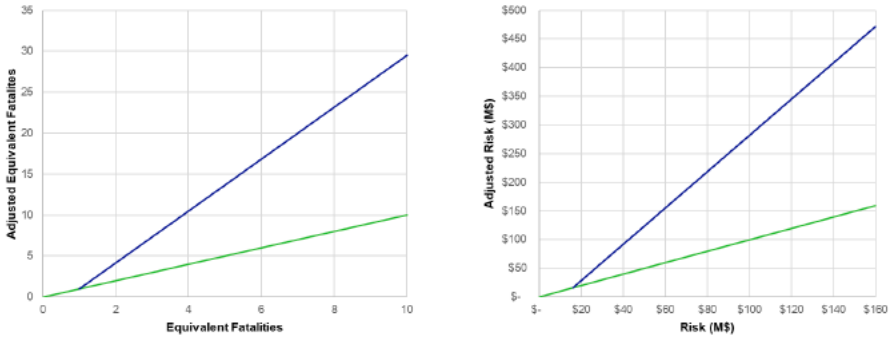

Figure 1 - SDG&E's Figure 5-7, showing its "Risk Aversion Function" in terms of what it calls "equivalent fatalities" and calculated risk in $M.

This leads SDG&E's estimated losses to be as high as $52B (P99) or even $211B (P100), as shown in its Table 5-7. This sounds implausible, and in fact is, so Energy Safety needs to carefully examine the basis of SDG&E's approach.

First, it is important to note (and SDG&E does) that the power law used for the scaling function has nothing to do with the truncated power law behavior exhibited in wildfire consequence modeling and used in PG&E's and SDG&E's enterprise risk models. However, as MGRA noted in its PG&E WMP Comments, applying a multiplier to adjust for "tail risk" may "double count" power law behavior (actually "double multiply"), because the truncated power law used to describe wildfire losses incorporates tail risk already. Additionally, for planning models which run 24 hour

[24] SDG&E WMP p. 41.

simulations, large consequences are the norm and more accurately describe wildfire tail risks. As SDG&E explains: "*While statistical models such as power-law distributions and/or Technosylva simulations effectively describe the potential scale of wildfire-related losses, they do not inherently account for any risk attitude, whether risk-seeking or risk-averse*."[25]

Nevertheless, the companies are allowed to use risk scaling. For Energy Safety to adopt these estimates over neutral risk scaling, however, this use needs to be adequately justified. SDG&E cites Griesmeyer, et. al, 1980 (fn 35) to state that this is an "*outcome that aligns with societal preferences.*"[26]

Griesmeyer et. al describe the general principle of risk aversion:

"*Societal values have frequently been assessed using recorded accident statistics on a wide range of human activities assuming that the statistics in some way reflect societal preferences, or by surveys concerning perceptions and evaluations of risk.*

Both methods indicate a societal aversion to risk e.g., many small accidents killing a total a of 100 people are preferred over one large accident in which 100 lives are lost."

It is important to note that Griesmeyer's work was done in 1980, and considerable work has been done in risk management since then. A literature search reveals that acceptance risk aversion and the use of f-N curves is by no means universal. Rheinberger and Treich, 2017,[27] provide a superb overview of the topic, describing the rapid increase in publications referring to disasters and catastrophes, and discuss many topics now familiar to California utilities, regulators, and stakeholders: catastrophes, tail-risk, f-N curves, ALARP, and risk aversion. The paper reviews the results of numerous studies that have attempted to gauge societal attitudes toward risk and finds that, surprisingly, the majority of studies have found "catastrophe acceptance" to be more prevalent that "catastrophe aversion", and concludes that: "*It is not clear whether we are, nor whether we should be, catastrophe averse*."

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[25] SDGE DRR MGRA-2026-8-04-Q3d.

[26] SDG&E 2025 RAMP-3-23.
Griesmeyer, J.M., Simpson, M., Okrent, D., 1980. Use of risk aversion in risk acceptance criteria (No. ALO-83; UCLA-ENG-7970). California Univ., Los Angeles (USA). Dept. of Chemical, Nuclear, and Thermal Engineering. https://doi.org/10.2172/5230500

[27] Rheinberger, C.M., Treich, N., 2017. Attitudes Toward Catastrophe. Environ Resource Econ 67, 609–636. https://doi.org/10.1007/s10640-016-0033-3

They utility's motivation for adopting a risk-averse attitude is obvious: it resolves every issue that the utility has regarding wildfire and regulation, and additionally allows it to make additional profits. And as SDG&E's own language shows, they do a quick bait and switch, arguing first that risk aversion "*aligns with societal preferences*" and then stating that its risk aversion function converts risk values to "*an adjusted figure that reflects SDG&E's risk aversion towards catastrophic events*". SDG&E's attitude toward risk aversion is not necessarily society's attitude toward risk aversion. Should the regulators, the CPUC and OEIS adopt risk aversion? The CPUC's motivation for allowing utilities to use it was apparently to allow another mechanism for incorporating uncertainty and tail risk. SDG&E and PG&E, however, are purportedly using it to impute an aversion to catastrophic events. Should OEIS give this model any credence or adopt it itself?

While SDG&E has provided reasonable regulatory and academic support for its risk aversion function, examining how it is used in practice reveals that it goes badly wrong in the details, and in fact generates absurd (though self-serving) results.

Noting that a loss of $210 B dollars seems extraordinarily high given the size and makeup of SDG&E's service area, SDG&E was asked to provide additional detail regarding this number. It responded that: "*Over the course of the 5 million simulated years, the most extreme wildfire scenario, resulting in an estimated cost of approximately $211 billion, was driven by two ignition events that coincidentally occurred under the same simulation seed ID*," and provides the following detail regarding these events:

	Ignition 1	Ignition 2	Total
Sim Weather Conditions Date	11/12/2018	11/17/204	
Total Acres Burned	43,703	35,934	79,637
Total Structures Destroyed	6,029	4,042	10,071
Wildfire Total Risk (with Risk Aversion) $M	$136,729.33	$74,237.73	$210,967.06
Wildfire Total Risk (without Risk Aversion) $M	$7,559.78	$4,989.72	$12,549.50
Wildfire Safety Risk (without Risk Aversion) $M	$1,427.77	$863.42	$2,291.19
Wildfire Financial Risk (without Risk Aversion) $M	$6,132.00	$4,126.24	$10,258.25
Wildfire Total Risk (with Risk Aversion) $M	$0.01	$0.05	$0.06

Table 2 – SDG&E's two "worst case" Monte Carlo events shown in DRR MGRA-2026-8-3-Q4. Risk averse score can be seen to be roughly 7-10X the size of the total safety, financial, and reliability risk.

What is odd about the SDG&E estimation is how much larger the "risk averse" estimated risk is than the estimates of safety, reliability, and financial risk without "risk aversion" applied, with SDG&E's total risk averse estimate being nearly 100X larger than its uncorrected wildfire safety risk. SDG&E explains its method for getting a correction of this magnitude:

"*Note that any monetized CoRE will first transform into equivalent fatalities using Equation 3.8, then be scaled by Equation 3.7, and finally be transformed back to monetized scaled CoRE… Consistent with the Commission's shift to monetization in the Phase 2 Decision, SoCalGas and SDG&E's adoption of Equation 3.10 produces a consistent implied threshold for Safety, Reliability, and Financial attributes. Specifically, the Companies apply the risk scaling factor on a trial-by-trial basis to each CoRE attribute, starting at the monetized equivalent of the VSL dollar value for one fatality*."[28]

SDG&E's Equation 10 is defined:

[28] Op. Cite; p. RAMP-3-27.

$$g(x) = \frac{x}{VSL} \quad 3.8$$

$$g^{-1}(x) = VSL \cdot x \quad 3.9$$

$$s(x) = g^{-1} \circ f \circ g(x) = g^{-1}\left(f(g(x))\right) \quad 3.10$$

where *x* is the loss, and VSL is the DOT value of Statistical Life (currently $16.2 M).

Effectively SDG&E is stating that the societal preference – or at least SDG&E's preference – aversion to catastrophic loss of life translates directly to aversion to "catastrophic" loss of money, which by SDG&E's definition is anything over the Department of Transportation Value of Statistical Life, or $16.2 M. SDG&E's methodology stands every principle of cost/benefit analysis and risk aversion as defined in the references and in the regulatory record on its head. The whole idea of catastrophic risk aversion, whether one accepts it or not, is to decouple the value of human life from the cold logic of cost/benefit analysis, to say that the societal impact of a mass casualty event is worse than the impact of an equal number of fatalities that occur for more mundane reasons. For SDG&E to then conclude that if society is willing to spend an amount of money that grows exponentially with the number of casualties it is therefore willing to spend an amount of money that grows exponentially with amount of money at risk makes no sense from an economic or ethical point of view. It is in fact an example of a classic "affirming the consequent" logical error.[29] The absurdity of this approach is apparent in Table 2 which shows the total estimated risk reaching nearly 100X the safety risk. Even from an economic standpoint, the SDG&E estimate implies a societal catastrophe aversion that would be willing, for CBR of 1.0, to spend 17X the amount of the potential loss for a mitigation. It is also important to note that until the recent CPUC decision setting VSL, SDG&E and other utilities were using $100 M as the effective VSL to account for this risk aversion,[30] indicating utilities in fact supported the idea of differentiating losses from fatalities from other wildfire costs and preferentially increasing safety risk.

It might be argued that in fact society does spend more than potential loss for insurance against catastrophic loss, such as spending for homeowners insurance. This example provides a

[29] https://en.wikipedia.org/wiki/Affirming_the_consequent

[30] See MUSSEY GRADE ROAD ALLIANCE COMMENTS ON 2022 WILDFIRE MITIGATION PLANS OF PG&E, SCE, AND SDG&E; p. 296/332. Cites;
MGRA Informal Comments on SDG&E 2020 RAMP, DRR MGRA-DR-003-Q7.

good comparison. A homeowner might be required to spend ~1% of their home value per year to provide insurance in a wildfire area. SDG&E's estimates for unscaled and scaled wildfire and PSPS enterprise risk in its RAMP are $467 M and $3,021 M,[31] respectively, a factor of 6.5, or a risk premium of 550%. Assuming this was mitigated at CBR=1.0, with an amortization period of 50 years, this yields an effective annual premium of 4%/year. In fact, is unlikely that wildfire mitigation costs will be amortized over 50 years. More likely, ratepayers will need to pay it in 10 years or less, which would result in an annual risk premium of 21% of dollars-at-risk. And whose risk? While some wildfire loss costs may be passed on to ratepayers through various mechanisms into higher rates, it is SDG&E's shareholders that would be most affected. So this is not a "societal" preference, it is an SDG&E preference, and it represents an economic choice, and not a safety choice, and therefore is outside of Energy Safety's mandate, and Energy Safety should therefore look strictly at risk-neutral scaling.

SDG&E's risk averse scaling, however, is deeply baked into the risk calculations on which its WMP and RAMP are based, calling the validity of the entire WMP presentation into question. As SDG&E states, "*Risk aversion plays a critical role in regulatory and operational decision-making, shaping how SDG&E evaluates, plans for, and responds to wildfire threats. It influences mitigation strategies, infrastructure investments, emergency response protocols, and stakeholder engagement.*
To ensure wildfire risk is managed in accordance with regulatory requirements and community safety priorities, additional modeling techniques, such as incorporating a risk aversion scaling function, are essential. These adjustments help integrate both statistical projections and the practical, economic sensitivities of utilities, regulators, and communities, ensuring that extreme loss scenarios receive appropriate consideration in planning and risk mitigation efforts."[32]

SDG&E's WiNGS-Planning CBR calculations, shown in Appendix G, incorporate its risk-averse scaling function.[33] At MGRA's request SDG&E also provided a version of Appendix G with neutral risk scaling, as described in Section 8.2.2.[34]

[31] RAMP-01-11; Table 4.
[32] DRR MGRA-2026-8-04-Q3.
[33] DRR MGRA-2026-8-04-Q11.
[34] DRR MGRA-2026-8-05-Q2; Workpapers MGRA-2026-8-05_Q2.xlsx

The CPUC has indicated that risk-averse scaling is permissible assuming risk-neutral calculations are provided as well, but the basic assumption made by all stakeholders until SDG&E's WMP and RAMP filings was that risk aversion was intended to address uncertainty, aversion to mass casualties, and otherwise unmanageable tail-risk estimates. For wildfire tail-risk calculation, risk-aversion is unnecessary and redundant because extreme loss cases are automatically created by 24 hour wildfire spread modeling and truncated power law loss estimates. If Energy Safety wishes to support a mass-casualty averse attitude, it can do so by requiring SDG&E's use of risk aversion to apply this scaling ONLY to its safety attribute. This would still incorporate a societal or regulatory risk-averse attitude but would have a smaller effect on the overall result. This is demonstrated in the table below, in which MGRA re-calculates the values in Table 2 applying SDG&E's scaling function only to its safety attribute:

	Ignition 1	**Ignition 2**	**Total**
Sim Weather Conditions Date	11/12/18	11/17/14	
Total Acres Burned	43,703	35,934	79,637
Total Structures Destroyed	6,029	4,042	10,071
Wildfire Total Risk (with Risk Aversion) $M	$136,729.33	$74,237.73	$210,967.06
Wildfire Total Risk (without Risk Aversion) $M	$7,559.78	$4,989.72	$12,549.50
Wildfire Safety Risk (without Risk Aversion) $M	$1,427.77	$863.42	$2,291.19
Wildfire Financial Risk (without Risk Aversion) $M	$6,132.00	$4,126.24	$10,258.25
Wildfire Reliability Risk (without Risk Aversion) $M	$0.01	$0.05	$0.06
Wildfire Total Risk (without Risk Aversion) $M	$15,119.55	$9,979.38	$25,098.93
Estimated number of fatalities	44	27	71
Estimated number of serious injuries	176	107	283
SDG&E Risk Averse equivalent fatalities	261	426	688

Wildfire Safety Risk (without Risk Aversion) $M	$8,460.41	$13,814.72	$22,275.13
Wildfire Total Risk (with Safety Risk Aversion) $M	$14,592.42	$17,941.01	$32,533.43

Table 3 - Identical to Table 2 except applies SDG&E's risk scaling function and its equivalent fatality estimates only to the Safety attribute and not the financial or reliability attributes. Note that SDG&E's estimates of fatalities per structure is addressed in the consequence section. VSL of $16.2 M is used.

Table 3 demonstrates that while applying risk scaling to only the safety attribute still substantially increases the total risk estimate (from $25.1 B to $ 32.5 B), it is still a factor of 7 lower than if the risk-averse function were to be applied to all attributes ($210 B). MGRA does not recommend this approach, but it at the least adheres to the principal of mass-casualty aversion. SDG&E's application of a multiplier to its entire risk including financial and reliability risk lacks foundation and should not be used in any way by Energy Safety.

Recommendations:

- Energy Safety should only accept products of risk-neutral attitude functions. This goes for SDG&E's modeling as well (Appendix G) and any decisions or processes that incorporate CBR or risk.
- To the extent that Energy Safety accepts a risk-averse function for certain purposes, and specifically to allow aversion to mass-casualty events, this should be tied only to the safety attribute and not the risk calculation as a whole.

5.2. Risk Analysis Framework

5.2.1. Likelihood of Ignition

SDG&E's ignition model "*WiNGS-Planning model utilizes the statistical and machine learning models detailed in Appendix B. These deterministic and regression models are developed using historical electrical outage data and ignitions, including CPUC-reportable ignitions and evidence of heat collected from Fire Coordination and District Engineers*

The models are trained on a decade of historical records and predict the probability of failure and ignition using two years of historical weather and fuels data from the weather station network. This method calculates failure and ignition rates at the pole and span level under diverse

weather and fuel conditions, offering a comprehensive overview of potential outcomes."[35] SDG&E's Appendix B Figure 1[36] shows the schematic of this model.

SDG&E provides additional detail in its RAMP:

"*WiNGS-Planning now utilizes statistical and machine learning models developed with historical electrical outage data and ignitions and correlated with historical asset characteristics, vegetation, site-specific conditions, and weather conditions, in order to capture the influence of wind gust and wind direction* ***variables at the time of the outage and ignition****. By analyzing these correlations and the influence of other variables, insights into the* ***probability of failure and ignition across various wind gust scenarios*** *can be determined*"[37] (Emphasis added).

SDG&E has taken further steps to unify its WiNGS-Planning and WiNGS-Ops models, and now uses a common ignition model for both. This is important because SDG&E is the only of the three major utilities to use hourly rather than aggregated yearly weather and wind gust data.

SDG&E is currently the only utility that makes an attempt to 1) use wind data valid at the time of outage or ignition and 2) link that to the consequence model conditions used for simulation. The machine learning models used by SCE and PG&E are not capable of analyzing hourly data and instead need to use yearly aggregates, which MGRA showed in its PG&E WMP Comments are poorly predictive of both extreme winds and ignitions. Energy Safety should therefore exercise caution in favoring machine learning models over regression models if those machine learning models do not have the capability to capture key variables influencing risk such as hourly wind data.

Nevertheless, SDG&E's ignition model still has serious issues regarding its "PSPS blindness" and the wind gust correction mechanism it uses to try to correct for it.

[35] SDG&E WMP; p. 49.
[36] SDG&E WMP; p. B-4.
[37] SDG&E RAMP-4-19.

5.2.1.1. PSPS Blindness

MGRA has for a considerable time been raising the issue of "PSPS blindness" or the fact that all outage and ignition data is extremely biased in areas where PSPS is operative.[38] This is because PSPS prevents any ignitions or outages from occurring, and periods when PSPS is in operation are typically represent the very highest wildfire danger. As a result, frequent PSPS areas look "safer" than they really are if one uses outage and ignition history as a proxy for risk. This is potentially dangerous. It might be decided, for instance, to leave a particular area outside of a PSPS for a particular weather event, because the risk model shows the risk in the area is below threshold. However that area may have "hidden risk" such as old or faulty equipment that is more sensitive to wind gusts, but not measured because it has been typically de-energized during past fire weather events.

As of the 2025 WMP Update SDG&E was planning[39] to apply a measure used by PG&E: incorporating damage identified during post-PSPS patrols as proxies for outages and risk. SDG&E does not mention doing this in its current WMP or RAMP, and its schematic diagram does not indicate that PSPS damage events are an input to its risk model.

Recommendation:

- SDG&E should be required to correct for the bias caused by PSPS in ignition and outage data by including PSPS damage events as risk events in its model. If it is doing so already its methodology should be described.

5.2.1.2. Wind gust correction

SDG&E attempts to correct for higher wind gusts in certain areas by calculating a multiplicative correction: "$WRwind$: *historical 99th percentile wind gusts at the location of a risk event, used as a weighted factor based on its distribution*."[40] SDG&E elaborates in its response to

[38] MUSSEY GRADE ROAD ALLIANCE COMMENTS ON 2021 WILDFIRE MITIGATION PLANS OF PG&E, SCE, AND SDG&E; March 29, 2021; p. 33.
[39] MGRA 2025 WMP Update Comments; p. 16.
[40] SDG&E WMP; p. 13.

data request MGRA-2026-8-03-Q2: "*To distinguish and quantify the wildfire risk for a given risk driver that occurred at locations prone to wildfire conditions, the 99th percentile wind gust for a given location is compared to the 25th, 50th, 75th of the overall 99th percentile wind guests for all HFTD locations. The weight (WRwind) of the wind component for a risk event is calculated using 2^0, 2^1, 2^2, and 2^3, respectively.*"

This is a valid approach in principle if not in detail to correct for "PSPS blindness". For one thing, the correction factor is somewhat arbitrary and could benefit from further justification. Studies of the dependency of outage rates on wind, both academic[41] and based on data obtained from utilities during past WMP and CPUC proceedings, show that outage rates increase extremely steeply as a function of wind speed, and that the multiplier should be a function of overall wind gust value, and not just the percentile of wind gusts. It also appears that the factor of two for each tier is an arbitrary choice and not based on data. SDG&E's description would appear to indicate that a location that has a wind gusts over the 75th percentile of 20 mph 10% of the time would have a higher wind gust correction than a location that had wind gusts over the 75th percentile of 90 mph 5% of the time, thus ignoring peak values.

SDG&E's wind gust correction could be made more accurate by obtaining a fragility curve using outage rates and using that for the correction. For example:

$WR_{wind} = \overline{R_{outage}(u: u = w \ldots u = W_{99\%})} \; / \; \overline{R_{outage}(u: u < W_{25\%})}$

where w is the wind gust speed,

$W_{99\%}$ is the 99th percentile wind gust speed and $W_{25\%}$ is the 25th percentile wind gust speed,

$\overline{R_{outage}(u: u = w \ldots u = W_{99\%})}$ is the mean outage rate averaged over wind gust speeds greater than w and up to 99th percentile, and

$\overline{R_{outage}(u: u < W_{25\%})}$ is the base mean outage rate for wind speeds less than the 25th percentile.

[41] Mitchell, J.W., 2013. Power line failures and catastrophic wildfires under extreme weather conditions. Engineering Failure Analysis, Special issue on ICEFA V- Part 1 35, 726–735. https://doi.org/10.1016/j.engfailanal.2013.07.006

This approach would 1) base SDG&E's multiplier in historical data that is demonstrated to be wind-speed dependent, and 2) tie the estimate to actual wind speed as well as relative percentile wind speed.[42]

Recommendations:

- SDG&E should adopt a wind gust model based on fragility curves determined from outage rates rather than from arbitrary multipliers.

