THE UTILITY REFORM NETWORK

CPUC Docket: A.23-05-010
Exhibit Number: TURN-12
Witness: Eric Borden

PREPARED TESTIMONY OF ERIC BORDEN

ADDRESSING SOUTHERN CALIFORNIA EDISON'S TEST YEAR 2025 GENERAL RATE CASE WILDFIRE GRID HARDENING INVESTMENTS

Submitted on Behalf of

THE UTILITY REFORM NETWORK

360 Grand Ave, Suite 150
Oakland, CA 94610

Telephone: (415) 929-8876
E-mail: tlong@turn.org

February 29, 2024

I. INTRODUCTION AND OVERVIEW

SCE's proposal for grid hardening expenditures – $4.2 billion from 2025-2028, primarily for undergrounding overhead power lines – prioritizes capital spending above prudent risk mitigation, affordability, and cost-effectiveness. In the context of an ever-present affordability crisis in California, Southern California Edison's (SCE's) proposal ignores basic principles of risk management, including examination of cost-effectiveness, to prioritize spending on its newly preferred mitigation, undergrounding. The proposal should be significantly modified to focus on risk reduction **and** cost-effectiveness.

Based on our analysis of SCE's proposal and underlying wildfire risk analysis, TURN finds the following:

- SCE's designation of certain areas as having "severe risk" and therefore requiring undergrounding of overhead lines is based on a largely opaque qualitative process that adopts a different definition of "risk" than that adopted by this Commission and agreed to by SCE in the D.18-12-014 Settlement, while ignoring affordability and cost-effectiveness.

- SCE's argument that examination of relative risk, and therefore cost-effectiveness, is "irrelevant", is contrary to basic risk management practices and the Commission's mandate to ensure safe and affordable electric service.

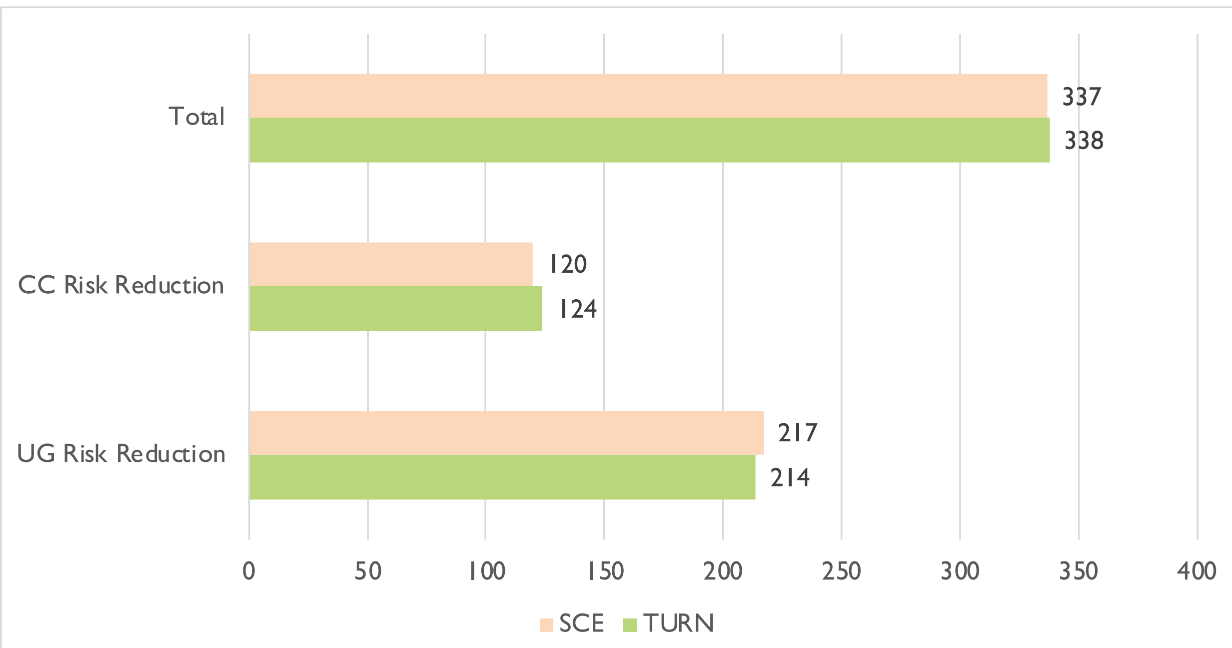
- SCE's massive proposed investment in undergrounding does not adequately take into account the significant ratepayer investment and burden borne by ratepayers over the last six years for grid hardening measures. This investment has allowed for a nearly 80 percent risk reduction since 2018, due primarily to the installation of covered conductor.

- Covered conductor remains by far the most cost-effective and expeditious grid hardening measure; up to 300 percent more risk reduction per dollar spent can be expected from covered conductor than undergrounding according to the utility's risk analysis.

Based on our analysis and findings, TURN recommends a <u>truly</u> "targeted" undergrounding program that focuses on the very highest risk miles. Specifically, SCE should be allowed to deploy up to 44 overhead miles per year of undergrounding over the rate cast period, subject to a location-specific analysis of alternatives that shows undergrounding is the most cost-effective solution, or, if not, that undergrounding can be justified as the preferred alternative based on factors showing that overhead hardening would have limited effectiveness at the location in question.

TURN proposes covered conductor deployment on the remaining miles SCE has targeted for hardening. The more than $2 billion additional investment in grid hardening recommended by TURN, detailed below, addresses most of the remaining wildfire risk on SCE's system and equals the risk reduction of SCE's plan, at a cost that is $2 billion less than SCE's proposal.

Figure 1. Absolute Risk Reduction of Grid Hardening Proposals – TURN vs. SCE



Source: Calculations based on SCE's response to Data Request (DR) TURN-SCE-7, Q1b Revised, and Excel attachment "WP SCE-04 Vol. 05 Pt. 1 - WCCP-UG-RSE_Amended."

Table 1. Overhead Mileage and Costs of Grid Hardening ($ thousands) – TURN vs. SCE

	Undergrounding				
	2025	2026	2027	2028	Total / Weighted Average
TURN Miles	44	44	44	44	177
SCE Miles	60	150	200	170	580
Unit Cost	*$ 5,083*	*$ 5,677*	*$ 5,717*	*$ 5,687*	*$ 5,632*
TURN Budget	$ 224,903	$ 251,227	$ 252,984	$ 251,633	$ 980,746
SCE Budget	$ 304,954	$ 851,620	$ 1,143,432	$ 966,727	$ 3,266,733
TURN-SCE	**$ (80,051)**	**$ (600,392)**	**$ (890,448)**	**$ (715,095)**	**$ (2,285,986)**

	Covered Conductor				
	2025	2026	2027	2028	Total / Weighted Average
TURN Miles	413	413	413	413	1,651
SCE Miles	850	300	50	50	1,250
Unit Cost	*$ 763*	*$ 778*	*$ 805*	*$ 812*	*$ 770*
TURN Budget	$ 314,921	$ 320,902	$ 332,373	$ 335,247	$ 1,303,442
SCE Budget	$ 648,666	$ 233,289	$ 40,271	$ 40,620	$ 962,845
TURN-SCE	**$ (333,745)**	**$ 87,613**	**$ 292,101**	**$ 294,627**	**$ 340,597**

Source: SCE unit costs and mileage figures (all overhead miles) from SCE's response to DR TURN-SCE-051 Q2 and "TURN-SCE-051 Q2bd TUG Forecast Costs" (Excel attachment) and "TURN-SCE-051 Q2ac WCCP Forecast Costs" (Excel attachment). All dollars in this testimony are nominal.

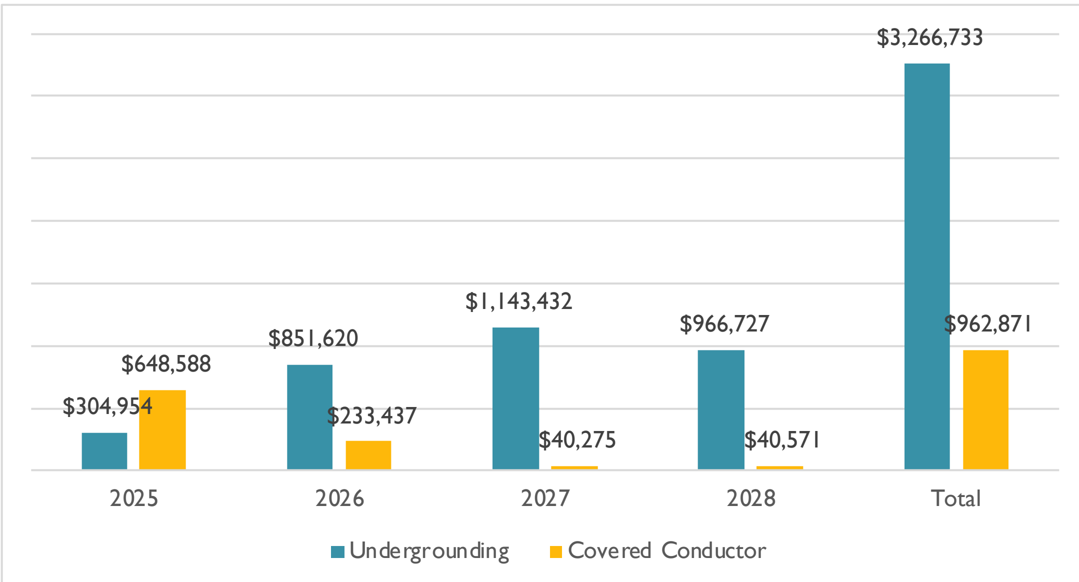
II. OVERVIEW OF SCE'S GRID HARDENING PROPOSAL

SCE proposes massive costs for undergrounding of electric lines over the general rate case (GRC) period, despite a previous focus on covered conductor deployment that has quickly and dramatically helped to reduce wildfire risk in SCE's service territory. That said, SCE still plans on spending nearly $1 billion on covered conductor from 2025-2028, with significant deployment continuing in 2023 and 2024 (1,200 miles in each year for a cost of more than $1.6 billion).[1]

[1] SCE-04, Vol. 5, part 2a, p. 31, Table I-10. In addition, SCE is proposing significant additional covered conductor installation for reasons other than wildfire mitigation in its Overhead Conductor Program.

SCE proposes the following costs and overhead miles[2] from 2025-2028 for its grid hardening measures – undergrounding and covered conductor.

