



OFFICE OF ENERGY INFRASTRUCTURE SAFETY
WILDFIRE SAFETY ADVISORY BOARD

**STAFF DRAFT: CONSIDERATION OF
EXTREMES IN UTILITY RISK MODELS**

FEBRUARY 2026

TABLE OF CONTENTS

- Executive Summary 4**
- 1. Introduction 5**
 - 1.1 About the Wildfire Safety Advisory Board 5
 - 1.2 Energy Safety Request 5
 - 1.3 Conditions During Los Angeles Fires 6
 - 1.3.1 Wind and Relative Humidity 6
 - 1.3.2 Precipitation and Fuel Load 7
 - 1.3.3 Fire Weather Index 7
 - 1.4 Approach and Structure of This Report 8
- 2. Primary Uses of Risk Models..... 9**
- 3. Risk Model Inputs..... 11**
- 4. Model Uncertainties Under Extreme Conditions..... 11**
- 5. Discussion 12**
 - 5.1 Operations Models: Adequacy 12
 - 5.2 Planning Models: Historical Data Do Not Include All Realistic Extremes 12
 - 5.3 Planning Models: Relative and Absolute Risk Values 13
 - 5.4 Planning Models: Alternative Consequence Approaches..... 14
- 6. Recommendations 15**
- 7. References Table 17**

LIST OF FIGURES

Figure 1. Daily FWI based on global climate modeling. January is highlighted in yellow. Record daily highs were observed during January 2025. 8

Figure 2. An example of a list of highest-risk circuits, ranked by overall utility risk per mile... 10

Figure 3. An example of calculated risk reduction after mitigation activities. 10

Figure 4. PG&E’s base consequence table describing inputs and evaluations. Wildfire spread models contribute “Flame Length” and “Rate of Spread” values. 15

DRAFT

EXECUTIVE SUMMARY

This report evaluates whether utility wildfire risk models adequately represent realistic extreme wildfire scenarios. The Wildfire Safety Advisory Board prepared this report in response to an Office of Energy Infrastructure Safety request following the January 2025 Los Angeles Fires, which occurred under extreme conditions of high winds, low humidity, and a large amount of vegetation following multiple wet years.

A key question in evaluating “adequacy” of risk models is in how model results are used. Utilities apply wildfire risk models in two primary decision contexts: near-term operations and long-term planning. Operations models support real-time safety decisions using forecasts, field observations, thresholds, and expert judgment. Planning models support longer-term mitigation selection, capital investment prioritization, and regulatory analysis.

Utilities represent extreme wildfire conditions in planning models primarily through historical weather and fuel inputs, which has both strengths and limitations. Historical fire-weather day selection ensures realistic combinations of conditions but may not capture the full range of compound extremes or future climate-driven risk conditions. The key issue is whether extreme inputs meaningfully influence outputs used for ranking riskiest circuits, estimating absolute risk, and planning mitigation.

Wildfire spread model uncertainty increases for extreme wildfire conditions and introduces additional uncertainty into consequence estimates. The wildfire spread models most commonly used by utilities rely on equations developed using lower wind-speed laboratory data and do not capture ember-driven fire spread. Planning model outputs that rely on wildfire spread modeling therefore require caution, particularly when used to estimate absolute risk values.

Targeted improvements can strengthen planning models for use under realistic extreme wildfire conditions. The report recommends that Energy Safety be cautious in basing decisions on modeled absolute risk values and to fully implement the 2025 WSAB risk modeling recommendations; require utilities to compare circuit risk rankings using expected values and maximum or tail values; and require utilities to test and report on alternatives or supplements to wildfire spread models when calculating wildfire consequence under realistic extreme scenarios.



1. INTRODUCTION

On March 1, 2025, the Office of Energy Infrastructure Safety (Energy Safety) sent a letter seeking advice from the Wildfire Safety Advisory Board (WSAB).¹ This letter requested recommendations on best practices in vegetation management and utility risk model adequacy. This report is a response to the request on risk model adequacy.