5.2.1.3. Wind gust drivers

SDG&E's wind gust correction makes an additional error by applying weighting to some drivers that have no relationship to wind. This was indicated in SDG&E's response to MGRA-2026-8-03-2:

"*For example, if 5 animal-contact caused ignitions occurred at locations where the 99th wind gust falls between 25th to 50th percentiles of the overall 99th wind gust (WRwind = 2^1) and where the 50th consequence is above the overall 50th percentile threshold, the Rfreq is calculated as follow*:"[sic]

MGRA enquired further and received the following additional information:

"*SDG&E applied a wind gust weight factor (WRwind) to ignition events, including those caused by animal contact when calculating the Rfreq…*

By applying a wind-based weighting, SDG&E accounts for the elevated wildfire risk associated with ignition events occurring in locations prone to high wind gusts. This approach enables a location-specific quantification of risk, even for ignition causes not directly influenced by wind, such as animal contact."[43]

This is an erroneous approach. While wind can play a role in increasing the probability of ignition given an outage (called *P(i|o)* in PG&E's WMP), the outage rate's sensitivity on wind depends strongly on causal effects, with power line damage and vegetation contact being the most likely contributors. In fact, an examination of the cause of catastrophic power line wildfires shows

[42] Additionally, the increased probability of outage proceeding to ignition (P(i|o)) may merit applying a supplemental scaling factor. SDG&E has studied this relationship.
[43] DRR MGRA-2026-8-04-1.

that their cause is statistically inconsistent with an external agent such as animals or vehicles.[44] MGRA's PG&E WMP Comments revisited the question of wind / power line wildfire causality and showed large wildfires (size exceeding a threshold) that ignite under high winds are more likely to come from power lines.[45]

SDG&E in fact not only erroneously applies additional wind gust risk corrections to drivers that are not influenced by wind, but also does not consider wind to be risk contributor for other drivers known to be affected by wind. Drawing from SDG&E's OEIS Table 3-1,[46] the issues are summarized below:

Risk Driver	Priority	x% ignitions	x% outages	SDG&E Wind Risk?	Wind Driver?
Pole	1	2.3	7.1	No	Yes
Animal Contact	2	27.9	12.4	Yes	No
Vehicle Contact	5	11.6	10.0	Yes	No
Conductor Failure	6	2.3	4.9	No	Yes
Cross Arm Failure	8	0	4.0	No	Yes
Transformer	10	0	4.1	Yes	No
Branch Failure	13	4.7	2.5	Yes	Yes
Tree Fall-in	13	n/a	n/a	Yes	Yes
Balloon	16	9.3	2.6	Yes	No
Anchor/Guy Failure	22	2.3	0.7	Yes	Yes
Vegetation Blow-in	28	0.0	0.2	Yes	Yes

Table 4 - SDG&E's risk drivers shown with priority, ignition and outage percentage, whether SDG&E considers wind gust risk, and whether winds should be expected to increase outage rates for the driver type. Highlighted rows are those in which SDG&E misclassifies drivers.

Some of these misclassifications add potential risk to the system by mis-prioritizing mitigation. For example, SDG&E's December 2024 PSPS report showed that numerous instances of cross arm damage occurred during a high wind event. Furthermore, SDG&E's estimated risk for

[44] Mitchell, J.W., 2023. Analysis of utility wildfire risk assessments and mitigations in California. Fire Safety Journal 140, 103879. https://doi.org/10.1016/j.firesaf.2023.103879. See Table 2.
[45] MGRA PG&E WMP Comments; pp. 21-25.
[46] SDG&E WMP; p. 11.

the circuits in those areas was in the bottom 85% of risk circuits, indicating that SDG&E's skill in predicting risk events during fire weather is poor.[47] In summary, it appears that SDG&E's wind gust scaling factor may apply to only the probability of ignition given an outage, and be ignoring the much larger effect of increase in outage rates during periods of high wind gusts.

Recommendations:

- Energy Safety should request additional information from SDG&E regarding its wind gust correction factor and ensure that any wind gust model corrects for the increase in outage rates as well as the increase in ignition probability given outage.
- SDG&E's Probability of Ignition model should undergo additional third party review.

5.2.2. Consequence of Wildfire Risk Event

SDG&E has made modifications to its wildfire risk consequences model, described in this section. Some of these require improvements or further explanation.

5.2.2.1. Simulation increase from 8 to 24 hours

SDG&E has increased the duration of the Technosylva fire spread modeling for unsuppressed wildfires to 24 hours from 8 hours.[48] SDG&E does not provide justification for this increase, however PG&E's supplemental WMP documents have provided an analysis that shows that 24 hour simulations provide, on the average, a more accurate estimate of final burn sizes for historical wildfires. PG&E's justification is discussed and validated in MGRA's PG&E WMP Comments.[49] SDG&E's adoption of a 24 hour simulation is correct.

5.2.2.2. SDG&E Fatality Estimate

SDG&E includes wildfire fatalities as part of the "safety" attribute of its risk model, using $16.0 M as its Value of Statistical Life (VSL),[50] and adjusting this value down using Department of

[47] Full analysis is in Section 7.1.
[48] SDG&E WMP; p. 45.
[49] MGRA PG&E WMP Comments; pp. 29-31.
[50] SDG&E WMP; p. 26-28; Tables 5-1, 5-2.

Transportation scaling for injuries. For the safety component, SDG&E states that it is using an assumption of a 0.00617 factor to estimate the total number of equivalent fatalities per structure destroyed.[51] Data supporting this estimate was requested by OEIS via a data request and provided by SDG&E.[52] The SDG&E estimate was based on the records of 42 historical wildfires in California that had fatalities, going back to 1889.

This data was re-analyzed and is published in the MGRA Workpapers.[53] MGRA's re-analysis contains the following adjustments:

- Wildfires occurring prior to 1990 were excluded. Many of the wildfires included before that date included wildfires with large firefighter casualties, and these are not necessarily relevant to modern firefighting and building codes.
- Wildfires with fewer than 10 structures destroyed were not included, since these artificially inflate the fatality/structure rate due to a sampling effect.
- A column was added with the logarithm of the number of structures lost, since losses can span several orders of magnitude.

The MGRA analysis with selection for recent date and significant structure loss found a fatalities per structure rate of .00438. However, the variation from wildfire to wildfire varies widely, so a statistical analysis was performed on the data.[54] Results are shown below:

[51] SDG&E WMP; p. 38; Table 5-4.
[52] OEIS-P-WMP_2025-SDGE-02-10, Attachment SDGE_Wildfire_Fatality_Structures_ratios_2025_05_12_0.xlsx
[53] WMP26/SDGE/SDGE_Wildfire_Fatality_Structures_ratios_2025_05_12_0-jwm.xlsx
[54] Analysis is contained in workpaper file cal_wf_fatality_per_structure_mgra.py
This is a Python-based analysis using the pandas, numpy, and scipy.stats libraries. It consists of testing the hypothesis of a straight line fit using the SDG&E and MGRA averages against the observed fatalities per structure data. Only non-zero fatality values were used in the fit. RMS values are calculated based on the Poisson distribution of number of fatalities. A reduced chi-squared analysis was performed and the results shown in Figure 2. The analysis was performed in conjunction with and portions of the Python code written by OpenAI ChatGPT. All AI input was reviewed and independently validated.

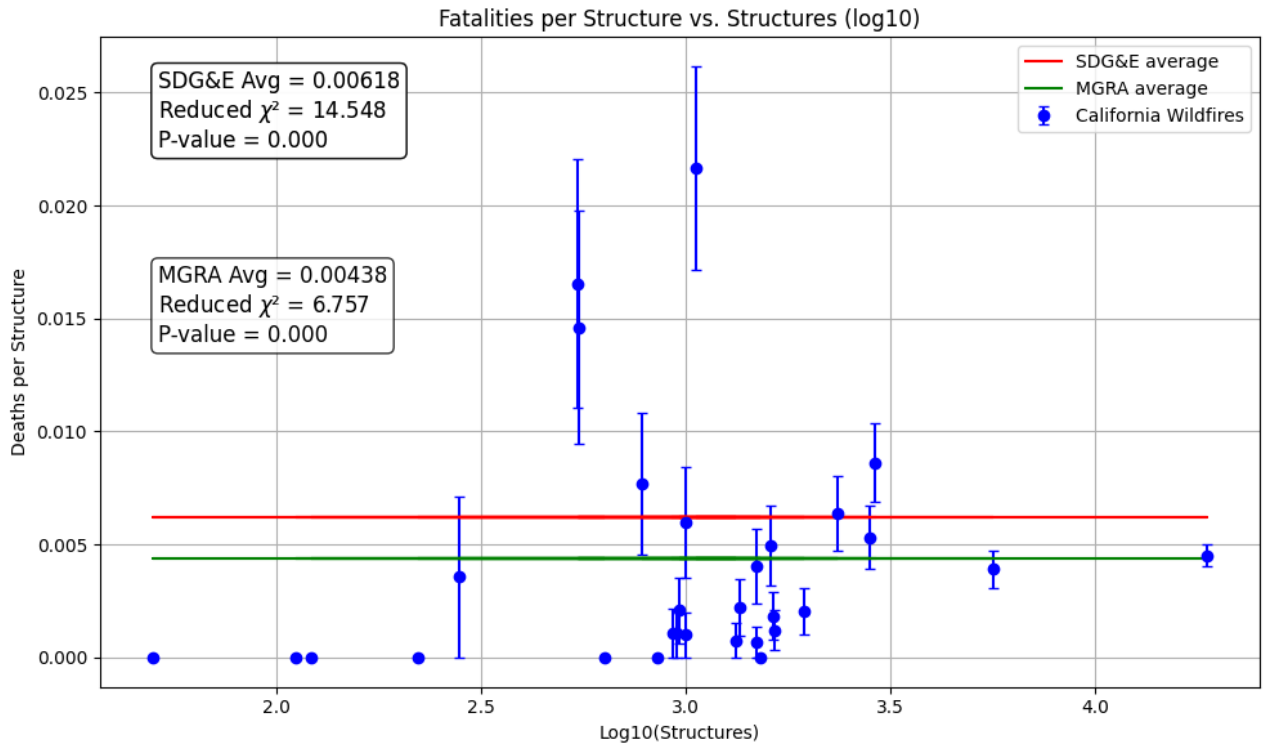

Figure 2 - Fatalities per structure obtained from analysis of SDG&E wildfire fatality data file. Number of fatalities per structure is plotted against the base10 logarithm of structures lost. Error bars are based on RMS of number of fatalities. Average values obtained from SDG&E and re-calculated by MGRA are compared against the data. Statistical analysis was performed as described in Footnote 54 and the results of the reduced chi-squared analysis are shown. P-values of zero are found for both hypotheses, ruling out the possibility that the observed variation is a result of statistical fluctuation.

As can be seen in Figure 2, significant variation is seen in the deaths per structure for each wildfire, much larger than the range of statistical variation for each point (indicated by the error bars, which are the RMS assuming a Poisson distribution for number of deaths). The average number of fatalities per structure calculated by both SDG&E and MGRA is shown. A weighted chi-squared analysis indicates very high chi-squared for both, showing that there is significant variation in fatalities per structure between wildfires that does not scale with the number of structures lost. The P-value of zero indicates that the hypothesis that this variation is due to statistical fluctuation can be ruled out. This suggests that incorporating additional explanatory variables may significantly improve model fit. PG&E has proposed factors such as age and AFN status. Other candidate variables include egress and accessibility for firefighting resources.

As it is Energy Safety's mandate to reduce safety risks, it is important to understand what factors lead to excess fatalities and injuries from utility-caused wildfires so that mitigations can be prioritized to reduce those risks. Analysis of wildfire data provided by SDG&E suggests that use of

a "fatalities per structure" metric may be alright as an initial approximation, but it leaves significant variance in the data that still needs to be identified.

Recommendations:

- SDG&E should restrict its analysis to relatively recent wildfires and ignore wildfires with small structure loss. This will result in the adoption of a somewhat lower fatalities per structure average.
- SDG&E should be required to investigate other variables that may influence number of fatalities per structure, such as resident age, AFN status, and egress issues.

5.2.2.3. Egress

SDG&E has developed a detailed and sophisticated egress model. As SDG&E explains: "*The model integrates multi-source geospatial and temporal data to simulate fire progression, population movement, and traffic dynamics. It leverages a combination of deterministic fire spread modeling, graph-based network optimization, and behavioral simulation to identify evacuation bottlenecks and high-risk communities*."[55] SDG&E's model attempts to incorporate many relevant factors, and correctly acknowledges that: "*Egress modeling is a complex and technically challenging process, and its accuracy depends on a several factors and necessary assumptions that are intrinsically extremely difficult to model*."[56]

OEIS also requested information regarding SDG&E's egress model. SDG&E explains that "*The Egress model is intended to be included in the wildfire consequence model (safety attribute) of WiNGS-Planning. The egress model is a relative ranking model that helps in identifying areas in SDG&E service territory that are most vulnerable to evacuation constraints during a wildfire event*."[57] However, SDG&E does not in its responses to either Energy Safety or MGRA data requests explain how their egress model is incorporated into its consequence model. Additionally, SDG&E provides no information regarding how its model is validated. These are issues that Energy Safety should follow up on as areas for improvement.

[55] SDG&E DRR MGRA-2026-8-04-18.
[56] Id.
[57] DRR OEIS-P-WMP_2025-SDGE-02-9.

Also of great concern is that SDG&E does not use its egress model to inform its WiNGS-Ops framework. As stated in SDG&E's data request response to OEIS: "*As the WiNGS-Ops model is focused on PSPS and emergency decision making, SDG&E does not incorporate egress modeling into its WINGS-Ops model, based on the operational roles and responsibilities defined during wildfire and PSPS de-energization events. This decision reflects both the utility's limited authority in evacuation matters and the established structure of emergency response coordination within California…*

Primarily, SDG&E does not intend to use egress model outputs during PSPS activations or active wildfire incidents. This is because utility personnel do not have the authority to initiate or request evacuations, nor are they part of the formal decision-making process regarding evacuation orders."[58]

SDG&E errs in its understanding of the purpose of the egress model. While "identifying evacuation challenges" will have value for other emergency response organizations, SDG&E's primary role is to understand that these evacuation challenges increase the risk of mass casualty events and thereby increase potential consequences of a wildfire. This increase in consequences applies to both planning and operations, and therefore egress should be a factor in determining PSPS decisions. MGRA has already raised and delved into this issue in our 2023-2025 WMP Comments,[59] using the Mussey Grade Road area as an example of a limited egress neighborhood and showing the potentially catastrophic consequences of an ignition in the wrong place during extreme fire weather. One of the figures presented in the MGRA 2023-2025 WMP Comments is shown below:

[58] Id.

[59] Docket OEIS-WMPs; MUSSEY GRADE ROAD ALLIANCE COMMENTS ON 2023-2025 WILDFIRE MITIGATION PLANS OF PG&E, SCE, AND SDG&E; May 26, 2022; pp. 51-55. (MGRA 2023-5 WMP Comments)

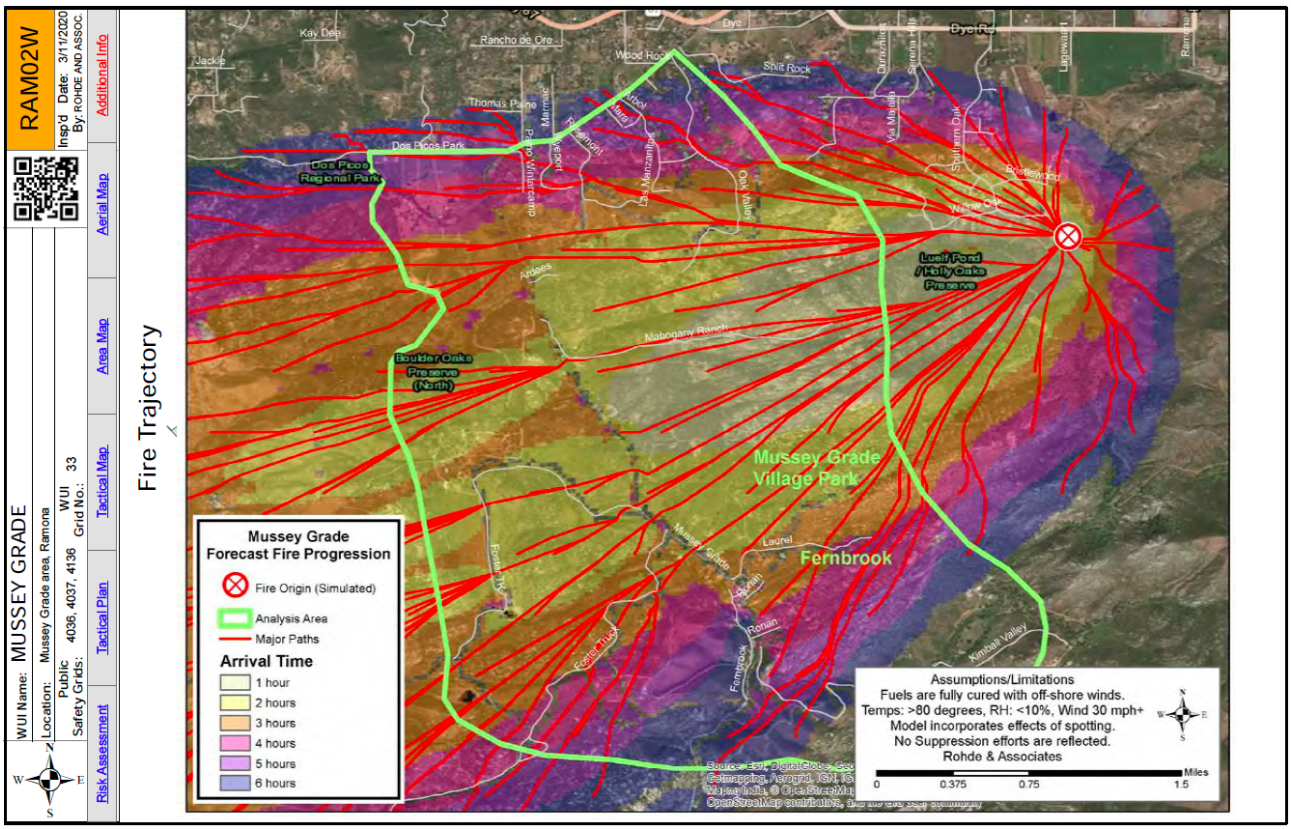

Figure 3 - Fire spread modeling for an ignition in the Dye Road area of Ramona, California, performed by Rohde and Associates at the behest of San Diego County.[60] As can be seen, the Mussey Grade Road corridor can be impacted by the fire front in as little as an hour after ignition. The southern Mussey Grade Road corridor is home to hundreds of people and is a single-egress neighborhood depending on Mussey Grade Road for evacuation. This model does not take the effect of smoke into account, which could severely limit visibility along the evacuation route before the fire front arrives.

As can be seen in this simulation performed on behalf of the County of San Diego, an ignition in the Dye Road area northeast of the Mussey Grade corridor could cut off the Mussey Grade Road evacuation route within 1-2 hours, not accounting for wildfire smoke visibility effects. MGRA had also noted in its 2021 SDG&E RAMP Comments that the Dye Road area was a "hot spot" for SDG&E ignitions.[61] The status of the Mussey Grade Road corridor and SDG&E's hardening efforts as of the end of 2024 is shown in the figure below:

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[60] Id. Cites:
BOULDER OAKS PRESERVE; Improvement Project; FIRE SERVICES OPERATIONAL ASSESSMENT; Prepared for the Fire Marshal, San Diego County Fire Authority, by: Rohde & Associates Emergency Management; March 11, 2020; p. 25.
https://files.ceqanet.opr.ca.gov/255399-3/attachment/RoCw4UBieJabVxwD17qEFEgtaDfVVUZDJBkYn0n0nCMP5oee4U5QZTiblg509QlYUWMRtidLAvA6bb0m0. Downloaded 10/18/2021.

[61] A.21-05-011, A.21-05-014; Safety Policy Division Staff Evaluation Report on SDG&E's and SoCalGas' Risk Assessment and Mitigation Phase (RAMP) Application Reports; November 5, 2021; p. 239/295.
Incorporates:
MUSSEY GRADE ROAD ALLIANCE INFORMAL COMMENTS TO THE SAFETY POLICY DIVISION

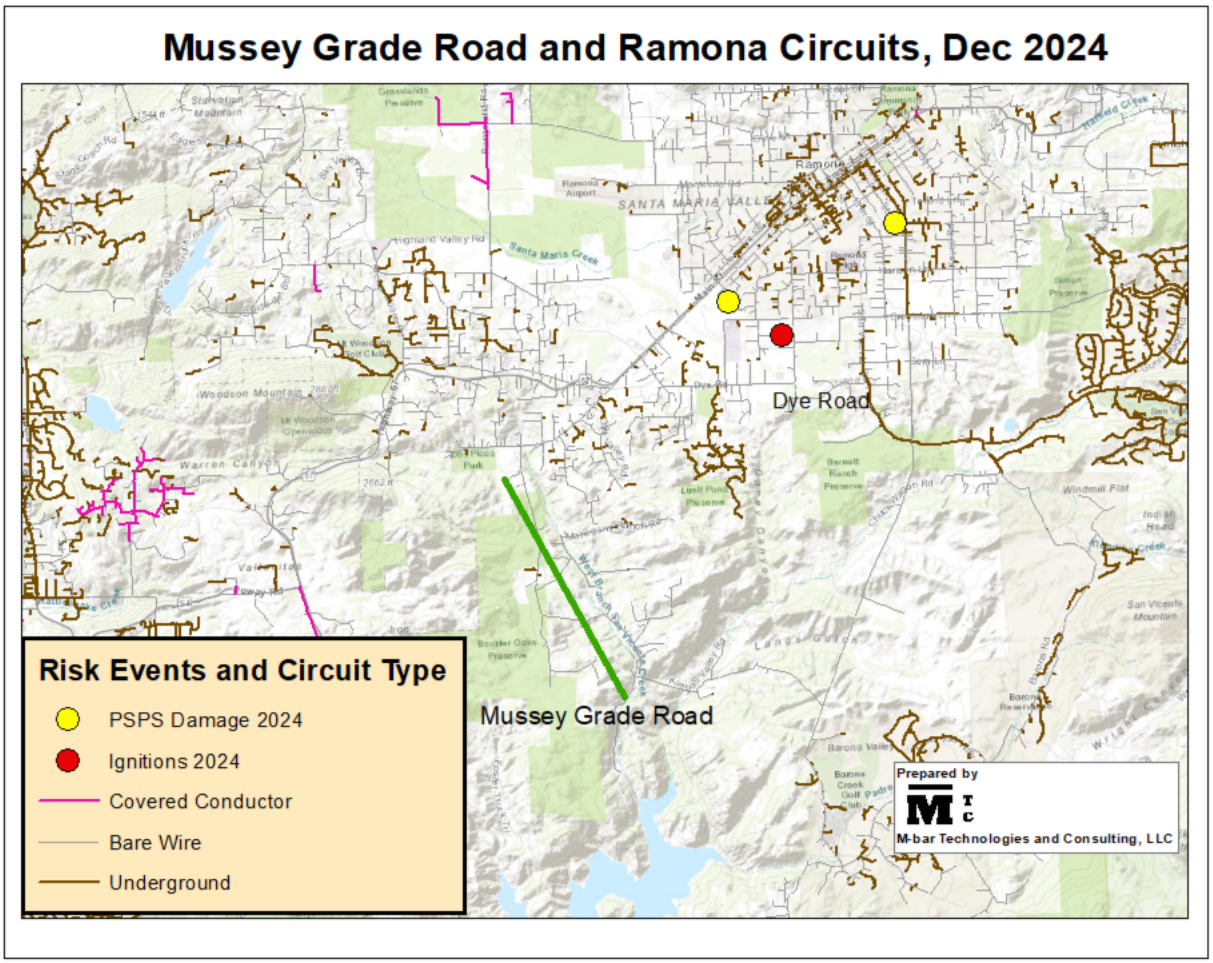

Figure 4 - Risk events in Ramona, California and the Mussey Grade corridor and current circuit covered conductor and undergrounding status. The Dye Road area is northeast of the Mussey Grade corridor, and a fire originating in this area can prevent egress.

