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Safety Policy Division Evaluation Report on Sempra's 2025 RAMP Applications (A.)25-05-10

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California Public Utilities Commission

Table of Contents

Executive Summary

Background

The Safety Policy Division (SPD) of the California Public Utilities Commission (CPUC) is responsible for evaluating Southern California Gas Company's (SoCalGas) and San Diego Gas & Electric Company's (SDG&E) 2025 Risk Assessment and Mitigation Phase (RAMP) applications.[1] Sempra filed its RAMP applications (for SDG&E and SoCalGas) on May 15, 2025, and the Assigned Administrative Law Judge (ALJ) consolidated A.25-05-010 and A.25-05-013, the application numbers of the two filings, into a single proceeding, A.25-05-010, on June 19, 2025. This report presents SPD's evaluation of the 2025 Sempra RAMP which informs the 2028 Test Year General Rate Case (GRC) cycle and subsequent post-test years through 2031.

This RAMP proceeding applies to the Risk-Based Decision-Making Framework (RDF) as adopted in Phase 2 Decision[2] and further modified in Phase 3 Decision.[3, 4] Phase 2 requires the use of cost-benefit ratios (CBRs) in RAMP and GRC filings, replacing the earlier risk-spend efficiency metrics. Phase 3 incorporates additional requirements and clarifications, including:

- Tranching Methodology – Adoption of a quintile-based LoRE/CoRE (likelihood of a risk event/consequence of a risk event) matrix, producing 25 tranches in all cases where the quantile method is applied, unless a utility justifies an alternative.
- Tail Risk Analysis – How to account for low-probability, high-consequence events in risk modeling.
- Convex Risk-Averse Scaling Functions – Option to apply scaling functions that weight higher-consequence events more heavily, reflecting a risk-averse approach. If a utility elects to address tail risk using the power law or other statistical approach and chooses to present Risk-Adjusted Attribute 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.
- Transparency Pilot – Requirement that each utility file and test the Transparency Guidelines within 60 days of its 2025 RAMP filings.

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[1] This report evaluates the RAMP filings submitted by both SDG&E and SoCalGas. References in this evaluation to "Sempra" pertain to actions and events conducted jointly by both SDG&E and SoCalGas.

[2] D.22-12-027.

[3] D.24-05-064.

[4] In August 2025, the CPUC adopted the RDF Phase 4 Decision (D.25-08-032) but that decision is not applicable to these 2025 Sempra RAMP filings. However, the RDF Phase 4 Decision does implement requirements on Sempra's impending GRC filings. If any findings or recommendations made by SPD in this report pertaining to Sempra's Test Year 2028 GRC filings conflict with requirements in the RDF Phase 4 Decision, the RDF Phase 4 Decision takes precedence.

Phase 3 establishes the quintile tranching approach as the default best practice. As permitted by CPUC Phase 3 Decision,[5] Sempra deviated from this requirement by submitting a White Paper proposing the Homogeneous Tranche Methodology (HTM) as an alternative for CPUC consideration. This marks the first instance of a utility formally testing an alternative to the quantile approach within the RDF framework.

[5] D.24-05-064, Appendix A, Row 14.

Documents Reviewed by SPD

The 2025 Sempra RAMP applications consist of the application documents and associated workpapers. The included workpapers are electronic files in Excel spreadsheets and PDF documents obtained from Sempra's regulatory discovery portal webpage for the 2025 RAMP proceeding.

In addition to the above documents, SPD issued 15 data requests to Sempra. Sempra provided written responses to these data requests. SPD also considered informal comments that were posted to the service list in this proceeding.

Evaluation Scope and Methodology

The Scoping Memo prescribed the scope of issues for this RAMP proceeding and formed the basis of SPD's evaluation. Additionally, SPD's evaluation relied on the governing RDF documents applicable to this RAMP, contained in D.22-12-027 and D.24-05-064, including their appended frameworks and guidelines. SPD used a standard evaluation template to review each of the risk chapters contained in the 2025 Sempra RAMP.

Using this approach, SPD evaluated each risk chapter addressing the following categories:

- Risk Description
- Risk Bow Tie
- Risk Exposure
- Risk Tranches
- Risk Drivers and Frequencies
- Consequences
- Controls and Mitigations
- Alternatives Analysis
- CBR Calculations

SPD did not verify the reasonableness of Sempra's cost projections, as this is beyond the scope of this evaluation. To the extent uncertainties or potential errors may be found in Sempra's mitigation cost estimates, those uncertainties or errors would carry through to the cost-benefit ratio calculations, potentially affecting mitigation decisions. Therefore, cost estimates should be substantiated in the Test Year 2028 GRC.

General Conclusions

In general, the 2025 Sempra RAMP complies with the Phase 2 and Phase 3 Risk-Based Decision-Making Framework. No areas of deficiency are severe enough to warrant SPD's recommendation that the Commission reject the 2025 Sempra RAMP applications. The filings reflect implementation of key Phase 3 elements: tranche granularity;[6] risk scaling with presentation of both unscaled and scaled risk at the enterprise level[7]; and CBRs calculated under three discount-rate scenarios.[8]

However, SPD identified discrete deficiencies and areas for improvement that are not dispositive but should be addressed before the TY 2028 GRC. These include the need for clearer cross-walks from segment-level selections to LoRE × CoRE tranches, more transparent use of risk-averse scaling, explanation of which discount-rate scenarios are used for mitigation selection, and improved cost-benefit accounting (incremental O&M versus capital).

[6] SDG&E and SoCalGas 2025 RAMP Reports, Volume 1, Chapter RAMP-1: Overview, p. Overview-11.

[7] SDG&E and SoCalGas 2025 RAMP Reports, Volume 1, Chapter RAMP-1: Overview, p. Overview-12.

[8] SDG&E and SoCalGas 2025 RAMP Reports, Volume 1, Chapter RAMP-1: Overview, p. Overview-13

Summary of Significant Findings

In this report, SPD defines Significant Findings as those that pertain to an individual RAMP chapter, while Global Observations pertain to more than one RAMP chapter.

1. SDG&E satisfies the RDF's tranche-level analysis requirements,[9] but it also states that tranching does not drive its mitigation selection. Instead, "short-term and long-term grid hardening mitigations are determined at the individual feeder-segment level, rather than at the broader Class or Tranche level," and tranche-level information "does not necessarily drive the decision-making process for Wildfire and PSPS grid hardening investments."[10] The RDF does not explicitly require utilities to base the type or extent of mitigation selections on tranche rankings; it requires that risk analysis and CBRs be developed and reported by tranche for each post-test year to make the analysis transparent and decision-useful.[11]

SPD observes a material transparency gap in SDG&E's approach. SDG&E should provide a clear crosswalk from each selected mitigation segment to its corresponding LoRE × CoRE tranche and show tranche-level CBRs that justify its selection (or explain deviations). Doing so would meaningfully inform parties' and decision-makers' review of SDG&E's prioritization and funding focus within the context of the tranche analysis required by the RDF.[12]

2. SDG&E's 2025 RAMP references batteries only as resiliency assets within the Wildfire & PSPS portfolio—e.g., C504 Standby Power describes permanent backup batteries charged by onsite solar and C506 Microgrids notes deployment of mobile batteries to form temporary microgrids—rather than identifying a discrete Battery Energy Storage System (BESS) safety enterprise risk with Step-2A metrics, bow-tie/tranche definitions, and CBRs.[13] In Appendix 4, "Microgrid and Battery Energy Storage Systems (BESS)" are further characterized as Non-RAMP activities, reinforcing that storage deployments are treated outside the selected RAMP risk set.[14]

SPD observes a scope/placement gap regarding where BESS safety risk resides (e.g., within Electric Infrastructure Integrity versus a discrete ERR entry), why it was not selected given recent incident history and asset scale, and how its frequency and consequence assumptions are reflected in SDG&E's risk model.[15] Because each risk chapter presents costs but does not request funding—with funding requests deferred to

[9] E.g., applying HTM under Row 14 and developing/reporting risk and CBRs by tranche per Row 26.

[10] SDG&E-Risk-4, p. 44; TURN-SDGE-002, Response 3g.ii.

[11] D.24-05-064, Appendix. A, Row 26.

[12] SDG&E-Risk-4, p. 44; TURN-SDGE-002, Response.3g.ii; D.24-05-064, Appendix. A, Row 26.

[13] SDG&E 2025 RAMP Report, Risk-4 Wildfire & PSPS Chapter, Controls C504 and C506 at 50.

[14] SDG&E 2025 RAMP Report, Volume 1, Appendix 4, p. Appendix 4-16.

[15] D.24-05-064, Appendix A; D.22-12-027, Appendix A.

the TY 2028 GRC—clarity is also needed on the venue and timing for any BESS-safety program proposals and associated CBRs.[16]

[16] SDG&E and SoCalGas 2025 RAMP Reports, Volume 1, Chapter RAMP-1: Overview, p. Overview-18.

Background and Introduction

In accordance with the revised Rate Case Plan schedule adopted in Decision (D.)20-01-002,[17] SoCalGas and SDG&E filed their 2025 Risk Assessment and Mitigation Phase (RAMP) applications (A.25-05-010 and A.25-05-013) on May 15, 2025. On June 19, 2025, the Assigned Administrative Law Judge (ALJ) consolidated the two applications into a single proceeding, A.25-05-010. The 2025 RAMP applications, covering expenditure years 2028 through 2031, were filed in advance of Sempra's Test Year (TY) 2028 General Rate Case (GRC) application.

According to the Rate Case Plan in D.20-01-002 and as directed by the Scoping Ruling in A.25-05-010, the Safety Policy Division (SPD) is tasked with evaluating the 2025 Sempra RAMP applications. This report summarizes the evaluation results.

In Phase 2 of the Risk-Based Decision-Making Framework (RDF) rulemaking proceeding, R.20-07-013, the California Public Utilities Commission (CPUC) adopted a cost-benefit framework in D.22-12-027[18] that the four largest jurisdictional energy utilities must use to evaluate RAMP risk mitigation options and justify proposed mitigations in their RAMP and GRC applications. Central to this framework is expressing in dollar terms all the components of the utility's risk value function, which under the prior Safety Model Assessment Proceeding (S-MAP) Settlement Agreement in D.18-12-014[19] was represented by a Multi-Attribute Value Function (MAVF). Monetizing the safety, reliability, and financial attributes of risk enables calculation of a cost-benefit ratio, in which the numerator (net present monetized value of risk reduction benefits) and denominator (net present value of mitigation program or project costs) are expressed in the same units. This approach permits a more logically consistent ("apples-to-apples") comparison of mitigation options than the superseded risk-spend efficiency methodology.

Phase 3 of the RDF, adopted in D.24-05-064,[20] further refined the cost-benefit framework by introducing requirements for tranche-level analysis using the LoRE/CoRE quintile methodology, incorporation of tail risk and convex risk-averse scaling functions, and the filing and testing of Transparency Guidelines within 60 days of the utilities' RAMP filings.

The 2025 Sempra RAMP are the first RAMP applications from Sempra in which both the Phase 2 cost-benefit framework (D.22-12-027) and the Phase 3 modifications (D.24-05-064) apply. In these filings, Sempra also deviated from the default quintile tranching approach, as permitted in D.24-05-064, by

[17] Revised Rate Case Plan Decision, D.20-01-002, Appendix B.

[18] Cost-benefit framework detailed in Appendix A of D.22-12-027.

[19] S-MAP Settlement Agreement framework adopted in D.18-12-014.

[20] D.24-05-064. Appendix A-D.

submitting a Tranching White Paper[21] proposing the Homogeneous Tranche Methodology (HTM) as an alternative for CPUC consideration.

[21] Sempra, "Tranching Whitepaper", A.25-05-010, Vol. 1, Appendix 3.

Explanation of Terms

This section clarifies the definitions of several terms that are used throughout this report.

RAMP Reports – The individual chapters and appendices of the SoCalGas and SDG&E 2025 RAMP applications, along with supporting workpapers (including electronic files such as spreadsheets), are collectively referred to as the "RAMP Reports."

2025 RAMP – Utilities refer to RAMP applications by the calendar year in which the application is filed. The 2025 Sempra RAMP has a Test Year 2028 and covers expenditures from 2028 through 2031.

TY 2028 GRC – The Commission and the utilities refer to General Rate Case (GRC) applications by the test year (TY) on which the general rate case estimates and calculations are based. Sempra refers to its upcoming GRC applications to be filed in calendar year 2026 as the "TY 2028 GRC."

Cost-Benefit Ratio (CBR) – As used throughout the 2025 Sempra RAMP Reports and this SPD evaluation report, the cost-benefit ratio is defined as the ratio of the dollar value of Mitigation Benefit (numerator) divided by the Mitigation Cost estimate (denominator). This definition is consistent with the adopted definition in the governing frameworks for this RAMP contained in Appendix A of D.22-12-027 and Appendix A of D.24-05-064. The alternative term "Benefit/Cost Ratio" may occasionally be used in this report to refer to this definition of CBR.

Homogeneous Tranche Methodology (HTM) – An alternative to the quintile-based tranching approach adopted in Phase 3 of the RDF. Under HTM, assets or risk elements are grouped into tranches based on physical and operational homogeneity rather than on their placement in a LoRE/CoRE quantile matrix. Sempra introduced HTM in its Tranching White Paper (filed November 1, 2024) as a proposed alternative methodology for Commission consideration in this RAMP.

Tail Risk – A requirement introduced in Phase 3 of the RDF for utilities to account for low-probability, high-consequence events in risk modeling. Tail risk analysis ensures that extreme but plausible scenarios are considered in risk exposure and mitigation planning.

Risk-Averse Scaling Function – A convex scaling function permitted in Phase 3 of the RDF that applies greater weight to high-consequence events compared to lower-consequence ones. This reflects the Commission's directive that utilities apply a risk-averse approach when assessing risk exposure and mitigation effectiveness.

Additional terms are defined in the governing Risk-Based Decision-Making Framework documents contained in Appendix A of D.22-12-027 and Appendix A of D.24-05-064.

Scope and Methodology of Evaluation

The Scoping Memo in the 2025 Sempra RAMP proceeding enumerates the following questions for consideration in the evaluation of Sempra's RAMP Reports.

The issues to be determined or otherwise considered are:

1. Whether SoCalGas's and SDG&E's RAMP Reports are complete and in compliance with RAMP-related and governing decisions, including D.14-12-025, D.18-12-014, D.21-11-009, D.22-12-027, and D.24-05-064.
2. Whether SoCalGas and SDG&E adequately demonstrate how they use their RAMP model and risk analysis in selection and implementation of specific mitigation projects and programs.
3. Whether there are gaps in SoCalGas's and SDG&E's RAMP Reports in identifying enterprise-level risks and considering mitigation options, including but not limited to:
    a. Whether key safety risks have been adequately identified, assessed, and analyzed.
    b. Whether risk analysis is adequately supported.
    c. Whether effective mitigation programs have been developed and defined with sufficient granularity.
    d. Whether cost effectiveness of mitigations has been reasonably assessed and analyzed.
    e. Whether reasonable alternatives have been fully considered and adequately discussed by SoCalGas and SDG&E.
    f. Whether SoCalGas and SDG&E ensured that all relevant lifecycle costs and benefits are comprehensively identified, accurately integrated into the Cost Benefit Ratio calculations, adequately demonstrated when assessing risk mitigation programs and projects, and implemented in compliance with the directives of D.22-12-027 and D.24-05-064.
    g. Whether SoCalGas's and SDG&E's proposed Homogeneous Tranche Method is appropriately granular and an acceptable alternative to the Commission's best-practice quintile approach to tranching, as set forth in D.24-05-064.
4. Whether SoCalGas's and SDG&E's analyses are transparent and allow for independent validation of their results.
5. Whether RAMP feedback has been adequately incorporated into SoCalGas's and SDG&E's 2028 Test Year General Rate Case filing.
6. Whether SoCalGas and SDG&E have reasonably implemented the Environmental and Social Justice Pilot study and other related directions ordered in D.22-12-027.
7. Whether SoCalGas and SDG&E adequately demonstrate how their "risk-averse" Risk Scaling Function optimizes costs and benefits to ratepayers.
8. Whether the RAMP Reports align with or impacts the achievement of any of the nine goals of the Commission's Environmental and Social Justice Action Plan.

Where SPD staff observed gaps in compliance with the RDF guidelines in Sempra's RAMP Reports, the evaluation summarizes these gaps as findings and provides corresponding recommendations for improvement.

One aspect of the evaluation involved reviewing the mitigation cost projections presented by SoCalGas and SDG&E for use in the cost-benefit ratio calculations. Verification of mitigation cost estimates is beyond the scope of this evaluation. To the extent uncertainties or potential errors may be found in Sempra's mitigation cost estimates, those uncertainties or errors would carry through to the cost-benefit ratio calculations, potentially affecting mitigation decisions. Therefore, the cost estimates should be substantiated in the TY 2028 GRC.

As in recent SPD RAMP evaluations, SPD's evaluation of the 2025 Sempra RAMP Reports used a uniform template to review each risk chapter. This standardized approach supports consistency across the evaluation.

SPD staff reviewed each risk chapter in detail. The evaluations examined the soundness and adequacy of the overall risk assessment and analytical approach and whether the applications comply with the governing Risk-Based Decision-Making Frameworks contained in Appendix A of D.22-12-027 and Appendix A of D.24-05-064.

Key Differences between the 2025 RAMP and 2021 RAMP

1. Monetization of Attributes and Cost-Benefit Ratios

In 2025, Safety, Electric Reliability, and Gas Reliability attributes are expressed in dollar values and evaluated using Cost-Benefit Ratios (CBRs). This replaces the unitless Multi-Attribute Value Function (MAVF) scores and Risk-Spend Efficiency (RSE) used previously.[22]

2. Standardized Monetization Inputs

The 2025 RAMP applies a California-adjusted Value of Statistical Life (VSL-CA), U.S. DOT injury severity scaling, the Lawrence Berkeley National Laboratory Interruption Cost Estimator (ICE) for electric reliability, and an implied gas reliability value. In 2021, relative weights were based on MAVF scoring.[23]

3. Environmental and Social Justice (ESJ) Pilot Study

The 2025 RAMP includes an ESJ Pilot Study as required by the Phase 2 RDF Decision.[24] No such study was included in the 2021 RAMP.

4. Post-Test-Year (PTY) CBRs

Phase 3 requires utilities to present CBRs for each post-test-year and aggregate PTY/GRC-cycle CBRs by tranche. The 2025 RAMP therefore extends analysis through 2031, whereas the 2021 RAMP only included analysis for the test year.[25]

5. Tranching Methodology

Phase 3 establishes quintiles of LoRE and quintiles of CoRE (5×5) as the default best practice, producing 25 tranches.[26] In 2025, Sempra deviated from this default by submitting a Tranching White Paper on November 1, 2024, proposing a Homogeneous Tranching Methodology.[27] This represents the first instance of a utility formally testing an alternative to the quintile approach.

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[22] D.22-12-027, Appendix A, Rows 24-26; OP 2(a)(b)(c), pp. 63-65.

[23] D.22-12-027, Appendix A, Step 1A; OP 2(a)(b)(c), pp. 63-65.

[24] D.22-12-027, Appendix A, OP 5, pp. 65-67.

[25] D. 24-05-064, Appendix A, Rows 25-26, pp. A-15 and A-16.

[26] D. 24-05-064, Appendix A, Row 14, pp. A-13 and A-14.

[27] Sempra, "Tranching Whitepaper", A.25-05-010, Vol. 1, Appendix 3.

6. Tail Risk and Risk-Averse Scaling

The 2025 RAMP incorporates convex risk-averse scaling functions and wildfire tail-risk modeling in accordance with Phase 3.[28] The 2021 RAMP contained no explicit tail-risk treatment.

7. Discount Rate Scenarios

Phase 3 requires CBRs to be calculated under three discount rate scenarios: Weighted Average Cost of Capital (WACC), a 2 percent Social Discount rate, and a Hybrid rate.[29] These scenarios were not required in the 2021 RAMP.

8. Foundational Program Cost Allocation

In the 2025 RAMP, foundational program costs that support or enable mitigations are allocated to those mitigations and included in program costs for CBR calculations, consistent with the Phase 1 Decision[30] and implemented under the Phase 2 Decision.[31] In 2021, such costs were not consistently included because the 2021 RAMPs pre-dated the Phase 1 Decision.

[28] D. 24-05-064, Appendix A, Row 24, p. A-15.

[29] D. 24-05-064, Appendix A, Row 25, pp. A-15 and A-16.

[30] D. 21-11-009, pp. 19 and 22.

[31] D.22-12-027, p. 7.

Sempra's RAMP Risk Selection Process

The risk selection process used by SoCalGas and SDG&E in the 2025 RAMP follows the Phase 2 RDF and is broadly consistent with the process used in 2021; the key difference is that safety risk scores are monetized consistent with the Phase 2 Decision.[32] See also Sempra's summary of monetization requirements and implementation in Volume 1, Chapter RAMP1 and Chapter RAMP3.[33] Consistent with RDF Step 2A/Row 9, Sempra starts from the Enterprise Risk Registry (ERR), computes monetized safety-only risk scores, sorts risks in descending order, and then—for the top 40 percent of ERR risks with a nonzero monetized safety score—calculates full monetized risk values using all risk attributes (Safety, Reliability, Financial).[34]

RDF Step 2B/Row 12 requires a publicly noticed prefiling workshop to review the preliminary RAMP risk list. Sempra held that workshop on December 17, 2024; based on input (including from SPD), Sempra finalized its list and added Underground Gas Storage (UGS) for SoCalGas.[35]

Phase 3 also modified RDF Row 14 (tranching).[36] The decision identified as "best practice" a quintile based approach that allocates both LoRE and CoRE into equally sized groups (five × five = 25 reporting tranches) but permits an alternative methodology if the utility serves a White Paper at least 45 days before the first pre-RAMP workshop.[37] Sempra complied by serving its Alternative Tranching White Paper (Homogeneous Tranching Method, HTM) on November 1, 2024, and describing the approach in Appendix 3 to Vol. 1; Sempra also explains the Row 14 "best practice" and White Paper process in Vol. 1, Ch. RAMP3 and Vol. 1, Ch. RAMP1.[38] Finally, consistent with Phase 2's monetization requirements, Sempra values safety using a California adjusted Value of Statistical Life (VSLCA) and applies DOT based injury scaling (MAIS) as specified in OP 2 of D.22-12-027; Sempra documents its 2023–2024 VSL CA values ($15.2 million; $16.2 million) and corresponding fractional injury values in Vol. 1, Ch. RAMP3.[39]

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[32] D.22-12-027, Appendix A, Step 1A/Row 6; Step 2A/Row 9.

[33] D.22-12-027, App. A; Vol. 1, Ch. RAMP1 at 8–10; Vol. 1, Ch. RAMP3 at 3–6.

[34] RDF, Step 2A/Row 9; Vol. 1, Ch. RAMP2 at 4–5.

[35] D.24-05-064, App. A, Row 12; Vol. 1, Ch. RAMP2 at 4–6; Vol. 1, Ch. RAMP1 at 2 & 15–16.

[36] D.24-05-064.

[37] D.24-05-064 at 26–28, 32-33; App. A, Row 14.

[38] D.24 05 064 at 26-28, 32-33; Vol. 1, Ch. RAMP3 at 16–19; Vol. 1, Ch. RAMP1 at 10–12.

[39] D.22-12-027 OP 2 at 63–64; Vol. 1, Ch. RAMP3 at 5–8 & Tables 4 & 5.

Overall Risk Quantification Methodology

Sempra's risk quantification methodology contains several key features that are discussed below.

Monetized Values of Attributes

The 2025 RAMP is Sempra's first RAMP in which the monetization of the safety and reliability attributes is used to calculate cost-benefit ratios of risk mitigation programs and projects in accordance with D.22-12-027.

Sempra used the following monetized CoRE attribute values:[40]

Table 1: CoRE Attributes and Monetized Values (Direct, in 2024 $)

Attributes	Sub-Attributes	Monetized Value
Safety	Fatality	$16.2 million per fatality
Electric Reliability (SDG&E Only)	Customer Minute Interrupted	$3.76 per CMI
Gas Reliability	Gas Meter Outage	$3,868.79 per gas meter experiencing outage
Financial	US Dollar	$1

The $16.2 million per fatality (or Value of Statistical Life, VSL) for 2024 was calculated based on the Department of Transportation's methodology as described in D.22-12-027 and further adjusted for California using California's Price Index and Real Incomes.[41]

SDG&E states that using Acres Burned to account for the detrimental environmental impacts of wildfire smoke was eliminated as a sub-attribute of the Safety Attribute in the 2025 RAMP "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."[42] The omission of the dollar value of this sub-attribute will likely result in an underestimation of the cost-benefit ratios of wildfire mitigation programs.

[40] SCG/SDG&E RAMP-3 Risk Quantification Framework, p.5, Table 3

[41] SCG/SDG&E RAMP-3 Risk Quantification Framework, p.6.

[42] SCG/SDG&E RAMP-3 Risk Quantification Framework, p.9.

For the Electric Reliability Attribute, the monetization of the Customer Minutes of Interruption was estimated using the Lawrence Berkeley National Laboratory's Interruption Cost Estimate (ICE) Calculator, Version 1.0.

For the Gas Reliability Attribute, the monetized value of gas outage per gas meter was estimated using the implied monetary value of a gas meter experiencing an outage based on Sempra's 2021 MAVF figures, in accordance with Row 6 of the RDF. However, in the transition to the cost-benefit approach, Sempra acknowledged that "it was not feasible to develop a methodology for calculating a Gas Curtailment sub-attribute in the time available and only utilized meter outages as a single attribute to measure gas reliability CoRE."[43] SPD recommends that SoCalGas and SDG&E incorporate the gas curtailment sub-attribute in the Test Year 2028 GRC.

Sempra further acknowledges that its cost-benefit approach "currently does not quantify the value of the gas system as an integral component of California's interconnected energy system and the many functions it provides as the reliability backstop for the electric grid and broader energy system for the State as well as the region."[44] SPD recommends that Sempra continue to refine its quantification of gas reliability and, if feasible, incorporate this sub-attribute in the Test Year 2028 GRC.

For the Financial Attribute, Sempra includes two general types of costs: societal damage (physical damage, lost wages, relocation costs, etc.) and utility service restoration and repair costs (labor, materials).[45]

Risk-Averse Scaling Function

Sempra uses a risk-averse scaling function to modify the CoRE attributes as permitted by Row 7 of the RDF. Sempra's risk scaling applies to the Safety, Reliability, and Financial CoRE attributes using the scaling function:

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

Where χ = the CoRE value expressed in number of VSL units.

$\alpha = 1.47$

To use this scaling function, the unscaled monetized value of a CoRE attribute is divided by the 2024 VSL value of $16.2 million to convert the unscaled CoRE value into the number of VSL units. This quantity is then raised to the power of 1.47 to obtain the risk-scaled equivalent number of VSL units. Finally, to

[43] SCG/SDG&E RAMP-3 Risk Quantification Framework, p.12.

[44] SCG/SDG&E RAMP-3 Risk Quantification Framework, p.13.

[45] SCG/SDG&E RAMP-3 Risk Quantification Framework, p.14.

calculate the monetized risk-scaled value of the CoRE attribute, the intermediate risk-scaled number of VSL units is multiplied by the VSL value of $16.2 million to obtain the risk-scaled and monetized CoRE for that attribute.

A risk-averse scaling function has the general effect of magnifying the cost-benefit ratio, especially of high-consequence events. It can also turn an apparently unfavorable mitigation option (due to its low unscaled cost-benefit ratio) into an acceptable or even favorable mitigation proposal by magnifying the cost-benefit ratio. However, because Sempra did not apply a strict risk mitigation decision mechanism based on a rigid cutoff value of cost-benefit ratio—nor did Sempra base its mitigation selections strictly on cost-benefit ratio values—the actual effect of the risk scaling function on the mitigation selections in this RAMP is difficult to generalize. The impact of risk scaling on risk mitigation selections must be examined on a case-by-case basis within each risk chapter.

Alternative Tranching Methodology

Instead of using the quintile tranching methodology described in Row 14 of the RDF, Sempra introduced and selected its own alternative tranching method, named Homogeneous Tranche Method (HTM). Sempra circulated a white paper to describe this alternative tranching method. This white paper is included as Appendix 3 of Sempra's RAMP Reports.

Sempra was motivated to use this HTM in place of the quintile approach after observing that the quintile approach has some notable deficiencies, among them:

1. Risk (LoRE x CoRE) of similar levels will scatter across many quintile tranches. This can result in the highest-risk pairs and the lowest-risk pairs being aggregated in the same tranche, thereby defeating the desired risk homogeneity within tranches.
2. Completely dissimilar asset types can be grouped into the same tranche. This makes it more challenging to compare mitigation options within the tranche.
3. Unless the LoRE and CoRE are uniformly distributed, some tranches may be much more heavily populated than others.

To alleviate these flaws of the quintile tranching methodology, Sempra introduced its HTM, which comprises the following steps:

> **Step 1.** Organize the granular level risk and associated LoRE/CoRE pairs, the starting LoRE/CoRE pairs, into groups, referred to as "Classes," based on similar risk profiles (*e.g.*, Mains, Regulators, Risers).
>
> **Step 2.** Within each Class, rank the risk scores (LoRE x CoRE) into quantiles using the following algorithm. A KK-quantile is defined here as a quantile of order KK _ (*e.g.*, tercile (3-quantile), quartile (4-quantile)). And NN _is defined here as the number of starting LoRE/CoRE pairs within the Class.
>
> 1) If N is less than 8, then KK=1 and you can move to Step 3.

2) If N is not less than 8, find the whole number KK _such that the following inequality is satisfied:

$$\text{Min}(N/8 - 1, 9) < K \leq \min(N/8, 10),$$

then continue to Step 3.

Step 3. For each risk K-quantile from Step 2, create up to four homogeneous LoRE/CoRE Tranches. These will be the final tranches of the HTM.

1) If no more than four unique LoRE/CoRE pairs for this Risk Quantile exist, then the Risk Quantile is the final Tranche and sub-Steps 2-3 do not apply. Note, if there are no more than four unique LoRE/CoRE pairs, then one can simply examine the values of those LoREs/CoREs and grouping them is no longer necessary.

2) Separate the Risk Quantile into regions using the median of the LoRE and the median of the CoRE. This will separate the LoREs into two groups of near-equal numbers where about half are less than the LoRE median, and the other is greater than the median.

For values equal to the median, decide which group (lower LoRE or upper LoRE) will produce the greater balance of the starting pairs. Do the same for the CoREs. Since there are at least five unique LoRE/CoRE pairs, this will produce at least two LoRE/CoRE homogeneous regions.

3) Dissolve any region with a relatively low number of LoRE/CoRE pairs compared to other regions. One way this can be achieved is by computing the Euclidean distance to every LoRE/CoRE pair in the other regions. Then the closest point (nearest neighbor) will determine which tranche the pair should be recategorized into.

4) As a result, there will be two to four Tranches for each Risk Quantile. The homogeneous profiles for each risk KK-quantile will be from the following:

1. Lower LoRE/Upper CoRE
2. Upper LoRE/Lower CoRE
3. Upper LoRE/Upper CoRE
4. Lower LoRE/Lower CoRE

Step 4. For each final Tranche, Ti, define the LoRE(Ti) as the sum of the LoREs from the starting LoRE/CoRE pairs that make up Ti. Then define the CoRE(Ti) as the sum of all the Risks from the starting LoRE/CoRE divided by LoRE(Ti).

Observations and Findings:

SPD reviewed Sempra's alternative tranching method—submitted pursuant to the RDF decision and accompanied by a White Paper—as a substitute for the Phase-3 best practice of quintile LoRE ×CoRE tranching (RDF Row 14). Elements of the approach may be reasonable and, in some gas and electric chapters, were implemented consistently with the RDF. In other chapters, SPD identified material limitations (e.g., reduced transparency in asset ordering, and unclear linkage to mitigation prioritization). On balance, SPD does not conclude that the alternative is categorically superior to the default quintile method. The chapter-specific evaluations in the SPD Evaluation Report document where Sempra's HTM approach performed well and where it did not.

Global Observations

1. SPD is concerned with treatment of baseline O&M costs in the CBR calculations. In the Wildfire and PSPS chapter's comparison of covered conductors and undergrounding, SDG&E assigns the full baseline O&M costs of activities such as vegetation management and overhead inspections to the CBR for the Combined Covered Conductor (CCC) mitigation, rather than including only the net incremental O&M costs or savings attributable to the mitigation. This approach is inaccurate, since baseline O&M costs will continue under the no-build (i.e., existing) scenario. When recalculated without baseline O&M, the CCC CBR rises from 0.62 to 1.23, nearly matching Strategic Undergrounding's (SUG) CBR of 1.33, demonstrating that SDG&E's O&M treatment can significantly shift comparative results in favor of SUG compared to CCC.[46]

   In the 2025 RAMP, the UGS, High Pressure (HP) Gas, and Medium Pressure (MP) Gas chapters exhibit issues in their Cost-Benefit Ratio (CBR) calculations, particularly in the handling of capital expenditure (CapEx) and O&M costs. The workpapers for these chapters combine CapEx and O&M into a single cost column, preventing clear differentiation between incremental expenses tied to capital investment and ongoing operating expenses, which hinders accurate CBR evaluations.

2. SPD observes that the reported pre-mitigation risk values in the gas system chapters increased by roughly an order of magnitude between the 2021 and 2025 RAMP filings. For illustration, in Underground Gas Storage, the 2025 chapter reports LoRE = 3.68 and a Total Risk of $56.08 million (2024$, risk-scaled),[47] whereas the 2021 chapter's *Alternate Mitigation Plan – Quantitative Analysis Summary (Direct After Allocations, In 2020 $000)* shows LoRE = 0.292, CoRE = $9.306 million, and Risk = $2.721 million.[48] Within the time available for this evaluation, SPD was unable to complete an apples-to-apples normalization of CoRE across cycles (same dollars, aligned attribute set, and with/without consistent risk-averse scaling), and therefore cannot isolate how much of the observed increase reflects framework and monetization changes versus changes in underlying per-event severity. Nevertheless, SPD finds that when there is a large change in LoRE and CoRE between RAMP cycles, Sempra should explain the drivers of that change within the applications themselves.

3. SPD observes a transparency gap between the presentation of CBRs and their impact on mitigation strategy. While Sempra calculates and presents CBRs under the required three discount-rate scenarios (Societal, Hybrid, and WACC), and for each GRC year, as required in the Phase 3

[46] SPD Evaluation Report, Chapter 7 SDG&E Wildfire and PSPS, p. 27.

[47] SoCalGas 2025 RAMP Chapter SCG-Risk-4, Underground Gas Storage, Table 2, p. 13.

[48] SoCalGas 2021 RAMP Chapter SCG-Risk-4, Underground Gas Storage, Table 9, p. SCG-4-23.

Decision,[49] the chapters generally do not demonstrate how differences among those scenarios informed prioritization and selection of specific controls/mitigations. Appendix A Row 26 of the RDF states that while "the utility is not bound to select its Mitigation strategy based solely on the Cost-Benefit Ratios" the utility "will clearly and transparently explain its rationale for selecting Mitigations for each risk and for its selection of its overall portfolio of Mitigations."[50] SPD finds Sempra's narrative does not close the loop between the three CBR scenarios and selection decisions, and recommends adding brief tie-outs in each chapter explaining whether selections are robust across scenarios or driven by a particular scenario.

4. Sempra applies convex (risk-averse) scaling in CBR calculations and provides side-by-side comparison of unscaled to scaled values at the risk level. Although the Phase 3 RDF Decision does not require presentation of unscaled CBR data when scaling is used, SPD recommends that Sempra also provide the companion unscaled CBRs at the most granular level feasible (at minimum, the reporting-tranche level in Sempra's filings, with details provided in the workpapers), for each GRC year and all three discount-rate scenarios; this simple addition would separate scaling effects from underlying data, improve cross-chapter comparability, and make selection rationales more transparent.

5. The "historical progress" presentations in the Cybersecurity and Underground Gas Storage (UGS) chapters evidence activity but do not fully meet the requirement in D.22-10-002, which calls for graphics that "clearly illustrate what safety work has been accomplished and what work remains" over at least the two preceding RAMP cycles.[51] In Cybersecurity, the historical graphic consists of a BitSight rating time series and a vulnerability-remediation tally (2016–2024; more than 2.6 million remediations in 2022–2024), but this does not quantify the remaining work or depict baseline-to-residual risk on the chapter's monetized basis.[52] In UGS, the chapter includes a bar-chart labeled "Safety Progress 2016–2024" and a narrative list of Storage Integrity Management Program (SIMP) inspections and repairs, while deferring "remaining work" to the controls/mitigations section, leaving the graphic without a completed-versus-remaining depiction or a monetized risk trajectory across the last two RAMP cycles.[53] Because the RDF framework expressly contemplates pre- and

[49] D.24-05-064, Summary of the Decision, p. 3, which specifies that "utilities shall present the CBR using three discount rate scenarios for each mitigation."

[50] D.24-05-064 Appendix A, p. A-16.

[51] D.24-05-064 Appendix A at Row 20.

[52] SDG&E 2025 RAMP, Chapter SDG&E-Risk-8, Cybersecurity, pp.35-36.

[53] SoCalGas 2025 RAMP, Chapter SCG-Risk-4, Underground Gas Storage, pp. 3–15, 28–50, 64–66.

post-mitigation monetized risk values as the basis for showing risk-reduction trajectories,[54] the absence of those trajectories renders these historical graphics incomplete. To align with the requirement, in the future, each chapter should add a companion display that quantifies completed versus remaining assessments/remediations and plot monetized baseline and residual risk across the last two RAMP cycles.

6. SPD observes that Sempra's bow ties list drivers/triggers and potential consequences qualitatively but omit key quantitative elements needed for decision-grade traceability. SPD recommends that Sempra review PG&E's approach to bow ties in its most recent RAMP, and that each bow tie include:

    - Per-driver annual frequency (events/year) and each driver's share of total frequency and total risk.
    - An explicit exposure metric in the central panel (e.g., circuit miles, assets, customers) to anchor the scale.
    - Per-outcome CoRE ($) and each outcome's share of frequency and share of risk.
    - The aggregated baseline risk value ($) for the risk, with the vintage and any risk-adjustment noted.
    - Clear tie-outs that map each mitigation to the specific bow tie element it affects—driver-side likelihood (LoRE) and/or outcome-side consequence (CoRE).

[54] D.24-05-064, Appendix A at A-14.

Evaluation of Chapters

1. SoCalGas and SDG&E Excavation Damage

Risk Description

Sempra defines excavation damage risk as the risk of a dig-in on the natural gas system caused by excavation activities resulting in an uncontrolled release of gas and the potential for serious injuries, fatalities and/or damage to the infrastructure.[55] The natural gas system is classified as either high pressure or medium pressure. Medium pressure pipelines operate at or less than 60 pounds per square inch gauge (psig), and high pressure pipelines operate above 60 psig.[56] The analyses consider risk events caused by excavation damage on the natural gas system regardless of the party (first, second, or third) at fault.[57]

SDG&E notes that excavation damage risk is not among the top 40 percent of its enterprise risks with a safety risk value greater than zero dollars, but SDG&E elected to include excavation damage risk in its RAMP filing.[58]

Observations and Findings

SPD has no observations or findings on the risk description.

[55] SCG-Risk-1 Excavation Damage, p. 1; SDG&E-Risk-1 Excavation Damage, p. 1.

[56] SCG-Risk-1 Excavation Damage, p. 2; SDG&E-Risk-1 Excavation Damage, p. 2.

[57] First party refers to the utility, second parties are contractors working for the utilities, and third parties are not connected with the utilities, such as excavation contractors or members of the public.

[58] SDG&E-Risk-1 Excavation Damage, p. 7.

Risk Bow Ties

SoCalGas

SoCalGas presents the following risk bow tie for excavation damage risk:

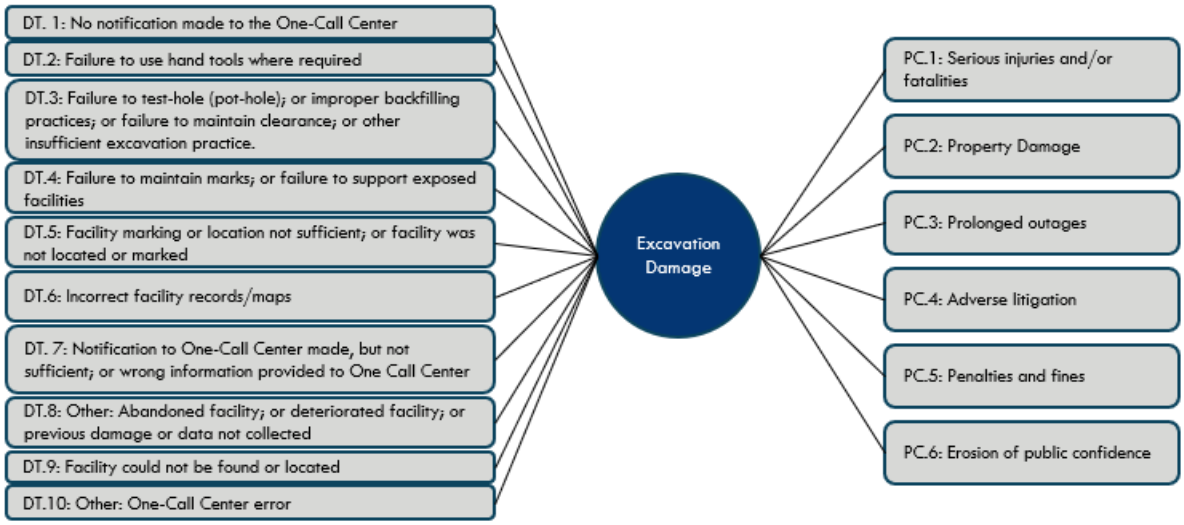

Figure 1-1. SoCalGas Excavation Damage Risk Bow Tie[59]

SDG&E

SDG&E presents the following risk bow tie for excavation damage risk:

[59] SCG-Risk-1 Excavation Damage, p. 7, Figure 3.

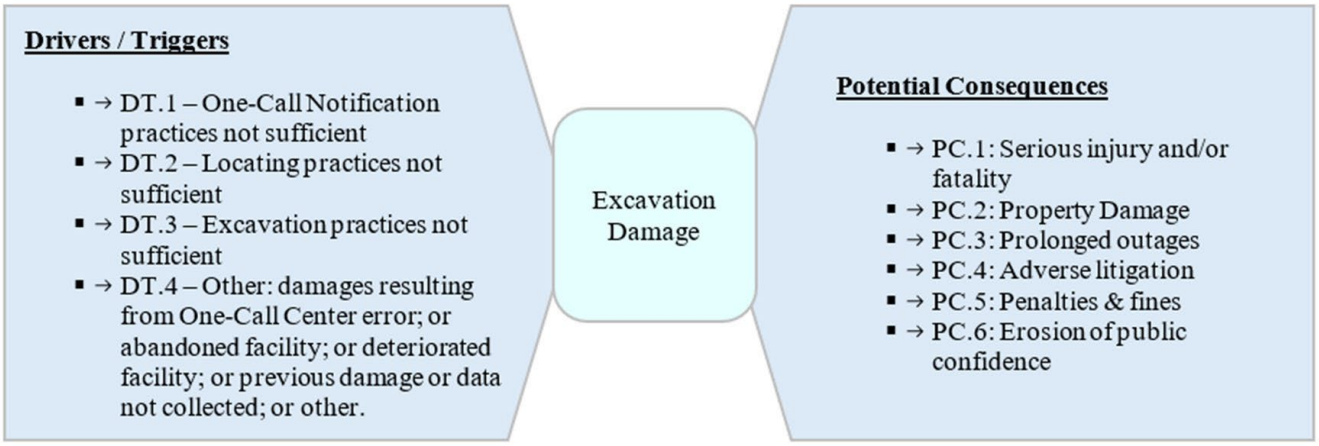

Figure 1-2. SDG&E Excavation Damage Risk Bow Tie[60]

More information on the potential drivers/triggers and consequences is presented in the Risk Drivers and Consequences sections below.

Observations and Findings:

SPD has no observations or findings on the risk bow ties.

Exposure

SoCalGas

SoCalGas operates and manages a natural gas system of over 101,000 miles of distribution pipe and 3,385 miles of transmission pipe within its 24,000 square mile service territory.[61] In 2024, SoCalGas managed 1,032,221 Underground Service Alert (USA) tickets and reported approximately 2,400 Excavation Damage incidents.[62, 63] About 63 percent of the incidents reported in 2024 were caused by a lack of notification to

[60] SDG&E-Risk-1 Excavation Damage, p. 7, Figure 3.

[61] SCG-Risk-1 Excavation Damage, p. 2.

[62] Pursuant to Cal. Gov. Code § 4216.2(b), an excavator planning excavation work is required to contact the Regional Notification Center by calling 811 at least two days prior to commencing excavation activities. The 811 call-in program is usually referred to as "Call Before You Dig." California has two Regional Notification Centers: DigAlert and USA North 811, which are referenced as 811 USA in this Chapter.

[63] Once an excavator makes contact, the Regional Notification Center will issue a USA ticket notifying local utilities and other operators of the location and areas to be inspected for potential conflicts of underground infrastructure with the excavation work. Operators are then required to provide an electronic positive response to indicate that there are no facilities in conflict or to mark

811 USA, and about 26 percent were caused by inadequate excavation practices even after the excavator called 811 USA and underground facilities were properly marked.[64]

SDG&E

SDG&E operates and manages a natural gas system of over 15,400 miles of distribution pipe and 219 miles of transmission pipe within its 4,100 square mile service territory.[65] In 2024, SDG&E managed 212,553 USA tickets and reported 260 excavation damage incidents. About 62 percent of the incidents reported in 2024 were caused by a lack of notification to 811 USA, and about 32 percent were caused by inadequate excavation practices even after the excavator called 811 USA and underground facilities were properly marked.[66]

Observations and Findings:

SPD has no observations or findings on the exposure.

Tranches

Sempra applies an alternative tranching methodology, or HTM, to create tranches. The RDF allows utilities to use an alternative tranching methodology.[67] The HTM separates the natural gas system into two classes: high pressure and medium pressure. Medium pressure includes distribution main and service pipelines operating at or less than 60 psig, and high pressure includes distribution and transmission pipelines operating above 60 psig. Sempra then identified the LoRE-CoRE risk pairs within each class based on segments of the pipeline systems, and it created tranches containing the LoRE-CoRE pairs.[68]

SoCalGas

The following table summarizes SoCalGas's tranches for Excavation Damage Risk:

their underground facilities with aboveground identifiers (*e.g.,* paint, chalk, flags, whiskers) so that excavators know where substructures are located. The law also requires excavators to use careful, manual (hand digging) methods to expose substructures prior to using mechanical excavation tools. See SCG-Risk-1 Excavation Damage, p. 3.

[64] Sempra's response to SPD-Sempra-2025RAMP-006, Question 1, SPD-SEMPRA-2025 RAMP-006-Attch 1_18660_18666.xlsx.

[65] SDG&E-Risk-1 Excavation Damage, p. 2.

[66] Sempra's response to SPD-Sempra-2025RAMP-006, Question 1, SPD-SEMPRA-2025 RAMP-006-Attch 1_18660_18666.xlsx.

[67] D.24-05-064, Appendix A, Row 14.

[68] For more information on the HTM, see White Paper Describing Alternative Tranching Method of Southern California Gas Company and San Diego Gas & Electric Company, November 1, 2024.

Table 1-1 SoCalGas Excavation Damage Risk Tranche Summary[69]

Class	Number of LoRE-CoRE Pairs	Number of Tranches
High Pressure	117	29
Medium Pressure	426	20
Total	**543**	**49**

SDG&E

The following table summarizes SDG&E's tranches for Excavation Damage Risk:

Table 1-2 SDG&E Excavation Damage Risk Tranche Summary[70]

Class	Number of LoRE-CoRE Pairs	Number of Tranches
High Pressure	48	12
Medium Pressure	91	20
Total	**139**	**32**

Observations and Findings:

SPD finds that under Sempra's HTM, the high pressure tranches do not contain LoRE-CoRE pairs with homogeneous risk profiles. For instance, the first tranche of SoCalGas's high pressure class contains six LoRE-CoRE pairs: one pair representing high pressure distribution asset and five pairs representing transmission assets. The exposure of the six LoRE-CoRE pairs ranges from 3.89 to 857.14 miles of pipes. The starting LoRE ranges from 0.000 to 0.017, and the starting CoRE ranges from $372 million to $4,117 million.[71]

Moreover, high pressure distribution and high pressure transmission pipelines have significantly different risk profiles because high pressure distribution pipelines operate above 60 psig, but high pressure

[69] SCG-Risk-1 Excavation Damage, p. 13, Table 1.

[70] SDG&E-Risk-1 Excavation Damage, p. 11, Table 1.

[71] SCG_Excavation_CBR_Main_Workbook_R.xlsx, Tranche Mapping worksheet.

transmission pipelines can operate from 200 to 1,500 psig.[72]. A rupture involving a high pressure transmission pipeline would have far more severe consequences than one involving a high pressure distribution pipeline.

Additionally, SPD observes the following:

1. Each different segment of high pressure pipeline is represented by three LoRE-CoRE pairs based on outcome (e.g., rupture, large leak, and small leak). For example, in the tranche mapping worksheet of SoCalGas's workpapers, IDs 13, 15, and 17 represent the same segment of high pressure distribution pipeline with an exposure of 1,843.4 miles.[73] ID 13 presents risk data for a large leak outcome; ID 15 presents risk data for a rupture outcome; and ID 17 presents risk data for a small leak outcome. Because of this, the same asset appears three times in the high pressure tranches.
2. The LoRE-CoRE pairs have varying lengths of Exposure. For SoCalGas's High Pressure LoRE-CoRE pairs, the shortest segment is 0.16 miles, while the longest segment is 1,843.4 miles. For SoCalGas's Medium Pressure LoRE-CoRE pairs, the shortest segment is 0.00018939 miles, while the longest segment is 7,576.94 miles. For SDG&E's High Pressure LoRE-CoRE pairs, the shortest segment is 0.03 miles, while the longest segment is 261.3 miles. For SDG&E's Medium Pressure LoRE-CoRE pairs, the shortest segment is 0.00076 miles, while the longest segment is 2,350.02 miles.
3. Sempra's HTM resulted in more tranches than the RDF's recommended method, which would result in 25 tranches.

Risk Drivers

SoCalGas

In its risk bow tie, SoCalGas presents ten potential leading indicators, referred to as drivers or triggers (DT). The DTs inform the LoRE component of a risk value. The table below summarizes the ten DTs.

[72] California Natural Gas Pipelines: A Brief Guide, www.osti.gov/servlets/purl/1240050#:~:text=The%20Transmission%20System&text=These%20large%20transmission%20lines%20for,the%20potential%20for%20accidental%20damage, accessed September 9, 2025.

[73] SCG_Excavation_CBR_Main_Workbook_R.xlsx.

Table 1-3 SoCalGas Excavation Damage Risk Drivers/Triggers[74]

Driver/Trigger	Description
DT.1: No notification made to the One-Call Center	Excavators such as contractors or property homeowners/tenants do not call 811 prior to excavation.
DT.2: Failure to use hand tools where required	Excavators do not use "hand tools" to verify the exact location and that no conflicts exist within 24 inches of either side of the gas pipeline prior to using any power-operated excavation or boring equipment.
DT.3: Failure to administer a test-hole (pot-hole); or improper backfilling practices; or failure to maintain clearance; or other insufficient excavation practice	Failure to pothole can cause damage to natural gas pipelines.
DT.4: Failure to maintain marks; or failure to support exposed facilities	Failure to maintain marks or failure to support exposed facilities can cause damage to natural gas pipelines.
DT.5: Facility marking or location not sufficient; or facility was not located or marked	The Company may inaccurately mark facilities or fail to mark facilities due to incorrect operations, such as mapping/data inaccuracies, equipment signal interference, or human error. Third parties are then provided with inaccurate information on underground pipelines.
DT.6: Incorrect facility records/maps	Incorrect/inadequate asset records and/or delays in updating mapping records could result in underground infrastructure being incorrectly marked.
DT.7: Notification to One-Call Center made, but not sufficient; or wrong information provided to One-Call Center.	Excavators such as contractors or property homeowners/tenants have requested an 811 USA ticket but are not knowledgeable about the Dig Safe law. They may damage underground facilities by: 1. Excavating prior to the valid start date/time 2. Excavating after a valid ticket has expired 3. Excavating under another excavator's USA ticket 4. Improper job delineation and/or excavating beyond the delineation marks
DT.8: Other: Abandoned facility; or deteriorated facility; or previous damage or data not collected	Excavators such as contractors or property owners/tenants have requested an 811 USA ticket, the

[74] SCG-Risk-1 Excavation Damage, pp. 8-10.

Driver/Trigger	Description
	Company has responded to the request and an unknown abandoned facility is struck. The requestor may come across a deteriorated facility or previous damage caused by another entity.
DT.9: Facility could not be found or located	Delays in updating asset records/mapping, tracer wire issues, and equipment signal interference can cause an underground facility to not be located.
DT.10: Other: One-Call Center Error	Includes mistakes made by the one call center (also known as 811 centers).

SDG&E

In its risk bow tie, SDG&E presents four DTs, which inform the LoRE component of a risk value. The table below summarizes the four DTs.

Table 1-4 SDG&E Excavation Damage Risk Drivers/Triggers[75]

Driver/Trigger	Description
DT.1: One-Call Notification practices not sufficient	Damages resulting from no notification made to the One-Call Center; or notification made to One-Call Center, but not sufficient; or wrong information provided to One-Call Center.
DT.2: Locating practices not sufficient	Damages resulting from facility could not be found or located; or the facility marking or location is not sufficient pursuant to requirements; or the facility was not located or marked; or incorrect facility records/maps.
DT.3: Excavation practices not sufficient	Damages resulting from failure to maintain marks; or failure to support exposed facilities; or failure to use hand tools where required; or failure to test-hole (pothole); or improper backfilling practices; or failure to maintain clearance; or other insufficient excavation practice.
DT.4: Other	Damages resulting from One-Call Center error; or abandoned facility; or deteriorated facility; or previous damage or data not collected; or other.

[75] SDG&E-Risk-1 Excavation Damage, p. 8.

Observations and Findings:

SPD observes that compared to its 2021 RAMP filing, SoCalGas changed the order and descriptions of DT.1-DT.9 and added DT.10 in its 2025 RAMP filing.