1.1 About the Wildfire Safety Advisory Board

Public Utilities Code (PUC) section 326.1 established the WSAB, a seven-member body of wildfire and utility policy experts appointed by the Governor, Speaker of the Assembly, and Senate Committee on Rules. Each member of WSAB brings a unique perspective and their own expertise. Additional information about WSAB, its members, and its prior recommendations, advisory opinions, and meetings can be found on WSAB website.²

The current members of the WSAB are:

- Ralph Armstrong
- Marybel Batjer
- Jessica Block, Chair
- Timothy Haines
- John Mader
- Chris Porter, Vice Chair
- Dr. Alexandra Syphard

PUC section 326.2 states that WSAB shall “[p]rovide other advice and recommendations related to wildfire safety as requested by the Office of Energy Infrastructure Safety.”

1.2 Energy Safety Request

The Energy Safety request on risk model adequacy was:

Risk Model Adequacy in Light of Los Angeles Fires. January fires in Los Angeles occurred in conditions of extreme wind and extremely high vapor pressure deficit after a wet two years that allowed for much vegetation growth. We request your expertise to advise us as to whether the risk models used by electric utilities adequately consider the circumstances Southern California faced in January and other realistic extreme scenarios. If the risk models do not adequately consider these realistic extreme scenarios, we request your recommendations on how electrical utilities

¹ 2025 Energy Safety Request.

² Wildfire Safety Advisory Board.

should modify their risk models to provide more useful outputs for informing electric utility planning and operations.³

For the purposes of this report, “Los Angeles Fires” refers primarily to the Palisades and Eaton Fires, which burned from January 7–31, 2025. The Palisades Fire burned 23,488 acres over 24 days, causing 12 fatalities and destroying 6,837 structures.⁴ The Eaton Fire burned 14,021 acres over the same period, causing 19 fatalities and destroying 9,414 structures.⁵ Both fires were driven by extreme weather and fuel conditions. At least ten other wildfires occurred in Los Angeles County in the same period.

This report primarily uses relative humidity rather than vapor pressure deficit. Both compare the amount of moisture the air is holding to the maximum amount of moisture the air could hold, at a given temperature.^{6, 7} While vapor pressure deficit has been argued to be a more direct measure of the atmosphere’s “drying power,” relative humidity is widely available in forecasts and historical meteorological data.⁸

This report reviews the risk models of three investor-owned utilities (IOUs): Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas and Electric (SDG&E). Specifically, it reviews the consequence part of risk calculation, and not the likelihood part.

1.3 Conditions During Los Angeles Fires

Energy Safety noted the Los Angeles Fires occurred under “conditions of extreme wind and extremely high vapor pressure deficit after a wet two years that allowed for much vegetation growth.” Characterizing conditions helps establish what “extreme” means in the context of Energy Safety’s request. The meteorological record confirms that this combination of drivers aligned in producing conditions that were both rare and highly conducive to large, destructive fires.

1.3.1 Wind and Relative Humidity

During the Los Angeles Fires, maximum hourly-averaged wind speeds on January 7 exceeded 98th percentile at the three nearest weather stations.⁹ Wind gusts reached 70–80 miles per hour (mph) with isolated gusts near 100 mph.¹⁰

³ 2025 Energy Safety Request.

⁴ 2025 Palisades Fire.

⁵ 2025 Eaton Fire.

⁶ What is VPD.

⁷ Understanding RH.

⁸ Vapor Pressure Deficit.

⁹ Unprecedented LA Fires.

¹⁰ SCE PSPS Post Event, page 8 and App C.

At the same time, relative humidity dropped suddenly. In Malibu Canyon, relative humidity dropped from 36 percent on January 4 to 13 percent on January 7.¹¹ This sudden decrease dried fuels and increased the likelihood of ignition and the potential rate of spread of a fire.

1.3.2 Precipitation and Fuel Load

Southern California received well-above-average rainfall from 2022–2024, which produced large amounts of grass and shrub growth.^{12, 13} Satellite imagery showed that the Los Angeles region had 30 percent greater values of normalized difference vegetation index (NDVI) than average.¹⁴ NDVI is a measure of plant health and biomass.¹⁵ When 2024 turned hot and dry, with almost no rain after April, that vegetation cured into fine, highly flammable fuel.¹⁶ This created a continuous fuel bed capable of carrying fire rapidly under wind-driven conditions.¹⁷

1.3.3 Fire Weather Index

The fire weather index (FWI) combines variables such as wind, relative humidity, precipitation, fuel load, and temperature to scale fire danger.¹⁸ The fire weather index reached record-high daily values across the Los Angeles region during the Los Angeles Fires (Figure 1).¹⁹

¹¹ Unprecedented LA Fires.