As can be seen, a considerable fraction of the Dye Road area is still unhardened 4 years after MGRA raised its issue, though it should be acknowledged that the neighborhood where the San Diego County simulated ignition occurred has now been undergrounded. It should also be noted how little covered conductor has been deployed in the Ramona area. The eastern part of the Dye Road area is ranked in the bottom 80% of SDG&E's circuit risk rankings, while the western part is ranked in the 75-80% range. It would be interesting to see how WiNGS-Planning calculated this estimate, and how egress limitations were figured in. SDG&E may not be immediately hardening these circuits, so in the meantime it is vital to ensure the safety of residents during extreme fire weather events.

REGARDING SAN DIEGO GAS AND ELECTRIC COMPANY'S RAMP FILING; October 22, 2021; p. 31.

Recommendations:

- Energy Safety should require SDG&E to quantify how its egress model is incorporated into the WiNGS-Planning model.
- Energy Safety should require that SDG&E incorporate its egress model into the WiNGS-Ops model in order to inform shutoff decisions.

5.2.2.4. Age and AFN Status

PG&E notes in its Wildfire Consequence Modeling document that of the Camp fire fatalities, 67 of the 85 victims were age 64 or above.[62] When asked to provide the equivalent age distribution of the Camp fire evacuation PG&E provided the following 2010 Census for Paradise:

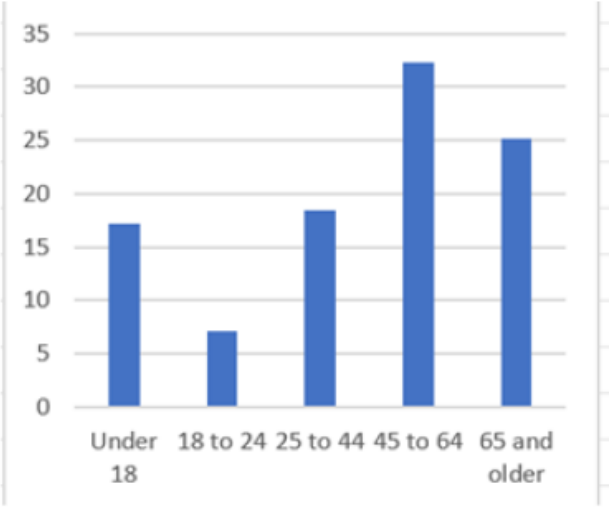

Figure 5 – PG&E in response to WMP-Discovery2026-2028_DR_MGRA_006-Q009 stated "we did consult the 2010 census results for Paradise: The age distribution was 4,501 people (17.2%) under the age of 18, 1,858 people (7.1%) aged 18 to 24, 4,822 people (18.4%) aged 25 to 44, 8,466 people (32.3%) aged 45 to 64, and 6,571 people (25.1%) who were 65 years of age or older. The median age was 50.2 years. The median age for the victims of the Camp fire is 72 years."

The median age for fire victims was 20 years older than the median age of the population. PG&E noted that many victims had mobility issues.

[62] MGRA PG&E WMP Comments; pp. 43-46. Cites
Wildfire Consequence Model Version 4; (WFC v4) Documentation; March 12, 2025; p. 24.

This observation is not restricted to the Camp fire. The Northern California fires of 2017 shared a similar trend, with an average age of victims in the late 70s.[63]

SDG&E considers aging populations to be included in its definition of AFN.[64] Additionally, SDG&E filed its AFN plan with the Commission on January 31, 2025, and includes this plan as Appendix H of its WMP filing.[65] While SDG&E describes the measures it takes to accommodate AFN needs for PSPS "and wildfire", its treatment is particularly centered on operational needs with regard to PSPS risk. There is no description of how or whether SDG&E includes its knowledge of AFN exposure to determine its wildfire consequence risk, to be used either for planning purposes or for the sake of operational protection of communities with substantial egress risk. It should consider doing so.

Recommendation:

- SDG&E should consider incorporating AFN weighting in its consequence models for the purposes of both mitigation and the protection of egress-limited communities.

5.2.2.5. Wildfire smoke health effects

Historically SDG&E was the only utility that attempted to correct for wildfire smoke health effects. While MGRA has filed extensive comments regarding technical error in the details of SDG&E's calculations, it supported the overall approach used by SDG&E of using acres burned as a rough scaling factor for potential injuries and fatalities. MGRA recommended updating references and technique to do this more accurately.[66]

This issue was reviewed in the Risk Mitigation Working Group, and while all stakeholders acknowledge the importance of wildfire smoke health effects – it likely is the largest cause of health

[63] Tchekmediyian, A., Bermudez, E., October 17, 2017. California firestorm takes deadly toll on elderly; average age of victims identified so far is 79. Los Angeles Times. https://www.latimes.com/local/lanow/la-me-ln-norcal-fires-elderly-20171012-story.html
[64] SDG&E WMP; pp. 276-277.
[65] SDG&E WMP; Appendix H; p. 712/831.
[66] MGRA 2022 WMP Comments; MUSSEY GRADE ROAD ALLIANCE COMMENTS ON 2022 WILDFIRE MITIGATION PLANS OF PG&E, SCE, AND SDG&E; April 11, 2022; pp. 47-52.

impacts and premature deaths from wildfire – the technical problem is difficult enough that there is widespread desire to defer this issue and to move it to another agency if possible.[67]

Accordingly, none of the 2026-2028 IOU WMPs refer to wildfire smoke health risks at all, including SDG&E. In fact, SDG&E has specifically removed its wildfire smoke correction from its consequence model, as it describes in its RAMP:

"*In the 2021 RAMP, SDG&E included Acres Burned as a sub-attribute to account for the detrimental environmental impacts of wildfire smoke. During the transition to the Cost Benefit Approach, this sub-attribute was eliminated from the Safety Attribute due to several challenges, including the difficulty of accurately identifying and quantifying the potential number of SDG&E customers impacted by smoke related to utility-caused wildfires and assessing the extent of the effects on both customers and the environment. The complexity arises from several factors, including but not limited to the variability in wildfire behavior, identifying and quantifying the type of material burned, the duration of the fire, the diverse locations and existing characteristics of the customers impacted, and the difficulty in predicting long-term environmental impacts. While the removal of the Acres Burned sub-attribute may lead to an underestimation of wildfire risk in SDG&E's service territory, this change is intended to streamline the wildfire risk quantification process and improve the accuracy of SDG&E's assessments to provide a more transparent wildfire risk evaluation.*

As a utility, SDG&E lacks the information necessary to adequately quantify and measure the health or overall environmental impacts of utility-related wildfire smoke. SDG&E is open to collaborating with Safety Policy Division, Energy Safety, and academia, to assess whether the potential risks of utility-related wildfire smoke on air quality and the environment can be isolated and whether this should be incorporated into future cost-benefit calculations."[68]

MGRA has provided substantial evidence that wildfire smoke effects are likely the largest harm done by utility wildfires, larger even that direct casualties.[69] OEIS through the RMWG has de-emphasized the importance of this issue because it is hard to solve correctly and requires

[67] WMPs-2023-2025; MGRA WMP Comments; p. 125.
[68] SDG&E 2025 RAMP; p. RAMP-2-9.
[69] MUSSEY GRADE ROAD ALLIANCE COMMENTS ON 2022 WILDFIRE MITIGATION PLANS OF PG&E, SCE, AND SDG&E; April 11, 2022; pp. 47-50. (MGRA 2022 WMP Comments)

external resourcing. Consulting group E3, however, in its review of PG&E's risk model agrees with the importance of wildfire smoke modeling and urges that some form of it be incorporated: "*E3 recommends that PG&E, in collaboration with the State and other IOUs, consider a simple, standardized statewide approach to model the consequences of smoke from utility-caused wildfires. Because smoke is a complex, computationally expensive consequence to model, standardizing a simple statewide modeling approach would prove beneficial to all utilities and State agencies considering the health consequences of wildfire smoke….*
If smoke were to be incorporated in the consequence score, careful consideration would need to be given to how this might impact the geospatial distribution of consequence. For example, the consequences related to smoke would likely be more concentrated in highly populated areas. The consequence score is main driver of the risk tranche assignment for circuit segments (e.g. only circuit segments in the top two quintiles of consequence are considered to be in the top eight risk tranches)."[70]

SDG&E claims that its goal is to "*improve the accuracy of SDG&E's assessments*", however it would be more correct to say that by removing wildfire smoke health impact estimates SDG&E is improving the ***precision*** of its assessments ***at the expense of accuracy***, since all acknowledge that wildfire smoke health effects are a major wildfire impact. The consensus that we should defer wildfire smoke risk estimations until sometime in the future when an academic or governmental organization solves the very domain-specific problem of how location-specific ignitions impact aggregate wildfire smoke health risk, is ill-conceived. No entities aside from the utilities have much of a stake in solving this problem, and so it will likely never be solved unless OEIS, the CPUC, and the IOUs advocate for it. While interim estimates of wildfire smoke risks using crude average approximations such as acres-to-fatality are likely to be highly inaccurate, and at some level wrong, including them is ***significantly less wrong*** than ignoring the problem entirely, as E3 acknowledges.

Recommendation:

- Energy Safety should revisit the issue of wildfire smoke risk in its RMWG, and devise an action plan that will lead to a methodology to approximate wildfire smoke

[70] E3 Report; pp. 57-58.

health risks and a pathway that will lead to improving accuracy of the estimate over time.

- SDG&E and other utilities should in the meantime be encouraged to include in their consequence estimates wildfire smoke estimates using an acres-to-fatalities approximation linked to best available literature.

5.3. Design Basis Scenarios

The "Design Basis Scenarios" instruction provided by Energy Safety is extensive and detailed. According to OEIS:

"*The design scenarios identified must be based on the unique wildfire risk and reliability risk characteristics of the electrical corporation's service territory and achieve the primary goal and stated plan objectives of its WMP. The design scenarios must represent statistically relevant weather and vegetative conditions throughout the service territory.*"[71] These scenarios include 1) wind conditions of increasing severity as timescale increases, 2) weather conditions including climate effects, and 3) vegetation conditions both current and projected. Energy Safety requests that the utility provide narrative discussion of how it will address scenarios as they arise.

SDG&E, like PG&E, did not comply with the basic requirement or goal of design scenarios at all. For the case of Extreme Event / High Uncertainty scenarios SDG&E refuses to comply with guidance:

"*SDG&E does not currently analyze extreme events or highly uncertain scenarios. Instead, the WiNGS-Planning model is designed to incorporate historical weather conditions experienced within the service territory. The model can simulate a variety of weather conditions based on past data, providing a robust framework for risk analysis based on known conditions. By focusing on historical weather patterns, the model can accurately reflect the range of conditions that have been observed over time, allowing for more reliable predictions and effective planning.*"[72]

SDG&E entirely misses the point. It is precisely because future extreme events *may* be unprecedented and not represented in event histories that other methodologies – statistical or scenario-based, must be applied to ensure future safety. It is SDG&E's job to solve for the future,

[71] PG&E WMP; p. 84.
[72] SDG&E WMP; p. 51.

not the past, and this is the point of OEIS guidance on this issue. This is a potentially dangerous omission.

Current utility operational and hardening in the aftermath of the recent wildfire disasters have made the utility systems significantly more resilient to extreme events. PSPS, for example, can be employed regardless of the severity of the risk event with equivalent effectiveness. Consequently it isn't clear that "tail risk" on the weather and climate side necessarily leads to additional wildfire "tail risk" to the public. However, it still is beneficial to work through the contingencies of major events to ensure that all implications of those events can be properly managed if they occur. Some examples were provided in the MGRA's PG&E WMP Comments[73] and are reproduced here. OEIS may use these and possibly others to provide more detailed guidance as to what it expects from utilities in this section:

5.3.1. Extreme 100+ year fire wind event

An extreme 50+ year fire wind event would be potentially characterized by:

- Record-breaking wind gusts, sometimes in areas not typically affected by high winds
- Long duration of high winds, potentially many days.
- Potential for uncharacteristic or unstable weather behavior, including rapid changes in local weather conditions.

Primary utility response to such an event would be:

- Normal operation in areas where full path is undergrounded, however with greater potential for secondary line ignitions if these are not also undergrounded.
- General long-duration PSPS active throughout large portions of the service area.

Potential complications of such an event would be:

- Increased vulnerability to failures in circuit control systems due to the sheer number being affected.
- Areas requiring de-energization that may not have been fully sectionalized.
- Rapid changes in local weather conditions challenging operational response times.

[73] MGRA PG&E WMP Comments; pp. 47-50.

- Extensive damage to above-ground electrical infrastructure potentially requiring mutual aid assistance.
- Long duration outages affecting the population in general, as well as critical facilities and AFN populations, potentially extending beyond current contingency plans.
- Increased dangers of sparking during re-energization and resulting wildfires.

5.3.2. Extended extreme drought exacerbated by climate change

It is also foreseeable that an extended drought, such as those California has suffered in the past decades but even more severe, may occur under climate change. In these circumstances, PG&E would face the following exacerbated risks:

- Increased tree mortality causing a greater rate of tree fall-in and vegetation contact on overhead lines.[74]
- Much greater vapor pressure deficits and dangerously low vegetation moisture for extended periods, leading to higher FPIs and extended EPSS enablement.
- Greater potential for fuel-driven rather than wind-driven catastrophic wildfires, meaning that ignition drivers unrelated to wind may make up a greater proportion of severe power line fires than observed historically.
- Greater potential for extended PSPS even in the absence of extreme winds.
- Greater potential for an extreme weather "fire siege" consisting of multiple simultaneous large wildfires (such as Southern California October 2003, Southern California October 2007, Bay and Northern California 2017, Los Angeles 2025). Even in the case that power line fires are prevented, there is the potential for multiple catastrophic large wildfires simultaneously threatening multiple transmission assets and significantly damaging distribution assets in affected areas.

[74] PG&E WMP; p. 24 ,and
WMP-Discovery2026-2028_DR_MGRA_003-Q003, cites:
Lessons from California's 2012–2016 Drought. Jay Lund, Josue Medellin-Azuara, John Durand and Kathleen Stone. J. Water Resour. Plann. Manage., 2018:
"*Perhaps the greatest impact of California's drought was the death of 1020 million forest trees, which depend on soil moisture accumulated in the wet season for growth during the spring and summer.*"

Energy safety should require SDG&E and other utilities to analyze these and other potential risks, and then for each of these fully describe the measures that the utility would take to mitigate each of those risks. Ideally these would be the subject of "tabletop" scenario exercises in coordination with Energy Safety and the Office of Emergency Services.

Recommendations:

- Energy Safety should not permit utilizes to ignore guidance regarding extreme event planning scenarios.
- Utilities should be at the least required to provide operational and contingency scenarios showing how they will be prepared to protect the public in the event of extreme events. Examples are 100+ year wind events and extreme extended drought.

7. PUBLIC SAFETY POWER SHUTOFF (PSPS AND EPSS)

The absence of catastrophic fire in SDG&E territory since 2007 is in part due to the judicious employment of PSPS.[75] In PG&E's service territory, where tree fall-ins constitute much more of a risk to covered conductor, PG&E estimates that covered conductor, EPSS+DCD, and PSPS can reduce wildfire risk by 97%.[76] Similarly, SDG&E estimates that covered conductor + PEDS + FCD + PSPS can reduce wildfire risk by 97.7%.[77] Once the wildfire risk is reduced, EPSS and PEDS risk constitute a larger component of overall risk. Reduction of PSPS risk and EPSS risk in a cost-effective manner without increasing wildfire risk would be a great benefit. Last year's MGRA WMP comments showed that for PG&E and SDG&E undergrounding projects to date, the reduced PSPS/EPSS risk was insignificant compared to the substantial costs of undergrounding, introducing the notion that it would be most cost efficient in many if not most cases to provide remote rural residents on sparsely populated circuits with the capacity to go off grid rather than spend the money on undergrounding projects.[78]

[75] See for example SDG&E Figure 6-5, which shows that 25% of risk reduction from 2007-2037 is from PSPS.
[76] PG&E WMP TABLE PG&E-6.1.3-1; p. 126.
[77] SDG&E DRR MGRA-2026-8-04-13.
[78] MGRA 2025 WMP Update Comments; pp. 29-39. Also see workpaper WMP25/ SDGE Response MGRA-SDGE-2025WMP-03_Q2_Revised 4.19.24-TUGCustomers-jwm.xlsx. This shows an imputed CMI break-even for undergrounding using historical customer outages between $0.54 and $29.

Recently, the independent HAAS group working out of Berkeley performed an independent analysis of PG&E's wildfire issue and found that dynamic EPSS was an economically more efficient way to reduce risk than vegetation management or hardening.[79]

It is essential to understand, particularly as we move into the SB 884 long term underground planning projects, that while improving reliability and preventing unnecessary power loss is a public good, the power of PSPS and EPSS (particularly with FCD which partially addresses the tree fall-in vulnerability of covered conductor) cannot be easily and cheaply dispensed with. Raising shutoff thresholds on hardened systems, as will be shown below, can go a long way to reducing the scope, duration, and frequency of PSPS events. Monitoring effectiveness using post-event damage surveys as a probe provides feedback as to where these changes can be made safely.

7.1. Recent PSPS Effectiveness

One way to gauge the effectiveness of PSPS is whether it prevented risk events or damage to energized lines that might have resulted in a wildfire. In 2024, SDG&E initiated PSPS December 9-11, 2024 and reported ten damage events in post PSPS surveys.

MGRA filed comments on this particular PSPS event with the CPUC.[80] While acknowledging that "*de-energization was a prudent action that likely prevented utility-ignited wildfire that may have led to significant risk to life and loss of property*",[81] the MGRA filing provided weather data indicating that "*much of SDG&E's power shutoff occurred six to eight hours prior to wind gusts that would present a significant hazard to its infrastructure, thus putting residents at additional risk as well as inconvenience during this period*."[82] MGRA's Comments conclude that: "*In the case of the December 9th-11th power shutoff, SDG&E appears to have been overaggressive in its shutoff threshold, ignoring wind measurement data and relying only on*

[79] Warner, C., Callaway, D., Fowlie, M., n.d. Dynamic Grid Management Technologies Reduce Wildfire Adaptation Costs in the Electric Power Sector (No. WP-347R). https://haas.berkeley.edu/wp-content/uploads/WP347.pdf
[80] R.18-12-005; MUSSEY GRADE ROAD ALLIANCE COMMENTS ON THE SAN DIEGO GAS AND ELECTRIC COMPANY DECEMBER 2024 PSPS EVENT REPORT; January 27, 2025. (MGRA December 2024 PSPS Comments)
[81] Id.; p. 1.
[82] Id.; p. 9.

potential worst case forecasts. The early shutoff extended what was already a long outage, and put residents at additional risk as well as the expense and inconvenience related to shutoff. Additionally, damage to utility infrastructure appears to occur at thresholds lower than GO 95, indicating that further remedial work is necessary in the HFTD areas. The fact that this damage is occurring at moderate wind speeds indicates that to address it via undergrounding would be overkill – a combination of pole hardening and covered conductor would have mitigated the observed damage."[83] However, MGRA also noted that SDG&E's PSPS procedures during the more extreme January 2025 wildfire weather events were much more in line with its previous more judicious and targeted use of PSPS.