SPD observes that SDG&E presented nine DTs in its 2021 RAMP filing but consolidated the nine DTs into four DTs in its 2025 RAMP filing because many of the DTs in the 2021 RAMP filing, as SDG&E explained, have the same root driver.[76]

Risk Driver Frequencies

Sempra emphasizes that the majority of Excavation Damage incidents were caused by a lack of notification to 811 USA for a "locate and mark ticket" and the next greatest cause was inadequate excavation practices even after the excavator called 811 USA and underground facilities were properly marked.

SoCalGas

The table below shows the number of USA tickets managed and the number of Excavation Damage incidents reported by SoCalGas from 2016-2024:

Table 1-5 SoCalGas Excavation Damage Tickets and Incidents (2016-2024)[77]

	2016	2017	2018	2019	2020	2021	2022	2023	2024
USA Tickets	627,116	770,016	841,369	960,855	938,358	1,043,299	1,104,907	1,044,971	1,032,221
Incidents Caused by Lack of 811 USA Notification	1,589	1,698	1,776	1,530	1,188	1,895	1,741	1,532	1,509
Incidents Caused by Inadequate Excavation Practice	726	613	773	590	408	649	744	607	620
Incidents Due to Other Causes	985	909	915	961	1,545	281	306	309	271

[76] SDG&E-Risk-1 Excavation Damage, p. 9.

[77] Sempra's response to SPD-Sempra-2025RAMP-006, Question 1, SPD-SEMPRA-2025 RAMP-006-Attch 1_18660_18666.xlsx.

	2016	2017	2018	2019	2020	2021	2022	2023	2024
Total Incidents	3,300	3,220	3,464	3,081	3,141	2,825	2,791	2,448	2,400

SDG&E

The table below shows the number of USA tickets managed and the number of excavation damage incidents reported by SDG&E from 2016-2024:

Table 1-6 SDG&E Excavation Damage Tickets and Incidents (2016-2024)[78]

	2016	2017	2018	2019	2020	2021	2022	2023	2024
USA Tickets	125,267	147,417	146,108	164,389	180,875	168,232	194,218	203,026	212,553
Incidents Caused by Lack of 811 USA Notification	161	123	147	98	213	212	176	152	162
Incidents Caused by Inadequate Excavation Practice	133	83	86	47	109	117	104	122	84
Incidents Due to Other Causes	111	226	188	286	49	16	22	19	14
Total Incidents	405	432	421	431	371	345	302	293	260

Observations and Findings:

In 2024, SoCalGas managed about 65 percent more USA tickets than it did in 2016, and SDG&E managed about 70 percent more. The number of USA tickets is usually interpreted as representing the total level of excavation activity in a year, although it may also indicate increased responsiveness to and awareness of the 811 program. Tables 1-5 and 1-6 show that the absolute number of dig-ins has gone down even while the number of tickets has gone up significantly. Despite the overall improvement, SPD observes that the number of dig-ins when USA tickets have not been called in has remained nearly constant. It could be

[78] Sempra's response to SPD-Sempra-2025RAMP-006, Question 1, SPD-SEMPRA-2025 RAMP-006-Attch 1_18660_18666.xlsx.

inferred that damage prevention efforts are helping to keep the number of non-called ticket dig-ins from rising even as the level of excavation activity has increased.

Consequences

SoCalGas and SDG&E present the same potential consequences in their risk bow ties:

- PC. 1: Serious injuries and/or fatalities;
- PC. 2: Property damage;
- PC. 3: Prolonged outages;
- PC. 4: Adverse litigation;
- PC. 5: Penalties and fines; and
- PC. 6: Erosion of public confidence.[79]

The potential consequences are the same as those presented in SoCalGas's and SDG&E's 2021 RAMP filings.

Observations and Findings:

SPD does not have any observations or findings on consequences.

Controls and Mitigations

Sempra's control plan includes four controls. These controls are in place in 2024 and are expected to be ongoing from 2025-2031. All four controls are mandated programs.[80]

Table 1-7 SoCalGas and SDG&E Excavation Damage Risk Control Plan Summary[81]

ID	Control Description
C001	Damage Prevention Strategies
C002	Damage Prevention Activities (Gas)
C003	Damage Prevention - Public Awareness
C004	Damage Prevention Mapping

[79] SCG-Risk-1 Excavation Damage, p. 11; SDG&E-Risk-1 Excavation Damage, p. 9.

[80] SCG-Risk-1 Excavation Damage, p. 24; SDG&E-Risk-1 Excavation Damage, p. 20.

[81] SCG-Risk-1 Excavation Damage, p. 16, Table 4; SDG&E-Risk-1 Excavation Damage, p. 14, Table 4.

C001 Damage Prevention Strategies

SoCalGas's Damage Prevention Strategies include the following four components:

1. Engagement: focuses on building collaborative relationships with excavators by engaging with them in the field.
2. Education: focuses on educating excavators on safe excavation practices and the requirements of CA State Excavation Law 4216.[82]
3. Enforcement: focuses on imposing a "stop the job" on sites where unsafe excavation activities are encountered and reporting negligent activities that result in excavation damage to the California Underground Safety Board.
4. Enhancements: focuses on reviewing data and industry best practices to identify and implement enhancements to further promote safe excavation practices.[83]

SDG&E's Damage Prevention Strategies comprise the Damage Prevention Analyst (DPA) Program and Ticket Risk Analysis (TRA). The DPA Program identifies high-risk excavating contractors and informs them that their practices may be in violation of digging laws and standards. The DPAs drive to districts with the greatest number of reported incidents and inspect excavation projects with 811 USA ticket requests. Lastly, the DPAs validate that locators are following processes and procedures when performing locating tasks on all SDG&E substructures including natural gas, electric, and fiber optic substructures. SDG&E expects to expand this program with additional analysts and broader system-wide coverage. The TRA is a proprietary in-house software tool that assists DPAs and field supervisors by providing a GIS map interface highlighting high-risk tickets.[84]

C002 Damage Prevention Activities (Gas)

SoCalGas' Damage Prevention Activities include, among other activities, managing and responding to 811 ticket requests; conducting stand-by activities; potholing; and inspecting randomly completed work.[85]

Similarly, SDG&E's primary Damage Prevention Activities are locating and marking underground gas facilities; observing (stand-by) pipeline excavation activities; and providing staff support for compliance and improvement.[86]

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[82] https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=GOV&sectionNum=4216.

[83] SCG-Risk-1 Excavation Damage, pp. 16-18.

[84] SDG&E-Risk-1 Excavation Damage, pp. 14-16.

[85] SCG-Risk-1 Excavation Damage, pp. 18-19.

[86] SDG&E-Risk-1 Excavation Damage, p. 16.

C003 Damage Prevention - Public Awareness

Sempra's Damage Prevention – Public Awareness control consists of the following key components:

1. Compliance Monitoring: conducts regular audits and reviews to assess compliance with industry guidelines and legal requirements for public education and outreach.
2. Public Education Campaigns: uses various media channels to inform the community about safe excavation practices.
3. Educational Materials: develops and distributes educational materials about safe excavation practices.
4. Collaborative Partnerships: collaborates with local governments, industry associations, and other stakeholders to enhance public awareness efforts.
5. Community Outreach Programs: engages with local communities through workshops, seminars, and informational sessions to provide insights on damage prevention and 811 services.
6. Feedback and Improvement: seeks feedback through surveys and focus groups from the public and stakeholders to improve public awareness initiatives.[87]

C004 Damage Prevention Mapping

SoCalGas's Damage Prevention Mapping includes the following activities and initiatives:

1. Map Update Request Process: updates mapping records when deviations are identified in the field.
2. GIS Data Quality Improvement Initiative: integrates GPS data with GIS systems to improve the accuracy and reliability of subsurface facility maps.
3. Anodes Connected to Tracer Wires: improves the signal received by locating underground equipment.
4. Pipeline Optical Cables: collects data and improves monitoring capabilities on newly installed transmission pipelines.
5. Warning Mesh: serves as a visual indicator to prevent accidental damage during excavation.[88]

SDG&E's Damage Prevention Mapping efforts, consistent with GO 112-F and 58-A, capture pipeline data and records as gas system construction, maintenance, and repair projects are completed.[89]

Observations and Findings:

SPD finds that SDG&E's rationale for expanding its Damage Prevention Strategies (C001) by hiring additional analysts for broader system-wide coverage may be inconsistent with the data presented in its

[87] SCG-Risk-1 Excavation Damage, pp. 19-20; SDG&E-Risk-1 Excavation Damage, pp. 17-18.

[88] SCG-Risk-1 Excavation Damage, pp. 20-21.

[89] SDG&E-Risk-1 Excavation Damage, p. 18.

workpapers. According to the "Mitigation Summary" worksheet,[90] the scope of Damage Prevention Strategies (C001) already covers the entire service territory.[91]

Additionally, SPD observes that the Damage Prevention Analysts perform tasks not relevant to the natural gas system, such as quality assurance on work completed on electric and fiber optic substructures.

Alternatives Analysis

Both SoCalGas and SDG&E present the same two alternatives. Alternative 1 is Medium Pressure Standby for Repeat Offenders (A001), which will provide additional oversight of repeat offenders (RO) when they excavate within 10 feet of company medium pressure substructures.[92]

Company personnel would meet onsite with the RO to agree upon excavation activities and verify that excavation activities are appropriate. This alternative mitigation would encourage responsible behavior among contractors, enhance safety standards, and reduce the need for standby activities, according to Sempra. However, Sempra did not include this alternative in the mitigation plan because the alternative would mitigate risks only on a narrow group of excavators and the costs would be significant.[93] SPD observes the CBRs for Alternative 1 are extremely low, as shown in Table 1-8.

Alternative 2 is Installation of Non-Required Excess Flow Valves (A002), which is an expansion of the requirements under Code of Federal Regulations (CFR) 192.385. CFR 192.385 currently requires installation of manual service line shut-off valve or excess flow valve (EFV) on new or replaced service lines with meter capacity exceeding 1,000 standard cubic foot hours.

This alternative mitigation proposes the installation of EFVs on existing services that do not exceed 1,000 standard cubic foot hours. Sempra claims that this alternative mitigation would enhance the safety of its gas distribution system, but Sempra explains that additional in-depth analysis is required to determine the feasibility of this alternative mitigation.[94] The very low CBRs for Alternative 2 are provided even though feasibility has not been evaluated.

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[90] SDGE_Excavation_CBR_Main_Workbook_R.xlsx.

[91] SDGE_Excavation_CBR_Main_Workbook_R.xlsx, Mitigation Summary worksheet.

[92] Sempra defines Repeat Offender as excavators who have more than two damages on company substructures in a running 12-month period. See SCG-Risk-1 Excavation Damage, p. 25, Footnote 26; SDG&E-Risk-1 Excavation Damage, p. 21, Footnote 25.

[93] SCG-Risk-1 Excavation Damage, pp. 24-26; SDG&E-Risk-1 Excavation Damage, pp. 21-22.

[94] SCG-Risk-1 Excavation Damage, pp. 24-26; SDG&E-Risk-1 Excavation Damage, pp. 21-22.

Observations and Findings:

SPD observes that the two alternatives have very low CBRs, limited applicability and/or feasibility. Those are good reasons to reject these choices. However, to be considered as a reasonable alternative, the proposal should at least be feasible at the time of comparison, so the EFV alternative is not a realistic choice until a feasibility analysis can be performed.

CBR Calculations

Sempra calculates CBR values for four controls and two alternative mitigations. The CBRs are calculated based on scaled, expected values. The table below shows the CBR values from 2028-2031:

Table 1-8 SoCalGas and SDG&E Excavation Damage Risk CBR Summary (2028-2031)[95]

ID	Control/Mitigation	SoCalGas			SDG&E		
		Societal	Hybrid	WACC	Societal	Hybrid	WACC
C001	Damage Prevention Strategies	1.91	2.04	1.91	0.68	0.72	0.68
C002	Damage Prevention Activities	18.23	19.49	18.28	6.17	6.60	6.21
C003	Damage Prevention Public Awareness	0.82	0.88	0.83	0.28	0.30	0.28
C004	Damage Prevention Mapping	0.03	0.01	0.01	4.31	1.47	1.14
A001	MP Standby for Repeat Offenders	0.01	0.01	0.01	0.03	0.03	0.03
A002	Installation of Non-Required EFVs	0.04	0.02	0.02	~0.00	~0.00	~0.00

The following table shows the 2024-2027 and 2028-2031 GRC cycle costs for each control and alternative mitigation, as well as the change in dollars between the GRC cycles:

[95] SCG-Risk-1 Excavation Damage, pp. 24-25, Tables 7 and 9; SDG&E-Risk-1 Excavation Damage, pp. 20-21, Tables 7 and 9.

Table 1-9 SoCalGas and SDG&E Controls 2024-2027 and 2028-2031 GRC Cycle Costs (2024 Dollars, Thousands)[96]

ID	Control/Mitigation Name	SoCalGas			SDG&E		
-	-	2024-2027 GRC Cycle	2028-2031 GRC Cycle	Change in Dollars	2024-2027 GRC Cycle	2028-2031 GRC Cycle	Change in Dollars
C001	**Damage Prevention Strategies**	$5,564	$8,284	$2,720	$2,698	$3,200	$502
C002	**Damage Prevention Activities**	$120,543	$130,236	$9,693	$28,014	$33,426	$5,412
C003	**Damage Prevention – Public Awareness**	$9,363	$15,964	$6,601	$4,229	$4,116	($113)
C004	**Damage Prevention Mapping**	$4,368	$4,368	$0	$2,744	$2,744	$0
A001	**MP Standby for Repeat Offenders**	$495,099	$660,132	$165,033	$18,000	$24,000	$6,000
A002	**Installation of Non-Required EFVs**	$4,770	$6,360	$1,590	$2,400	$3,200	$800

Observations and Findings:

SPD observes that Sempra plans to increase spending or to expand controls with CBR values less than 1.0. For SoCalGas, the CBR values for damage prevention – Public Awareness (C003) range from 0.82 to 0.88, yet SoCalGas proposes to increase spending on this control for the 2028-2031 GRC cycle. For SDG&E, the CBR values for Damage Prevention Strategies (C001) range from 0.68 to 0.72, yet SDG&E proposes to increase spending on and expand this control for the 2028-2031 GRC cycle.

Historical Graphic

Pursuant to D.22-10-002, Sempra provides bar charts illustrating the progress in mitigating excavation damage risk over the two immediately preceding RAMP cycles. The bar charts below – the first one for

[96] 2024 costs are adjusted recorded costs, but 2025-2031 yearly costs are adjusted forecast costs. See SoCalGas Excavation Damage O&M Workpapers, p. 2; SDG&E Excavation Damage O&M Workpapers, p. 2.

SoCalGas and the second for SDG&E – show decreasing trends in the rate of excavation damage incidents per 1,000 USA tickets.

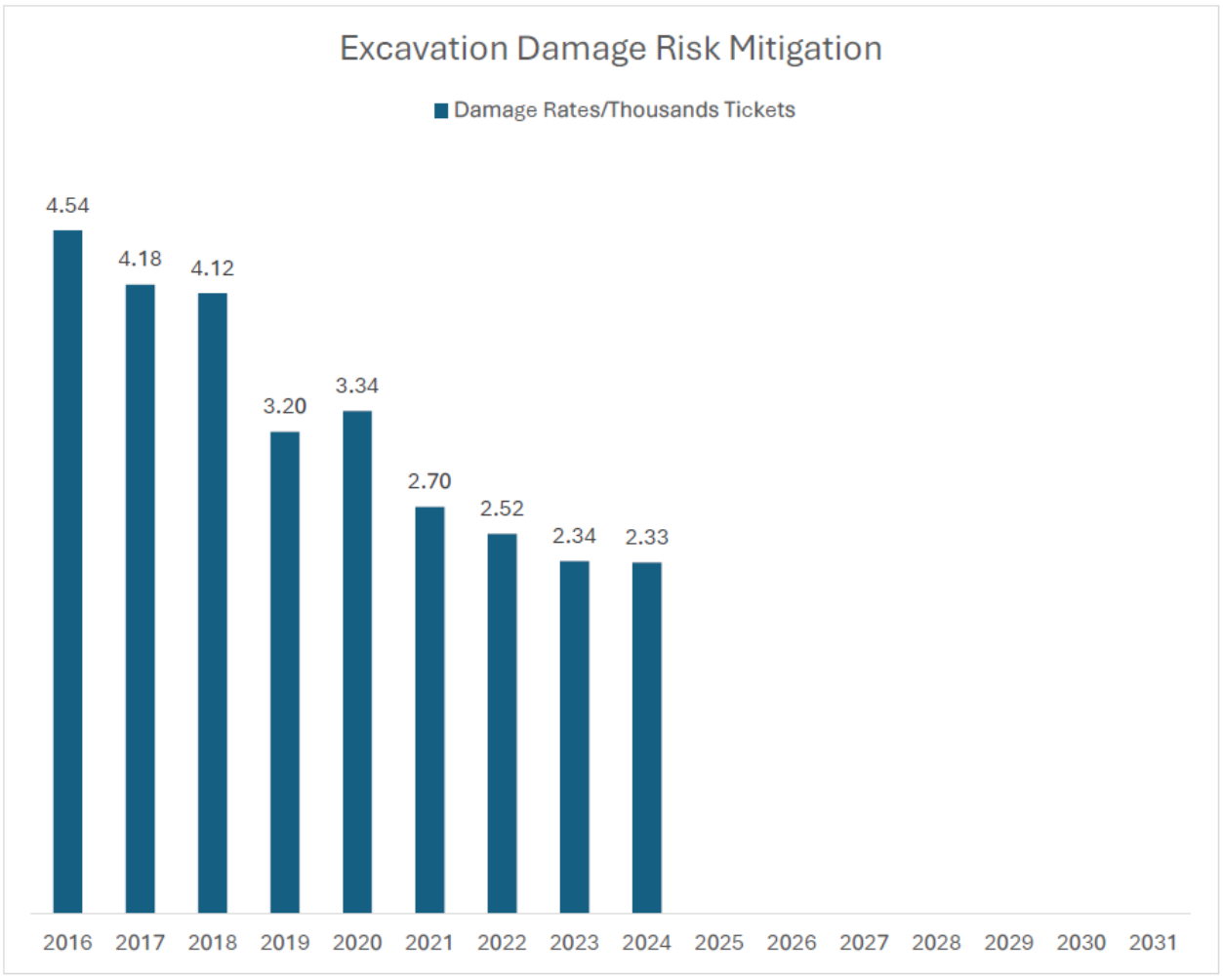

Figure 1-3 SoCalGas Excavation Damage Risk: Safety Progress 2016-2024[97]

[97] SCG-Risk-1 Excavation Damage, p. 26, Figure 4.

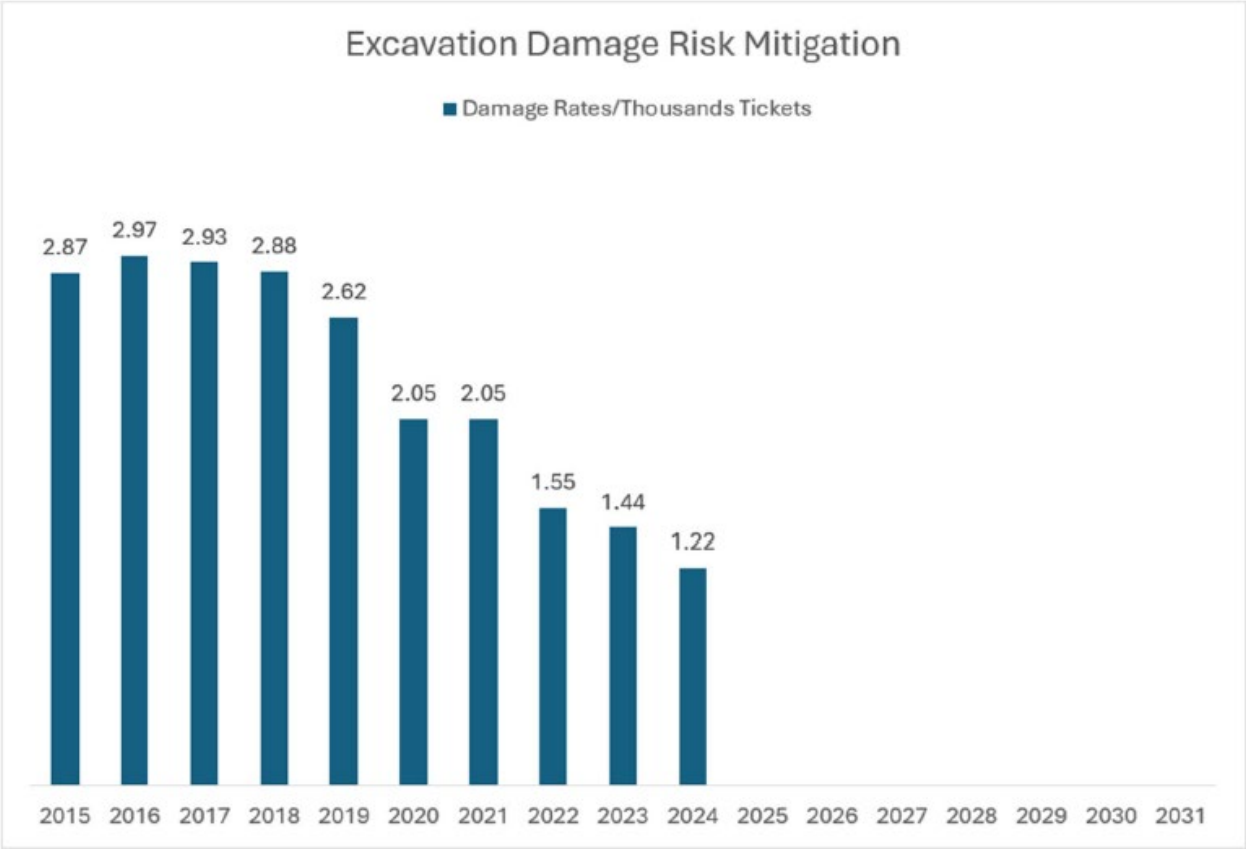

Figure 1-4 SDG&E Excavation Damage Risk: Safety Progress 2016-2024[98]

Observations and Findings:

SPD observes that damage per 1000 tickets is a standard metric to monitor the results of damage prevention programs. The graphs show a significant improvement over ten years. The number of USA tickets serves as a proxy for excavation activity to normalize the dig-in data to the level of excavation activity. Tables 1-5 and 1-6 show that the absolute number of dig-ins has gone down even while the number of tickets has gone up significantly. SPD observes that the metric may not give a complete picture because the leading cause of dig-ins is when USA tickets have not been called in at all, and that number has remained nearly constant. However, it could be inferred that damage prevention is helping to keep the number of no-call dig-ins from rising even as the level of excavation activity has increased. The increasing number of tickets, though, may be due in part to increased awareness of the 811 program.

[98] SDG&E-Risk-1 Excavation Damage, p. 23, Figure 4.

Summary of Findings

SPD finds that:

1. Under Sempra's HTM, the high pressure tranches do not contain LoRE-CoRE pairs with homogeneous risk profiles. For instance, the first tranche of SoCalGas's high pressure class contains six LoRE-CoRE pairs: one pair representing high pressure distribution asset and five pairs representing transmission asset. The exposure of the six LoRE-CoRE pairs ranges from 3.89 to 857.14 miles of pipes. The starting LoRE ranges from 0.000 to 0.017, and the starting CoRE ranges from $372 million to $4,117 million.[99] Moreover, high pressure distribution and high pressure transmission pipelines have significantly different risk profiles because high pressure distribution pipelines operate above 60 psig, but high pressure transmission pipelines can operate from 200 to 1,500 psig.[100]
2. SDG&E's rationale for expanding its Damage Prevention Strategies (C001) by hiring additional analysts for broader system-wide coverage is inconsistent with the data presented in its workpapers. According to the "Mitigation Summary" worksheet,[101] the scope of Damage Prevention Strategies (C001) already covers the entire service territory.
3. SPD finds that one of Sempra's alternative mitigations is not realistic, feasible, or reasonable for consideration. To be considered as an alternative, the proposal should be feasible at the time of comparison.

Recommendations

SPD recommends:

1. Sempra should separate high pressure distribution and transmission assets into two different classes, and the risk profiles of the resulting tranches under each class should be homogeneous based on LoRE and CoRE. Sempra should also calculate and provide CBR values specific to its transmission assets.
2. SDG&E should re-examine whether expanding its Damage Prevention Strategies by hiring additional analysts for broader system-wide coverage is necessary, or SDG&E should better explain the reasons for expected benefits of this expansion.

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[99] SCG_Excavation_CBR_Main_Workbook_R.xlsx, Tranche Mapping worksheet.

[100] California Natural Gas Pipelines: A Brief Guide (www.osti.gov/servlets/purl/1240050#:~:text=The%20Transmission%20System&text=These%20large%20transmission%20lines%20for,the%20potential%20for%20accidental%20damage, accessed September 9, 2025).

[101] SDGE_Excavation_CBR_Main_Workbook_R.xlsx.

3. Sempra should present alternative mitigations that are realistic, feasible, and reasonable for consideration.

2. SoCalGas & SDG&E High Pressure Gas System

Risk Description

SoCalGas's and SDG&E's High Pressure (HP) Gas System risk is defined as the risk of failure of a high-pressure[102] gas pipeline (including non-line pipe, appurtenances, and facilities) that results in serious injuries, fatalities, and/or damage to the infrastructure. This excludes any risk associated with excavation damage, which is evaluated separately in Sempra's respective Excavation Risk Damage chapters.

Observations and Findings

SPD observes that SoCalGas's 2025 RAMP expands the HP Gas System risk to include above-ground storage field assets previously categorized in 2021 under "Incident Related to the Storage System (excluding dig-in)." SPD did not find an accompanying rationale in the chapter or workpapers for this change and recommends such changes should be explained in future RAMP narratives. t.

Because SDG&E does not operate any storage fields, no comparable change was made to the SDG&E HP Gas System chapter risk.

[102] Maximum Allowable Operating Pressure (MAOP) of higher than 60 psig.

Risk Bow Tie

SoCalGas and SDG&E provide the same risk bow ties for their HP Gas System Risk chapters. The bow tie includes 11 potential drivers or triggers (DT's) and 7 potential consequences (PC's).

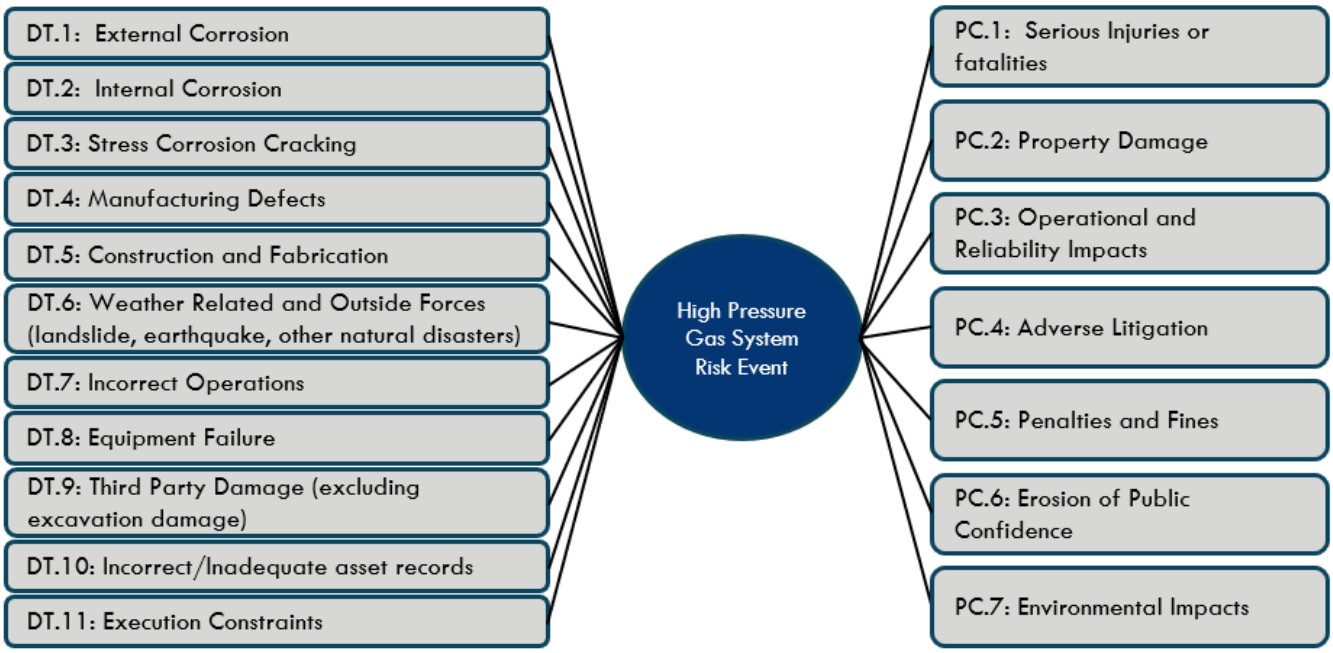

Figure 2-1. SCG and SDG&E High Pressure Gas System Risk Bow Tie[103]

Observations and Findings:

SPD has no observations or findings on the risk bow ties.

Exposure

SoCalGas

SoCalGas describes its HP Gas System risk exposure as approximately 6,700 miles of natural gas high pressure pipelines.[104] Of this, 3,357 miles are defined as transmission pipeline,[105] including 1,100 miles of High Consequence Area (HCA)[106] transmission pipeline.

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[103] SoCalGas 2025 RAMP Chapter SCG-Risk-2, Figure 1, p. 6.

[104] SoCalGas 2025 RAMP Chapter SCG-Risk-2, pp. 2-5.

[105] On p. 15 of SCG-Risk-2, SoCalGas instead describes 3,381 miles of transmission pipeline

[106] As defined by 49 C.F.R. section192.903 (2024).

SDG&E

SDG&E describes its HP Gas System risk exposure as approximately 550 miles of high-pressure pipelines, 219 miles of which are defined as transmission pipelines.[107]

Observations and Findings:

Neither utility provides a sufficient description of the exposure of assets included in the scope of the risk. While Sempra includes high pressure pipeline, non-line pipe, appurtenances, and facilities asset classes in the risk scopes, the chapter narratives only detail their exposure in the context of pipeline length and do not provide any information regarding the other listed asset classes. While some of this information may be inferred from the workbooks provided, this presentation lacks the clarity expected in a description of risk exposure.

Tranches

The HTM is applied by Sempra for both utilities' HP gas system risk. Sempra segregated the utilities' respective HP gas systems into two asset classes: HP pipe and facilities. Within these asset classes they identify a number of discrete LoRE-CoRE pairs, which are then grouped into tranches that reflect similar frequency and consequence profiles.

SoCalGas

The following table summarizes SoCalGas's tranches for high pressure gas system risk:

Table 2-1 SoCalGas High Pressure Gas System Risk Tranche Summary

Class	Number of LoRE-CoRE Pairs	Number of Tranches
HP Pipe	908	20
Facilities	39	12
Total	**947**	**32**

[107] SDG&E 2025 RAMP Chapter SDG&E-Risk-2, pp. 2-4.

SDG&E

The following table summarizes SDG&E's tranches for Excavation Damage Risk:

Table 2-2 SDG&E High Pressure Gas System Risk Tranche Summary

Class	Number of LoRE-CoRE Pairs	Number of Tranches
HP Pipe	313	23
Facilities	3	1
Total	**316**	**24**

Observations and Findings:

After review of the tranching methodology and supporting workpapers, SPD finds that Sempra's approach adheres to the RDF's requirements. The separation of HP Pipe and Facilities assets into two asset classes acknowledges the differences in characteristics between the two types of assets. Furthermore, the decision to not simply tranche by risk score, but by LoRE-CoRE pairs, allows for separate tranches for high-LoRE, low-CoRE and low-LoRE, high-CoRE scenarios. This acknowledges the significant difference in risk profile between these two scenarios, which can be obscured when using a single risk-score to establish tranches. In such instances, a high-frequency, low-consequence scenario may misleadingly be grouped into a tranche with a low-likelihood, high consequence scenario simply because multiplying their respective LoRE and CoRE values produces risk scores that are similar.

However, SPD notes that these tranches are based on risk-scaled CoRE values. While the RDF allows for the use of a risk-scaling function, this approach is likely to result in some impact on the tranches when compared to unscaled CoRE values. Because the workpapers provided by Sempra only present the scaled CoRE values for scenarios the scope of this impact is difficult to determine.

Risk Drivers

Sempra identifies eleven drivers (DT.1–DT.11) that contribute to High Pressure Gas System risk.[108] These DT's inform the LoRE component of risk and are summarized below.

Table 2-3 SoCalGas and SDG&E High Pressure Gas System Risk Drivers/Triggers

Driver/Trigger	Description
DT.1: External	The natural deterioration of material (usually metal) that results from chemical or

[108] SoCalGas 2025 RAMP Ch. SCG-Risk 2, p. 6-8 and SDG&E 2025 RAMP Ch. SDG&E-Risk 2, p. 6-8.

Driver/Trigger	Description
Corrosion	electrochemical reaction with its environment. Based on the potential for corrosion on the external surface of assets, such as steel tubing, casing, and pipelines exposed to corrosive environments.
DT.2: Internal Corrosion	Deterioration of the interior of a pipeline attributable to environmental conditions inside the asset.
DT.3: Stress Corrosion Cracking	A type of environmentally assisted cracking usually resulting from the formation of cracks due to various factors in combination with the environment surrounding the pipe that together reduce the pressure-carrying capability of the pipe.
DT.4: Manufacturing Defects	Failure due to manufacturing defects. Attributable to material defects within the pipe, component, or joint due to faulty manufacturing procedures, design defects, or in-service stresses such as vibration, fatigue, and environmental cracking.
DT.5: Construction and Fabrication	Errors in construction methodology applied during the installation of pipeline components typically based on the vintage of the construction standards, fabrication techniques (welding, bending, etc.), and overall guiding regulations.
DT.6: Weather Related and Outside Forces (landslide, earthquake, other natural disasters)	Causes not involving humans, including events such as earth movement, earthquakes, landslides, subsidence, heavy rains/floods, lightning, temperature, thermal stress, frozen components, and high winds. Also includes effects due to climate change.
DT.7: Incorrect Operations	Pipeline incidents attributed to insufficient or incorrect operating procedures or the failure to follow a procedure.
DT.8: Equipment Failure	Malfunction of a component, including but not limited to, regulators, valves, meters, flanges, gaskets, collars, and couples.
DT.9: Third-Party Damage (excluding excavation damage)	Outside force damage other than excavation damage or natural forces, such as damage by car, truck, or motorized equipment not engaged in excavation.
DT.10: Incorrect/ Inadequate Asset Records	The use of inaccurate or incomplete information that could result in the failure to (1) construct, operate, or maintain the pipeline system safely and prudently; or (2) to satisfy regulatory compliance requirements.
DT.11: Execution Constraints	Events (excluding those covered by outside force damages) that impact the utility's ability to perform as planned. Examples include, but are not limited to, reduced availability of materials or operational oversight, delays in response and awareness, resource constraints, and/or inefficiencies and reallocation of (human and material) resources, unexpected maintenance, or regulatory requirements.

Observations and Findings

SPD observes that both utilities used the same eleven risk drivers as in their 2021 RAMP filings, with only minimal changes made to the titles and descriptions of some of the risk drivers in the filings. Sempra provides a thorough accounting of risk drivers grounded in the widely accepted American Society of Mechanical Engineers (ASME) B31.8S integrity management standards for pipeline risk.

Risk Driver Frequencies

To assess the likelihood of high pressure pipe failure, Sempra developed a model that leverages both internal data and external Pipeline and Hazardous Materials Safety Administration (PHMSA) industry data for a wide variety of risk events. Sempra includes the use of external industry data due to a lack of available internal data for several types of low-frequency incidents. The models produced the following LoRE values, which estimate the expected number of any high pressure gas system risk event in a year:

SoCalGas: LoRE = 81.19 events per year

SDG&E: LoRE = 7.15 events per year

Observations and Findings:

The likelihood figures generally represent low-consequence, high-frequency incidents, rather than major pipeline ruptures. SPD finds the use of internal and broader industry data when constructing the model as appropriate and consistent with RDF guidance.

SPD also observes a dramatic increase in LoRE values reported by both utilities in their respective High Pressure Gas System risk chapters compared to the 2021 RAMP Reports. In 2021, SoCalGas reported a LoRE of 8.64 events per year for its High Pressure Gas System risk, whereas the 2025 LoRE increased to 81.19 events per year. Similarly, SDG&E reported a 2021 LoRE of 0.88 events per year, which rose to 7.15 events per year in 2025. This trend is also evident in the Medium Pressure Gas System and Underground Gas System risk chapters. In response to a data request by SPD,[109] Sempra attributed these increases to improvements in risk modeling and the availability of internal data since Sempra's 2021 RAMP filings. While SPD supports enhancements to risk modeling, an increase in the expected frequency of risk events by nearly a factor of ten—without clear acknowledgment and context—is concerning. SPD strongly recommends that Sempra provide discussion of prior RAMP risk analyses, along with explanations for any significant changes in risk outcomes that have occurred between successive RAMP Reports.

Consequences

SoCalGas and SDG&E both present the following Potential Consequences in their Risk Bow Ties:

[109] SPD-SEU-2025RAMP-002.

- **PC.1**: Serious Injuries or Fatalities
- **PC.2**: Property Damage
- **PC.3**: Operation and Reliability Impacts
- **PC.4**: Adverse Litigations
- **PC.5**: Penalties and Fines
- **PC.6**: Erosion of Public Confidence
- **PC.7**: Environmental Impacts

Observations and Findings:

While SPD finds the potential consequences listed by Sempra for a risk event to be sufficient, Sempra did not provide additional information in the RAMP narrative beyond the consequence titles. Nor does Sempra specify the parameters of each potential consequence or define what is considered in scope for the purposes of the risk analysis. For example, methane—the primary component of natural gas—is a potent greenhouse gas,[110] and large-scale natural gas leaks have documented health impacts.[111] However, Sempra does not provide a description of PC.7: Environmental Impacts, nor clarify which environmental impacts are considered within the High Pressure Gas System chapters of Sempra's RAMP filings. As a result, it is unclear which environmental impacts are factored into the risk score calculations or how much they contribute to the overall risk score. This lack of clarity extends to the other six potential consequences listed in the RAMP Reports, which are presented only by title without explanation or scope.

Controls and Mitigations

Sempra proposed a large number of controls in their 2025 RAMP plans.

SoCalGas
SoCalGas proposed a total of 36 controls in its 2025 RAMP Report, with no new mitigations proposed.[112] All but one control is stated to be mandated by regulations.

SDG&E proposed a total of 14 controls in its 2025 RAMP Report, with no new mitigations proposed.[113] Total proposed capital is $2.2 million, with Test Year O&M at $139 million. All but one control is stated to be mandated by regulations.

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[110] Importance of Methane, https://www.epa.gov/gmi/importance-methane

[111] Aliso Canyon Disaster Health Research Study, http://publichealth.lacounty.gov/eh/healthresearch/background.htm

[112] SoCalGas 2025 RAMP Ch. SCG-Risk 2, pp. 12-35.

[113] SDG&E 2025 RAMP Ch. SDG&E-Risk 2, pp. 13-22.

Observations and Findings:

SPD finds that the mitigation strategy is comprehensive and sufficiently addresses identified risk drivers. SPD also notes that all listed controls/mitigations except for C010 are mandated programs or activities.

Alternatives Analysis

SoCalGas and SDG&E both consider the following two alternative mitigations that they will not be pursuing:[114]

- Alternative 1 (A125): Pipeline Rerouting to Mitigate Landslide Impacts

Sempra identifies approximately 41 miles of transmission pipeline in high landslide risk areas, with the alternative mitigation resulting in the replacement of approximately 1 mile of pipeline each year per utility. However, the utilities state that more analysis would be required to verify that all identified pipeline segments would benefit from rerouting. The scaled CBRs for this alternative range from ~0.00-0.01 for SoCalGas, and ~0.00-~0.00 for SDG&E.

- Alternative 2 (A171): DIMP – High Pressure Pipeline In-Line Inspections

Sempra presents an alternative mitigation to conduct in-line inspections (ILI) of high pressure distribution pipeline segments. While not directly pursuing this alternative, Sempra describes pilot projects associated with such a program under other mitigations associated with the Distribution Integrity Management Program (DIMP). The scaled CBRs presented for this alternative range from 0.11-0.13 for SoCalGas, and 0.06-0.07 for SDG&E.

Observations and Findings:

SPD finds the alternative analysis to be appropriate and well-documented.

Due to the high costs and resource requirements associated with many controls that will be continued by Sempra, SPD agrees that Alternative 1 should only be undertaken if analysis verifies the benefits of re-routing the pipeline in question. SPD also notes that, while Alternative 2 may be beneficial in the future, improvements in ILI technology and procedures will need to be developed before adoption of such a program would be appropriate.

[114] SoCalGas 2025 RAMP Ch. SCG-Risk 2, pp. 46-49 and SDG&E 2025 RAMP Ch. SDG&E-Risk 2, pp 29-31.

CBR Calculations

The 2025 RAMP chapters provided CBRs for SoCalGas's[115] and SDG&E's[116] forecasted controls.

Observations and Findings:

The set of control programs present a wide range of CBR values. Many of the CBRs are significantly below 1.0 under all three of the discount rate scenarios, which indicates the costs outweigh the monetized benefits. Almost all of these controls are required by regulations that emphasize safety, but it is informative to see the CBRs for those programs.

SPD observes that the CBRs provided by Sempra are derived from calculations that apply a non-linear, risk-averse scaling function to the consequence outcomes of the risk analysis. While SPD acknowledges that this approach is permissible under the guidance of the RDF, such scaling functions tend to increase CBR values relative to those calculated without scaling—particularly for mitigations targeting assets with high consequence scores. Transparency is diminished because Sempra does not also provide CBRs calculated using unscaled CoRE values, leaving it unclear how much the scaling function affects each mitigation's CBR calculation.

Summary of Findings

1. Minimal Description of Risk Exposure:

The narratives describe exposure only in terms of pipeline length and provide no information regarding other listed asset classes.

2. Minimal Description of Potential Consequences:

The RAMP narratives list potential consequences only by title, without further explanation. This creates uncertainty regarding what is considered in scope for the purposes of the risk analysis.

3. Large Increase in LoRE:

SPD observes a substantial increase in LoRE values reported for both SoCalGas's and SDG&E's High Pressure Gas System risk chapters when compared to the 2021 RAMP reports. While subsequent data requests indicate that these increases were driven by changes in methodology and the availability of additional data, such large increases are concerning especially because they are not acknowledged or explained within the 2025 RAMP Reports.

4. Limited Inclusion of Non-Scaled Outcomes of the Risk Analysis:

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[115] SoCalGas 2025 RAMP Ch. SCG-Risk 2, pp. 42-45.

[116] SDG&E 2025 RAMP Ch. SDG&E-Risk 2, pp. 27-28

Although the RDF allows for the use of risk-scaling functions, Sempra does not provide unscaled values for many risk analysis outcomes, including CoRE and CBR values. This omission limits transparency regarding the impact of non-linear scaling functions on the results of Sempra's risk analysis.

Recommendations

1. Identify the Quantity of Other Assets:

In addition to pipeline length, include in the chapter narrative the quantities of other asset types within the scope of the risk analysis (e.g., compressors, non-line pipe, valves).

2. Define Potential Consequences

Provide a clear definition of each potential consequence, including which aspects are considered in scope and how they are addressed within the risk analysis.

3. Note Significant Changes in Risk Analysis Results

Identify how the results of the risk analysis differ from prior analyses and provide detailed explanations for any significant changes.

4. Provide Unscaled Results of the Risk Analysis

When applying a scaling function in the risk analysis, also present the results calculated without the scaling function.

3. SoCalGas and SDG&E Medium Pressure Gas System

Risk Description

Medium pressure (MP) gas system risk is defined as the risk of failure of a medium pressure[117] gas pipeline (including appurtenances to and at the meter) which results in serious injuries, fatalities, and/or damages to the infrastructure. This excludes any risk associated with excavation damage, which is evaluated separately in each utilities' respective Excavation Risk Damage chapters.

Observations and Findings

SPD has no observations or findings on the medium pressure gas system risk description.

Risk Bow Ties

SoCalGas and SDG&E provide similar risk bow ties for their MP Gas System Risk chapters. Both bow ties include eight potential drivers or triggers (DTs) and seven potential consequences (PCs).

SoCalGas

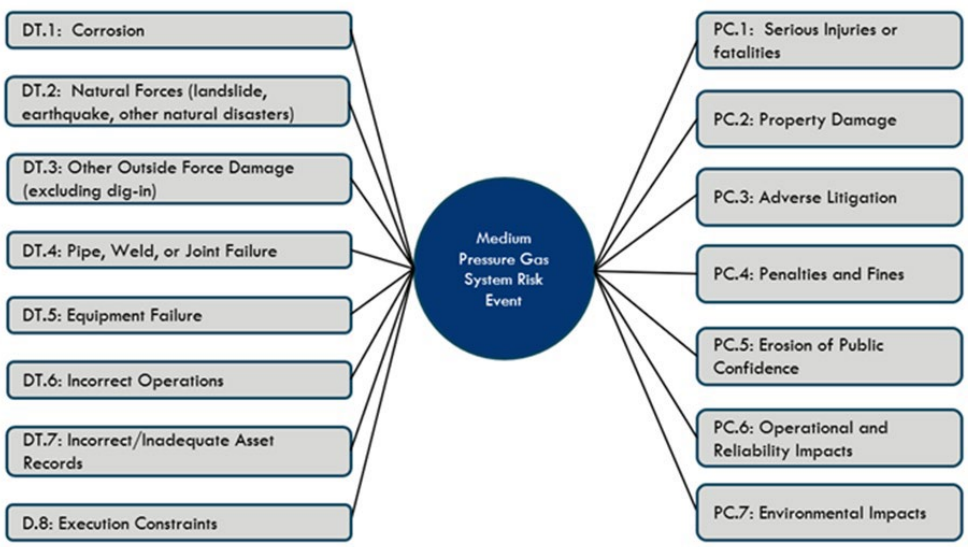

Figure 3-1 SoCalGas's Medium Pressure Gas System Risk Bow Tie

[117] Maximum allowable operating pressure (MAOP) of 60 psig or less.

SDG&E

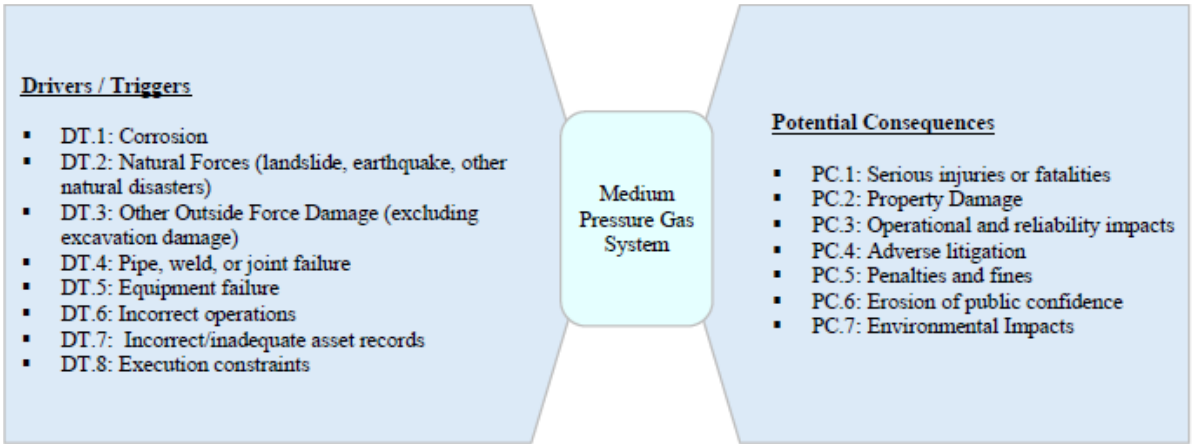

Figure 3-2. SDG&E's Medium Pressure Gas System Risk Bow Tie[118]

Observations and Findings:

Sempra presents functionally the same bow ties, with only minor variations in the numbering and titles of some of the DTs and PCs. While SPD finds that both bow ties are compliant with the RDF, it encourages Sempra to maintain a consistent ordering and title of the DTs and PCs to improve clarity.

Exposure

SoCalGas

SoCalGas described its exposure in the "Risk Overview" section of the chapter,[119] where it identified approximately 40,200 miles of steel mains and services and 59,600 miles of plastic mains and services; serving a total of over 21.1 million customers.

SDG&E

SDG&E described its exposure in the "Risk Overview" section of the chapter,[120] where it identified approximately 5,900 miles of steel mains and services and 9,200 miles of plastic mains and services; serving a total of over 920,000 SDG&E consumers.

[118] SDG&E 2025 RAMP Chapter SDG&E-Risk 3, Figure 1, p. 5.

[119] SoCalGas 2025 RAMP Chapter SCG-Risk-3, pp. 2-4.

[120] SDG&E 2025 RAMP Chapter SDG&E-Risk-3, pp. 2-4.

Observations and Findings:

Sempra does not provide a sufficient description of the exposure of assets included in the scope of the risk. While they both include medium pressure pipeline and appurtenances to and at meters in the risk scope, the chapter narratives only detail exposure in the context of pipeline length and do not provide any information regarding the other listed asset classes. While some of this information may be inferred from the workbooks provided by Sempra, this lacks the clarity expected in a description of risk exposure.

Tranches

In accordance with the option provided in RDF Phase 3,[121] Sempra applies the HTM for both utilities' MP Gas System risk. Sempra first segregated its respective MP Gas System into two asset classes: Aboveground and Belowground. Within these asset classes it identifies a number of discrete LoRE-CoRE pairs corresponding to pipeline segments, which it then groups into tranches that reflect similar frequency and consequence profiles.

SoCalGas

The following table summarizes SoCalGas's tranches for Medium Pressure Gas System Risk:

Table 3-1 SoCalGas Medium Pressure Gas System Risk Tranche Summary

Class	Number of LoRE-CoRE Pairs	Number of Tranches
Aboveground	254	27
Belowground	3,073	40
Total	**3,327**	**67**

SDG&E

The following table summarizes SDG&E's tranches for Medium Pressure Gas System Risk:

Table 3-2 SDG&E Medium Pressure Gas System Risk Tranche Summary

Class	Number of LoRE-CoRE Pairs	Number of Tranches
Aboveground	60	14
Belowground	570	33

[121] D.24-05-064, Row 14.

Class	Number of LoRE-CoRE Pairs	Number of Tranches
Total	**630**	**47**

Observations and Findings:

SPD finds that Sempra's approach adheres to the RDF's requirements. The separation of MP Pipe and Facilities assets into two asset classes acknowledges the differences in characteristics between the two types of assets. Furthermore, the decision to not simply tranche by risk score, but by LoRE-CoRE pairs allowed Sempra to create separate tranches for high-LoRE, low-CoRE and low-LoRE, high-CoRE scenarios. This approach acknowledges the significant difference in risk profile between these two scenarios, which can be obscured when using a single risk-score to establish tranches. In such instances, a high-frequency, low-consequence scenario may misleadingly be grouped into a tranche with a low-likelihood, high consequence scenario simply because multiplying their respective LoRE and CoRE values produces risk scores that are similar.

SPD notes that these tranches are based on risk-scaled CoRE values. While the RDF allows for the use of a risk-scaling function, this approach is likely to impact the tranche assignments when compared to unscaled CoRE values. Because the workpapers provided by Sempra only present the scaled CoRE values for scenarios the scope of this impact is difficult to determine.

Risk Drivers

Sempra identifies eight drivers that contribute to Medium Pressure Gas System risk:[122]

Observations and Findings:

SPD observes that Sempra used the same eight risk drivers as in its 2021 RAMP filings, with only minimal changes made to the titles and descriptions of some of the risk drivers in the report. These drivers are based on the widely accepted ASME[123] B31.8S standard for pipeline integrity management.

Risk Driver Frequencies

To assess likelihood of medium pressure pipe failure, Sempra developed a model that leverages both internal data and external PHMSA industry data for a wide variety of risk events. Sempra includes the use of external industry data due to a lack of available internal data for several types of low-frequency incidents.

[122] SoCalGas 2025 RAMP Ch. SCG-Risk 3, pp. 6-7 and SDG&E 2025 RAMP Ch. SDG&E-Risk 3, pp. 6-7.

[123] American Society of Mechanical Engineers.

The models produced the following LoRE values, which estimate the expected number of any medium pressure gas system risk event in a year:

SoCalGas: LoRE = 58,846.77 events per year

SDG&E: LoRE = 4,932.73 events per year

Observations and Findings:

The likelihood figures include a large number of low-consequence high-frequency incidents, along with major pipeline ruptures. SPD finds the use of internal and broader industry data when constructing the model as appropriate and consistent with RDF guidance.

SPD observes a dramatic increase in LoRE values reported by Sempra in its Medium Pressure Gas System risk chapters compared to the 2021 RAMP Reports. In 2021, SoCalGas reported a LoRE of 544.99 events per year for its medium pressure gas system risk, whereas the 2025 LoRE increased to 58,846.77 events per year. Similarly, SDG&E reported a 2021 LoRE of 101.42 events per year, which rose to 4,932.73 events per year in 2025. This trend is also evident in the High Pressure Gas System and Underground Gas System risk chapters.

The rationale for the large change from 2021 was not clearly presented in the 2025 RAMP. In response to a data request,[124] Sempra attributes these increases to improvements in risk modeling and the availability of internal data since Sempra's 2021 RAMP filings. While SPD supports enhancements to risk modeling, an increase in the expected frequency of risk events by a factor of more than 40—without clear acknowledgment and context—is concerning. SPD strongly recommends that Sempra provide discussion of prior RAMP risk analyses, along with explanations for any significant changes in risk outcomes between reports.

Consequences

SoCalGas and SDG&E both present the following potential consequences in their risk bow ties:

- **PC.1**: Serious Injuries or Fatalities
- **PC.2**: Property Damage
- **PC.3**: Operation and Reliability Impacts
- **PC.4**: Adverse Litigations
- **PC.5**: Penalties and Fines
- **PC.6**: Erosion of Public Confidence
- **PC.7**: Environmental Impacts

[124] SPD-SEU-2025RAMP-002

Observations and Findings:

While SPD finds the listed potential consequences for a risk event appear to be sufficient, Sempra does not provide additional information in the RAMP narrative beyond the consequence titles. Sempra does not specify the parameters of each potential consequence or define what is considered in scope for the purposes of the risk analysis. For example, methane—the primary component of natural gas—is a potent greenhouse gas,[125] and large-scale natural gas leaks have documented health impacts.[126] However, Sempra does not provide a description of PC.7: Environmental Impacts, nor clarify which environmental impacts are considered within the Medium Pressure Gas System chapters of either utility's RAMP filing. As a result, it is unclear which environmental impacts are factored into the risk score calculations or how much they contribute to the overall risk score. This lack of information extends to the other six potential consequences listed in Sempra's RAMP Reports, which are presented only by title without explanation or scope.