¹² 2024 Atmospheric Rivers.

¹³ 2024 Fuels Advisory.

¹⁴ Fuel for California Fires.

¹⁵ NDVI and Crop Growth.

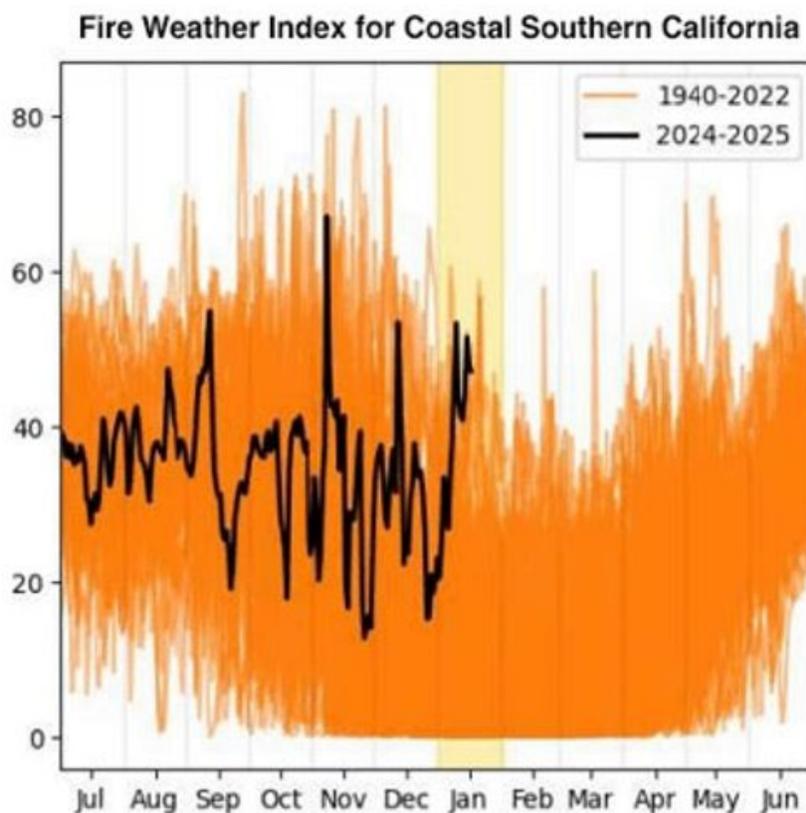
¹⁶ Unprecedented LA Fires.

¹⁷ 2025 Flammable Flora California

¹⁸ Fire Weather Index System.

¹⁹ Climate Change and LA wildfires.

Figure 1. Daily FWI based on global climate modeling. January is highlighted in yellow. Record daily highs were observed during January 2025.²⁰



1.4 Approach and Structure of This Report

Model “adequacy” will depend on how utilities use model outputs to support real-world decisions. Energy Safety asked whether utility risk models “adequately consider the circumstances Southern California faced in January and other realistic extreme scenarios.” To address this question, this report evaluates both the conditions utilities input into their models and how those conditions influence outputs used for decision-making. Section 2 describes how utilities use models, distinguishing between operations and planning models. Section 3 outlines how utilities select weather and fuel inputs for their models. Section 4 evaluates utility modeling of extreme conditions and describes limitations using wildfire spread models.

The report then integrates these findings in Section 5 and discusses model adequacy based on intended use, the differences between relative and absolute risk values, and alternatives to current consequence calculations. Finally, Section 6 details three recommendations based on the analysis presented in this report.

²⁰ Climate Change and LA Fires.

2. PRIMARY USES OF RISK MODELS

“Utility planning and operations” in the Energy Safety request refers to different time scales for utility decisions. Utilities use operations models to support real-time and near-term (hours to days) decisions about system safety and reliability. These models combine real-time weather data, near-term forecasts, and grid status data to guide immediate actions, including de-energization and rapid crew deployment.