As in the MGRA PG&E WMP Comments, MGRA analyzed weather station data in the vicinity of the reported damage point (for SDG&E within 3 miles), and calculated peak wind gust recorded by any station in the 72 hours prior to the reported damage time. MGRA's analysis also incorporates cause data from SDG&E's PSPS report.[84]

The results from the MGRA analysis are shown below. Damage/risk events are color coded by SDG&E's rated risk tier for the circuit on which the damage occurred (Top 5%, Top 5-10%, Top 10-15%, and Bottom 80%).[85] The numeric values show the maximum wind speed measured by any weather station within 5 miles of the damage within 72 hours of the damage report.[86]

[83] Id.
[84] R.18-12-005; SAN DIEGO GAS & ELECTRIC COMPANY (U 902-E) PUBLIC SAFETY POWER SHUTOFF POST-EVENT GROUP REPORT FOR DECEMBER 09 – DECEMBER 11, 2024; January 10, 2025. (SDG&E Dec 2024 PSPS Report)
[85] Obtained in SDG&E DRR MGRA-2026-8-04-19.
[86] See supplemental file SDGE_2024_PSPS_Damage_3mi.xlsx, Tab SDGE24WIND. Wind analysis was performed using the M-bar Technologies and Consulting, LLC wind analysis suite.

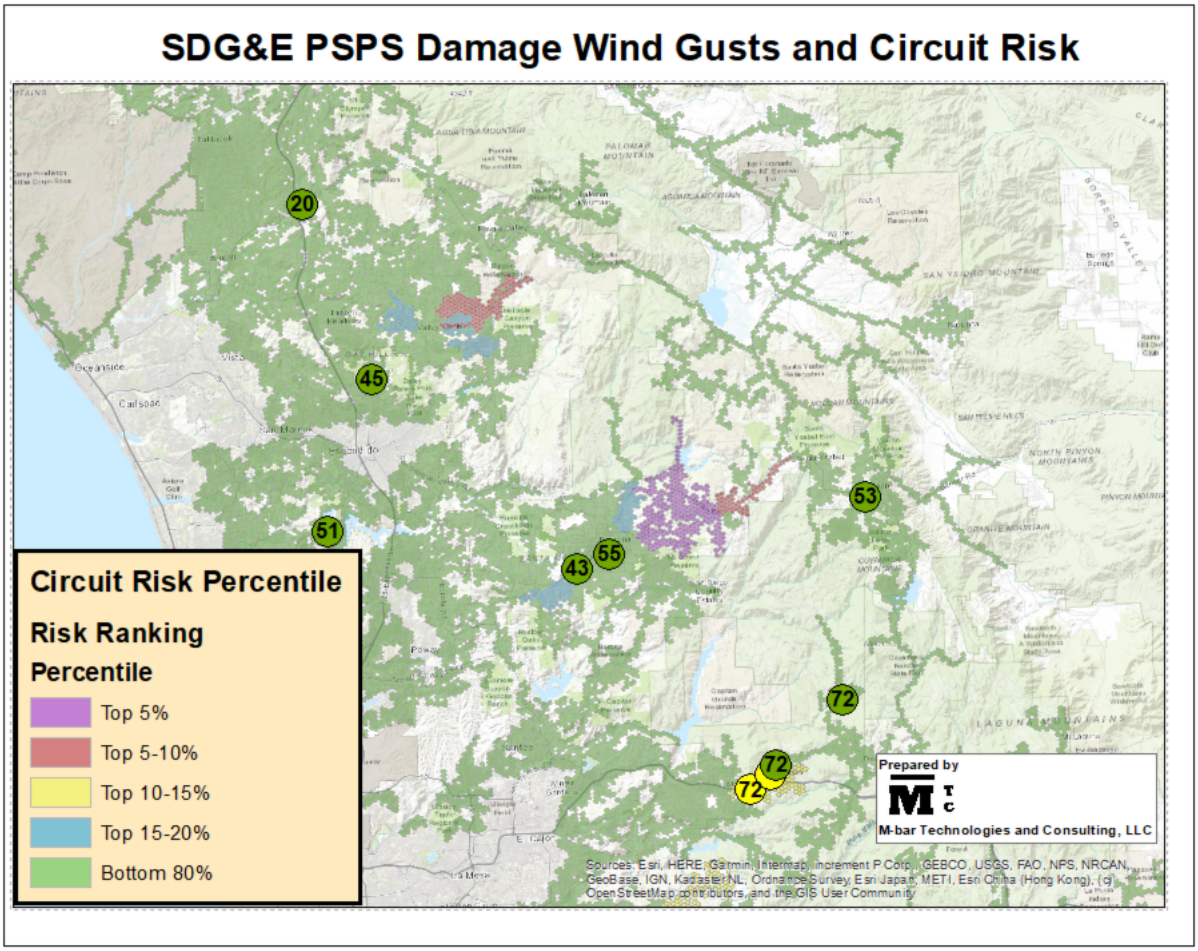

Figure 6 - SDG&E damage events identified in post-PSPS inspections. SDG&E's circuit risk tier is identified by color coding. The numeric values are the maximum wind gust speed in mph recorded by ground weather stations within three miles of the event in the 72 hour period prior to the damage report

One issue of concern is that of the ten PSPS damage events, only two were on circuits that SDG&E ranks in the top 20% risk tier, and none of them occurred on circuits within the top 10% risk tier. This is in stark contrast with PG&E, for which the majority of PSPS damage events occurred on the 5% highest risk circuits and all but one occurred on circuits in the top 10% risk tier.[87] Also noteworthy is that areas with nearby wind gust speeds of 72 mph still ranked in the lowest 80%. Looking at areas where SDG&E calculates its highest risk tiers, these are highly concentrated and mostly to the northeast of population centers Valley Center (NW) and Ramona (central). This supports the suspicion that SDG&E is not properly incorporating ignition risk from wind drivers into its risk analysis,[88] and therefore concentrating on consequence. This suspicion finds additional evidence if one examines the cause of the damage, provided in SDG&E's PSPS report along with photographs of the damage. This is summarized below:

[87] MGRA PG&E WMP Comments; p. 53; Figure 11.
[88] Section 5.2.1.2.

Pole ID	Cause	Max 3 mi Gust (mph)
P710840	Object - Telco	44.9
P376436	Cross arm	72.0
P213996	Transformer - Leak	19.6
P119515	Cross arm	50.9
P419391	Vegetation - Blow-in	43.2
P516439	Cross arm	54.7
P78896	Guy	72.3
P78880	Cross arm	72.3
P166012	Cross arm	53.5
P179023	Cross arm	72.3

Table 5 - SDG&E December 2024 PSPS risk events, along with causes listed in SDG&E's Dec 2024 PSPS Report and wind gusts calculated using M-bar Technologies and Consulting, LLC analysis available in Github. Wind gusts are the maximum measured at any weather station reported by Synoptic in the 72 hours before the damage event was attributed by SDG&E and within 3 miles of the reported damage event. Complete results can be found in Workpaper "SDGE_PspsEventDamagePoint_2024_3mi".xlsx, tab SDGE24WIND.

The fact that most of the reported risk events were due to physical infrastructure damage, particularly to cross arms, is an indication that SDG&E's infrastructure is not able to tolerate the wind gusts typical of its service area. Three of these cross arm failures occurred when no weather station within 3 miles recorded gusts greater than 56 mph prior to the discovery of the damage, which SDG&E claims is its understanding of the GO 95 requirement. These are not new poles, as shown in the photo below:

Figure 23 - Item #6 P516439 Damaged Crossarm

Figure 7 - Photo of damaged cross arm P516439 provided by SDG&E in their report on the December 9-11, 2024 PSPS event. The maximum recorded wind gust within 3 miles of this pole in the 72 hours prior to SDG&E's attribution of the damage time was 54.7 mph.

It is not known whether any of these specific damage events would have led to arcing had the line been energized. However, the risk is significant enough that in retrospect de-energization was appropriate for this weather event. However, the fact that some of this damage was occurring at modest wind speeds regularly encountered in the SDG&E service area is a problem. SDG&E's preferred solution to the issue is undergrounding, but this is expensive and slow to deploy. Additionally, the circuits showing this damage are not rated as high priority by SDG&E. Covered conductor, on the other hand, while not mitigating all cross arm breakage risk, would entail replacement with hardened cross arms and poles and would be much less susceptible to the type of damage seen during the December 9-11th weather event. It would enable SDG&E to raise its shutoff threshold, which substantially reduces the frequency, extent, and duration of PSPS events.

Recommendations:

- SDG&E should identify which PSPS Damage events could have been addressed by covered conductor and consider application of covered conductor with higher wind thresholds on those and similar segments.
- Energy Safety should further investigate why SDG&E's PSPS damage events are occurring on line segments which it ranks as lower risk.

7.2. PSPS and Shutoff Thresholds

MGRA has shown in its past WMP comments that the number weather stations exceeding particular gust thresholds in a given year, and the total count of measurements from those stations (which is representative of duration) drops off rapidly as a function of wind speed. Below is a table first provided in MGRA's 2023 WMP Comments that shows this effect for weather stations in the SDG&E service area using data between 2017 and 2022.[89]

Wind gust speed greater than (mph)	Stations	Measurements	M – Sill Hill
48	146	54030	46488
55	104	17499	13285
70	26	1391	482
85	6	133	5
111	0	0	0

Table 6 - Wind speed exceedance at SDG&E weather stations, 2015-2022. 'Stations' is the count of the stations exceeding threshold at least once during this period. 'Measurements' are the total number of measurements (usually 10 minute intervals), and is a measure of how much time is spent over threshold. 'M-Sill Hill' removes data from the anomalously high Sill Hill weather station.[90]

The total count above threshold measures the number of 10 minute measurements observed across the SDG&E service area in HFTD Threat Districts 2 and 3 above threshold for all stations.

[89] MUSSEY GRADE ROAD ALLIANCE COMMENTS ON 2023-2025 WILDFIRE MITIGATION PLANS OF PG&E, SCE, AND SDG&E; May 26, 2022; p. 109.

[90] This data has been previously presented in other Workpaper TURN-SEU-015_ATTACH_Q7_Q8_8584_Weather_jwm.xlsx, found in SDGEGRC24 workpapers: https://github.com/jwmitchell/Workpapers/tree/main/SDGEGRC24

The number of stations is a proxy for the physical area of PSPS events, while the number of counts is a proxy for area, frequency, and duration of events. As can be seen, raising the shutoff threshold from 48 to 55 reduces the total time over threshold by a factor of 3.5.

Recommendations:

- When modeling PSPS consequences using backcasting for covered conductor alternative mitigations in its GRC, SDG&E should include the effect of an increased PSPS wind speed threshold.

7.3. Frequently De-Energized Circuits and CMI Costs

The data for frequently de-energized circuits presented in OEIS Table 4-3 was analyzed. Additionally, MGRA requested that SDG&E provide the number of residential and commercial/industrial (C&I) customers.[91] In the measures that SDG&E has taken or plans to take for each circuit, mileage of planned and completed undergrounding projects are included along with other measures. SDG&E also presents its estimate of annual decline in customer hours of PSPS impact that is expected when its mitigation measures are complete. Using the ICE 1.0 model, SDG&E estimates its mean CMI to be $3.85.[92] SDG&E estimates that the costs for C&I customers are three times that of residential customers.[93] Using these numbers and an estimated $3M per mile for undergrounding, it is possible to calculate return on investment (ROI) periods assuming only reliability benefits.

While SDG&E uses an estimate for CMI costs that while on the average is similar to that obtained by PG&E, SDG&E's method for differentiating residential and commercial customers differs greatly from PG&E, which claims to use ICE 1.0 guidance. PG&E's findings are that CMI impacts for individual commercial customers are orders of magnitude larger than that for individual residential customers, and that the residential CMI cost is less than 2% of the average CMI cost over its service territory. This is shown in the table below:

[91] SDG&E DRR MGRA-2026-8-03-6; MGRA-2026-8-04-4.
[92] SDG&E WMP; p. 24 – SDG&E Table 5-1.
[93] Id; p. 39.

FIGURE 2-3
$/CMI USING ICE DEFAULT DATA AND PG&E-SPECIFIC DATA

	ICE Data (California)		PG&E Data	
Sector	Cost per CMI (2016$)	**Cost per CMI (2023$)**	Cost per CMI (2016$)	**Cost per CMI (2023$)**
Medium and Large C&I	$70.37	$89.34	$61.35	$77.89
Small C&I	$5.36	$6.81	$7.87	$9.99
Residential	$0.04	$0.06	$0.04	$0.06
All Customers	**$1.53**	**$1.94**	**$2.50**	**$3.17**

Table 7 - PG&E data from its 2024 RAMP filing, showing ICE calculations for commercial, industrial, and residential customers.[94]

SDG&E explains its calculation of PSPS consequences as follows:

"*Assumption: For residential customers a $482 cost per event is calculated using the per diem rates applicable to San Diego, California, as of September 2024, with the assumption of accommodating four family members per customer meter. For C&I customers, a $1,446 cost per event* is estimated.*

Financial values as of February 2025.* ***A factor of three is assumed for C&I customers*."[95]

This is dramatically different from PG&E's approach and Energy Safety should further investigate how SDG&E constructs its CMI.

The data for highest risk circuits provided by SDG&E then analyzed that weighted the potential improvement in customer outage hours by the fraction of C&I customers on the circuit. Such an adjustment is justified because even though there are 5-10 times as many residential as commercial customers, the ratio of residential customer CMI rates to the average is only about 1.5%. Results of both approaches can be found in Workpapers file SDGE Response MGRA-2026-8-03_Q06-OEIS-Table-4-3-jwm.xlsx. Results for some circuits are summarized below:

Circuit	**Reduced Hours**	**UG Miles**	**ROI Years (SDG&E CMI)**	**ROI Years C&I Only (PG&E)**
1030	60,844	112.9	26.5	142
222	95,367	154	20.9	64.5

[94] PG&E 2024 RAMP; PG&E-2-12.
[95] Op. Cite.

79	15,347	28	23.9	103
214/CTL1	3,433	54.9	207	696
358	13,017	18.9	18.8	80.7
441	2,961	15.3	66.6	58.0

Table 8 - Examples of analysis of data from SDG&E's Table 4-3, most frequently de-energized circuits, Workpaper SDGE Response MGRA-2026-8-03_Q06-OEIS-Table-4-3-jwm.xlsx. Reduced customer impact hours and underground miles are provided by SDG&E. SDG&E also provided numbers of residential and commercial/industrial customers per circuit. ROI was calculated using $3M/mile cost for undergrounding and taking no other mitigations into account. SDG&E imputed CMI assumes that commercial customers have three times the losses of residential customers. "PG&E's CMI" is derived from ICE 1.0 estimates, and uses only C&I customers because the residential customer CMI is only 1.5% of ICE C&I customer. ROI for C&I was adjusted for the ratio of residential and C&I customers on each circuit.

As can be seen in Table 8 and associated workpaper, using a mean CMI of $3.85 and assuming that C&I customer costs are three times that of residential results in a large PSPS cost and therefore a favorable ROI period, without even taking wildfire risk reduction benefits into account. Using the ratios of CMI for residential versus C&I customers that PG&E attributes to the ICE 1.0 model results in much less favorable ROI.

Additionally, the results in the above table do not appear to be consistent with Appendix G if risk averse weighting is not applied, in that BCR including reliability costs and benefits for undergrounding is consistently less than 1.0.[96] Energy Safety should ensure these calculations are transparent.

Recommendations:

- Energy Safety should investigate whether SDG&E's values for commercial/industrial customer outage costs and residential customer outage costs are reasonable, and why SDG&E's estimates appear to be so different from those of PG&E.
- Energy Safety should ensure that SDG&E's ICE model calculation estimates based on avoided customer outages provided in Table 4-3 are consistent with its risk modeling (Appendix G, unscaled).

[96] Section 8.2.2.

8. GRID DESIGN AND SYSTEM HARDENING

8.2. Covered Conductor and Undergrounding

Hardening has recently represented a substantial portion of utility wildfire mitigation spending, and SDG&E intends to expand its current undergrounding program. SDG&E had planned to have started this expansion in its last WMP cycle, however SDG&E failed to prove the reasonability of its undergrounding program in its 2024-2027 Test Year GRC, resulting in a substantial cutback in funding: "*Given SDG&E's assessment of its wildfire risk, the Commission also does not find it reasonable to spend six times as much on undergrounding as on covered conductor in light of the cost-effectiveness of covered conductors.*
Based on the above, the Commission finds a slower pace of undergrounding at a lower cost to be reasonable..."[97] As a result, SDG&E states that "*the Strategic Undergrounding Program will be essentially suspended beginning in 2026 unless additional funding is secured*."[98] Instead, SDG&E states that it "*is exploring the submission of an EUP in accordance with Senate Bill 884, which could provide funding to resume these projects prior to 2028. As part of its long-term strategy to mitigate wildfire risks and reduce PSPS impacts, SDG&E aims to resume these projects by securing funding through the EUP or the next GRC cycle in 2028*."[99] During the WMP workshop held on May 21, 2025, Jonathan Woldemariam of SDG&E stated that SDG&E is hoping to submit an SB 884 application later this year.

8.2.1. Covered Conductor Effectiveness

SDG&E's newest estimate of covered conductor risk reduction effectiveness is now 58%,[100] and it claims that this estimate is for "combined covered conductor" which includes Falling Conductor Detection (FCD) and Early Fault Detection (EFD).[101] SDG&E estimates that if PEDS and PSPS are included as well, the overall efficiency will be 97.8%.[102] However, its expected

[97] CPUC A.22-05-015, et al.; D.24-12-074; p. 481.
[98] SDG&E WMP; p. 133.
[99] SDG&E WMP; p 97.
[100] SDG&E WMP; p. 111.
[101] SDG&E DRR MGRA-2026-8-04-7,8, and SDG&E_2026-2028_Base- WMP_Appendix G Supporting Data_R0_Errata.
[102] SDG&E DRR MGRA-2026-8-04-13.

ignition reduction efficiency is much higher leaving something of a mystery how it obtains its lower risk reduction number.

8.2.1.1. SDG&E's Estimates High Covered Conductor Ignition Reduction

Although it is not provided in its WMP, SDG&E's basic ignition reduction efficiency estimates for covered conductor and for covered conductor in combination with FCD+ESD are quite high – compatible with previously published values and roughly consistent with those estimated by SCE. MGRA obtained this data through a data request and has published it in its workpapers as "SDGE Response MGRA-2026-8-06-jwm.xlsx".[103] Some results are summarized below:

Risk Driver	x% ignitions	x% outages	Wind Driver?	CC Eff%	CCC Eff%	Res Ign CCC%
Pole	2.3	7.1	Yes	39	42	1.3
Animal Contact	27.9	12.4	No	90	90	2.8
Vehicle Contact	11.6	10.0	No	90	91	1.1
Conductor Failure	2.3	4.9	Yes	90	100	0
Cross Arm Failure	0	4.0	Yes	39	80	0
Transformer	0	4.1	No	39	90	0
Connector Device	9.3	5.4	No	39	97	0.3
Other Equipment	4.7	0.4	Yes	39	86	0.6
Fall-in Branch	4.7	2.5	Yes	90	98	0.1
Balloon	9.3	2.6	No	90	90	0.9
3rd Party	2.3	1.3	No	50	50	1.2
Other Contact	2.3	2.6	Yes	50	50	1.2
Wire-to-Wire	2.3	0.8	Yes	99	100	0
Anchor/Guy	2.3	0.7	Yes	39	39	1.4

Table 9 - Efficiency of covered conductor (CC) and covered conductor + Falling Conductor Protection + Electronic Fault Detection (CCC=CC+FCD+EFD). Residual ignition rate after mitigation is shown. Cells are shaded if the driver outage and ignition frequency can be multiplied by wind.[104]

[103] SDG&E DRR MGRA-2026-8-06-1.
[104] See previous footnote.

If the residual ignition rates are summed the net ignition reduction efficiency for covered conductor (CC) is 68.8%, which is close to SCE's estimated risk reduction fraction, though still considerably lower than that observed in SCE field data. The ignition reduction efficiency for CC+FCD+EFD (CCC) is predicted to be 86.9%. Of the residual 1.13% ignitions after CCC mitigation, 8.4% comes from drivers that have no relationship to wind drivers and 4.7% comes from drivers that can be amplified by high winds.

8.2.1.2. SDG&E Doesn't Adequately Explain its Lower Risk Reduction Efficiency

Despite an ignition reduction efficiency of 87%, SDG&E calculates its CCC risk reduction efficiency at 58%. Its explanation is as follows:

"*The expected risk reduction for combined covered conductor may appear lower than the stated activity effectiveness due to two key factors: baseline asset condition and the probabilistic nature of risk reduction modeling.*

First, the effectiveness of any mitigation activity is calculated relative to the baseline condition of the asset. Assets that have already received traditional hardening measures will experience less additional benefit from the application of covered conductor compared to assets that are currently unhardened. In SDG&E's modeling framework, this means that the marginal risk reduction is lower where the baseline already includes some degree of risk mitigation.

Second, expected risk reduction is derived through stochastic simulation in which ignition events are probabilistically sampled out based on the modeled efficacy of the mitigation. For example, a mitigation effectiveness of 0.58 implies that, on average, 58 out of 100 ignition events are prevented on an unhardened asset. However, because wildfire risk is highly skewed (tail risk, where a small number of events can drive a large share of total expected dollar impact) the removal of events does not necessarily translate to a proportional reduction in overall risk. The events that are sampled out may be lower impact on average, and therefore the total expected risk (in dollar terms) may be reduced by less than the raw event count suggests."[105]

[105] SDG&E DRR MGRA-2026-8-04-9.

Regarding asset condition, this raises the additional question of why SDG&E would be prioritizing assets that are already hardened for further hardening, either through CCC or through undergrounding, rather than assets that may still be older and more vulnerable. Indeed, for this to be a plausible explanation the ignition rates for assets that SDG&E proposes to harden would have to be ***lower*** than the historical ignition rates. Why would SDG&E select assets with lower ignition rates for its proposed circuit hardening program? Energy Safety should ask. This is particularly important because, as will be shown in the subsequent section, the cost-benefit ratios are not favorable unless SDG&E applies "risk averse scaling". In Section 8.2.3, MGRA suggests that Energy Safety require SDG&E to produce supplemental data on lines that were not already hardened through the FiRM program.