Controls and Mitigations

Sempra presents a large number of control programs in its 2025 RAMP filings.

SoCalGas presented a total of 20 controls in its 2025 RAMP report, with no new mitigations proposed.[127]

SDG&E proposed a total of 14 controls in its 2025 RAMP report, with no new mitigations proposed.[128]

Observations and Findings:

SPD observes that almost all planned controls are stated to be mandated by regulations.

Aldyl A Pipeline Replacement

Early vintage Aldyl A polyethylene pipes are prone to brittle-like cracking failure through a process known as slow crack growth. Due to the rapid transition from no leak to significant gas leakage when a crack breaches the surface of an Aldyl A pipe in a brittle-like cracking failure, annual leak surveys cannot completely eliminate the risk posed by early vintage Aldyl A pipes. To mitigate the risk associated with early vintage Aldyl A pipes, a combination of frequent leak surveys and proactive risk-informed pipeline replacements is necessary.

SDG&E and SoCalGas have several ongoing risk mitigation programs that specifically address the risk of Aldyl A pipes or concomitantly address the Aldyl A risk along with other risk factors:

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[125] Importance of Methane, https://www.epa.gov/gmi/importance-methane.

[126] Aliso Canyon Disaster Health Research Study, http://publichealth.lacounty.gov/eh/healthresearch/background.htm.

[127] SoCalGas 2025 RAMP Ch. SCG-Risk 3, pp. 32-33.

[128] SDG&E 2025 RAMP Ch. SDG&E-Risk 3, p. 27-28.

SoCalGas C174: This SoCalGas Service Replacements program is not specifically designed to address the replacement of Aldyl A service lines. Instead, under this program, when service lines made of obsolete materials, such as Aldyl A, are encountered during maintenance or leak repairs, the obsolete service lines are replaced with lines made from modern materials.

Using the spreadsheet[129] provided by SoCalGas in the workpapers, SPD calculated the CBR for the below-ground tranches of C174 for the 2028 to 2031 GRC period, discounted using the hybrid discount methodology. The resulting CBRs for the SoCalGas C174 below-ground tranches range from 0.01 to 2.64, with an overall CBR of 1.37. Using the WACC discount rate, the overall CBR for all underground tranches during the GRC period is 1.31. It should be noted that the CBR values shown above for the below-ground tranches apply to all types of service lines, not just Aldyl A service lines, since there is no way to isolate the Aldyl A-only CBRs for the C174 program using the information provided by SoCalGas.

SoCalGas C178: Periodic and special one-time Leak Surveys conducted in compliance with 49 CFR Part 192.723. SoCalGas did not provide CBRs for this compliance program.

C182: Distribution Risk Evaluation & Monitoring System (DREAMS). Both SDG&E and SoCalGas use this program to manage the proactive replacement of Non-State-Of-The-Art (NSOTA) pipes, which include the early vintage Aldyl A pipes. Sempra's NSOTA pipes consist of both early vintage Aldyl A pipes and bare steel pipes. C182 utilizes Sempra's DREAMS model to apply a quantitative risk assessment algorithm to segment-specific information, estimating the risk of NSOTA pipes and determining appropriate actions, such as prioritizing replacement, for each segment. Specifically, Sempra states that they have "established a threshold of an annual probability greater than $6x10^{-6}$ of a serious incident for medium pressure distribution main locations. NSOTA medium pressure distribution mains with QRA results that exceed this threshold are targeted for replacement under the DREAMS program."[130]

SPD calculated the CBR for the below-ground tranches of C182 for the 2028 to 2031 GRC period, discounted using the hybrid discount methodology. The resulting CBRs for the SoCalGas C182 below-ground tranches range from 0.00 to 3.30, with an overall CBR of 0.229. Using the WACC discount rate, the overall CBR for all underground tranches during the GRC period is 0.216. It should be noted that the CBR values shown above for the below-ground tranches apply to both bare steel pipes and Aldyl A pipes, since there is no way to isolate the Aldyl A-only CBRs for the C182 program using the information provided by SoCalGas.

The corresponding CBR values[131] for SDG&E's C182 program for below-ground tranches using the hybrid discount methodology range from 0.00 to 0.23, with an overall CBR value of 0.032. The corresponding CBRs using the WACC discount rate range from 0.00 to 0.19, with an overall CBR value of 0.028.

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[129] SCG_MP_CBR_Main_Workbook.xlsx.

[130] SCG-Risk-3 Medium Pressure Gas System, page 28.

[131] SDGE_MP_CBR_Main_Workbook.xlsx.

SPD requested[132] Sempra to define the term "medium pressure distribution main locations" with respect to the Aldyl A pipeline quantitative risk assessment. Sempra's response[133] indicates an absence of standardized or definite starting and ending boundaries for each such location. Therefore, it appears the size of any distribution main location can be arbitrarily selected by the risk evaluator. Consequently, the quantity of Aldyl A pipelines in each distribution main location, and, hence, the total risk of each location can be changed simply by changing the starting area and ending area of the distribution main location. This level of flexibility, without a standardized way to construct a distribution main location, partially defeats the operation of the $6x10^{-6}$ serious injuries threshold, since a pipeline replacement decision on each segment can be overridden by varying the size of each location. SPD recommends that for the 2028 GRC, a standardized way be used to define distribution main locations when comparing the risk value against the $6x10^{-6}$ serious injuries threshold.

Alternatives Analysis

Sempra presents two alternative mitigations that it will not be pursuing:

SoCalGas[134]

- Alternative 1 (A106): Replacement of 10-year Cycle Cathodically Protected Services (CP10s)

SoCalGas would replace all 301,718 CP10 services rather than continue to inspect and maintain the assets on a ten-year cycle.

- Alternative 2 (A009): Comprehensive Replacement of Bare Steel Pipelines

As an alternative to C129 and C182, SoCalGas would target all Non-State of the Art (NSOTA) bare steel mains and services for replacement.

SDG&E[135]

- Alternative 1 (A106): Replacement of 10-year Cycle Cathodically Protected Services (CP10s)

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[132] SPD data request, SPD-Sempra-2025RAMP-015, Questions 1 and 2.

[133] Sempra's response to SPD data request SPD-Sempra-2025RAMP-015, Questions 1 and 2: "Distribution main locations" is referring to evaluation of "location risk" for Medium Pressure Quantitative Risk Assessment (MP QRA). SoCalGas and SDG&E define location risk as the annual probability that a risk receptor (*e.g.*, person) at a given location along the pipeline will be exposed to a serious incident. Location risk estimation requires the risk aggregation to be different than the segment level. To accomplish this, the risk from the portion of any segments that fall within an impact circle with a radius of 150 ft is aggregated at a point location every 10 ft along the network. This aggregation process is repeated for the risks associated with various asset types, including steel mains, plastic mains, steel services, and plastic services. The location risk at each point contains the sum of the risk from the four asset types. Service risk is combined at the main level, such that for a given main, the risks from services connected to that main are summed up and assumed to be distributed evenly across the main segment.

[134] SoCalGas 2025 RAMP Ch. SCG-Risk 3, pp. 37-39.

[135] SDG&E 2025 RAMP Ch. SDG&E-Risk 3, pp. 31-32.

SDG&E would replace approximately 20,000 CP10 services rather than continue to inspect and maintain the assets on a ten-year cycle.

- Alternative 2 (A118): Strategic Valve Placement/Installation

SDG&E would analyze the MP System to identify potential locations for added valves to reduce the response time to control and isolate gas flow in an emergency, as well as improve pipeline maintenance flexibility.

Observations and Findings:

SPD agrees with the conclusion that the program listed by Sempra as "Alternative 1" (Replacement of 10-year Cycle Cathodically Protected Services) would be costly and unfeasible, particularly given existing programs that already monitor and maintain the assets. SPD reaches the same conclusion when considering SoCalGas's Alternative 2 (Comprehensive Replacement of Bare Steel Pipelines).

SPD, however, finds the analysis of SDG&E's Alternative 2 (Strategic Valve Placement/Installation to be lacking. The utility appears to be describing a plan to perform an analysis in the future of locations where valves could be strategically added to medium pressure gas system to enhance safety. Such an analysis would be more appropriately conducted before its inclusion as a potential alternative in the RAMP, otherwise any risk analysis performed in the RAMP would have insufficient granularity. While SPD acknowledges that an analysis of the entirety of the medium gas system to identify potential locations for additional valves could be onerous, such a task could be simplified by targeting already-identified high-risk areas for analysis.

CBR Calculations

The 2025 RAMP chapters provided the CBRs for the SoCalGas[136] and SDG&E[137] planned mitigations/controls:

Observations and Findings:

The set of control programs present a wide range of CBR values. Some of the CBRs are significantly below 1.0 under all three of the discount rate scenarios, which indicates the costs significantly outweigh the monetized benefits. Almost all of these controls are required by regulations that emphasize safety.

SPD observes that the CBRs provided by Sempra are derived from calculations that apply a non-linear, risk-averse scaling function to the consequence outcomes of the risk analysis. While SPD acknowledges that this approach is permissible under the guidance of the RDF, such scaling functions tend to increase CBR values

[136] SoCalGas 2025 RAMP Ch. SCG-Risk 3, pp. 36-37.

[137] SDG&E 2025 RAMP Ch. SDG&E-Risk 3, pp. 29-30.

relative to those calculated without scaling—particularly for mitigations targeting assets with high consequence scores. Transparency is diminished because Sempra does not also provide CBRs calculated using unscaled CoRE values, leaving it unclear how much the scaling function affects each mitigation's CBR calculation.

Summary of Findings

1. Minimal Description of Risk Exposure:

The narratives describe exposure only in terms of pipeline length and provide no information regarding other listed asset classes.

2. Minimal Description of Potential Consequences:

The RAMP narratives list potential consequences only by title, without further explanation. This lack of information creates uncertainty regarding what is considered in scope for the purposes of the risk analysis.

3. Large Increase in LoRE:

SPD observes a dramatic increase in LoRE values reported by Sempra in its High Pressure Gas System risk chapters compared to Sempra's 2021 RAMP Reports. While subsequent data requests indicate that these increases were driven by changes in methodology and the availability of additional data, such large increases are concerning and are not acknowledged or explained within Sempra's 2025 RAMP Reports.

4. Limited Inclusion of Non-Scaled Outcomes of the Risk Analysis:

Although the RDF allows for the use of risk-scaling functions, Sempra does not provide unscaled values for many risk analysis outcomes, including CoRE and CBR values. This omission limits transparency regarding the impact of non-linear scaling functions on the results.

5. Insufficient Analysis of SDG&E Alternative 2:

SDG&E Alternative 2 (A118 - Strategic Valve Placement/Installation) does not have sufficient analysis performed to determine if it is a viable alternative mitigation.

Recommendations

1. Identify the Quantity of Other Assets:

In addition to pipeline length, include in the chapter narrative the quantities of other asset types within the scope of the risk analysis (e.g., compressors, non-line pipe, valves).

2. Define Potential Consequences

Provide a clear definition of each potential consequence, including which aspects are considered in scope and how they are addressed within the risk analysis.

3. Note Significant Changes in Risk Analysis Results

Identify how the results of the risk analysis differ from prior analyses and provide detailed explanations for any significant changes.

4. Provide Unscaled Results of the Risk Analysis

When applying a scaling function in the risk analysis, also present the results calculated without the scaling function.

5. Perform Valve Placement Analysis or Present Different Alternative Mitigation

To evaluate this potential alternative mitigation, analysis of the medium gas pressure system for valve placement should be performed to determine locations where valves would be placed if this mitigation would be performed, and a risk analysis should then be performed based on that information. Should a comprehensive analysis of the entire medium gas system prove too onerous, SPD recommends targeting analysis of potential valve placements to known high-risk areas. Alternatively, the utility should present a different alternative mitigation that has had sufficient risk analysis performed.

4. SoCalGas Underground Gas Storage

Risk Description

The Underground Gas Storage (UGS) Risk is defined as the risk of failure of an UGS well that results in serious injuries, fatalities, and/or damage to infrastructure. This risk encompasses the integrity and operation of storage wells and reservoirs, including components such as casing, tubing, and wellheads.

The scope of the risk includes potential failure events at SoCalGas's four UGS facilities: Aliso Canyon, Honor Rancho, La Goleta, and Playa del Rey, which collectively operate 177 active wells and serve as critical infrastructure for meeting regional gas demand and system reliability.

While this risk did not meet the 40 percent safety attribute threshold required for inclusion in a RAMP Report under the RDF, it was added to the 2025 Sempra RAMP applications in response to stakeholder interest following the Aliso Canyon leak event in 2015.

Observations and Findings

SoCalGas has thoroughly identified and described the UGS risk. SoCalGas included this UGS risk in its 2025 RAMP in response to stakeholder concerns. SPD views this proactive inclusion positively, as it recognizes the significant public and regulatory interest in gas storage safety. The risk description appropriately emphasizes severe safety outcomes and infrastructure damage. However, environmental impacts (e.g., large methane releases) are not explicitly mentioned.

Given the Aliso Canyon leak, SPD finds it important that these harms be acknowledged in the risk scope, whether reflected as safety impacts (e.g., public health outcomes) or financial impacts (e.g., fines, remediation costs), consistent with the RAMP attribute framework.

Table 4-1. Safety, Reliability, Financial—Baseline CoRE.[138]

Attribute (Baseline, pre-mitigation)	Value (2024 $M)
Safety CoRE	0.39
Reliability CoRE	0.07
Financial CoRE	14.77

[138] SoCalGas 2025 RAMP Ch. SCG-Risk 4, p. 13.

The Safety CoRE value is low because current definition of safety risk counts only fatalities and serious injuries, and it does not capture sub-SIF health symptoms (e.g., headaches, nausea) observed in Aliso-type events—hence the small Safety CoRE ($0.39M) relative to Financial ($14.77M).[139] Baseline values also reflect post-Aliso integrity upgrades and compliance programs now embedded in operations, supporting a lower Safety contribution.[140]

Risk Bow Tie

The bow tie diagram (Figure 4-1) for the UGS risk maps ten identified risk drivers (DT.1–DT.10) on the cause side to seven potential consequence categories (PC.1–PC.7) on the outcome side.[141] These drivers range from technical causes, such as internal and external corrosion, to organizational factors, such as execution constraints. The diagram illustrates the cause-and-effect pathways leading from risk drivers (e.g., equipment failure, human error, natural hazards) through the risk event (loss of containment) to potential consequences (e.g., property damage, injuries, environmental harm). Preventive and mitigative controls are positioned along these pathways to either reduce the likelihood of failure or lessen the severity of consequences.

[139] SoCalGas 2025 RAMP Ch. SCG-Risk 4, p. 13

[140] SoCalGas 2025 RAMP Ch. SCG-Risk 4, pp. 4-5 and 15.

[141] SoCalGas 2025 RAMP Ch. SCG-Risk 4, p. 7.

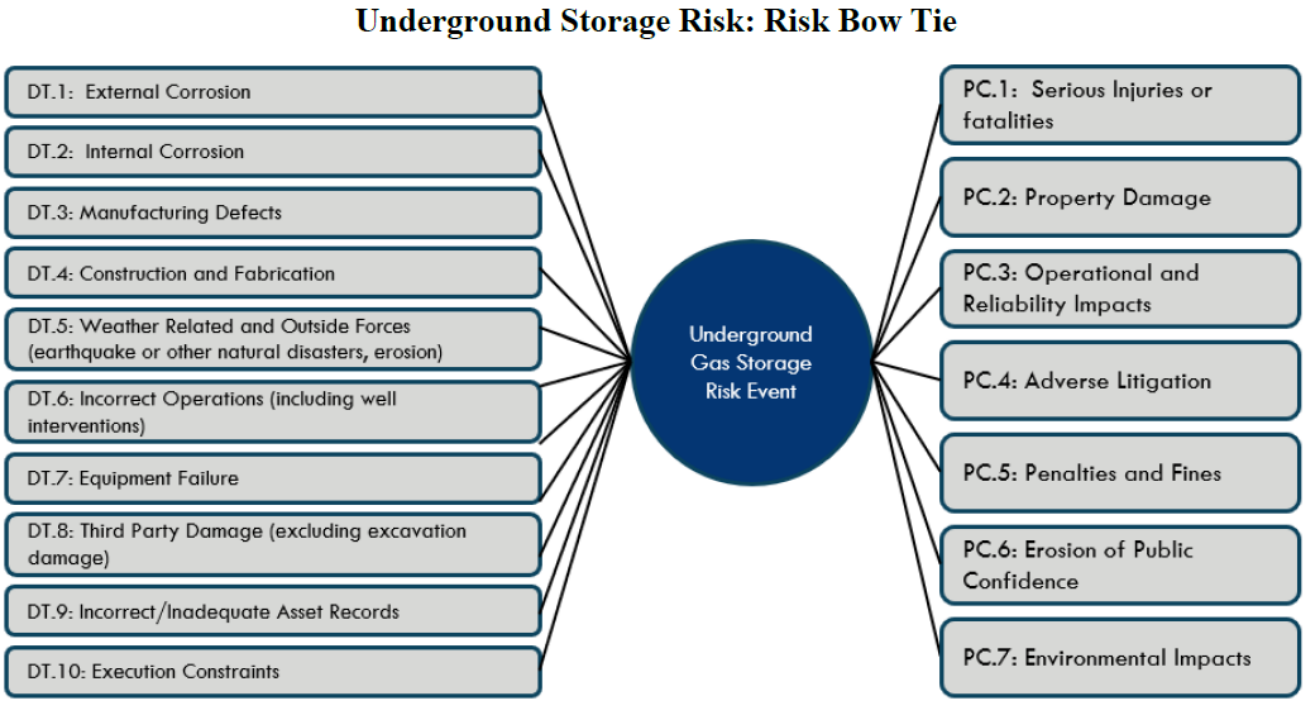

Figure 4-1. SoCalGas's Underground Storage Risk Bow Tie.[142]

Observations and Findings:

One observation is that some bow tie drivers DT.10 "Execution Constraints" and DT.9 "Incorrect/Inadequate Asset Records" are organizational and cross-cutting (e.g., resourcing, scheduling, data-management) rather than direct physical failure mechanisms.[143] SPD recommends adding a brief cross-reference showing how DT.9 and DT.10 are addressed in the Controls & Mitigations section to improve transparency without implying a one-to-one driver–mitigation requirement. Overall, SPD finds the listed drivers and consequence categories are complete.

Exposure

Exposure refers to the storage system components at risk—in this case, SoCalGas's four UGS fields, comprising ~119.5 billion cubic feet (bcf) of working gas and 177 active wells.[144] Aliso Canyon is the largest

[142] SoCalGas 2025 RAMP Ch. SCG-Risk 4, Figure 1, p. 7.

[143] SoCalGas 2025 RAMP Ch. SCG-Risk 4, p. 7.

[144] SoCalGas 2025 RAMP Ch. SCG-Risk 4, p. 2.

(92 wells), while La Goleta, Playa del Rey, and Honor Rancho are smaller.[145] The fields differ in surrounding land use, with some located near densely populated areas.

Observations and Findings:

SPD finds that SoCalGas clearly defines the scope of exposure across all active wells. The company's mitigation plans—such as well abandonments and retrofits—are intended to reduce exposure over time. While the UGS risk chapter treats the system as a single exposure group, future segmentation by field or well type could support more targeted risk assessments.

Tranches

Tranching refers to the grouping of assets or risk scenarios that share similar characteristics, allowing utilities to quantify and compare risk across more homogeneous subsets. In accordance with the RDF Phase 3 Decision,[146] SoCalGas applied the Homogeneous Tranching Methodology (HTM) for its UGS risk.[147]

The company defined a single asset class ("Full UGS") encompassing all active storage wells and developed 12 tranches based on modeled combinations of risk drivers and outcomes. These tranches were derived by first identifying ~50 discrete LoRE–CoRE scenario pairs—representing.[148]

Each tranche, therefore, contains a subset of scenarios with comparable likelihood and consequence estimates, and is treated as a reporting unit for CBR calculations and mitigation planning.[149] For example, one tranche may contain multiple low-frequency, high-consequence events (e.g., catastrophic blowouts), while another tranche groups more frequent, low-impact incidents (e.g., minor surface leaks).

Attachment D of the RAMP chapter provides a summary of the tranche derivation, and further detail is available in the supporting Excel workpapers.

Observations and Findings:

SPD reviewed the UGS tranching methodology and supporting workpapers in detail and finds that the approach is consistent with RDF expectations for granularity and transparency. The 12 tranches are logically grouped and based on a range of scenario assumptions, rather than asset-specific characteristics like well age or location. SoCalGas's use of a single "Full UGS" class assumes uniform regulatory oversight and similar

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[145] SoCalGas 2025 RAMP Ch. SCG-Risk 4, pp. 2-3.

[146] Phase 3 RDF Decision, D.24-05-064, Row 14.

[147] Sempra 2025 RAMP Vol1_App3-Tranching-Whitepaper, pp. 1-2.

[148] SoCalGas 2025 RAMP Workpapers, UGS Risk Modelling.xlsx and SCG_UGS_CBR_Main_Workbook_R.xlsx.

[149] SoCalGas 2025 RAMP Workpapers, SCG_UGS_CBR_Main_Workbook_R.xlsx.

integrity management across all storage fields, which is reasonable given the shared application of SIMP and California Geologic Energy Management Division (CalGEM) compliance standards.

However, SPD observes that the tranching structure does not segment risk by particular sites or by location attributes that can materially affect consequence severity (e.g., population density near Playa del Rey). Adding a site/location dimension would improve visibility into location-specific risk concentrations and aid mitigation targeting. SPD recommends that SoCalGas should: (a) include, in its GRC testimony and workpapers, UGS site specific tranche results (risk buy-down and CBRs) for each post-test year, and (b) in its next RAMP, either adopt UGS Site Specific risk segmentation or provide a documented justification that the current HTM grouping offers comparable decision-usefulness.

Overall, SPD finds SoCalGas's tranching approach well-documented and transparent and that it meets the intent of Row 14; the field/location item is a recommended enhancement rather than a compliance deficiency.

Risk Drivers

SoCalGas identified ten potential drivers (DT.1–DT.10) that contribute to UGS well failures, informing the likelihood side of the risk model.[150] These include mechanical degradation mechanisms like internal/external corrosion, latent defects (manufacturing or construction), natural hazards (e.g., earthquakes), human error, equipment failure, and third-party damage. The list also includes organizational and procedural risks, such as poor asset records and "Execution Constraints" (e.g., resource or permitting delays), which reflect non-technical contributors to failure likelihood.

The list is broadly consistent with industry integrity-management guidance (e.g., ASME B31.8S for gas pipelines and API 1171 for UGS and includes both controllable and external factors.

Observations and Findings:

SPD finds that SoCalGas's risk drivers are comprehensive and grounded in industry knowledge. Corrosion and construction-related defects are particularly relevant for aging infrastructure, and seismic risks are appropriately highlighted for California operations. Human error and external interference are also accounted for.

The inclusion of DT.9 (asset records) and DT.10 (execution constraints) reflects an effort to recognize organizational contributors to failure risk. However, SPD notes that these drivers, particularly DT.9 (asset records) and DT.10 (execution constraints) are not addressed by specific mitigations or controls in the chapter's Controls & Mitigations section. Their inclusion is reasonable; however, future filings should explicitly link these cross-cutting drivers to actionable management controls (e.g., data-governance and

[150] SoCalGas 2025 RAMP Ch. SCG-Risk 4, pp. 7-9.

scheduling/resource-allocation measures) to demonstrate how exposure is reduced. Overall, SPD finds no major omissions and considers the set of drivers a sound basis for risk modeling and mitigation planning.

Risk Driver Frequencies

SoCalGas estimated the likelihood of storage-well integrity events using internal incident records, integrity-test results, limited industry data, and subject matter expert (SME) judgment. The model produces an overall LoRE of 3.68 events per year for the modeled well population (106 wells: 59 Aliso Canyon; 24 Honor Rancho; 11 La Goleta; 12 Playa del Rey), reflecting severities from minor leaks to major blowouts. For context, the chapter lists 177 active wells as of March 2025; "active" includes additional well categories beyond the modeled set.[151]

Observations and Findings:

The estimated frequency of 3.68 events per year reflects a range of consequences: the presentation aggregates severities rather than disaggregating minor leaks from high-consequence events. The model's LoRE-weighted per-event consequences (CBR baseline) are $14.77 million (financial), $0.394 million (safety), and $0.074 million (reliability), totaling $15.24 million.

SPD finds the use of field and SME judgment consistent with RDF guidance, particularly given the scarcity of public UGS failure data. SoCalGas aggregates driver contributions to combined consequences, however, a more detailed breakdown (e.g., corrosion vs. integrity-test failures) and a severity split would improve transparency and decision-usefulness. SPD supports future refinement of driver-specific response measures and higher-impact items to align with stakeholder concerns.

SPD observes that the modeled LoRE for UGS increased significantly from approximately 0.29 in the 2021 RAMP to 3.68 events per year in 2025.[152, 153] Similarly, Sempra's data request response indicates comparable increases in LoRE for other gas risks. For instance, the LoRE for SoCalGas high pressure gas risk rose from 8.64 in 2021 to 81.19 in 2025, while the LoRE for SoCalGas medium pressure gas risk increased from 544.99 to 58,846.77.[154]

Consistent with the Commission's goals for decision-useful risk analysis, SPD views the 2025 LoRE as a more data-driven baseline rather than evidence that physical risk increased tenfold between cycles. However, because the 2025 RAMP also introduces changes to how consequences are monetized and risk-scaled, direct

[151] SoCalGas 2025 RAMP Workpapers, UGS Risk Modelling.xlsx.

[152] SoCalGas 2021 RAMP Ch. SCG-Risk-4, Table 9, p. 23.

[153] SoCalGas 2025 RAMP Ch. SCG-Risk-4, Table 2, p. 13.

[154] Data Request, SPD-SEU-2025RAMP-002, Table 1-2, p. 1.

comparisons of LoRE or CoRE between the two cycles are meaningful only after conducting an apples-to-apples normalization (same dollars, aligned attributes, and consistent scaling).

Due to time constraints, SPD did not complete this comparison for UGS in this evaluation. Moving forward, when LoRE and/or CoRE change substantially between RAMP cycles, SPD expects Sempra to provide a clear, chapter-level explanation of the reasons for significant changes within the RAMP applications themselves. The trend in risk reduction over RAMP cycles is expected to be presented with the historical risk graphic from one RAMP to the next.

SPD observes that while the UGS chapter reported 177 active wells, the supporting workpaper[155] shows the LoRE is calculated for 106 modeled wells. The chapter does not reconcile this difference or explain the exclusion of certain wells, which limits transparency and hinders interpretation of the reported 3.68 events per year.

Outcome Frequencies

Outcome frequencies describe the likelihood of specific consequences (e.g., injuries, property damage) following a well failure. SoCalGas modeled seven consequence types (PC.1–PC.7) using estimated probabilities to quantify the expected impact of each risk event.[156]

Observations and Findings:

The outcome impacts are predominantly financial rather than safety related, with an average per-event consequence of $15.24M, of which $0.39M is attributed to safety and $14.77M to property and financial costs.[157] This result reflects a low expected probability of fatalities or serious injuries and aligns with past experience (e.g., Aliso Canyon caused no deaths but had a high financial loss). SoCalGas does not provide the numeric breakdown of outcome probabilities for the seven consequence types (PC.1–PC.7) or key conditional steps (e.g., probability of ignition given a release); the chapter presents only aggregated monetized results.

SPD observes that environmental harm (PC.7) is discussed qualitatively and is not monetized. As a result, it is unclear how environmental pathways—such as community health effects from methane releases, regulatory penalties, and remediation costs—are reflected within the quantified safety and financial attributes. SPD recommends that SoCalGas either (a) monetize PC.7 directly with documented methods and data, or (b) explicitly map these environmental pathways into the existing safety and financial attributes with clear assumptions.

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[155] SoCalGas 2025 RAMP Workpapers, UGS Risk Modelling.xlsx.

[156] SoCalGas 2025 RAMP Ch. SCG-Risk 4, p. 10.

[157] SoCalGas 2025 RAMP Ch. SCG-Risk 4, p. 13.

Overall, SoCalGas's outcome modeling reasonably prioritizes financial and operational consequences, with safety and reputational impacts considered in severe scenarios. SPD recommends that rare but extreme outcomes—such as large-scale injury or environmental release— remain a focus for planning and monitoring, even if their modeled probability is low.

Consequences

SoCalGas identified seven consequence types (PC.1–PC.7) for storage well failures: safety, property damage, reliability impacts, litigation, penalties, reputational damage, and environmental harm.[158] These categories were used in the 2024 Enterprise Risk Register and inform the monetized risk estimates. While safety, reliability, and financial impacts are quantified, reputational and environmental consequences are addressed qualitatively.

Observations and Findings:

SPD finds the Consequence framework comprehensive and appropriate. The addition of "Environmental Impacts" (PC.7) in this RAMP cycle reflects growing attention to climate-related harm—an important improvement. Risk modeling shows that financial losses, particularly from property damage and operational disruption, dominate the expected Consequence value (~$15M/event), while safety risks are modeled with low probability, consistent with historical experience.

SPD agrees with the low expected injury rate but emphasizes that catastrophic outcomes, though rare, remain plausible. Continued attention to health and safety controls is warranted. Environmental harm, while acknowledged, appears to be primarily reflected in compliance-related costs (e.g., cleanup, penalties, fines). SPD finds this consistent with Sempra's attribute definitions but recommends that SoCalGas more clearly demonstrate how significant environmental consequences, such as methane releases, are represented within the safety and financial attributes. SPD flags this as a gap and encourages future efforts to quantify long-term environmental consequences to enhance transparency

Overall, the Consequence structure aligns with expectations, and no major omissions are identified. However, improved tracking of outcome metrics (e.g., gas released, regulatory actions) will be key to validating risk reduction.

Controls and Mitigations

SoCalGas proposed a robust set of programs to reduce the likelihood and consequences of well failures:

[158] SoCalGas 2025 RAMP Ch. SCG-Risk 4, p. 10.

- C401 – SIMP: The Storage Integrity Management Program includes regular well inspections, pressure testing, and repairs. Key actions include installing inner strings in degraded wells and abandoning those that cannot be safely remediated. SIMP addresses drivers DT.1–DT.6.[159]
- C402 – Well Abandonment & Replacement: This capital program targets proactive well retirements and replacements, even when not triggered by SIMP findings. SoCalGas plans to abandon or replace over 150 wells by 2031, directly reducing LoRE.[160]
- C408 – Storage Field Maintenance: Covers routine O&M for wellheads, valves, and field equipment, mitigating DT.7 (equipment failure). While modest in cost, it yields notable risk reduction.

Other ongoing efforts include installation of safety valves, methane leak detection, and cathodic protection upgrades. Many activities are compliance-driven under CalGEM and PHMSA mandates, ensuring a baseline of risk control.

Observations and Findings:

SPD finds the mitigation strategy comprehensive and aligned with the identified drivers. The plan balances safety and operational needs—inner strings extend well life while reducing risk, and well abandonments remove the highest-risk assets. By 2031, the active well population will be smaller and more resilient.

SPD notes that most mitigations are mandated, which ensures consistency across the industry. SPD supports the scale and scope but encourages SoCalGas to accelerate high-impact actions where feasible and ensure permitting or resource constraints (DT.10) do not delay progress.

Some controls that affect UGS consequences reside on surface equipment and are documented in other chapters (e.g., wellhead piping, headers, station Emergency Shutdown Device (ESD)/gas detection/overpressure protection, compressor stations). To ensure complete coverage and clear accounting, SPD recommends providing a concise cross-reference in the GRC workpapers—listing each relevant control, its location, and the owning chapter—and adding the same cross-references in the next RAMP.

With these clarifications on cross-chapter references and delivery pace, SPD considers the programs well targeted and, if executed as planned, expects significant UGS risk reduction.

Alternatives Analysis

SoCalGas considered two alternatives to its preferred mitigation strategy:

[159] SoCalGas 2025 RAMP Ch. SCG-Risk 4, Attachment C, p. 34.

[160] SoCalGas 2025 RAMP Ch. SCG-Risk 4, p. 22.

- Alternative 1 (A401): Abandoning wells instead of installing inner strings. This approach maximizes risk reduction but significantly reduces storage capacity, affecting system reliability.[161]
- Alternative 2 (A402): Installing metal skin liners (MSLs) instead of inner strings.[162]

Cost-benefit results show Alternative 1 has a strong societal CBR (1.8) but lower utility CBR (0.73) due to lost capacity. Alternative 2 performed poorly on both metrics (societal CBR 0.99, utility CBR 0.52).[163]

Observations and Findings:

SPD finds SoCalGas's alternatives analysis to be adequate at a screening level and reasonably documented but limited in depth. The preferred strategy—installing inner strings with selective abandonments—offers a balanced approach between safety and reliability. While Alternative 1 reduces risk further, it is constrained by deliverability needs. SPD encourages future re-evaluation if system conditions change (e.g., reduced gas demand or increased storage redundancy).

Alternative 2 is not viable due to technical challenges and inspection limitations. SPD agrees that inner strings are preferable under current conditions. We recommend continued monitoring of mitigation technologies and system needs, as future developments could shift the viability of these alternatives.

CBR Calculations

SoCalGas evaluated the cost-effectiveness of its UGS mitigations using three CBR perspectives—Societal, Hybrid, and WACC (utility financial). Key results include:

- SIMP (C401): $269.5 million capex[164] + $80.3 million O&M. CBR: 1.80 (Societal), 0.75 (Hybrid), 0.74 (WACC).
- Well Abandonment (C402): $261.6 million capex. CBR: 4.00 (Societal), 1.65 (Hybrid), 1.64 (WACC).
- Maintenance (C408): $15.4 million O&M. CBR: 10.27 (Societal), 10.38 (Hybrid), 10.35 (WACC). These results show that abandonment and maintenance programs are cost-effective across all perspectives, while SIMP is cost-justified mainly from a public safety standpoint.

Observations and Findings:

SPD finds the CBR analysis transparent and aligned with CPUC guidance. Key takeaways include:

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[161] SoCalGas 2025 RAMP Ch. SCG-Risk 4, pp. 24-25.

[162] SoCalGas 2025 RAMP Ch. SCG-Risk 4, pp. 25-26.

[163] SoCalGas 2025 RAMP Workpapers, SCG_UGS_CBR_Main_Workbook_R.xlsx.

[164] "capex" means capital expenditure.

- C402's strong CBR indicates high-risk wells are being effectively targeted for retirement. SPD supports its full execution and potential expansion.
- C401's sub-1.0 WACC CBR reflects compliance-driven spending on low-frequency risks. SPD recommends continued prioritization within SIMP to maximize risk reduction per dollar.
- C408's high CBR underscores the value of preventive maintenance—these activities are essential and low-cost.
- SoCalGas followed proper discounting methods per the Phase 3 Decision, and the results justify regulatory support for safety-driven programs.
- Some unquantified benefits (e.g., system flexibility) may enhance the value of these programs beyond the CBR figures.

Overall, the CBR results validate the proposed mitigations and provide a strong foundation for regulatory oversight and resource prioritization.

Summary of Findings

1. Limited Treatment of Environmental Impacts:
   SoCalGas recognizes environmental impacts (e.g., methane emissions) as a consequence of UGS failure, but these impacts are not directly quantified in the risk modeling. Instead, the treatment relies largely on potential fines and compliance costs. This approach does not fully reflect the broader safety and financial implications of large methane releases (e.g., public health impacts, property damage, and long-term operational costs).

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2. Lack of UGS Site Specific Risk Differentiation:
   The RAMP aggregates all UGS assets into a single exposure group without differentiating risks by storage field. This may obscure differences in public safety risk depending on facility location, population density, or well condition.

3. Limited Mitigation for Organizational Risk Drivers:
   Certain bow tie drivers (e.g., DT.9: Inadequate Records, DT.10: Execution Constraints) represent cross-cutting organizational limitations. However, the RAMP does not present corresponding mitigations that address enterprise-level root causes such as staffing, data governance, or project management capacity.

4. Insufficient Exploration of Alternative Mitigations:
   SoCalGas evaluated two alternatives but dismissed them without deeper consideration of partial or phased adoption. For example, selective well abandonment (Alternative 1) could yield safety benefits with limited reliability trade-offs, but this was not analyzed in detail.

5. Cross-chapter references for surface-equipment controls:
   The UGS chapter would benefit from clearer cross-references to controls that reside on surface equipment (e.g., wellhead piping, headers, station ESD/gas detection/overpressure protection, compressor stations) and are documented in other chapters, so readers can see how these controls are integrated and accounted for.

6. Active Well Modeling Scope:
   The UGS chapter reports 177 active wells across the four storage fields[165] and describes its LoRE/CoRE modeling as covering the "Full UGS" asset class. The supporting workpaper[166] indicates 106 wells are used in the model and the UGS chapter does not explain why all 177 active wells are not modelled.

Recommendations

1. Integrate Environmental Impacts into Safety and Financial Attributes:
   Rather than monetize climate costs separately, SPD recommends that SoCalGas strengthen how environmental impacts are reflected within the existing safety and financial attributes of the RDF framework. For example, large methane releases could be linked to community health and safety outcomes, as well as to financial liabilities that extend beyond regulatory fines (e.g., litigation, property devaluation, operational remediation). This approach would improve representation of environmental harm while remaining consistent with RDF guidance.

2. Provide UGS Site Specific Risk Segmentation or Sensitivity Cases:
   Analyze risk exposure and consequences at the facility level or provide scenario-based modeling for each storage field. This will help identify if particular sites (e.g., Playa del Rey) merit enhanced mitigation focus due to geographic or operational factors. SPD recommends that SoCalGas should (a) include, in its GRC testimony and workpapers, UGS site specific tranche results (risk buy-down and CBRs) for each post-test year, and (b) in its next RAMP, either adopt UGS Site Specific risk segmentation or provide a documented justification that the current HTM grouping offers comparable decision-making usefulness.

3. Develop Cross-Functional Controls for Organizational Drivers:
   Establish enterprise programs to address management-related risk drivers. This could include improvements in asset record-keeping systems, workforce resource planning, and mitigation project execution to reduce the impact of DT.9 and DT.10.

[165] SoCalGas 2025 RAMP Ch. SCG-Risk 4, p. 2.

[166] SoCalGas 2025 RAMP Workpapers, UGS Risk Modelling.xlsx.

4. Re-evaluate and Quantify Partial Mitigation Alternatives:
   Conduct additional analysis on partial implementation of Alternative 1 (e.g., retiring redundant or low-demand wells). A phased strategy may provide incremental risk reduction with minimal reliability impacts and improved cost-effectiveness.

5. Provide cross-references for surface-equipment controls:
   In the GRC workpapers, include a concise cross-reference (a one-page table is sufficient) listing each UGS-relevant surface control, its asset location, the owning chapter, and where its costs/benefits/CBRs are reported; include the same cross-references in the next RAMP to demonstrate cohesive management of above- and below-ground risks.

6. Active Well Modeling Scope:
   Sempra should: (a) state the modeled well population by field and well type; (b) provide a cross-walk reconciling the modeled set to the 177 active wells reported in the chapter; and (c) justify any material exclusions and indicate how risk from excluded wells is accounted for (or deemed immaterial) in the modeled event pathways.

5. SoCalGas and SDG&E Employee Safety

Risk Description

Employee Safety Risk is defined by SDG&E as "the risk of an incident, involving one or more on-duty employees, that causes injury, illness or fatality to a company employee,"[167] and by SoCalGas as "the risk of a condition, practice, or event that threatens the safety of a SoCalGas employee."[168]

The assigned Risk Value for SDG&E is $11.12 million, and for SoCalGas, $26.01 million.

SDG&E proposes to spend $7.21 million annually and $28.52 million cumulatively for the four-year funding period of 2028-2031. SoCalGas proposes to spend $20 million annually and $79.73 million cumulatively for the four-year funding period of 2028-2031.

Observations and Findings

SDG&E's proposed spending levels would have the utility spending at about 65 percent of the value of the risk. By contrast, SoCalGas's proposed spending levels would have the utility spending at levels of about 77 percent of the value of the risk. Such risk value to spending ratios appear reasonable.

[167] SDG&E 2025 RAMP Chapter SDG&E-Risk 6, p. 2.

[168] SoCalGas 2025 RAMP Chapter SCG-Risk 5, p .1.

Risk Bow Ties

SDG&E's employee safety risk bow tie identifies nine drivers/triggers feeding six potential consequences:

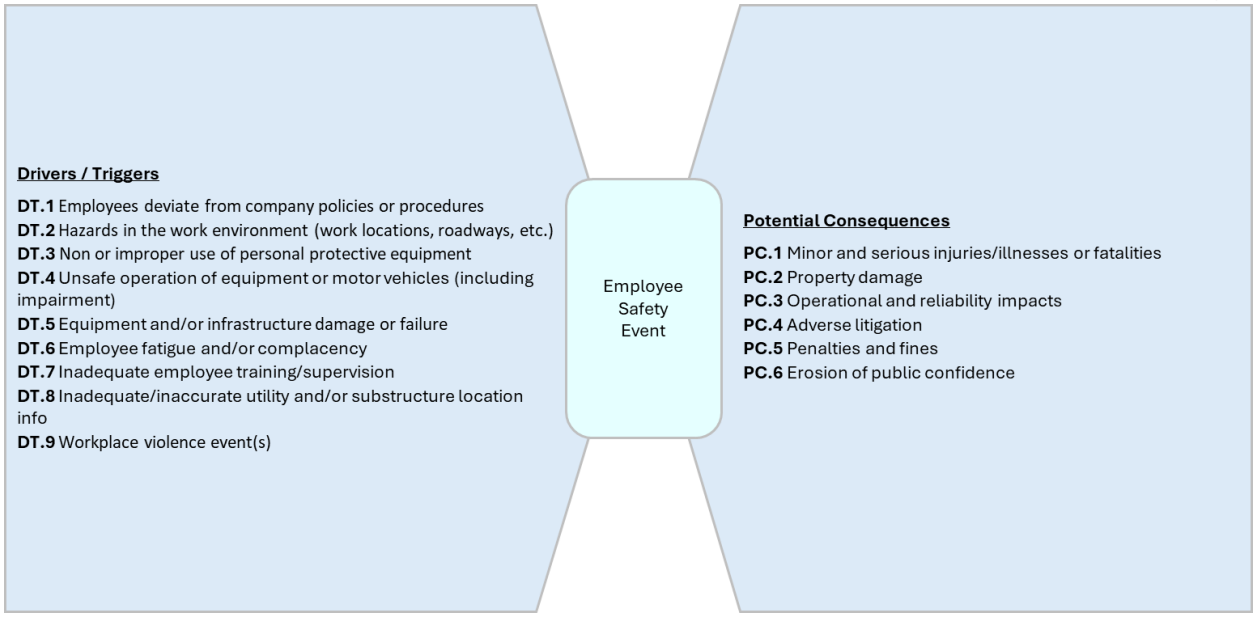

Figure 5-1. SDG&E's Employee Safety Risk Bow Tie[169]

[169] SDG&E 2025 RAMP Chapter SDG&E-Risk 6, Figure 1, p. 1.

SoCalGas's risk bow tie identifies twelve drivers/triggers feeding eight potential consequences:

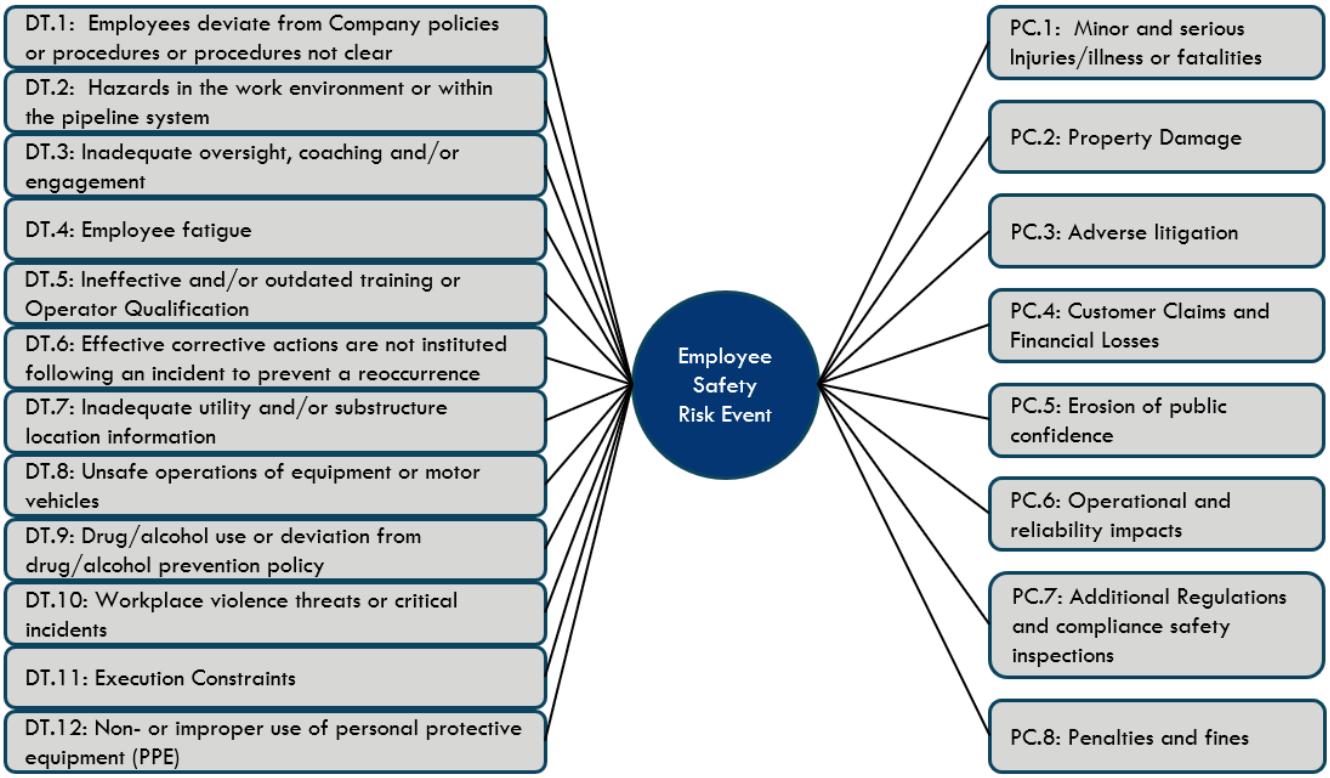

Figure 5-2. SoCalGas's Employee Safety Risk Bow Tie[170]

Observations and Findings:

The risk bow tie sets above for both SDG&E and SoCalGas do not include many standard and useful elements that normally would be found in an energy-utility risk profile. Key data points absent on the Drivers/Triggers side include Risk Score, Frequency, Percent Frequency, and Percent of Risk; while data points absent on the Potential Consequences side include CoRE, Percent Frequency, and Percent of Risk. Both bow ties are too limited to satisfy the purpose of providing a useful all-in-one overview dashboard that encapsulates key characteristics that define the primary risks detailed in the chapter.

SPD expressed similar concerns with Sempra's prior efforts in the 2021 RAMP, stating "SDG&E and SoCalGas should clearly state or show which risk drivers or triggers (DTs) and potential consequences (PCs) are their priorities in the risk bow tie, using frequencies and/or rankings."[171]

[170] SoCalGas 2025 RAMP Chapter SCG-Risk 5, Figure 1, p. 5.

[171] 2021 SPD Evaluation Report, p. 85.

Exposure

Neither SDG&E nor SoCalGas discuss the important subject of Exposure or identify the metric the utility is using to quantify exposure. In the case of Employee Safety, an appropriate metric would be the number of employees at the utility, or perhaps the number of employee hours worked. SPD identified the absence of this data when assessing the prior Sempra 2021 RAMP, in the context of Contractor safety risk, stating, "Observations: Presentation of exposure data, such as the number of persons exposed to a risk, could provide helpful context in evaluating the risk assessment."[172]

Observations and Findings:

Sempra was noticed by SPD on the absence of exposure criteria and data in its 2021 RAMP applications. There, within the context of the Contractor Safety chapter, SPD offered the following: "SDG&E and SoCalGas should explicitly state its exposure to the risk (i.e., number of employees). In any description of risk, verifiable measurement units are essential to the assessment."[173] For the 2025 RAMP, SPD was able to obtain from Sempra much of this data.[174] SDG&E's employees number 5,000 with 9.47 million employee annual hours worked, and SoCalGas's employees number 8,900 with 15.95 million annual hours worked.

Working from these numbers, Sempra calculated and furnished additional useful information,[175] including:

- Per-hour planned annual spending on Employee Safety: SDG&E at $0.76; and SCG at $1.25;
- Per-hour value of Employee Safety risk: SDG&E at $1.17; and SCG at $1.63;
- Per-worker planned annual spending for SDG&E at $1,442; and SCG at $1,933; and
- Per-worker annual total risk value of Employee Safety risk: SDG&E at $2,222; and SCG at $2,247

Additionally, for this risk, Sempra discloses that:

- Annual number of incidents for SDG&E is 119; and SoCalGas is 582; with resulting cost per incident for SDG&E of $93,737; and SoCalGas of $44,709[176]

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[172] 2021 SPD Evaluation Report, p. 84.

[173] 2021 SPD Evaluation Report, p. 85.

[174] Data Request 008; numbers are office- and field-based workers combined.

[175] All data in 2024 dollars, Data Request 008 Sempra Response, Attachment 01_SPD-Sempra-2025RAMP-008_Q1_SCG_18702_18704, Sheet "Employees-A" (SCG); and Attachment 02_SPD-Sempra-2025RAMP-008_Q1_SDGE_18702_18704, Sheet "Employees-A" (SDG&E).

[176] All data in 2024 dollars, Data Request 008 Sempra Response, Attachment 01_SPD-Sempra-2025RAMP-008_Q1_SCG_18702_18704, Sheet "Employees-A" (SCG); and Attachment 02_SPD-Sempra-2025RAMP-008_Q1_SDGE_18702_18704, Sheet "Employees-A" (SDG&E).

Tranches:

SDG&E lists seven tranches and counts Workplace Violence as having two tranches.

- Electric Operations
- Gas Operations
- Motor Vehicle Incidents
- Office of the Customer
- Admin / Miscellaneous
- Workplace Violence

SoCalGas identified three classes of tranches, each having two variants for a total of six tranches.

- OSHA Recordable (1. minor injury or 2. serious injury/fatality)
- Vehicle Incident (3. minor injury or 4. serious injury/fatality)
- Workplace Violence (5. employee or 6. non-employee)

Observations and Findings:

SDG&E provided little narrative to describe and justify its selection of tranches. However, some useful descriptive information was found within an untitled table located at the end of an attachment to the chapter (see Figure 5-3 below).

Class	Risk Quantile	Incident (LoRE/CoRE) Pair	Risk Quantile Region	Tranche	Tranche LoRE	Tranche CoRE	Tranche Risk Score
Electric Ops	1	Electric Ops	None	Electric Ops	39.00	$0.11M	$4.46M
Gas Ops	1	Gas Ops	None	Gas Ops	14.89	$0.06M	$0.84M
Motor Vehicle Incident	1	Motor Vehicle Incident	None	Motor Vehicle Incident	41.89	$0.06M	$2.45M
Office of Customer	1	Office of Customer	None	Office of Customer	13.56	$0.09M	$1.23M
Admin/Miscellaneous	1	Admin/Miscellaneous	None	Admin/Miscellaneous	8.33	$0.11M	$0.93M
Workplace Violence	1	In Person Event	UL / LC	WPV-1	0.91	$0.87M	$0.79M
		Active Shooter Event	LL / UC	WPV-2	0.003	$140.62M	$0.42M

Figure 5-3. Untitled SDG&E Tranche Valuation Table[177]

Though SDG&E highlighted the hazards that Customer Service workers face in their interpersonal interactions with the public, the utility's description of its tranches lacks detail, leaving much open to interpretation. For example, the Admin/Miscellaneous category is not clearly explained, introducing uncertainty about whether it is meant to address office-based workers. SDG&E's discussion of worker safety would be improved with more and better data, including expanded articulation regarding the nature

[177] SDG&E 2025 RAMP Chapter SDG&E-Risk 6, Contractor Safety Attachments-8.

of the risks. Absent are a more thoughtful treatment of its tranches that could have articulated whether a tranche applies to office- or field-based workers, or both.

The utility also could have mentioned the number and ratio of each type of worker and account for share of workforce, as well as included the absent component of an incident breakdown by event severity to provide for minor injury, serious injury, or fatality. These values would enable a better understanding of whether, and by what degree, the job of utility field worker tends to be more dangerous than that of a utility office worker. Doing so would advance a more transparent, precise, and frank discussion on the safety risks and exposure to the workforce in SDG&E's employees.

SoCalGas's account of its tranches and the resulting limited value to the Commission as useful datapoints is similar to that of SDG&E, with much left unspecified. SoCalGas also provides an untitled summary table at the end of its chapter, but the table is very different from the SDG&E summary. Though SoCalGas's three tranche classes/six tranche variants are somewhat limited, its table segregates data on minor injuries from serious injuries and fatalities.

Class	Risk Quantile	Incident (LoRE/CoRE) Pair	Risk Quantile Region	Tranche	Tranche LoRE	Tranche CoRE	Tranche Risk Score
OSHA Reportables	1	Non-SIFs	UL / UC	OSHA Reportables-1	229.5	49,296	11,313,086
		SIF	LL / UC	OSHA Reportables-2	1.33	5,012,747	6,690,726
Vehicle Incidents	1	Minor Injuries / Non - Injury	UL / LC	Vehicle-1	350.9	9,753	3.422.407
		SIF	UL / UC	Vehicle-2	0.1	5,057,898	445,031
Workplace Violence	1	Cause- Non- Employee	UL / UC	WPV-1	0.015	140,915,841	2,133,744
		Cause- Employee	LL / UC	WPV-2	0.014	140,915,841	2,009,477

Figure 5-4. Untitled SCG Tranche Valuation Table[178]

In response to a data request, Sempra provided supplemental data, presented below in Figures 5-5 and 5-6.

[178] SCG 2025 RAMP Chapter SCG-Risk 5, Contractor Safety Attachments-9.