Utilities use operations models as one of several sources of information in making real-time decisions, e.g., on whether to activate a public safety power shutoff (PSPS). In that case, wildfire risk calculations are weighed against risk calculations on the impact a PSPS event would have on customers. Utilities complement operations model outputs with direct input from meteorologists, fire behavior analysts, and fire agencies.^{21, 22} Field crews also inform operations decisions, observing conditions on the ground.²³

Utilities use planning models for long-term project selection and determining mitigation strategies. These are used to rank circuits by risk (relative use of risk value). Utilities report more information for circuits ranked as highest risk in their wildfire mitigation plans (Figure 2).²⁴ Utilities also use risk values, not merely to rank circuits, but to report the amount of risk that mitigation projects reduce (Figure 3) and develop cost-benefit analysis.²⁵

²¹ SCE Email Exchange.

²² SDG&E Email Exchange.

²³ SDG&E Email Exchange.

²⁴ OEIS, WMP Guidelines, section 5.

²⁵ OEIS, WMP Guidelines, section 6.

Figure 2. An example of a list of highest-risk circuits, ranked by overall utility risk per mile.²⁶

OEIS Table 5-5: Summary of Top-Risk Circuits, Segments, or Spans

Risk Ranking (by Overall Utility Risk Per Mile)	Circuit, Segment, or Span ID	Overall Utility Risk Score	Wildfire Risk Score	Outage Program Risk Score	Top Risk Contributors	Total Miles	Version of Risk Model Used	Overall Utility Risk Per Mile*
1	222-1986R	\$79,194,349	\$78,602,170	\$592,179	Wildfire	21.26	Version 4	\$3,725,802
2	237-1765R	\$28,249,252	\$28,064,039	\$185,213	Wildfire	8.34	Version 4	\$3,386,368
3	222-1990R	\$45,106,640	\$44,939,414	\$167,226	Wildfire	14.24	Version 4	\$3,168,165
4	358-682F	\$37,602,118	\$37,073,061	\$529,058	Wildfire	12.51	Version 4	\$3,006,265
5	909-451	\$55,252,375	\$54,850,769	\$401,606	Wildfire	20.60	Version 4	\$2,682,718
6	909-805R	\$32,313,161	\$32,075,253	\$237,908	Wildfire	13.42	Version 4	\$2,408,131
7	1458-601R	\$37,077,302	\$36,838,604	\$238,698	Wildfire	15.45	Version 4	\$2,400,175
8	908-2038R	\$41,258,574	\$40,800,964	\$457,611	Wildfire	17.93	Version 4	\$2,301,533
9	1021-1748F	\$35,156,122	\$34,811,511	\$344,612	Wildfire	17.73	Version 4	\$1,983,191
10	237-30R	\$65,515,492	\$64,815,659	\$699,833	Wildfire	33.47	Version 4	\$1,957,370
11	237-17R	\$27,080,738	\$26,780,686	\$300,052	Wildfire	14.64	Version 4	\$1,850,171
12	237-2R	\$30,894,123	\$30,619,728	\$274,395	Wildfire	16.72	Version 4	\$1,847,268
13	1030-42R	\$28,398,789	\$27,971,256	\$427,534	Wildfire	16.72	Version 4	\$1,698,351
14	971-2050R	\$28,484,584	\$28,174,790	\$309,794	Wildfire	20.70	Version 4	\$1,375,980
15	524-69R	\$40,375,331	\$39,985,025	\$390,306	Wildfire	34.17	Version 4	\$1,181,539

* The column "Overall Utility Risk Score per Mile" was added by SDG&E.

