STATE OF CALIFORNIA GAVIN NEWSOM, *Governor*

PUBLIC UTILITIES COMMISSION
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TO PARTIES OF RECORD IN RULEMAKING 20-07-013:

This is the proposed decision of Commissioner John Reynolds. Until and unless the Commission hears the item and votes to approve it, the proposed decision has no legal effect. This item may be heard, at the earliest, at the Commission's May 30, 2024 Business Meeting. To confirm when the item will be heard, please see the Business Meeting agenda, which is posted on the Commission's website 10 days before each Business Meeting.

Parties of record may file comments on the proposed decision as provided in Rule 14.3 of the Commission's Rules of Practice and Procedure.

/s/ MICHELLE COOKE
Michelle Cooke
Chief Administrative Law Judge

MLC:smt

Attachment

COM/JR5/smt **PROPOSED DECISION** **Agenda ID #22550**
Quasi-Legislative

Decision **PROPOSED DECISION OF COMMISSIONER JOHN REYNOLDS**
(Mailed 4/26/2024)

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Further Develop a Risk-Based Decision-Making Framework for Electric and Gas Utilities.	Rulemaking 20-07-013

PHASE 3 DECISION

TABLE OF CONTENTS

Title **Page**

TABLE OF CONTENTS

Title **Page**

TABLE OF CONTENTS

Title **Page**

PHASE 3 DECISION

Summary

This decision resolves the following Phase 3 issues: evaluation of post-test years; uncertainty-transparency pilot; tail risk-consequence modeling; climate change; risk scaling; discount rates; Risk Assessment and Mitigation Phase (RAMP) reporting templates; and tranches. Specifically, this decision:

- Modifies the Risk-Based Decision-Making Framework (RDF) included in Appendix A to Decision (D.) 22-12-027 to require investor-owned utilities (IOUs) to present cost-benefit ratios (CBR) for each general rate case post-test year rather than an aggregate CBR for the entire post-test year period;
- Modifies the Transparency Pilot Guidelines appended to D.21-11-009 and directs Pacific Gas and Electric Company (PG&E), Southern California Gas Company (SoCalGas) and San Diego Gas & Electric Company (SDG&E) to continue to use and test the Transparency Pilot Guidelines in conjunction with their next Risk Assessment and Mitigation Phase filings;
- Identifies best practices for tranche granularity when implementing the RDF;
- Identifies the truncated power law distribution model as the best practice for wildfire tail risk modeling when implementing the RDF, while allowing other modeling approaches if justified;
- Directs IOUs to each prepare a Climate Pilot White Paper testing the quantitative integration of climate hazard data into the RDF;
- Clarifies that IOUs are currently authorized but not required to integrate quantitative climate hazard data into the RDF and provides related guidance;
- Declines to adopt a utility proposal regarding non-wildfire tail risk modeling;

- Modifies the risk scaling requirements of the RDF to require the IOUs to supplement their analysis with a presentation of the Risk-Adjusted Attribute Levels applying a linear scaling function if they choose to address tail risk using the power law or other statistical approach and choose to present Risk-Adjusted Levels by relying on a convex scaling function;
- Modifies the CBR calculation by incorporating sensitivity analysis and requiring the presentation of the CBR using three discount rate scenarios for each mitigation; and
- Authorizes continuation of the Technical Working Group established in D.21-11-009 for the refinement of selection and progress reporting templates with the goals of transparency, consistency across IOUs, and ease of use.

The modified RDF is appended to this decision in full as Appendix A and the redlined RDF is appended in full as Appendix C. The modified Transparency Pilot Guidelines are appended to this decision in full as Appendix B and the redlined Transparency Pilot Guidelines are appended in full as Appendix D.

This proceeding remains open.

1. Background

The Commission opened Rulemaking (R.) 20-07-013 on July 16, 2020, to consider ways to strengthen the risk-based decision-making framework that regulated energy utilities use to assess, manage, mitigate, and minimize safety risks. The rulemaking builds on requirements for a utility risk framework adopted in the Safety Model Assessment Proceeding (S-MAP), Application (A.) 15-05-002 et al, and in R.13-11-006, which was opened to address the requirements of Public Utilities Code[1] Sections 963(b)(3) and 750. The purpose of

[1] All references to Code Sections on this decision are to Public Utilities Code Sections, unless specified otherwise.

this rulemaking is to further the prioritization of safety by gas and electric utilities in alignment with the requirement of Section 451 of just and reasonable rates.

The Commission adopted two decisions in Phase 1 of this proceeding, Decision (D.) 21-11-009, *Decision Addressing Phase 1, Track 1 and 2 Issues*, and D.22-10-002, *Decision Addressing Phase 1, Tracks 3 and 4 Issues*. In Phase 2 of this proceeding, the Commission adopted D.22-12-027, *Phase 2 Decision Adopting Modifications to the Risk-Based Decision-Making Framework Adopted in D.18-12-014 and Directing Environmental and Social Justice Pilots*. Amongst other actions, D.22-12-027 modified the Risk-Based Decision-Making Framework (RDF)[2] adopted in D.18-12-014 by requiring Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE) and Southern California Gas Company (SoCalGas) and San Diego Gas & Electric Company (SDG&E) (collectively, investor-owned utilities or IOUs) to develop and present cost-benefit ratios (CBRs) in their Risk Assessment and Mitigation Phase (RAMP) and general rate case (GRC) filings, rather than Risk-Spend Efficiency (RSE) ratios.