Risk Event Consequences										
					Natural Units Per Event	Levels (2023 $M) of a Consequence Per Event [1]	CoRE (risk-adjusted 2024 $M)	Natural Units per Year	Expected Loss per Year (2024 $M)	Risk Score (risk-adjusted 2024 $M)
	CoRE	% Freq	%Risk	Freq	Safety EF/event	Safety $M	Safety	Safety EF/yr	Safety $M/yr	Safety
Unsurvivable	17,689,309	0%	18%	0.11	1	16,200,000	16,200,000	0.11	1,800,000	1,800,000
Serious	4,172,077	1%	29%	0.78	0.253	4,098,600	4,098,600	0.78	3,187,800	3,187,800
Minor	56,636	65%	40%	77.67	0.003	48,600	48,600	77.67	3,774,600	3,774,600
No Injury	7,526	33%	3%	39.11	0	-	-	39.11	-	-
WPV Incident	1,356,480	1%	11%	0.91	0.084	1,295,233	1,295,233	0.91	1,181,252	1,181,252
Aggregated	93,737	100%	100%	118.58	-	83,856	83,856	118.58	9,943,500	9,943,500

Figure 5-5. SDG&E Risk Score and Exposure by Tranche Table[179]

Risk Tranche Disclosure						
	Tranche Name/ Descriptor	Percent Exposure	Safety Risk Value	Financial Risk Value	Total Risk Value	Percent Risk Value
Tranche 1	OSHA SIF	93.82%	$6,480,090.91	$210,634.77	$6,690,725.68	25.72%
Tranche 2	OSHA Non-SIF	93.82%	$9,565,174.80	$1,747,911.32	$11,313,086.13	43.49%
Tranche 3	Vehicle SIF	6.18%	$427,173.39	$17,857.93	$445,031.32	1.71%
Tranche 4	Vehicle non-SIF / no injury	6.18%	$630,544.88	$2,791,861.63	$3,422,406.52	13.16%
Tranche 5	Workplace Violence - Cause Non-Employ	100.00%	$2,067,517.02	$66,257.20	$2,133,774.22	8.20%
Tranche 6	Workplace Violence - Cause Employee	100.00%	$1,947,079.14	$62,397.56	$2,009,476.69	7.72%
Total		100	$21,117,580.15	$4,896,920.42	$26,014,500.56	100

Figure 5-6. SoCalGas Risk Tranche Disclosure Table[180]

In Sempra's prior effort in the 2021 RAMP, SPD noted that "SDG&E and SoCalGas should create additional granular tranches for the IIE Risk. Staff does not agree that all employees share the same risk profile. At a minimum, more granular tranches could include, for example, office-only employees and field employees. SDG&E may then find it appropriate to provide additional granularity for field employees by tranching this group by specific duties performed."[181]

Risk Drivers

As shown above in the SDG&E risk bow tie diagram, the utility has identified nine drivers/triggers:

[179] All data in 2024 dollars, Data Request 008 Sempra Response, Attachment 02_SPD-Sempra-2025RAMP-008_Q1_SDGE_18702_18704, Sheet "Employees-B" (SDG&E).

[180] All data in 2024 dollars, Data Request 008 Sempra Response, Attachment 01_SPD-Sempra-2025RAMP-008_Q1_SCG_18702_18704, Sheet "Employees-B" (SCG).

[181] 2021 SPD Evaluation Report, pg. 85.

- DT.1 – Employees deviate from policies or procedures
- DT.2 – Hazards in the work environment
- DT.3 – Non or improper use of personal protective equipment
- DT.4 – Unsafe operation of equipment or motor vehicles
- DT.5 – Equipment and/or infrastructure damage or failure
- DT.6 – Employee fatigue/complacency
- DT.7 – Inadequate employee training/supervision
- DT.8 – Inadequate or inaccurate information on utility and/or substructure location information
- DT. 9 – Workplace violence event(s)

The SoCalGas risk bow tie diagram shows twelve drivers/triggers:

- DT.1 – Deviation from Company standards, policies or procedures or procedures not clear
- DT.2 – Hazards in the work environment or within the pipeline system
- DT.3 – Inadequate oversight, coaching and/or engagement
- DT.4 – Employee fatigue
- DT.5 – Ineffective and/or outdated training or Operator Qualification
- DT.6 – Effective corrective actions are not instituted following an incident to prevent a recurrence
- DT.7 – Inadequate utility and/or substructure location information
- DT.8 – Unsafe operations of equipment or motor vehicles
- DT.9 – Drug/alcohol use or deviation from drug/alcohol prevention policy
- DT.10 – Workplace violence threats or incidents
- DT.11 – Execution Constraints
- DT.12 – Non- or improper use of personal protective equipment (PPE)

Observations and Findings:

SDG&E and SoCalGas characterize workplace violence as inclusive of external actors and physical security threats of the kind that might involve terrorism and sabotage. This is a departure from how the risk is typically understood to exist within the context of energy utilities, which traditionally would be described as employee-on-employee events and insider threats.[182]

SDG&E does not include abuse from members of the public such as may occur at in-person customer interface facilities, with the utility having established a standalone category for this type of threat.

Other examples of differences in the utilities' respective approaches to identifying drivers can be found. Neither utility explains this practice in the filings, but a response to an SPD data request provided the rationale that the two are distinct companies, and they reserve the right to operate independently.

[182] SDG&E p. 3; SoCalGas p. 5.

The data request also produced a table which shows variations between the Sempra utilities in their approaches to drivers.

Risk Driver Frequencies

The risk chapters put forward by SDG&E and SoCalGas provide no insights or mention of risk driver frequencies.

Observations and Findings:

SPD recommends that driver frequencies should be included with the risk data provided in future RAMP filings.

Outcome Frequencies

Sempra's risk chapters provide no insights into or mention of outcome frequencies. As mentioned above within the Tranches section, the two provide some limited insight into outcome proportionality within a tranche summary table found at chapter's end within an attachment.

Observations and Findings:

SPD has no observations or findings on the outcome frequencies.

Consequences

As shown above in the SDG&E risk bow tie diagram, the utility identified six potential consequences:

- PC.1 – Minor and serious injuries/illnesses or fatalities
- PC.2 - Property damage
- PC.3 - Operational and reliability impacts
- PC.4 - Adverse litigation
- PC.5 - Penalties and fines
- PC.6 - Erosion of public confidence

The SoCalGas risk bow tie diagram identified eight potential consequences:

- PC.1 – Minor or serious injuries/illness or fatalities
- PC.2 – Property damage
- PC.3 – Adverse litigation
- PC.4 – Customer claims and financial losses
- PC.5 – Erosion of public confidence
- PC.6 – Operational and reliability impacts

- PC.7 – Additional regulations and compliance safety inspections
- PC.8 – Penalties and fines

Observations and Findings:

Both SDG&E and SoCalGas note that this risk is not expected to impact service reliability, referencing the absence of industry wide data demonstrating any causal link.[183] Accordingly, Sempra assigns a zero-dollar reliability Outcome Cost prospect to this primary risk category. Sempra identifies reliability impact as a Potential Consequence, which appears to be at odds with a zero-dollar cost valuation. Sempra should rectify and explain this contradiction.

Controls and Mitigations

SDG&E identified five Controls and three Mitigation measures in its current RAMP through fiscal year 2031:

- C317: Employee Safety Training & Field Safety Oversight Programs
- C323: Safety Culture Survey, Recognition & Awards
- C319: Safety Management System Implementation & Management
- C328: Safety Compliance & Industrial Hygiene Program
- C326: Workplace Violence Prevention

Mitigation measures to be introduced in 2025 consist of:

- M303: Enhanced, Risk Informed, Employee Safety Training & Field Safety Oversight Programs
- M305: Safety Management System Maturity and Improvement: Enhanced Safety Communications & Safety Data Analytics
- M311: Establish Event Learning Teams

SoCalGas identified seven existing Controls and no new Mitigation measures through fiscal year 2031.

Controls consist of:

- C312: Drug & Alcohol Testing Programs
- C326: Workplace Violence Prevention Programs (Facilities Hardening)
- C342: Safety Technology & Analytics
- C343: Employee Safety Strategy
- C345: Safety & Health – Operations
- C346: Safety & Health – Programs
- C347: Event Learning & Continuous Improvement

[183] SDG&E, p..10; SoCalGas, p. 11.

Observations and Findings:

SDG&E's Controls appear to be adequate and in line with industry standards, incorporating such contemporary practices as good-catch/near-miss protocols for serious injury prevention, coaching and positive reinforcement mechanisms, data tracking/trending, and regulatory monitoring and reform uptake by assigned staff.

SDG&E Mitigation Measures also appear to be adequate and in line with industry standards, incorporating such contemporary practices as high-energy threat awareness, field monitor hiring, incident root-cause investigations and application of resulting lessons learned.

Similarly, SoCalGas's Controls appear to be reasonable and allow for accidents to become teachable moments--by championing practices that encourage parties involved in safety incidents to come forward, declare an incident, and have the experience added to the record of tracked safety data, all in line with contemporary industry standards.

SoCalGas's absence of Mitigation measures is notable and the utility is encouraged to consider and weigh new measures that may hold potential to make workers safer. At minimum, the utility should explain and justify the absence of new measures in future RAMP filings.

Alternatives Analysis

SDG&E's Mitigation Plan Alternatives fall short and do not detail two comprehensive plan alternatives, each consisting of multiple mitigation measures that the utility explains and justifies in not undertaking. Rather, it offers variations of a single control or mitigation measure already found within the utility's proposed Mitigation Plan.

SoCalGas's Mitigation Plan Alternatives offer a better approach, but they still show room for improvement. Similar to SDG&E, SoCalGas does not include two fully developed Mitigation Plans, with multiple measures the utility considered but rejected. Instead, it provides two measures that are variations of controls found within the utility's proposed Mitigation Plan. Still, SoCalGas stated it gave serious consideration to both Alternative measures, with the utility stating that it remains open to the possibility of future deployment of them.

Observations and Findings:

SDG&E and SoCalGas shared one identical Alternative measure, A392: Enhanced Safety Validation Program Mitigation, that would hire dedicated staff rather than employees whose responsibilities are more varied. Both utilities assign A392 a CBR of 0.06.

The identified cost-benefit ratios for the pair of Alternatives put forward by SDG&E are very small, at 0.03 and 0.06. In tandem with the utility's expressed outlook on the Alternatives, they do not appear to be serious proposals.

SoCalGas's claimed cost-benefit ratio of 3.89 for its second Alternative A393: Industrial Athlete Program Mitigation is well within the respectable range, and in targeting on-the-job sprains by deploying personal ergonomic and lifting trainers would appear to hold merit. However, the utility does not detail whether the program would target office-assigned or field-assigned workers, or both.

Sempra's Alternative Plan proposals are in need of further development as they consist of just a single measure, and typically are variants of plans already underway. SPD noted similar shortcomings in evaluation of Sempra's 2021 RAMP, stating "SCG-5 / SDG&E-8.12.8. SDG&E and SoCalGas should consider a different set of alternatives that are more viable and thoughtful as substitutes for their current selection of control and mitigation programs in 2022-2024."[184]

As with the Contractor Safety risk, Employee Safety risk Alternative Plan proposals submitted by Sempra should clearly indicate whether a given Alternative is intended to supplement the Proposed Mitigation Plan, or whether the measure is intended to supplant the entirety of a Proposed Mitigation Plan. Resulting confusion points to why utilities would do well to articulate a Plan Alternative, not as a sole measure but as a full and inclusive list of any applicable risk-reduction measures.

CBR Calculations

SDG&E's cost-benefit ratios (all Societal measures) are as follows:

Controls

- 1.65 | C317: Employee Safety Training & Field Safety Oversight Programs
- 0.43 | C323: Safety Culture Survey, Recognition & Awards
- 1.05 | C319: Safety Management System Implementation & Management
- 0.92 | C328: Safety Compliance & Industrial Hygiene Program
- 0.23 | C326: Workplace Violence Prevention

Mitigation Measures

- 1.97 | M303: Enhanced, Risk Informed, Employee Safety Training & Field Safety Oversight Programs
- 2.65 | M305: Safety Management System Maturity and Improvement: Enhanced Safety Communications & Safety Data Analytics
- 1.06 | M311: Establish Event Learning Teams

SoCalGas's cost-benefit ratios (all Societal measures) are as follows:

[184] 2021 SPD Evaluation Report, p. 85.

Controls

- 0.43 | C312: Drug & Alcohol Testing Programs
- 0.04 | C326: Workplace Violence Prevention Programs (Facilities Hardening)
- 0.99 | C342: Safety Technology & Analytics
- 0.95 | C343: Employee Safety Strategy
- 1.05 | C345: Safety & Health – Operations
- 0.79 | C346: Safety & Health – Programs
- 0.97 | C347: Event Learning & Continuous Improvement

Observations and Findings:

SDG&E's Control and Mitigation measures fall within a CBR range of 0.23 at the lowest to 2.65 at the highest. Workplace Violence Prevention encompasses some facility hardening measures and is the only measure to incur capital expenses ($10.2 million total over the four-year period from 2028 to 2031), with a low CBR of only 0.23.

Similarly, SoCalGas's Control and Mitigation measures fall within a CBR range of 0.04 at the lowest to 1.05 at the highest. Workplace Violence Prevention encompasses some facility hardening measures, and, in turn, represents an exception, having low value of only 0.04. SoCalGas indicated that Workplace Violence Prevention would be the sole proposed measure to incur capital expenses ($48.8 million total over the four-year period from 2028 to 2031).

Summary of Findings

In its review and assessment of Sempra's Employee Safety risk chapter, SPD finds that:

1. Sempra did not incorporate within its 2025 RAMP filings several SPD recommendations to improve identified concerns and deficiencies identified in its 2021 RAMP filings.
2. Sempra did not address the important subject of risk exposure in its risk analysis.
3. Sempra did not make a distinction in inherent job risk and exposure to various risk drivers among its office and field-assigned workers who are profiled uniformly.
4. As a result, SDG&E's and SoCalGas's risk chapters offer limited insight into which workers are subject to minor or major injuries and fatalities.
5. Sempra's risk bow ties both fall short of expectations and do not serve as useful indicators of risk profiles.
6. Employee Safety Risk Alternative Plan proposals submitted by Sempra do not adequately specify whether a given Alternative (single measure) is intended as an add-on to a broader comprehensive plan, or as a substitute for a single measure within the Proposed Mitigation Plan, or whether the

measure is intended to supplant the entirety of the Proposed Mitigation Plan. Such resulting confusion is one reason Sempra should articulate each Alternative Plan as a full and inclusive list of any and all applicable risk-reduction measures.

Recommendations

SPD recommends that SDG&E and SoCalGas should take action to address Findings 1 through 6 within a future RAMP iteration. In particular, Sempra should address all SPD recommendations in their RAMP filings, regardless of whether action is taken to remedy SPD concerns.

6. SoCalGas and SDG&E Contractor Safety

Risk Description

Contractor Safety Risk is defined by SDG&E as "the risk of an incident involving one or more on-duty contractors or subcontractors while conducting work on behalf of SDG&E that results in injury or fatality,"[185] and by SoCalGas as "the risk of a condition, practice, or event that threatens the safety of a field contractor, conducting work on behalf of SoCalGas, which results in injury or death."[186]

The assigned Risk Value for SDG&E is $14.56 million, and $13.86 million for SoCalGas.

SDG&E intends to spend $6.23 million annually and $29.85 million cumulatively for the four-year funding period of 2028-2031.

SoCalGas proposes spending $1.52 million annually and $6.12 million cumulatively for the four-year funding period of 2028-2031.

Observations and Findings

SoCalGas's annual spending of $1.52 million to address a risk valued at $13.86 million appears to be an instance of underfunding risk reduction. SoCalGas does not put forward any new mitigation measures for this risk category. SDG&E's risk value of $14.56 million is comparable to that of SoCalGas's and yet SDG&E proposes to spend about four times that of SoCalGas.

[185] SDG&E 2025 RAMP Chapter SDG&E-Risk 7, p. 1.

[186] SoCalGas 2025 RAMP Chapter SCG-Risk 6, p. 1.

Risk Bow Ties

SDG&E's risk bow tie identifies nine drivers/triggers informing seven potential consequences:

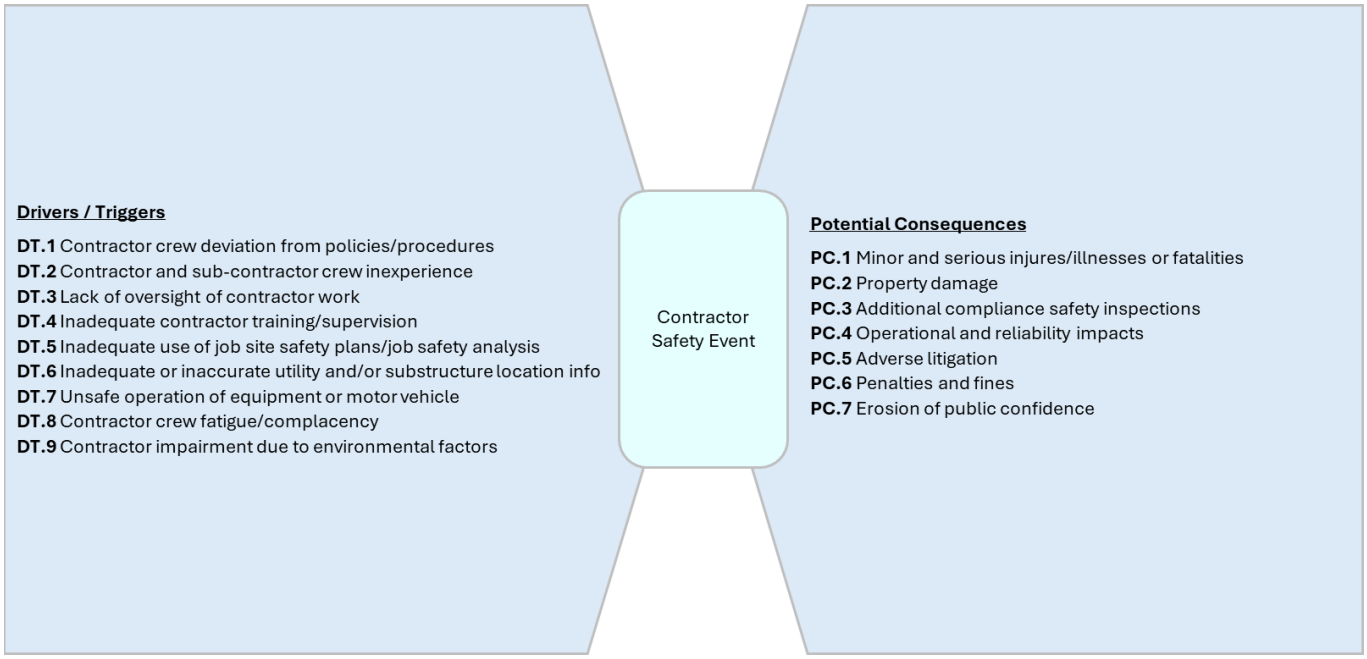

Figure 6-1. SDG&E's Contractor Safety Risk Bow Tie[187]

[187] SDG&E 2025 RAMP Chapter SDG&E-Risk 7, Figure 1, p. 5.

SoCalGas's risk bow tie identifies twelve drivers/triggers feeding eight potential consequences:

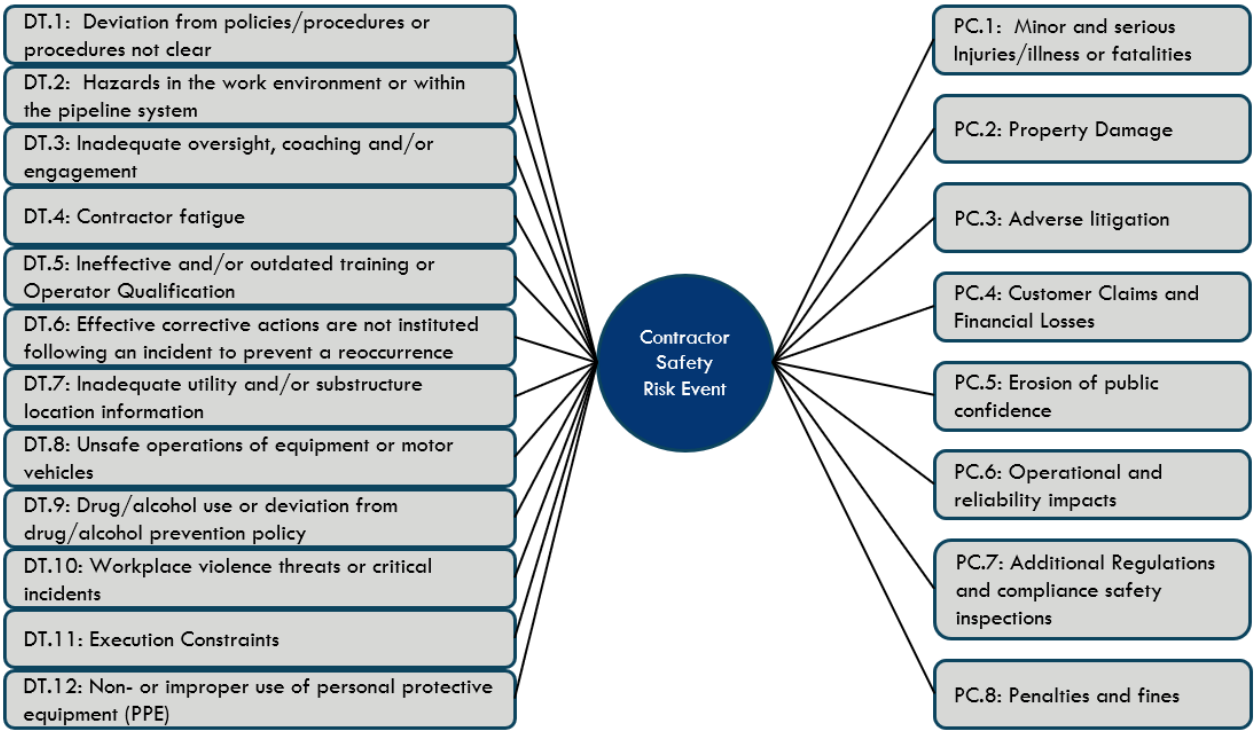

Figure 6-2. SGC's Contractor Safety Risk Bow Tie[188]

Observations and Findings:

Sempra's risk bow ties do not include sufficient information that would normally be found in an energy-utility risk bow tie. Absent are key data that would include, on the driver/trigger side of the diagram, risk score, frequency, percent frequency, and percent of risk. On the potential consequences side of the diagram, notably missing are CoRE, percent frequency and percent of risk. The result is that the bow ties are too limited to satisfy their intended purpose of serving as useful all-in-one overview dashboards to convey key defining data on the primary risk at hand.

SPD expressed similar concern about past risk bow ties within Sempra's 2021 RAMP. Within the scope of Sempra's Contractor Safety chapters, SPD stated "SDG&E and SoCalGas should rank their drivers/triggers to help Staff know which drivers/triggers are more likely to cause a potential consequence. This information would support Staff's evaluation of the RAMP by allowing Staff to analyze if the proposed mitigations are reasonable to address the top drivers/triggers."[189]

[188] SoCalGas 2025 RAMP Chapter SCG-Risk 6, Figure 1, p. 5.

[189] 2021 SPD Evaluation Report, p. 106.

Exposure

Neither SDG&E nor SoCalGas discuss the important subject of Exposure or identify the metrics Sempra is using to quantify Exposure to this set of risks. In the case of contractor safety, an appropriate metric would be the number of contractors, or perhaps the annual number of contractor hours expended. SPD identified the absence of these data when assessing Sempra's 2021 RAMP, again in regard to Contractor Safety risk, stating, "Observations: Presentation of exposure data, such as the number of persons exposed to a risk, could provide helpful context in evaluating the risk assessment."[190]

Observations and Findings:

Sempra was noticed by SPD about the absence of exposure criteria and data in Sempra's 2021 RAMP applications. "SDG&E and SoCalGas should explicitly state its exposure to the risk (i.e., number of employees). In any description of risk, verifiable measurement units are essential to the assessment."[191] For the 2025 RAMP, SPD was able to obtain much of this data from the utilities.[192] SDG&E contract workers are estimated at 3,485 with 7.25 million annual hours worked, but SoCalGas maintained that it was unable to estimate the number of contract workers in its employ, although the utility indicated there are 7.56 million annual hours worked.[193]

Working from these numbers Sempra calculated[194] and furnished additional useful information,[195] including:

- Per-hour planned annual spending on Contractor Safety: SDG&E at $0.86; and SoCalGas at $1.25;
- Per-hour value of Contractor Safety risk: SDG&E at $2.01; and SoCalGas[196] at $1.80;
- Per-worker planned annual spending for SDG&E at $1,789; and SoCalGas at $729; and

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[190] 2021 SPD Evaluation Report, p. 102.

[191] 2021 SPD Evaluation Report, p. 85.

[192] Data Request 008; numbers are office- and field-based workers combined for SDG&E; for SCG, the numbers are for "Class 1" contact employees.

[193] By applying the contractor staff number estimate methodology used by SDG&E (dividing total annual hours worked by the 2,080 hours found within a work-year), SPD derived a similar reasonable approximation to assign to SGG for its contract worker-force number, which is 3,632.

[194] Number derived from SPD contract worker-force number of 3,632.

[195] All data in 2024 dollars, Data Request 008 Sempra Response, Attachment 01_SPD-Sempra-2025RAMP-008_Q1_SCG_18702_18704, Sheet "Contractors-A" (SCG); and Attachment 02_SPD-Sempra-2025RAMP-008_Q1_SDGE_18702_18704, Sheet "Contractors-A" (SDG&E).

[196] The numbers for SoCalGas are derived from SPD's calculated contract worker-force number of 3,632.

- Per-worker annual total risk value of contractor safety risk: SDG&E at $4,178; and SoCalGas at $3,817.

Additionally, for this risk, Sempra discloses that:

Annual number of incidents for SDG&E is 61; and 180 for SoCalGas. The cost-per-incident figures for SDG&E is $238,088; and is $77,086 for SoCalGas.[197]

Tranches

SDG&E lists five tranches.

- Electric Operations
- Gas Operations
- Vegetation Management
- Construction Management
- Miscellaneous

SoCalGas identifies three classes of tranches, with two having two variants for a total of five tranches.

- OSHA Recordable (1. minor injury or 2. serious injury/fatality)
- Vehicle Incident (3. minor injury or 4. serious injury/fatality)
- Workplace Violence (5. Employee-on-employee)

[197] All data in 2024 dollars, Data Request 008 Sempra Response, Attachment 01_SPD-Sempra-2025RAMP-008_Q1_SCG_18702_18704, Sheet "Employees-A" (SoCalGas); and Attachment 02_SPD-Sempra-2025RAMP-008_Q1_SDGE_18702_18704, Sheet "Employees-A" (SDG&E).

Observations and Findings:

SDG&E tranche categories are useful but insufficient to pinpoint precisely whether the work being done is field-based or office-based.[198] Additional useful information on risk costs is to be found within an untitled table located at the end of an attachment to the chapter.

Class	Risk Quantile	Incident (LoRE/CoRE) Pair	Risk Quantile Region	Tranche	Tranche LoRE	Tranche CoRE	Tranche Risk Score
Electric Ops	1	Electric Ops	None	Electric Ops	5.0	$0.19M	$0.97M
Gas Ops	1	Gas Ops	None	Gas Ops	10.50	$0.53M	$5.59M
Vegetation Management	1	Vegetation Management	None	Vegetation Management	7.50	$0.24M	$1.78M
Construction Management	1	Construction Management	None	Construction Management	15.83	$0.23M	$3.62M
Miscellaneous	1	Miscellaneous	None	Miscellaneous	22.33	$0.12M	$2.61M

Figure 6-3. Untitled SDG&E Tranche Valuation Table[199]

SDG&E includes tranche risk scores and other values within the untitled table, organized according to the five risk tranches. These scores reveal that gas operations, at a risk score of $5.59 million ranks first among the five tranches and roughly forty percent higher than the second-place tranche, construction management. Contributing to the high-risk value for gas operations is a high expected value of harm to contractor workers per incident (CoRE) of $0.53 million, the highest of the five tranches. Also evident is a relatively high likelihood of such an incident (LoRE) at 10.5, more than double that for electric operations and about one-third higher than for that of vegetation management, an activity widely considered to be among the most dangerous occupations in the U.S.[200] However, SDG&E's untitled table lacks a breakdown of Minor versus Major injuries or fatalities that are featured within SoCalGas's effort, detailed below.

SoCalGas's approach to its tranches for contractor safety would be improved by clarifying whether a given work activity and associated risk have any attribution to office-based workers and functions. SoCalGas similarly provides an untitled yet helpful summary table at the end of its chapter, though one that differs from the SDG&E summary. Although SoCalGas's three tranche classes/five tranche variants may present a

[198] Sempra notes that some aspects of their risk-reduction plans are directed toward "Class 1" contracted workers, which does not clarify the extent that contactor workers include or do not include office-based workers.

[199] SDG&E 2025 RAMP Chapter SDG&E-Risk 7, Contractor Safety Attachments-8.

[200] The U.S. Bureau of Labor Statistics (BLS) does not track utility vegetation management as its own category, with relatively limited workforce numbers nationally, the employment category may be too specific to enable a national statistical survey. Still, one can apply data available within existing tangential labor categories to triangulate a proxy approximation of the elevated danger inherent in VM work. 1. Utility Line Workers are 5.4 times as likely to die on the job than Americans on average in other occupations; 2. Landscapers are 5.2 times as likely to suffer a fatality; and 3. Loggers die on the job at a rate almost 27 times higher than the average American occupation and serve in the second most dangerous line of work of all U.S. jobs according to the BLS. More at: https://www.urbint.com/blog/why-utility-vegetation-management-is-one-of-the-most-dangerous-jobs-in-america (accessed August 26, 2025).

somewhat limited spectrum of categories, the utility's table proves more useful than SDG&E's given that data on minor injuries are segregated from serious injuries and fatalities.

Given that SoCalGas operates as a single-fuel utility, it would not be expected to feature tranches that address electricity delivery. Consistent with the data found within SDG&E's unnamed table, SoCalGas similarly reveals that the most dangerous and high-risk-scoring incidents for contractor safety occur in gas operations, with an assigned expected value of about $9.1 million.

Class	Risk Quantile	Incident (LoRE/CoRE) Pair	Risk Quantile Region	Tranche	Tranche LoRE	Tranche CoRE	Tranche Risk Score
Electric Ops	1	Electric Ops	None	Electric Ops	5.0	$0.19M	$0.97M
Gas Ops	1	Gas Ops	None	Gas Ops	10.50	$0.53M	$5.59M
Vegetation Management	1	Vegetation Management	None	Vegetation Management	7.50	$0.24M	$1.78M
Construction Management	1	Construction Management	None	Construction Management	15.83	$0.23M	$3.62M
Miscellaneous	1	Miscellaneous	None	Miscellaneous	22.33	$0.12M	$2.61M

Figure 6-4. Untitled SoCalGas Tranche Valuation Table[201]

Tempering somewhat remaining unknowns surrounding Sempra's risk exposure for contractor safety are figures produced by Sempra in response to a request by SPD, and which are presented below in Figures 6-5 and 6-6.

Risk Event Consequences

	CoRE	% Freq	%Risk	Freq	Natural Units Per Event	Levels (2024 $M) of a Consequence Per Event [1]	CoRE (risk-adjusted 2024 $M)	Natural Units per Year	Expected Loss per Year (2024 $M)	Attribute Risk Score (risk-adjusted 2024 $M)
					Safety EF/event	Safety $M	Safety	Safety EF/yr	Safety $M/yr	Safety
Unsurvivable	17,681,740.00	0.27%	20%	0.17	1	16,200,000	16,200,000	0.17	2,700,000	2,700,000
Serious	4,171,814.04	3%	57%	2.00	0.253	4,098,600	4,098,600	2.00	8,197,200	8,197,200
Minor	55,465.16	96%	22%	59.00	0.003	48,600	48,600	59.00	2,867,400	2,867,400
Aggregated	238,087.67	100%	100%	61.17	-	225,034	225,034	61.17	13,764,600	13,764,600

Figure 6-5. SDG&E Risk Score and Exposure by Tranche Table[202]

[201] SoCalGas 2025 RAMP Chapter SCG-Risk 6, Contractor Safety Attachments-8.

[202] All data in 2024 dollars, Data Request 008 Sempra Response, Attachment 02_SPD-Sempra-2025RAMP-008_Q1_SDGE_18702_18704, Sheet "Contractors-B" (SDG&E).

Risk Tranche Disclosure						
	Tranche Name/ Descriptor	Percent Exposure	Safety Risk Value	Financial Risk Value	Total Risk Value	Percent Risk Value
Tranche 1	OSHA SIF	93.82%	$8,795,761.68	$322,462.16	$9,118,223.84	65.77%
Tranche 2	OSHA Non-SIF	93.82%	$769,531.70	$135,548.62	$905,080.32	6.53%
Tranche 3	Vehicle SIF	6.18%	$579,824.48	$26,288.33	$606,112.81	4.37%
Tranche 4	Vehicle non-SIF / n	6.18%	$49,500.92	$1,222,853.53	$1,272,354.46	9.18%
Tranche 5	Workplace Violenc	100.00%	$1,901,768.43	$60,945.49	$1,962,713.92	14.16%
Total		100	$12,096,387.21	$1,768,098.14	$13,864,485.35	100

Figure 6-6. SoCalGas Risk Tranche Disclosure Table[203]

SPD concerns expressed here regarding Sempra tranches are similar to ones identified in Sempra's 2021 RAMP. SPD's 2021 review of the Sempra employee safety chapters advised, "SoCalGas-7 / SDGE-4.12 Recommended Solutions to Address Findings and Deficiencies. Both SDG&E and SoCalGas should tranche contractor risks to reflect the variable risk of different tasks ranging from pipeline maintenance to vegetation management to office-related work."[204]

Risk Drivers

As shown above in the SDG&E risk bow tie diagram, the utility identified nine drivers/triggers.

These are:

- DT.1 – Contractor crew deviation from policies/procedures
- DT.2 – Contractor and sub-contractor crew inexperience
- DT.3 – Lack of oversight of contractor work
- DT.4 – Inadequate contractor training/supervision
- DT.5 – Inadequate use of job site safety plans/job safety analysis
- DT.6 – Inadequate or inaccurate utility and /or substructure location information
- DT.7 – Unsafe operation of equipment or motor vehicles
- DT.8 – Contractor crew fatigue/complacency
- DT.9 – Contractor impairment due to environmental factors

As shown above in the SoCalGas risk bow tie diagram, the utility identified twelve drivers/triggers.

These are:

- DT.1 – Deviation from policies or procedures or procedures not clear

[203] All data in 2024 dollars, Data Request 008 Sempra Response, Attachment 01_SPD-Sempra-2025RAMP-008_Q1_SCG_18702_18704, Sheet "Contractors-B" (SCG).

[204] 2021 SPD Evaluation Report, p. 106.

- DT.2 – Hazards in the work environment or within the pipeline system
- DT.3 – Inadequate oversight, coaching and/or engagement
- DT.4 – Contractor fatigue
- DT.5 – Ineffective and/or outdated training or Operator Qualification
- DT.6 – Effective corrective actions are not instituted following an incident to prevent a reoccurrence
- DT.7 – Inadequate utility and/or substructure location information
- DT.8 – Unsafe operations of equipment or motor vehicles
- DT.9 – Drug/alcohol use or deviation from drug/alcohol prevention policy
- DT.10 – Workplace violence threats or incidents
- DT.11 – Execution Constraints
- DT.12 – Non- or improper use of personal protective equipment (PPE)

Observations and Findings:

SDG&E and SoCalGas differ somewhat in how each applies drivers to the Contractor Safety risk chapter. While both utilities turn in consistent counts (nine for SDG&E and twelve for SoCalGas) of drivers for the two risks, SDG&E's effort has the Workplace Violence driver found in the Employee Safety chapter fall away. And the SoCalGas approach of including Drug and Alcohol Use as a driver for the two risks, is one that SDG&E does not touch on for either risk.

The Sempra utilities, in their RAMP Contractor risk chapters, do not explain or justify inconsistent approaches, or how a given best practice employed by one might be replicated by the other. However, in response to an SPD data request, SDG&E provided a statement that the two are distinct companies and reserve the right to operate independently, if not always consistently. The issue of vendor efforts to mitigate risk was not addressed by either utility. SPD is concerned whether contractor workers, as primarily field-based, are, by nature of their assignments, inherently well insulated from physical security threats compared to office-based employees, or whether the vendors are responsible for various hardening strategies and their resulting costs.

In future RAMP iterations, SPD believes that it would facilitate greater understanding and transparency of this subject to have Sempra declare how utility dollars programed in pursuit of contractor safety are or are not matched and supplemented by vendor commitments, and whether such vendor spending commitments are voluntary or obligatory by way of utility hiring rules relating to reducing risk to utility contractor workers.

Risk Driver Frequencies

The risk chapters put forward by SDG&E and SoCalGas provide no insights into or mention of risk driver frequencies. As mentioned above within the tranches section, Sempra provides some limited insight into outcome proportionality within a tranche summary table at chapter's end within an attachment. SPD noted

the absence of driver frequencies within its summary of findings in the utility's prior contractor safety risk effort in the 2021 RAMP.[205]

Observations and Findings:

SPD recommends that driver frequencies should be included with the risk data provided in future RAMP filings.

Outcome Frequencies

Sempra's risk chapters provide no insights into or mention of outcome frequencies. As mentioned above within the Tranches section, the two provide some limited insight into outcome proportionality within a tranche summary table found at chapter's end within an attachment.

Observations and Findings:

SPD has no observations or findings on the employee safety outcome frequencies.

Consequences

As shown earlier, SDG&E identified seven potential consequences in its risk bow tie diagram:

- PC.1 – Minor and serious injuries/illnesses or fatalities
- PC.2 - Property damage
- PC.3 - Additional compliance safety inspections
- PC.4 - Operational and reliability impacts
- PC.5 - Adverse litigation
- PC.6 - Penalties and fines
- PC.7 - Erosion of public confidence

As shown earlier, SoCalGas identified eight Potential Consequences in its risk bow tie diagram:

- PC.1 – Minor or serious injuries/illness or fatalities
- PC.2 – Property damage
- PC.3 – Adverse litigation
- PC.4 – Customer claims and financial losses
- PC.5 – Erosion of public confidence
- PC.6 – Operational and reliability impacts
- PC.7 – Additional regulations and compliance safety inspections

[205] 2021 SPD Evaluation Report, p. 50.

- PC.8 – Penalties and fines

Observations and Findings:

Sempra notes that this risk is not expected to impact service reliability in light of industrywide data demonstrating any causal link.[206] Accordingly, Sempra assigns a zero-dollar Reliability Outcome to this primary risk category. And yet Sempra identifies reliability impacts as a Potential Consequence, which appears to be at odds with a zero-dollar cost valuation. SPD recommends Sempra rectify and explain this contradiction.

SPD notes that of the 15 combined Potential Consequences claimed for this risk, all but one is repeated in the Employee Safety risk chapter.

Controls and Mitigations

SDG&E identifies two Controls and a single Mitigation measure for the fiscal years through 2031.

Controls consist of:

- C301: SDG&E Contractor Safety Program
- C304: Contractor Safety Field Oversight

Mitigation measures, to be introduced in 2025, consist of:

- M307: Risk Informed Class 1 Contractor Safety Program Management

SoCalGas identifies a single existing Control and no new Mitigation measures for the fiscal years through 2031. Controls consist of:

- C349: Contractor Safety Program

Observations and Findings:

SDG&E and SoCalGas risk-reduction measures, which include the elements below, appear to be generally adequate and consistent with industry standards:

- third-party audits
- contractor pre-qualification hiring protocols and ongoing vendor safety protocols requirements
- risk monitoring software to facilitate incident tracking and trending
- safety culture that enables worker near-miss reporting and lessons learned takeaways
- job site inspections and field oversight

[206] SoCalGas 2025 RAMP Chapter SCG-Risk 6, p. 11 and SDG&E 2025 RAMP Chapter SDG&E-Risk-7, p. 10.

- coaching and team-building safety events to enable knowledge transfer of best practices

Overall, SDG&E's and SoCalGas's Contractor Safety discussion lacks some of the granularity and assurance of the Employee Safety chapter. More significant, the limited spending levels relative to in-house utility employees' risk-reduction efforts rely on unsupported assumptions that vendor efforts provide a reasonable baseline degree of protection that allows Sempra to take less of a hands-on approach to the risk than for Employee Safety. SDG&E and SoCalGas should do more to inform such an approach. Helpful information for Sempra to provide might include quantitative data disclosing vendor risk-reduction efforts, that points to an estimate of any resulting risk reduction leading to baseline levels on which utility intervention builds.

SoCalGas's absence of Mitigation measures is notable. The utility is encouraged to consider and weigh new measures that may hold potential to improve Contractor Safety, as well as explain and justify any absence of new measures in future RAMP filings.

Notably, SDG&E does not include (as SoCalGas does) among its Mitigation Plan measures any proposal to reduce incidents stemming from Drug and Alcohol Use among workers. The utility offers no explanation in its risk chapter, but in response to an SPD data request SDG&E justified its choice of risk-reduction strategies by pointing out that the two utilities are distinct and reserve the right to operate independently if not always consistently.

Alternatives Analysis

Overall, SDG&E's Mitigation Plan Alternatives fall short. Instead of delivering two comprehensive and thoughtful plan alternatives, each consisting of multiple mitigation measures, the utility merely offers two Alternatives, each consisting of one measure. Alternative 394 (CBR value of 0.53), would hire additional in-house field staff to enable data analytic capability. Alternative 395 (CBR value of 1.51), would support additional in-house field-assigned staff to support safety verification efforts. SDG&E's preferred M307 is driven by new safety analysis software procurement with a CBR value of 0.45.

SoCalGas's Mitigation Plan Alternatives are similarly flawed. Alternative 397 (CBR value of 1.24), would hire fewer in-house field oversight inspectors and supervisors than proposed by C349 (CBR value of 1.69), instead contracting out such responsibility. Alternative 398 (CBR value of 1.54), would offer no expansion of in-house field oversight.

Observations and Findings:

Going forward, SDG&E and SoCalGas should call out when the Mitigation Plan they favor entails an optimal middle-ground option. SDG&E and SoCalGas should, in the future, clearly state whether an Alternative would be intended to supplement or entirely supplant one or more proposed risk-reduction measures.

SPD offered the following similar critique of Sempra's 2021 RAMP Employee safety chapters: "SoCalGas-5/SDG&E-8.12.8. SDG&E and SoCalGas should consider a different set of alternatives that are more

viable and thoughtful as substitutes for their current selection of control and mitigation programs in 2022-2024."[207]

CBR Calculations

SDG&E's cost-benefit ratios (all Societal measure) are as follows:

Controls:

- 2.87 | C301: Class 1 Contractor Safety Program Oversight
- 2.14 | C304: Contractor Safety Field Oversight

Mitigation Measures:

- 0.45 | M307: Risk Informed Class 1 Contractor Safety Program Management

SoCalGas's cost-benefit ratios (all Societal measure) are as follows:

Controls:

- 1.69 | C349: Contractor Safety Program

Mitigation Measures:
None proposed.

Observations and Findings:

Sempra's CBRs fall within a range generally considered reasonable.

Summary of Findings

1. Sempra did not incorporate within its 2025 RAMP filings several SPD recommendations to address concerns and deficiencies identified in its 2021 RAMP filings.
2. Sempra did not address the important subject of risk exposure in respective risk analysis.
3. Sempra did not make a distinction in inherent job risk and exposure to various risk drivers and whether they have bearing on office-based Contractor workers.
4. As a result, Sempra's risk chapters offer limited insight as to which workers are subject to minor or major injuries and fatalities.
5. Sempra's risk bow ties fall short of expectations and do not serve as useful indicators of risk profiles.

[207] 2021 SPD Evaluation Report, p. 85.

6. SDG&E's and SoCalGas's risk approaches to contractor safety differ. The utilities do not justify or explain this practice, resulting in uncertainty as to how one utility might decide to uptake an effective best practice demonstrated by the other.
7. Risk reduction efforts and assumptions on the part of vendors that directly hire contractors are presumed to carry the bulk of the responsibility with keeping those workers safe. Yet, Sempra only provides limited unquantified information in this regard.
8. Heightening SPD concerns surrounding unknown vendor baseline spending to reduce risk for contractor safety and how much of this spending is contractually mandated, is the issue of perceived underspending by SoCalGas for this risk category for the years 2028 to 2031. As discussed above, the utility's annual spending of just $1.52 million annually to address a risk valued at $13.86 million represents about a quarter of the spending levels proposed by SDG&E.

Recommendations

SPD recommends Sempra:

1. Avoid actions that repeat SPD Findings 1 through 7 within future RAMP filings. In particular, Sempra should address all SPD recommendations in its RAMP filings, whether or not it acts on them.
2. In future RAMP filings, make some declaration how utility dollars programed in pursuit of contractor safety are or are not matched and supplemented by vendor commitments, and whether such vendor spending commitments are voluntary or obligatory by way of utility hiring rules, to reduce risk to utility contractor workers.

7. SDG&E Wildfire and PSPS

Risk Description

SDG&E's Wildfire Risk is defined as the risk of catastrophic wildfire, initiated by SDG&E equipment, whether through normal operation or failure, that may pose an immediate threat to the communities, the environment, and overall safety resulting in fatalities, widespread property destruction, and a multi-billion-dollar liability. SDG&E defines the PSPS risk as the risk created from proactive de-energization of infrastructure during extreme fire weather conditions, which can result in negative impacts on customers and communities.[208]

Risk Bow Tie

SDG&E provided a risk bow tie diagram in which the left side illustrates drivers/triggers, and the right side shows the potential consequences. The drivers/triggers serve as leading indicators. Observations from risk bow tie are further studied in greater detail in the Driver and Consequences sections below.

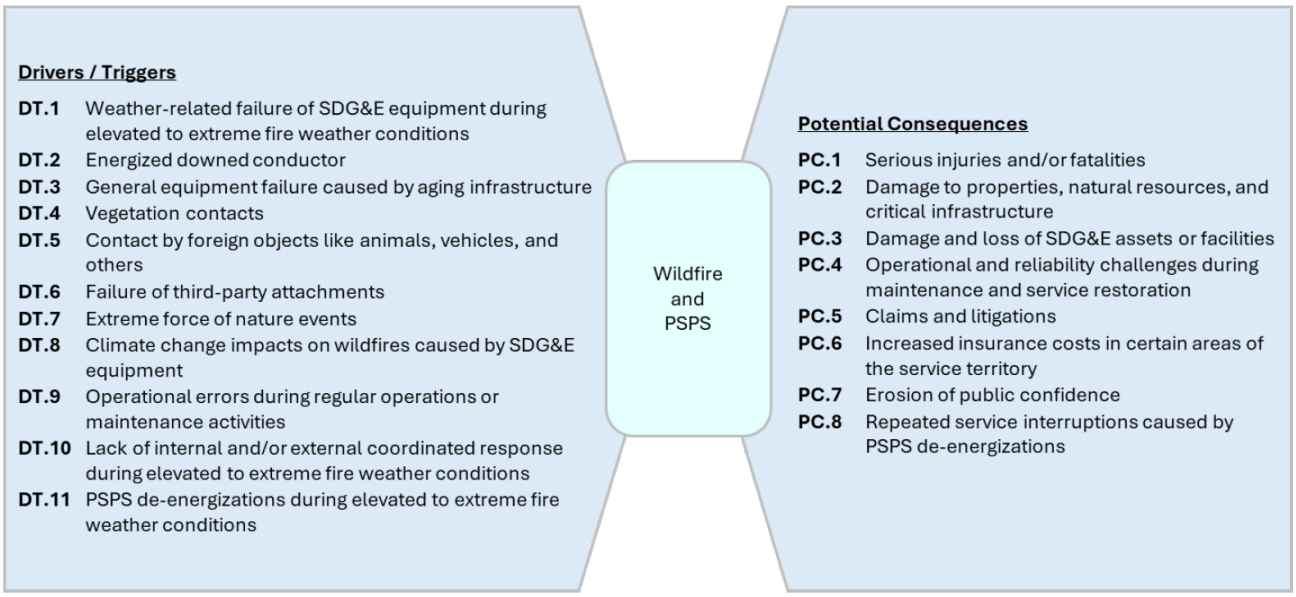

Figure 7-1: SDG&E's Wildfire and PSPS Risk Bow Tie

[208] SDGE-Risk-4 Wildfire and PSPS, p. 2.

Exposure

In its latest Wildfire Mitigation Plan (WMP) filing,[209] SDG&E reported operating 6,313 miles of overhead distribution lines, nearly half of which (3,372 miles) are in High Fire Threat District (HFTD) Tiers 2 and 3 areas. It also reported 11,360 miles of underground distribution lines, with 8,407 miles in non-HFTD areas as part of its service territory components.

In its 2025 RAMP filing, SDG&E identified and analyzed 2,142 unique circuit segments to create tranches. However, SDG&E did not disclose total distribution (and potentially transmission) line miles exposed to the Wildfire Ignition and PSPS risks disaggregated by HFTD tier and tranche. Instead, it only reported plans to install 717 miles of undergrounding and covered conductor and other control and mitigation mileages.

Observations and Findings:

SDG&E did not present the total mileage of distribution (and potentially transmission) lines disaggregated by HFTD tier and associated tranche. Instead, it stated 2,142 segments are used to analyze and to create tranches and only reported mileage figures for planned hardening (including 717 miles of CC and UG) as well as for other controls and mitigations.

Tranches

SDG&E developed a tranching method called the HTM[210] which first organizes risk events (incidents and segments for wildfire and PSPS risks) into classes based on asset type or system characteristics.

Within each class, the methodology then determines the number of divisions, referred to as "risk quantiles," using a predefined formula. It then categorizes the segments in each class into these risk quantiles based on their risk scores calculated as the product of LoRE and CoRE. For example, if a class contains 40 segments, five risk quantiles would be created, with the top 20 percent of risk scores assigned to the first risk quantile and the next 20 percent to the second, and so on.

Each risk quantile is then further disaggregated into two to four "regions" using the median LoRE and CoRE values to split the space into upper/lower groups, (e.g., upper LoRE/upper CoRE versus lower LoRE/lower CoRE). SDG&E refers to each region as a tranche.

For each tranche, SDG&E calculates the following metrics:

1) Tranche LoRE: The sum of all LoRE values for the segments in the tranche.
2) Tranche CoRE: The weighted average of CoRE values, typically weighted by LoRE or event probability.
3) Tranche Risk Score: The product of tranche LoRE and tranche CoRE

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[209] 2026-2028 Wildfire Mitigation Base Plan, July 18, 2025.

[210] Sempra 2025 RAMP Chapter SDG&E-Risk-4, Wildfire and PSPS, Attachment D, and Sempra 2025 RAMP Chapter SDG/SDG&E-RAMP-3, Quantification Framework, p. 43.

SDG&E stated that to comply with the Phase 3 Decision of the Commission's RDF,[211] it developed the HTM which generates significantly more tranches compared to SDG&E's 2021 RAMP filing. For example, in its 2021 RAMP filing, SDG&E reported only three tranches for wildfire risk, whereas in its 2025 RAMP filing the number increased to 64.

SDG&E categorized feeder segments for wildfire and PSPS risks into three classes (Non-HFTD, HFTD Tier 2, and HFTD Tier 3), and further divided them into 20, 22, and 22 tranches, respectively.[212]

Based on data from SDG&E's wildfire workbook,[213] SPD observed that when segments are sorted by descending risk score values within each class (e.g., HFTD Tier 3), the HTM ranking (tranche assignment) generally aligns with the actual risk score values, demonstrating a strong correlation between the risk scores and the HTM's tranche assignment within that class (see Figure 7-2).

However, when all segments in all three classes (HFTD Tier 3, Tier 2, and Non-HFTD) of the wildfire and PSPS risk are analyzed together, the HTM does not generate homogeneous risk tranches (tranches with similar risk scores) or the homogeneous CoRE/LoRE tranches (tranches with similar CoRE/LoRE pairs). As shown in Figure 7-3, segments with nearly identical risk scores (y-axis values) are assigned to widely different HTM tranches across tiers, for example, Tier 3 HTM tranches 9–12[214] and Tier 2 HTM tranches 1–4. This observation suggests that the SDG&E's method does not effectively tranche segments into homogeneous risk groups.

[211] D.24-05-064, Row 14, p. A-13.

[212] SEMPRA 2025 RAMP Chapter SDG&E-Risk-4, Wildfire and PSPS, Table 1, p. 11.

[213] SDGE_Wildfire&PSPS_CBR_Main_Workbook_NoAversion.xlsx.

[214] For better visualization in these graphs, the approximately 20 tranches used by SDG&E for each class have been grouped into five brackets; 1-4, 5-8, 9-12, 13-17, and 18-22

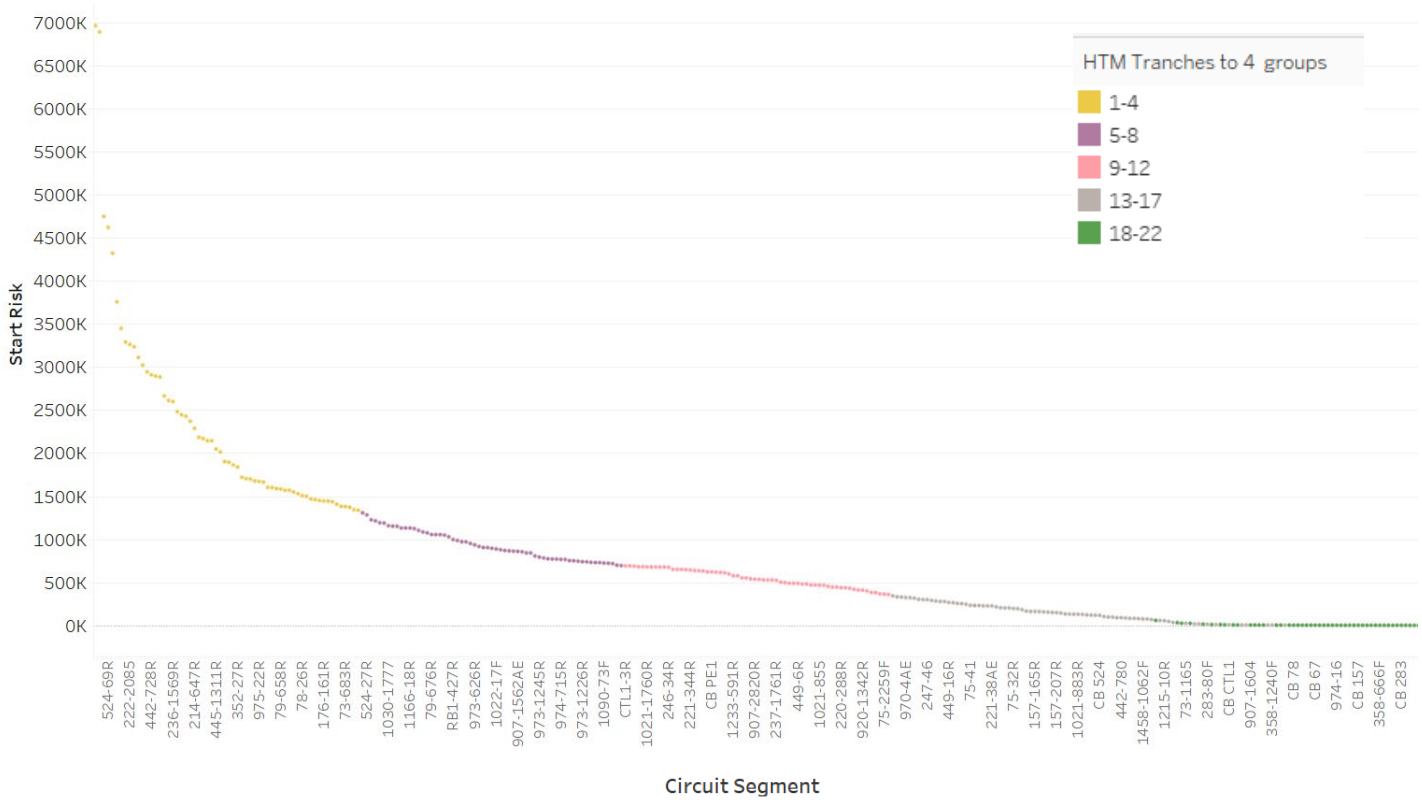

Figure 7-2: Strong correlation between "Start Risk"[215] and the HTM's tranche assignment within one class ("Tier 3")

Similarly, Figure 7-4 illustrates the HTM tranche assignment for HFTD Tier 3 when the segments are sorted by CoRE values from highest to lowest. The results show poor alignment, as segments assigned to HTM tranche rankings at opposite ends of the ranking (e.g., tranches 1–4 vs. 18–22) are located next to each other in terms of CoRE values. When considering all three classes together, this disconnect becomes even more pronounced. This further suggests that SDG&E's HTM does not consistently create tranches with similar CoRE values (i.e., homogeneous CoRE tranches). The same conclusion can be made regarding LoRE homogeneity.