Figure 3. An example of calculated risk reduction after mitigation activities.²⁷

OEIS Table 6-4: Summary of Risk Reduction for Top-Risk Circuits

Circuit, Segment, or Span ID	Initial Overall Utility Risk	2026 Activities	2026 Overall Utility Risk	2027 Activities	2027 Overall Utility Risk	2028 Activities	2028 Overall Utility Risk	WiNGS 4.0 Rank
222-1986R	\$79,194,349	['Fuel Management' 'OH Patrol' 'Off Cycle Patrol' 'Pole Clearing' 'RIDI' 'Trim and Removal' 'Veg Detail Inspection']	\$56,424,256	['Fuel Management' 'OH Patrol' 'Off Cycle Patrol' 'Pole Clearing' 'RIDI' 'Trim and Removal' 'Veg Detail Inspection']	\$56,612,589	['Fuel Management' 'OH Patrol' 'Off Cycle Patrol' 'Pole Clearing' 'RIDI' 'Trim and Removal' 'Veg Detail Inspection']	\$56,222,086	1
237-30R	\$65,515,492	['Fuel Management' 'OH Detail Inspection' 'OH Patrol' 'Off Cycle Patrol' 'Pole Clearing' 'RIDI' 'Trim and Removal' 'Veg Detail Inspection']	\$45,767,092	['Fuel Management' 'OH Patrol' 'Off Cycle Patrol' 'Pole Clearing' 'RIDI' 'Trim and Removal' 'Veg Detail Inspection']	\$45,540,967	['Fuel Management' 'OH Patrol' 'Off Cycle Patrol' 'Pole Clearing' 'RIDI' 'Trim and Removal' 'Veg Detail Inspection']	\$44,288,168	2
909-451	\$55,252,375	['Fuel Management' 'OH Detail Inspection' 'OH Patrol' 'Off Cycle Patrol' 'Pole Clearing' 'RIDI' 'Trim and Removal' 'Veg Detail Inspection']	\$38,832,312	['Fuel Management' 'OH Patrol' 'Off Cycle Patrol' 'Pole Clearing' 'RIDI' 'Trim and Removal' 'Veg Detail Inspection']	\$37,899,114	['Fuel Management' 'OH Patrol' 'Off Cycle Patrol' 'Pole Clearing' 'RIDI' 'Trim and Removal' 'Veg Detail Inspection' 'Wood Pole Intrusive']	\$33,892,623	3
222-1990R	\$45,106,640	['Fuel Management' 'OH Patrol' 'Off Cycle Patrol' 'Pole Clearing' 'RIDI' 'Trim and Removal' 'Veg Detail Inspection']	\$32,029,305	['Fuel Management' 'OH Patrol' 'Off Cycle Patrol' 'Pole Clearing' 'RIDI' 'Trim and Removal' 'Veg Detail Inspection']	\$32,065,198	['Fuel Management' 'OH Patrol' 'Off Cycle Patrol' 'Pole Clearing' 'RIDI' 'Trim and Removal' 'Veg Detail Inspection']	\$31,456,932	4
908-2038R	\$41,258,574	['Fuel Management' 'OH Detail Inspection' 'OH Patrol' 'Off Cycle Patrol' 'Pole Clearing' 'RIDI' 'Trim and Removal' 'Veg Detail Inspection']	\$21,287,557	['Fuel Management' 'OH Patrol' 'Off Cycle Patrol' 'Pole Clearing' 'RIDI' 'Trim and Removal' 'Veg Detail Inspection']	\$20,630,822	['Fuel Management' 'OH Patrol' 'Off Cycle Patrol' 'Pole Clearing' 'RIDI' 'Trim and Removal' 'Veg Detail Inspection' 'Wood Pole Intrusive']	\$19,745,841	5
524-69R	\$40,375,331	['Fuel Management' 'OH Detail Inspection' 'OH Patrol' 'Off Cycle Patrol' 'Pole Clearing' 'RIDI' 'Trim and Removal' 'Veg Detail Inspection']	\$20,020,371	['Fuel Management' 'OH Patrol' 'Off Cycle Patrol' 'Pole Clearing' 'RIDI' 'Trim and Removal' 'Veg Detail Inspection']	\$18,684,313	['Fuel Management' 'OH Patrol' 'Off Cycle Patrol' 'Pole Clearing' 'RIDI' 'Trim and Removal' 'Veg Detail Inspection']	\$18,966,954	6
358-682F	\$37,602,118	['Fuel Management' 'OH Patrol' 'Off Cycle Patrol' 'Pole Clearing' 'RIDI']	\$27,497,985	['Fuel Management' 'OH Detail Inspection' 'OH Patrol' 'Off Cycle Patrol' 'Pole Clearing' 'RIDI' 'Trim']	\$25,465,433	['Fuel Management' 'OH Patrol' 'Off Cycle Patrol' 'Pole Clearing' 'RIDI']	\$0	7