Regarding the potential amplification of tail risk for drivers having lower CCC mitigation efficiency, this would mean that that drivers with lower CCC efficiency tend to be more prevalent in areas that have greater potential consequence.[106] The drivers with higher residual risk are pole and cross-arm failures, fuses, anchors and guy wires. It is not clear why any of these would be preferentially located in high consequence areas. Indeed, while cross arm failures were observed to be a problem during the December 2024 PSPS event, as noted in Section 7.1 these were mainly observed to be in the lowest tier of SDG&E's risk ranking.

We might hypothesize that the higher consequence for some drivers is tied to weather conditions related to the driver, as shown in Table 4. This could legitimately be the case for wind-related drivers. Damage to poles, cross arms, guy wires and anchors is predicted to have lower CCC mitigation efficiency, and the incidence rate of this kind of damage is expected to increase under high wind conditions. However, SDG&E does not include wind gust corrections either poles or cross arms, so this does not seem to be an adequate explanation either.

In summary, SDG&E has provided no consistent or technically plausible explanation of how a mitigation that is 86% in reducing ignitions is only 58% effective in reducing risk. Energy Safety should require SDG&E to provide further documentation in order to justify its estimate.

[106] It is not clear exactly what SDG&E meant in its response to MGRA-2026-8-04-9, but I assume that what is meant by "*The events that are sampled out may be lower impact on average…"* is that the events that are in locations with lower consequence are preferentially removed from the sample, leaving the high consequence events and reducing the overall risk mitigation effectiveness.

Recommendations:

- Energy Safety should require SDG&E to provide additional information as to whether and why it may be choosing assets with lower baseline ignition rates than historical averages for its proposed 2026-2028 hardening portfolio.
- SDG&E should be made to provide a technical explanation and examples of how and why drivers with a lower fractional ignition reduction would be more likely to have larger consequences and therefore a lower risk reduction than ignition rate reduction.

8.2.1.3. SCE field data implies a higher covered conductor efficiency

MGRA provided its analysis of SCE's ignition data for both covered conductor and unhardened overhead lines in its 2025 WMP Update comments.[107] SCE has provided additional data for 2024[108] and MGRA presents it and its analysis below.

[107] MGRA 2025 WMP Update Comments; pp. 21-23.

[108] SCE has not provided data in the same format as previous years and further updates and possible corrections will be provided in the upcoming MGRA SCE WMP Comments, as well as SCE DRRs, available upon request. SCE DRR MGRA-SCE-003-1, MGRA-SCE-005-2. Workpapers are in WMP26/SCE. Specifically SCE did not specify "bare wire" and "covered conductor" in the same manner as in previous proceedings. It was necessary for MGRA to analyze GIS data with regard to primary distribution lines and ignitions provided in response to SCE DRR MGRA-SCE-001 to determine number of actual ignitions by conductor type. The results are tallied in WMP26-8_MGRA-SCE-05_Q1-CCUG-WD-Ign-jwm.xlsx.

	2019	2020	2021	2022	2023	2024	Total/Avg
Bare Wire (BW) Miles	8,952	7,992	6,492	5,093	3,873	3,077	
CC Installed Miles	372	1,332	2,832	4,231	5,451	6,247	
Total	9,324	9,324	9,324	9,324	9,324	9,324	
BW HFTD Ignitions	37	49	46	36	15	8	191
CC HFTD Ignitions	0	1	2	5	3	4	15
BW Ignitions/mi-yr	0.0041	0.0061	0.0071	0.0071	0.0039	0.0026	0.00538
CC Ignitions/mi-yr	0.00000	0.00075	0.00071	0.00118	0.00055	0.00064	0.00073
BW/CC		8.17	10.03	5.98	7.04	4.06	7.34
Reduction %		87.8%	90.0%	83.3%	85.8%	75.4%	86.4%

Table 10 – SCE data on ignitions for its bare wire (BW) and covered conductor (CC) circuits updated to include 2024 data. See fn. 108. Calculations assume that the total mileage of covered conductor deployed is tracked accurately, and that remaining conductor is bare wire. SCE provided 2019-2023 data in previous proceedings. SCE's 2024 deployed mileage is calculated from their DR responses, while number of reportable HFTD ignitions on bare wire and covered conductor was calculated from SCE's GIS data. Entries are weighted for amount of CC and BW deployed each year, allowing an ignition rate for each to be calculated, and an estimate of CC ignition reduction.

The 2024 data reaffirms earlier estimates, with an estimated historical ignition reduction of 86% for covered conductor versus bare wire. This allows a 95% confidence level to be set at 71%.[109] It is interesting that the 2024 data showed only a 75% reduction of ignitions on covered conductor versus bare wire. However, this is not due to any change to covered conductor estimates, which have remained relatively steady, but rather that "bare wire" has apparently become safer over the last couple of years, as shown in the figure below:

[109] See WMP26-8_MGRA-SCE-05_Q1-CCUG-WD-Ign-jwm.xlsx.

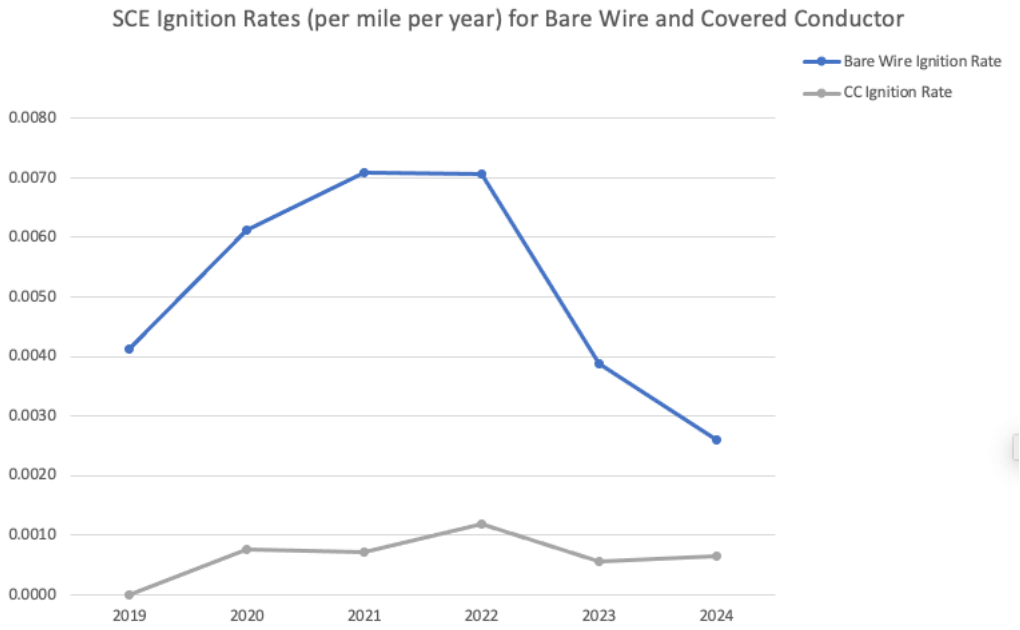

Figure 8 - Southern Edison HFTD ignition rates per mile for covered conductor and bare wire from 2019 to 2024.[110]

This reduction in bare wire ignitions is likely a "survivor" effect. SCE is attempting to reduce number of ignitions by concentrating on circuits with higher risk first, thus leaving "safer" bare wire circuits behind and thereby shifting the overall ignition rate in the remaining pool. Thus the marginal improvement in safety obtained by replacing SCE's remaining bare wire circuits with covered conductor may be smaller than it used to be.

SDG&E has not deployed sufficient covered conductor to allow a statistically meaningful estimate of covered conductor effectiveness using field data. Energy Safety should therefore require SDG&E to use SCE field data to calculate the risk reduction rate for covered conductor.

Recommendations:

- In lieu of statistically significant or representative field data, SCE field data should be considered representative of covered conductor deployments. SDG&E should be required to recalculate its wildfire reduction estimates using the ignition reduction effectiveness determined by SCE field data in its comparative analyses that include covered conductor, in addition to any reasonable local adjustments due to tree fall-in and SDG&E-specific technologies such as PEDS and FCD.

[110] Id.

8.2.2. Covered Conductor versus Undergrounding Risk Reduction and CBR

Along with its WMP submission, SDG&E provided the tool it uses to calculate its risk reduction and cost/benefit ratios (which it more correctly inverts and calls BCRs, or benefit-cost ratios). This is applied to a selection of circuit segments that it proposes as an example of a potential set to be mitigated during the 2026-2028 WMP period. This worksheet is provided as SDG&E's Appendix G in its supporting documents.[111] MGRA asked if SDG&E's calculation includes its "risk averse" scaling function,[112] and to provide a "risk neutral" example if it did.[113] SDG&E responded by providing file "SDGE Response MGRA-2026-8-05_Q2".xlsx, which contains Appendix G data but using a neutral risk scaling function.[114]

SDG&E's original calculation shows a BCR of between 11 and 30 for undergrounding and 1.6 and 2.5 for covered conductor, depending which of its long-term cost models is chosen (SDG&E refers to these as WACC, HDR, and SDR). A result showing a higher BCR for undergrounding than covered conductor is novel, and should be examined closely. In all previous WMPs the risk-spend efficiency (RSE) has been shown to be higher for covered conductor, or comparable even using SDG&E's former "Decision Tree".[115]

SDG&E's alternative calculation provided to MGRA shows the dramatic effect of risk-averse scaling on the calculated risk and BCR. With risk-neutral scaling, the BCR ranges from 0.8 to 2.2 for undergrounding and 0.4 to 0.6 for covered conductor. Not only is the overall estimated risk up to 15X higher using risk averse scaling, but the relative difference between covered conductor also drops from 10X using risk averse scaling to 2-4X with risk-neutral scaling. This is another indication that SDG&E's risk-averse scaling has an overwhelming effect on risk measurements (in a way that favors undergrounding) and that Energy Safety should insist on risk-neutral risk calculations.

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[111] SDG&E_2026-2028_Base-WMP_Appendix G Supporting Data_Errata.xlsx.
[112] Section 5.1.
[113] SDG&E DRR MGRA-2026-8-05-2.
[114] See Workpapers, WMP26/SDGE.
[115] MGRA 2023 WMP Comments; pp. 20-23.
SDG&E no longer utilizes a "decision tree": SDG&E DRR MGRA-2026-8-04-5

There has been insufficient time to fully examine the assumptions that have gone into the SDG&E's risk calculation, but a couple of the questionable assumptions are that 1) SDG&E's calculation assumes that covered conductor efficiency is 58%, which has been shown to be an underestimate and 2) SDG&E claims a cost of $2 million per mile for future undergrounding costs, which is lower than any previous estimate.

SDG&E's worksheet provides the possibility of changing some variables and recalculating, such as undergrounding cost per mile. However, the costs and BCR are calculated on a per circuit segment basis by SDG&E's WiNGS-Planning Monte Carlo, and therefore changing the efficiency for a mitigation has no effect on the calculation.[116] SDG&E at MGRA's request provided a version of Appendix G that assumes 85% covered conductor efficiency,[117] although it is not clear whether this is for risk averse scaling because the BCRs are on the order of 10. However, SDG&E also calculates a CCC versus UG plot with what it terms "Societal" weighting, and in this UG is heavily favored. SDG&E provided plots of its estimated CCC BCR versus UG BCR for both assumptions, and these are shown below:

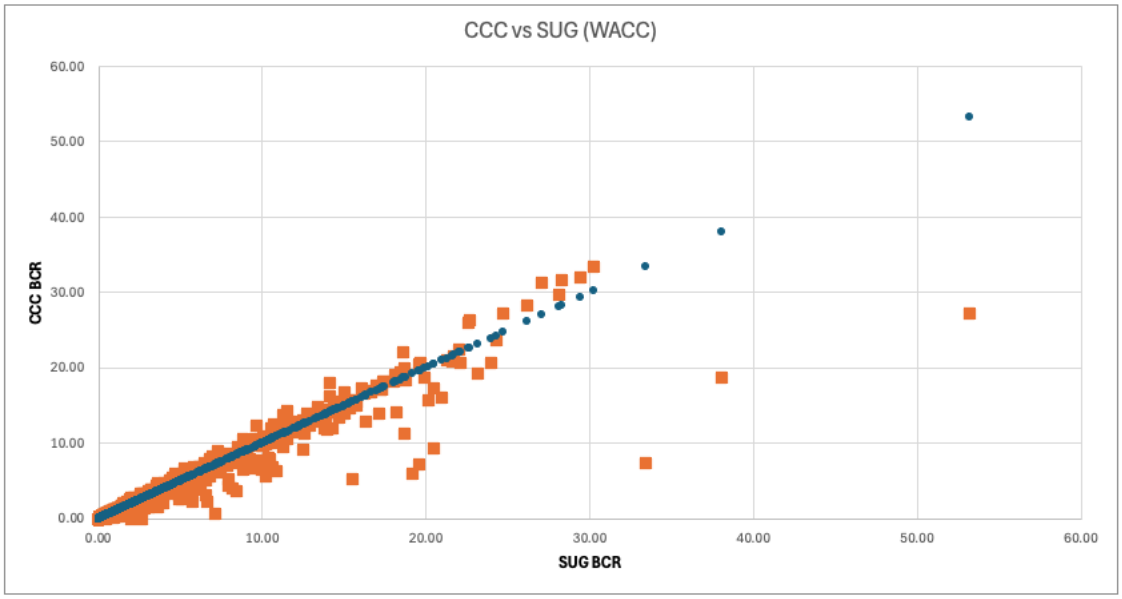

Figure 9 - SDG&E plot of CCC BCR versus undergrounding (SUG) BCR with 85% CCC efficiency.[118]

[116] SDG&E DRR MGRA-2026-8-04-10.
[117] Workpapers SDGE Response MGRA-2026-8-04_Q10c.xlsx
[118] Id.

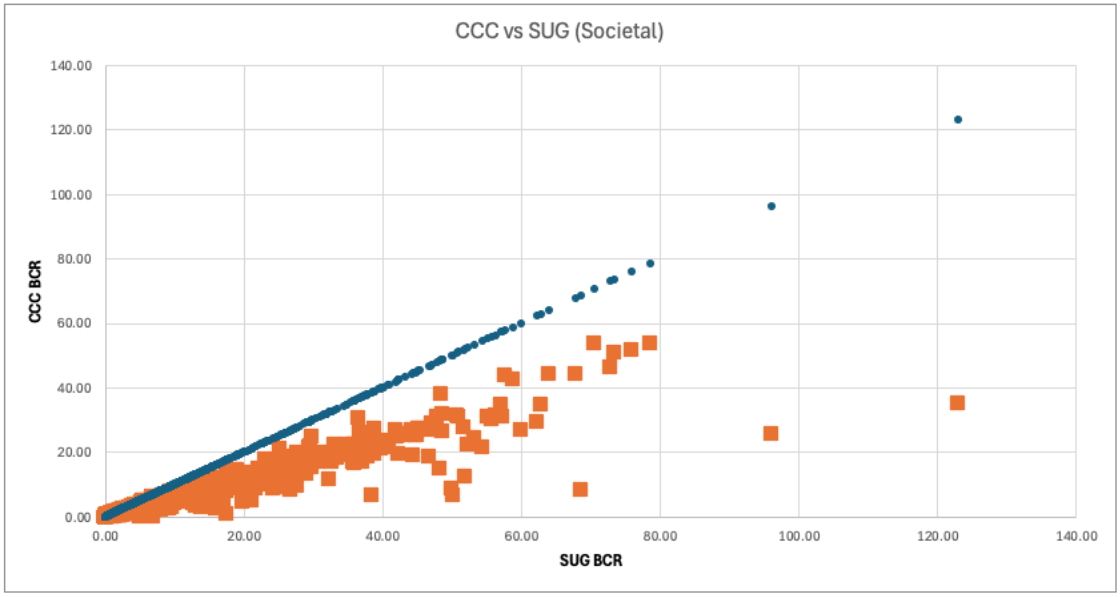

Figure 10 - The same as Figure 9 but with what SDG&E calls "Societal" weighting (i.e. risk aversion).

Because there is proportionality between UG BCR and CC BCR, it is possible to create a scaling function that will approximately incorporate a user-defined CCC efficiency using by scaling the CCC risk by the UG risk (which is still determined by the WiNGS-Planning Monte Carlo). The residual risk for CC using this approach is:

*CC Risk = (CC Efficiency / UG Efficiency) * UG Risk*

The MGRA calculation is applied to safety and financial risks but not reliability risk, though reliability risk reduction is also expected for covered conductor because higher PSPS thresholds are possible.[119] MGRA's alternative analysis thus offers a method to calculate risks and BCR for a user defined covered conductor efficiency. The validity of this approach depends on risk neutrality, because as shown above SDG&E's risk averse scaling exaggerates the difference between residual UG and CC risk. The alternative analysis is provided in the workpapers.[120] This modified tool and the original Appendix G Excel spreadsheet were used to obtain the following risk and BCR calculations:

[119] Section 7.2.
[120] SDGE Response MGRA-2026-8-05_Q2_AppendixG-jwm-RN-Eff.xlsx

CC Efficiency	Risk Aversion?	UG $/mi	PV Risk CC Reduced WACC $M	PV Risk UG Reduced WACC $M	BCR CC WACC	BCR UG WACC
58% - Original	Yes	2	370	4800	1.55	11.5
58% - Neutral	No	2	101	492	0.41	1.18
58% - $3M/mi	No	3	101	492	0.41	0.82
72% - SCE Value	No	3	122	492	0.50	0.82
85% - MGRA Value	No	3	142	492	0.58	0.82
97.8% - CC+PSPS[121]	No	3	161	492	0.66	0.82

Table 11 - Averted risk cost and BCR for covered conductor and undergrounding using modified Appendix G Excel spreadsheet[122] and different assumptions about scaling, undergrounding cost, and risk aversion.

It is evident that SDG&E's risk-averse scaling function is essential to obtain a CBR greater than 1.0, though it should also be noted that the "SDR" long-term risk calculation method gives undergrounding BCR around 2.0. No increase in shutoff threshold for CC was assumed, so CC does not reduce reliability risk and therefore at a certain point improvements in ignition risk reduction efficiency no longer result in BCR or risk reductions improvements. Using SDG&E's methodology but with risk-neutral scaling, neither CC nor UG is favorable from an economic perspective. The SDG&E model has assumed yearly costs for risk mitigation and maintenance for covered conductor that are not applicable to undergrounding and calculates these costs over the 55 year lifetime of the hardening project. ***MGRA has not yet examined SDG&E's assumptions regarding continuing O&M costs for covered conductor or unhardened bare wire.***

The implications of SDG&E's analysis and claim would be far-reaching if they are true. Without amplifying the consequences, SDG&E's predicted risk reduction benefits for covered conductor do not exceed long term O&M costs for two of SDG&E's models. If SDG&E is right, then Southern California Edison has made a terrible mistake, and while fortifying its system it against wildfire it has committed itself to higher O&M costs and rates for the next half century. It is not clear how much of this issue lies within Energy Safety's mandate, since costs are the CPUC's domain, but a low BCR for the most effective hardening measures could potentially place Energy Safety and the CPUC on the opposite sides of wildfire mitigation policy. Fortunately, Energy Safety does not need to fully resolve this issue now. SDG&E has submitted its RAMP application, reportedly will submit an SB 884 application later this year, and will submit its GRC next spring.

[121] SDG&E DRR MGRA-2026-8-04-13.
[122] Id.

We can anticipate that the issue of hardening cost effectiveness will be at the core of these applications and that the question will be fully litigated. However, for its own purposes Energy Safety should collect as much information as it can.

Recommendations:

- Energy Safety should closely examine SDG&E's projected O&M costs for covered conductor and unhardened bare wire as well as request additional information on method for calculating BCR.
- Energy Safety should require SDG&E to justify its projected $2M per mile capital costs for undergrounding.

8.2.3. Previous Overhead Hardening

In light of the fact that SDG&E's planning documents indicate that there may be a BCR lower than 1.0 for hardening projects unless a "risk averse scaling function" is used, it may be helpful for Energy Safety to gather additional information regarding the state of SDG&E's infrastructure in order to further aid pinpointing infrastructure for which hardening may be especially useful. SDG&E's FiRM program hardened a significant number of SDG&E's overhead conductors starting in 2014 up until its termination and was highly successful in reducing outage and ignition rates.[123] However, the circuit damage shown in SDG&E's December 9-11 PSPS Report does not appear to be occurring on new infrastructure.[124] It may be that a different BCR might be obtained for recently hardened equipment versus older infrastructure.

Recommendation:

- Energy Safety should request that SDG&E differentiate infrastructure hardened under the FiRM program for the purposes of risk and BCR calculations if any of this infrastructure is part of its 2026-2028 planning proposals.

[123] SDG&E 2022 WMP Update; TN10587-1_20220211T151544_20220211_SDGE_2022_WMPUpdate_R0; pp. 58-60.
[124] Section 7.1.

14. CONCLUSION

San Diego Gas and Electric Company has always cut its own path in the wildfire safety area, and its 2026-2028 Wildfire Mitigation Plan is no exception. There is much in this plan and in the data surrounding it that is surprising and novel. Whether it is good is another matter, and MGRA's comments have identified some areas that merit further attention from Energy Safety. It is important to keep in mind that there has not been a catastrophic wildfire in the SDG&E service area since 2007. To what extent this has been due to SDG&E's skill and to what degree we have been fortunate is not known. SDG&E did extensive overhead hardening in the aftermath of the 2007 wildfires, and was the first to deploy PSPS starting in 2014. It has in the past provided ample evidence that these measures have significantly reduced ignition risk. However, damage to infrastructure during the December 2024 PSPS event, particularly to cross arms, indicates that residual risk remains.