[215] "Start Risk" refers to the baseline or initial level of risk before any proposed mitigation activities are applied.

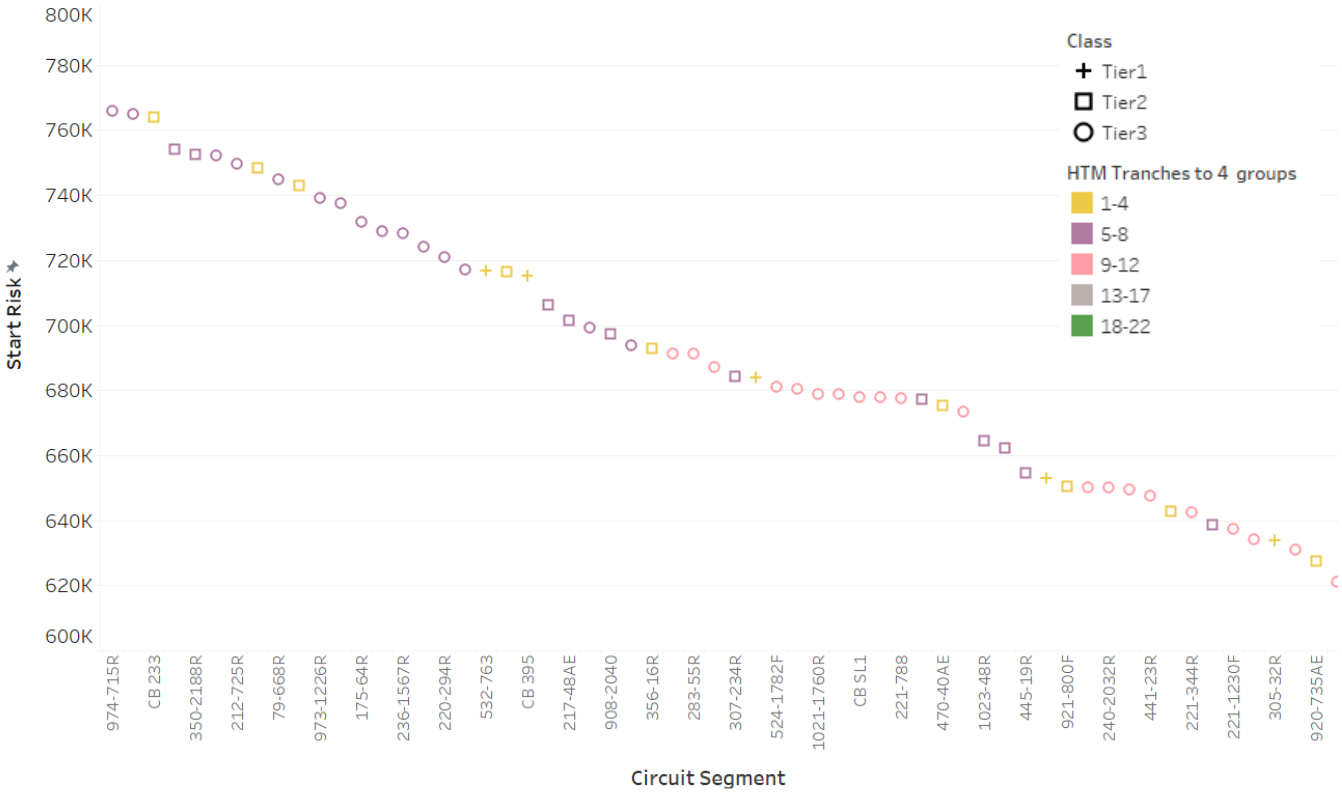

Figure 7-3 : Disconnect between "Start Risk" and the HTM's tranche assignment when all Classes of Wildfire and PSPS Risk are included

In response to SPD's data request, SDG&E stated that "For Tier 3 and Tier 1 (Non-HFTD) areas, there were not enough data points to define distinct Upper CoRE/Upper LoRE regions without creating a significant imbalance in the number of feeder segments between regions. While a few feeder segments in these tiers may have met the criteria for Upper CoRE/Upper LoRE or Lower CoRE/Lower LoRE classification, they did not meet the minimum threshold set to define the LoRE/CoRE regions. To address this, a nearest-neighbor approach was applied to assign these segments to the most appropriate region, either upper/lower or lower/upper, based on proximity."[216]

SPD finds that SDG&E's HTM is ineffective at creating consistently homogeneous risk tranches or homogeneous CoRE/LoRE tranches when applied across all classes. The observed inconsistencies in grouping across classes point to a fundamental design limitation in SDG&E's methodology. Moreover, the methodology relies on workarounds, such as a "nearest-neighbor approach," to address data scarcity in certain classes, a situation driven in part by excessive over-partitioning. These limitations suggest that the

[216] SPD-SEMPRA-2025RAMP-009 Q7.

methodology's design is not robust enough to effectively handle the available data across wildfire ignition and PSPS risk, resulting in distorted final tranche assignments, which cannot be considered a reliable tool for mitigation selection or hardening prioritization.

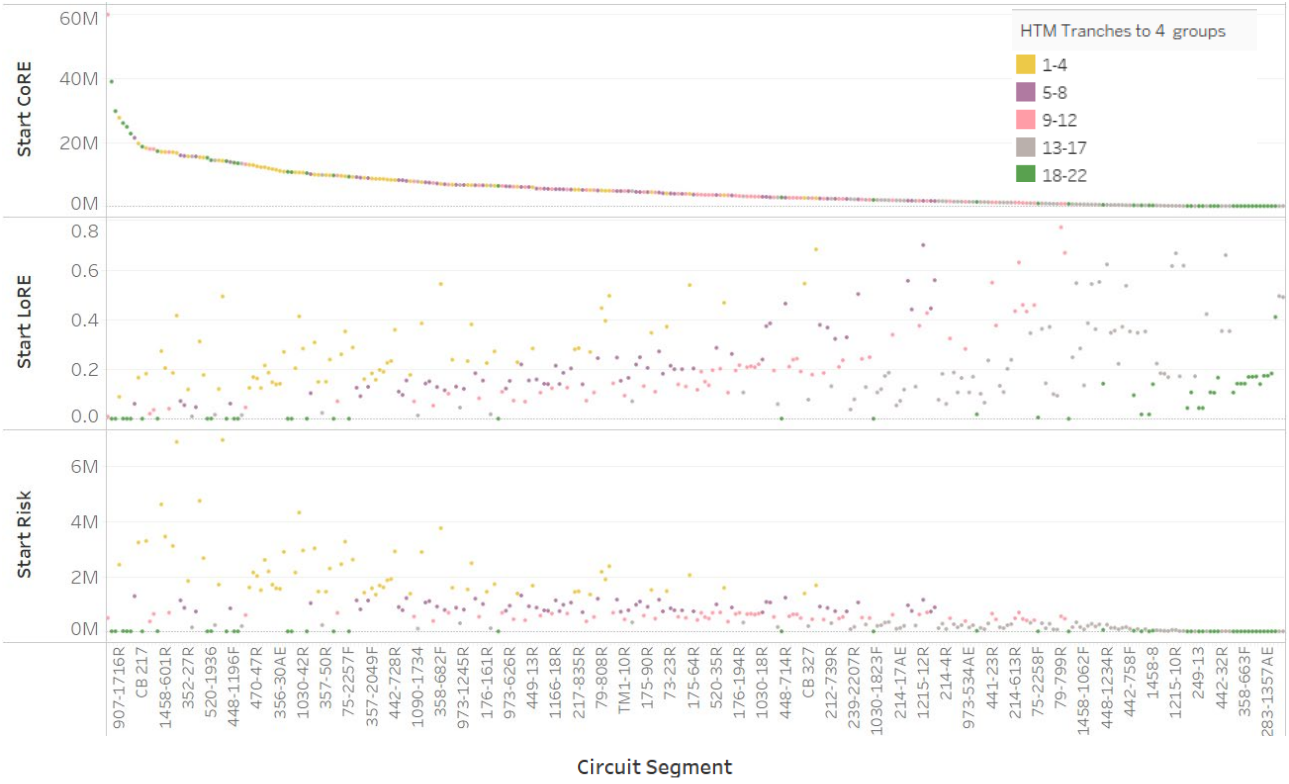

Figure 7-4: Disconnect between "Start Core"[217] and the HTM's tranche assignment even within a Class ("Tier 3")

Table 7-1 illustrates the relationship between the HTM ranking, risk score,[218] and SDG&E's grid hardening plan.[219] Segments are sorted from highest to lowest "Start Risk" (neutral value) with gray, red, and orange boxes indicating whether a hardening project is planned (red for undergrounding [UG], orange for covered conductor [CC] and grey for no mitigation). Table 7-1 highlights the highest risk segment in the first section and a sample of mid-risk segments in the second. The remainer of the data is omitted in Table 7-1 for clarity

[217] "Start Core" refers to the baseline or initial level of CoRE before any proposed mitigation activities are applied.

[218] SDG&E 2025 RAMP workpaper "SDGE_Wildfire&PSPS_Calc_Details_NoAversion.xlsx", Sheet "5.Tranche Mapping"

[219] SDG&E 2025 RAMP workpaper "SDGE_Wildfire&PSPS_Calc_Details_NoAversion.xlsx", Sheet "8.SUG_vs_CCC_2028-2031"

and brevity. Although these are only two snapshots of a larger dataset, they clearly reveal that SDG&E has not planned UG and CC mitigations for many high-risk segments, while several lower-risk segments are slated for capital-intensive mitigations such as UG and CC installations. In other words, high-risk segments are not systematically prioritized for mitigation, while lower-risk segments sometimes receive capital-intensive treatments (e.g., SPD finds that only 17 of the 35 highest risk segments are planned for UG or CC). SPD further investigated several of these segments and followed up with SDG&E through a data request,[220] as discussed later.

Table 7-1 also reinforces SPD's earlier finding that SDG&E's HTM fails to generate homogeneous risk tranches: segments with comparable risk levels are often placed in different tranches, as noted previously. Together, these findings reveal a misalignment between SDG&E's HTM, the risk scores, and SDG&E's grid hardening plan. In conclusion, SDG&E's tranching methodology, as (or if) applied by SDG&E, does not support consistent or effective risk-based hardening decisions.

Also, in response to TURN's data request "… how this is used to select mitigations" SDG&E replied that "While Tranche-level information is included in the Wildfire and PSPS Risk Workbooks to fulfill regulatory reporting requirements, it doesn't necessarily drive the decision-making process for wildfire and PSPS grid hardening investment" [221]

[220] SPD-SEMPRA-2025RAMP-013.

[221] TURN-SDGE-002 Q 3g, 2025 SEMPRA RAMP.

Table 7-1: Relationship Between SDG&E's HTM Ranking, Risk

222-1986R	6,887,384.5	Tier3---1	2.44	1.16	2029	
909-451	4,745,710.8	Tier3---1	Null	Null	Null	
524-69R	4,619,074.2	Tier3---1	Null	Null	Null	
222-1990R	4,318,782.1	Tier3---2	2.35	1.01	2029	
908-2038R	3,761,734.6	Tier2---1	1.50	0.77	2029	
358-682F	3,753,978.1	Tier3---2	2.58	1.51	2028	
1458-601R	3,446,907.1	Tier3---1	Null	Null	Null	
237-2R	3,287,573.9	Tier3---1	1.61	0.71	2030	
222-2085	3,261,422.7	Tier3---2	0.87	0.34	2029	
1021-1748F	3,232,764.5	Tier3---1	1.30	0.74	2029	
971-2050R	3,108,897.4	Tier3---1	Null	Null	Null	
1030-989R	3,020,578.5	Tier3---2	1.11	0.57	2030	
1030-42R	2,942,254.5	Tier3---2	1.26	0.58	2030	
442-728R	2,907,247.7	Tier3---2	Null	Null	Null	
214-1122R	2,893,372.5	Tier3---1	1.04	0.54	2031	
157-81R	2,882,582.6	Tier3---2	Null	Null	Null	
599-19R	2,814,081.2	Tier2---1	Null	Null	Null	
909-805R	2,804,391.1	Tier2---2	Null	Null	Null	
CB 476	2,666,340.5	Tier2---1	Null	Null	Null	
972-1590F	2,662,477.0	Tier3---1	Null	Null	Null	
237-17R	2,654,277.4	Tier2---1	Null	Null	Null	
972-32R	2,627,097.6	Tier2---1	Null	Null	Null	
1030-20R	2,610,279.7	Tier3---2	1.19	0.48	2030	
597-595	2,598,879.4	Tier2---1	1.06	0.64	2031	
236-1569R	2,598,321.3	Tier3---1	Null	Null	Null	
79-785	2,480,480.4	Tier3---2	1.74	0.81	2031	
237-1765R	2,444,435.1	Tier3---2	2.41	1.17	2030	
235-899R	2,436,324.7	Tier2---1	1.75	1.02	2030	
907-1716R	2,427,182.7	Tier3---1	Null	Null	Null	
445-18R	2,423,196.8	Tier2---2	Null	Null	Null	
448-744R	2,370,160.9	Tier3---2	Null	Null	Null	
214-647R	2,287,381.8	Tier3---2	Null	Null	Null	
357-45R	2,182,262.2	Tier3---1	Null	Null	Null	
79-808R	2,167,652.9	Tier3---2	1.52	0.96	2030	
354-1706R	2,161,980.9	Tier2---3	0.91	0.52	2031	
356-19R	2,142,910.6	Tier3---1	Null	Null	Null	
CB 358	699,283.0	Tier3---7	Null	Null	Null	
908-2040	697,272.5	Tier2---5	Null	Null	Null	
1030-18R	693,660.8	Tier3---8	1.43	0.63	2028	
356-16R	692,727.9	Tier2---4	Null	Null	Null	
CTL1-3R	691,130.8	Tier3---10	1.19	0.50	2029	
283-55R	691,079.8	Tier3---9	Null	Null	Null	
448-47R	687,085.3	Tier3---10	Null	Null	Null	
307-234R	684,134.6	Tier2---5	Null	Null	Null	
221-1251R	683,999.8	Non-HFTD---2	Null	Null	Null	
524-1782F	681,123.8	Tier3---9	0.65	0.45	2030	
217-837R	680,508.0	Tier3---9	Null	Null	Null	
1021-1760R	678,797.4	Tier3---9	1.64	0.99	2029	
249-24R	678,748.3	Tier3---9	Null	Null	Null	
CB SL1	677,976.3	Tier3---9	Null	Null	Null	
176-194R	677,779.0	Tier3---10	Null	Null	Null	
221-788	677,515.2	Tier3---9	Null	Null	Null	
212-773R	677,110.3	Tier2---5	Null	Null	Null	
470-40AE	675,342.4	Tier2---4	Null	Null	Null	
246-34R	673,237.7	Tier3---9	Null	Null	Null	
1023-48R	664,401.4	Tier2---5	Null	Null	Null	
520-1489R	662,163.3	Tier2---5	Null	Null	Null	
445-19R	654,526.9	Tier2---5	Null	Null	Null	
CB 1140	652,896.9	Non-HFTD---1	Null	Null	Null	
921-800F	650,306.7	Tier2---4	Null	Null	Null	
215-38R	650,178.4	Tier3---9	0.73	0.32	2028	

This response is consistent with SPD findings that SDG&E's tranching methodology is poorly correlated with its mitigation selection. SPD's observation is also aligned with Mussey Grade Road Alliance's (MGRA) comment that "SDG&E is leaving a remarkable amount of risk 'on the table' by choosing to mitigate lower-ranked risk circuits in the 2026-2028 timeframe there is little evidence that SDG&E is using calculated risk as a primary motivation for its hardening priorities."[222]

In its RAMP Report, SDG&E states that its mitigation selection process is based on risk reduction modeling using "WiNGS-Planning model." SDG&E reports that the results are then reviewed by SDG&E's Risk Analytics team and subject matter experts to assess feasibility and practicality, after which the final project will be confirmed. In addition, SDG&E is developing an optimization algorithm to identify feeder-segments that, when mitigated, would minimize the residual wildfire and PSPS risks while maintaining a cost-benefit ratio greater than one. The algorithm produces a list of projects consisting of bundled segments eligible for covered conductor and undergrounding.[223]

In a data request response, SDG&E elaborated that selection of the 82 feeder segments for undergrounding or covered conductor is guided by a multi-dimensional evaluation framework rather than a single primary metric. The primary and secondary justifications for each planned mitigation strategy are based on the following considerations:

1- Risk Reduction Potential
2- Cost-Benefit Performance: Segments demonstrating cost-benefit ratios greater than 1, under both risk-averse and non-risk-averse planning assumptions, are considered strong candidates for mitigation.
3- Residual Risk Management: The evaluation includes the level of unmitigated risk that would persist if no action is taken, helping to prioritize segments where mitigation efforts would result in the greatest overall improvement to safety.
4- Operational Constraints and Feasibility.
5- Segment Characteristics: like Maximum wind speeds associated with a given feeder segment
6- Bundling strategies aim to optimize wildfire and PSPS risk reduction by hardening adjacent segments together. [224]

SPD's data request asked why "SDG&E plans to implement undergrounding (SUG) on two relatively low-risk segments, 1022-17F and 214-1135R, which have neutral risks of $887K and $805K respectively. … In contrast, high-risk segments such as 909-451 and 524-69R have unscaled risks of $4.75M and $4.62M."

SDG&E replied that high-risk segments 909-451, and 524-69R were "not part of the initial undergrounding candidate" but are "currently under consideration for inclusion in the GRC portfolio" and they are under

[222] SDGE 2026-2028 Base WMP R1 - MGRA Comments p. 12, August 2025

https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=59121&shareable=true.

[223] SDG&E 2025 RAMP Chapter SDG&E-Risk 4, Wildfire and PSPS, p. 44.

[224] SPD-SEMPRA-2025RAMP-013 Q3.

"engineering review focused on system configuration" and "comprehensive engineering, permitting, and environmental assessments to evaluate the feasibility of implementing either Strategic Undergrounding or Combined Covered Conductor." Also "SDG&E remains committed to refining its mitigation strategy and will revisit and update the feeder segment portfolio in its Test Year 2028 General Rate Case to reflect evolving risk profiles, regulatory guidance, and system modeling improvements."

SPD observes that SDG&E has changed its mitigation plan for these two highlighted sections based on the data request response dated August 4, 2025.[225]

Observations and Findings:

1. SDG&E's HTM divides segments into tranches through a three-step process: (1) grouping segments into classes based on HFTD Tiers, (2) subdividing classes into risk quantiles based on risk scores, and (3) further splitting risk quantiles into regions using the median CoRE and LoRE values. SPD finds several design issues:
    a. **Redundancy in the process -** HFTD Tiers (used as classes in HTM) are already defined based on risk levels, and those same risk levels drive the formation of risk quantiles. As a result, breaking the data first by class and then again by risk quantiles is redundant, adding unnecessary complexity, and producing inaccurate groupings of risk.
    b. **Arbitrary criteria and partitioning** – HTM's excessive over-partitioning (splitting segments three times based on risk levels and CoRE/LoRE medians) leads to inconsistent groupings and creates segment scarcity in some tranches forcing reliance on workarounds like a "nearest-neighbor approach."
    c. **Non-HFTD Class -** Because tranches are formed and ranked independently within each class, the inclusion of a separate non-HFTD class, composed mainly of low-risk segments, creates the risk of misallocating mitigation resources by elevating low-risk tranches ahead of higher-risk HFTD tranches.

2. When all segments of wildfire and PSPS risk are analyzed together, SDG&E's HTM produces neither homogeneous risk tranches nor homogeneous CoRE/LoRE tranches. In other words, the resulting tranche assignment shows poor correlation with both risk and CoRE/LoRE values.

3. SDG&E calculates tranche-level risk scores using the sum of LoRE and the weighted average of CoRE. This method assumes that the LoRE of individual segments in each tranche are mutually exclusive, which may not be true, especially since adjacent segments with correlated risk and overlapping profiles may be grouped into the same tranche. Such an overlap could result in inaccurate aggregation and potential overestimation of overall risk.

[225] SPD-SEMPRA-2025RAMP-013 Q2a.

4. Analyzing SDG&E's segment risk data alongside SDG&E's hardening plan (mitigation selection) clearly reveals a disconnect between segment's Risk Scores and SDG&E's gird hardening plan. Many high-risk segments have no planned hardening, while several lower-risk segments are slated for capital-intensive measures such as undergrounding and covered conductor installations. As an example, out of the 35 highest-risk segments, only 17 are planned for UG or CC, compared to a total of 82 UG and CC projects, proposed in SDG&E's 2025 RAMP. This pattern reflects broader concerns that SDG&E's tranching methodology as applied (or if used) may not drive risk-based decisions and is poorly correlated with actual mitigation selection.

5. SDG&E states that its mitigation selection process is not based on a single risk metric but instead on a multi-dimensional framework combining modeling, expert judgment, and operational considerations. While SDG&E cites use of the WiNGS-Planning model, risk analytics review, and an in-development optimization algorithm, the actual selection of undergrounding and covered conductor projects is guided by a mix of factors.

6. SDG&E's mitigation plan appears highly fluid. Between May 15, 2025, when the RAMP was submitted, and SPD's August 2025 data request, two of the four randomly selected segments studied by SPD were re-planned for different hardening treatments (from none to UG). This inconsistency is further supported by findings from the WMP data request, which showed that SDG&E's underlying risk calculations changed significantly over a short period. Taken together, these changes suggest that SDG&E's hardening plan process lacks stability and transparency, which can hinder effective regulatory oversight to determine whether mitigation priorities are consistently risk-based.

Risk Drivers

SDG&E uses multiple drivers to calculate the LoRE for Wildfire and PSPS risks. Several of these drivers such as weather-related failure of SDG&E equipment (DT.1), energized downed conductor (DT.2), vegetation contact (DT.4), and extreme force of nature events (DT.7) might be influenced by the same underlying factor: adverse weather conditions. Because SDG&E sums the likelihoods of these weather-related drivers to calculate the total LoRE used in determining the overall risk score, this approach introduces overlap and potential double-counting. The result is an increased total LoRE and an overstated overall risk score.[226]

SPD's data request raised these concerns: "How does SDG&E ensure that these drivers are calculated and treated as mutually exclusive in its risk model to avoid double-counting when summing their individual likelihoods into a total LoRE for Wildfire and PSPS risk events?"

In response, SDG&E stated, "In modeling for WiNGS-Ops and WiNGS-Planning, each probability of failure model uses a separate historical occurrence rate for its associated risk driver. These models are then

[226] SEMPRA 2025 RAMP Chapter SDG&E-Risk-4, Wildfire and PSPS, p. 7.

measured against their historical risk driver type to determine if they are accurate model … however each model is treated independently to reduce the assumptions of how risk events relate to one another. Any real-world interdependencies are captured within the historical data used to calculate each risk driver model's likelihood." [227]

SPD is concerned that SDG&E's approach of modeling each risk driver independently, even when using the historical data, does not ensure mutual exclusivity. While treating models separately may simplify the process, it does not prevent overlapping real-world occurrences from being double counted when aggregating LoRE and risk values.

Without explicit adjustments for events' correlation or co-occurrence, summing individual driver probabilities could overstate overall Risk Score. Furthermore, relying solely on historical data to implicitly capture interdependencies may be insufficient, as the data may reflect correlated events, rather than isolating drivers.

SDG&E's risk assessment framework is built around Wildfire Ignition risk, PSPS, and PEDS[228] risk models, which are integrated into a comprehensive Monte Carlo simulation covering five million simulated years for every asset. For wildfires, the model leverages ignition probabilities, calculated at the asset level, that are calibrated to match observed annual ignition rates from historical record. To simulate how PSPS de-energizations unfold, a random value is drawn for each of the high fire days in a simulated year, representing the region-wide wind conditions for that day. [229]

The PEDS model uses historical outage data to calculate two statistical distributions: one for the annual frequency of PEDS de-energization and another for the consequence of each event, measured in customer minutes interrupted (CMI). In each run of the simulation each segment is treated as binary (fire/no fire). Thus, in any given one of the 5 million runs some segments ignite while others do not. SDG&E then averages the results across all runs and calculates the expected value (EV) as the risk for each segment, which is subsequently applied in tranche formation and risk scaling. At the system level, SDG&E combines the simulated events across all segments to produce a total risk distribution as shown in Figure 7-5.

SDG&E derives the total risk by summing the individual wildfire ignition, PSPS, and PEDS risks.[230] This approach assumes that these risks are mutually exclusive and do not overlap. If they are not mutually exclusive, the summation will overstate the total risk. In response to SPD concerns regarding the mutual exclusivity of PSPS and wildfire ignition risk, SDG&E stated "While these factors may intersect with other weather-related or ignition-related drivers, they are treated as distinct because they are not directly linked to wildfire risk but rather to the specific risk associated with Public Safety Power Shutoff (PSPS) risk. SDG&E

[227] SPD-SEU-001, Q1.

[228] Protective Equipment Device Settings

[229] SDG&E 2025 RAMP Chapter SDGE-Risk-4 Wildfire and PSPS, p.21.

[230] SDG&E 2025 RAMP Chapter SDGE-Risk-4 Wildfire and PSPS, p. 16.

ensures mutual exclusivity and avoids double-counting in the overall risk calculation by clearly delineating PSPS-related risks from other risk categories within the framework."[231]

However, SDG&E fails to provide supporting evidence to demonstrate mutual exclusivity. Simply "delineating" categories or stating that they are "treated as distinct" conceptually does not prove they are mutually exclusive in practice. Given that PSPS, wildfire ignition, and PEDS risks may overlap, simply summing their values will likely double count and overestimate the total risk.

SPD's data request also asked: "How has SDG&E incorporated PEDS risk into the Wildfire and PSPS risk and how they calculated the LoRE of Wildfire Ignition and PSPS risks considering the PEDS, PSPS and even some Wildfire Ignition drivers may not be exclusive?"

SDG&E responded that "Wildfire, PSPS, and PEDS risk events are modeled independently and aggregated at each feeder-segment level using a stochastic (Monte Carlo) simulation approach, allowing for a probabilistic representation of risk interactions and cumulative impacts across the electric distribution system."[232]

This also confirms SPD's concern that SDG&E impliments its modeling by assuming Wildfire Ignition, PSPS, and PEDS as "independent risks." If the inputs are assumed independent, the modeling is not designed to address overlap which may cause a double-counting issue.

SDG&E does not explain how the Monte Carlo simulation accounts for correlated drivers or overlapping events. Without clear documentation of correlation structures, dependency modeling, or joint probability treatment, it is unclear whether the simulation provides a defensible estimate of combined risk. If interdependencies are ignored and each risk is simulated independently, the aggregation process could still increase the total risk.

[231] SPD-SEU-001, Q2.

[232] SPD-SEU-001, Q4.

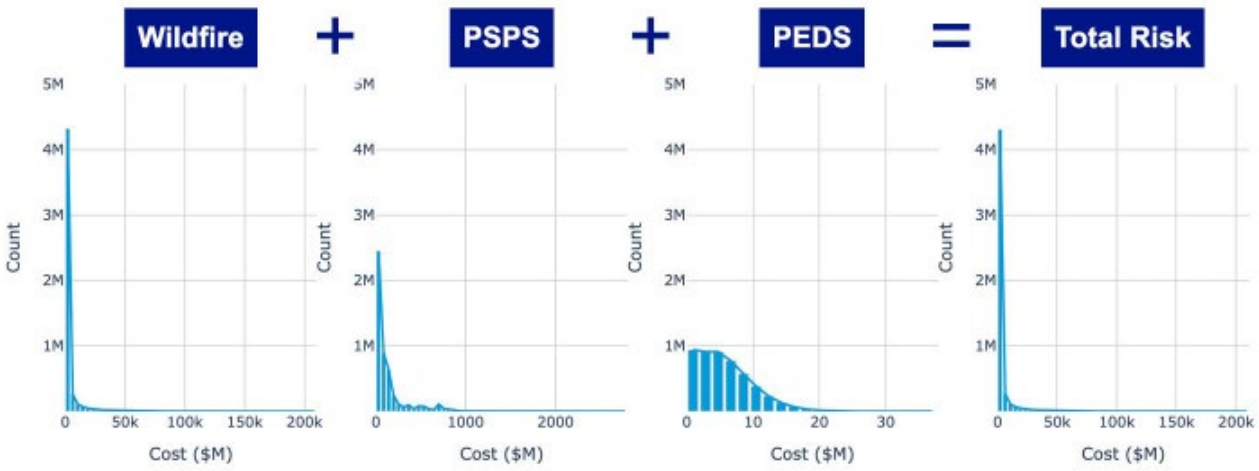

Figure 7-5: Wildfire, PSPS and PEDS Using Risks Aversion Attitude[233]

Observations and Findings:

1. SDG&E's method of calculating the LoRE appears to overstate Wildfire and PSPS risks. By treating weather-related risk drivers (e.g., equipment failure, downed conductor, vegetation contact, extreme weather) as independent and summing their probabilities, SDG&E may be double-counting correlated events that stem from the same underlying factor—adverse weather. While SDG&E argues that historical data implicitly captures interdependencies, SPD finds this approach insufficient because correlated events in the historical record do not ensure mutual exclusivity in modeling. As a result, the aggregation of LoRE values may artificially increase risk scores, undermining the accuracy and reliability of SDG&E's risk model.

2. SDG&E derives total risk by summing Wildfire Ignition, PSPS, and PEDS risks, an approach that assumes these risks are mutually exclusive. While SDG&E stated that these risks are "treated as distinct" or "modeled independently," this does not substantiate mutual exclusivity in practice. Without evidence of mutual exclusivity, or explicit dependence modeling (e.g., correlations or joint probabilities), summing these risks may result in double-counting overlapping drivers and overstating total risk.

[233] SDG&E 2025 RAMP Chapter SDG&E-Risk-4, Wildfire and PSPS, Figure 6, p. 23.

Consequences

The CoRE value has three attributes: safety, electric reliability, and financial. SDG&E summarized these attributes and their respective sub-attributes and monetized values in Table 2.[234] The table shows that the monetized values that SDG&E used in the 2025 RAMP for safety, and electric reliability are $16.2 million per fatality, and $3.76 per CMI.

SDG&E presented a breakdown of the values of dollars per CMI for each of three customer classes in Table 7.[235] SDG&E's dollars per CMI values are:

- $188.38 for Medium and Large Commercial & Industrial (C&I) customers
- $7.81 for Small C&I customers
- $0.05 for Residential customers

This means that for each minute of service interruption, the estimated cost is $188.38, $7.81, and $0.05 for each respective customer class. However, SDG&E applies a uniform dollars per CMI value of $3.67 across all customer classes for electric reliability.

To monetize the safety attribute of PSPS, SDG&E uses "one fatality per 10 billion customer minutes de-energized" metric based on a review of historical PSPS events to calculate SIFs[236] per de-energization in California (2018 to 2021).

For the electric reliability attribute of the PSPS risk, SDG&E relies on subject matter expert assumptions for CMI estimates based on a review of historical CMI values associated with past PSPS de-energizations in the service territory. To monetize the financial attribute of PSPS, SDG&E uses a $482 cost per de-energization for residential customers based on the per diem rates applicable to the San Diego area, as of September 2024 with the assumption of accommodating four family members per customer meter.

For commercial and industrial (C&I) customers, a $1,446 cost per de-energization is estimated. The PEDS Consequence model follows a similar approach to the PSPS CoRE model because it is modeled as a reliability outage occurring during extreme fire weather days. However, for the PEDS financial attribute, due to the limited data on the financial impacts of a PEDS outage, SDG&E stated that it relies on conservative estimates from subject matter experts. These estimates are based on high-level projections of overhead line patrol costs during periods of elevated or extreme fire weather conditions.[237]

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[234] SEMPRA 2025 RAMP, Chapter SDG/SDG&E RAMP-3 Risk Quantification Framework-5.

[235] SEMPRA 2025 RAMP Chapter SDG/SDG&E-RAMP-3 Quantification Framework-11

[236] Serious injuries and fatalities.

[237] SDG&E 2025 RAMP Chapter SDG&E-Risk-4, Wildfire and PSPS, p. 37.

Observations and Findings:

1. PSPS de-energizations (DT.11), along with repeated service interruptions caused by PSPS (PC.6 and PC.8), were added to the driver of total risk for the wildfire and PSPS risk. However, if the PSPS driver and other contributing drivers are not mutually exclusive, this can lead to overlapping and potential double-counting in the overall risk calculation.
2. SDG&E uses a flat $3.67 per CMI to represent the electric reliability valuation for all customer classes, while actual values vary significantly by customer type ($188 for large C&I vs. $0.05 for residential). A single value overlooks important differences in how outages affect residential versus non-residential customers and does not account for higher-risk and lower-risk regions. This over-aggregation can increase residential reliability costs and distort CBR results.
3. SPD observes that SDG&E monetizes the financial attribute of PSPS, using a $482 cost per de-energization for residential customers and $1,446 cost per de-energization for C&I customers However, it is not clear if this approach is double counting the electrical reliability value, which is intended to cover the costs of electric service lost as determined by ICE calculation of PSPS and PEDS.

Controls and Mitigations

Observations and Findings:

SPD has no observations and findings specific to the Controls and Mitigations section.

Alternatives Analysis

SDG&E Grid Hardening Alternative 1 (Alt 1) proposes undergrounding approximately 800 miles of electric lines between 2028 and 2031. SDG&E also claims that "This approach is the most effective method for mitigating wildfire risk as it virtually eliminates exposure…" [238] However, the CBR for Alt 1 is 0.93 (using WACC) for 815 miles, which is lower than the CBR of 1.37 for the proposed 604 miles of Strategic Undergrounding (SUG) in SDG&E's 2025 RAMP Grid Hardening Plan. The lower CBR for Alt 1 is likely due to diminishing returns for additional capital investment in lower risk segments. A CBR value below 1 indicates that the costs of the mitigation exceed the benefits it delivers meaning the mitigation is not cost efficient.

[238] SDG&E 2025 RAMP Chapter SDG&E-Risk-4, Wildfire and PSPS, p. 89.

SDG&E Grid Hardening Alternative 2 proposes installing approximately 800[239] miles of covered conductor between 2028 and 2031 instead of the undergrounding proposed in Alt 1. SDG&E's calculations show that this alternative mitigation results in a CBR of 0.59 (using WACC).[240] SPD observes that SDG&E's CBR calculation included the full, rather than the incremental, lifecycle and ongoing maintenance costs for its CC program which are substantially higher than those for SUG. This cost treatment depresses the CC CBR. SPD discusses this issue in greater detail in the CBR section.

Observations and Findings:

1. SDG&E's Grid Hardening Alternative 1, which proposes the undergrounding of 800 miles of distribution lines, is less cost-effective, with a CBR of 0.93, than SDG&E's planned Strategic Undergrounding program. Moreover, the scale of undergrounding proposed as Alternative 1 faces substantial feasibility challenges, including higher capital intensity, permitting hurdles, and geographic constraints.
2. SDG&E's Grid Hardening Alternative 2 proposes the installation of 800 miles of covered conductor, which is typically a more cost-efficient mitigation compared to undergrounding. However, SDG&E's inclusion of lifecycle and ongoing maintenance costs in the CBR denominator, without recognizing that many of these costs are status quo, skews the calculation and depresses the result. Consequently, the reported CBR for Alternative 2 is lower than for SUG, at 0.59.

Risk Scaling

SDG&E's CBRs are presented based on the expected value of CoRE,[241] adjusted through a convex, non-linear scaling function.[242] However, the Phase 3 Decision[243] directs that, if a utility applies risk scaling in its CBR calculations, it must also present the unscaled (neutral) CBR values and unscaled related risk elements. SDG&E presented both sets of CBRs in two workpapers: "No Aversion" for unscaled, and "Aversion" for scaled values. SDG&E summarized the effect of risk scaling on its risk calculations,[244] showing that the wildfire and PSPS's risk value increases from $476.41 million for risk neutral (unscaled) to $3020.61 million

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[239] In SDG&E workpaper; "SDGE_Wildfire&PSPS_Calc_Details_NoAversion.xlsx" column E and row 39, "1254" miles are estimated for Alternative 2.

[240] SDG&E 2025 RAMP Chapter SDG&E-Risk-4, Wildfire and PSPS, Table 15.

[241] Consequence of a risk event.

[242] SEMPRA 2025 RAMP Chapter SDG/SDG&E-RAMP-1 Overview, p. 12.

[243] D.24-05-064, Row 7, p. 98
"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".

[244] Sempra 2025 RAMP Chapter SDG/SDG&E RAMP-1 Overview, Table 4, p. 12.

for the risk averse (scaled)-an increase of approximately sevenfold. This substantial scaling increases the numerator of the CBR calculation (i.e., risk reduction benefit), which significantly impacts the CBR values.

SoCalGas and SDG&E stated that they used studies from the U.S. Department of Energy (DOE) and the Gas Research Institute (GRI) to calculate their risk scaling function.[245] The DOE study[246] examined how society perceives and responds to catastrophic risks, such as large-scale energy failures or accidents, while GRI study focused more specifically on North American pipeline systems and their risk characteristics.

SoCalGas and SDG&E used these studies as proxies for societal risk aversion because SDG&E believes that:

- They are reputable and peer-reviewed sources.
- They apply to industries with similar safety and reliability challenges.
- The results help quantify how strongly to weigh rare but severe events in their risk models.

By averaging the two values (1.34 from DOE and 1.6 from GRI), SoCalGas and SDG&E derived a risk scaling factor of 1.47 (where $y = x$ represents the neutral risk , while $y = x^{\alpha}$ reflects the scaled risk). SoCalGas and SDG&E claim this is an industry-consistent and socially appropriate level of risk aversion.

SPD's data request asked: "How does SDG&E ensure that its risk aversion scaling methodology prevents disproportionate inflation of certain risk components?" SDG&E responded, "SDG&E consistently applies the risk scaling function to all RAMP risks.…. The results of the risk aversion scaling function appropriately reflect SDG&E's aversion to the most severe outcomes. SDG&E does not apply arbitrary constraints to its risk aversion function, nor does it introduce an alternative scaling factor beyond the established value of 1.47 to artificially suppress or increase the monetized value of individual risk events."[247]

Figure 7-5 below, which corresponds to SDG&E Chapter 4's Tables 7 and 8, illustrates SDG&E's Wildfire, PSPS, and PEDS risk levels both with and without the application of SDG&E's risk aversion assumptions (risk scaling vs neutral risk). This comparison highlights the difference between scaled and unscaled risk valuations. For example, at the 99th percentile, which represents events estimated to occur approximately once every 100 years, the monetized overall risk increases from $4,290 million (unscaled) to $52,098 million (scaled) after SDG&E applied its scaling function, reflecting a 12-fold amplification (the legend "M" signifies millions).

Figure 7-6 visually demonstrates this difference and how the SDG&E's scaling function impacts the risk distribution, especially in the upper percentiles. This level of scaling warrants careful consideration when interpreting the results for planning and investment decisions.

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[245] SEMPRA 2025 RAMP Chapter SDG/SDG&E-RAMP-3 Quantification Framework, p. 24.

[246] UCLA School of Engineering and Applied Sciences, *The Use of Risk Aversion in Risk Acceptance Criteria?* (June 1980), *available at:* https://www.osti.gov/servlets/purl/5230500.

[247] SPD-SEU-001, Q3.

Table 7: Monetized Risk Estimates with Risk Aversion

Percentile	Annual Return Period (Years)	Wildfire Risk (M$)	PSPS Risk (M$)	PEDS Risk (M$)	Overall Utility Risk (M$)
p50	20	$ 14	$ 61	$ 5	$ 168
p98	50	$ 36,061	$ 766	$ 16	$ 36,196
p99	100	$ 51,962	$ 845	$ 18	$ 52,098
p100	---	$ 210,379	$ 2,804	$ 38	$ 211,202
AAL	1	$ 2,883	$ 132	$ 6	$ 3,021

Table 8: Monetized Risk Estimates without Risk Aversion

Percentile	Annual Return Period (Years)	Wildfire Risk (M$)	PSPS Risk (M$)	PEDS Risk (M$)	Overall Utility Risk (M$)
p50	20	$ 14	$ 61	$ 5	$ 155
p98	50	$ 3,235	$ 754	$ 16	$ 3,381
p99	100	$ 4,141	$ 833	$ 18	$ 4,290
p100	---	$ 13,334	$ 2,756	$ 38	$ 13,624
AAL	1	$ 340	$ 131	$ 6	$ 476

Figure 7-5 : SDG&E Tables 7 and 8, Illustrating SDG&E's Wildfire, PSPS, and PEDS Risk Levels With and Without SDG&E's Risk Aversion Scaling Applied.[248]

[248] AAL stands for the expected average annual loss.

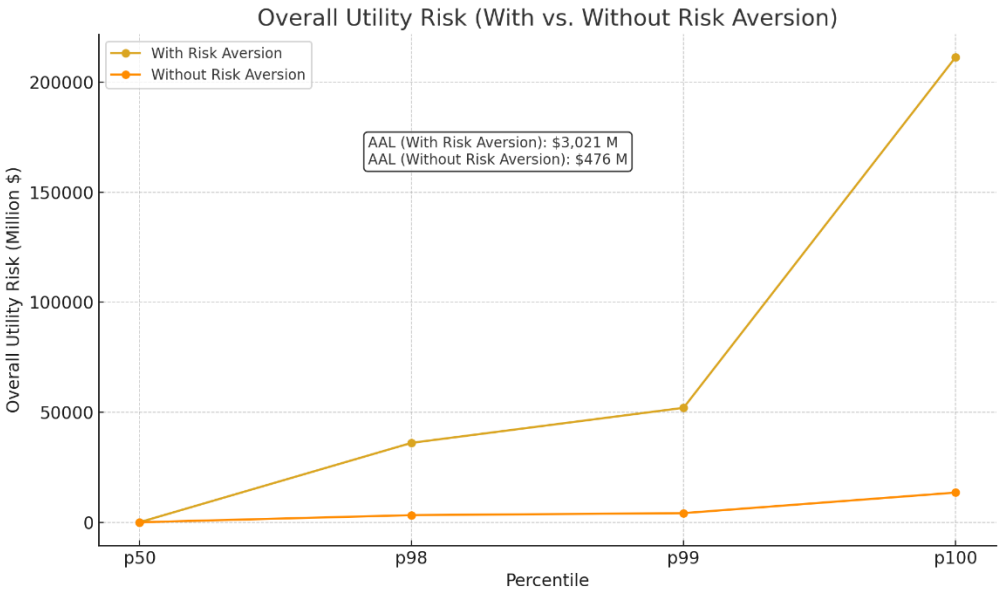

Figure 7-6: Scaled Versus Unscaled Risk Distribution for Different Event Percentiles

SDG&E also presents the pre-mitigation risk values for the wildfire and PSPS risks, broken down by each LoRE and CoRE atribute summarized in Table 7-2. It includes both scaled and unscaled values, enabaling comparison between risk-neutral (unscaled) and risk-averse (scaled) values based on SDG&E's underlying assumptions.[249] This table clearly demonstrates how SDG&E's risk aversion scaling increases the total risk more than 6 times, mostly driven by the exponential scaling applied to the financial attribute of the CoRE, which is the largest of the three attributes.

Table 7-2: Pre-Mitigation Risk Values for Wildfire and PSPS Risks by each LoRE and CoRE attributes (in 2024 $ Millions)

Risk Aversion	LoRE	CoRE [Risk-Adjusted Attribute Values]			Total CoRE	Total Risk [LoRE x Total CoRE]	
		Safety	Reliability	Financial			
Scaled Risk Values	127.02	$1.60	$1.08	$21.10	$23.78	$	3,020.61
Unscaled Risk Values	127.02	$0.47	$1.04	$2.24	$3.75	$	476.42

[249] SDG&E 2025 RAMP Chapter SDG&E-Risk-4, Wildfire and PSPS, Table 2, p. 12.

SPD analyzed the effect of scaling on the risk values and on the underlying CoRE values for each feeder circuit segment presented in SDG&E workpapers. Figure 7-7 illustrates SDG&E's scaling effect on the risk value across those segments. The X-axis represents unique feeder segments (SDG&E labeled feeder segment as assigned feeder segment names "*upstreamardfacilityid*"),[250] sorted from highest to lowest based on unscaled risk, where:

- Top panel (Start Risk Neutral): Unscaled segment risk values.
- Middle panel (Start Risk Scaled): Scaled segment risk values.
- Bottom panel (Implied Risk Scaling Effect): defined as the Start Risk Scaled divided by Start Risk Neutral.

Implied risk scaling effect values are color-coded: gray (less than 2.5), blue (2.5–5), amber (5–7.5), orange (7.5–10), and red (greater than 10). Figure 7-7 shows that some segments with relatively low start risk neutral (on the right side of the graphs) still receive disproportionately high scaling effect, indicating that SDG&S's scaling is not strictly proportional to risk values and start risk neutral. The bottom panel further highlights that implied risk scaling effect values are widely scattered rather than systematically correlated with unscaled risk.

Figure 7-8 shows the SDG&E's segments sorted based on unscaled CoRE (Start CoRE Neutral) from the highest to the lowest, where:

- Top panel (Start CoRE Neutral): Unscaled segment CoRE values;
- Middle panel (Start CoRE Scaled): Scaled segment CoRE values;
- Bottom panel (Implied Risk Scaling Effect).

Figures 7-4 shows that implied risk scaling effect values are also poorly correlated to CoRE values and start CoRE neutral. Figures 7-7 and 7-8 together indicate that SDG&E's scaling function does not exhibit a meaningful correlation with either unscaled risk or unscaled CoRE of segments. The scaling function appears to have been applied inconsistently, raising concerns about the integrity of risk prioritization and the validity of SDG&E's CBR calculations.

Although CoRE has three attributes (i.e., reliability, safety, and financial) and risk scaling may be applied to each separately, which suggests that the total scaled CoRE value may be driven by the single highest of the three attributes when exponential scaling is applied, a high value in any one attribute will result in a high overall CoRE (CoRE = reliability + safety + financial.) Thus, if a single attribute is high enough to warrant a strong implied risk scaling effect, the unscaled segment would appear on the left side of Figure 7-7, where segments with high CoRE values are located.

[250] SPD-SEMPRA-2025RAMP-013 Q1.

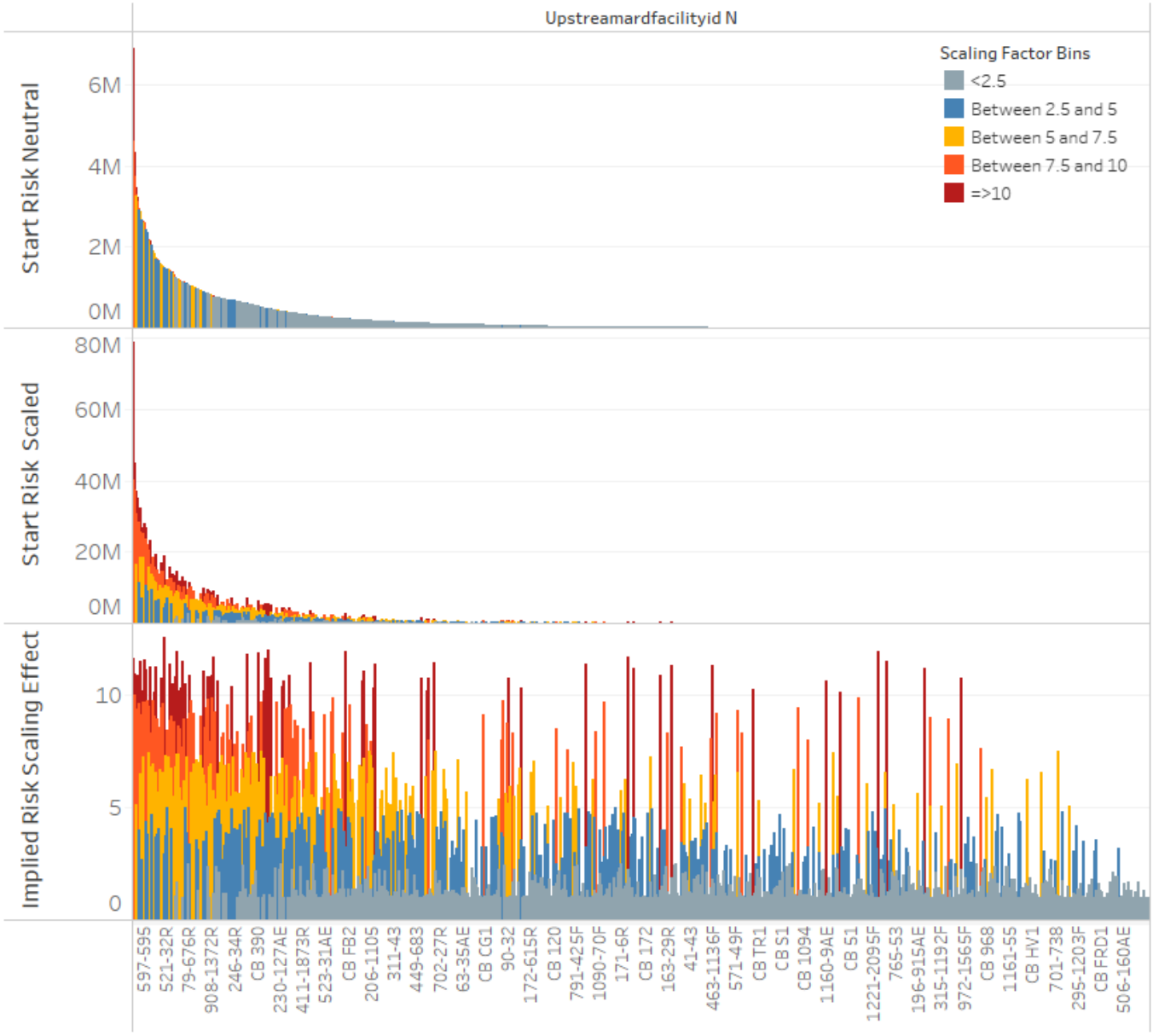

Figure 7-7: SDG&E Implied Risk Scaling Effect Relative to Start Risk Neutral

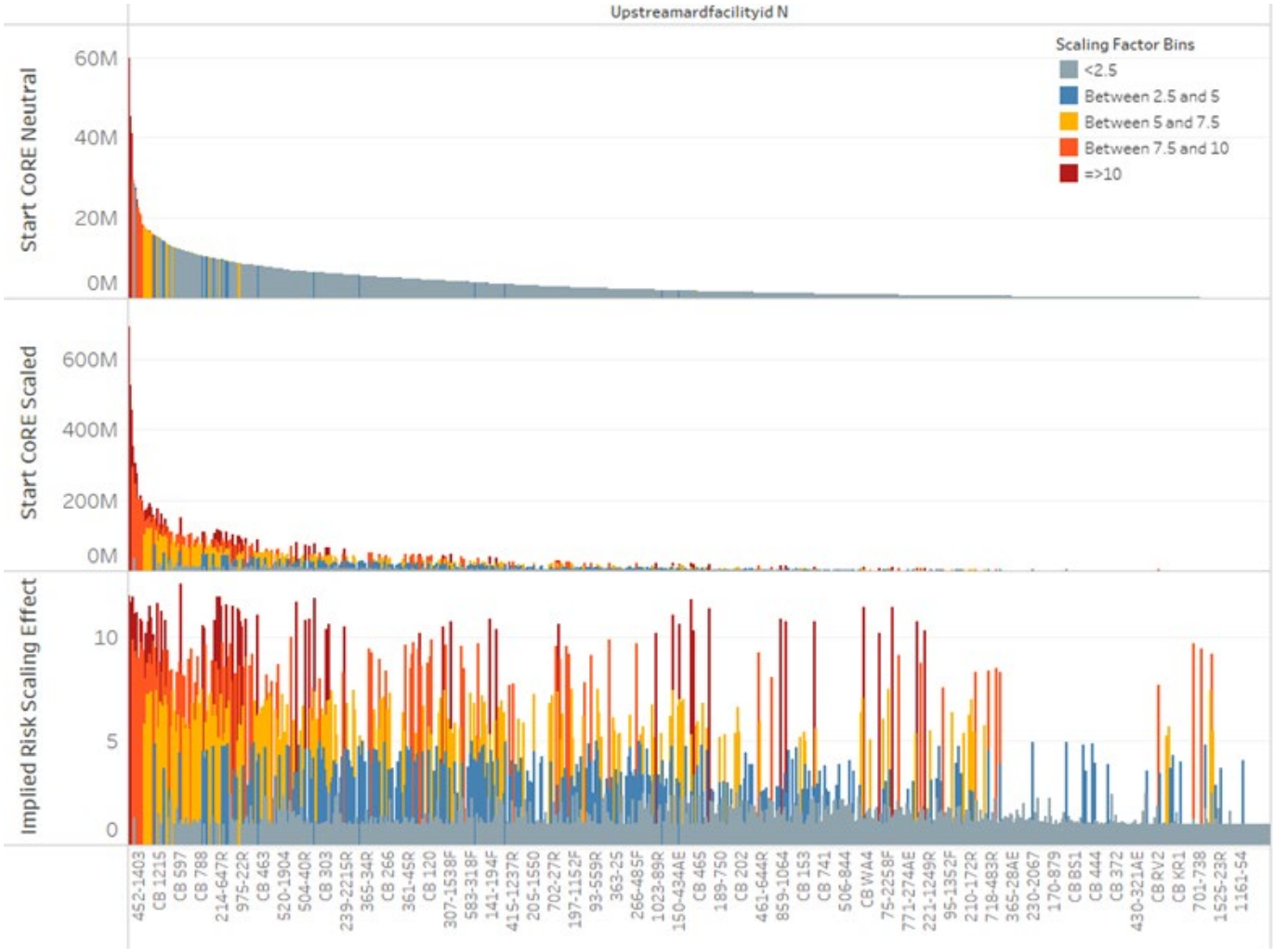

Figure 7-8: SDG&E Implied Risk Scaling Effect Relative to Start CoRE Neutral

SPD noted the unusual result that many instances of high-risk scaling (seen especially towards the right-hand, lower risk portion of the figures above) occur where the underlying CoRE is very low and randomly chose a few examples to request additional explanation from SDG&E.