Figure 2. SCE Forecast Grid Hardening Costs ($ Thousands)

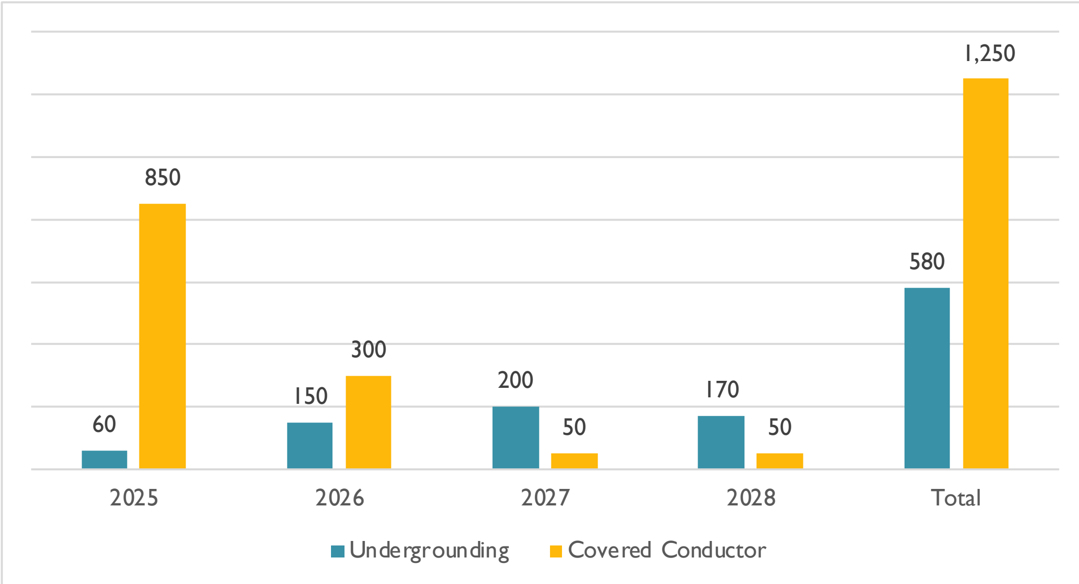


Source: Undergrounding from SCE's response to DR TURN-SCE-051 Q2 and "TURN-SCE-051 Q2bd TUG Forecast Costs" (Excel attachment); covered conductor from "TURN-SCE-051 Q2ac WCCP Forecast Costs" (Excel attachment).

(OCP) described in SCE-02, Vol. 2, part 2, pp. 81 *et seq.* TURN separately addresses SCE's OCP in Ex. TURN-05, the testimony of Jalal Awan.

[2] When comparing covered conductor and undergrounding miles and costs, one must compare these in terms of "overhead miles." As SCE explains in its testimony (SCE-01, Vol 5, Part 2A, p. 16), the number of miles to underground an overhead powerline is often more than the miles of overhead line. This is because "[l]ines may need to be moved […] to avoid steep terrain, heavy vegetation, water crossings, erosion concerns, an to generally avoid environmental considerations associated with heavy equipment access to construct and/or maintain lines." This results in "increasing the length of the undergrounding needed and increasing the total cost as well as construction timeline. SCE estimates that for high difficulty miles, underground miles on average are 20% more than overhead miles." We note that this is a critical assumption that can mask important variations when expressed as an average. In reality, the additional mileage needed for an overhead to underground conversion is highly project specific.

Figure 3. SCE Forecast Grid Hardening Overhead Miles



Source: Undergrounding from SCE's response to DR TURN-SCE-051 Q2 and "TURN-SCE-051 Q2bd TUG Forecast Costs" (Excel attachment); covered conductor from "TURN-SCE-051 Q2ac WCCP Forecast Costs" (Excel attachment).

SCE seeks to scale its undergrounding program significantly over the GRC period, from just 15 targeted underground miles recorded in 2022 to 240 in 2027 (miles shown above are overhead miles replaced).[3]

III. SEVERE RISK AREAS

SCE bases its grid hardening forecast largely on its designation of certain portions of its service territory as "Severe Risk Areas" (SRAs), where SCE states overhead powerlines must be undergrounded to limit or eliminate risk. SCE would deploy covered conductor to non-SRAs, called "High Consequence," as well as "Other HFRA" if operationally necessary when deploying to "High Consequence" areas.[4] SCE admits that its grid hardening proposal, which hinges primarily on the SRA concept, was not created with any thresholds for affordability in

[3] SCE DR Response "TURN-SCE-051 Q2bd TUG Forecast Costs" (2027 underground miles); SCE-04, Vol. 5, Part 2a, Table I-4, p. 18.
[4] SCE-04, Vol. 5, Part 1a, p. 2.

mind.[5] In addition, SCE's proposal is not based on a project-specific analysis that assesses whether undergrounding is the most cost-effective mitigation alternative in SRAs.[6]

SCE's SRAs are based on the following criteria, only one of which need be present to qualify a location as an SRA:[7]

1. Population egress constraints, high fire frequency, and burn-in buffer into egress locations.[8]
2. Significant fire consequence – Acres burned consequence greater than 10,000 over an 8-hour unsuppressed model simulation.
3. High winds – Locations, which if fully covered with covered conductor, would still be subject to high PSPS likelihood.
4. Communities of Elevated Fire Concern (CEFCs) – Smaller geographic areas where terrain, construction, and other factors could lead to smaller, fast-moving fires threatening populated locations under benign (normal) weather conditions.

SCE has incorporated both egress risk and PSPS risk into its wildfire risk modeling and risk scores at the circuit segment level.[9] As a result, in choosing between undergrounding and overhead hardening in a given location, SCE's cost-effectiveness and absolute risk reduction comparisons can take into account how well the alternatives address these risks.

We note that SCE does not define "egress risk" as specific to utility assets, i.e. as necessarily caused by overhead utility poles and equipment. Rather, it has identified areas of its service territory that generally, it believes, might face egress risk if there were a wildfire and all residents had to evacuate at the same time.[10]

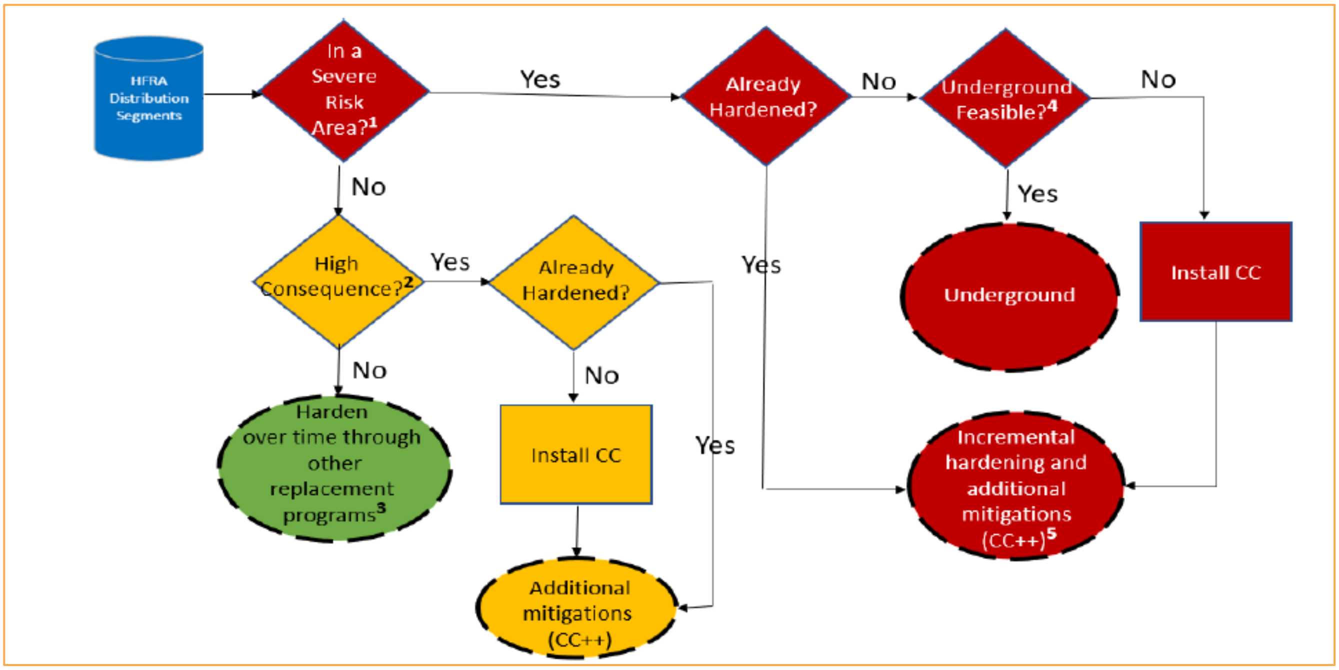
Based on these criteria, SCE identifies 3,226 miles of its service territory that are SRAs. However, most of these miles are already hardened or will be by 2024; only 590 miles of SRA remain that will not be hardened through 2024 (primarily with covered conductor), almost all of

---

[5] SCE Response to DR TURN-SCE-039, question 2a: "There are no affordability thresholds or constraints specific to the planned grid hardening scope in the referenced volume of testimony."
[6] SCE Response to DR TURN-SCE-039, question 2c.
[7] SCE-04, Vol. 5, Part 1a, pp. 23-24.
[8] SCE states in SCE-04, Vol. 5, Part 1a, "Burn-in buffers are areas adjacent to the egress constrained areas such that if the fire originated there, could enter the egress constrained area."
[9] SCE-04, Vol. 5, Part 1a, pp. 15, 17.
[10] SCE-04, Vol. 5, Part 1a, p. 25.

which the utility seeks to underground in the GRC period.[11] SCE would install covered conductor for remaining miles in the HFRA (1,250 miles) or have additional mitigations deployed, according to the following decision-tree:

Figure 4. SCE Decision Process for Grid Hardening



Source: SCE-04, Vol. 5, part 1a, p. 45, Figure II-19. Footnotes omitted.

Notable in this decision tree is the fact that whether undergrounding is deployed hinges on whether a location is an SRA. No consideration is given to a comparison of cost-effectiveness values for undergrounding and overhead hardening at the location in question.

A. SCE's Designation of Certain Areas as "Severe Risk" Lacks Rigor, Ignores Cost-Effectiveness, and is Contrary to the Commission's Adopted Risk Framework