SDG&E's preferred solution to mitigate this risk continues to be an extensive undergrounding program. Overt bias in terms of the use of a "decision tree" favoring undergrounding has been removed and replaced with a number of modifications that result in undergrounding having a favorable benefit-cost ratio (BCR) that is greater, so SDG&E maintains, than the BCR for covered conductor. There are a number of issues that merit skepticism and further investigation, and some that should be rejected outright.

Most egregious is SDG&E's approach to its "risk averse scaling function". While there are differences of professional opinion in the risk community regarding the appropriateness of weighting mass casualty events with relatively more risk per fatality than isolated deaths, there is no logical, empirical, economic, or ethical basis for applying an exponentially increasing aversion function to the risk of the utility losing money, even if some losses are passed on to customers.

There are in addition a number of apparent errors and shortcomings in SDG&E's risk analysis. Some of these are technical issues for which MGRA is suggesting various improvements, but others suggest deeper general skepticism regarding SDG&E's risk model. SDG&E's wind gust correction, for instance, lacks scientific grounding and is applied to the wrong drivers. It remains "PSPS blinded", and it is concerning that its PSPS damage events occur on segments rated as low risk by its model. SDG&E continues to and has in fact doubled down on underestimating the

effectiveness of covered conductor as a mitigation measure, and so these comments continue to urge the use of risk reduction estimated derived from SCE's extensive history with its own covered conductor deployment instead.

These issues come together in SDG&E's estimates of BCR for undergrounding and covered conductor presented in Appendix G. SDG&E provided MGRA with estimates using alternative assumptions and the results are surprising. If SDG&E's risk averse scaling function is not used, then BCR estimates for all hardening measures, both covered conductor and undergrounding, are less than 1.0 for two of its three cost models, indicating unfavorable economics for those mitigation measures. These estimates are, however, under the assumption that O&M costs of covered conductor and unhardened bare wire will be removed by undergrounding. MGRA's comments do not address SDG&E's long term O&M cost model but this is the fundamental reason why undergrounding ranks higher than covered conductor in SDG&E's BCR measurements.

Because there have been so many changes to its risk mitigation modeling, and because we are approaching a "do or die" moment for SDG&E's undergrounding program as it enters its GRC cycle and potentially seeks SB 884 funding, it is critical that Energy Safety give particular attention to SDG&E's 2026-2028 WMP. These comments are provided as a starting point for Energy Safety's further inquiries.

Respectfully submitted this 13th day of June, 2025,

By: __*/S/*____***Joseph W. Mitchell, Ph.D.***_____

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15. RECOMMENDATION SUMMARY

Recommendations:

- Energy Safety should only accept products of risk-neutral attitude functions. This goes for SDG&E's modeling as well (Appendix G) and any decisions or processes that incorporate CBR or risk.
- To the extent that Energy Safety accepts a risk-averse function for certain purposes, and specifically to allow aversion to mass-casualty events, this should be tied only to the safety attribute and not the risk calculation as a whole.
- SDG&E should be required to correct for the bias caused by PSPS in ignition and outage data by including PSPS damage events as risk events in its model. If it is doing so already its methodology should be described.
- SDG&E should adopt a wind gust model based on fragility curves determined from outage rates rather than from arbitrary multipliers.
- Energy Safety should request additional information from SDG&E regarding its wind gust correction factor and ensure that any wind gust model corrects for the increase in outage rates as well as the increase in ignition probability given outage.
- SDG&E's Probability of Ignition model should undergo additional third party review.
- SDG&E should restrict its analysis to relatively recent wildfires and ignore wildfires with small structure loss. This will result in the adoption of a somewhat lower fatalities per structure average.
- SDG&E should be required to investigate other variables that may influence number of fatalities per structure, such as resident age, AFN status, and egress issues.
- Energy Safety should require SDG&E to quantify how its egress model is incorporated into the WiNGS-Planning model.
- Energy Safety should require that SDG&E incorporate its egress model into the WiNGS-Ops model in order to inform shutoff decisions.
- SDG&E should consider incorporating AFN weighting in its consequence models for the purposes of both mitigation and the protection of egress-limited communities.
- Energy Safety should revisit the issue of wildfire smoke risk in its RMWG, and devise an action plan that will lead to a methodology to approximate wildfire smoke

health risks and a pathway that will lead to improving accuracy of the estimate over time.

- SDG&E and other utilities should in the meantime be encouraged to include in their consequence estimates wildfire smoke estimates using an acres-to-fatalities approximation linked to best available literature.
- Energy Safety should not permit utilizes to ignore guidance regarding extreme event planning scenarios.
- Utilities should be at the least required to provide operational and contingency scenarios showing how they will be prepared to protect the public in the event of extreme events. Examples are 100+ year wind events and extreme extended drought.
- SDG&E should identify which PSPS Damage events could have been addressed by covered conductor and consider application of covered conductor with higher wind thresholds on those and similar segments.
- Energy Safety should further investigate why SDG&E's PSPS damage events are occurring on line segments which it ranks as lower risk.
- When modeling PSPS consequences using backcasting for covered conductor alternative mitigations in its GRC, SDG&E should include the effect of an increased PSPS wind speed threshold.
- Energy Safety should investigate whether SDG&E's values for commercial/industrial customer outage costs and residential customer outage costs are reasonable, and why SDG&E's estimates appear to be so different from those of PG&E.
- Energy Safety should ensure that SDG&E's ICE model calculation estimates based on avoided customer outages provided in Table 4-3 are consistent with its risk modeling (Appendix G, unscaled).
- Energy Safety should require SDG&E to provide additional information as to whether and why it may be choosing assets with lower baseline ignition rates than historical averages for its proposed 2026-2028 hardening portfolio.
- SDG&E should be made to provide a technical explanation and examples of how and why drivers with a lower fractional ignition reduction would be more likely to have larger consequences and therefore a lower risk reduction than ignition rate reduction.

- In lieu of statistically significant or representative field data, SCE field data should be considered representative of covered conductor deployments. SDG&E should be required to recalculate its wildfire reduction estimates using the ignition reduction effectiveness determined by SCE field data in its comparative analyses that include covered conductor, in addition to any reasonable local adjustments due to tree fall-in and SDG&E-specific technologies such as PEDS and FCD.
- Energy Safety should closely examine SDG&E's projected O&M costs for covered conductor and unhardened bare wire as well as request additional information on method for calculating BCR.
- Energy Safety should require SDG&E to justify its projected $2M per mile capital costs for undergrounding.
- Energy Safety should request that SDG&E differentiate infrastructure hardened under the FiRM program for the purposes of risk and BCR calculations if any of this infrastructure is part of its 2026-2028 planning proposals.

APPENDIX A - MGRA DATA REQUESTS

2026-8 Wildfire Mitigation Plans
SDG&E
MGRA Data Request No. 1
March 17, 2024

GIS Data:

Please provide the GIS data set provided to the Office of Energy Infrastructure Safety for Q1 through Q4 2024. If all attributes were not provided in the 2025 WMP Update Data Request Response, include these as well. GIS should be in a standard format that can be processed by GIS tools (ArcGIS, specifically. KMZ format is not acceptable.)

Please remove any confidential attributes that may have been added to the requested records.

Explanation:

MGRA has customarily issued its data requests for non-confidential GIS data prior to the release of WMPs, knowing that that preparation of such data sets is burdensome and will require some time and preparation. In the previous cycle, some of the data released was incomplete and required iterations, sometimes not leading to a satisfactory result. While MGRA has been flexible on the data delivery schedule in the past, and will continue to be, it is essential that potential differences between MGRA's request and expectation and the data to be delivered be flagged as early as possible in order to enable resolution within the timeline set by OEIS. MGRA therefore requests that limitations on data to be provided due to confidentiality claims (or other grounds) be identified as per the specified schedule for data request responses issued outside of the WMP comment window.

MGRA-1-1 Please provide for Asset Point data for Camera, Fuse, Support Structure, and Weather Station.

MGRA-1-2 Provide Asset Line data for Transmission Line (as permitted as non-confidential), Primary Distribution Line, and Secondary Distribution Line.

MGRA-1-3 Provide PSPS Event data. Include Event Log, Event Line, Event Polygon data. Please exclude customer meter data. Provide all PSPS Event Asset Damage data. Data should include time, duration

MGRA-1-4 Provide Risk Event Point data, including Wire Down, Ignition, Transmission unplanned outage (as classified non-confidential), Distribution Unplanned Outage data, Distribution Vegetation Caused Unplanned Outage, Risk Event Asset Log. Attributes should include location, time, and cause information.

MGRA-1-5 Under Initiatives, please provide Grid Hardening data, including Hardening Log, Hardening Point, and Hardening Line data. Inspection data is not requested at this time.

MGRA-1-6 Under Other Required Data, please provide Red Flag Warning Day polygon data including dates and duration.

MGRA-1-7 Please provide a layer indicating calculated circuit-level risk using the methodology presented in the WMP.

a. If independent probability and consequence layers exist, please provide these independently as well.

MGRA-1-8 If SDG&E maintains that providing specific data in response to the above requests would violate confidentiality as it has asserted it please provide a justification for each of the asserted violations. Likewise, if requested data cannot be provided for other reasons please provide justifications. Please expedite response to this data request to the extent required by applicable OEIS process documents.

MGRA DATA REQUEST: MGRA-2026-8-02
SDG&E RESPONSE

Date Received: 04-21-2025
Date Submitted: 04-24-2025

I. GENERAL OBJECTIONS

1. SDG&E objects generally to each request to the extent that it seeks information protected by the attorney-client privilege, the attorney work product doctrine, or any other applicable privilege or evidentiary doctrine. No information protected by such privileges will be knowingly disclosed.

2. SDG&E objects generally to each request that is overly broad and unduly burdensome. As part of this objection, SDG&E objects to discovery requests that seek "all documents" or "each and every document" and similarly worded requests on the grounds that such requests are unreasonably cumulative and duplicative, fail to identify with specificity the information or material sought, and create an unreasonable burden compared to the likelihood of such requests leading to the discovery of admissible evidence. Notwithstanding this objection, SDG&E will produce all relevant, non-privileged information not otherwise objected to that it is able to locate after reasonable inquiry.

3. SDG&E objects generally to each request to the extent that the request is vague, unintelligible, or fails to identify with sufficient particularity the information or documents requested and, thus, is not susceptible to response at this time.

4. SDG&E objects generally to each request that: (1) asks for a legal conclusion to be drawn or legal research to be conducted on the grounds that such requests are not designed to elicit facts and, thus, violate the principles underlying discovery; (2) requires SDG&E to do legal research or perform additional analyses to respond to the request; or (3) seeks access to counsel's legal research, analyses or theories.

5. SDG&E objects generally to each request to the extent it seeks information or documents that are not reasonably calculated to lead to the discovery of admissible evidence.

6. SDG&E objects generally to each request to the extent that it is unreasonably duplicative or cumulative of other requests.

7. SDG&E objects generally to each request to the extent that it would require SDG&E to search its files for matters of public record such as filings, testimony, transcripts, decisions, orders, reports or other information, whether available in the public domain or through FERC or CPUC sources.

8. SDG&E objects generally to each request to the extent that it seeks information or documents that are not in the possession, custody or control of SDG&E.

9. SDG&E objects generally to each request to the extent that the request would impose an undue burden on SDG&E by requiring it to perform studies, analyses or calculations or to create documents that do not currently exist.

10. SDG&E objects generally to each request that calls for information that contains trade

secrets, is privileged or otherwise entitled to confidential protection by reference to statutory protection. SDG&E objects to providing such information absent an appropriate protective order.

II. EXPRESS RESERVATIONS

1. No response, objection, limitation or lack thereof, set forth in these responses and objections shall be deemed an admission or representation by SDG&E as to the existence or nonexistence of the requested information or that any such information is relevant or admissible.

2. SDG&E reserves the right to modify or supplement its responses and objections to each request, and the provision of any information pursuant to any request is not a waiver of that right.

3. SDG&E reserves the right to rely, at any time, upon subsequently discovered information.

4. These responses are made solely for the purpose of this proceeding and for no other purpose.

MGRA DATA REQUEST: MGRA-2026-8-02
SDG&E RESPONSE

Date Received: 04-21-2025
Date Submitted: 04-24-2025

III. RESPONSES

QUESTION 1

As a follow up to Data Request Response 1-5, please include grid hardening initiatives including conductor that has been undergrounded and for conductor replaced with covered conductor in 2024 and provide this as GIS data.

RESPONSE 1

See attached zipped GIS folder titled "SDGE_DR_CC_PSPS_Damage.gdb.zip".

MGRA DATA REQUEST: MGRA-2026-8-02
SDG&E RESPONSE

Date Received: 04-21-2025
Date Submitted: 04-24-2025

QUESTION 2

As a follow up to Data Request Response 1-3, please reissue PSPS Event Asset Damage data, in this case including cause any sub-cause information.

RESPONSE 2

See attached zipped GIS folder titled “SDGE_DR_CC_PSPS_Damage.gdb.zip”.

MGRA DATA REQUEST: MGRA-2026-8-02
SDG&E RESPONSE

Date Received: 04-21-2025
Date Submitted: 04-24-2025

END OF REQUEST

MGRA DATA REQUEST: MGRA-2026-8-03
SDG&E RESPONSE

Date Received: 05-12-2025
Date Submitted: 05-15-2025

I. GENERAL OBJECTIONS

1. SDG&E objects generally to each request to the extent that it seeks information protected by the attorney-client privilege, the attorney work product doctrine, or any other applicable privilege or evidentiary doctrine. No information protected by such privileges will be knowingly disclosed.

2. SDG&E objects generally to each request that is overly broad and unduly burdensome. As part of this objection, SDG&E objects to discovery requests that seek "all documents" or "each and every document" and similarly worded requests on the grounds that such requests are unreasonably cumulative and duplicative, fail to identify with specificity the information or material sought, and create an unreasonable burden compared to the likelihood of such requests leading to the discovery of admissible evidence. Notwithstanding this objection, SDG&E will produce all relevant, non-privileged information not otherwise objected to that it is able to locate after reasonable inquiry.

3. SDG&E objects generally to each request to the extent that the request is vague, unintelligible, or fails to identify with sufficient particularity the information or documents requested and, thus, is not susceptible to response at this time.

4. SDG&E objects generally to each request that: (1) asks for a legal conclusion to be drawn or legal research to be conducted on the grounds that such requests are not designed to elicit facts and, thus, violate the principles underlying discovery; (2) requires SDG&E to do legal research or perform additional analyses to respond to the request; or (3) seeks access to counsel's legal research, analyses or theories.

5. SDG&E objects generally to each request to the extent it seeks information or documents that are not reasonably calculated to lead to the discovery of admissible evidence.

6. SDG&E objects generally to each request to the extent that it is unreasonably duplicative or cumulative of other requests.

7. SDG&E objects generally to each request to the extent that it would require SDG&E to search its files for matters of public record such as filings, testimony, transcripts, decisions, orders, reports or other information, whether available in the public domain or through FERC or CPUC sources.

8. SDG&E objects generally to each request to the extent that it seeks information or documents that are not in the possession, custody or control of SDG&E.

9. SDG&E objects generally to each request to the extent that the request would impose an undue burden on SDG&E by requiring it to perform studies, analyses or calculations or to create documents that do not currently exist.

10. SDG&E objects generally to each request that calls for information that contains trade

secrets, is privileged or otherwise entitled to confidential protection by reference to statutory protection. SDG&E objects to providing such information absent an appropriate protective order.

II. EXPRESS RESERVATIONS

1. No response, objection, limitation or lack thereof, set forth in these responses and objections shall be deemed an admission or representation by SDG&E as to the existence or nonexistence of the requested information or that any such information is relevant or admissible.

2. SDG&E reserves the right to modify or supplement its responses and objections to each request, and the provision of any information pursuant to any request is not a waiver of that right.

3. SDG&E reserves the right to rely, at any time, upon subsequently discovered information.

4. These responses are made solely for the purpose of this proceeding and for no other purpose.

MGRA DATA REQUEST: MGRA-2026-8-03
SDG&E RESPONSE

Date Received: 05-12-2025
Date Submitted: 05-15-2025

III. RESPONSES

QUESTION 1

With regard to Figure 1-1: 2026-2028 Expected risk Reduction:

a. Does the risk reduction indicated include SDG&E's convex risk weighting function/attitude?

b. If the answer to a) is yes, please provide an equivalent figure using a neutral risk attitude.

RESPONSE 1

a) No. Figure 1-1 does not include SDG&E's risk aversion.

b) Not applicable

MGRA DATA REQUEST: MGRA-2026-8-03
SDG&E RESPONSE

Date Received: 05-12-2025
Date Submitted: 05-15-2025

QUESTION 2

With regard to "Wind Gust Weight" described on p. 13, how is this weighting determined and the driver normalized?

RESPONSE 2

To distinguish and quantify the wildfire risk for a given risk driver that occurred at locations prone to wildfire conditions, the 99th percentile wind gust for a given location is compared to the 25th, 50th, 75th of the overall 99th percentile wind guests for all HFTD locations. The weight (WR_{wind}) of the wind component for a risk event is calculated using 2^0, 2^1, 2^2, and 2^3, respectively.

The frequency of the ignition events (R_{freq}) is aggregated by the FPI level, wind gust category, and consequence category. For drivers that do not have CPUC reportable ignitions, this multiply factor (n_ignition_events_normalized) would be 1.

For example, if 5 animal-contact caused ignitions occurred at locations where the 99th wind gust falls between 25th to 50th percentiles of the overall 99th wind gust ($WR_{wind} = 2^1$) and where the 50th consequence is above the overall 50th percentile threshold, the R_{freq} is calculated as follow:

R_{freq} = n_ignition_events_normalized × WR_{wind} × W_{con} × Σ_n R_{con}

The ignition events are normalized using the min-max scaling normalization formula:

$$x_{\text{norm}} = \frac{x - \min(x)}{\max(x) - \min(x)}$$

MGRA DATA REQUEST: MGRA-2026-8-03
SDG&E RESPONSE

Date Received: 05-12-2025
Date Submitted: 05-15-2025

QUESTION 3

Please provide technical documentation for the risk driver statistical analysis and testing mentioned on page 14: "*Topographical and climatological risk factors, which include factors include FPI, temperature, humidity, wind gust, elevation, slope, and aspect associated with the location where risk events were observed, were evaluated. Test statistics method Mann Whitney Test was used to compare the sample mean of a risk driver to the sample mean of the other risk drivers. If the difference was statistically significant, this risk factor is noted in OEIS Table 3-1 as influential for a risk driver. These factors are evaluated based on the historical climatological data and current topographical characteristics of the locations associated with each risk driver*."

RESPONSE 3

SDG&E objects to the request to the extent is seeks information that is publicly available and equally available to the requestor. Subject to and without waiving the foregoing objections, SDG&E responds as follows:

SDG&E does not have technical documentation regarding this Mann Whitney Test but abundant explanations can be found online. The goal is to test the statistical significance of a risk factor for a given risk driver. Risk events for each diver category are not normally distributed, which is the main reason Mann Whitney Test is used to run the statistical test instead of using T test. The data used for this test are processed in python, mannwhitneyu() function under "scipy.stats" library.

The underlying data have risk factors mapped to individual risk event observations. The data field, FPI value, is spatially and temporally mapped to each observation; whereas other risk factors, such as temperature and slope, are mapped spatially to the asset where the risk events were observed. The data are sampled into two groups, a given risk driver and all other observations before running this test. The OEIS table 3-1 shows the result of the test for each risk driver category when compared with all the other risk drivers.

MGRA DATA REQUEST: MGRA-2026-8-03
SDG&E RESPONSE

Date Received: 05-12-2025
Date Submitted: 05-15-2025

QUESTION 4

With regard to SDG&E Table 5-7, p. 42, please provide the justification and modeling that leads to the P100 percentile of a potential $211B loss in the SDG&E service area.

RESPONSE 4

As illustrated in Table 5-7, Wildfire risk constitutes the majority of the Overall Utility Risk, significantly outweighing the contributions from PSPS and PEDS risks. Over the course of the 5 million simulated years, the most extreme wildfire scenario, resulting in an estimated cost of approximately $211 billion, was driven by two ignition events that coincidentally occurred under the same simulation seed ID.

The table below shows how the maximum values are derived based on the Monte Carlo simulation:

	Ignition 1	**Ignition 2**	**Total**
Sim Weather Conditions Date	11/12/2018	11/17/2014	---
Ignition ID	403589	1012407	---
Seed ID	11792465	11792465	---
Total Acres Burned	43,703	35,934	79,637
Total Structures Destroyed	6,029	4,042	10,071
Sim Max Wind Gust Conditions	62	55	---
SCADA Sect. Device	907-1562AE	909-451	---
Feeder ID	907	909	---
Wildfire Total Risk (with Risk Aversion) [M$]	$136,729.33	$74,237.73	$210,967.06
Wildfire Total Risk (without Risk Aversion) [M$]	$7,559.78	$4,989.72	$12,549.50
Wildfire Safety Risk (without Risk Aversion) [M$]	$1,427.77	$863.42	$2,291.19
Wildfire Financial Risk (without Risk Aversion) [M$]	$6,132.00	$4,126.24	$10,258.25
Wildfire Reliability Risk (without Risk Aversion) [M$]	$0.01	$0.05	$0.06

MGRA DATA REQUEST: MGRA-2026-8-03
SDG&E RESPONSE

Date Received: 05-12-2025
Date Submitted: 05-15-2025

QUESTION 5

Please provide a list of the 125 worst fire weather days (p. 45) and associated wildfire hazard intensity data.

RESPONSE 5

Please see attached spreadsheet titled "SDGE Response MGRA-2026-8-03_Q5_SDGE_125_worst_fire_days_stats_2025_05_15.xlsx" for the list of 125 days and percentile values of acres burned and structure destroyed for each day. This is the data as referenced on page 45 of SDG&E's 2026-2028 WMP.

This list is currently under review by the Meteorology and Risk Analytics teams. Given the extreme fire weather conditions experienced within SDG&E's service territory between November 2024 and January 2025, SDG&E is evaluating the inclusion of these recent dates in future analyses.