SPD's data request highlighted two low risk segments ("1022-17F" and "214-1135R") whose risk values are scaled more than 11 and 8 times, respectively, compared to two very high risk segments ("909-451", "524-69R") whose risk values are scaled similarly after the application of SDG&E's risk scaling function.

SDG&E stated that its "Monte Carlo simulation model uses a discrete probabilistic approach to monetize risk and does not sample monetized risk outcomes from an underlying distribution. Specifically, event occurrence is modeled as a series of Bernoulli trials, where each asset has a binary outcome: either

experiencing or not experiencing a risk event each year. Each segment has a probability of a risk event that is informed by historical data and its attributes."[251]

SPD is concerned that SDG&E's use of a Bernoulli-style Monte Carlo simulation does not adequately portray the full distribution of CoRE outcomes which is required to identify or prioritize "black swan" scenarios: rare but catastrophic events with outsized consequences. By representing the potential range of outcomes with one expected value, information about possibly extreme events is not available to inform mitigation decisions. Also, SDG&E's response stands in contrast to SPD's findings [see Figures 7-7 and 7-8], which show that the Implied Risk Scaling Effect is not strongly correlated with underlying CoRE or Risk values.

All said, SDG&E's use of expected value with risk scaling appears to distort prioritization by applying the scaling function to all CoRE values, regardless of the consequence distributional characteristics. The result is that risk values and CBRs are increased, without meaningfully addressing the potentially high tail risk segments.

SPD also considered the impact of risk scaling on tranche assignments, expecting that scaling segments based on higher consequences would elevate those segments into higher tranches to impact prioritization of mitigations. Figure 7-9 shows the result of SDG&E's risk scaling on tranche assignments. The x-axis values represent the change in assigned tranche after SDG&E applies its risk scaling function to the segments. For example, a value of 9 indicates that a segment's assigned tranche increased by 9 levels moving to a tranche that signifies higher risk (e.g., tranche 10 to tranche 1). A negative value indicates a segment was moved to a lower risk tranche. It is worth noting that out of 2,142 unique segments, the assigned tranche of only 41 segments moved down more than 5 tranches while 21 segments moved up by more than 5 tranches, which SPD considers a significant change in tranche level. SPD expects that the benefit of scaling is to identify segments for prioritization of mitigations. However, in the instances where scaling promoted segments to a higher risk tranche, only one such segment is planned for undergrounding (SUG) and two are planned for Covered Conductor installation (CCC).

[251] SPD-SEMPRA-2025RAMP-013 Q4.

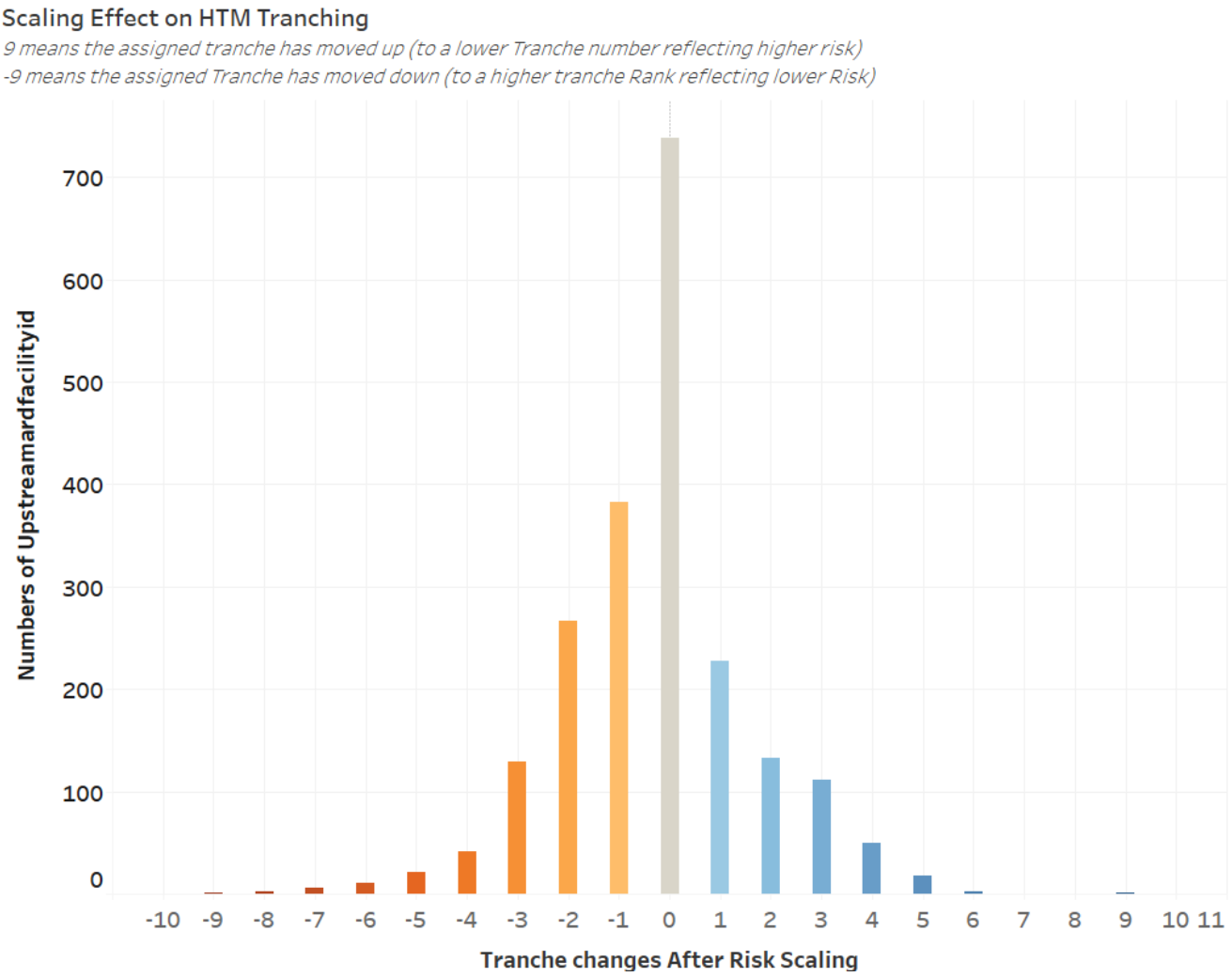

Figure 7-9: Impact of SDG&E's Risk Scaling on HTM Tranching

In its informal comments, MGRA also had concerns with the risk scaling approach, stating that SDG&E's "use of risk aversion to apply to financial losses is inappropriate … Using SDG&E's scaling function, SDG&E's reasonable cost for loss avoidance in the 2025 Eaton fire would be: $10 B X (10,000 X ($1 M/$16 M))1.47 = $10 B X (625 life equivalents)$^{1.47}$ = $128 trillion."[252]

SPD is concerned about how risk scaling is used in risk mitigation planning. In response to SPD's Data Request, which asked SDG&E to demonstrate "how risk scaling affects mitigation planning for those four

[252] SDGE 2026-2028 Base WMP R1 - MGRA Informal Comments p. 21, August 2025

https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=59121&shareable=true.

segments" (two high-risk segments with no hardening planned and two low-risk segments slated for undergrounding), SDG&E objected on the grounds that the request would "impose an undue burden."[253]

This lack of transparency reinforces SPD's concern that SDG&E's risk scaling is not meaningfully linked to mitigation planning. Instead, the evidence suggests that risk scaling functions serve primarily to increase CBR values, rather than to guide SDG&E's risk-informed prioritization.

SDG&E expects faster population and construction growth in HFTDs than in other areas and is evaluating how to incorporate these forecasts into its wildfire risk models. To do so, SDG&E plans to apply scale factors, one based on forecasted HFTD population growth relative to a baseline year, and another based on changes in housing unit counts as a proxy for the number of structures in the HFTD. SDG&E will also account for wildland-urban interface ignition-resistant construction requirements, excluding new buildings in designated Fire Hazard Severity Zones.

Observations and Findings:

1. The comparison between SDG&E's scaled and unscaled risk values for wildfire and PSPS risks highlights the substantial impact of the risk scaling function to CoRE values and, consequently, to the overall Risk Score (LoRE × CoRE). By applying scaling, the total risk for wildfire and PSPS events is raised from $476.42 million to $3,020.61 million, a sixfold increase. SPD expects that this large amplification of risk should drive mitigation priority to the highest consequence circuit segments.

2. SDG&E's scaling function appears to alter the CoRE attributes in a highly uneven way. The safety CoRE attribute increases from $0.47 to $1.60 (a 3.4-fold increase), the financial CoRE attribute surges from $2.24 to $21.10 (a 9.4-fold increase), while the reliability CoRE remains almost unchanged ($1.04 to $1.08). While it is possible that applying an exponential function at the segment attribute level could explain these differences, the unscaled data was not provided at the segment attribute level. The differences raise concerns about whether SDG&E applies a consistent scaling methodology.

3. SDG&E's risk scaling process does not exhibit a meaningful correlation with either unscaled risk value or unscaled CoRE values of segments. This finding suggests that scaling factors have been applied inconsistently, potentially undermining the integrity of risk prioritization and SDG&E's CBR calculation.

   SDG&E's use of a Bernoulli-style Monte Carlo simulation to calculate risk rather than incorporating full risk (or CoRE) distributions when applying its risk scaling function, does not adequately address "black swan" scenarios, i.e., rare but catastrophic events. As a result, SDG&E's risk scaling approach

[253] SPD-SEMPRA-2025RAMP-013 Q5.

treats nearly all high risk and CoRE values as equally significant, regardless of their underlying distribution and hence distorts mitigation prioritization. In other words, SDG&E risk scaling increases Risk values and CBRs without meaningfully addressing tail risks or accounting for extreme events.

Out of the 2,142 unique segments SDG&E reported in this RAMP, the assigned tranche for 41 segments moved down by more than five levels in tranche ranking, while only 21 segments moved up by more than five levels in tranche ranking after SDG&E applied its risk scaling function to emphasize segments with the greatest risk. Among those 21 segments shifted upward by 5 tranche levels, only one segment is slated for undergrounding (SUG) and two for covered conductor (CCC) installation. These results suggest the effect of SDG&E's risk scaling does not significantly influence its choices to prioritize the highest risk segments but mainly increases CBR values of most segments.

4. SDG&E's objection to demonstrating how risk scaling affects its mitigation planning for four segments (two high-risk segments with no hardening planned and two low-risk segments slated for undergrounding), as requested by SPD, reinforces SPD's concern that SDG&E's risk scaling is not meaningfully linked to mitigation planning. Instead, the evidence suggests that SDG&E's risk scaling primarily increase CBR values, rather than guiding risk-informed prioritization.

5. SDG&E plans to incorporate projected population and housing growth into its Wildfire risk models by applying scaling factors based on forecasted changes within HFTDs. SDG&E stated that these factors will adjust the estimated consequences of Wildfire Ignition events, such as structures destroyed. The approach excludes new buildings in ignition-resistant zones. [254]

CBR Calculations

SPD is concerned with the way SDG&E has presented Operation and Maintenance (O&M) costs associated with proposed mitigations in their benefit-cost ratio (CBR) calculations, which can be seen in the workpapers for this risk. SDG&E has included all the costs of existing O&M baseline activities required to maintain existing overhead conductors in the calculation of the combined covered conductor CBR, rather than just the incremental costs or savings expected from the mitigation, as required by the RDF.

SPD finds that inclusion of O&M costs already incurred by ratepayers in establishing the baseline level of risk is not appropriate since these costs will continue to be paid in a non-build scenario. For a true cost-benefit analysis of a proposed improvement, only the incremental O&M cost, or likely the savings, should be accounted for to show the benefits of making a change.

[254] SDG&E 2025 RAMP Chapter SDG&E-Risk-4, Wildfire and PSPS, p. 35.

The guidance provided in the RDF Phase 3 Decision Appendix A is by necessity designed for flexibility in order for its requirements to be applicable to all enterprise risks, but the present RAMP has provided an opportunity to visit these points and provide clarification.

Table 7-3 illustrates the CBRs for "Strategic Undergrounding" (SUG) and "Combined Covered Conductor" (CCC) calculated using SDG&E's methodology and workpapers.[255] SDG&E's methodology incorporates O&M costs in the CBR denominator using the baseline costs for existing O&M activity which is producing the baseline level of risk.

As a result, SDG&E's approach significantly depresses the CBR for CCC compared to SUG, because SDG&E assigns the full costs of existing O&M activity such as vegetation management (VM) and overhead (OH) inspection patrols rather than only the incremental O&M costs associated with CCC, while accounting for the incremental cost reductions in the case of SUG. MGRA also made similar observations in its informal comments on the RAMP and noted "SDG&E makes a number of assumptions regarding these costs, and the majority of these assumptions appear to skew in favor of underground mitigation."[256]

MGRA also mentioned that "Some lifecycle costs that apply to the SDG&E system as a whole are being inappropriately assigned to only the covered conductor program."[257]

Table 7-3 : CBR including Capital and O&M Costs in the Denominator (using WACC [258])

[255] SDG&E 2025 RAMP workpaper "SDGE_Wildfire&PSPS_Calc_Details_NoAversion.xlsx" tabs "C518_SUG" and "C550-CCC".

[256] SDGE 2026-2028 Base WMP R1 - MGRA Comments Page 12, August 2025

https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=59121&shareable=true.

[257] SDGE 2026-2028 Base WMP R1 - MGRA Comments Page 22, August 2025

https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=59121&shareable=true.

[258] WACC stands for Weighted Average Cost of Capital. Table 7-4, 7-5, and 7-6 present cost values using the WACC discount rate for simplicity and illustrative purposes only. This does not imply any preference or endorsement of one discount rate over another.

Control Mitigation Name and ID	OH Miles	Capital and O&M Costs[259]	Risk Reduction	CBR (Neutral Risk)
Strategic Undergrounding(C518)	717[260]	$1,489,468.98	$1,790,296.45	1.2
Combined Covered Conductor (C550)	717	$1,146,735.53	$711,499.37	0.62

During the August 2025 RAMP workshop,[261] SPD questioned whether the benefits of VM and OH inspections were included within the calculation of the CCC CBR while the costs of VM and OH inspections were added. In response, SDG&E claimed that Table F-2[262] includes the benefit of VM. SDG&E argues that the value of 2024/2025 SME Risk Reduction for the Vegetation Contact driver would not be 90 percent if VM was not taken into account. To verify this claim, SPD has reviewed multiple documents to determine whether SDG&E provided evidence that the 90% SME Risk Reduction value does incorporate VM. For instance, Section 13.2.3 of SDG&E's WMP discusses establishing joint working groups on combined mitigation effectiveness studies. However, SDG&E acknowledged that "because the working group is relatively new, there is not enough information to develop any lessons learned."[263] Additionally, in response to Area for Continued Improvement SDGE-25U-04, SDG&E noted its participation in the development of the Continuation of Grid Hardening Joint Studies, which was also submitted with SDG&E's WMP.[264]

SDG&E's primary contribution to this study was to discuss the relative decrease of covered conductor's mitigation effectiveness over time, however, SPD was unable to find any discussion of how SDG&E incorporated VM into its calculation of mitigation effectiveness.[265]

Finally, in Attachment F of the Wildfire chapter of the 2025 Sempra RAMP, there is no explicit statement that SDG&E has included VM or OH inspections as part of its Combined Covered Conductor effectiveness value. More specifically, SDG&E stated: "To determine the overall effectiveness of Combined

[259] SDG&E 2025 RAMP workpaper "SDGE_Wildfire&PSPS_Calc_Details_NoAversion.xlsx" , Sheet "C518_SUG", columns S and T

[260] These miles are based on SDG&E calculations and higher than what SDG&E proposed in 2025 RAMP which are 200, and 600 miles respectively.

[261] SEMPRA 2025 RAMP Workshop August 2025.

[262] SDG&E 2025 RAMP Chapter SDG&E-Risk-4, Wildfire and PSPS, Appendix F p. 20.

[263] SDG&E 2026-2028 Base WMP at 32.7

[264] SDG&E 2026-2028 Base WMP, Appendix D at 31.

[265] See SDG&E 2026-2028 Base WMP, Appendix D, Attachment A, Continuation of Grid Hardening Joint Studies at 11.

Covered Conductor mitigation, the effectiveness of the Covered Conductor (45.8 percent) is combined with the impact of Falling Conductor Protection (FCP) and Early Fault Detection (EFD) mitigations."[266]

While there remains some question about how the benefits of these O&M activities are accounted for in the risk calculations, the overall expectation is that because they are currently in effect, their impact on risk is already part of the baseline risk conditions. What is important in proposing a different mitigation is to show the incremental net benefits in reducing risk, including the incremental expense, or savings, expected from the proposal.

Figure 7-10 shows SDG&E's long-term operational and foundational costs for Existing OH conductors, proposed covered conductor (CCC) and strategic undergrounding (SUG). [267] Comparing the VM and OH Inspections costs of CCC and Existing OH clearly shows that SDG&E adds the full baseline costs of $1,915.8 million in the CCC's CBR calculation, rather than the incremental savings of $1,915.8 minus $2,265 = ($349.4) This approach depresses CBR for covered conductor programs as SPD previously discussed.

To illustrate the difference with numbers and how it affects the CBR, SPD created Table 7-4 which presents the CBR calculations, excluding O&M costs for CCC and SUG programs. Under this approach, the CBR for CCC increases substantially (from 0.62 to 1.23) nearly matching the CBR of SUG, which is 1.33. This rough analysis ignores the additional effect that including incremental O&M savings for CCC would have when included in the benefits term of the CBR calculation. The inclusion or exclusion of O&M from the denominator can significantly shift the comparative assessment of these two strategies.

[266] SDG&E 2025 RAMP Chapter SDG&E-Risk-4, Wildfire and PSPS, Appendix F p. 20.

[267] This data was presented at the SEMPRA 2025 RAMP Workshop, August 2025.

Category	Activity	Existing OH	CCC	SUG
OH Inspections	Detailed Inspections	$ 4.47	$ 4.47	$ -
	Patrol Inspection	$ 8.57	$ 8.57	$ 3.57
	Drone Inspections	$ 20.48	$ 20.48	$ -
	Wood Pole Intrusive Inspect.	$ 6.50	$ -	$ -
UG Inspections	SS10 Inspection	$ -	$ -	$ 4.05
	Padmount Inspections	$ -	$ -	$ 5.38
Repair and Replacement	Repair O&M	$ 148.75	$ 127.43	$ 2.55
	Repair Capital	$ 594.65	$ 509.41	$ 57.15
	Pole Replacement	$ 244.95	$ 8.60	$ -
	Outage Repair	$ 13.01	$ 13.01	$ 16.34
Vegetation Management	Tree Inspections	$ 61.32	$ 61.32	$ -
	Tree Audit	$ 18.74	$ 18.74	$ -
	Pole Inspections	$ 3.29	$ 3.29	$ -
	Pole Clearance	$ 36.76	$ 36.76	$ -
	Pole Audit	$ 2.92	$ 2.92	$ -
	Tree Trim	$ 369.26	$ 369.26	$ -
PEDS	Falling Conductor Protection	$ 2.10	$ 2.10	$ -
	Early Fault Detection	$ 0.45	$ 0.45	$ -
PSPS	PSPS Community Outreach	$ 233.69	$ 233.69	$ 56.81
	PSPS Activation	$ 8.10	$ 8.10	$ 6.55
Microgrid	Microgrid	$ 45.57	$ 45.57	$ 45.57
Foundational		$ 441.64	$ 441.64	$ 183.53
	Total (K$/mile)	**$2,265.21**	**$1,915.79**	**$381.51**

Figure 7-10: SDG&E's Average Long-term Operational and Foundational Costs

Table 7-4: CBR with Only Capital Costs in the Denominator (using WACC)

Control Mitigation Name and ID	OH Miles	Capital Costs[268]	O&M Costs (not in CBR)	Risk Reduction (Neutral Risk)	CBR (Neutral Risk)
Strategic Undergrounding(C518)	717[269]	$1,344,735.42	$144,733.56	$1,790,296.45	1.33
Combined Covered Conductor(C550)	717	$579,632.74	$567,102.80	$ 711,499.37	1.23

[268] SDG&E 2025 RAMP workpaper "SDGE_Wildfire&PSPS_Calc_Details_NoAversion.xlsx" , Sheet "C518_SUG", columns S and T.

[269] SDG&E 2025 RAMP workpaper "SDGE_Wildfire&PSPS_Calc_Details_NoAversion.xlsx" , Sheet "C518_SUG", columns H. These calculations are related to all segments, SDG&E plans to implement SUG or CCC.

Table 7-5 illustrates the effect of SDG&E's risk scaling in CBR calculations. For both C518 and C550, the scaled risk (and risk reduction) is nine times higher than the neutral risk (and risk reduction) values. This large scaling dramatically increases the CBR for both mitigation programs. Also, when O&M costs are excluded, the scaled CBR for C550 is 11.2, which is nearly identical to the scaled CBR for C518 at 12.3 mirroring the relationship observed in the unscaled CBRs.

Table 7-5: SDG&E's CBR calculation for Scaled and Neutral Risk using WACC[270]

Control Mitigation Name and ID	OH Miles	Risk Reduction Scaled	Risk Reduction Neutral Unit	CBR Neutral Risk	CBR Scaled
Strategic Undergrounding (C518)	717	$16,557,659.48	$1,790,296.45	1.2	11.1
Combined Covered Conductor (C550)	717	$ 6,498,713.16	$ 711,499.37	0.62	5.66

Observations and Findings:

1. SDG&E has included the existing O&M baseline activity costs required to maintain overhead conductors in the calculation of the combined covered conductor CBR, rather than just the incremental costs or savings expected from the mitigation. SPD finds that inclusion of O&M costs already incurred by ratepayers in establishing the baseline level of risk is not appropriate since these costs will continue to be paid in a non-build scenario. For a true cost-benefit analysis of a proposed improvement, only the incremental O&M cost, or potentially the savings, should be accounted for to show the benefits of making a change. As a rough estimate, when O&M costs are excluded from the denominator of the CBR calculations, the CBR for CC increases substantially (from 0.62 to 1.23), nearly matching the CBR of Strategic Undergrounding at 1.33. The treatment of O&M costs can significantly shift the comparative assessment of these strategies.
2. A comparison of the total risk scores and CBR values for SDG&E's strategic undergrounding and combined covered conductor plans, both with and without the applications of SDG&E's risk scaling function, shows that risk scaling substantially increases CBRs, giving SUG a favorable CBR of 11 compared to CCC at 5.5. This result emphasizes the importance of how risk scaling is applied and how the underlying CBR benefits and costs are determined.

[270] SDG&E 2025 RAMP workpaper "SDGE_Wildfire&PSPS_Calc_Details_NoAversion.xlsx" and "SDGE_Wildfire&PSPS_Calc_Details_Aversion.xlsx".

Cost and Work Units Presentation

SDG&E provides "Control and Mitigation Plan" costs, units, and CBR in formats such as Table 11 and 12 of SDG&E-Risk-4 (see Figure 7-11).[271]

SPD's data request cited several inconsistencies in reporting (e.g., "explain why there is a column for 2025-2028 capital, but no column for 2025-2028 O&M," "Explain why there is a column for '2028 O&M' but no column for 2028 capital," "Explain why O&M and capital are separated for units of measure. E.g., for C518, what does it mean to show 150 miles under 2028 O&M and 178 miles under 2025- 2028 capital").

SDG&E explained that the 2025 RAMP is aligned with the 2028 GRC cost presentation.[272] However, SPD finds this presentation confusing and inconsistent, as it conflates cost categories (Capital vs. O&M) with mitigation units (miles, poles, circuits). For example, SDG&E reports "150 miles" of O&M in 2028 alongside "178 miles" of Capital for 2025–2028, even though O&M is not a measurable mitigation unit. Moreover, inconsistent use of timeframes (single years, multi-year spans) further complicates interpretation. This approach obscures rather than clarifies the scope of mitigations, preventing reviewers from thoroughly examining high-level data or validating comparisons across mitigations.

Also, SDG&E appears to use inconsistent and potentially overlapping cost categories in its CBR calculations. For example, it is unclear whether "Long-term Foundational Costs" are included within "Long-term Operational Mitigation Costs," and whether VM costs are being counted both in Combined Covered Conductor (C550) and in VM-related mitigations such as C551 and C554. This lack of transparency makes it difficult to verify cost allocation across mitigations and may result in inaccurate or biased CBR values. [273]

SDG&E reports conflicting capital costs for Strategic Undergrounding (C518): $1,393.5 million in its 2025 RAMP filing[274] versus $932,745 in its data request response.[275] Such discrepancies raise concerns about the accuracy and reliability of the reported cost basis used in CBR calculations and hinder confidence in the integrity of SDG&E's filings.

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[271] SDG&E 2025 RAMP Chapter SDG&E-Risk-4, Wildfire and PSPS, pp. 76-81.

[272] SPD-SEMPRA-2025RAMP-009 Q10.

[273] SPD-SEMPRA-2025RAMP-009 Q2.

[274] SDG&E 2025 RAMP Chapter SDG&E-Risk-4, Wildfire and PSPS, p. 82.

[275] SPD-SEMPRA-2025RAMP-009 Q9a.

Table 12: Wildfire and PSPS
Control & Mitigation Plan – Units Summary

Control/Mitigation			Adjusted Recorded Units		Estimated Units			
ID	Name	Units of Measure	2024 Capital	2024 O&M	2028 O&M	2025-2028 Capital	PTY Capital	PTY O&M

Figure 7-11: SDG&E's Table 12 Control and Mitigation Plan's Unit Table Column Headers

Observations and Findings:

1. In Chapter SDG&E Risk 4, SDG&E broke down the control and mitigation planned units and forecasted costs to "2028 O&M" and "2025-2028 capital" and "PTY Capital" and "PTY O&M" and stated that this is consistent with its GRC filings. SPD finds this presentation confusing and inconsistent, as it conflates cost categories (Capital and O&M) with mitigation units (miles, poles, circuits). For example, SDG&E reports "150 miles" of UG under O&M in 2028 category alongside "178 miles" of UG under Capital for 2025–2028 column, even though O&M is not a measurable mitigation unit. Also, inconsistent use of timeframes (single years, multi-year spans) further complicates interpretation. This format obscures rather than clarifies the scope of mitigations, preventing reviewers from thoroughly examining data or validating comparisons across mitigations.

2. SDG&E uses unclear and potentially overlapping cost categories in its CBR calculations. It is not evident whether "Long-term Foundational Costs" overlap with "Long-term Operational Mitigation Costs," or whether VM costs are being double counted between Combined Covered Conductor (C550) and standalone VM mitigations (C551, C554). This presentation undermines transparency and may produce biased CBR values.

3. SDG&E reports inconsistent capital costs for Strategic Undergrounding (C518): $1,393.5 million in the 2025 RAMP versus $932.7 million in a data request response. These discrepancies raise concerns about the accuracy and reliability of the cost basis underlying CBR calculations and reduce confidence in SDG&E's filings.

Summary of Findings

1. SDG&E did not present the total mileages of its distribution (and potentially transmission) lines disaggregated by HFTD tier and associated tranche. Instead, it stated 2,142 segments are used to analyze and to create tranches and only reported mileage figures for planned hardening (including 717 miles of CC and UG) as well as for other controls and mitigations.

2. SDG&E's Homogeneous Tranching Methodology (HTM) divides segments into tranches through a three-step process: (1) grouping segments into classes based on HFTD tiers, (2) subdividing classes into risk quantiles based on risk scores, and (3) further splitting risk quantiles into regions using the median CoRE and LoRE values.

SPD finds several design issues:

a. **Redundancy in the process**: HFTD Tiers (used as classes in HTM) are mainly defined based on segment risk levels, but those same risk levels drive the formation of risk quantiles. As a result, breaking the data first by class and then again by risk quantiles is redundant, adding unnecessary complexity, and producing inaccurate groupings of risk.
b. **Arbitrary criteria and partitioning**: HTM excessive over-partitioning (splitting segments three times based on risk levels and CoRE/LoRE medians) leads to inconsistent groupings and creates segment scarcity in some tranches forcing reliance on workarounds like a "nearest-neighbor approach."
c. **Non-HFTD Class**: Because tranches are formed and ranked independently within each Class, the inclusion of a separate non-HFTD class, composed mainly of low-risk segments, creates the risk of misallocating mitigation resources by elevating low-risk tranches ahead of higher-risk HFTD tranches.

3. When all segments of wildfire and PSPS risk are analyzed together, the SDG&E's HTM produces neither homogeneous risk tranches nor homogeneous CoRE/LoRE tranches. In other words, the resulting tranche assignment shows poor correlation with both risk and CoRE/LoRE values.

4. SDG&E calculates tranche-level risk scores using the sum of LoRE and the weighted average of CoRE. This method assumes that the LoRE of individual segments are mutually exclusive, which may not be true, especially since adjacent circuits with correlated risk and overlapping profiles are mostly grouped into the same tranche. Such overlaps could result in inaccurate aggregation and potential overestimation of overall risk.

5. Analyzing SDG&E's segment risk data alongside SDG&E's hardening plan (mitigation selection) reveals a disconnect between segment's risk scores and SDG&E's grid hardening plan. Many high-risk segments have no planned hardening, while several lower-risk segments are slated for capital-intensive measures such as undergrounding and covered conductor installations. As an example, out of the 35 highest-risk segments, only 17 are planned for UG or CC, compared to a total of 82 UG and CC projects, proposed in the SEMPRA 2025 RAMP. This pattern reflects broader findings that SDG&E's tranching methodology as applied (or even if used) does not drive risk-based decisions and is poorly correlated with actual mitigation selection.

6. SDG&E states that SDG&E's mitigation selection process is not based on a single risk metric but instead on a multi-dimensional framework combining modeling, expert judgment, and operational considerations. While SDG&E cites use of the WiNGS-Planning model, Risk Analytics review, and an in-development optimization algorithm, SDG&E's actual selection of undergrounding and covered conductor projects is guided by a mix of factors: (1) risk reduction, (2) cost-benefit ratios, (3) residual risk, (4) operational feasibility and segment characteristics like maximum wind speeds associated with a given feeder segment, and (5) bundling strategies.

7. SDG&E's mitigation plan appears highly fluid. Between May 15, 2025, when the RAMP was submitted, and SPD's August 2025 data request, two of the four random segments studied by SPD were re-planned for different hardening treatments (from none to UG). This inconsistency is further supported by findings from the WMP data request, which showed that SDG&E's underlying risk calculations changed significantly over a short period. Taken together, these changes suggest that SDG&E's hardening plan process lacks stability and transparency and also hinders effective regulatory oversight to determine whether mitigation priorities are consistently risk-based.

8. SDG&E's method of calculating the LoRE appears to overstate wildfire and PSPS risks. By treating weather-related risk drivers such as weather-related failure of SDG&E equipment (DT.1), energized downed conductor (DT.2), vegetation contact (DT.4), and extreme force of nature events (DT.7) as independent and summing their probabilities, SDG&E may be double-counting overlapping events that share the same underlying driver: adverse weather. While SDG&E argues that historical data implicitly captures interdependencies, SPD finds this approach insufficient because correlated events in the historical record do not ensure mutual exclusivity in modeling. As a result, the aggregation of LoRE values may artificially increase Risk Scores, undermining the accuracy and reliability of SDG&E's risk model.

9. SDG&E determines total risk by summing wildfire ignition, PSPS, and PEDS risks, an approach that assumes these risks are mutually exclusive. While SDG&E stated that these risks are "treated as distinct" or "modeled independently," this does not substantiate mutual exclusivity in practice. Without evidence of mutual exclusivity, or explicit dependence modeling (e.g., correlations or joint probabilities), summing these risks may result in double-counting overlapping drivers and overstating total risk.

10. DT.11 (PSPS de-energizations), along with PC.6 and PC.8 (repeated service interruptions caused by PSPS), were added to the driver of total risk for the wildfire and PSPS risk. However, if the PSPS driver and wildfire drivers are not mutually exclusive, this can lead to overlapping and potential double-counting in the total risk (also see #7, #10, and #14).

11. SDG&E uses a flat $3.67 per CMI to represent the electric reliability valuation for all customer classes, while actual values vary significantly by customer type ($188 for large C&I versus $0.05

for residential). A single value overlooks important differences in how outages affect residential versus non-residential customers and does not account for higher-risk and lower-risk regions. This over-aggregation can increase residential reliability costs and correspondingly increase CBR results.

12. SPD observes that SDG&E monetizes the financial attribute of PSPS, using a $482 cost per de-energization for residential customers and $1,446 cost per de-energization for C&I customers However, it is not clear if this approach is double counting the electrical reliability values which is intended to cover the costs of electric service lost as determined by ICE calculation of PSPS and PEDS.

13. SDG&E's Grid Hardening Alternative 1, which proposes to underground 800 miles of distribution lines, is not cost-efficient, with a CBR of 0.93, below the threshold of 1 and lower than SDG&E's own Strategic Undergrounding program. Moreover, the scale of undergrounding proposed as Alternative 1 faces substantial feasibility challenges, including high capital intensity, permitting hurdles, and geographic constraints. SPD observes that Alternative 1 is not a preferrable choice.

14. SDG&E's Grid Hardening Alternative 2 proposes the installation of 800 miles of covered conductor, which is typically a more cost-efficient mitigation compared to undergrounding. However, SDG&E's inclusion of lifecycle and ongoing maintenance costs in the CBR denominator, without recognizing that many of these costs are status quo, skews the calculation and depresses the result. Consequently, the reported CBR for Alternative 2 is lower than for SUG, at 0.59.

15. The comparison between SDG&E's scaled and unscaled risk values for Wildfire and PSPS risks highlights the substantial impact of the risk scaling function to CoRE values and, consequently, to the overall Risk Score (LoRE × CoRE). By applying scaling, the total risk for Wildfire and PSPS events is raised from $476.42 million to $3,020.61 million, a sixfold increase. SPD expects that this large amplification of risk should drive mitigation priority to the highest consequence circuit segments.

16. SDG&E's scaling function appears to alter the CoRE attributes in a highly uneven way. The safety CoRE attribute increases from $0.47 to $1.60 (a 3.4-fold increase), the financial CoRE attribute surges from $2.24 to $21.10 (a 9.4-fold increase), while the reliability CoRE remains almost unchanged ($1.04 to $1.08). While it is possible that applying an exponential function at the segment attribute level could explain these differences, the unscaled data was not provided at the segment attribute level. The differences raise concerns about whether SDG&E applies a consistent scaling methodology.

17. SDG&E's risk scaling process does not exhibit a meaningful correlation with either unscaled risk value or unscaled CoRE values of segments. This finding suggests that scaling factors have been applied inconsistently, potentially undermining the integrity of risk prioritization and SDG&E's CBR calculations.

18. SDG&E's use of a Bernoulli-style Monte Carlo simulation to calculate the expected value of risk rather than incorporating full risk (or CoRE) distributions when applying its risk scaling function, does not adequately address "black swan" scenarios (i.e., rare but catastrophic events). As a result, SDG&E's risk scaling approach treats nearly all high risk and high CoRE values as equally significant, regardless of their underlying risk or CoRE distribution and hence distorts mitigation prioritization. In other words, SDG&E risk scaling increases risk values and CBRs without meaningfully addressing tail risks or accounting for extreme events.

19. Out of the 2,142 unique segments SDG&E reported in this RAMP, the assigned tranche for 41 segments moved down by more than five levels in tranche ranking, while only 21 segments moved up by more than five levels in tranche ranking after SDG&E applied its risk scaling function to emphasize segments with the greatest risk. Among those 21 segments shifted upward by five tranche levels, only one segment is slated for undergrounding (SUG) and two for combined covered conductor (CCC) installation. These results suggest the effect of SDG&E's risk scaling does not significantly influence choices to prioritize the highest risk segments but mainly increases CBR values of most segments.

20. SDG&E's objection to demonstrating how risk scaling affects mitigation planning for four specific segments (two high-risk segments with no hardening planned and two low-risk segments slated for undergrounding), as requested by SPD, reinforces SPD's concern that SDG&E's risk scaling is not meaningfully linked to mitigation planning. Instead, the evidence suggests that SDG&E's risk scaling primarily serves to increase CBR values, rather than to guide risk-informed prioritization.

21. SDG&E plans to add scaling factors to incorporate projected population and housing growth into its wildfire risk models based on forecasted changes within HFTDs. These factors will adjust the estimated consequences of wildfire ignition events, such as structures destroyed. The approach will exclude new buildings in ignition-resistant zones.

22. SDG&E has included the costs of existing O&M baseline activities required to maintain overhead conductors in the calculation of the Combined Covered Conductor CBR, rather than just the incremental costs or savings expected from the mitigation. SPD finds that inclusion of O&M costs already incurred by ratepayers in establishing the baseline level of risk is not appropriate since these costs will continue to be paid in a non-build scenario. For a true cost-benefit analysis of a proposed improvement, only the incremental O&M cost, or likely the savings, should be accounted for to show the benefits of making a change.

23. A comparison of the total risk scores and CBR values for SDG&E's strategic undergrounding and combined covered conductor plans, both with and without the applications of SDG&E's risk scaling function, shows that risk scaling substantially increases CBRs, giving SUG a favorable CBR of 11 compared to CCC at 5.5. This result emphasizes the importance of how risk scaling is applied and how the underlying CBR benefits and costs are determined.

24. In Chapter SDG&E Risk 4, SDG&E broke down the control and mitigation planned units and forecasted costs to "2028 O&M" and "2025-2028 capital" and "PTY Capital" and "PTY O&M" and stated that this is consistent with its GRC filings. SPD finds this presentation confusing and inconsistent, as it conflates cost categories (Capital and O&M) with mitigation units (miles, poles, circuits). For example, SDG&E reports "150 miles" of UG under O&M in 2028 category alongside "178 miles" of UG under Capital for 2025–2028 column, even though O&M is not a measurable mitigation unit. Also, inconsistent use of timeframes (single years, multi-year spans) further complicates interpretation. This format obscures rather than clarifies the scope of mitigations, preventing reviewers from thoroughly examining data or validating comparisons across mitigations.

25. SDG&E uses unclear and potentially overlapping cost categories in its CBR calculations. It is not evident whether "Long-term Foundational Costs" overlap with "Long-term Operational Mitigation Costs," or whether VM costs are being double counted between Combined Covered Conductor (C550) and standalone VM mitigations (C551, C554). This presentation undermines transparency and may produce biased CBR values.

26. SDG&E reports inconsistent capital costs for Strategic Undergrounding (C518): $1,393.5 million in the 2025 RAMP versus $932.7 million in a data request response. These discrepancies raise concerns about the accuracy and reliability of the cost basis underlying CBR calculations and reduce confidence in SDG&E's filings.

Recommendations

1. SDG&E should report the total mileage of distribution (and, where applicable, transmission) lines, disaggregated by HFTD tier and associated tranche. SDG&E should also report how its grid-hardening plan affects line miles within each HFTD tier and tranche, to allow assessment of whether mitigations are aligned with risk exposure.

2. SDG&E should create tranches based on risk scores or LoRE × CoRE pairs across all segments for Wildfire and PSPS risk and avoid redundant steps that could introduce unnecessary complexity or lead to biased or inconsistent outcomes. SDG&E's tranching methodology should be designed to enable data-driven decision-making for hardening prioritization.

3. When summing LoRE (or risk) across multiple segments to calculate the total LoRE or the total risk (e.g., for a tranche), SDG&E should clearly demonstrate whether the LoRE events are mutually exclusive. If they are not, SDG&E should apply methods that account for overlap in risk exposure to avoid double-counting and overestimating total LoRE, and total risk.

4. SDG&E should explicitly integrate its tranching methodology into its mitigation planning. Mitigation decisions should be clearly linked to tranches with homogeneous risk or LoRE/CoRE values, ensuring that the highest-risk and most cost-efficient projects (e.g., those with high CBRs) are prioritized. If SDG&E allocates capital to lower-risk segments, it should provide a clear justification.

5. SDG&E should provide detailed documentation of its mitigation selection process, including a clear step-by-step description and an accompanying decision tree or flowchart. In addition, SDG&E should:
    a. Disclose weighting or prioritization criteria used when/if multiple factors (e.g., risk reduction, CBR, residual risk, feasibility) conflict.
    b. Provide case examples demonstrating how specific projects were selected or rejected using this framework.
    c. Clarify the role of modeling vs. expert judgment in the final decision, including thresholds or conditions under which expert overrides are applied.
    d. Ensure consistency with the CPUC's risk-based decision-making standards like RDF, so that mitigation selection is transparent, repeatable, and auditable.

6. To ensure accountability, SDG&E should maintain a transparent version-controlled record of its risk calculations and mitigation selection (criteria), so that stakeholders can verify whether mitigation priorities are consistently risk-based and not subject to arbitrary shifts.

7. SDG&E should not assume mutual exclusivity of risk drivers solely from historical data. SDG&E should provide clear documentation showing how its methodology avoids overlap among drivers that are summed up to calculate the total LoRE. To prevent double-counting and overstating risk, SDG&E should either:
    a. Demonstrate mutual exclusivity by clearly defining driver events such that no overlap can occur, or
    b. Explicitly model dependencies/overlap using mathematically appropriate methods (e.g., inclusion–exclusion for unions of events, joint/conditional probabilities)
8. To ensure SDG&E's risk modeling is transparent and does not overstate total risk, the following clarifications are needed:
    a. SDG&E should clearly demonstrate how overlaps between the drivers of PSPS, PEDS, and wildfire ignition risks are modeled or excluded.
    b. If risks are treated additively (as SDG&E did in 2025 RAMP), SDG&E should provide evidence that risks, and their drivers are statistically mutually exclusive.

c. SDG&E should document the methods used to avoid overstating total risk, including how correlation, dependency, or joint probability structures are addressed in its modeling.

9. SDG&E should calculate and use ICE Calculator granularity at the level of customer class (i.e., residential vs non-residential) separated by HFTD and non-HFTD regions. SDG&E should use the corresponding dollars per CMI values for each customer class and HFTD tier in the CBR calculation of mitigation projects to ensure consistent and representative valuation of electric reliability.
10. SDG&E should provide robust justification for its assumptions in monetizing the PSPS and PEDS financial attributes and explain how the use of $482 and $1446 cost per de-energization for residential customers and C&I customers respectively, reflects best practice in monetizing the financial attribute of CoRE. Also, SDG&E should explain whether these costs are not already included in the electric reliability values determined by ICE.

11. SDG&E should reconsider Alt 2, the covered conductor approach, after correcting the CBR calculation to include only incremental O&M costs as part of the net benefits

12. SDG&E indicated that its selected scaling exponent ($\alpha = 1.47$) was derived by averaging two values (1.34 from the DOE study and 1.6 from the GRI study).
    a. SDG&E should clearly justify why the use of $\alpha = 1.47$ is appropriate across all segments and attributes. This justification should include demonstrating that the selected exponent aligns with stakeholder risk preferences and is not arbitrarily applied.
    b. SDG&E should report both unscaled and scaled risk values along with their associated risk attributes (Safety, Reliability, Financial) side-by-side for each segment. SDG&E should also clearly demonstrate how scaling affects each attribute, how it alters segment risk rankings, and how it influences project prioritization in its hardening plans.
    c. SDG&E should conduct and publish a sensitivity analysis to illustrate how different values of the α impact total Risk Scores, CBR results, and mitigation prioritization.

13. SDG&E should clearly document and explain both the justification for applying risk scaling and the process used to apply it to any segment when:
    a. Risk scaling results in the segment being included in or excluded from SDG&E's grid hardening plan.
    b. Risk scaling causes significant changes to the segment's tranche assignment.

14. SDG&E should revise its risk assessment and scaling methodology to incorporate full CoRE (and risk) distributions when/if applying risk scaling. This revision should appropriately account for rare segments associated with low-probability, high-impact scenarios. Additionally, SDG&E should demonstrate how its revised model better captures tail risks and guides mitigation decisions for segments where extreme events are plausible.

15. SDG&E should explain and justify the linkage (or lack thereof) between the application of risk scaling, and the resulting tranche changes and mitigation selections. If SDG&E's risk scaling application does not lead to changes in mitigation plans and merely increases the CBRs of most high-risk segments, it calls into question the practical utility of the risk scaling function.

16. SDG&E should file and serve a technical whitepaper detailing all assumptions, data sources, and formulas used to develop and apply any scaling factors (e.g., associated with population and housing growth or other forecasts) in wildfire consequence modeling, prior to incorporating such factors into its risk modeling. Also, SDG&E should provide version-controlled data to enable SPD and stakeholders to review the effect of these factors on mitigation selection.

17. The CBR calculation should be based solely on the incremental difference between the proposed mitigation and the no-build baseline (i.e., a well-defined baseline scenario representing no mitigation). Net O&M benefits (or costs) should be calculated from the no-build baseline. This approach prevents double-counting and ensures analytical consistency.

18. SDG&E should restructure its reporting templates for costs and units across control and mitigation plans in a more consistent and transparent format. SDG&E should provide the units (e.g., miles of UG, inspections) for each year of the GRC cycle without splitting them into O&M and Capital categories. While it may be appropriate to break down forecasted costs into O&M and Capital, such cost information should be presented consistently (e.g., annual reporting or clearly defined multi-year blocks) for all relevant years to allow for clear comparison and alignment with physical work.

19. SDG&E should provide clear cost allocation rules and reconcile overlapping categories. Each cost element (e.g., capital, O&M, VM, foundational) should be uniquely defined and consistently applied across mitigations. SDG&E should also provide reconciliation tables demonstrating that no cost is double counted across mitigations.

20. SDG&E should reconcile conflicting cost figures and ensure consistency across all filings (RAMP, GRC, and data requests). If differences arise due to methodological assumptions or updated estimates, SDG&E should explicitly disclose the rationale and provide a crosswalk table showing how each figure was derived.

8. SDG&E Electric Infrastructure Integrity

Risk Description

In SDG&E's 2025 RAMP Report, Electric Infrastructure Integrity (EII) Risk is defined as the potential result of asset failures due to factors such as degradation over time, aging, operation beyond design specifications, unforeseen events like natural disasters, or non-compliance with updated engineering standards. These failures can lead to incidents affecting public safety or the reliability of electric service. SDG&E stated that EII does not fall within the top 40 percent of safety attribute values, but the high electric reliability attribute brings the total risk score to the highest among all the RAMP Report risks. Table 8-1 below describes SDG&E's risk definition and scope relating to this chapter.

Table 8-1. Risk Definition and Scope[276]

Line No.	Item	Description
1	Risk Name	Electric Infrastructure Integrity.
2	Definition	The risk of electric asset failure due to internal or external factors, leading to serious injuries, fatalities, reliability impacts, and associated financial costs of remediation and restoration. The electric operational functionality may result in public or employee safety issues, property damage, environmental damage, or inability to deliver energy.
3	In Scope	Risks and mitigations unrelated to wildfire mitigation, primarily outside of SDG&E's High Fire Threat District (HFTD). Mitigation activities such as vegetation management, pole replacements, and equipment inspections, excluding those explicitly related to wildfire mitigation. Costs associated with mitigation activities are allocated according to HFTD and non-HFTD percentages, consistent with SDG&E's Wildfire Mitigation Plan.
4	Out of Scope	Wildfire-related risks and mitigations are covered in SDG&E's "Wildfire and PSPS" risk chapter (SDG&E-Risk-4). Mitigation activities and associated costs related explicitly to wildfire mitigation, as detailed in the Wildfire and PSPS risk chapter.

[276] SDG&E 2025 RAMP Chapter SDG&E-Risk-5, p. 1.

Observations and Findings

In SDG&E's September 9, 2021, RAMP workshop,[277] the company clarified that its EII Risk includes risk to underground assets. These incidents do not involve wildfire risks but may still impact public safety or service reliability. While most of the assets in question are part of the electric distribution system, transmission assets are also considered within this risk scope.

Mitigation activities such as pole replacements and equipment inspections are conducted to address risks unrelated to wildfire mitigation. These measures aim to enhance the overall safety and reliability of the electric infrastructure, irrespective of high-fire threat areas such as parts of San Diego and southern Orange Counties.

Risk Bow Tie

The risk bow tie depicted in Figure 8-1 illustrates the risk drivers and triggers that lead to electric asset failure and the associated consequences, as defined in SDG&E's risk definition and scope.

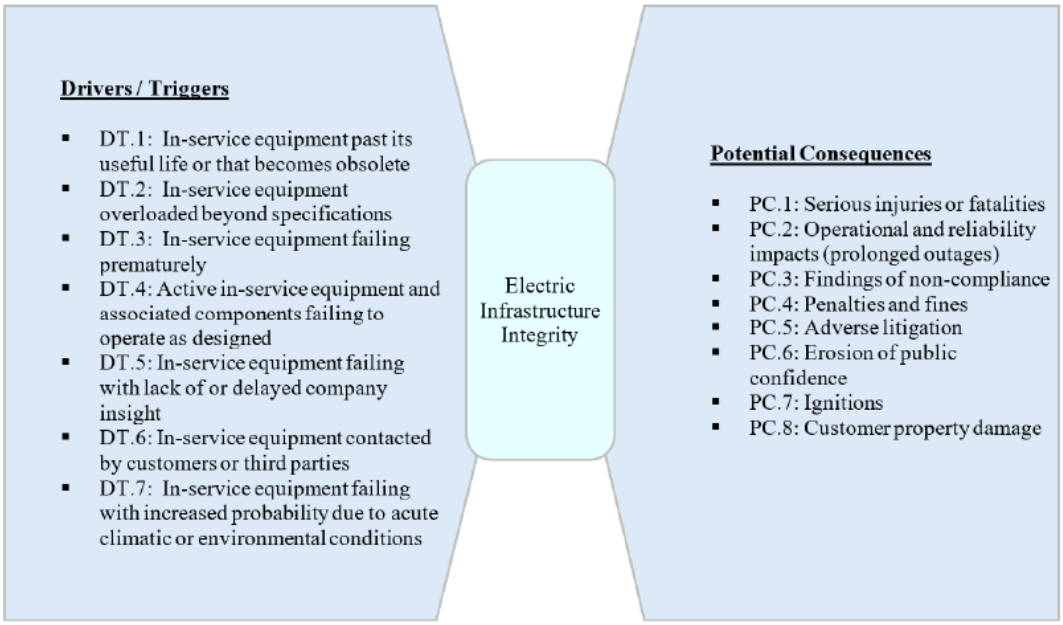

Figure 8-1: SDG&E's Electric Infrastructure Integrity Risk Bow Tie[278]

[277] 2021 RAMP Workshop recording at CPUC webpage: Risk Assessment and Safety Analytics (ca.gov)
[278] SDG&E 2025 RAMP Ch. SDG&E-Risk-5, Figure 1, p. 5.

Observations and Findings:

The risk bow tie presented is superficial, and lacks quantitative details about drivers, triggers, or potential consequences. In contrast, PG&E's risk bow tie in its 2024 RAMP for this same risk provided very detailed quantitative information.[279] SDG&E presented a risk bow tie for this same risk in its 2021 RAMP filing also. The major difference in the risk bow ties is that SDG&E added "Ignitions" (PC7) and "Customer Property damage" (PC8) as potential consequences in the 2025 RAMP.[280]

In addition, SDG&E made minor grammatical wording changes to DT1, DT2, DT7, and PC2 from the 2021 RAMP bow tie to its current presentation. These changes do not impact the analysis of the risk bow tie.

Exposure

No exposure data is provided or discussed in this chapter.

Observations and Findings:

SPD observes that a discussion of the kinds of equipment that are exposed to the risk can be very helpful to illustrate what elements of the utility infrastructure have been assessed in the chapter. This chapter did not present a list or the numbers of the assets exposed to EII risk. In particular, SPD is concerned whether this risk assessment includes Battery Energy Storage Systems (BESS), which are logically part of the electric infrastructure.

SDG&E's 2025 RAMP references batteries only as resiliency assets within the Wildfire & PSPS Risk chapter (e.g., C504 Standby Power describes permanent backup batteries charged by onsite solar and C506 Microgrids notes deployment of mobile batteries to form temporary microgrids) rather than identifying a discrete BESS-safety enterprise risk with Step-2A metrics, bow-tie/tranche definitions, and CBRs. In Appendix 4 of the ESJ Pilot Study, "Microgrid and Battery Energy Storage Systems (BESS)" are further characterized as Non-RAMP activities, reinforcing that storage deployments are treated outside the selected RAMP risk set.[281]

[279] 2024 PG&E RAMP (A.24-05-008).
[280] SDG&E 2021 RAMP Ch. SDG&E-Risk-2, Figure 1, p. SDG&E-2-6.

[281] SDG&E 2025 RAMP, Appendix 4 Environmental Social Justice (ESJ) Pilot Study, p. 16.

Tranches

In its 2025 RAMP filings, Sempra presents a notably larger number of mitigation tranches than in 2021. This increase aligns with the RDF Decision's[282] goal of enhanced tranche granularity, breaking down risks into more refined, quintile-based segments. This shift demonstrates progress toward more granular and transparent risk management.

SDG&E utilizes the Homogeneous Tranching Methodology (HTM) to categorize assets and systems into groups with similar risk profiles, referred to as "tranches." This approach follows the guidance in Row 14 of the RDF),[283] which allows utilities to create alternatives to the quintile tranching approach, provided they support the approach with a White Paper. The HTM process involves analyzing various factors such as asset characteristics, environmental conditions, and potential failure modes to ensure that each tranche represents a distinct risk category.