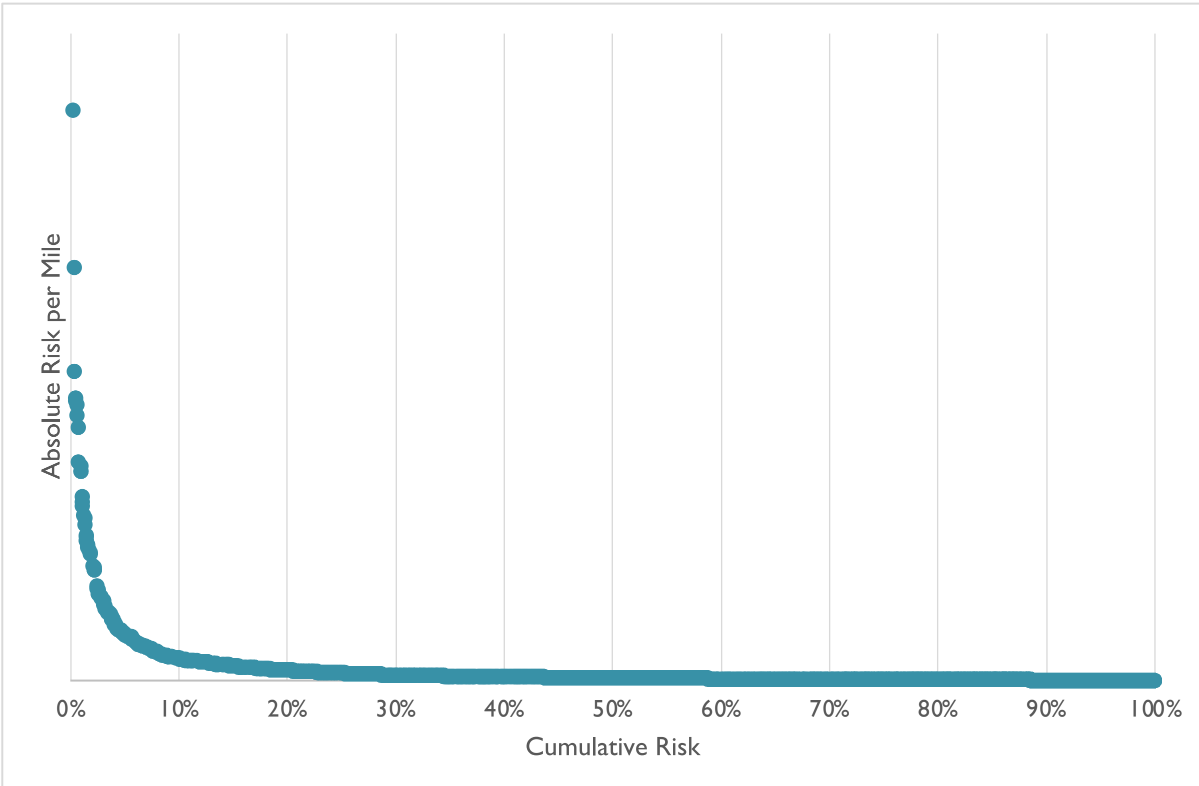
The utilities and Commission have made significant strides in moving towards more rigorous and quantitative risk assessments over the last ten years. Indeed, the wildfire risk analysis SCE has produced in this GRC is by far the most granular and detailed that I have seen to-date, consisting of over 38,000 circuit segments which the utility analyzes to produce cost-effectiveness statistics. While there are still improvements the utility can make to improve the

[11] SCE-04, Vol. 5, Part 1a, Table II-7, p. 44.

rigor of its analysis, SCE's proposal to effectively ignore its own quantification of wildfire risk in lieu of the qualitative factors it selects appears geared to artificially select undergrounding regardless of what its own risk modeling data shows regarding the highest risk miles and concentration of risk. SCE *does* incorporate certain factors like egress and PSPS risk into its quantification of risk (consequence) that are also factors of what is deemed an "SRA", yet still chooses to effectively ignore its analysis for the purpose of selecting the appropriate hardening or other mitigation, demonstrated further below.

The implication of SCE's proposal is to use a different definition of risk than the one adopted by the Commission and agreed to by the investor owned utilities (IOUs) in the D.18-12-014 settlement – likelihood of risk event (LoRE) times consequence of risk event (CoRE). SCE's decision-making methodology almost completely ignores likelihood while treating all circuit miles that meet *any* of the proposed criteria as effectively the same, warranting (according to SCE) the most costly and time-consuming mitigation available, undergrounding. Yet the utility's own risk calculations show that it is far from the reality that all circuits in SRA's have "severe" risk – indeed, the utility's data indicates some portions have zero or near-zero risk. This is illustrated below, where we rank SRA circuit segments from highest to lowest risk per mile by segment according to the utility's risk analysis. The x-axis shows the percent of cumulative risk, while the y-axis shows the risk per mile of the circuit segment.

Figure 5. Absolute Risk per Mile Values of Circuit Segments in "Severe Risk Areas"

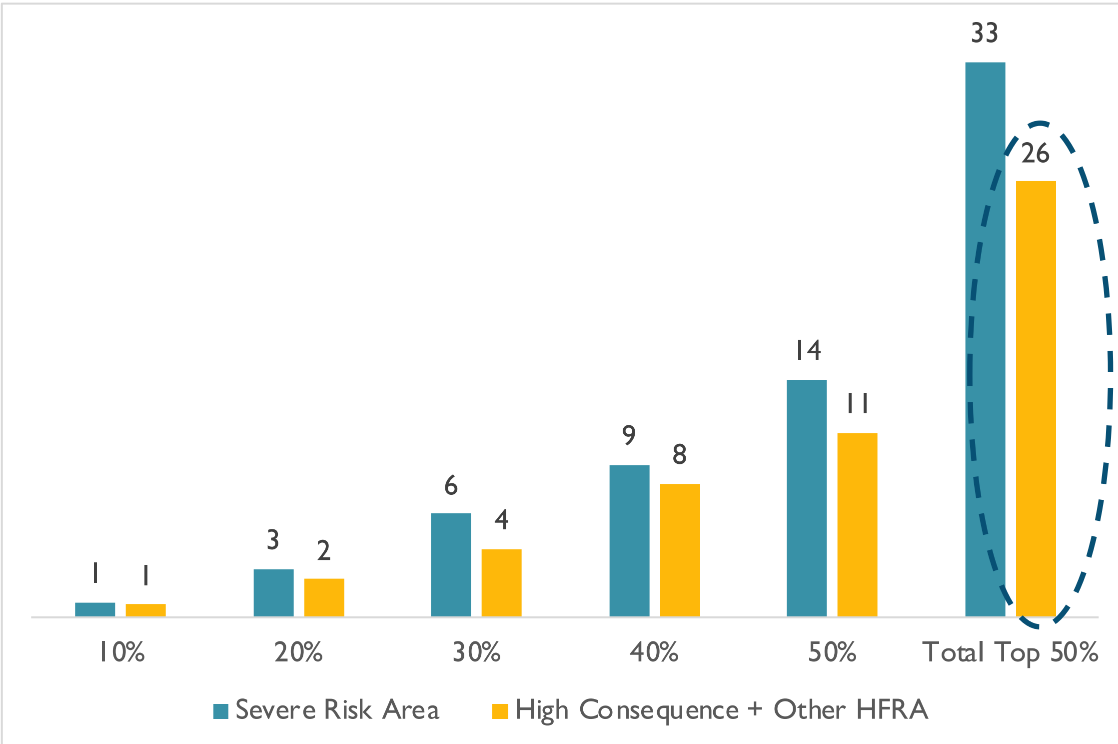


Source: Calculated from SCE response to DR TURN-SCE-7, Q1b Revised, and Excel attachment "WP SCE-04 Vol. 05 Pt. 1 - WCCP-UG-RSE_Amended.". The highest risk per mile segment is not shown because it is significantly higher than other scores and could not be shown on the same scale.

As this figure shows, many circuit segments that SCE paints broadly as having "severe risk" have very low relative and absolute risk. Indeed, there is significant variation in absolute risk among the broad swath of segments that SCE categorizes as SRA.

The lack of quantitative rigor inherent in SCE's categorization approach is also demonstrated by an analysis of *all* unhardened circuit miles, i.e., not just those that SCE labels as SRA. Again, we sort SRA circuit segments, contrasted with the non-SRA segments in SCE's HFRA, from highest to lowest risk per mile by segment according to the utility's risk analysis, in order to analyze risk across unhardened miles. First, we find that there are very high-risk miles in the non-SRA category that will be missed by the utility's undergrounding program which likely warrant consideration. Indeed, as shown in the figure below, 26 miles, or 44 percent of unhardened miles contained in the top 50 percent of cumulative risk, are not considered to be within a "severe risk area."

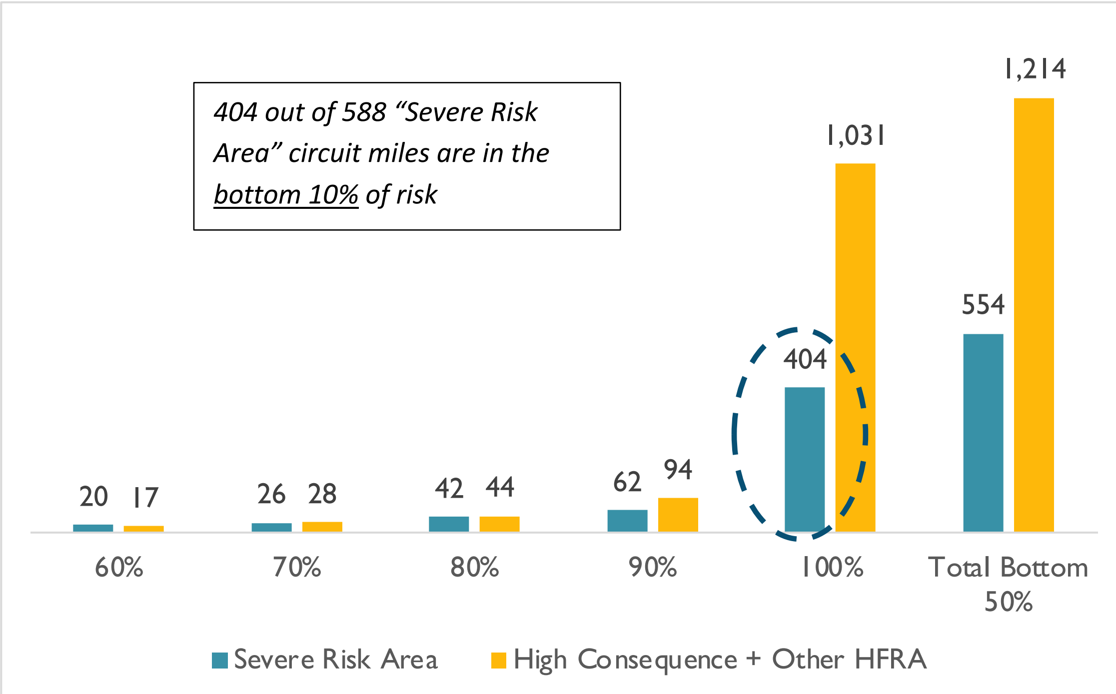
Figure 6. Circuit Miles in Top 50 Percent of Risk



Source: Calculated from SCE response to DR TURN-SCE-7, Q1b Revised, and Excel attachment "WP SCE-04 Vol. 05 Pt. 1 - WCCP-UG-RSE_Amended."

Equally concerning is the significant presence of relatively *low* risk miles that SCE's approach requires to be undergrounded because they have all been categorized as "severe risk."

Figure 7. Circuit Miles in Bottom 50 Percent of Risk



Source: Calculated from SCE response to DR TURN-SCE-7, Q1b Revised, and Excel attachment "WP SCE-04 Vol. 05 Pt. 1 - WCCP-UG-RSE_Amended."

As this figure shows, 554 out of the total of 588 miles that SCE classifies as SRA are in the bottom 50 percent of risk; 404 miles are in the bottom **10%**.

This analysis demonstrates the flaws in SCE's qualitative, category-based approach to undergrounding. Clearly, the locations that SCE labels "severe risk areas" are not well correlated with the segments that the CPUC-adopted risk quantification approach shows to have the highest risk.

B. SCE's SRA Criteria Are a Poor Fit for Explaining the Situations When Undergrounding May Be Superior to Overhead Hardening

In SCE's proposal, whether or not an HFRA location is considered an SRA is the key determinant of whether undergrounding overhead lines should be performed. However, , the SRA criteria identified by SCE do not provide a sound basis for choosing undergrounding over covered conductor or covered conductor with REFCL. Undergrounding may be a superior alternative to covered conductor in locations, for example, where the risk drivers are not aligned with the best use case of covered conductor, where undergrounding can be accomplished for a reasonably comparable cost,, or where the absolute risk (based on likelihood and consequence per the D.18-12-014 settlement) is relatively high, among other possible scenarios. The following table shows the mismatch between SCE's SRA criteria and reasons that would make undergrounding the superior alternative.