1.1. Phase 3 Procedural Background

On March 13, 2023, an Assigned Commissioner and Assigned Administrative Law Judges (ALJ) issued a ruling (March 13, 2023 Ruling) setting forth the Phase 3 Roadmap for comment and scheduling a prehearing conference (PHC).[3] Parties filed comments on the Phase 3 Roadmap proposal on March 30, 2023.

[2] Use of the acronym "RDF" throughout this decision refers to the requirements initially adopted in D.18-12-014 as modified by D.22-12-027.

[3] Phase 3 Roadmap proposed by Safety and Policy Division (SPD) was attached to March 13, 2023 Ruling)

A PHC was held on April 11, 2023, to address the issues of law and fact, determine the need for hearing, set the schedule for resolving the outstanding issues in this proceeding, and address other matters as necessary. Parties filed reply comments on the Phase 3 Roadmap proposal and Post-PHC Statements on April 21, 2023.

An assigned Commissioner's Phase 3 Scoping Memo and Ruling Extending Statutory Deadline (Phase 3 Scoping Memo) was issued on May 31, 2023. The scoping memo outlined a detailed schedule for five workshops between July 12, 2023 and October 25, 2023, with an additional potential workshop scheduled for December 6, 2023.

Workshop #1, held July 12, 2023, addressed the topic of Evaluation of Post-Test Years and Uncertainty: Transparency Pilot. SCE filed a Submission Regarding Pacific Gas and Electric Company's Transparency Proposal (SCE Transparency Submission) on June 13, 2023. During the workshop, SCE and PG&E led discussions regarding PG&E's Transparency Proposal (hereafter, Transparency Pilot Guidelines), which the Commission had ordered SCE to undertake in D.21-11-009.[4] SPD staff led workshop discussions regarding evaluation of post-test years.

On July 21, 2023, PG&E filed a Summary of Workshop #1 that included the slides presented during the workshop. On July 21, 2023, the assigned ALJ issued a ruling entering the SPD Proposal discussed at the workshop, "Evaluation of Post-Test Years [SPD] Staff Proposal on Phase 3 of R.20-07-013" (SPD Workshop #1 Proposal) into the record and invited comment on the proposal and on PG&E's Summary of Workshop #1. On August 10, SCE, PG&E, The Utilities

[4] D.21-11-009 at Ordering Paragraph 3.

Reform Network (TURN), the Protect Our Communities Foundation (PCF), the Energy Producers and Users Coalition and Indicated Shippers (EPUC/IS), Mussey Grade Road Alliance (MGRA) and, jointly, SDG&E and SoCalGas (collectively the Sempra companies) filed comments regarding workshop #1 and the SPD proposal. On August 17, 2023, TURN, PG&E, the Sempra companies and SCE filed reply comments regarding workshop #1 and the SPD proposal. PG&E's reply comments included the revised and final Workshop #1 Summary as an attachment.

Workshop #2 regarding Tail Risk: Consequence Modelling was held on July 26, 2023. The Mussey Grade Road Alliance (MGRA) presented during the workshop on this topic. On July 31, 2023, the assigned ALJ issued a ruling posing questions regarding the issues discussed during Workshop #2 and seeking comment. On August 1, 2023, MGRA filed the White Paper it presented on during the workshop entitled, "Tail Risk and Event Statistics for Utility Planning." On September 8, 2023, the Sempra companies, SCE, PG&E, and TURN filed comments on the Workshop #2 questions. On September 15, 2023, TURN, the Sempra companies, SCE and MGRA filed reply comments on the Workshop #2 questions.

Workshop #3 regarding Climate Change was held on September 13, 2023, jointly with R.18-04-019. Commission Energy Division and SPD staff presented during the workshop, as did PG&E. PG&E presented a proposal entitled "Continuous Improvement in Investor-Owned Utility Risk Management: Integrating Enterprise Risk Modeling and Climate Vulnerability Assessment to Enhance IOU Resilience." PG&E filed a White Paper summarizing its proposal on September 19, 2023. On September 20, 2023, the assigned ALJ issued a ruling posing questions for party comment regarding Workshop #3, and appending the

SPD proposal presented during Workshop #3, entitled "Rulemaking 20-07-013 Phase 3 SPD Proposal on Climate Change and the Risk-Based Decision-Making Framework," as well as the Workshop #3 presentation slides. TURN, PG&E, SCE, PCF, and the Sempra companies filed opening comments on the questions regarding Workshop #3 on October 13, 2023. TURN, SCE, the Sempra companies and PG&E filed reply comments on October 17, 2023.