MGRA DATA REQUEST: MGRA-2026-8-03
SDG&E RESPONSE

Date Received: 05-12-2025
Date Submitted: 05-15-2025

QUESTION 6

With regard to OEIS Table 4-3, and corresponding Excel table (MGRA-3-9 b), please break out customers into Residential, Small C&I, and Medium/Large C&I.

RESPONSE 6

SDG&E objects to the request to the extent it is unduly burdensome and calls on SDG&E to perform studies or analysis that do not currently exist. Subject to and without waving the foregoing objections, SDG&E responds as follows:

Commercial and Industrial customers are split based on their kW demand. SDG&E does not have C&I broken down by small, medium or large. The documentation provided includes customer hours broken out into Residential and C&I.

Please see the attached spreadsheet titled "SDGE Response MGRA-2026-8-03_Q06-OEIS-Table-4-3.xlsx."

MGRA DATA REQUEST: MGRA-2026-8-03
SDG&E RESPONSE

Date Received: 05-12-2025
Date Submitted: 05-15-2025

QUESTION 7

WiNGS-Planning still incorporates a decision tree that will default to underground if the Cost/benefit characteristics meet certain criteria, as was described in the SDG&E GRC? Or are all combinations evaluated as options prior to the decision tree?

a. If the answer is yes, the decision tree is prior to CBR calculation does the CBR use SDG&E's convex risk function/attitude for the decision tree?

RESPONSE 7

SDG&E objects to the request to the extent it is argumentative and mischaracterizes SDG&E's modeling functions. SDG&E further objects to the request to the extent it is vague and ambiguous, and fails to identify with specificity the information requested. Subject to and without waiving the foregoing objections, SDG&E responds as follows:

SDG&E does not default to undergrounding as the preferred mitigation strategy. For each feeder segment, SDG&E evaluates risk reduction and cost-benefit ratios for both Combined Covered Conductor and Strategic Undergrounding mitigation options. As stated in the 2026-2028 WMP filing, mitigations are selected by considering their Cost Benefit Ratio (CBR) estimates which encompass risk reduction estimates, as well as both upfront installation and lifecycle costs. Lifecycle costs are essential to making informed and cost-effective decisions in infrastructure investments. They encompass not only the initial investment in mitigation measures but also the ongoing costs of maintenance, operations, and potential upgrades. See section 6.1.3 of the 2026-2028 WMP filing for further details.

MGRA DATA REQUEST: MGRA-2026-8-03
SDG&E RESPONSE

Date Received: 05-12-2025
Date Submitted: 05-15-2025

QUESTION 8

SDG&E describes significant changes to the covered conductor management structure that are now ongoing (p. 98).

Will covered conductor deployment continue unabated while SDG&E reorganizes the management process?

RESPONSE 8

Yes, the covered conductor deployment is expected to continue unabated while SDG&E reorganizes the Project Management Office (PMO) services. There will be some overlap between the incumbent PMO service provider and the new PMO service provider to ensure a smooth transition. The new PMO service provider may also subcontract some of their services with the incumbent to ensure there are no disruptions in the program.

MGRA DATA REQUEST: MGRA-2026-8-03
SDG&E RESPONSE

Date Received: 05-12-2025
Date Submitted: 05-15-2025

QUESTION 9

Please provide tabular data in Excel spreadsheet format for the following figures:

a. OEIS Table 3-1: List of Risks and Risk Drivers to Prioritize

b. OEIS Table 4-3: Frequently De-energized Circuits

c. OEIS Table 6-1 and Appendix F, List of Prioritized Areas

d. SDG&E Table 6-1 Potential Mitigation Activities for Risk Drivers

e. OEIS Table 6-3 Risk Impact of Activities

f. Appendix G refers to a dead web link. Please provide the data in Excel spreadsheet as well as fix the weblink.

RESPONSE 9

For a-f all the requested tables are available on SDG&E's website at https://www.sdge.com/2026-2028-wildfire-mitigation-plan

MGRA DATA REQUEST: MGRA-2026-8-03
SDG&E RESPONSE

Date Received: 05-12-2025
Date Submitted: 05-15-2025

QUESTION 10

Please provide GIS data in the form of shapefiles or geodatabases that support the following figures (if these have not already been provided).

a. Figure 4-3: Frequently De-energized circuits, p. 22.

RESPONSE 10

Please see the attached gdb titled, "SDGE_Frequently_De-energized_circuits.gdb."

MGRA DATA REQUEST: MGRA-2026-8-03
SDG&E RESPONSE

Date Received: 05-12-2025
Date Submitted: 05-15-2025

QUESTION 11

Is FPI historic geographic data available, if so is it available through a public interface and if not how difficult would it to be to produce?

a. If SDG&E were asked to produce FPI estimates given a set of geographic points and date/time, how far back into history could SDG&E provide FPI data?

RESPONSE 11

SDGE divides the service territory into 8 operational districts. The FPI is computed daily for each operational district using live fuel moisture values, dead fuel moisture values, grass NDVI values, dewpoint depression and sustained wind speed forecast. The output is not gridded, and each district receives an FPI value from 1-17. Historical values are archived in a spreadsheet and are not posted publicly.

a. For operational FPI values, SDGE started keeping daily records of the data in April 2013 but there exists intermittent values as far back as late September 2012. Again, the FPI values are calculated per district and not for a set of otherwise specified geographic points.

MGRA DATA REQUEST: MGRA-2026-8-03
SDG&E RESPONSE

Date Received: 05-12-2025
Date Submitted: 05-15-2025

END OF REQUEST

MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

I. GENERAL OBJECTIONS

1. SDG&E objects generally to each request to the extent that it seeks information protected by the attorney-client privilege, the attorney work product doctrine, or any other applicable privilege or evidentiary doctrine. No information protected by such privileges will be knowingly disclosed.

2. SDG&E objects generally to each request that is overly broad and unduly burdensome. As part of this objection, SDG&E objects to discovery requests that seek "all documents" or "each and every document" and similarly worded requests on the grounds that such requests are unreasonably cumulative and duplicative, fail to identify with specificity the information or material sought, and create an unreasonable burden compared to the likelihood of such requests leading to the discovery of admissible evidence. Notwithstanding this objection, SDG&E will produce all relevant, non-privileged information not otherwise objected to that it is able to locate after reasonable inquiry.

3. SDG&E objects generally to each request to the extent that the request is vague, unintelligible, or fails to identify with sufficient particularity the information or documents requested and, thus, is not susceptible to response at this time.

4. SDG&E objects generally to each request that: (1) asks for a legal conclusion to be drawn or legal research to be conducted on the grounds that such requests are not designed to elicit facts and, thus, violate the principles underlying discovery; (2) requires SDG&E to do legal research or perform additional analyses to respond to the request; or (3) seeks access to counsel's legal research, analyses or theories.

5. SDG&E objects generally to each request to the extent it seeks information or documents that are not reasonably calculated to lead to the discovery of admissible evidence.

6. SDG&E objects generally to each request to the extent that it is unreasonably duplicative or cumulative of other requests.

7. SDG&E objects generally to each request to the extent that it would require SDG&E to search its files for matters of public record such as filings, testimony, transcripts, decisions, orders, reports or other information, whether available in the public domain or through FERC or CPUC sources.

8. SDG&E objects generally to each request to the extent that it seeks information or documents that are not in the possession, custody or control of SDG&E.

9. SDG&E objects generally to each request to the extent that the request would impose an undue burden on SDG&E by requiring it to perform studies, analyses or calculations or to create documents that do not currently exist.

10. SDG&E objects generally to each request that calls for information that contains trade

secrets, is privileged or otherwise entitled to confidential protection by reference to statutory protection. SDG&E objects to providing such information absent an appropriate protective order.

II. EXPRESS RESERVATIONS

1. No response, objection, limitation or lack thereof, set forth in these responses and objections shall be deemed an admission or representation by SDG&E as to the existence or nonexistence of the requested information or that any such information is relevant or admissible.

2. SDG&E reserves the right to modify or supplement its responses and objections to each request, and the provision of any information pursuant to any request is not a waiver of that right.

3. SDG&E reserves the right to rely, at any time, upon subsequently discovered information.

4. These responses are made solely for the purpose of this proceeding and for no other purpose.

MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

III. RESPONSES

QUESTION 1

With regard to SDG&E Data Request Response MGRA-2026-8-03-2:

"For example, if 5 animal-contact caused ignitions occurred at locations where the 99th wind gust falls between 25th to 50th percentiles of the overall 99th wind gust (WRwind = 21) and where the 50th consequence is above the overall 50th percentile threshold, the Rfreq is calculated as follow:"[sic]

a. Does SDG&E use a wind-gust adjustment for animal contact?

b. If the answer to a is yes, what is the justification for adjusting the frequency of animal contact ignitions as a function of wind gust speed?

c. Does SDG&E apply the same wind gust weight adjustment to all ignition drivers?

d. If the answer to c is no, which ignition drivers have a wind gust adjustment applied, and what is the basis for the application of the weighting and its magnitude?

RESPONSE 1

a. Yes. SDG&E applied a wind gust weight factor (WR_{wind}) to ignition events, including those caused by animal contact when calculating the R_{freq}

b. By applying a wind-based weighting, SDG&E accounts for the elevated wildfire risk associated with ignition events occurring in locations prone to high wind gusts. This approach enables a location-specific quantification of risk, even for ignition causes not directly influenced by wind, such as animal contact.

c. Yes

d. N/A

MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

QUESTION 2

With regard to SDG&E Data Request Response MGRA-2026-8-03-3:

a. For risk factors such as wind gust, humidity, and temperature, were these sampled at the time of the risk event or does the analysis use aggregated data (i.e. averages, peaks, etc.)?

b. If sampled at the time of the was this based on climatology models or weather station data?

c. If aggregated describe the source of the data, aggregation period method.

RESPONSE 2

a. For this analysis, the risk factors other than Fire Potential Index (FPI) such as wind gust, humidity, and temperature, were aggregated for a given location.

b. N/A

c. Historical wind gust, humidity and temperature were aggregated at the weather station level. For each station, wind gust was aggregated using the 99^{th} percentile, and both temperature and humidity were aggregated using minimum, median and maximum values. All risk events (outages and ignitions) were then spatially tied to their associated weather station to incorporate these localized climatological factors into the risk driver prioritization analysis.

MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

QUESTION 3

With regard to SDG&E Data Request Response MGRA-2026-8-03-4:

In SDG&E's most extreme wildfire scenario, the total risk with SDG&E's risk aversion applied is 16 times larger than without risk aversion. In Section 5.2.2.3 of its WMP SDG&E explains this adjustment comes from applying a power law with an exponent of 1.47.

a. Provide the basis for choosing a power law for the risk aversion function.

b. Provide the method by which the exponent of 1.47 was determined.

c. Does SDG&E agree that wildfire loss statistics, in particular wildfire size, generally follow a power law distribution?

d. If the answer to c is yes, then please provide an explanation of why it is appropriate to adjust a power law distribution by multiplying by another power law distribution.

RESPONSE 3

SDG&E objects to the request to the extent it seeks information that is otherwise publicly available in SDG&E's existing filings and regulatory submissions. Subject to and without waiving the foregoing objections, SDG&E responds as follows:

a. Refer to "Risk-Averse Scaling Function" detailed discussion in SDG&E's recent RAMP submission at "SCG/SDG&E RAMP-3 Risk Quantification Framework-24"
https://www.sdge.com/sites/default/files/regulatory/Vol1_Ch3_Joint_ERM_Risk_Quantification.pdf

b. Refer to the answer given in 3a.

c. Yes, SDG&E agrees with this statement. Refer to "Consequence of a Risk Event" discussion in SDG&E's recent RAMP submission, starting in "SDGE-Risk-4 Wildfire and PSPS-25"
https://www.sdge.com/sites/default/files/regulatory/SDG%26E%20-Risk-4%20Wildfire%20%26%20PSPS_0.pdf

d. SDG&E's wildfire risk modeling framework demonstrates that wildfire consequences within its service territory exhibit a heavy-tailed loss distribution, underscoring the significant role that infrequent yet high-impact events play in overall risk assessment. By modeling tail events, this approach ensures that rare but severe losses are appropriately

accounted for in decision-making, leading to a more precise risk characterization and the development of more effective mitigation strategies.

To further refine its wildfire consequence modeling, SDG&E has transitioned its wildfire consequence model to Technosylva's 24-hour unsuppressed simulations.[1] These simulations validate the previously observed heavy-tailed behavior while offering a site-specific, asset / span, level analysis of wildfire impact across varying observed weather conditions within SDG&E's service territory. While statistical models such as power-law distributions and/or Technosylva simulations effectively describe the potential scale of wildfire-related losses, they do not inherently account for any risk attitude, whether risk-seeking or risk-averse. These models provide a robust quantitative foundation for understanding wildfire impacts but lack the dimension necessary to capture SDG&E's reasonable approach to wildfire risk management.

Risk aversion plays a critical role in regulatory and operational decision-making, shaping how SDG&E evaluates, plans for, and responds to wildfire threats. It influences mitigation strategies, infrastructure investments, emergency response protocols, and stakeholder engagement.

To ensure wildfire risk is managed in accordance with regulatory requirements and community safety priorities, additional modeling techniques, such as incorporating a risk-aversion scaling function, are essential. These adjustments help integrate both statistical projections and the practical, economic sensitivities of utilities, regulators, and communities, ensuring that extreme loss scenarios receive appropriate consideration in planning and risk mitigation efforts.

[1] SDGE-Risk-4 Wildfire and PSPS-25 https://www.sdge.com/sites/default/files/regulatory/SDG%26E%20-Risk-4%20Wildfire%20%26%20PSPS_0.pdf

MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

QUESTION 4

With regard to SDG&E Data Request Response MGRA-2026-8-03-5:

Please provide a version of the table MGRA-2026-8-03_Q06-OEIS-Table-4-3.xlsx with three additional columns listing the total number of customers current as of 2025 on each listed circuit for each of the customer classes:

a. Large/Medium commercial

b. Small commercial

c. Residential

RESPONSE 4

SDG&E objects to the request to the extent it is unduly burdensome and calls on SDG&E to perform studies or analysis that do not currently exist. Subject to and without waving the foregoing objections, SDG&E responds as follows:

Commercial and Industrial customers are split based on their kW demand. SDG&E does not have C&I broken down by small, medium or large. The documentation provided includes customers broken out into total, residential and C&I based on current circuit customer counts.

Please see the attached spreadsheet titled “SDGE Response MGRA-2026-8-04_Q04-OEIS-Table-4-3.xlsx.”

MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

QUESTION 5

With regard to SDG&E Data Request Response MGRA-2026-8-03-7:

SDG&E states that it "*does not default to undergrounding as the preferred mitigation strategy. For each feeder segment, SDG&E evaluates risk reduction and cost-benefit ratios for both Combined Covered Conductor and Strategic Undergrounding mitigation options*."

In SDG&E's last GRC, the WiNGS Planning suite used a decision tree (see GRC DR request responses SDG&E DR Response MGRA-3-13, SDG&E DR Response MGRA-4-1, and SDG&E DR Response TURN-SEU-056-1).

a. Please confirm whether the methodology used during the GRC has been replaced and whether a decision tree is still used at any point in the mitigation decision process.

b. Since SDG&E evaluates both risk reduction and cost-benefit ratios to evaluate mitigation options, please provide the quantitative and qualitative process by which both risk reduction and CBR go into the mitigation decision.

RESPONSE 5

a. The current mitigation decision process has evolved from the methodology used in previous WiNGS-Planning versions. While a structured framework still guides mitigation selection, the process now incorporates a more dynamic, data-driven approach. After the Risk Analytics team reviews and approves the feeder-segment outputs from WiNGS-Planning, a multidisciplinary group of subject matter experts, including Electric System Hardening engineers, fire coordination staff, meteorologists, risk data scientists, and construction engineers, conducts a comprehensive evaluation.

This team assesses the WiNGS-Planning model results and associated cost-benefit ratios, considering feasibility, expected risk reduction, and residual risks for each mitigation option, such as Combined Covered Conductor or Strategic Undergrounding. They also factor in both upfront installation and lifecycle costs, which are modeled over a 55-year lifespan, to ensure long-term cost-effectiveness.

Additionally, the team evaluates opportunities to "bundle" upstream feeder segment hardening projects to enhance PSPS risk reduction and achieve cost efficiencies through reduced permitting and mobilization efforts.

This integrated, expert-driven process reflects a refinement of earlier methodologies, allowing for more nuanced and context-sensitive mitigation decisions. For further details, please refer to

Figure 6.1.3.2.6, *Mitigation Initiative Prioritization to Reduce Wildfire and PSPS Risk in the 2026–2028 WMP*.

b. SDG&E performs a cost-benefit analysis to compare the expected risk reduction and lifecycle costs of Strategic Undergrounding and Combined Covered Conductor. This analysis informs the prioritization of grid hardening mitigations. The WiNGS-Planning model estimates reductions in wildfire, PSPS, and PEDS risks for each feeder segment located in Tier 2 and Tier 3 of the High Fire-Threat District (HFTD). Based on these risk reduction estimates, SDG&E recommends a mitigation strategy for each feeder segment. These recommendations are then reviewed by the Electric System Hardening team for further evaluation. As part of the scoping process, a desktop feasibility study is conducted to assess the practicality of the proposed mitigation. Adjacent upstream and downstream segments are also evaluated to determine whether Strategic Undergrounding or Combined Covered Conductor is the more effective solution (see Section 6.1.2, *Risk-Informed Prioritization*). Where appropriate, consecutive segments may be bundled to maximize PSPS risk reduction and realize economies of scale.

Additionally, Electric Distribution Planning engineers review wildfire mitigation projects for any capacity-related grid needs identified on the associated circuits. These needs, along with any required upgrades, are identified through the annual Distribution Planning Process. As part of their review, engineers verify the results of the Distribution Planning Process and assess whether any changes in scope have occurred since its completion. If necessary, upgrades or reconfigurations are incorporated into the wildfire mitigation project scope. For further details, please refer to Figure 6.1.3.2.6, *Mitigation Initiative Prioritization to Reduce Wildfire and PSPS Risk in the 2026–2028 WMP*.

MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

QUESTION 6

With regard to SDG&E Data Request Response MGRA-2026-8-03-11:

Please provide:

a. An Excel spreadsheet listing all FPI daily records going back to April 2013, listing FPI value, date, and operational district.

b. A shapefile or geodatabase representing SDG&E's operational districts.

RESPONSE 6

SDG&E objects to the request to the extent it is overly broad and unduly burdensome, particularly in that it seeks information dating back more than 10 years. Subject to and without waiving the foregoing objections, SDG&E responds as follows:

a. See attached spreadsheet titled "SDGE Response MGRA-2026-8-04_Q6_Operational FPI - 2012-Current.xlsx."

b. See attached zipped folder titled "SDGE Response MGRA-2026-8-04_Q6_District Shapefiles.zip."

MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

QUESTION 7

With regard to Appendix G and the file SDG&E_2026-2028_Base- WMP_Appendix G Supporting Data_R0.xlsx:

Define “Combined Covered Conductor” and why this is different from the traditional term “Covered Conductor.

RESPONSE 7

The term “Covered Conductor” previously referred solely to replacing bare conductor with covered conductor manufactured with an internal semiconducting layer and external insulating ultraviolet-resistant layers to provide incidental contact protection. The “Combined Covered Conductor” Program (WMP.455) refers to the replacement of bare conductors with covered conductors in the HFTD and, as needed, combining additional equipment replacements and installations such as structures, lighting arrestors, fuses, connectors, and avian protection. Furthermore, advanced protection solutions like Early Fault Detection (EFD) and Falling Conductor Protection (FCP) are assessed and implemented to enhance the system's effectiveness against various risk drivers.

A revised version of these calculations can be found in SDG&E’s non-substantive errata folder, dated May 16, at the following link: https://www.sdge.com/2026-2028-wildfire-mitigation-plan.

MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

QUESTION 8

With regard to Appendix G and the file SDG&E_2026-2028_Base- WMP_Appendix G Supporting Data_R0.xlsx:

Does the "CCC_RA_RAMP" tab calculate the effectiveness of covered conductor alone or does it include EFD and FCD?

RESPONSE 8

All calculations related to Combined Covered Conductor include effectiveness of EFD and FCP.

A revised version of these calculations can be found in SDG&E's non-substantive errata folder, dated May 16, at the following link: https://www.sdge.com/2026-2028-wildfire-mitigation-plan..

MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

QUESTION 9

With regard to Appendix G and the file SDG&E_2026-2028_Base- WMP_Appendix G Supporting Data_R0.xlsx:

Why is Expected Risk Reduction dramatically less than Activity Effectiveness for combined covered conductor? Section 6.2.1.2 does not clarify why this would be the case.

RESPONSE 9

The expected risk reduction for combined covered conductor may appear lower than the stated activity effectiveness due to two key factors: baseline asset condition and the probabilistic nature of risk reduction modeling.

First, the effectiveness of any mitigation activity is calculated relative to the baseline condition of the asset. Assets that have already received traditional hardening measures will experience less additional benefit from the application of covered conductor compared to assets that are currently unhardened. In SDG&E's modeling framework, this means that the marginal risk reduction is lower where the baseline already includes some degree of risk mitigation.

Second, expected risk reduction is derived through stochastic simulation in which ignition events are probabilistically sampled out based on the modeled efficacy of the mitigation. For example, a mitigation effectiveness of 0.58 implies that, on average, 58 out of 100 ignition events are prevented on an unhardened asset. However, because wildfire risk is highly skewed (tail risk, where a small number of events can drive a large share of total expected dollar impact) the removal of events does not necessarily translate to a proportional reduction in overall risk. The events that are sampled out may be lower impact on average, and therefore the total expected risk (in dollar terms) may be reduced by less than the raw event count suggests.