SRA Criteria	Does this demonstrate undergrounding is the preferred solution?
1. Population egress constraints, high fire frequency, and burn-in buffer into egress locations.[12]	These criteria do not necessarily support undergrounding over covered conductor. They are not related to the location-specific drivers that determine the effectiveness of overhead hardening compared to undergrounding and otherwise, do not show why undergrounding is superior. SCE does not explain why its SRA designation better explains where undergrounding is preferable compared to its circuit segment risk scores, which quantitatively capture many of the risk factors in these criteria.
2. Significant fire consequence – Acres burned consequence greater than 10,000 over an 8-hour unsuppressed model simulation.	A high consequence score does not necessarily mean risk drivers would not be significantly mitigated by covered conductor.
3. High winds – Locations, which if fully covered with covered conductor, would still be subject to high PSPS likelihood.	Of the four criteria, this one best explains why undergrounding may be preferable. Still, from this criterion, it is not clear what the likelihood or frequency of these high wind events are, nor whether this likelihood justifies the high expense of undergrounding. Further, undergrounding is by far the most expensive and likely least cost-effective mitigation to address PSPS risk. Most other programs intended to mitigate PSPS risk would be significantly more cost-effective and in the interest of ratepayers: customer care programs – batteries and generator back-

[12] SCE states in SCE-04, Vol. 5, Part 1a, p. 53 fn 51: "Burn-in buffers are areas adjacent to the egress constrained areas such that if the fire originated there, could enter the egress constrained area."

	up, sectionalization, switching plans, mobile generator deployment, and likely others.[13]
4. Communities of Elevated Fire Concern (CEFCs) – Smaller geographic areas where terrain, construction, and other factors could lead to smaller, fast-moving fires threatening populated locations under benign (normal) weather conditions.	Same problems as identified for the first and second criteria.

IV. SCE'S SOLE FOCUS ON ABSOLUTE RISK REDUCTION IS MISGUIDED, INCONSISTENT WITH STANDARD RISK MANAGEMENT PRACTICES, AND NOT IN THE PUBLIC INTEREST

A. SCE Wrongly Treats the Tradeoff Between Risk Reduction and Cost as Irrelevant

SCE dismisses a recommendation by Safety Policy Division (SPD) to consider focusing 40 percent of its spending to get 85 percent of the risk reduction proposed, stating that SPD commits a "logical fallacy" by conflating relative and absolute risk.[14]

> [SPD's recommendation] is ultimately irrelevant: the important question is how much absolute risk would remain if SPD's recommendation is accepted and SCE does not harden those remaining areas—areas that the Commission has already deemed inherently risky by designating them as part of the HFTD. It is the remaining (i.e., residual) absolute risk that is relevant, not the amount of relative risk that can be bought down by making the limited investments SPD recommends.[15]

SCE appears to double down on its opposition to *any* examination of relative risk in a data request response to the Public Advocates Office:

[13] SCE response to DR TURN-SCE-40, question 5b.
[14] SCE-01, Vol. 5, Part 1a, p. 54.
[15] SCE-01, Vol. 5, Part 1a, p. 54: 25-29.

> The premise of Cal Advocates' stated data request improperly focuses on relative risk, not absolute risk. Capturing some portion of theoretical relative risk in a corresponding number of overhead circuit miles does not accurately illustrate the amount of overall risk eliminated by existing or proposed mitigations or the remaining residual risk after those mitigations are implemented. For example, if one assumes that the entire overhead distribution system has 1,000 miles of overhead conductor and has 1,000 risk units, and that the riskiest mile is 100 times riskier on a relative basis than the remaining 999 miles, then by definition hardening that 1 mile would eliminate 99% of the relative risk on the entire system. And that hypothetical is not hyperbolic. That conclusion would be both mathematically correct and logically meaningless at the same time. The only relevant question should be: "What remaining absolute risk remains in those 999 miles that you did not harden?"[16]

TURN strongly disagrees with SCE that the tradeoff between risk reduction and costs is "irrelevant."

First, examination of the tradeoff between costs and risk reduction benefits is central to the Commission's review and obligations in this GRC, discussed below. The implication of SCE's statement is to ignore the CPUC's entire cost-effectiveness framework and to instead address all remaining "absolute risk" that SCE has unilaterally deemed to be "acceptable." Furthermore, SCE fails to even articulate a quantitative or objective standard for the level of risk it finds to be "acceptable," stating that it believes California mandates there be no "material remaining wildfire risk"[17] for utilities within HFTD areas. Under this amorphous standard, which depends on SCE's judgment of materiality, SCE could justify any amount of undergrounding and costs for hardening, making the Commission's review and application of the required "just and reasonable" rates standard secondary to any spending unilaterally decided upon by SCE as leaving "no material risk." This argument is certainly beneficial for utility shareholders to drive up capital expenditures and rate base, but not ratepayers. It is not reasonable policy to spend large amounts of ratepayer funds on projects that deliver paltry risk reduction benefits compared to the cost.

---

[16] SCE response to DR PubAdv-SCE-305, 1b. Footnote omitted.
[17] SCE response to DR TURN-SCE-039, question 6b.

Second, SCE's forceful assertion that the Commission should not care if it can eliminate 99 percent of risk if there is absolute risk remaining is instructive and illuminating regarding the degree to which SCE's approach ignores basic concepts of risk management and cost-effectiveness. In SCE's example, the highest risk circuit mile would have risk that is **9,900 percent** greater than all remaining risk combined. Yet, SCE would have the CPUC compel ratepayers to fund the same type of work on all of the other 999 miles if these were considered "SRA". This is precisely why cost-effectiveness matters – not to say that no mitigation should ever take place on any of those remaining 999 circuit miles but, in considering whether and how to mitigate risk for those miles, it is necessary to examine cost-effectiveness tradeoffs that allow for both safe and affordable electric service.

Furthermore, if the Commission were to accept that relative risk reduction is "irrelevant," it would also need to abandon a significant portion of its extensive and to-date largely fruitful efforts to implement and improve risk modeling and cost-effectiveness analyses (risk spend efficiencies and cost-benefit ratios) as cost-effectiveness involves prioritizing work to be funded by ratepayers based on tradeoffs between costs and risk reduction.

To be clear - we do not disagree that absolute risk is a relevant consideration, which is why, for example, TURN supports covered conductor deployment for all remaining unhardened HFRA sections targeted by SCE despite the fact that cost-effectiveness will vary greatly for these miles. Areas are designated HFTD because they have been found to have elevated risk of a utility-caused wildfire. But absolute risk is not and cannot be the *only* consideration to determine the appropriate response to utility wildfire risk. In particular, when choosing the best mitigation strategy in HFTD locations, cost-effectiveness needs to be a key determinant in order to make the best use of finite ratepayer resources.

B. Consideration of Relative Risk is Well Supported by Standard Risk Management Practices

Examination of relative risk reduction and cost-effectiveness is based on a well-established principle in risk management often referred to "As Low as Reasonably Possible" (ALARP). This is defined as follows (discussed in the context of nuclear safety in the United Kingdom):

> Making decisions by applying the ALARP principle essentially 'involves weighing a risk against the trouble, time and money needed to control it'. This involves making a judgement whether introducing risk reduction measures is grossly disproportionate to the benefit of the risk reduction it achieves. A key part of the ALARP thinking process is to justify that the risks in the design or plant are ALARP and to do more to reduce risk would incur disproportionate 'trouble' in the form of time, effort and cost.[18]

The use of cost-effectiveness and benefit-cost analysis is useful when analyzing how to achieve ALARP. The ability to explore the tradeoffs of costs and risk reduction is highlighted through these analyses:

> One long-standing theme within regulatory risk management is evaluating the cost benefit of managing risk. Assuming a risk warrants active management, what is a reasonable spend on risk management; when does this spend become disproportionate to the benefits that a managed risk brings and how far should investment in risk management continue, if at all, beyond the point whereby the risk is deemed insignificant? In essence, this is an optimisation problem inherently bound up with the law of diminishing returns, in that continued investment in risk management results in ever-decreasing incremental reductions in risk of lesser incremental value. **Wise risk managers understand that the principal benefits of risk reduction are likely to be secured by targeting resources at relatively few features of a problem,** and that this action will be optimised when the risk is reduced to that which is as low as reasonably practicable (ALARP) or achievable (ALARA). **Thereafter, increased investment may become disproportionate to the benefits gained.**[19]

While we understand that the Commission has yet to decide how ALARP and related principles should be applied to the CPUC's risk-based decision-making framework,[20] , our point here is to emphasize the standard practice, across industries, of the need to examine costs in relation to benefits, which exactly describes the purpose of cost-effectiveness analysis across mitigations and portfolios of mitigations.

---

[18] John Hurst, Jenna McIntyre, Yoshikazu Tamauchi, Hiroshi Kinuhata &
Takashi Kodama (2019) *A summary of the 'ALARP' principle and associated thinking*, Journal of Nuclear Science and Technology, 56:2, 241-253, DOI: 10.1080/00223131.2018.1551814.

[19] Jiawei Li, et al., *Optimising risk reduction: an expected utility approach for marginal risk reduction during regulatory decision-making* Reliability Engineering & System Safety, Volume 94, Issue 11, November 2009, Pages 1729–1734.

[20] Consideration of issues related to risk tolerance and optimization is slated to be considered in a future phase of R.20-07-013. *Assigned Commissioner's Ruling* in R.20-07-013, May 31, 2023, p. 14.

SCE's proposal to underground all miles that meet its SRA criteria effectively ignores basic risk management principles because it does not even consider an examination of benefits attained versus costs imposed on ratepayers. Nor does it consider whether the overhead hardening alternative can mitigate risk more cost-effectively than other alternatives in locations SCE has designated as an SRA.

C. Consideration of Relative Risk is Central to the Commission's Role in Effectively Regulating Monopoly Utilities

Not only is SCE's approach contrary to standard risk management, it is also contrary to the Commission's mandate to balance the sometimes competing goals of just and reasonable rates and promoting a safe system.

As the Commission explained in its decision in Southern California Edison's 2021 test year GRC, addressing this issue is one of the CPUC's "central tasks" in a GRC:

> One of the central tasks in this proceeding is to balance safety and reliability risks with the associated cost to mitigate those risks. SCE is required by law to 'promote the safety, health, comfort and convenience of its patrons, employees, and the public,' while including only 'just and reasonable' charges in its rates.[fn: Section 451] A fundamental challenge in many disputed areas of this case is to reach an outcome consistent with these two, often competing, objectives.[21]

The CPUC articulated this challenge clearly and succinctly in its decision on PG&E's 2014 GRC:

> Virtually everything a utility does [has]some nexus to safety and can be deemed to have some safety impact, *but the emphasis should be on those initiatives that deliver the optimal safety improvement in relation to the ratepayer dollars spent*.[22]

Statements like these show that the Commission recognizes that ratepayer funding is finite and that utility risk reduction projects need to be prioritized in order to avoid unacceptable harm to the affordability of an essential service.