3. RISK MODEL INPUTS

Wildfire risk model inputs include weather, fuels, topography, and asset characteristics. Operations models use real-time or near-term meteorological and fuel data and forecasts. In contrast, the three large IOUs derive planning model weather and fuel inputs from historical conditions. Utility subject matter experts select specific days from historical records to represent high fire likelihood days. PG&E uses 571 “worst weather days” drawn from 2003–2022 historical data.²⁸ SDG&E uses data from 2013–2021 that includes 125 “worst fire weather days.”²⁹ SCE uses data from 1980–2021 and breaks its service territory into 13 fire climate zones. These zones vary in the number of “fire weather days,” from 29 in the Central Sierras to 464 in Tehachapi.³⁰

4. MODEL UNCERTAINTIES UNDER EXTREME CONDITIONS

In its June 2025 Recommendations to the Office of Energy Infrastructure Safety (2025 Recommendations to Energy Safety), WSAB emphasized the importance of understanding and communicating uncertainty in utility wildfire risk models and provided actionable recommendations.³¹ While these recommendations did not focus on extreme conditions, they are relevant to the questions in the Energy Safety request as well.

When inputs to the most commonly used wildfire spread models reflect extreme conditions such as the Los Angeles Fires, uncertainty increases in model outputs. Utilities use wildfire spread models that are based on the Rothermel equations, which were developed using laboratory data with wind speeds below 12 mph, equating to field conditions around 30 mph.^{32, 33} At higher wind speeds, models become less reliable, and can produce outputs with “severely elongated elliptical shapes due to the high eccentricity at high wind speeds.”³⁴ The Los Angeles Fires occurred with wind gusts recorded up to 100 mph.³⁵

The Rothermel-based spread models that utilities use also neglect ember casting.³⁶ At higher wind speeds embers—small pieces of burning debris or vegetation—can carry large distances,

²⁸ 2025 PG&E Data Request, OEIS_001_Q24.

²⁹ 2025 SDG&E RAMP, page 30.

³⁰ SCE, 2026-2028 WMP, page 86.

³¹ 2025 Recommendations to Energy Safety.

³² Model for Predicting Fire Spread, page 21.

³³ Fire Response to High Wind Speeds, pages 1-2

³⁴ Fire Spread Simulations, page 2.

³⁵ LA’s Critically Dry Conditions.

³⁶ Ember Risk Modeling.

changing the dynamic of wildfire spread.³⁷ Ember casting was largely blamed for the “chaotic and destructive” nature of the Los Angeles Fires.³⁸ Modelers have developed separate analyses to specifically identify areas, including in and adjacent to the built environment, with higher vulnerability to ember casting.³⁹

5. DISCUSSION

This analysis decomposed the Energy Safety request into evaluation of model inputs and uncertainties, applied to wildfire risk operations models and planning models. In this section we discuss adequacy considering each of these elements. As noted in Section 1, a key question in evaluating adequacy of risk models is in how utilities use both relative and absolute model results.

5.1 Operations Models: Adequacy

Because operations models use real-time data and near-term forecasts as inputs, utilities are not selecting representative inputs in the same way they do for planning models. There is no reason to believe that utilities would not faithfully consider data and forecasts of extreme conditions. Further, when operations models’ outputs exceed threshold values, the amount of exceedance may not affect the decisions made. Given the complexity and real-time nature of operational decision-making, WSAB does not currently have any recommendations on the operations models.

5.2 Planning Models: Historical Data Do Not Include All Realistic Extremes

While using historical data for model inputs ensures that the combinations of conditions (e.g., wind, temperature, fuel moisture) are realistic, it also means individual variables cannot be scaled independently. Further, limiting the historical period from which fire weather days are drawn may not account for the full range of fire weather conditions outside of that period. For example, SCE noted that “recent events in California, including the [Los Angeles Fires], highlight that relying solely on historical wildfire data may not fully capture the range and severity of the potential tail risk events.”⁴⁰ The approach also does not account for rare conditions that would be realistic extremes but have not yet been observed; nor for potential changes to realistic extremes that could occur under climate change.