This distinction between activity effectiveness and expected risk reduction is an intentional aspect of the model design, ensuring that mitigation impacts are realistically scaled to both the existing system state and the asymmetric nature of wildfire consequences.

A revised version of these calculations can be found in SDG&E's non-substantive errata folder, dated May 16, at the following link: https://www.sdge.com/2026-2028-wildfire-mitigation-plan.

MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

QUESTION 10

With regard to Appendix G and the file SDG&E_2026-2028_Base- WMP_Appendix G Supporting Data_R0.xlsx:

While the Excel file is interactive and relatively transparent, changing the Mitigation Effectiveness value in cell K10 on the CCC_RA_RAMP page has no effect on the calculated mitigation values.

a. Why is this the case?

b. Is there a way to adjust the table in order to insert user-defined efficiencies?

c. If not, please provide an alternative version of SDG&E_2026-2028_Base-WMP_Appendix G Supporting Data_R0.xlsx with the CCC efficiency set to 85%.

RESPONSE 10

SDG&E objects to the request on the grounds it calls for SDG&E to conduct studies or analysis that do not currently exist and are inconsistent with SDG&E's existing risk models. Subject to and without waiving the foregoing objections, SDG&E responds as follows:

a. Modifying the effectiveness does not affect risk reduction because SDG&E incorporates mitigation effectiveness into its risk reduction calculations within the WiNGS-Planning tool, where millions of stochastic simulations are performed to ensure accurate risk reduction assessments at the feeder-segment level. WiNGS-Planning outputs can be reviewed in tab "raw_WiNGS_Planning".
b. User-defined mitigation efficiencies can be modified in all tabs except CCC and SUG, where this functionality is not available due to risk reductions being calculated within the WiNGS-Planning tool.
c. See attached file titled "SDGE Response MGRA-2026-8-04_Q10c.xlsx" with 85% CC efficacy rate.

A revised version of these calculations can be found in SDG&E's non-substantive errata folder, dated May 16, at the following link: https://www.sdge.com/2026-2028-wildfire-mitigation-plan

MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

QUESTION 11

With regard to Appendix G and the file SDG&E_2026-2028_Base- WMP_Appendix G Supporting Data_R0.xlsx:

Do the cost benefit calculations derived from the file incorporate SDG&E's risk attitude function?

RESPONSE 11

Yes, the cost benefit calculations derived from the file incorporate SDG&E's risk attitude function.

A revised version of these calculations can be found in SDG&E's non-substantive errata folder, dated May 16, at the following link: https://www.sdge.com/2026-2028-wildfire-mitigation-plan

MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

QUESTION 12

With regard to Appendix G and the file SDG&E_2026-2028_Base- WMP_Appendix G Supporting Data_R0.xlsx:

SDG&E states that "*Currently, SDG&E does not calculate a Mitigation Effectiveness metric for PSPS and PEDS risk reductions*." Does SDG&E calculate a wildfire risk reduction metric for PSPS and PEDS?

RESPONSE 12

SDG&E does not establish a wildfire risk reduction metric for PSPS and PEDS, as its approach to risk assessment focuses on analyzing the likelihood and potential consequences of risk events both before and after mitigation. For each mitigation effort, risk reduction is determined by calculating the difference between the total baseline risk and the total post-mitigation risk.

Since both PSPS and PEDS events are highly dependent on weather conditions, SDG&E cannot precisely identify the locations where these protocols will be activated within a three-year period. As a result, SDG&E is unable to calculate risk reduction specific to the WMP years for PEDS and PSPS.

A revised version of these calculations can be found in SDG&E's non-substantive errata folder, dated May 16, at the following link: https://www.sdge.com/2026-2028-wildfire-mitigation-plan

MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

QUESTION 13

With regard to Appendix G and the file SDG&E_2026-2028_Base- WMP_Appendix G Supporting Data_R0.xlsx:

Figure 6.5 shows that the residual risk after SDG&E hardening programs, PSPS and PEDS is 1.5%.

a. What is the estimated combined net estimated residual risk from the portfolio CCC+FCD+ESD+PEDS+PSPS

b. Please provide a version of SDG&E_2026-2028_Base-WMP_Appendix G Supporting Data_R0.xlsx with a tab representing this portfolio risk if it is not already incorporated into the CCC tab.

c. If the tab in b) is onerous to produce, provide a date by which such a portfolio could be generated.

RESPONSE 13

a. "Figure 6-5: Estimated Wildfire Risk Reduction 2007–2037" is derived from current grid hardening initiatives and the projected mileage outlined in "Figure 6-4: Wildfire Hardening Targets". In developing these estimates, an average risk reduction factor is applied to both SUG and CC scenarios, regardless of the specific location of the feeder segment.

   Currently, SDG&E has not scoped the exact feeder segments beyond 2027. Consequently, the risk reduction estimates provided are indicative and reflect preliminary risk reduction estimates. These high-level risk reduction estimates serve as an initial assessment to support wildfire and PSPS risk strategy efforts, and they are expected to be refined and updated as more detailed feeder segmentation data becomes available.

   Modeling only CCC (CC+ Inspections + EFD + FCP+PSPS) the resulting residual risk is 2.22% with a 38.89% risk reduction provided by PSPS de-energizations.

b. Refer to tab "CCC" where risk reduction for 139 miles are presented for the given portfolio. Note that a revised version of these calculations can be found in SDG&E's non-substantive errata folder, dated May 16, at the following link: https://www.sdge.com/2026-2028-wildfire-mitigation-plan

c. N/A

MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

QUESTION 14

With regard to Appendix G and the file SDG&E_2026-2028_Base- WMP_Appendix G Supporting Data_R0.xlsx:

Are advanced protections planned for circuits that may be in SDG&E's long term undergrounding plans?

RESPONSE 14

The current method for scoping advanced protection projects includes analysis based on SDG&E's strategy and cost consideration in selecting circuits for strategic undergrounding of electric lines and aims to provide protection on circuits where no other mitigation exists before implementing a combined mitigation of Falling Conductor Protection (FCP) and long term undergrounding scope. The goal is to gain immediate risk reduction on circuits expected to remain overhead before installing additional mitigation measures on circuits which already have had risk reduced via undergrounding.

Some circuits may not be completely undergrounded due to construction complexity or lower calculated risk on those segments. In this case, advanced protection deployments may be scoped to provide additional risk reduction by installing advanced protection downstream of where the underground segment ends and returns to the overhead plant.

A revised version of these calculations can be found in SDG&E's non-substantive errata folder, dated May 16, at the following link: https://www.sdge.com/2026-2028-wildfire-mitigation-plan.

MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

QUESTION 15

Consequence Modeling:

With regard to SDG&E Data Request Response OEIS-P-WMP_2025-SDGE-02-Q7 and Q9:

Provide available technical details of the structure loss model including citations to supporting literature.

RESPONSE 15

SDG&E objects to the request to the extent it seeks information that contains confidential trade secret or proprietary information. SDG&E objects to providing such information absent an appropriate protective order. Subject to and without waiving the foregoing objections, SDG&E responds as follows:

SDG&E utilizes Technosylva's proprietary software to estimate potential wildfire impacts, including acres burned and structures destroyed. To ensure clarity and transparency on the methodology used, SDG&E has formally requested Technosylva's latest documentation detailing the methodology used to determine structures destroyed based on those located within the fire footprint in their simulations.

MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

QUESTION 16

Consequence Modeling:

With regard to SDG&E Data Request Response OEIS-P-WMP_2025-SDGE-02-Q7 and Q9:

What assumptions do the structure loss model make regarding the fractions of structures burned within the fire perimeter?

RESPONSE 16

See response to Question 15.

MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

QUESTION 17

Consequence Modeling:

With regard to SDG&E Data Request Response OEIS-P-WMP_2025-SDGE-02-Q7 and Q9:

Does the structure loss model use Technosylva's TDI calculation to estimate home losses? If so what is the relationship between TDI and fraction of structures burned?

RESPONSE 17

See response to Question 15.

MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

QUESTION 18

Consequence Modeling:

With regard to SDG&E Data Request Response OEIS-P-WMP_2025-SDGE-02-Q7 and Q9:

Provide additional technical detail regarding SDG&E's egress model.

RESPONSE 18

The wildfire egress modeling framework developed by SDG&E is a simulation system designed to evaluate evacuation feasibility and understand potential egress strategies in the event of a wildfire. The model integrates multi-source geospatial and temporal data to simulate fire progression, population movement, and traffic dynamics. It leverages a combination of deterministic fire spread modeling, graph-based network optimization, and behavioral simulation to identify evacuation bottlenecks and high-risk communities.

At its core, the model treats each utility pole as a potential ignition point, associating it with the nearest weather station and Technosylva fire simulation data to parameterize fire behavior. Fire spread is modeled as an elliptical function, where the major and minor axes are dynamically determined by wind gust magnitude and direction. This allows the model to simulate the temporal evolution of fire perimeters across a heterogeneous landscape. The fire footprint is discretized into five concentric zones, each representing a different level of threat, and road segments are dynamically assigned to these zones as the fire advances.

Population data is spatially resolved using smart meter locations, with each meter's population assigned to the nearest road segment. This enables fine-grained estimation of evacuee density and supports the identification of critical evacuation corridors. The road network is derived from OpenStreetMap (OSM) via OSMNx python library, incorporating attributes such as speed limits and lane capacities. These are used to construct a weighted graph for network flow analysis, where evacuation routes are identified using shortest-path algorithms that account for dynamic fire encroachment and traffic congestion.

The simulation pipeline consists of several stages: ignition point initialization, fire spread simulation, safe zone identification, egress route computation, and behavioral modeling. Safe zones are predefined based on geographic and infrastructural criteria, and the model computes optimal paths from each populated node to the nearest safe zone, updating routes in response to fire progression. Human behavior is modeled probabilistically, incorporating compliance rates with evacuation orders and potential deviations from optimal routes. The model also supports dynamic rerouting and capacity adjustments, such as contraflow lane usage, to reflect real-world emergency response strategies.

To manage computational complexity, the model employs spatial clustering using hexagonal binning. This reduces the number of required simulations by aggregating ignition points with similar fire spread characteristics. For instance, out of over 216,000 potential ignition points, only 30,283 simulations are necessary after filtering out those locations with simulated zero rate of spread and applying hexagonal aggregation. This optimization significantly reduces runtime while preserving spatial resolution and ensuring the predictions remain relevant and accurate.

Egress modeling is a complex and technically challenging process, and its accuracy depends on a several factors and necessary assumptions that are intrinsically extremely difficult to model. SDG&E is constantly working on model enhancements and more effective incorporation of modeling inputs into its larger risk assessment framework to help support a more accurate predictive and prescriptive modeling output, with the intent to more effectively support wildfire mitigation efforts and situational awareness to benefit the community at large.

MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

QUESTION 19

GIS Data:

Please provide GIS data in the form of geodatabase used in Figure 5-12.

RESPONSE 19

Please see attached zip file titled "base_risk_data_GDB.zip" containing the base_risk_geodatabase.gdb file. The .gdb file includes all 3 geospatial layers visualized in Figure 5-12, namely circuit-segment overall risk hexagons, San Diego County line boundaries, and High Fire Threat District (HFTD) line boundaries.

MGRA DATA REQUEST: MGRA-2026-8-04
SDG&E RESPONSE

Date Received: 05-21-2025
Date Submitted: 05-28-2025

END OF REQUEST

MGRA DATA REQUEST: MGRA-2026-8-05
SDG&E RESPONSE

Date Received: 05-30-2025
Date Submitted: 06-04-2025

I. GENERAL OBJECTIONS

1. SDG&E objects generally to each request to the extent that it seeks information protected by the attorney-client privilege, the attorney work product doctrine, or any other applicable privilege or evidentiary doctrine. No information protected by such privileges will be knowingly disclosed.

2. SDG&E objects generally to each request that is overly broad and unduly burdensome. As part of this objection, SDG&E objects to discovery requests that seek "all documents" or "each and every document" and similarly worded requests on the grounds that such requests are unreasonably cumulative and duplicative, fail to identify with specificity the information or material sought, and create an unreasonable burden compared to the likelihood of such requests leading to the discovery of admissible evidence. Notwithstanding this objection, SDG&E will produce all relevant, non-privileged information not otherwise objected to that it is able to locate after reasonable inquiry.

3. SDG&E objects generally to each request to the extent that the request is vague, unintelligible, or fails to identify with sufficient particularity the information or documents requested and, thus, is not susceptible to response at this time.

4. SDG&E objects generally to each request that: (1) asks for a legal conclusion to be drawn or legal research to be conducted on the grounds that such requests are not designed to elicit facts and, thus, violate the principles underlying discovery; (2) requires SDG&E to do legal research or perform additional analyses to respond to the request; or (3) seeks access to counsel's legal research, analyses or theories.

5. SDG&E objects generally to each request to the extent it seeks information or documents that are not reasonably calculated to lead to the discovery of admissible evidence.

6. SDG&E objects generally to each request to the extent that it is unreasonably duplicative or cumulative of other requests.

7. SDG&E objects generally to each request to the extent that it would require SDG&E to search its files for matters of public record such as filings, testimony, transcripts, decisions, orders, reports or other information, whether available in the public domain or through FERC or CPUC sources.

8. SDG&E objects generally to each request to the extent that it seeks information or documents that are not in the possession, custody or control of SDG&E.

9. SDG&E objects generally to each request to the extent that the request would impose an undue burden on SDG&E by requiring it to perform studies, analyses or calculations or to create documents that do not currently exist.

10. SDG&E objects generally to each request that calls for information that contains trade

secrets, is privileged or otherwise entitled to confidential protection by reference to statutory protection. SDG&E objects to providing such information absent an appropriate protective order.

II. EXPRESS RESERVATIONS

1. No response, objection, limitation or lack thereof, set forth in these responses and objections shall be deemed an admission or representation by SDG&E as to the existence or nonexistence of the requested information or that any such information is relevant or admissible.

2. SDG&E reserves the right to modify or supplement its responses and objections to each request, and the provision of any information pursuant to any request is not a waiver of that right.

3. SDG&E reserves the right to rely, at any time, upon subsequently discovered information.

4. These responses are made solely for the purpose of this proceeding and for no other purpose.

MGRA DATA REQUEST: MGRA-2026-8-05
SDG&E RESPONSE

Date Received: 05-30-2025
Date Submitted: 06-04-2025

III. RESPONSES

QUESTION 1

With regard to SDG&E Data Request Response MGRA-2026-8-03-4 and MGRA-2026-8-04-3:

SDG&E states that it applies its risk aversion function to all attributes related to wildfire, and that the power law correction for wildfire uses an exponent of 1.47.

a. Under what conditions, if any, will this risk aversion function affect the choice of mitigation set used, and if there are differences how do they come about?

b. Is cost/benefit ratio used explicitly used as a threshold to make decisions in any wildfire safety process, for spending requests, or in the choice of mitigations? If so state specifically where and how cost/benefit threshold is used. (That comparisons of CBRs is used is clear and need not be discussed.)

RESPONSE 1

a) Risk aversion is integrated into the assessment of baseline risk, risk reduction potential, residual risk, and cost-benefit evaluations. SDG&E's subject matter experts, including specialists in risk analytics, fire coordination, meteorology, and engineering, utilize these metrics to inform the selection of grid hardening strategies at the feeder-segment level. Final mitigation strategies are determined through detailed, site-specific scoping of each feeder segment.

b) Cost-benefit ratio (CBR) is not used as a strict threshold or cutoff for decision-making in wildfire safety processes, spending requests, or mitigation selection. Rather, CBR is one of several key metrics used to inform prioritization and comparative evaluation of mitigation options. SDG&E's wildfire mitigation planning process incorporates CBR analyses to assess the relative efficiency of different mitigation strategies, particularly at the feeder-segment level. However, final decisions also consider additional factors such as:

   - Operational feasibility and constructability,
   - Geographic and environmental constraints, and
   - Expert judgment from interdisciplinary teams (including fire science, engineering, and meteorology).

   Thus, while CBR comparisons are explicitly used to guide and support decision-making, they are not applied as absolute thresholds that determine whether a mitigation is approved or rejected.

MGRA DATA REQUEST: MGRA-2026-8-05
SDG&E RESPONSE

Date Received: 05-30-2025
Date Submitted: 06-04-2025

QUESTION 2

With regard to SDG&E Data Request Response MGRA-2026-8-04-11, CPUC rules (D.24-05-064 at p. 98) state that when a utility uses a convex function to calculate fix, their analysis should be accompanied by a neutral function as well.

a. Has SDG&E prepared a neutral risk analysis and presented in SDG&E_2026-2028_Base WMP_Appendix G Supporting Data_R0.xlsx or elsewhere in public data, and if not please provide one?

RESPONSE 2

SDG&E's neutral risk analysis is presented in the attached file titled "SDGE Response MGRA-2026-8-05_Q2".xlsx.

A revised version of risk aversion cost benefit calculations can be found in SDG&E's substantive and non-substantive errata folder, dated May 16, at the following link: https://www.sdge.com/2026-2028-wildfire-mitigation-plan..

MGRA DATA REQUEST: MGRA-2026-8-05
SDG&E RESPONSE

Date Received: 05-30-2025
Date Submitted: 06-04-2025

END OF REQUEST

MGRA DATA REQUEST: MGRA-2026-8-06
SDG&E RESPONSE

Date Received: 06-06-2025
Date Submitted: 06-11-2025

I. GENERAL OBJECTIONS

1. SDG&E objects generally to each request to the extent that it seeks information protected by the attorney-client privilege, the attorney work product doctrine, or any other applicable privilege or evidentiary doctrine. No information protected by such privileges will be knowingly disclosed.

2. SDG&E objects generally to each request that is overly broad and unduly burdensome. As part of this objection, SDG&E objects to discovery requests that seek "all documents" or "each and every document" and similarly worded requests on the grounds that such requests are unreasonably cumulative and duplicative, fail to identify with specificity the information or material sought, and create an unreasonable burden compared to the likelihood of such requests leading to the discovery of admissible evidence. Notwithstanding this objection, SDG&E will produce all relevant, non-privileged information not otherwise objected to that it is able to locate after reasonable inquiry.

3. SDG&E objects generally to each request to the extent that the request is vague, unintelligible, or fails to identify with sufficient particularity the information or documents requested and, thus, is not susceptible to response at this time.

4. SDG&E objects generally to each request that: (1) asks for a legal conclusion to be drawn or legal research to be conducted on the grounds that such requests are not designed to elicit facts and, thus, violate the principles underlying discovery; (2) requires SDG&E to do legal research or perform additional analyses to respond to the request; or (3) seeks access to counsel's legal research, analyses or theories.

5. SDG&E objects generally to each request to the extent it seeks information or documents that are not reasonably calculated to lead to the discovery of admissible evidence.

6. SDG&E objects generally to each request to the extent that it is unreasonably duplicative or cumulative of other requests.

7. SDG&E objects generally to each request to the extent that it would require SDG&E to search its files for matters of public record such as filings, testimony, transcripts, decisions, orders, reports or other information, whether available in the public domain or through FERC or CPUC sources.

8. SDG&E objects generally to each request to the extent that it seeks information or documents that are not in the possession, custody or control of SDG&E.

9. SDG&E objects generally to each request to the extent that the request would impose an undue burden on SDG&E by requiring it to perform studies, analyses or calculations or to create documents that do not currently exist.

10. SDG&E objects generally to each request that calls for information that contains trade

secrets, is privileged or otherwise entitled to confidential protection by reference to statutory protection. SDG&E objects to providing such information absent an appropriate protective order.

II. EXPRESS RESERVATIONS

1. No response, objection, limitation or lack thereof, set forth in these responses and objections shall be deemed an admission or representation by SDG&E as to the existence or nonexistence of the requested information or that any such information is relevant or admissible.

2. SDG&E reserves the right to modify or supplement its responses and objections to each request, and the provision of any information pursuant to any request is not a waiver of that right.

3. SDG&E reserves the right to rely, at any time, upon subsequently discovered information.

4. These responses are made solely for the purpose of this proceeding and for no other purpose.

MGRA DATA REQUEST: MGRA-2026-8-06
SDG&E RESPONSE

Date Received: 06-06-2025
Date Submitted: 06-11-2025

III. RESPONSES

QUESTION 1

For each of the risk drivers listed in OEIS Table 3-1 which has x% of either ignitions or overhead faults greater than 0.5%, please provide in tabular form the percentage reduction in risk events from the specified risk driver by applying the following mitigations:

a. Covered conductor

b. Combined covered conductor (CCC) with FCP and ESD

c. CCC + PEDS

RESPONSE 1

The percentage reduction in risk events for drivers with either ignition or overhead fault greater than 0.5% by mitigations has been provided in the attached spreadsheet titled "SDGE Response MGRA-2026-8-06.xlsx".

a. Covered Conductor: Can be found in Column H in the above-mentioned sheet

b. CCC with FCP and EFD: Can be found in Column I in the above-mentioned sheet. SDG&E doesn't have calculated effectiveness by driver for FCP and EFD. The risk reduction provided is an SME estimation of effectiveness.

c. Protective Equipment and Devices Settings (PEDS), known within SDG&E as the Sensitive Relay Profile (SRP), serves as a reactive ignition mitigation strategy. These settings respond to fault currents without differentiating between various risk events, resulting in a consistent risk reduction percentage across all incidents. Historically, SDG&E has applied SRP selectively, activating it only during periods of heightened wildfire risk—approximately 7% of the year on average. While SDG&E does not measure efficacy by specific risk drivers, PEDS is 100% effective whenever it is enabled, as SDG&E has not experienced any downstream ignitions on SRP-enabled devices regardless of CCC installation.

MGRA DATA REQUEST: MGRA-2026-8-06
SDG&E RESPONSE

Date Received: 06-06-2025
Date Submitted: 06-11-2025

END OF REQUEST