[21] D.21-08-036, p. 30.
[22] D.14-08-032, p. 28 (emphasis added).

SCE provides no examination of the tradeoff between benefits and costs to justify its new-found focus on undergrounding. As discussed below, SCE does not explain why, at this mature stage of its system hardening program with the huge investments already made, ratepayers should be expected to fund an *increased* level of funding in this rate case period compared to 2021-2024. And, as SCE's decision-making framework (Figure 4) shows, it does not consider the cost-effectiveness of overhead hardening alternatives in choosing to deploy undergrounding as the exclusive mitigation in areas it designates as SRAs.

V. SCE'S GRID HARDENING PROPOSAL DOES NOT INCORPORATE THE MASSIVE RATEPAYER INVESTMENT ALREADY MADE AND RISK REDUCTION ACHIEVED

SCE's proposal for grid hardening expenditures of over $4 billion in a single rate case is inappropriate for a multitude of reasons, discussed throughout this testimony. One factor that must be considered is that the proposal does not recognize the significant investment and burden ratepayers have already been forced to shoulder, nor does it recognize the substantial amount of risk reduction already achieved by SCE.

A. Ratepayers Have and Will Provide a Huge Amount of Funding for Grid Hardening Measures

SCE's ratepayers have funded a huge amount of grid hardening expenditures, and are expected to continue to do so through 2024. In 2024 alone, the year before the rate case period begins, SCE expects to spend nearly $1 billion, primarily on covered conductor.

Table 2. SCE Grid Hardening Expenditures, 2019-2024 ($ Thousands)

	2019	2020	2021	2022	2023 (Forecast)	2024 (Forecast)	Total
Covered Conductor	$239,911	$544,093	$897,602	$791,274	$840,531	$879,801	$4,193,211
Undergrounding		$784	$6,586	$29,704	$25,618	$48,884	$111,576
Total	$239,911	$544,877	$904,188	$820,978	$866,150	$928,685	$4,304,788

Source: SCE response to DR TURN-SCE-027, Q3 and TURN-SCE-027_Q3a-g. (Excel attachment).

Importantly, 2023 and 2024 expenditures of $*1.8 billion* have yet to be incorporated into ratepayer bills, which by itself will have a significant impact on rates and bills for decades to come. This should further disincline the Commission towards over-investment in undergrounding, particularly given the significant reduction in risk already achieved, discussed further below.

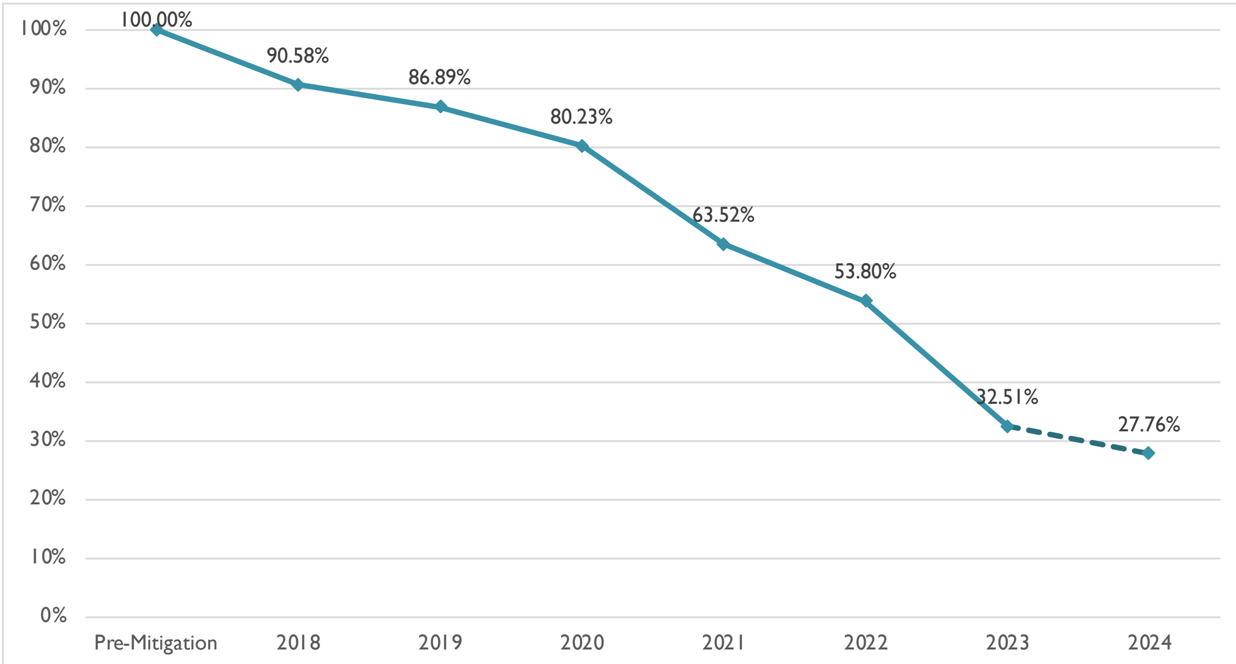
B. SCE Has "Bought Down" the Majority of Wildfire Risk in its Service Territory; Remaining Risk Reduction will Provide Diminishing Risk Reduction Returns to Ratepayers

SCE's significant ratepayer-funded investment in covered conductor has resulted in massive risk reduction, leaving a relatively small percentage of risk remaining on SCE's system. The absolute risk reduction and cost-effectiveness of all wildfire mitigation measures is likely to be significantly less than in previous years, including for the most expensive mitigation measure, undergrounding. The Commission must account for the previous investment and risk reduction achieved, given that there is now significantly lower absolute risk than when SCE embarked on instituting grid hardening measures in 2018 and the fact that ratepayers face the burden of ever-increasing rates and bills.

The following figures show SCE's estimation of risk reduced due to grid hardening (covered conductor and undergrounding) and fast curve settings, which cut off power when vegetation or another object come in contract with a powerline. The majority of this risk reduction, 77 percent, is due to grid hardening, almost entirely covered conductor.[23] In the figure below, risk reduction from 2023 to 2024 is calculated based only on the expected risk reduction percentage from grid hardening (primarily covered conductor).

[23] Calculated from SCE's response to DR MGRA-SCE-002_Q2-2 and attached Excel file "MGRA-SCE-002_Q2.xlsx".

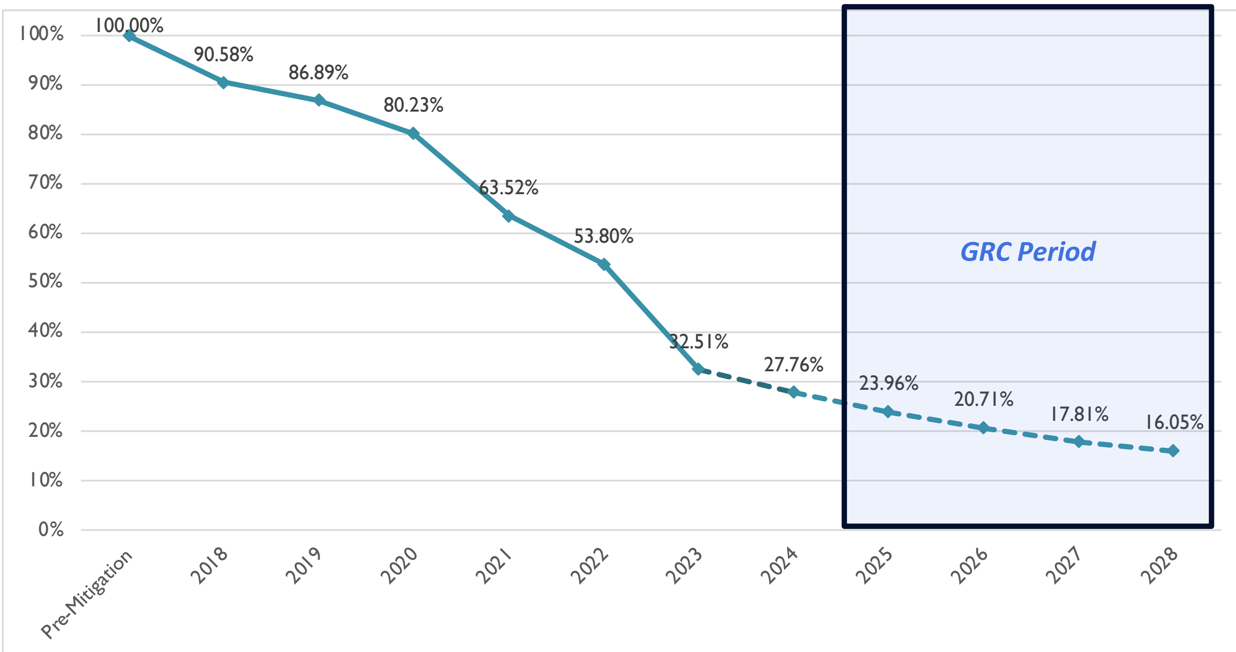
Figure 8. Wildfire Risk Remaining After Grid Hardening and Fast Curve Settings (2018-2024)



Source: SCE response to DR MGRA-SCE-002_Q2-2 and attached Excel file "MGRA-SCE-002_Q2.xlsx"; 2024 risk remaining estimated from SCE response to DR TURN-82, question 1e, where we incorporated the percentage risk reduction into "MGRA-SCE-002_Q2.xlsx", the basis of the previous years.

Because SCE will have mitigated the majority of wildfire risk in its service territory by 2025, it expects to see diminished risk reduction returns on investment. For example, while the utility mitigated around 53 percent of risk from 2021-2024 with $3.5 billion of expenditures, it expects to mitigate less than 12 percent of risk from 2025-2028 with $4.2 billion of expenditures. Some of these diminishing returns have to do with SCE's proposal, which does not maximize risk reduction for the dollars spent.

Figure 9. Wildfire Risk Remaining After Grid Hardening and Fast Curve Settings (2018-2028)



Source: SCE response to DR MGRA-SCE-002_Q2-2 and attached Excel file "MGRA-SCE-002_Q2.xlsx"; 2024-2028 risk remaining estimated from SCE response to DR TURN-82, question 1e, where we incorporated the percentage risk reduction into "MGRA-SCE-002_Q2.xlsx", the basis of the previous years.