However, it does not immediately follow that the models are not adequately considering extremes. The more important question is whether adding more extreme values would

³⁷ Spot Fire Distance.

³⁸ Burning Embers Flew Miles.

³⁹ Fine Scale Hazard Mapping.

⁴⁰ SCE, Power Law White Paper, page 1.

change how utilities use model outputs. Here, differentiating between uses of relative (ranked) outputs and absolute outputs further divides the problem.

5.3 Planning Models: Relative and Absolute Risk Values

Regulatory requirements influence how utilities generate and use planning model outputs. The California Public Utilities Commission (CPUC), in its Risk-Based Decision-Making Framework (RDF), requires utilities to “use expected value for the Cost-Benefit Approach-based measurements and calculations of [Consequence of Risk Event]” values.⁴¹ An expected value is the weighted average within a probability distribution.⁴² The RDF also permits utilities to perform an alternative analysis, such as tail value, in addition to the expected value analysis.⁴³ Energy Safety, in its Wildfire Mitigation Plan (WMP) Guidelines, also requires each electrical corporation to “describe how it identifies and evaluates options for mitigating wildfire...consistent with the CPUC guidelines associated with the [RDF].”⁴⁴

As noted in Section 2, planning model outputs are used both to rank circuits or circuit segments and for cost-benefit analysis. Ranking risk values of each circuit, or circuit segment, relative to the risk of any another circuit or circuit segment is comparing risk modeling outputs to risk modeling outputs. Using absolute values of risk for cost-benefit analysis is comparing risk model outputs not to other risk model outputs, but to external, measurable quantities such as cost.

PG&E and SDG&E have reported expected values. SDG&E noted that incorporating additional, more extreme scenarios would likely produce minimal change in expected value.⁴⁵ This impacts uses of both relative and absolute values—small changes in the expected value probably do not have big impacts either on the ranking or on cost-benefit analysis.

SCE has used maximum consequence values (of its selected fire weather days) to represent catastrophic wildfires. However, “even the use of the maximum consequence values may underrepresent the risk at certain locations given that the risk is likely to increase over time.”⁴⁶ Use of mean risk lowers absolute risk values, as SCE reports in its 2026–2028 Wildfire Mitigation Plan.⁴⁷ However, it is not clear whether using more extreme inputs would change the relative risk values (i.e., circuit rankings). That is, it is not clear whether using more

⁴¹ RDF Appendix A, pages 14-15.

⁴² Probability and Statistics, page 25.

⁴³ RDF Appendix A, pg. 18

⁴⁴ Final WMP Guidelines, page 64.

⁴⁵ SDG&E Email Exchange.

⁴⁶ SCE, 2025 WMP Update, page 43.

⁴⁷ SCE, 2026–2028 WMP, page 577.

extreme inputs would push all model results to higher consequences uniformly, or if there are meaningful variations in circuit ranking by extreme risk or expected risk.

The 2025 Recommendations to Energy Safety identified the need for caution when interpreting absolute risk values. The report noted that even updated fuel models have an average mean absolute percentage error of 37%. It indicated that all California IOUs use a single wildfire spread model, while comparing multiple models may give a fuller representation of the range of uncertainties. It pointed out that collapsing consequence distributions to single values is an incomplete representation of the results. It stated that utilities do not fully describe the uncertainties in likelihood modeling. Finally, it highlighted that utilities report risk results to improbable levels of precision—up to 15 decimal places. PG&E also states that wildfire spread models provide “poor correlation” between results and real-world observations of structures destroyed.⁴⁸ The additional sources of uncertainty in modeling extreme conditions described in this report further reinforce the need for caution when relying on absolute risk values.