The outcome of this methodology is the establishment of specific classes and likelihood of a risk event (LoRE) and consequence of a risk event (CoRE) pairings, leading to a defined number of tranches. SDG&E claims that these classifications are essential for prioritizing mitigation strategies and allocating resources effectively to address the most significant risks. SDG&E categorizes six tranche classes, 280 LoRE-CoRE pairs, and 69 tranches. Table 8-2 depicts the EII risk tranches. Risk mitigation and reduction to tranches are illustrated and calculated in the workpapers.[284]

[282] Rulemaking 20-07-013, Phase 3, D.24-05-064, Order Instituting Rulemaking to Further Develop a Risk Decision-Making Framework (RDF) for Electric and Gas Utilities, May 30, 2024 "RDF Phase 3 Decision".

[283] D.24-05-064, Appendix A, Regarding Required Elements for Risk and Mitigation Analysis in the RAMP and GRC Applications, Row 14, p. A-13.

[284] SDG&E 2025 RAMP Workpapers, EII Full Workbook_Calc_Details_R.

Table 8-2. EII Risk Tranche Identification by Class[285]

Class	LoRE-CoRE Pairs	Resulting Tranches
Emergency Restoration (Non-UG)	55	12
Overhead	64	16
Substation	22	6
Underground	38	11
Vegetation	22	6
Other	79	18
Total	**280**	**69**

Observations and Findings:

SPD observes that Sempra employed its HTM as an alternative permitted by the RDF Phase 3 Decision, which segments risks by LoRE and CoRE into 69 distinct tranches. In comparison to Sempra's 2021 RAMP filings, the 2025 filings include significantly more tranches, reflecting a more granular risk assessment and improved data transparency that provide visibility into tailored mitigation strategies.

Risk Drivers

SDG&E utilizes a bow tie risk model (Figure 8-1) to evaluate EII risk by identifying "Drivers/Triggers" (DT)—early indicators of potential failure. These include both external influences (e.g., weather, load stress, public third-party actions) and inherent asset traits (e.g., aging, obsolescence, overloading). These drivers/triggers inform the LoRE and enable a proactive risk framework that links observable signals to failure probabilities, guiding targeted mitigation efforts.

SDG&E highlights seven key drivers of EII risk: aging or obsolete equipment (DT1); overloading beyond design limits due to extreme conditions like high winds (DT2); premature failure despite quality testing (DT3); failures or delays in protection systems that exacerbate damage (DT4); hidden faults lacking timely visibility, such as leaking transformers (DT5); accidental contact by third parties (DT6); and increased failure probability during acute weather or environmental events, which hinder response times (DT7). These categories span the asset lifecycle—from degradation and design stress to operational dynamics and external threats—and inform SDG&E's use of condition-based monitoring, hardening programs, and real-time analytics to enhance system reliability and public safety within their service territory.

[285] SDG&E 2025 RAMP Chapter SDG&E-Risk-5, p. 8.

Observations and Findings:

SPD observes that only minor wording refinements were made to enhance clarity and emphasis compared to the 2021 versions. In DT1 and DT2, the phrasing was slightly adjusted for grammatical precision and added descriptiveness ("that becomes obsolete," "overloaded beyond specifications"). For DT7, the wording was refined to emphasize the increased probability of failure rather than just the quantity under adverse conditions, aligning the language with a more probabilistic perspective. These are subtle yet intentional edits designed to improve precision and align with the risk framework. SPD also observes that the description of DT6 does not mention potential excavation damage by third parties, which would help clarify that excavation contact of underground facilities is a component of the risk assessment.

Consequences

In SDG&E's bow tie risk framework for EII, potential consequences (PC1-PC8) are identified by analyzing internal performance data, industry benchmarks, and expert input. These consequences represent plausible worst-case outcomes if a triggering event occurs, and include:

- Serious injuries or fatalities
- Operational disruptions and prolonged outages
- Regulatory non-compliance
- Penalties, fines, and litigation
- Erosion of public trust
- Ignitions (fires)
- Damage to customer property

These consequences directly feed into the CoRE scoring, which is used in SDG&E's 2024 Electric Risk Register (ERR) to quantify and prioritize risks based on the severity of potential outcomes.

Observations and Findings:

SPD observes that SDG&E made only minor wording adjustments to the consequence categories: PC2 was pluralized to "impacts" to align grammatically with "prolonged outages," while two new consequences—Ignitions (PC7) and Customer property damage (PC8) —were introduced in 2025 RAMP filing, expanding the framework to address fire and property risk explicitly. These changes enhance clarity and broaden the scope of risk visibility in the bow tie model.

Controls and Mitigations

SDG&E outlines its EII risk mitigation, detailing current and planned controls and mitigations from 2024 through the 2028 General Rate Case (GRC) cycle. It specifies which activities are active in 2024 and which are scheduled for completion or initiation between 2025 and 2031. The 2024 Test Year (TY) General Rate

Case (GRC) proceedings established rates through 2027, with information through 2027 included in the baseline risk, as per D.21-11-009.[286] SDG&E calculated Cost-Benefit Ratios (CBRs) starting with TY 2028 and for each Post-Test Year (PTY) through 2031.

Controls and Mitigations

In Table 4[287] of the EII chapter, SPD identified 30 control programs in 2024, that SDG&E expects to remain part of its ongoing plan from 2025 to 2031.

SDG&E introduces a new mitigation strategy, M1 – Transformer Load Monitoring (TLM) Driven Transformer Replacement, aimed at enhancing grid reliability during extreme heat events. This initiative focuses on identifying transformers at high risk of overload by analyzing real-time load data, enabling SDG&E to proactively replace or upsize these transformers before failures occur. By addressing potential overloads in advance, the program seeks to reduce the likelihood of significant outages and bolster SDG&E's response capabilities during peak demand periods.

Observations and Findings:

SPD notes that the controls are based on industry standards and are expected to remain in place through 2031. Additionally, a new mitigation, M1, has been proposed.

SPD also notes that SDG&E has streamlined its General Order (GO) 165 Corrective Maintenance Program by consolidating three existing controls into two more focused initiatives. The updated controls are:

- **C212 GO165 Corrective Maintenance Program Underground**: This combines the previous "GO165 Corrective Maintenance Program Underground" and "GO165 Manhole Vault Restoration Program," addressing maintenance needs for underground facilities.
- **C251 GO165 Corrective Maintenance Program Overhead**: This control merges the "GO165 Pole Replacement Reinforcement" program with the existing overhead maintenance activities, focusing on overhead infrastructure.

These adjustments aim to enhance operational efficiency and ensure compliance with the Commission's GO 165 standards, which mandate regular inspections and maintenance of electric distribution facilities to ensure safety and reliability.

[286] See D.21-11-009 at 136, Conclusion of Law 7 (providing a definition for "baselines" and "baseline risk").

[287] SDG&E 2025 RAMP Ch. SDG&E-Risk-5, Table 4: Electric Infrastructure Integrity Risk 2024-2031 Control and Mitigation Plan Summary, pp. 11-12.

Alternatives Analysis

SDG&E presents alternative approaches for two of the control programs. The first alternative (A234) would convert 4 kV substations to 12 kV substations to enhance safety and reliability by eliminating a risky element of the infrastructure—specifically, 4 kV package substations—and replacing them with modern 12 kV systems. However, as shown in Table 8-3 below, this alternative is more expensive and has a lower CBR than the preferred approach of C234. Table 8-3 includes the CBR values for the three required discount rate scenarios used to determine present values of benefits and costs for the CBR calculation. "Societal" uses a societal discount rate, "WACC" uses the company's Weighted Average Cost of Capital, and "Hybrid" applies the societal discount to only the safety and reliability benefits while using the WACC for the financial benefits and all costs.

While the full circuit upgrades of A234 ensure comprehensive modernization, it requires significant resources and investment. SDG&E's targeted approach in C234 focuses on removing outdated 4 kV package unit substations and upgrading specific assets to 12 kV, thereby addressing critical reliability and safety to enhance infrastructure resilience while optimizing resource utilization.

The second alternative (A210) is compared to C236, the Distribution Overhead Switch Replacement Program. C236 focuses on replacing overhead distribution switches that exhibit severe or rapidly developing corrosion, particularly in high-corrosion zones. These switches are prone to failure, which can lead to significant outages. The program targets circuits identified as the worst-performing based on outage history, aiming to mitigate safety and reliability risks associated with inoperable switches.

However, alternative A210 would focus only on overhead switches within Disadvantaged and Vulnerable Communities (DVCs). While this approach would have a higher CBR, the overall risk reduction would be limited due to the localized nature of the improvements. Restricting the program's scope could hinder SDG&E's ability to address these issues comprehensively; safety and outage risks are not confined to DVC boundaries.

Consequently, SDG&E opted not to pursue the DVC-only alternative, as it would not effectively mitigate the broader safety and outage risks posed by aging overhead switches. The full-scale C236 program addresses both the DVC area and broader system risks and therefore remains the preferred strategy for enhancing system reliability and safety across the service territory.

Table 8-3. Ell Risk Cost Benefit Ratio Result Summary – Alternative and Preferred Mitigation Comparisons (2024 $ millions)[288]

ID	Alternative Mitigations	Capital (2028-2031)	O&M (2028-2031)	CBR (Societal)	CBR (Hybrid)	CBR (WACC)
A234	4 kV to 12 kV Conversion Program	$3.1	0	1.08	0.44	0.34
A210	DVC Switch Program	$0.035	0	207.94	83.69	62.98
ID	**Preferred Mitigations**	**Capital (2028-2031)**	**O&M (2028-2031)**	**CBR (Societal)**	**CBR (Hybrid)**	**CBR (WACC)**
C234	4 kV Reliability Program	$1.82	$0	5.26	2.25	1.70
C236	Distribution Overhead Switch Replacement Program	$2.71	$0	113.84	46.55	34.37

Observations and Findings:

SPD observes from the Alternative Analysis that SDG&E opted out of A210, a DVC-only alternative that while offering a higher CBR, excludes mitigation benefits from the broader service territory. Instead, SDG&E selected C236, which includes DVCs with the general territory. This full-scale mitigation is more expensive but still offers a reasonable CBR with greater customer coverage under all the discount scenarios, as shown in Table 8-3. In contrast, SPD observes that Alterative A234 offers much lower CBR values than C234, indicating it is less cost-efficient. SDG&E has selected the option with a higher CBR as its preference in this case.

CBR Calculations

To examine the CBR calculation, SPD selected samples from ongoing control programs to verify the validity of two controls, C236 and C267.

[288] SDG&E 2025 RAMP SDG&E-Risk-5 Electric Infrastructure Integrity, pp. 35-36.

C236: Distribution Overhead Switch Replacement Program

SPD examined SDG&E's Workpapers[289] and analyzed its calculations for safety, reliability, and financial attributes to confirm the values of CBRs, as well as the application of the discount rates used to determine present values for the CBR calculation. Table 8-4a and Table 8-4b summarize details for the GRC period 2028 through 2031.

Table 8-4a. CBR Calculations for Control Program C236 – Benefits Over Program Lifetime, Undiscounted to 2024

Year	Safety $	Financial $	Reliability $	Cost $	Total Benefit $	CBR	% Risk Addressed	%Effectiveness Addressed
2028	5,015	13,498	30,333,982	749,124	30,352,495	40.52	9.70%	0.59%
2029	5,398	14,529	32,541,461	767,852	32,561,388	42.41	9.73%	0.59%
2030	5,824	16,675	34,986,035	787,048	35,007,534	44.48	9.76%	0.59%
2031	6,300	16,956	37,704,951	806,724	37,728,206	46.77	9.79%	0.59%

Table 8-4b. CBR Calculations for Control Program C236 – Benefits Over Program Lifetime, Discounted to 2024 Present Values Using Hybrid Rate Scenario

Year	Safety $	Financial $	Reliability $	Cost $	Total Benefit $	CBR	% Risk Addressed	% Effectiveness Addressed
2028	5,015	13,498	30,333,982	561,989	23,950,983	42.62	9.70%	0.59%
2029	5,398	14,529	32,541,461	536,099	24,216,653	45.17	9.73%	0.59%
2030	5,824	16,675	34,986,035	511,402	24,538,896	47.98	9.76%	0.59%
2031	6,300	16,956	37,704,951	487,843	24,925,389	51.09	9.79%	0.59%

Observations and Findings:

Table 8-4a and Table 8-4b presents CBR values for undiscounted and discounted rate scenarios for the years 2028-2031 for Control C236, based on the lifetime combined safety, financial, and reliability benefits expected from the risk mitigation. As required by the RDF, the CBR for each of the GRC period years is presented to help demonstrate whether the benefits of the risk mitigation change significantly from one year to the next.

[289] SDG&E 2025 RAMP Workpapers, EII Full Workbook_Calc_Details_R.

In both scenarios, the Percentage of Risk Addressed remains unchanged for the undiscounted and discounted CBR, which is expected. The 0.59 percent effectiveness addressed remains unchanged between the undiscounted and discounted CBR because it reflects effectiveness metrics, not financial valuation. SPD observes that after discounting with the Hybrid rate, the present value of benefits and the present value of costs are both reduced as expected, but the cost discount is greater than the benefit discount, so that the effective CBR is greater.

C267: Damage Prevention Activities Electric Underground Program

SPD also examined the C257 program's details and analyzed its calculations for safety, reliability, and financial attributes to confirm values of CBRs, and the application of discount rates used to determine present values for the CBR calculation. Table 8-5a and Table 8-5b summarize the details for the GRC period from 2028 to 2031.

Table 8-5a. CBR Calculations for Control Program C267 – Nominal Over Program Lifetime, Undiscounted to 2024

Year	Safety $	Financial $	Reliability $	Cost $	Total Benefit $	CBR	% Risk Addressed	% Effectiveness Addressed
2028	1,424,092	477,438	6,430,563	5,703,401	8,332,093	1.46	3.40%	52.68%
2029	1,459,694	489,374	6,591,327	6,120,918	8,540,395	1.40	3.40%	52.68%
2030	1,496,186	501,608	6,756,111	6,569,663	8,753,905	1.33	3.40%	52.68%
2031	1,533,591	514,149	6,925,013	7,051,284	8,972,753	1.27	3.40%	52.68%

Table 8-5b. CBR Calculations for Control Program C267 – Nominal Over Program Lifetime, Discounted to 2024 Present Values Using Hybrid Rate Scenario

Year	Safety $	Financial $	Reliability $	Cost $	Total Benefit $	CBR	% Risk Addressed	% Effectiveness Addressed
2028	1,424,092	477,438	6,430,563	4,278,665	6,556,372	1.53	3.40%	52.68%
2029	1,459,694	489,374	6,591,327	4,273,508	6,329,565	1.48	3.40%	52.68%
2030	1,496,186	501,608	6,756,111	4,268,788	6,110,654	1.43	3.40%	52.68%
2031	1,533,591	514,149	6,925,013	4,264,060	5,899,362	1.38	3.40%	52.68%

Observations and Findings:

Similar to Table 8-4a and Table 8-4b, Table 8-5a and Table 8-5b demonstrates that the CBR values are calculated as expected when the Hybrid discount scenario is applied. The CBR numbers increase after calculation of the present values of benefits and costs because the dollar cost is discounted by a greater factor than the societal benefit value in the Hybrid scenario.

Summary of Findings:

1. SDG&E's 2025 wildfire bow tie notably introduces two new potential consequences—*PC7: Ignitions and PC8: Customer Property Damage*—expanding its scope since the 2021 RAMP, but it remains largely qualitative, lacking quantified triggers, drivers, and numeric consequence modeling.
2. SPD finds PG&E's 2024 RAMP bow tie is far more robust and quantitative, featuring probabilistic ignition modeling, metrics such as ignitions per circuit-mile days, monetized Safety Risk Values, and clear driver–trigger–consequence pathways. For clarity and better understanding, SDG&E should provide quantitative data in its bow tie analysis for this risk.
3. SDG&E's 2025 RAMP references batteries only as resiliency assets within the Wildfire & PSPS Risk chapter.. In Appendix 4 of the ESJ Pilot Study, "Microgrid and Battery Energy Storage Systems (BESS)" are further characterized as Non-RAMP activities, reinforcing that storage deployments are treated outside the selected RAMP risk set.

Recommendations

SPD recommends that SDG&E address the following key deficiency identified in this chapter:

1. SDG&E should enhance its bow ties with data-driven metrics—such as probabilities, frequencies, or quantitative barrier effectiveness—to robustly model risk reduction and improve precision in risk measurement.

2. SPD recommends that SDG&E clarify the venue and timing for any BESS-safety program proposals and associated CBRs. In addition, SDG&E should explicitly explain the exclusion of BESS from the selected RAMP risk set and provide supporting analysis of how BESS-related hazards are accounted for in LoRE, CoRE, and tranching.

9. SoCalGas and SDG&E Cybersecurity

Risk Description

The cybersecurity risk for SoCalGas and SDG&E refers to the potential for a major cybersecurity incident that could disrupt electric or gas operations (Supervisory Control and Data Acquisition (SCADA) systems, supply, transmission, distribution) and/or damage company operations (e.g., human resources, payroll, billing, customer services), harm reputation, or lead to the disclosure of sensitive customer or company data. This risk chapter aligns with the requirements of the CPUC's RDF.

Although not mandatory for RDF inclusion due to the relatively low safety risk attribute, this risk is included in Sempra's 2025 RAMP Reports due to its significant reliability consequences.[290] When the three risk values of safety, reliability, and financial attributes are added to determine the total risk, cybersecurity has the second highest scaled risk value in the Sempra RAMP applications.[291]

Because this was a joint shared risk, the figures used are for both utilities.

Observations and Findings:

The companies described controls, mitigations, compliance drivers, and alternative mitigations in this chapter and workpapers.[292] The controls and mitigations are well aligned with the RDF requirements, such as processes and methodologies from North American Electric Reliability Corporations' (NERC) Critical Infrastructure Protection (CIP) standards and the Transportation Security Administration (TSA) Security Directive (SD).[293] Sempra also illustrated a list of controls and mitigations with required compliance drivers of NERC CIP standards and TSA SD applicable to cybersecurity.[294]

[290] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, pp. 12-13.

[291] Vol1_Ch1_Joint_RAMP_Overview, Table 4, p. 12.

[292] SCG-R08-CWP Cybersecurity Capital, p.1.

[293] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk-8 Cybersecurity, pp.1-2.

[294] SCG-R08-CWP Cybersecurity Capital, p. 1.

Risk Bow Tie

The cybersecurity risk bow tie illustrates a "Cybersecurity Incident" as the central event shown in Figure 9-1 below. On the left, it presents potential drivers/triggers (DT) that could lead to such an incident, and on the right, it displays the potential consequences.

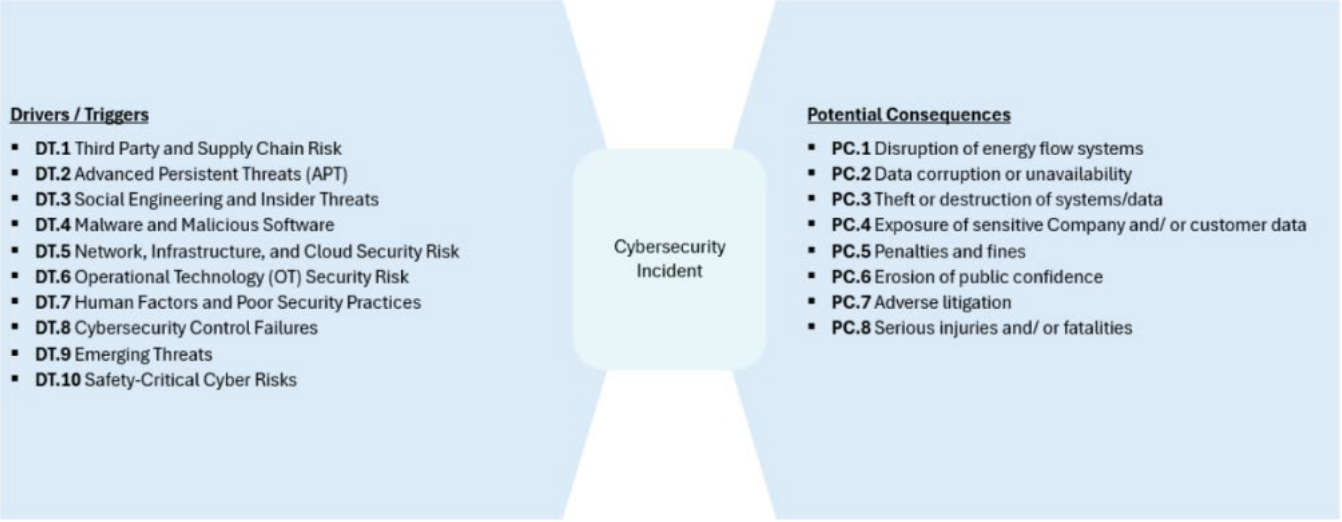

Figure 9-1. SoCalGas/SDG&E Cybersecurity Risk Bow Tie.[295]

Observations and Findings:

Sempra identified and analyzed the potential risk event DT to reflect current and forecasted conditions and internal data sources to specify the Potential Consequences of the risk event.[296] Sempra applied this framework and map five controls/mitigations of (1) Perimeter Defenses, (2) Internal Defenses, (3) Sensitive Data Protection, (4) Operational Technology (OT) Cybersecurity, and (5) Information Technology (IT) Infrastructure Modernization to address the control and mitigation elements of the risk bow tie in Attachment C.[297]

Additionally, Sempra provided a list of external reference resources and examples of sophisticated attacks to specify the evolving cyber threat landscape in utilities occurred recently in the world.[298]Sempra incorporates these supplemental national and external data resources to inform risk estimates in the 2025 RAMP Reports,

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[295] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, Figure 1, p. 12.

[296] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, pp. 12-13.

[297] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, Attachment C.

[298] These include: Colonial Pipeline hack in May 2021; BHI Energy Ransomware Attack in May 2023; CAR Sabotages Texas Water Unities in April 2024; ENGlobal Ransomware Attack in November 2024; and Darkside Ransomware Attack on Brazilian Utilities in February 2021. SoCalGas/SDG&E 2025 RAMP Ch. SDG_SDG&E-Risk-8 Cybersecurity, pp. 5-10.

addressing risk events that have not yet occurred within the companies.[299] This data is used for quantitative analyses aligned with the RDF, D.24-05-064 (Phase 3) at Row 10 and Row 29 to identify potential consequences of a risk event using available and appropriate data.[300]

Exposure

Sempra's cybersecurity risk analysis considers a scope that includes gas and electric control systems, all company data and information systems, operational technology systems, and related processes. This indicates a comprehensive exposure to cybersecurity threats across various critical aspects of their operations.

Observations and Findings:

Sempra addresses five mitigation plans of (1) Perimeter Defenses, (2) Internal Defenses, (3) Sensitive Data Protection, (4) OT Cybersecurity, and (5) IT Infrastructure Modernization to address several DT outlined in the Bow Tie to protect sensitive data that might be likelihood exposure.[301]

In addition, Sempra takes an on-going action to control sensitive data within IT, including hardware, software, network connections, and laptops. [302]

Tranches

Sempra applies the Homogeneous Tranching Methodology (HTM), as outlined in Chapter RAMP-3: Risk Quantification Framework, to determine a group of assets or systems with similar risk profiles or tranches. This methodology results in four classes and four resulting tranches (Tier 1, Tier 2, Tier 3, and Tier 4), each with one LoRE-CoRE pair. The classes are identified as logical groups of assets and systems based on the Sempra's operations, aligning risk treatments with asset risk profiles as shown in Figure 9-2 below.[303]

[299] SoCalGas/SDG&E 2025 RAMP Ch. SDG_SDG&E-Risk-8 Cybersecurity, p. 11.

[300] SoCalGas/SDG&E 2025 RAMP Ch. SDG_SDG&E-Risk-8 Cybersecurity, Attachment B.

[301] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, pp. 20-27.

[302] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, Table 5, p. 20.

[303] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, Table 2, p. 17.

Cybersecurity Risk Tranche Identification

Class	Number of LoRE-CoRE Pairs	Number of Resulting Tranches
Tier 1	1	1
Tier 2	1	1
Tier 3	1	1
Tier 4	1	1
TOTAL	**4**	**4**

Figure 9-2. SoCalGas/SDG&E Cybersecurity Risk Tranche Identification.[304]

Observations and Findings:

Sempra addresses four tiers in the class category. These classes are logical groups of Sempra's assets and systems and aligned with asset risk profiles reflective of Sempra's operations and all tranche information, including risk quantification by LoRE-CoRE pairs, Tranche names, and mitigations to Tranches.[305] In the Table below, Sempra listed its LoRE-Core scores.

Table 9-1 LoRE, CoRE and Total Scores.

	LoRE	CoRE (Millions)	Total Risk Score
Tier 1	0.78	$0.01	$0.01
Tier 2	0.191	$1.01	$1.01
Tier 3	0.085	$75.69	$75.69
Tier 4	0.04	$1,827.51	$1,827.51

Risk Value Methodology

The risk modeling for Cybersecurity Risk adheres to RDF phase 3 guidance for implementing a Cost Benefit Approach[306] as follows:

[304] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, Table 2, p. 17.

[305] SCG-R08-WP Cybersecurity O&M, p. 1.

[306] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk-8 Cybersecurity, pp. 17-20.

- **Cost Benefit Approach Principle 1 – Attribute Hierarchy (RDF Row 2):** Cybersecurity Risk is quantified in a combined attribute hierarchy in 2024 $ millions, shown in Figure 9-4 below.[307] The LoRE value of Sempra is 1.10, CoRE values for Safety, Reliability, and Financial are $0.32M, $1,730.65M, $6.32M respectively. The total risk value of (LoRE x CoRE) for Sempra is $1,904.22M. The values are based on available, observable and measured data.

- **Cost Benefit Approach Principle 2 – Measure Observations (RDF Row 3):** The Cybersecurity Risk is used in the estimation of CoRE values. Sempra utilizes a combination of internal and external data to estimate the consequences in terms of units of fatalities, serious injuries, meters out, and Customer Minutes Interrupted (CMI).

- **Cost Benefit Approach Principle 3 – Comparison (RDF Row 4):** The Cybersecurity Risk is utilized from various sources, including Business Continuity Institute, Department of Energy, and National Institute of Health to estimate the financial impacts, safety, and reliability impacts of cybersecurity incidents.

- **Cost Benefit Approach Principle 4 – Risk Assessment (RDF Row 5):** Data sources are used for Cybersecurity Risk to estimate risk values.

- **Cost Benefit Approach Principle 5 – Monetized Levels of Attributes (RDF Row 6):** Sempra uses a California-adjusted Department of Transportation monetized equivalent to calculate the Safety CoRE attribute at a monetized equivalent of $16.2 million per fatality, $4.1 million per serious injury, and $49 thousand for minor injury. The Electric Reliability CoRE attribute is valued at a monetized equivalent of $3.76 million per CMI. Gas Reliability is valued at a monetized equivalent of $3,868 million per gas meter outage, and the Financial CoRE attribute is value at $1 per dollar.[308]

- **Cost Benefit Approach Principle 6 – Adjusted Attribute Level (RDF Row 7):** For the Cybersecurity Risk, it is driven by the Reliability and Financial attributes due to the increased risk of Cybersecurity events.

[307] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk-8 Cybersecurity, Table 3, p.18.

[308] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk-8 Cybersecurity, p.19.

Cybersecurity Risk Monetized Risk Values
(Direct, in 2024 $ millions)

Company	LoRE	CoRE [Risk-Adjusted Attribute Values]			Total CoRE	Total Risk [LoRE x Total CoRE]
		Safety	Reliability	Financial		
SoCalGas	0.59	$0.003	$215.70	$4.73	$220.44	$129.02
SDG&E	0.51	$0.69	$3,466.54	$8.14	$3,475.37	$1,775.20
SoCalGas and SDG&E[13]	1.10	$0.32	$1,730.65	$6.32	$1,737.29	$1,904.22

Figure 9-3. SoCalGas/SDG&E Cybersecurity Risk Monetized Risk Values[309]

Cybersecurity Risk Scaled vs Unscaled Value by CoRE Attribute
(Direct, in 2024 $ millions)

SoCalGas	Safety	Reliability	Financial	Total
Unscaled Risk Value	$0.002	$18.84	$2.29	$21.13
Scaled Risk Value	$0.002	$126.25	$2.77	$129.02
SDG&E	**Safety**	**Reliability**	**Financial**	**Total**
Unscaled Risk Value	$0.34	$139.09	$2.80	$142.23
Scaled Risk Value	$0.35	$1,770.69	$4.16	$1,775.20
SoCalGas and SDG&E	**Safety**	**Reliability**	**Financial**	**Total**
Unscaled Risk Value	$0.34	$157.93	$5.09	$163.36
Scaled Risk Value	$0.35	$1,896.94	$6.93	$1,904.22

Figure 9-4. SoCalGas/SDG&E Cybersecurity Risk Scaled vs Unscaled Value by CoRE Attributes[310]

Observations and Findings:

Cybersecurity Risk calculations depict the results of applying the risk-scaling methodology shown in Figure 9-5 above.[311] This risk-scaling function is further detailed in Chapter RAMP-3, along with the CoRE attributes for Cybersecurity Risk.

The total scaled risk value by CoRE attributes is $1,904.22M with scaled Safety risk value of $0.35M, scaled Reliability risk value of $1,896.94M, and scaled financial risk value of $6.93M. The total unscaled risk value

[309] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk-8 Cybersecurity, Table 3, p. 18.

[310] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk-8 Cybersecurity, Table 4, p. 19.

[311] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk-8 Cybersecurity, Table 4, p. 19.

by CoRE attributes is $163.36M with unscaled Safety risk value of $0.34M, unscaled Reliability risk value of $157.93M, and unscaled financial risk value of $5.09M.[312]

Risk Drivers

The potential Risk Event DT identified for a Cybersecurity Incident are:[313]

- **DT.1: Third Party and Supply Chain Risk:** Risks from external partners, vendors, and supply chains.
- **DT.2: Advanced Persistent Threats (APT):** Sophisticated, targeted attacks causing prolonged damage.
- **DT.3: Social Engineering and Insider Threats:** Human factors bypassing technical controls through manipulation or exploitation.
- **DT.4: Malware and Malicious Software:** Widespread software causing damage from data breaches to operational disruptions.
- **DT.5: Network, Infrastructure, and Cloud Security Risk:** Compromises leading to widespread access and control issues.
- **DT.6: Operational Technology (OT) Security Risk:** Risks in OT environments leading to significant operational disruptions in critical infrastructure.
- **DT.7: Human Factors and Poor Security Practices:** Inadequate security behaviors, policies, and employee mistakes leading to breaches.
- **DT.8: Cybersecurity Control Failures:** Malfunctions in security controls (e.g., IDS/IPS, firewalls) leading to missed alerts.
- **DT.9: Emerging Threats:** New and evolving threats that may not be fully understood or mitigated by existing defenses, such as those involving AI and quantum computing.
- **DT.10: Safety-Critical Cyber Risks:** Inadequate cybersecurity in safety-critical systems and processes (e.g., job site safety plans) that compromise both safety and security.

Observations and Findings:

[312] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk-8 Cybersecurity, Table 4, p. 19.

[313] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, p. 13.

- DT.7 was formed by merging two drivers from the 2021 RAMP: "Access control or confidentiality failure" and "Human error (e.g., clicking on a phishing email)."
- DT.8 was changed from a general "Cybersecurity control failure" in the 2021 RAMP to specifically include failures of systems like Intrusion Detection Systems (IDS) or Intrusion Prevention Systems (IPS).
- DT.9 (Emerging Threats) and DT.10 (Safety-Critical Cyber Risks) are new drivers not included in the 2021 RAMP. These additions reflect the evolving threat landscape and the increasing recognition of cybersecurity's impact on safety-critical systems.

Consequences

The potential consequences (PC) of a cybersecurity event, listed on the right side of the risk bow tie, are:[314]

- PC.1 - Disruption of energy flow systems.
- PC.2 - Data corruption or unavailability.
- PC.3 - Theft or destruction of systems/data.
- PC.4 - Exposure of sensitive Company and/or customer data.
- PC.5 - Penalties and fines.
- PC.6 - Erosion of public confidence.
- PC.7 - Adverse litigation.
- PC.8 - Serious injuries and/or fatalities.

Observations and Findings:

There were no changes to the potential consequences compared to previous RAMP Reports.

Controls and Mitigations

Sempra's 2024-2031 control and mitigation plan for cybersecurity risk, as shown in Figure 9-6 below, includes five ongoing control programs evaluated at the program level. This approach is due to data availability, rapidly changing threats, and the need to avoid disclosing sensitive details to adversaries. The broad control categories are:[315]

- **C801: Perimeter Defenses:** Protects external access points, prevents attacks, ensures integrity, and detects unauthorized access to IT and OT systems.
- **C802: Internal Defenses:** Focuses on protecting internal systems once an adversary has bypassed perimeter controls.

[314] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, pp. 13-14.

[315] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8, pp. 19-31.

- **C803: Sensitive Data Protection:** Aims to prevent unauthorized access and exposure of sensitive Company and customer data.
- **C804: OT Cybersecurity:** Addresses cybersecurity for OT environments to maintain safe and reliable operations of critical infrastructure.
- **C805: IT Infrastructure Modernization:** Includes technology refreshes, system maintenance, and effective architecture to ensure high availability and service continuity for critical systems.

Cybersecurity Risk 2024-2031 Control and Mitigation Plan Summary

ID	Control/Mitigation Description	2024 Control	2025-2031 Plan
C801	Perimeter Defenses	X	Ongoing
C802	Internal Defenses	X	Ongoing
C803	Sensitive Data Protection	X	Ongoing
C804	Operational Technology (OT) Cybersecurity	X	Ongoing
C805	IT Infrastructure Modernization	X	Ongoing

Figure 9-5. SoCalGas/SDG&E Cybersecurity Risk 2024-2031 Control and Mitigation Plan Summary.[316]

Observations and Findings:

- Sempra plans to continue all existing controls through the 2025-2031 period.
- While the identified drivers, consequences, and control categories remain largely consistent, the specific mitigation projects within these controls continually evolve in response to new and more sophisticated cybersecurity threats.
- There are no new mitigations foreseen beyond those described.
- Climate change adaptation controls were deemed inapplicable to cybersecurity risk.
- No activities for cybersecurity risk meet the definition of a foundational program.

Alternatives Analysis

Sempra evaluates alternative mitigation portfolios against its chosen plan (high and medium-impact projects) as follows:

- **Companies' Plan:** Includes high and medium-impact projects, identified as the most cost-effective for managing increasing cybersecurity risk.
- **Alternative Portfolio 1:** Consists of high-impact projects only. This portfolio is estimated to have a slightly higher cost-benefit ratio (CBR) than Sempra's, but does not provide sufficient risk reduction

[316] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, Table 5, p. 20.

to address the increasing rate of cybersecurity risk. Its effectiveness is lower than the projected growth rate of risk.

- **Alternative Portfolio 2:** Includes all cybersecurity projects under consideration (high-impact, medium-impact, and low-impact). This portfolio has the highest cost with the most risk reduction, but a lower CBR than Sempra's plan because the incremental benefit from low-impact projects is less effective relative to their incremental cost.

Observations and Findings:

The quantitative analysis demonstrates that Sempra's plan (high and medium-impact projects) is the most cost-effective portfolio. Alternative Portfolio 1 is insufficient to address increasing risk, and Alternative Portfolio 2, although offering more reduction, is less cost-effective due to the inclusion of low-impact projects.

CBR Calculations

The chapter presents a quantitative summary of the risk control and mitigation plan, including associated costs, units, and CBRs. Costs are estimated using SME assumptions and available data, supplemented by industry or national data where internal data is insufficient. The CBRs are calculated for each control and mitigation consistent with the method and process prescribed in the RDF. The CBRs are presented for Sempra's plan and the alternative portfolios.

Sempra calculates cost benefit ratios (CBRs), which are illustrated in Figure 9-7 below, at the mitigation and/or control level for the TY 2028 General Rate Case (GRC) cycle. The CBRs are based on scaled expected values, unless otherwise noted, and are calculated for each of the three required discount rates for every year of the GRC cycle, as well as for the aggregated post-test years (2029-2031). Costs and CBRs for each year of the GRC cycle are also detailed in the workpapers.[317]

[317] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, Table 10, p. 30.

Cybersecurity Risk Cost Benefit Ratio Results Summary
2028-2031
(Direct, in 2024 $ millions)

ID	Control/Mitigation Name	Capital (2028 – 2031)	O&M (2028 – 2031)	CBR (Societal)	CBR (Hybrid)	CBR (WACC)
C801	Perimeter Defenses	$58	$22	103.98	97.52	87.83
C802	Internal Defenses	$88	$79	33.71	32.54	29.31
C803	Sensitive Data Protection	$10	$2	236.70	227.09	204.55
C804	Operational Technology (OT) Cybersecurity	$32	$0	220.11	213.21	192.03
C805	IT Infrastructure Modernization	$21	$0	197.04	182.04	163.97

Figure 9-6. SoCalGas/SDG&E Cybersecurity Risk Cost Benefit Ratio Results Summary.[318]

Observations and Findings:

Sempra addresses a quantitative summary of the risk control and mitigation plan for cybersecurity risk, including associated costs of capital and O&M, and CBRs shown in their summary of Figure 9-7 above. For capital values, the unit of measure is users protected. For O&M values, the unit of measure is full-time equivalents (FTEs).[319]

Historical Progress Graphic

The historical progress graphic, as directed by the Commission in the Phase 2 Decision D.22-12-027,[320] is intended to illustrate accomplishments in safety work and progress in mitigating safety risks over the two immediately preceding RAMP cycles.[321] The graphic aims to align with safety goals, show trends in historical progress, and identify remaining tasks for risk mitigation.

[318] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, Table 10, pp. 30-31.

[319] SoCalGas/SDG7E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, p. 30.

[320] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, p. 1.

[321] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, p. 35.

Figure 9-8 below[322] presents Sempra's cybersecurity rating score as determined by BitSight.[323] Cybersecurity rating services, such as BitSight, evaluate an organization's cybersecurity posture by continuously monitoring and assessing various risk factors, providing a security score or rating that reflects the organization's overall security performance, much like a credit score.

Security rating services provide an objective, data-driven view of cybersecurity programs, developing cybersecurity ratings by analyzing networks, assets, and vulnerabilities in real-time. Similar to a credit score, which reflects a business's creditworthiness based on its financial history and ability to repay debts, cybersecurity rating services offer a security score that indicates the organization's ability to manage and mitigate cybersecurity risks. The score enables external stakeholders, such as investors, financial institutions, and government agencies, to effectively determine whether an organization is protecting itself against potential threats. Thus, regulators may utilize these ratings to assess compliance with cybersecurity regulatory obligations. BitSight uses a scale from 250 to 900 to rate an organization based on its secure safety work performance. Sempra presents BitSight's recent studies to demonstrate a correlation between a cybersecurity rating and the risk of a cybersecurity incident.[324, 325] Figure 9-8[326] below shows BitSight cybersecurity ratings scores for Sempra range from 683 to 794 for the period 2016 through 2024.[327]

Additionally, a study by the Marsh McLennan Cyber Risk Analytics Center identified a clear correlation between lower security ratings and increased cybersecurity incidents.[328] Another analytical study by Verisk demonstrated that organizations with ratings of 700 or greater had a breach probability of less than 1 percent, while those with ratings below 500 had a probability of nearly 3 percent.[329]

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[322] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, Figure 2, p. 36.

[323] See BitSight, "Building Trust in the Digital Economy", available at https://www.bitsight.com/about/our-story

[324] See BitSight, BitSight Security Ratings Correlate to Breaches, available at Bitsight Security Ratings Correlate to Breaches – Bitsight Knowledge Base.

[325] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, p. 35.

[326] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, Figure 2, p. 36.

[327] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, Figure 2, p. 36.

[328] See BitSight, New Study Finds Significant Correlation Between BitSight Analytics and Cybersecurity Incidents (October 25, 2022), available at Bitsight Security Ratings Correlate to Breaches – Bitsight Knowledge Base

[329] See BitSight, BitSight Security Ratings Correlate to Breaches, Verisk: Correlation to Breach, available at Bitsight Security Ratings Correlate to Breaches – Bitsight Knowledge Base.

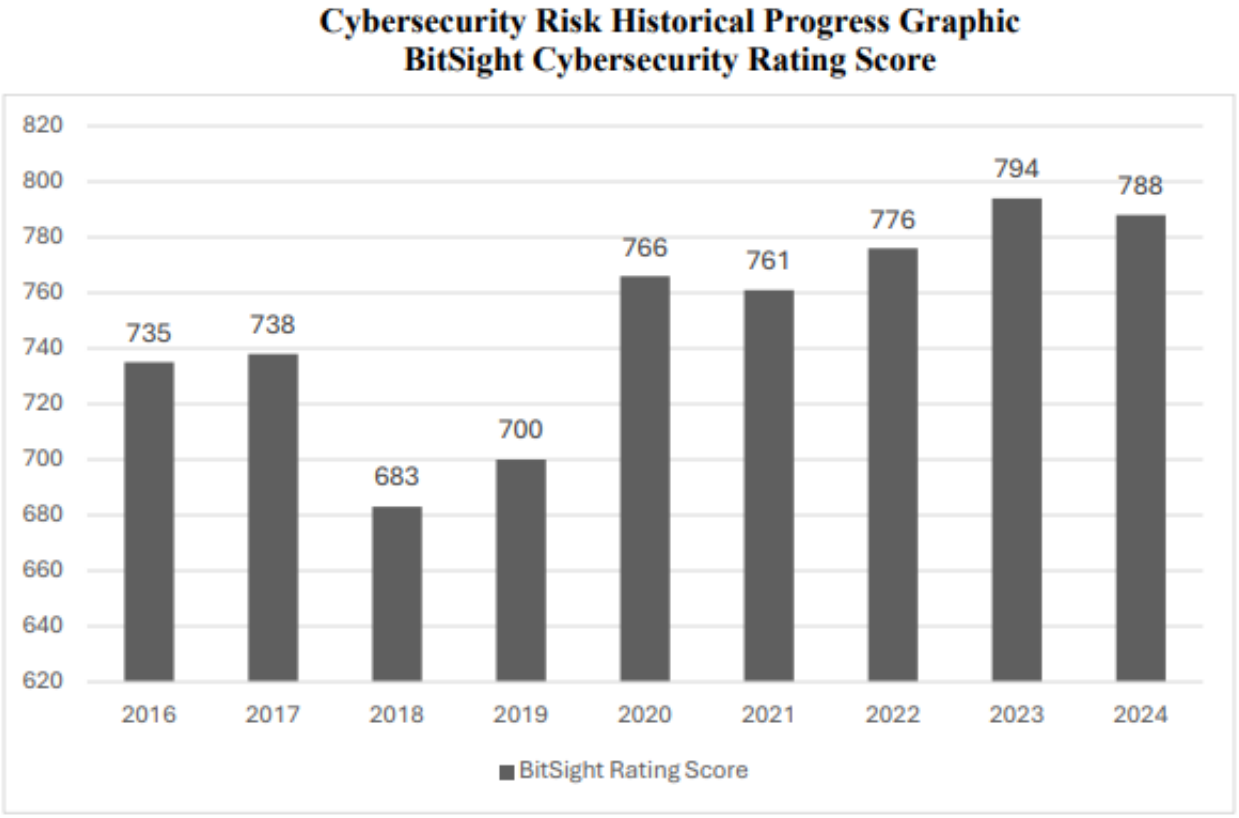

Figure 9-7. SoCalGas/SDG&E Cybersecurity Risk Historical Progress Graphic – BitSight Cybersecurity Rating Score.[330]

Sempra implements cybersecurity risk mitigation programs and listed activities of (1) Perimeter Defenses, (2) Internal Defenses, (3) Sensitive Data Protection, (4) OT Cybersecurity, and (5) IT Infrastructure Modernization during this period, shown in Figure 9-9 below.[331]

[330] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, Figure 2, p. 36.

[331] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, Figure 3, p. 37.

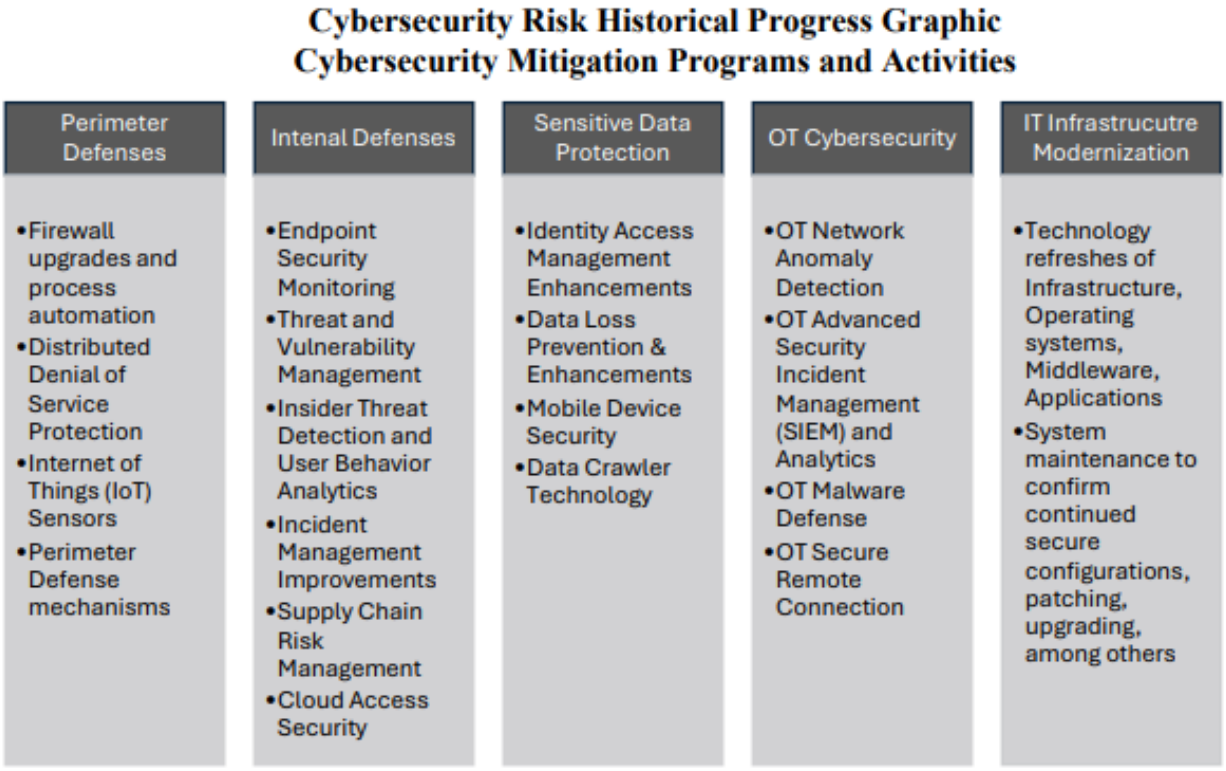

Figure 9-8. SoCalGas/SDG&E Cybersecurity Risk Historical Progress Graphic – Cybersecurity Mitigation Programs and Activities.[332]

In addition, for the period 2022 through 2024, Sempra addresses more than 2.6 million cybersecurity vulnerabilities and takes actions to remediate those cyber vulnerabilities, thereby mitigating potential security threats. The metric is crucial for demonstrating that Sempra is mitigating potential security threats.[333]

The safety work that remains to be done is addressed in the 2024-2031 Control and Mitigation Plan detailed in Figure 9-6 above for continuous improvement in security practices.[334]

Observations and Findings:

Staff found the Historical Progress Graphic section to be aligned with RDF guidelines.

[332] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, Figure 3, p. 37.

[333] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, p. 37.

[334] SoCalGas/SDG&E 2025 RAMP Ch. SCG_SDG&E-Risk 8 Cybersecurity, Section IV. 2024-2031 Control and Mitigation Plan, pp. 19-31.

Summary of Findings

1. The cybersecurity risk is included in Sempra's 2025 RAMP Reports due to its significant reliability consequences, even though it did not meet the minimum requirements for mandatory inclusion under the RDF based solely on the safety risk attribute.

2. The Cybersecurity Risk chapter aligns with the CPUC's Risk-Based Decision-Making Framework (RDF) requirements.[335]The cybersecurity threat landscape is constantly evolving, with increasing sophistication and impact from diverse adversaries, including state-sponsored groups and cybercriminal organizations.

3. New risk drivers, "Emerging Threats" (DT.9) and "Safety-Critical Cyber Risks" (DT.10), were added since the 2021 RAMP, reflecting the dynamic nature of cybersecurity threats and their impact on safety.

4. There have been no changes to the identified potential consequences of a cybersecurity risk event.

5. Sempra evaluates controls and mitigations at a program level, rather than individual activities, to avoid disclosing sensitive information to adversaries.

6. Sempra's plan, which includes high and medium-impact projects, is quantitatively shown to be the most cost-effective portfolio for managing the increase in cybersecurity risk when compared to alternative portfolios.

7. Alternative Portfolio 1 (high-impact projects only) does not provide enough risk reduction to address the increasing rate of cybersecurity risk.

8. Alternative Portfolio 2 (which includes all identified projects, including low-impact ones) has the highest cost. Still, its additional projects are less effective relative to their incremental cost, resulting in a lower cost-benefit ratio compared to Sempra's plan.

9. Sempra employs internal data and supplement with industry or national data when needed to quantify risk estimates and calculate cost-benefit ratios.

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1. [335] These include those adopted in D.22-12-027 and D.24-05-064. It also broadly refers to modifications to the CPUC's Rate Case Plan adopted in Rulemaking (R.) 13-11-006, Safety Model Assessment Proceeding A.15-05-002 et al. (cons..), and R.20-07-013 (the Risk OIR).

Recommendations

SPD recommends that:

1. Sempra continues to employ a flexible and adaptive strategy to counter rapidly evolving cybersecurity threats, as outlined in its current plan, which includes high- and medium-impact projects, given their demonstrated cost-effectiveness.

2. Sempra should continue to monitor and adapt to emerging threats (DT.9) and address safety-critical cyber risks (DT.10) as new drivers, continuously updating its mitigation projects within the broad control categories.

3. Sempra should maintain a program-level approach to control and mitigation reporting for cybersecurity risk to protect sensitive information from adversaries, while ensuring sufficient transparency for regulatory oversight.

4. Alternative Portfolio 1 is insufficient to address the increasing rate of cybersecurity risk so it should not be initiated. Sempra should carefully evaluate the cost-effectiveness of any low-impact projects from Alternative Portfolio 2 before inclusion, as these currently provide less effective incremental benefit relative to their cost.

10. SoCalGas and SDG&E Safety Culture

Overview

In Sempra's 2025 RAMP Reports, Volume 1 Chapter RAMP-4 Safety Culture (Safety Culture chapter) focuses on safety culture and describes Sempra's current organization, programs, initiatives, and employee compensation relating to safety culture. Because Safety Culture is not a risk in and of itself, but an important initiative for promoting safety, this chapter follows a different format than other risk evaluations.

As described in the Safety Culture chapter, Sempra has ongoing efforts to develop and improve the health of its safety culture. These efforts include defining and implementing Safety Improvement Plans, developing and managing organizational structures, developing and integrating Safety Management Systems (SMS), and developing effective compensation plans.

SEMPRA 2025 RAMP Safety Culture Programs

The Safety Culture chapter includes sections on the Safety Improvement Plans, safety organizational structures, Safety Management Systems (SMS), and compensation plans for each utility.

Safety Improvement Plans

SoCalGas

As required by the Commission, SoCalGas filed a Safety Improvement Plan with the Commission.[336] A review of this plan, within D.23-12-034, identified several deficiencies.[337] As a result, SoCalGas was required to submit a Revised Safety Culture Improvement Plan, with regular updates, to the Commission.

While no Commission-approved Safety Culture Improvement Plan is yet in place, the Safety Culture chapter does discuss the approach SoCalGas is now taking. The chapter states:

> *This approach to safety culture learning and improvement has fostered significant reflection and growth at SoCalGas. To improve SoCalGas's understanding of the assessment results, the Company's understanding of the existing safety culture and its drivers, and of the need and opportunity to improve, SoCalGas enlisted the support of renowned external experts to engage in over 90 employee and contractor dialogue and facilitated*

[336] Southern California Gas Company (U 904 G) Safety Culture Improvement Plan and Sempra Safety Culture Oversight and Initiatives, July 29, 2022.

[337] See D.23-12-034 for details on party comments detailing the deficiencies. Decision Directing Southern California Gas Company and Sempra to Revise Safety Culture Improvement Plan.

> *co-creation sessions. This work resulted in a deeper and richer understanding of SoCalGas's culture, enabled the identification of the basic assumptions influencing culture, and informed how to effect positive change.*[338]

The Safety Culture chapter also discusses its "Safety Together" initiative, described as "SoCalGas' 'North Star,' the fixed point on the horizon that will keep the utility reliably oriented and on course to navigate its safety culture aspirations."[339]

As part of its learning strategy, SoCalGas also reports that 11 programs have been designed to gather "feedback, suggestions, and recommendations with respect to safety…through multiple platforms and processes to gather and analyze employee safety feedback."[340]

SDG&E

SDG&E discusses how it leverages existing programs (e.g., "safety first"), and incorporates elements of the OIR Normative Framework as part of its improvement plan. "SDG&E leadership actively builds trust through non-punitive measures, a commitment to reducing high-risk conditions, leveraging data to identify risks, and advancing as a learning organization."[341] SDG&E also holds annual "Start Strong" safety events and an annual Safety Congress.

Safety Management System

Sempra has developed a structured Safety Management System (SMS) program designed to embed safety into all layers of its operations. This system follows the American Petroleum Institute (API) RP 1173 Guidelines[342] and aims to bring consistency, accountability, and continuous improvement to how risks are identified and managed. Nevertheless, an SMS alone is not fully sufficient as it needs to be fully supported by a strong safety culture. Culture brings the system to life. Leadership commitment, clear policies, ongoing training, employee engagement, and shared accountability are all parts of that development. An integrated SMS and safety culture should not only prevent incidents but also build trust across the organization, various stakeholders, and the public.

Compensation Programs

Sempra ties a significant portion of employee compensation to safety performance through its Incentive Compensation Plans (ICPs). For non-represented employees, safety-related goals make up the largest part of the company performance metrics: 80 percent for SoCalGas and 68 percent for SDG&E since 2020.

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[338] Safety Culture chapter at p. 4.

[339] Safety Culture chapter, p. 4.

[340] Safety Culture chapter at p. 9.

[341] Safety Culture chapter at p. 6.

[342] API RP 1173: American Petroleum Institute, Recommended Practice 1173.

Executive plans follow a similar structure. These metrics signal an intent to embed safety into company culture.