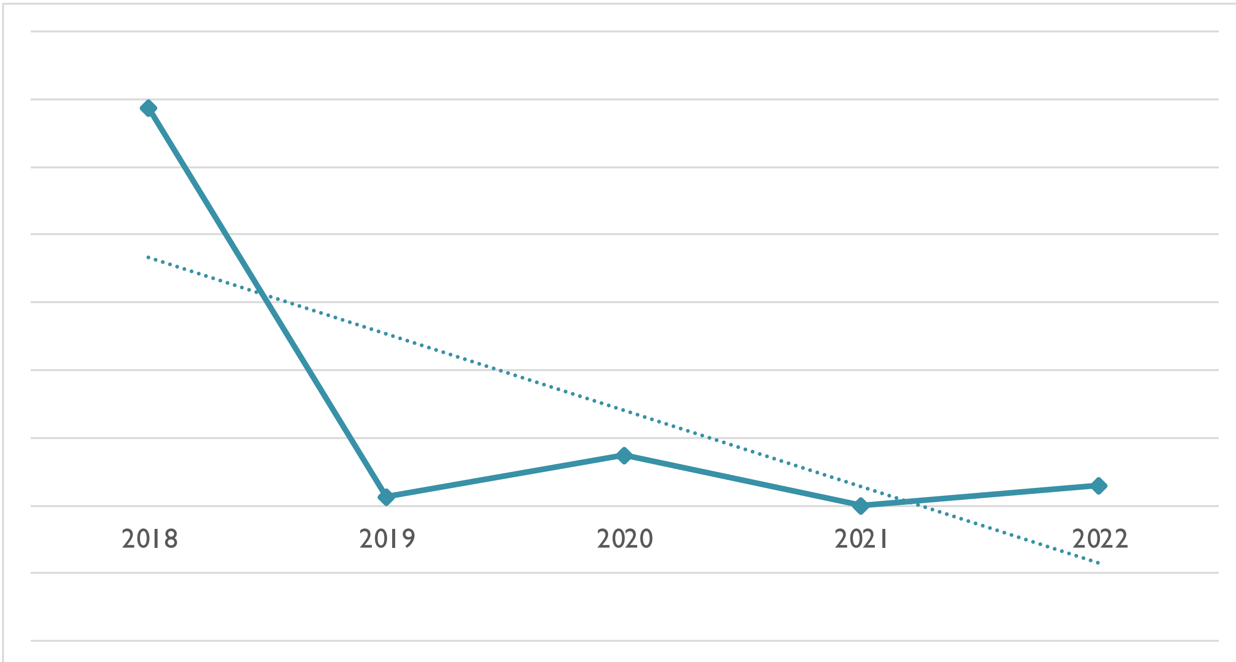
The risk reduction achieved by SCE through 2025 (again, mostly through covered conductor) is reflected in the significantly reduced risk from utility-caused wildfires experienced in recent years. In the figures below, I normalize the consequence data[24] for risky wildfire weather by dividing annual consequences from ignitions by overhead red flag warning circuit mile days in each year, which is a measure of the wildfire risk due to weather experienced over the particular year (primarily this relates to the presence of high wind speeds, low humidity, and warm temperatures).[25]

---

[24] Consequence data from SCE's response to DR TURN-SCE_039, Q1b Supplemental and Excel attachment "TURN-SCE-039_Q1b amended" and Excel attachment "TURN 39 1a-c.xls" (acres burned); SCE WMP Filing Q3 2023 R1 Tables 2,4; SCE WMP Filing Q4 2021 R2 Tables 2,6.

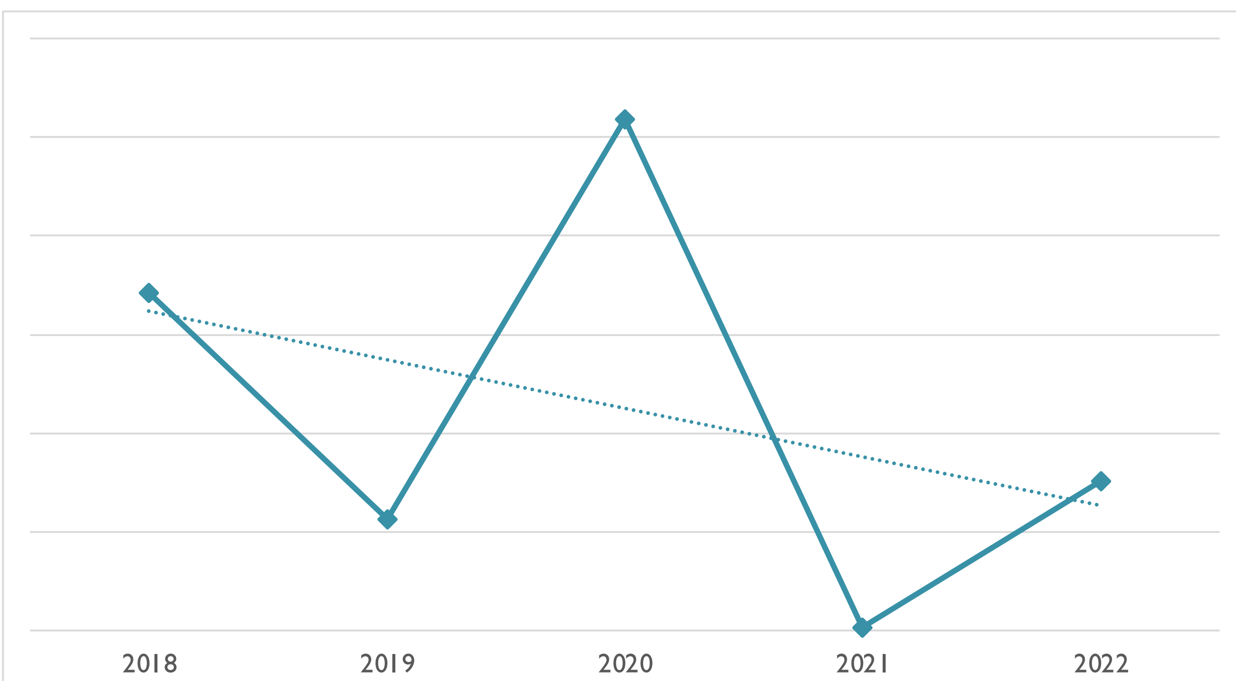
[25] See Red Flag Warning, National Weather Service, https://www.weather.gov/mqt/redflagtips. Red flag warning circuit mile days is defined as the "sum of OH circuit miles of utility grid subject to RFW each day within a given time period, calculated as the number of OH circuit miles under RFW multiplied by the number of days those miles are under said RFW." SCE 2023-2025 WMP, p. 675.

Figure 10. Structures Destroyed per RFW Circuit Mile Day



Source: SCE response to DR TURN-SCE_039, Q1b Supplemental and Excel attachment "TURN 39 1a-c.xls" (acres burned); SCE WMP Filing Q3 2023 R1 Table 2,4; SCE WMP Filing Q4 2021 R2 Tables 2,6.

Figure 11. Acres Burned per RFW Circuit Mile Day



Source: Source: SCE response to DR TURN-SCE_039, Q1b Supplemental and Excel attachment "TURN 39 1a-c.xls" (acres burned); SCE WMP Filing Q3 2023 R1 Table 2,4; SCE WMP Filing Q4 2021 R2 Tables 2,6.

Given significant additional investments and actions by SCE in 2023 and 2024, I would expect continued improvements before the upcoming rate case period (2025-2028), when SCE proposes to spend an additional $4.2 billion on grid hardening measures, a 20 percent increase over its projected spending for 2021-2024.

The Commission should consider the massive ratepayer spending and resultant risk reduction achieved by SCE before the test year in its decision on grid hardening expenditures for this rate case period, when significantly diminishing returns are expected given the lower level of risk at the outset.

VI. SCE's Risk Modeling Identifies Covered Conductor as by Far the Most Cost-effective Grid Hardening Approach

The risk reduction described above has been achieved to-date primarily through the deployment of covered conductor. TURN believes covered conductor should remain the primary grid hardening tool because it is significantly more cost-effective than undergrounding and can be deployed more quickly. SCE agrees with this assessment of the benefits of covered conductor:

> […]covered conductor has a mitigation effectiveness value of 72% (and higher when complemented by other mitigations), is cost-effective, and can buy down risk in a relatively short amount of time.[26]

Most importantly, as SCE states, covered conductor "mitigates the risk drivers that tend to cause the largest fires."[27] And it does so at a unit cost (per overhead mile) that is **six times less** than the cost of undergrounding on a weighted average basis, according to SCE's forecast.

[26] SCE-04, Vol. 5, Part 2A, p. 39.
[27] SCE-04, Vol. 5, Part 2A, p. 52.

Figure 12. SCE Forecast Unit Cost of Undergrounding vs. Covered Conductor per Overhead Circuit Mile ($ Thousands)

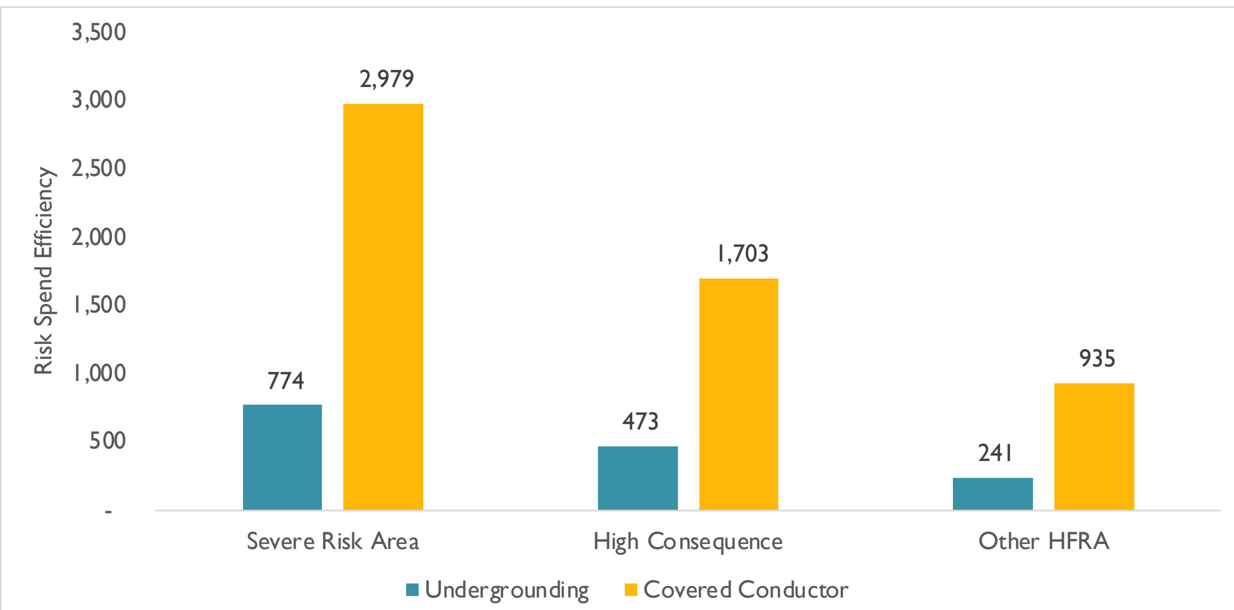
Source: SCE response to DR TURN-SCE-051 Q2bd TUG Forecast Costs; SCE response to DR TURN-SCE-051 Q2ac WCCP Forecast Costs.

When combined with Rapid Earth Fault Current Limiter (REFCL) technology, covered conductor can have mitigation effectiveness of 91 percent on average for drivers related to contact from an object (e.g. vegetation) and overall 80 percent, according to SCE's calculations and assumed frequency of different drivers.[28] REFCL costs around $100,000 per overhead mile to implement.[29] However, the 80 percent mitigation effectiveness is likely understated when considering effectiveness for large wildfires, given that SCE's probabilities are under "normal" weather conditions rather than more severe weather conditions.