5.4 Planning Models: Alternative Consequence Approaches

Some utilities have reduced their reliance on wildfire spread models to produce consequence values. SCE is developing a hybrid framework that combines its deterministic wildfire spread model-based Wildfire Integrated Model with a probabilistic consequence model. This hybrid approach was “designed to bridge the precision and granularity of deterministic models, with the capability to understand a full range of probabilistic outcomes to better capture rare, but potentially catastrophic tail risk events.”⁴⁹ SCE also noted the need for supplemental models as the approach used for the wildfire spread models “limits [the model’s] ability to capture the full range of possible outcomes, particularly those rare, but high-impact events, which occur under dynamic conditions.”⁵⁰

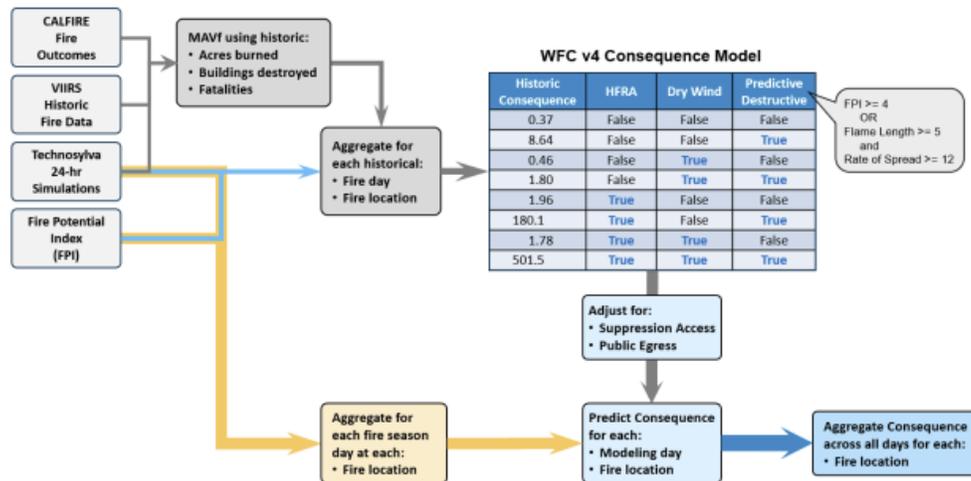
PG&E uses a unique approach to estimating wildfire consequence values that reduces its reliance on wildfire spread models. It assigns consequence values based on three conditional variables: whether the asset is in a high-fire risk area (HFRA), whether there are dry wind conditions in the simulated day, and whether a potential fire would be destructive. Wildfire spread modeling informs a portion of the “potentially destructive” conditional (Figure 4). PG&E uses multiple points of data in this approach, rather than relying on a single source.

⁴⁸ PG&E, 2026-2028 Data Response, GPI_001_Q002.

⁴⁹ Power Law, page 36.

⁵⁰ Power Law, page 33-34.

Figure 4. PG&E base consequence table describing inputs and evaluations. Wildfire spread models contribute “Flame Length” and “Rate of Spread” values.⁵¹



Given the known limitations and uncertainties of Rothermel-based wildfire spread models, it is worth exploring alternative approaches to calculating consequence. For example, further analysis could evaluate how much additional information PG&E derives from combining the Rothermel-derived flame length and rate of spread with fire potential index (FPI), as opposed to using FPI independently. More broadly, utilities could evaluate alternative approaches such as machine learning models, probabilistic consequence models, or FPIs. Without wildfire spread models, utilities could still calculate wildfire consequence, and alternate methods may better support planning for realistic extreme conditions.

6. RECOMMENDATIONS

Energy Safety requested WSAB’s “expertise to advise us as to whether the risk models used by electric utilities adequately consider the circumstances Southern California faced in January and other realistic extreme scenarios. If the risk models do not adequately consider these realistic extreme scenarios, we request your recommendations on how electrical utilities should modify their risk models to provide more useful outputs for informing electric utility planning and operations.”

WSAB has no recommendations on the adequacy or useful outputs of operations models at this time. WSAB recommends targeted improvements focused on transparency, model use,

⁵¹ PG&E 2026-2028 WMP, Figure 5.2.2.2-1, page 70.

and consequence modeling to improve the adequacy of planning models and the usefulness of their outputs.

1. Energy Safety should fully implement the risk modeling recommendations in the 2025 Recommendations to Energy Safety.
2. Energy Safety should be cautious in basing decisions on absolute values of modeled risk.
3. Energy Safety should require utilities to compare circuit risk rankings using expected values and maximum or tail values.
4. Energy Safety should require utilities to test and report on alternatives or supplements to wildfire spread models when calculating wildfire consequence, including under realistic extreme scenarios.

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