Observations and Findings

SoCalGas and SDG&E have documented several programs and initiatives that demonstrate forward movement and development of a healthy safety culture. However, several elements of the Safety Culture chapter should be clarified.

1. *Sempra has many programs and initiatives, but does not demonstrate any process or method for evaluating effectiveness to promote a healthier safety culture.* Many of the referenced programs and initiatives are aligned with the OIR guiding principles and the Safety Culture Normative Framework. For example, Sempra discusses the roles of leadership, communication, personal responsibility, learning, developing a questioning attitude, and non-punitive reporting. Though a good starting point, Sempra merely reports that these programs are in place. This only demonstrates a compliance/check-the-box mindset – i.e., simply having these programs and initiatives is not sufficient. The shortcoming of the Safety Culture chapter is the lack of any discussion of how or if Sempra is:

    a. Constantly utilizing and integrating the findings and learnings from these programs

    b. Evaluating the effectiveness of these programs

    c. Updating programs to be more effective processes for developing a healthy safety culture

    d. Allocating the resources (e.g., time from senior leadership to address the issues) required to evaluate the programs and make any needed changes.

2. *The integration of dissimilar programs and initiatives is not addressed.* Integrating several different programs and collecting and disseminating data and information is partially the role of a high-quality SMS. However, more fundamental structural problems exist that Sempra has not yet addressed in the safety culture. One example is the relationship between the Enterprise Risk Model (ERM) and the Safety Culture Framework. The former being a rigorous quantitative model, and the latter being a qualitative model of behavior. Sempra's response to a data request from SPD is a good illustration of this problem.[343]

    SPD asked SoCalGas to provide information about how it evaluated threats to its safety culture. In its response, SoCalGas identified two employee-related threats - identified as part of its comprehensive Enterprise Risk Management framework. These threats are aligned with the safety

[343] Data Request Response SPD-Sempra-2025RAMP-014.

culture traits: (3) personal accountability, (5) continuous learning, and (7) effective safety communication.

SoCalGas did not, however, identify other threats among the safety culture traits, such as (1) leadership, (4) work process, or (10) decision making. It is unclear if SoCalGas did not identify or perceive these threats as risks, or if simply no such categories exist in the ERM. The latter represents an integration problem where the definitions of risks do not fit all the safety culture traits of leadership and decision making. The result of the lack of integration is that personal safety and compliance traits of safety culture are emphasized while other, process-focused traits, are left behind.

The Safety Culture of an organization can be an important risk driver of catastrophic events. The subject RAMP, however, is primarily focused on implementing the RDF. Safety Culture does not easily fit into this paradigm.

Developing a better connection between the RDF and the safety culture traits would be an important step to merging these two processes.

Recommendations to Address Findings

Sempra should develop a better connection between the RDF processes and the safety culture improvement process as an important step to merging these two efforts.

We recommend that Sempra:

1. Develop a strategy and plan for integrating its RDF, ERM , Safety Culture Framework, and SMS.

2. Coordinate existing efforts and subject matter experts in safety culture and risk modeling, such as the Utility Safety Culture Working Group (USCWG) and the OEIS led Risk Modeling Working Group (RMWG).

3. Engage stakeholders to develop a pathway for creating a workable integration process.

4. Demonstrate the effectiveness (qualitatively and quantitatively) of safety culture, and SMS programs and their alignment with the RDF and ERM.

11. SoCalGas and SDG&E Climate Change Adaptation

Energy system infrastructure in California is increasingly vulnerable to the impacts of climate change. Extreme weather, sea-level rise, and wildfires can be risk drivers for gas and electric utility systems and operations. As in its 2021 RAMP filings, Sempra's 2025 RAMP filings presents the climate risk information pertaining to the RAMP separately from the risk chapters. Sempra provides the climate risk information in RAMP-5 "Climate Change Adaptation," part of Volume 1 of the Sempra RAMP.[344] Each RAMP-5 chapter (hereafter "SDG&E RAMP-5" and "SoCalGas RAMP-5"[345]) presents the set of climate hazards[346] each utility assessed and the related controls and mitigations each is employing. The following evaluation addresses both RAMP-5 chapters. Both RAMP-5 chapters note that climate change can "drive, trigger, or exacerbate multiple RAMP risks."[347]

Risk Description

Climate risk refers to the consequences to human or ecological systems that result from the vulnerability of infrastructure, operations, and customer base to the change in climate hazards over multiple dimensions, such as intensity, duration, and frequency.[348]

Sempra's 2025 RAMP filings are accompanied by the SDG&E and SoCalGas Climate Adaptation Vulnerability Assessments (CAVAs), which provide details about climate hazards in Sempra's service territories and how utility asset vulnerability to these hazards is expected to change through 2030, 2050, and 2070. The RAMP-5 chapters summarize the findings of each utility's CAVA.

[344] Volume 1 consists of five chapters: RAMP-1 "Overview," RAMP-2 "Enterprise Risk Management Framework," RAMP-3 "Risk Quantification Framework," RAMP-4 "Safety Culture," and RAMP-5 "Climate Change Adaptation." The first four are the same for SDG&E and SoCalGas while the fifth is different for each utility.

[345] Note that SoCalGas RAMP-5 does not have page numbers, so references to that document cite the PDF page number.

[346] In this chapter the term "climate hazard" refers to a physical event ("climate event" or trend in events) (e.g., extreme heat, flood, or wildfire); the term "climate risk" refers to the overall potential for negative consequences from the hazard, accounting for factors that may magnify or lessen the impact of the hazard, such as probability, exposure, or adaptive capacity (SDG&E RAMP-5, pp. 1-2; SoCalGas RAMP-5, p. 3).

[347] SDG&E RAMP-5, p. 2; SoCalGas RAMP-5, p. 4.

[348] SDG&E RAMP-5, p. 1; SoCalGas RAMP-5, p. 3.

Observations and Findings:

The impact of climate change on energy system infrastructure and operations is expected to increase in California.[349] In the RAMP-5 chapters Sempra discusses impacts to utility assets from climate risks such as extreme heat, sea level rise, flooding, extreme winds, extreme precipitation, erosion, landslides, and wildfire. They also provide a list of controls and mitigations that "pertain to climate adaptation options listed in [the] CAVA or which increase climate resiliency."[350] See Tables 11-1 and 11-2 below for each utility's most concerning climate risks and the assets that might be most vulnerable to these risks.

Risk Bow Tie

SDG&E and SoCalGas treat climate risk as a factor that can "drive, trigger, or exacerbate multiple RAMP risks"[351] (i.e., indirect risks) and, as such, do not provide bow tie analyses.

Observations and Findings:

SPD has no observations or findings on the bow tie.

Exposure

SDG&E and SoCalGas discuss the findings of their respective CAVAs including climate risk exposure and vulnerability.

Observations and Findings:

See Table 11-1 for a compiled list of utility-identified climate hazards and their associated RAMP risk chapters.

See Tables 11-2 and 11-3 below for each utility's most concerning climate risks and the assets that might be most vulnerable to these risks.

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[349] California Energy Commission, Multihazard Investigation of Climate Vulnerability of the Natural Gas Energy System (2020), Section 3.1 "Increasing Exposure of Energy Infrastructure to Climate Hazards," pp. 13-36 (https://www.energy.ca.gov/sites/default/files/2021-05/CEC-500-2020-071.pdf, accessed August 22, 2025).

[350] SDG&E RAMP-5, pp. 12-14; SoCalGas RAMP-5, pp. 13-15.

[351] SDG&E RAMP-5, p. 2; SoCalGas RAMP-5, p. 4.

Table 11-1. SDG&E and SoCalGas Climate Hazards and Associated RAMP Risk Chapters

Climate Hazard	Utility	RAMP Risk Chapters	Key Notes
Wildfire	SDG&E	Wildfire & PSPS, Electric Infrastructure Integrity, Employee Safety	Exacerbates existing risks, especially for electric infrastructure
	SoCalGas	Underground Gas Storage, Medium-Pressure Gas, Employee Safety	Affects gas infrastructure, linked to ongoing mitigation efforts
Extreme Temperatures	SDG&E	Electric Infrastructure Integrity, Employee Safety, Contractor Safety	Impacts heat-sensitive equipment and worker safety
	SoCalGas	Medium-/High-Pressure Gas, Contractor Safety, Employee Safety	Affects gas pipelines and worker safety in extreme heat
Inland Flooding	SDG&E	Electric Infrastructure Integrity, Gas Systems	Risk to electric substations and gas pipelines
	SoCalGas	High-/Medium-Pressure Gas Systems	Flood risk impacts pipeline stability and access
Coastal Flooding	SDG&E	Electric Infrastructure Integrity	Coastal flooding risks for coastal assets and facilities
	SoCalGas	Underground Gas Storage	Coastal flooding risk for storage fields
Coastal Erosion	SoCalGas	Underground Gas Storage	High vulnerability in storage fields, low adaptive capacity
Landslides	SDG&E	Gas System Integrity	Landslides affect gas pipelines in hilly regions
	SoCalGas	High-/Medium-Pressure Gas, Underground Storage	Landslide risks for pipelines and storage fields
Extreme Winds & Precipitation	SDG&E	Electric Infrastructure Integrity, Wildfire & PSPS	Wind and rain increase risk of damage to electric lines and poles

Table 11-2. SDG&E Electrical Asset Exposure to Climate Hazards[352]

Climate Hazard	Highest Exposure
Extreme Temperatures	Communication; Facilities
Inland Flood	Substations; Distribution; Transmission; Communication; Facilities[353]
Wildfire	Transmission; Communication; Facilities

In SDG&E RAMP-5, vulnerability to climate hazards is visualized in a graph that shows an aggregated vulnerability score over all CAVA time frames for all hazards and asset types. For electrical assets, SDG&E shows that facilities have the highest aggregated vulnerability, and distribution and transmission assets have the next-highest aggregated vulnerability. For gas assets, SDG&E shows that high-pressure pipelines have the highest aggregated vulnerability, and regulator, compressor, and valve assets have the next-highest aggregated vulnerability.

Table 11-3. SoCalGas Asset Vulnerability to Climate Hazards by 2050[354]

Climate Hazard	Moderate Vulnerability	High Vulnerability
Coastal Erosion	N/A	Storage Fields[355]
Coastal Flood	N/A	Storage Fields
Inland Flood	High-Pressure Pipelines; Facilities; Regulators, Compressors, Valves	Storage Fields
Landslide	Medium-Pressure Pipelines; Facilities; Regulators, Compressors, Valves	High-Pressure Pipelines; Storage Fields
Wildfire	Regulators, Compressors, Valves	Facilities; Storage Fields

[352] SDG&E RAMP-5, "Key Findings," pp. 7-11.

[353] All electrical asset classes show relatively high exposure scores for inland flooding, but there is wide variability in this exposure geographically: the mountain and inland regions are expected to have the highest inland flooding exposure.

[354] SoCalGas RAMP-5, Table 2 "Asset Vulnerability Summary for Year 2050," p. 10.

[355] "Storage fields" is understood to refer to underground gas storage fields.

Storage fields are the asset class of highest concern under climate change: SoCalGas indicates in Table 3 (SoCalGas RAMP-5, p. 11) that storage fields are the only asset class with low adaptive capacity, indicating that it has low adaptive capacity to the risk of coastal erosion. All other asset classes have high or moderate adaptive capacity with regard to all assessed hazards (coastal erosion, coastal flood, inland flood, landslide, and wildfire).

Tranches

SDG&E and SoCalGas treat this risk as a contributing factor to RAMP risks and, as such, do not explicitly discuss climate change-related impacts on tranches in their RAMP filings.

Observations and Findings:

SPD has no observations or findings on Tranches.

Risk Drivers

SDG&E and SoCalGas do not identify potential leading drivers or triggers for climate risk. SDG&E and SoCalGas do not explicitly discuss the LoRE or CoRE with regard to climate risk.

Observations and Findings:

SPD has no observations or findings on the risk drivers.

Consequences

SDG&E and SoCalGas do not identify potential consequences for climate risk.

Observations and Findings:

SPD has no observations or findings on the consequences.

Controls and Mitigations

SDG&E and SoCalGas provide a list of controls and mitigations that "pertain to climate adaptation options listed in [the] CAVA or which increase climate resiliency."[356] These lists indicate the relevant risk chapter,

[356] SDG&E RAMP-5, p. 12; SoCalGas RAMP-5, p. 12.

the control or mitigation ID number, the name of the program, and then what potential climate hazards the program addresses.

Observations and Findings

The controls listed below in Table 11-4 are not new programs developed solely for climate adaptation; they are ongoing risk mitigation efforts[357] that SDG&E and SoCalGas re-assessed and re-framed in reference to climate risks and adaptation needs.

Table 11-4. SDG&E Controls and Mitigations[358]

Risk Chapter	Number of Relevant Controls/Mitigations	Potential Climate Hazard(s) Addressed
Wildfire and PSPS	47	Wildfires
Electric Infrastructure Integrity	12	Extreme Temperatures; Wildfires; Inland Flooding; Coastal Flooding
Employee Safety	3	Extreme Temperatures; Wildfires
Contractor Safety	1	Extreme Temperatures
High-Pressure Gas System	7	Inland Flooding; Landslides
Medium-Pressure Gas System	2	Inland Flooding; Landslides

The majority of controls and mitigations described by SDG&E in its RAMP filing addressing climate risk are aimed at wildfire.

[357] With two exceptions, these controls are ongoing or will have ongoing risk mitigation impact despite being discontinued, because already-installed equipment will continue to function to mitigate risk, as in controls C501 "Wireless Fault Indicators" and C502 "Capacitor Maintenance and Replacement Program (SCADA)" (SDGE-Risk-4 Wildfire and PSPS, p. 71). The two discontinued controls included in Table 2 (SDG&E RAMP-5) or Table 4 (SoCalGas RAMP-5) "Controls and Mitigations that Align with Increasing Resilience to Climate Hazards" are being discontinued by SDG&E and will no longer contribute to risk mitigation: C528 "Distribution Infrared Inspections" (discontinued due to low find rate) and C564 "Distribution Communications Reliability Improvements" (due to change in approach to improvements) (SDGE-Risk-4 Wildfire and PSPS, pp. 71-72).

[358] SDG&E RAMP-5, pp. 12-14.

Table 11-5. SoCalGas Controls and Mitigations[359]

RAMP Risk Chapter	Number of Relevant Controls/Mitigations	Potential Climate Hazard(s) Addressed
High-Pressure Gas System	23	Inland Flooding; Landslides; Extreme Temperatures
Medium-Pressure Gas System	10	Inland Flooding; Landslides; Extreme Temperatures; Wildfires
Underground Gas Storage	3	Inland and Coastal Flooding; Coastal Erosion; Landslides; Wildfires
Contractor Safety	1	Extreme Temperatures
Employee Safety	3	Extreme Temperatures

The majority of controls and mitigations described by SoCalGas in its RAMP filing addressing climate risk are aimed at inland flooding and landslides.

Alternatives Analysis

SDG&E and SoCalGas make no mention of alternatives and offer no discussion of mitigation measures considered but not advanced with regard to climate risk.

Observations and Findings:

SPD has no observations or findings on the alternatives analysis.

CBR Calculations

SDG&E and SoCalGas offer no CBR calculations with regard to climate risk.

Observations and Findings:

SPD has no observations or findings on the CBR Calculations.

[359] SoCalGas RAMP-5, pp. 13-15.

Summary of Findings

The 2025 Sempra RAMP is governed by the RDF Phase 2 Decision (D.22-12-027) and the Phase 3 Decision (D.24-05-064). Those decisions do not require utilities to file a standalone chapter on climate risk; instead, Phase 3 states that utilities "may quantitatively consider climate change impacts" in their RAMP filings and requires utilities to prepare a Climate Pilot White Paper considering the risk reduction benefits of climate adaptation investments resulting from CAVA analyses.[360] Sempra's RAMP-5 Climate Change Adaptation chapters summarize CAVA findings, but the CAVAs themselves are filed and evaluated pursuant to the separate Climate Adaptation proceeding (R.18-04-019). In line with this framework, Sempra treats climate hazards primarily as drivers or modifiers of underlying RAMP risks rather than separate enterprise risks.

SDG&E and SoCalGas indicate in the RAMP-5 chapters that they recognize the importance of providing safe and reliable energy services for customers, maintaining resilient operations, and adapting to climate change.

Staff find the following with regard to the RAMP-5 chapters:

1. Climate risk is not quantified.
2. It is unclear from the RAMP-5 chapters which assets are included in the CAVAs but omitted from the RAMP risk chapters due to RDF prioritization criteria.[361]

Recommendations

1. Quantification of climate risk was not required in these filings, but SDG&E and SoCalGas should continue to work toward incorporating quantified climate risk elements in future RAMP filings.
2. SDG&E and SoCalGas should include in future climate change adaptation RAMP chapters a list of the assets that were included in their respective CAVA but omitted from RAMP risk chapters due to RDF prioritization criteria.

[360] Risk-Based Decision-Making Framework Phase 3 Decision (D.24-05-064), Ordering Paragraphs 3(a) and 5 (pp. 124-125).

[361] Although the Risk-Based Decision-Making Framework Phase 3 Decision Ordering Paragraph 3 indicates that "[a]ny assets identified by an IOU as at risk or vulnerable to climate change in its most recent [CAVA] report, as required in D.20-08-046, should be identified in the IOU's RAMP filings," SDG&E and SoCalGas state that "[s]ome of the assets identified as vulnerable in [the] CAVA may not appear in risk chapters due to RAMP asset prioritization criteria set forth in the RDF" (SDG&E RAMP-5, p. 11; SoCalGas RAMP-5, p. 11).

12. SoCalGas and SDG&E Environmental and Social Justice Pilot Study

ESJ Pilot Study Purpose

The primary purpose of Sempra's Environmental and Social Justice (ESJ) Pilot Study Plan (PSP) is to address the seven key action items directed in the Decision (D.) 22-12-027[362] and provide insight into how Sempra's planned risk mitigations impact Disadvantaged and Vulnerable Communities (DVCs) relative to environmental and social justice. It also aims to identify how to better target mitigation efforts to improve air quality and climate resilience in DVCs and explore ways to enhance equity and access in utility programs. It helps to identify challenges and opportunities for fully incorporating ESJ principles into utility operations.

Background and Introduction

Under the Phase 2 Decision of the Risk-Based Decision-Making Framework (RDF) Order Instituting Rulemaking (OIR, R.20-07-013), the four largest investor-owned energy utilities[363] (IOUs) were each directed to develop an ESJ pilot program as part of their next RAMP filing. The decision identified seven action items to be included in the pilot study. Each IOU is to prepare an ESJ PSP. The purpose of the PSP is to ensure the IOUs' risk assessments and risk mitigations address equity issues and the needs of the most vulnerable, specifically DVCs. The action items include addressing air pollution and climate resilience and integrating ESJ into the RDF. The IOUs are required to consult with the Disadvantaged Communities Advisory Group (DACAG) and the Community-Based Organization Working Group (CBOWG) in developing the PSP.[364]

In July 2024, Sempra presented its ESJ PSP to the CBOWG and DACAG to receive feedback. In August 2024, Sempra hosted a public webinar to present each ESJ action item and request stakeholder feedback. Building on this feedback, Sempra revised the PSP to better integrate the ESJ pilot study into its 2025 RAMP filings. According to the PSP, Sempra's 2025 RAMP filings should identify potential equity issues that may disproportionately impact DVCs within its territory. This chapter discusses the PSPs for Sempra's utilities SDG&E and SoCalGas in Sections A and B, respectively.

Section A: SDG&E's Action Item Implementation

[362] Decision (D.) 22-12-027, Phase II Decision Adopting Modifications to the Risk-Based Decision-Making Framework Adopted in Decision 18-12-014 and Directing Environmental and Social Justice Pilots (December 2022) (https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M500/K014/500014668.PDF, accessed August 1, 2025).

[363] Pacific Gas and Electric Company (PG&E), Southern California Gas Company, Southern California Edison Company, and San Diego Gas & Electric Company.

[364] D.22-12-027, Ordering Paragraph (OP) 5, pp. 65-67.

SDG&E submitted its ESJ pilot study's key findings with its 2025 RAMP filing.[365] In its PSP, SDG&E proposes an approach aimed at two risk categories: (1) wildfire and Public Safety Power Shutoff (PSPS) risk, and (2) Electrical Infrastructure Integrity (EII) risk.[366] The key findings address the seven action items required by D.22-12-027.

I. **Action Item 1:** *Consider equity in the evaluation of [c]onsequences and risk mitigation within the Risk-Based Decision-Making Framework (RDF), using the most current version of CalEnviroScreen to better understand how risks may disproportionately impact some communities more than others.*

   Approach: SDG&E identified areas with a disproportionate amount of risk by overlaying the electric distribution system with a map of DVCs.

Observations:

Wildfire and PSPS – SDG&E defines wildfire risk as risk to communities from catastrophic wildfire caused by SDG&E equipment. Public Safety Power Shutoffs (PSPS) both mitigate this wildfire risk and cause new risks to communities. SDG&E addresses wildfire and PSPS risk to DVCs by overlaying the electric distribution system and DVC map with the CPUC's High Fire Threat District (HFTD). Approximately 745 miles (including overhead and underground mileage) of SDG&E's electric distribution lines and about 9,100 customer meters within the HFTD are located in DVCs. Approximately 26 percent of the Tier 3 Wildfire and PSPS risk in SDG&E's service territory is in DVCs.

SDG&E estimated the total HFTD for Tiers 2 and 3 wildfire and PSPS risk are valued at $540 million annually, which is considered by SPD to be very high. That means that, for both Tier 2 and Tier 3, nearly half a billion dollars' worth of risk is concentrated in these disadvantaged and vulnerable communities. Although they make up less than 10 percent of the square mileage in the HFTD within SDG&E's service territory, DVCs, primarily tribal lands, bear a disproportionate 31 percent of the total risk exposure. SDG&E evaluates applicable controls and mitigations for wildfire and PSPS risk in Action Item 6.[367]

Electric Infrastructure Integrity (EII) – SDG&E defines EII risk as the risk of an asset failure from causes including age, degradation, operation outside of design criteria, and being out of compliance with the latest engineering standards. SDG&E proposes an approach to EII that focuses on its electric distribution system, as this risk is primarily concentrated there. As with wildfire and PSPS risk, SDG&E addresses the EII risk to DVCs by overlaying the electric distribution system and DVC map. Approximately 7 percent of SDG&E's electric distribution system, including approximately 150,000 customer meters, is located within DVCs. This

[365] SDG&E Environmental Social Justice (ESJ) Pilot Study (May 15, 2025).

[366] SDG&E 2025 RAMP, Chapter SDG&E-Risk-4: Wildfire and PSPS and Chapter SDG&E-Risk-5: Electric Infrastructure Integrity.

[367] SDG&E Environmental Social Justice (ESJ) Pilot Study (May 15, 2025), "Mitigation Impacts & Benefits," pp. 29-37.

is proportional representation: DVCs make up approximately 7 percent of SDG&E's service area in terms of square mileage and bear approximately 7 percent of SDG&E's EII risk.

II. **Action Item 2:** *Consider investments in clean energy resources in the RDF, as [a] possible means to improve safety and reliability and mitigate risks in DVCs.*

Approach: SDG&E evaluated where 2025 RAMP programs incorporating clean energy resources might benefit DVCs in terms of improved safety and reliability or reduced risk.

Observations:

Wildfire and PSPS – SDG&E identifies two 2025 RAMP controls incorporating clean energy resources that might benefit DVCs in terms of mitigating wildfire and PSPS risk: Microgrids (C506)[368] and the Standby Power Program (C504). SDG&E's Microgrids (C506) control supports clean energy resources when integrated with battery storage and clean power sources like solar panels. SDG&E reports that it takes into account the location of customers with access and functional needs (AFN customers) when identifying microgrid projects, adding that locations of AFN customers overlap with DVCs.[369] SDG&E's Standby Power Program (C504) provides backup power generators to households, potentially including households in DVCs, to increase their resiliency. These backup generators support clean energy resources when integrated with battery storage and clean power sources like solar panels.

Electric Infrastructure Integrity (EII) – SDG&E addresses EII risk by modernizing its distribution system, including upgrading substations and equipment to improve safety and reliability, which SDG&E asserts ultimately support the development of clean energy infrastructure. SDG&E reports that some of its distribution upgrade programs, such as those facilitating electrical vehicle adoption, may support improvements to public health and air quality by reducing greenhouse gas emissions.[370] SDG&E also asserts that undergrounding may reduce the number of trucks dispatched to inspect and maintain overhead lines, reducing greenhouse gas emissions. SPD notes that SDG&E doesn't provide any quantitative analysis of its plan for responding to Action Item 2 for EII risk.

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[368] Microgrids are small, independent electric grids that can provide power during outages.

[369] SDG&E notes that "AFN customers have significant overlap with DVC, namely in densely populated urban areas"; for more information see SDG&E Environmental Social Justice (ESJ) Pilot Study (May 15, 2025) p. 15 including Figure 3 "SDG&E AFN (left – zip code based) and DVC (right – census track based)."

[370] Greenhouse gas emissions exacerbate climate change, which in turn threatens public health in numerous ways including by degrading air quality (Intergovernmental Panel on Climate Change, Climate Change 2023 Synthesis Report, pp. 50-51 [human physical health], p. 68 [air quality], [https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_LongerReport.pdf, accessed Aug. 1, 2025]).

III. **Action Item #3:** *Consider [m]itigations that improve local air quality and public health in the RDF, including supporting data collection efforts associated with Assembly Bill [AB] 617 regarding [the] [C]ommunity [A]ir [P]rotection [P]rogram.*

Approach: SDG&E evaluated how controls and mitigations for EII, wildfire, and PSPS risks may impact the local public health and air quality, focusing on the two communities in its service territory selected by the California Air Resources Board (CARB) for the Community Air Protection Program under AB 617[371] the International Border Community[372] and Portside Environmental Justice Community,[373] which are also DVCs.

Observations:

SDG&E reports that it complies with the requirements of AB 617, providing an annual report on its emissions of criteria air pollutants and toxic air contaminants from stationary sources. SDG&E also indicates that the San Diego Air Pollution Control District has evaluated the emissions from SDG&E's last few annual reports as "low-risk."[374]

Wildfire and PSPS – The 2025 RAMP controls and mitigations do not directly aim to improve air quality or public health; however, they can provide information about weather and air quality that can in turn support a public health response to adverse conditions. For example, SDG&E allows public access to data from air quality monitors that are in place to protect SDG&E employees.[375] This access could support a public health response to poor air quality, including DVCs.

Electric Infrastructure Integrity (EII) – The EII controls and mitigations implemented by SDG&E are primarily focused on enhancing system reliability and safety and do not directly address air quality or public

[371] The Community Air Protection Program was established by CARB in response to Assembly Bill (AB) 617, "Nonvehicular air pollution: criteria air pollutants and toxic air contaminants" (2017) to reduce pollution exposure in communities most impacted by air pollution (https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB617, accessed July 30, 2025).

[372] San Diego Air Pollution Control District web page "International Border Community" (https://www.sdapcd.org/content/sdapcd/community/community-air-protection-program/international-border-community.html, accessed July 30, 2025).

[373] San Diego Air Pollution Control District web page "Portside Community" (https://www.sdapcd.org/content/sdapcd/community/community-air-protection-program/portside-community.html, accessed July 30, 2025).

[374] SDG&E Environmental Social Justice (ESJ) Pilot Study (May 15, 2025), p. 20.

[375] A component of SDG&E's Safety Compliance and Industrial Hygiene Program (C328).

health. However, some controls and mitigations may indirectly support air quality and public health, such as the ones mentioned above (Action Item #2, EII) that may reduce greenhouse gas emissions.[376]

IV. Action Item #4: *Evaluate how the selection of proposed mitigations in the RDF may impact climate resiliency in DVCs.*

Approach: SDG&E intends to align efforts across proceedings, including Rulemaking (R.) 18-04-019 with its Climate Adaptation Vulnerability Assessment (CAVA) framework, incorporating DVC and equity concerns into proposed mitigations in the RDF. SDG&E indicates that the foundation of its response to this action item is in its treatment of Wildfire as a climate hazard in its 2025 CAVA.[377]

Observations:

Wildfire and PSPS – SDG&E reports that all its wildfire and PSPS risk controls and mitigations support climate resiliency. SDG&E describes how undergrounding to address Wildfire and PSPS risk affects DVCs in Action Item #6.[378]

Electric Infrastructure Integrity (EII) – SDG&E reports that some of its EII risk controls and mitigations support climate resiliency, including installation of protective relaying devices (part of C250) to isolate substations to minimize outage impact and installation of supervisory control and data acquisition (SCADA) capacitors across SDG&E's service territory (C270) to identify and isolate faults more quickly. Other EII controls and mitigations that improve resiliency include system protection, maintenance, and service restoration upgrades as well as ongoing vegetation management. Regarding the impact of these risk controls and mitigations on climate resiliency in DVCs, SDG&E discusses the impact of three EII risk controls and mitigations in its response to Action Item 6, including SDG&E's finding that there is a higher CBR for C250 where substations are in or serve DVCs.[379]

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[376] Greenhouse gas emissions exacerbate climate change, which in turn threatens public health in numerous ways including by degrading air quality (Intergovernmental Panel on Climate Change, Climate Change 2023 Synthesis Report, pp. 50-51 [human physical health], p. 68 [air quality], [https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_LongerReport.pdf, accessed Aug. 1, 2025]).

[377] SDG&E's 2025 Climate Adaptation and Vulnerability Assessment (May 2025) (https://www.sdge.com/sites/default/files/documents/2025-05/SDGE%20CAVA%20-%20Supplemented%20250519.pdf?nid=28966, accessed July 30, 2025).

[378] SDG&E Environmental Social Justice (ESJ) Pilot Study (May 15, 2025), "Wildfire and PSPS," "C518 Strategic Undergrounding," pp. 30-32.

[379] SDG&E Environmental Social Justice (ESJ) Pilot Study (May 15, 2025), "Electric Infrastructure Integrity," pp. 32-38.

V. **Action Item #5:** *Evaluate if [the] estimated impacts of wildfire smoke included in the RDF disproportionately impact DVCs.*

Approach: SDG&E identified publicly available smoke and air quality models,[380] reviewed and reported on the findings of recent (2023-2024) research on how smoke impacts different populations (including DVCs),[381] consulted an expert on social vulnerability Dr. Michael Méndez from UC Irvine, and reviewed relevant information from SDG&E's 2026-2028 Wildfire Mitigation Plan (WMP).

Observations:

Wildfire and PSPS – SDG&E acknowledges that it currently lacks sufficient data to make predictive estimates regarding wildfire smoke impacts. It also notes that there are inherent barriers to assessing wildfire smoke impacts, including the variability of wildfire behavior, identifying what materials burned, fire duration, characteristics and locations of customers impacted, and the complexity of predicting long-term environmental impacts. Consequently, SDG&E relies on leaders in this field of research, including government agencies and academic institutions, to develop tools for assessing wildfire smoke risks. The 2025 RAMP program that addresses wildfire smoke risk is the Air Quality Management Program (part of C572 Situational Awareness and Forecasting). This program supports the safety of SDG&E employees and the general public, including DVCs. Additionally, all SDG&E's wildfire mitigation efforts are aimed at reducing ignition risk, which in turn reduces wildfire smoke risk for all communities in its service territory, including DVCs.

VI. **Action Item #6:** *Estimate the extent to which risk mitigation investments included in the RDF impact and benefit DVCs independently and in relation to non-DVCs in the IOU service territory.*

Approach: SDG&E evaluated the benefit of relevant controls and mitigations for wildfire and PSPS risk for DVCs compared to its larger service territory. It did the same for EII risk.

[380] SDG&E Environmental Social Justice (ESJ) Pilot Study (May 15, 2025), "Table 4 - Selected Smoke Related Tools and Models," pp. 28-29.

[381] SDG&E Environmental Social Justice (ESJ) Pilot Study (May 15, 2025), "Table 3 - Reviewed Publicly Available Studies on Health Impacts of Wildfire Smoke," pp. 27-28.

Observations:

Wildfire and PSPS – SDG&E provides details on its plans for undergrounding (C518 Strategic Undergrounding) including its analysis of this control's potential impact on DVCs.[382] Overlaying the map of circuits scheduled for undergrounding with the map of DVCs, SDG&E found that this control will impact tribal lands, but no other DVCs. SDG&E estimates a risk reduction of 98.4 percent on all affected tribal lands.[383]

Electric Infrastructure Integrity (EII) – SDG&E analyzed the impact of the following 2025 RAMP controls and mitigations for EII risk on DVCs compared to its larger service territory:[384] Distribution Overhead Switch Replacement (C236);[385] Substation Reliability for Distribution (C250);[386] and Distribution Circuit Reliability (C269).[387] While two of these controls (C236 and C250) have a higher CBR where they impact DVCs than in the larger service territory, they produce a risk reduction of less than 25 percent for DVCs.[388]

VII. **Action Item 7:** *Enhance outreach and public participation opportunities for DVCs to meaningfully participate in risk mitigation and climate adaptation activities consistent with Decision 20-08-046.*

Approach: In response to this action item, SDG&E points to its Community Engagement Plan (CEP) filed May 2024,[389] a requirement of R.18-04-019. SDG&E in particular points to a set of "key foundational principles"[390] that guide its approach to community engagement, including partnering with community-based organizations (CBOs) and providing in-person and virtual meeting options

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[382] SDG&E Environmental Social Justice (ESJ) Pilot Study (May 15, 2025), "Wildfire and PSPS," "C518 Strategic Undergrounding," pp. 30-32.

[383] SDG&E Environmental Social Justice (ESJ) Pilot Study (May 15, 2025), p. 32.

[384] These three EII controls were selected for this comparison exercise because "SDG&E possessed granular data to distinguish between DVCs and non-DVCs" (SDG&E Environmental Social Justice [ESJ] Pilot Study [May 15, 2025], p. 32).

[385] The Distribution Overhead Switch Replacement (C236) control aims to replace overhead distribution switches that show corrosion that may lead to catastrophic switch failure. This control has 19 projects planned for 2028, four serving DVCs (SDG&E Environmental Social Justice [ESJ] Pilot Study [May 15, 2025], p. 34). SDG&E considered an alternative (A210 Alternative 2) where it would only replace overhead distribution switches that benefit DVCs.

[386] The Substation Reliability for Distribution (C250) control aims to reduce substation risk. Of the 15 substations in this control, four are in or serve a DVC (SDG&E Environmental Social Justice [ESJ] Pilot Study [May 15, 2025], pp. 35-36).

[387] The Distribution Circuit Reliability (C269) control aims to improve distribution circuit reliability through installation of SCADA capacitors and addressing deficiencies. This control has 14 projects planned for 2028, three serving DVCs (SDG&E Environmental Social Justice [ESJ] Pilot Study [May 15, 2025], p. 37).

[388] SDG&E Environmental Social Justice (ESJ) Pilot Study (May 15, 2025), p. 32.

[389] SDG&E's Climate Adaptation Community Engagement Plan (May 2024) (https://www.sdge.com/sites/default/files/regulatory/R1804019_SDGE%20CEP.pdf, accessed August 1, 2025).

[390] SDG&E Environmental Social Justice (ESJ) Pilot Study (May 15, 2025), p. 39.

as well as incentives for attending meetings (see the full list in the CEP under "Guidance and Approach").[391, 392] SDG&E also includes engagement with DVCs as part of addressing wildfire and PSPS risk and EII risk.

Observations:

Wildfire and PSPS – Besides the measures described in SDG&E's CEP, several of SDG&E's controls for wildfire and PSPS risk and EII risk include outreach and public participation. SDG&E highlights seven controls as being supportive of "meaningful participation," including Engagement with AFN Populations (C556)[393] and Public Outreach and Education Awareness (C557).[394] For C557, SDG&E notes that it relies on CBOs for outreach to DVCs, and "DVC benefits will be dependent upon the activity and outreach success" of the relevant CBOs.[395]

Electric Infrastructure Integrity (EII) – SDG&E's EII risk control Electric Public Safety Communications (C215) includes outreach. SDG&E notes that this control aims at educating the general public regarding safety around electricity. It does not appear to involve public participation or any DVC-specific component.

Section B: SoCalGas's Action Item Implementation

SoCalGas submitted its ESJ pilot study's key findings with its 2025 RAMP filing.[396] In its PSP, SoCalGas proposes an approach for Action Items 1, 4, and 6 aimed at two risk categories: (1) medium pressure gas system risk and (2) excavation damage risk.[397] It did not specify a risk category focus for Action Items 2, 3, and 7. It stated that Action Item 5, regarding wildfire smoke, was inapplicable to SoCalGas. As such, the key findings address six of the seven action items required by D.22-12-027.

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[391] SDG&E's Climate Adaptation Community Engagement Plan (May 2024), "Guidance and Approach," pp. 8-9.

[392] Note that SDG&E's approach to outreach was created with input from the 10-member Equity-First Community Climate Coalition (EC3), created by SDG&E in 2023 to support its adaptation planning outreach efforts. The CEP implies that the membership of the EC3 lacks representation from DVCs: "SDG&E is currently exploring expanding the EC3 to be more representative of the communities, specifically DVCs, for which the CEP is designed. SDG&E plans to seek out additional members to join the EC3 to facilitate more representative and robust engagement on the CAVA from DVCs" (SDG&E's Climate Adaptation Community Engagement Plan [May 2024], p. 6). The ESJ Pilot Study evaluated here doesn't address the planned expansion of the EC3 to better represent DVCs.

[393] See Action Item #2 regarding SDG&E's finding of a large overlap between AFN customers and DVCs.

[394] SDG&E Environmental Social Justice (ESJ) Pilot Study (May 15, 2025), pp. 39-41.

[395] SDG&E Environmental Social Justice (ESJ) Pilot Study (May 15, 2025), p. 41.

[396] SoCalGas Environmental Social Justice (ESJ) Pilot Study Plan (May 15, 2025).

[397] SoCalGas 2025 RAMP, Chapter SCG-Risk-3: Medium Pressure Gas System and Chapter SCG-Risk-1: Excavation Damage.

I. **Action Item 1:** *Consider equity in the evaluation of [c]onsequences and risk mitigation within the Risk-Based Decision-Making Framework (RDF), using the most current version of CalEnviroScreen to better understand how risks may disproportionately impact some communities more than others.*

Approach: SoCalGas evaluated the overlap between areas of higher risk and locations of DVCs compared to its larger service territory.

Observations:

While SoCalGas examined the baseline risk levels in DVCs compared to the larger service territory, SPD finds that SoCalGas did not evaluate relative benefit from risk mitigation for DVCs as required by Action Item #1.

Medium Pressure Gas System Risk – For the purposes of this pilot study, SoCalGas looked at the distribution of the safety risk ("likelihood and expected safety consequences of a serious incident") of its medium pressure gas system as well as its reliability risk ("likelihood and expected reliability consequences of a serious incident or hazardous leak") with regard to the location of DVCs.[398] SoCalGas reports that pipelines in DVCs face a 54 percent higher average baseline safety risk per foot and a 74 percent higher average baseline reliability risk-per-foot compared to its larger service territory.

Excavation Damage Risk – SoCalGas looked at the historic locations of excavation damage on SoCalGas medium- and high-pressure pipelines (2019-2024) with regard to the location of DVCs. SoCalGas did not find a relationship between excavation damage sites and DVCs: the same number of incidents happen in DVCs compared to its larger service territory.

II. **Action Item 2:** *Consider investments in clean energy resources in the RDF, as [a] possible means to improve safety and reliability and mitigate risks in DVCs.*

Approach: SoCalGas describes the expected improvement to regional air quality for surrounding communities from an upgrade to its Honor Rancho Storage Field.[399]

Observations:

SoCalGas is expecting to reduce emissions of criteria air pollutants near its Honor Rancho Storage Field through the Honor Rancho Compressor Modernization (HRCM) project, which will involve replacing five

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[398] SoCalGas Environmental Social Justice (ESJ) Pilot Study Plan (May 15, 2025), p. 8.

[399] Note that the Honor Rancho Storage Field appears to be located near census tracts with relatively low CalEnviroScreen scores as shown in "Figure 11: Honor Rancho Relative to DVCs," SoCalGas Environmental Social Justice (ESJ) Pilot Study Plan (May 15, 2025), p. 18. The census tracts around the storage field would not be defined as DVCs, which are defined in part as being in the 25 percent highest scoring census tracts on CalEnviroScreen (per D.20-08-046).

aging gas-fueled compressor engines with four newer, cleaner gas-fueled engines and two electric engines. SoCalGas expects this upgrade to reduce peak daily nitrogen oxide (NO_x) emissions by up to 95 percent during normal operations, excluding startup emissions.

Additionally, SoCalGas expects the upgrade will lower levels of carbon monoxide (CO), volatile organic compounds (VOC), respirable particulate matter with a diameter of 10 micrometers or less (PM_{10}), and sulfur oxides (SO_x) by an estimated 30 percent.

III. Action Item 3: *Consider [m]itigations that improve local air quality and public health in the RDF, including supporting data collection efforts associated with Assembly Bill [AB] 617 regarding [the] [C]ommunity [A]ir [P]rotection [P]rogram.*

Approach: SoCalGas looked at the area of operation for its Alternative Fuel Fleet Vehicles (AFVs), which emit less carbon dioxide (a greenhouse gas)[400] than gas-powered vehicles, with regard to the location of communities designated as part of the AB 617 Community Air Protection Program, DVCs, and Consistently Nominated Communities.[401] SoCalGas's AFV Program converts existing natural gas-powered vehicles[402] in its fleet to alternative fuels and increases the number of AFVs in the fleet.

Observations:

SoCalGas reports that 96 percent of its AFV fleet operates within a community designated as part of the AB 617 Community Air Protection Program, DVC, or Consistently Nominated Community. The utility's AFV fleet (1,883 vehicles) is mostly renewable natural gas vehicles (1,583 vehicles or 84 percent of the fleet); the remaining vehicles are non-plug-in hybrid (149 vehicles or 8 percent), battery electric (101 vehicles or 5 percent), and fuel cell electric (50 vehicles or 3 percent).[403] SoCalGas estimates that its use of the renewable natural gas vehicles has reduced its annual emissions of carbon dioxide by the equivalent of the emissions of

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[400] Greenhouse gas emissions exacerbate climate change, which in turn threatens public health in numerous ways including by degrading air quality (Intergovernmental Panel on Climate Change, Climate Change 2023 Synthesis Report, pp. 50-51 [human physical health], p. 68 [air quality], [https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_LongerReport.pdf, accessed Aug. 1, 2025]).

[401] Consistently Nominated Communities are communities consistently nominated by community-based organizations for inclusion in the AB 617 Community Air Protection Program (California Air Resources Board web page "Consistently Nominated AB 617 Communities list" [https://ww2.arb.ca.gov/capp/resources/consistently-nominated-ab-617-communities-list, accessed August 4, 2025]).

[402] Since the majority of the vehicles are converted to "renewable natural gas," presumably the natural gas vehicles being converted are non-renewable natural gas vehicles (SoCalGas Environmental Social Justice [ESJ] Pilot Study Plan [May 15, 2025], pp. 18-19).

[403] SoCalGas Environmental Social Justice (ESJ) Pilot Study Plan (May 15, 2025), "Table 1: SoCalGas Alternative Fuel Fleet Vehicle Types," p. 19.

13,000 passenger vehicles.[404]

IV. Action Item 4: *Evaluate how the selection of proposed mitigations in the RDF may impact climate resiliency in DVCs.*

Approach: SoCalGas looked at the locations where climate hazards may impact its medium pressure gas system with regard to the location of DVCs.

Observations:

Medium Pressure Gas System Risk – SoCalGas projects that DVCs will likely not be exposed to impacts from climate hazards that might impact its medium pressure gas system, as DVCs are not located in those areas. The climate hazards SoCalGas projects may pose a risk to its system[405] primarily occur in coastal and mountainous regions, while DVCs are located in dense urban areas. Climate hazard mitigations would therefore not differentially impact DVCs regarding climate resiliency compared to SoCalGas's larger service territory. However, system-wide climate hazard mitigations are expected to benefit the climate resiliency of all communities in SoCalGas's service territory, including DVCs.

Excavation Damage Risk – SoCalGas did not find a relationship between excavation damage sites and locations vulnerable to climate hazards and—as noted above—SoCalGas did not find a relationship between excavation damage sites and the location of DVCs the same number of incidents happen in DVCs compared to its larger service territory. Therefore, excavation damage mitigations would not differentially impact DVCs regarding climate resiliency compared to SoCalGas's larger service territory.

V. Action Item 5: *Evaluate if [the] estimated impacts of wildfire smoke included in the RDF disproportionately impact DVCs.*

Approach: SoCalGas states that this "Action item No. 5 from D.22-12-027 does not apply to SoCalGas, as a natural gas utility" citing D.22-12-027 at 50-51.

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[404] SoCalGas Environmental Social Justice (ESJ) Pilot Study Plan (May 15, 2025), p. 20.

[405] SoCalGas reports in its Climate Change Adaptation RAMP filing that the climate hazard that might pose the greatest risk to its medium pressure gas system is landslide. For the present analysis, SoCalGas reports that it assessed the vulnerability of its medium pressure gas system to "wildfire, storm surge, and flood events" (SoCalGas Environmental Social Justice [ESJ] Pilot Study Plan [May 15, 2025], p. 22). These hazards are described as wildfire, coastal flood, and inland flood in the Climate Change Adaptation RAMP filing, where SoCalGas indicates that the asset class storage fields is the most vulnerable to those hazards (SoCalGas RAMP-5 Climate Change Adaptation, pp. 9-10).

Observations:

SPD finds that the referenced discussion on pages 50-51 of D.22-12-07 (the RDF Phase 2 Decision) does not exempt natural gas companies from Action Item 5; further Ordering Paragraph 7 of the RDF Phase 2 Decision explicitly requires SoCalGas to "use public studies of the health impacts of wildfire smoke available in 2023 and thereafter to structure their risk methodology related to evaluating the estimated impacts from wildfire smoke in their Environmental and Social Justice Pilot Studies."

It is conceivable that a gas pipeline leak or rupture that produces a fire might possibly cause a wildfire. SPD assumes that SoCalGas responded with "not applicable" because it has considered that the circumstances of its natural gas facilities pose no risk of causing incidents that would produce wildfire smoke. That may well be the case, but a compliant response should explain why the utility concludes the evaluation of wildfire smoke impacts is not applicable. For example, it may be that no pipeline facilities are within High Fire Threat Districts or other wildland areas that are prone to wildfires.

VI. Action Item 6: *Estimate the extent to which risk mitigation investments included in the RDF impact and benefit DVCs independently and in relation to non-DVCs in the IOU service territory.*

Approach: SoCalGas looked at the locations where it made improvements to its medium pressure gas system with regard to the location of DVCs and estimated the resulting change in safety and reliability risk for DVCs.

Observations:

Medium Pressure Gas System Risk – In 2024, medium pressure pipe main replacements took place primarily in urban areas and surrounding communities, where DVCs are found. Based on SoCalGas's analysis of the locations where medium pressure pipe main replacements occurred in 2024, on a per mile basis 8.7 percent more pipe main replacements took place in DVCs than the larger service territory. SoCalGas estimates that in areas where medium pressure pipe main replacements occurred, average safety risk per foot decreased by 40 percent in both DVCs and the larger service territory and average reliability risk per foot decreased by 50 percent in DVCs and by 44 percent in the larger service territory.

Excavation Damage Risk – SoCalGas acknowledges that it lacks excavation damage risk mitigation activity information for DVCs. This risk mitigation activity is dependent on reporting by third parties.[406]

[406] "Due to the nature of how [California Underground Facilities Safe Excavation Board excavation damage/violation reporting service 811 DigAlert ticket requests] are placed, the location data of 811 DigAlert ticket requests would not provide a full picture of mitigation impact between DVC and non-DVC areas" (SoCalGas Environmental Social Justice [ESJ] Pilot Study Plan [May 15, 2025], p. 35).

With available information, SoCalGas cannot compare damage reports and response activities in DVCs compared to the larger service territory.

VII. Action Item 7: *Enhance outreach and public participation opportunities for DVCs to meaningfully participate in risk mitigation and climate adaptation activities consistent with Decision 20-08-046.*

Approach: In response to this action item, SoCalGas points to its four Regional Advisory Boards, created as part of its response to the requirements of R.18-04-019,[407] a proceeding which dictates both the filing of Community Engagement Plans and Climate Adaptation Vulnerability Assessments. SoCalGas filed its Community Engagement Plan in May 2024.[408] SoCalGas's Regional Advisory Boards include representatives of CBOs that serve DVCs.

Observations:

SoCalGas's four Regional Advisory Boards (RABs) (the Los Angeles RAB, Orange County/Coastal or "Orange Coast" RAB, the Central Valley/Central Coast or "Northern" RAB, and the South Inland RAB), each include six to seven representatives of CBOs that serve DVCs.[409] The RABs participated in four SoCalGas workshops in late 2024 to discuss climate risks and introduce the RAMP and the ESJ Pilot Study Plan. According to SoCalGas, the feedback provided by the RABs in the workshops held in late 2024 focused on ways to mitigate excavation damage risk.

Sempra's ESJ Pilot Summary and Recommendations

Sempra (SDG&E and SoCalGas) generally complied with the directives outlined in Decision D.22-12-027 by developing plans to incorporate consideration of ESJ impacts into the RDF, in particular using CalEnviroScreen to better understand how risks may disproportionately impact some communities, with a special consideration for impacts on DVCs.

SDG&E addressed the seven action items required by D.22-12-027 and SoCalGas addressed six of the seven action items. Improvement is still needed. Below, SPD summarizes its recommendations in response to the Sempra ESJ Pilot Study Plans filed in May 2025.

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[407] D.20-08-046, Decision on Energy Utility Climate Change Vulnerability Assessments and Climate Adaptation in Disadvantaged Communities (Phase 1, Topics 4 And 5) (September 2020) (https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M346/K285/346285534.PDF, accessed August 5, 2025).

[408] SoCalGas's Climate Adaptation Vulnerability Assessment Community Engagement Plan (May 2024) (https://www.socalgas.com/sites/default/files/2025-02/2024-05-15-R1804019-SoCalGas-Community-Engagement-Plan.pdf, accessed August 5, 2025).

[409] SoCalGas's Climate Adaptation Vulnerability Assessment Community Engagement Plan (May 2024), "Table 3. CBO Partners in RABs" (membership information from 2023), pp. 31-33.

SDG&E:

1. Regarding Action Item 1: SDG&E estimates a disproportionate exposure to wildfire risk exposure for DVCs (primarily tribal lands) in the HFTD (31 percent risk exposure despite making up less than 10 percent of the square mileage). SPD recommends that SDG&E include in its 2028 GRC filing references to its Wildfire Mitigation Plan's measures to address the mitigations that reduce risk the most in DVCs.

2. Regarding Action Item 2: SPD recommends that SDG&E incorporate a quantitative analysis of electric infrastructure integrity related to clean energy resources in its action plan responding to this action item.

3. Regarding Action Item 3: SDG&E's 2025 RAMP controls and mitigations do not directly aim to improve air quality or public health; however, as part of these controls and mitigations, SDG&E can support a public health response to adverse conditions, such as in SDG&E's Safety Compliance and Industrial Hygiene Program (C328), which allows public access to data from air quality monitors that are in place to protect SDG&E employees. SPD recommends that SDG&E provide some quantitative, data-driven analysis on how to improve air quality by reducing emissions (both toxic air pollutants and greenhouse gas emissions), thereby protecting the electric grid and public health, particularly for DVCs.

4. Regarding Action Item 7: in response to this action item, SDG&E points to its Community Engagement Plan (CEP), filed May 2024, which describes its 10-member Equity-First Community Climate Coalition (EC3). The CEP implies that the membership of the EC3 lacks representation from DVCs: "SDG&E is currently exploring expanding the EC3 to be more representative of the communities, specifically DVCs, for which the CEP is designed. SDG&E plans to seek out additional members to join the EC3 to facilitate more representative and robust engagement on the CAVA from DVCs."[410] The ESJ Pilot Study evaluated here does not address the planned expansion of the EC3 to better represent DVCs. SPD recommends that SDG&E describe the steps it has taken to improve DVC representation on its EC3 in the 2028 GRC filing.

SoCalGas:

1. Regarding Action Item 5: SoCalGas says this action item does not apply to it. However, SPD finds that SoCalGas didn't provide any rationale for saying this action item is inapplicable. SPD recommends that SoCalGas should update its Pilot Study Plan with an explanation of why the evaluation of wildfire smoke impacts does not apply or develop a risk mitigation plan if merited upon reevaluation. The update should be served to the service list in the upcoming GRC.

2. Regarding Action Item 6: SoCalGas reports that, in 2024, medium pressure pipe main replacements took place primarily in urban areas and surrounding communities, where DVCs are found: there was

[410] SDG&E's Climate Adaptation Community Engagement Plan (May 2024), p. 6.

an 8.7 percent per mile higher rate of replacement in DVCs. SoCalGas estimates that reliability risk decreased more for DVCs than in the larger service territory as a result of these replacements. However, SoCalGas estimates that safety risk decreased by about the same amount for DVCs as in the larger service territory (40.0 percent decrease for DVCs and 40.3 percent decrease for other areas).

SPD recommends that SoCalGas explain in its upcoming GRC filing why the safety risk did not decrease more for DVCs, given that there was a higher rate of replacement in DVCs.

3. Regarding Action Item 7: in response to this action item, SoCalGas points to its four Regional Advisory Boards (RABs), created to support its CAVA planning process and described in its Community Engagement Plan (CEP), filed May 2024. SoCalGas's description of its work with the RABs presented in its ESJ Pilot Study Plan and in its CEP, includes reference to four workshops SoCalGas held with the RABs in late 2024, intended to discuss climate risks, the ESJ Pilot Study Plan, and the RAMP process. However, SoCalGas provides few details about these workshops. Given that the RAB feedback summarized from those workshops pertains only to excavation risk, SPD is interested to know more about which climate risks were discussed and if so what feedback SoCalGas received about them, as well as general feedback from the RABs about ways to increase meaningful community participation in SoCalGas's planning processes.

   SoCalGas should provide more details about its 2024 workshops with its RABs in the GRC filing, including the dates, times, and durations of workshops or meetings, who attended, and what happened at those workshops, as well as next steps for the RABs in SoCalGas's planning processes.

SDG&E and SoCalGas ESJ White Paper Recommendation

1. SPD recognizes that Sempra timely submitted its ESJ White Paper on July 15, 2025. It lacked detail and did not expand on the key findings presented in its PSPs.
2. SPD recommends Sempra provide further details in its 2028 GRC filings on future plans for assessing and addressing both risk impacts on DVCs and the benefits of risk mitigations for DVCs.

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END ATTACHMENT-A