[28] REFCL mitigation effectiveness from SCE's response to DR TURN-SCE Q5a-b and attachment "TURN-SCE-027_Q5_CC&REFCL_ME.pdf"; average likelihood by driver calculated from SCE's response to DR TURN-SCE-7 Q1b, Excel attachment "WP SCE-04 Vol. 05 Pt. 1 - WCCP-UG-RSE_Amended," combining all circuit segments in all areas and summing percent of likelihood (frequency) of the total by driver.
[29] SCE response to DR TURN-SCE-40 Q7 and Excel attachment "TURN_SCE_040_7abe.xlsx."

Relatively low unit costs and high mitigation effectiveness make covered conductor quite cost-effective, particularly in comparison to undergrounding which has the highest unit cost of any single wildfire mitigation available. SCE's modeling indicates covered conductor is about 67 percent more cost-effective, on average, than targeted undergrounding.[30] However, this is actually a significant understatement. This is because SCE calculates cost-effectiveness based on its proposal rather than by comparing the cost-effectiveness of undergrounding versus covered conductor if deployed to the same circuit segments, which provides an apples to apples cost-effectiveness calculation. The apples-to-apples analysis in the figure below shows covered conductor is actually between 260 and 288 percent more cost-effective than undergrounding when compared on the same circuit segments, broken down by SCE's three area-level tranches.

Figure 13. Risk Spend Efficiency of Undergrounding vs. Covered Conductor

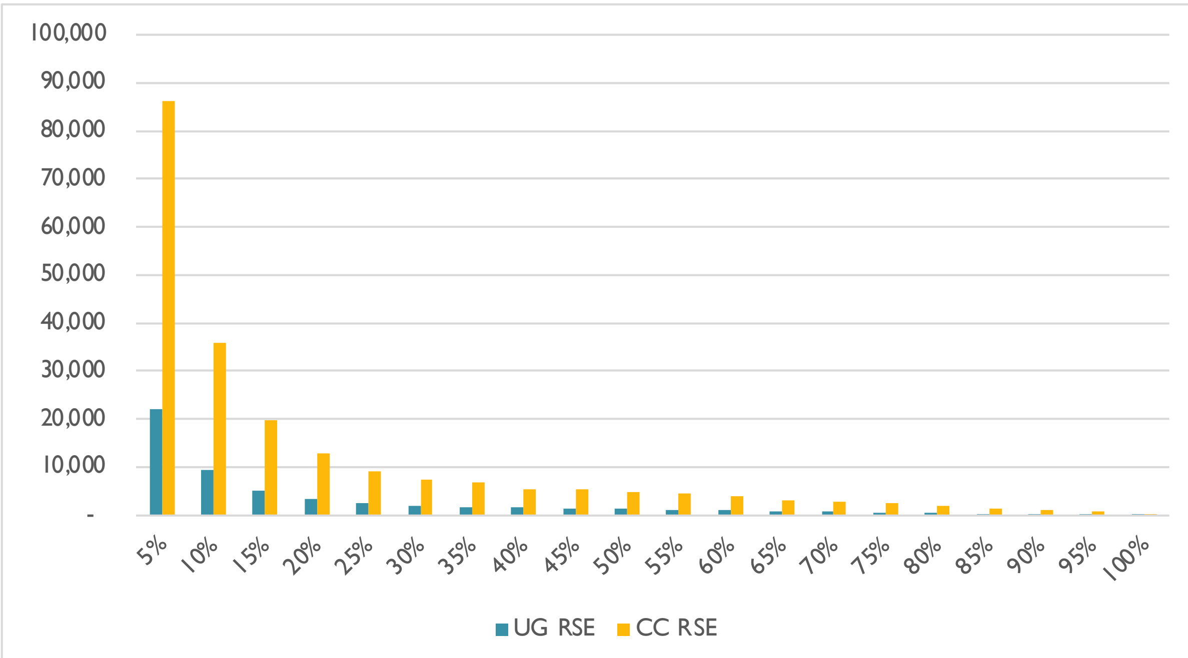


Source: Calculated from SCE's response to DR TURN-SCE-7 Q1b Revised, Excel attachment "WP SCE-04 Vol. 05 Pt. 1 - WCCP-UG-RSE_Amended." I use the same methodology and assumptions as SCE to calculate RSE values, with the exception of calculating cost-effectiveness of undergrounding and covered conductor by comparing the RSE for each mitigation on the same circuit segments so they can be compared on an apples to apples basis.

[30] Four-year RSE. UG RSE (761): SCE-04, Vol.5, Part 2A, p. 29, Table I-9; Covered conductor (1,278): SCE-04, Vol.5, Part 2A, p. 59, Table I-19.

The following figure shows relative cost-effectiveness based on more granular risk tranches, using a slightly different methodology that aggregates circuit segments together at the project level and sorting from highest to lowest undergrounding RSE.

Figure 14. Risk Spend Efficiency of Undergrounding vs. Covered Conductor



Source: Calculated from SCE's response to DR TURN-SCE-7 Q1b Revised, Excel attachment "WP SCE-04 Vol. 05 Pt. 1 - WCCP-UG-RSE_Amended." I use the same methodology and assumptions as SCE to calculate RSE statistics, with the exception of calculating cost-effectiveness for all "isolatable circuit segments."

For each risk percentile shown in the figure above, covered conductor is more cost-effective than undergrounding. At the even more granular individual circuit segment level, covered conductor is more cost-effective than undergrounding on 99.6 percent of circuit segment miles (1,821 of 1,828).[31]

While the statistics shown above should be sufficient for the Commission to question the necessity and cost-effectiveness of SCE's large-scale undergrounding proposal, even these statistics are understated. While SCE has found that covered conductor has an average mitigation

[31] Calculated from SCE response to DR TURN-SCE-7 Q1b, Excel attachment "WP SCE-04 Vol. 05 Pt. 1 - WCCP-UG-RSE_Amended."

effectiveness of 72 percent, SCE's calculations assume effectiveness of only 59 percent, on average, when considering the assumed probability of ignition by driver.[32]

VII. TURN Recommendations

A. Recommended Scope and Funding for Grid Hardening Mitigations

TURN recommends undergrounding be targeted to the very highest risk of remaining unhardened)miles in the HFRA in locations where SCE can show that undergrounding is the best option. Specifically, SCE should conduct a location-specific analysis of grid hardening alternatives that includes a cost-effectiveness comparison and recognizes the benefits from the ability to deploy covered conductor more expeditiously than undergrounding (see additional discussion below). TURN's proposal is therefore truly a "targeted" approach to undergrounding in comparison with SCE.

To examine options for how to best scope SCE's grid hardening measures, we utilized SCE's risk modeling assumptions and outputs presented in its workpapers. Given that SCE's analysis of likelihood and consequence consists of extremely granular circuit segments of overhead line (over 38,000 circuit segments, many of which are just a few *feet* long), we aggregated the data into "isolatable segments" which is akin to how circuit segment assets are aggregated into a single "project."[33] This provides a significantly more aggregated analysis that is more realistic for project planning purposes, reducing the approximately 38,000 circuit segment to around 1,900 "isolatable" sections. We then calculated RSEs for undergrounding on each isolatable

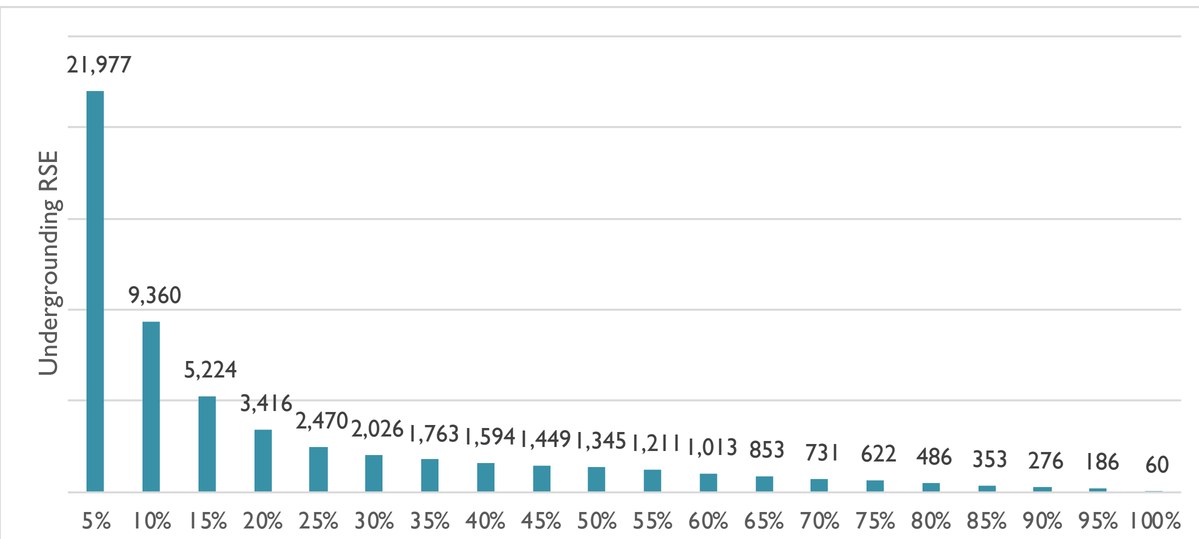
---

[32] Weighted average likelihood by driver calculated from SCE response to DR TURN-SCE-7 Q1b, Excel Attachment "WP SCE-04 Vol. 05 Pt. 1 - WCCP-UG-RSE_Amended," combining all circuit segments in all areas and summing percent of likelihood (frequency) of the total by driver and then multiplying by the assumed mitigation effectiveness of each driver (also contained in SCE response to DR TURN-SCE-7 Q1b, Excel attachment "WP SCE-04 Vol. 05 Pt. 1 - WCCP-UG-RSE_Amended").
[33] See SCE-04, Vol. 5, Part 1a, pp. 52-53. In response to TURN and SPD's recommendation to "utilize isolatable circuit segments for tranches to align more closely with how projects would be implemented on the ground," SCE provided data at the "isolatable circuit level" which is what we've used in our analysis to scope grid hardening measures.

circuit section and sorted from highest to lowest undergrounding RSE in order to target the most cost-effective circuits.

SCE's data indicates it would be appropriate to consider undergrounding for the top 50 percent of risk remaining on SCE's system – based on the risk scored calculated in accordance with the D.18-12-014 settlement -- which equates to 177 miles over the GRC period. This is based on our analysis of risk concentration, risk per mile, and the significantly decreasing risk reduction returns both before and after this point is reached. For example, the following figure shows RSE's for undergrounding, based on the previously described methodology. While there is a rather precipitous drop in cost-effectiveness after the top 20% of risk, conservatively TURN believes the levelling off and decline after 50 percent represents a more than reasonable scope for undergrounding.

Figure 15. Risk Spend Efficiency of Undergrounding

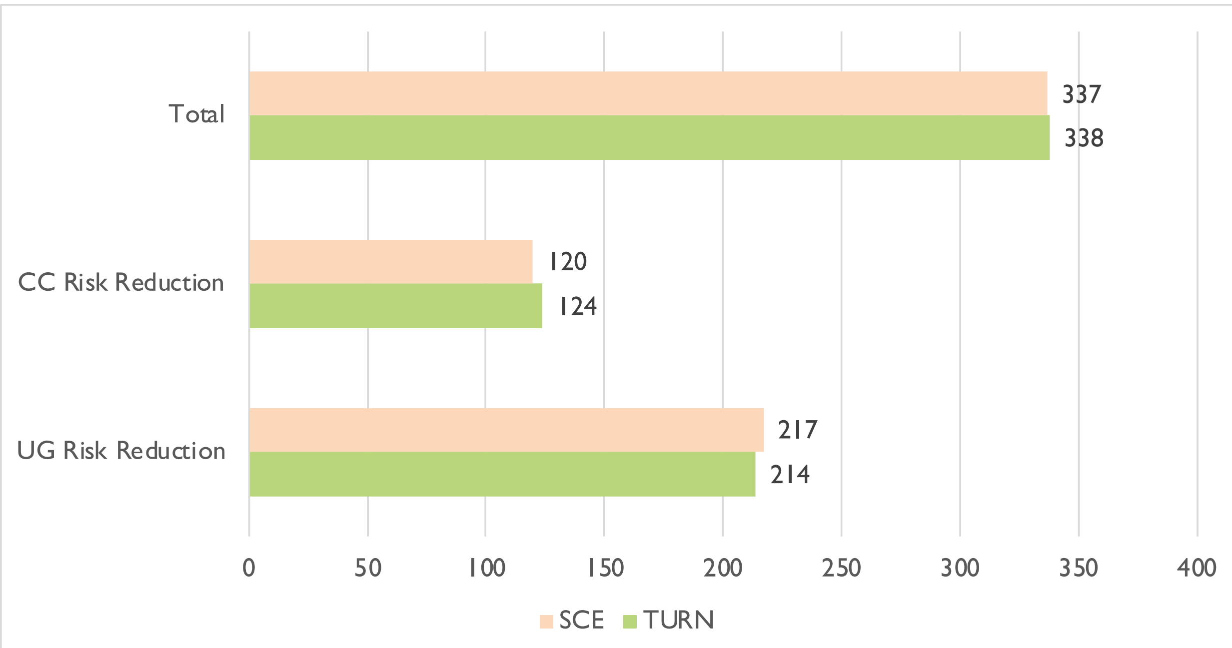


We reiterate that based solely on the cost-effectiveness information provided in this proceeding, undergrounding would never be selected over covered conductor. At the same time, a targeted program to the highest risk circuits can provide significant levels of risk reduction while minimizing costs to ratepayers. Additionally, these miles are already subject to significantly diminishing returns given the amount of risk addressed by covered conductor and other measures (see Section V).

As discussed in Section VII(B) below, 177 miles serves as the maximum number of overhead miles to underground, subject to the results of the location-specific analysis described in Section VII(B) below. TURN supports covered conductor deployment to the remainder of the circuits considered for hardening, 1,651 miles in total.[34]

If all 177 potential undergrounding miles were shown to warrant undergrounding, TURN's proposal results in the *same* absolute risk reduction as SCE, as shown in the following figure, and a significantly more cost-effective overall grid hardening proposal.

Figure 16. Absolute Risk Reduction of Grid Hardening Proposals – TURN vs. SCE



Source: Calculations based on SCE's response to DR TURN-SCE-7 Q1b Revised, Excel attachment "WP SCE-04 Vol. 05 Pt. 1 - WCCP-UG-RSE_Amended."

TURN's proposal achieves the same absolute risk reduction with many fewer miles because it targets the very highest risk circuits for undergrounding, which SCE's proposal does not.

[34] As discussed in Section VII(B), if fewer than 177 miles can be justified for undergrounding based on TURN's recommended location-specific analysis, the difference would be made up with overhead hardening.

Overall, TURN's grid hardening proposal is 81 percent more cost-effective than SCE's – with an RSE of 1,603, compared to 888 for SCE.[35]

Furthermore, TURN's proposal costs at least $2 billion less than SCE's over the rate case period for the *same* absolute risk reduction by prioritizing high-risk miles for undergrounding and results in a significantly more cost-effective approach to grid hardening compared with SCE's proposal.

Table 3. Mileage and Costs of Grid Hardening ($ thousands) – TURN vs. SCE

	Undergrounding				
	2025	2026	2027	2028	Total / Weighted Average
TURN Miles	44	44	44	44	177
SCE Miles	60	150	200	170	580
Unit Cost	*$ 5,083*	*$ 5,677*	*$ 5,717*	*$ 5,687*	*$ 5,632*
TURN Budget	$ 224,903	$ 251,227	$ 252,984	$ 251,633	$ 980,746
SCE Budget	$ 304,954	$ 851,620	$ 1,143,432	$ 966,727	$ 3,266,733
TURN-SCE	**$ (80,051)**	**$ (600,392)**	**$ (890,448)**	**$ (715,095)**	**$ (2,285,986)**

	Covered Conductor				
	2025	2026	2027	2028	Total / Weighted Average
TURN Miles	413	413	413	413	1,651
SCE Miles	850	300	50	50	1,250
Unit Cost	*$ 763*	*$ 778*	*$ 805*	*$ 812*	*$ 770*
TURN Budget	$ 314,921	$ 320,902	$ 332,373	$ 335,247	$ 1,303,442
SCE Budget	$ 648,666	$ 233,289	$ 40,271	$ 40,620	$ 962,845
TURN-SCE	**$ (333,745)**	**$ 87,613**	**$ 292,101**	**$ 294,627**	**$ 340,597**

Source: SCE unit costs and mileage figures (all overhead miles) from SCE's response to DR TURN-SCE-051 Q2 and "TURN-SCE-051 Q2bd TUG Forecast Costs" (Excel attachment) and "TURN-SCE-051 Q2ac WCCP Forecast Costs" (Excel attachment).

[35] Calculations based on data in SCE's response to DR TURN-SCE-7 Q1b, Excel attachment "WP SCE-04 Vol. 05 Pt. 1 - WCCP-UG-RSE_Amended."

B. Location-specific Analysis for Undergrounding and Accountability Measures

TURN's undergrounding recommendation provides a reasonable maximum amount of miles where undergrounding can be expected to be the best system hardening alternative. However, even for the 50 percent highest risk miles targeted by TURN's proposal, whether undergrounding proves to be the best alternative will depend on location-specific factors, such as the risk drivers and terrain present at the location, which affect the mitigation effectiveness of the competing alternatives and the cost. These factors can vary significantly by project. As the Office of Energy Infrastructure Safety (Energy Safety) stated in its decision on SCE's Wildfire Mitigation Plan (WMP):

> Mitigation selection should consider a variety of location-specific factors, such as how long it takes to deploy the solution, effectiveness at mitigating particular ignition drivers in a given location, feasibility given terrain and access challenges, and the cost-benefit analysis.[36]

Consistent with Energy Safety's direction, SCE should be required to justify through a location-specific analysis that undergrounding is the best alternative for that location. The analysis should include consideration of the following:

- The location-specific RSE or Cost-Benefit Ratio (CBR)[37] of undergrounding, based on location-specific costs, risk drivers, and risk reduction;
- The location-specific RSE/CBR of covered conductor, based on location-specific costs, risk drivers, and risk reduction and, where REFCL is feasible, the location-specific RSE/CBR of covered conductor with REFCL, based on the same location-specific factors.
- The RSE/CBR analysis for undergrounding and covered conductor should reflect the "time value of risk" given that undergrounding is usually much more time intensive than covered conductor.

---

[36] Decision on Southern California Edison Company's 2023-2025 Wildfire Mitigation Plan, Appendix A to Resolution SPD-17, p. 40.

[37] SCE is required to transition to calculation of cost-benefit ratios under the Cost Benefit Approach set forth in D.22-12-027 in its next RAMP submission.

- Consideration of any other location-specific factors that would influence which mitigation is the best alternative.

Based on this location-specific analysis, SCE should determine the best system hardening alternative for each location in the top remaining 50 percent of risk where undergrounding is considered. In most cases, the best alternative will be the one with the highest RSE or cost-benefit ratio, as the RSE reflects a comprehensive analysis of the risk reduction benefits compared to the costs at the location in question. However, if SCE chooses undergrounding even if it not the most cost-effective alternative, it should be required to explain and document the specific location-specific factor(s) that justify choosing undergrounding and why the RSE/CBR does not adequately reflect such factor(s). For example, SCE could explain that a high risk location has a particularly high tree fall-in risk and that the diminished effectiveness of covered conductor in addressing this driver is not sufficiently reflected in the RSE/CBR. For each undergrounding project that SCE elects to pursue, in the annual accountability report described below, it should document the RSE/BCRs it calculated in choosing among alternatives and, if undergrounding did not have the highest value, its explanation justifying its selection.

Based on this analysis, if SCE decides to pursue less than 177 overhead miles of undergrounding, overhead hardening should be deployed on the miles where undergrounding proved not to be best alternative.

The Commission should thus make explicit that no more than an average of 44 overhead miles of undergrounding is allowed per year (a total of 177 overhead miles from 2025-2028). If any miles are accomplished beyond this amount, they may not be recorded to any account (memorandum, balancing, etc.) nor may SCE request to establish such an account for this purpose.[38] To the extent that SCE performs less than 177 miles of undergrounding and replaces those miles with overhead hardening, at the end of the rate case period, the difference in costs, based on the forecast unit costs adopted in this decision, should be refunded to ratepayers. Therefore, we

[38] As I have previously opined, the proliferation of memorandum and balancing accounts for expenditures that are foreseeable has sufficiently degraded the affordability of electric rates at all the IOUs and weakened Commission oversight of expenditures, particularly for wildfire mitigation costs.

recommend that the one-way balancing account that TURN recommends for all grid hardening expenditures[39] have a separate one-way sub-account for undergrounding expenditures.

The scale of undergrounding proposed by TURN is a reduction from SCE's proposal, but still warrants additional scrutiny given the extraordinary cost and scale of this measure, particularly compared with historical deployment. To this end, SCE should be required to submit an annual accountability report, similar to the report PG&E was required to submit in D.23-11-069. As discussed above, the report should require SCE to provide the results of its location-specific analysis for each undergrounding project it opted to pursue (including incomplete projects) in the preceding year. In addition, the report should require SCE to show that is deploying undergrounding to the very highest risk miles in its HFRA, at minimum those ranked in the top 50% of remaining risk.. This is to ensure that SCE focuses more on risk reduction than achieving a mileage target.[40] Consistent with the report PG&E is required to submit, SCE's annual report should also include information on completed undergrounding projects, including costs, unit costs, and overhead to underground conversion ratio information.[41]

[39] See TURN's accompanying testimony of Robert Finkelstein, TURN-15.
[40] In particular, SCE should demonstrate that the undergrounding projects it is pursuing have risk scores in the top 50% of risk, based on the most recently updated risk model, from highest to lowest isolatable circuit segments or other project-level definition.
[41] D.23-11-069, Section 4.3.7.

Appendix A. Eric Borden Resume