Workshop #4 regarding risk scaling was held on October 4, 2023. PG&E and TURN presented on this topic at the workshop. On October 12, 2023, TURN and PG&E filed their respective risk scaling proposals. On October 12, 2023, the assigned ALJ issued a ruling posing questions on the issues discussed during Workshop #4 and seeking comment. This ruling also included the slide deck from Workshop #4. On November 6, 2023, the Sempra companies, TURN, PCF, PG&E, MGRA, and SCE filed comments in response to the October 12, 2023 ALJ ruling. On November 13, 2023, SCE, PG&E, the Sempra companies, TURN, PCF, and MGRA filed reply comments.

Workshop #5 regarding discount rates and RAMP reporting templates was held on October 25, 2023. Cal Advocates presented a proposal on Risk Mitigation reporting templates and SPD and TURN each presented a proposal on the use of discount rates in the RDF's cost-benefit analysis. On October 31, 2023, Cal Advocates filed its recommendation on Risk Mitigation reporting templates, and TURN filed the white paper on discounts rates it presented at Workshop #5. On November 2, 2023, the assigned ALJ issued a ruling posing questions on the issues discussed during Workshop #5 and seeking comment. This ruling also included the slides from Workshop #5 and the SPD Proposal on discount rates. On December 1, 2023, EPUC/IS, SCE, PCF, TURN, the Sempra companies, and PG&E filed comments in response to the November 2, 2023 ALJ Ruling. On

December 8, 2023, SCE, EPUC/IS, the Sempra companies, TURN, Cal Advocates, and PG&E filed reply comments.

On October 13, 2023, the Assigned Commissioner issued a ruling amending Phase 3 Scoping Memo and Ruling, scheduling December 6, 2023 Workshop and updating proceeding schedule (October 2023 Assigned Commissioner's Ruling). This ruling added the issue of additional tranche granularity guidance to the scope of Phase 3.

Workshop #6 regarding Tail Risk: Non-wildfire Risks and Tranche Granularity was held on December 6, 2023. The IOUs presented a "Joint IOU Risk Presentation," the Sempra companies and SCE presented a "Whitepaper on Methods to Incorporate Tail Risk into Utility Risk Modeling," TURN presented a "Granularity Proposal," and the IOUs presented an alternative granularity proposal. On December 12, 2023, these parties filed final proposals in these areas. On December 13, 2023, a ruling entered Workshop #6 slides into the proceeding record and posed questions for party comment regarding Workshop #6 issues. On January 10, 2024, TURN, EPUC/IS, the Sempra companies, SCE, PG&E, and MGRA filed opening comments on Workshop #6. On January 17, 2024, EPUC/IS, SCE, the Sempra companies, MGRA, PG&E and TURN filed reply comments on Workshop #6.

1.2. Submission Date

Phase 3 of this proceeding was submitted on January 17, 2024, upon the filing of reply comments regarding Workshop #6.

2. Jurisdiction

Sections 451 and 454 require electric and gas utilities to "promote the safety, health, comfort, and convenience of their patrons, employees, and the public," while offering "just and reasonable" rates.

Section 963(b)(3) states "it is the policy of the state that the Commission and each gas corporation place safety of public and gas corporation employees as the top priority," and that "the Commission shall take all reasonable and appropriate actions necessary to carry out a safety priority policy consistent with the principle of just and reasonable cost-based rates." Section 961(b)(1) requires gas corporations to develop plans for the safe and reliable operation of facilities that implement Section 963(b)(3) requirements.

Section 750 requires the Commission to develop formal procedures to consider safety in a rate case application by an electrical corporation or gas corporation. Section 321.1(b) requires the Commission to "take all necessary and appropriate actions to assess the economic effects of its decisions and to assess and mitigate the impacts of its decisions on customer, public, and employee safety."

3. Issues Before the Commission

Phase 3 issues are as follows:

a. Should the Commission provide more prescriptive guidance regarding Post-Test Year cost-efficiency calculations, potentially including a template with instructions?

b. Whether the Transparency Pilot Guidelines, as modified and appended to D.21-11-009, should be further modified and adopted for use by the IOUs, whether the framework should continue to be piloted or tested, or whether some other course of action is more appropriate?

c. Should the Commission require use of the power law probability distribution function to model wildfire risk, recommend use of this approach as a best practice, or take some other course of action to ensure appropriate modeling of wildfire tail risk and communication of associated uncertainties in IOU RAMP filings? Is additional Commission guidance needed regarding modeling of low

probability, high risk events more generally in the RDF and in RAMP filings?

d. Should analyses or outputs from the IOUs' Climate Adaptation Vulnerability Assessments inform quantitative risk modeling of climate hazards using the RDF? More generally, how should climate hazards be reflected in RAMP filings?

e. Should the Commission identify best practices for risk scaling or adopt minimum requirements regarding the risk scaling function for use in the RDF?

f. Should the Commission provide guidance regarding the use of varying discount rates (i.e. dual-rate discounting) for mitigation costs and benefits within the Cost-Benefit Ratios in RDF? Should the Commission identify an appropriate discount rate (or range of discount rates) for mitigation costs and benefits in the RDF? Should the Commission authorize IOUs to vary their use of discount rates by mitigation?

g. Should the Commission adopt required templates for data presentation for use in the RAMPs? If so, what should be the information requirements and format of the templates?

h. Should the Commission provide additional guidance regarding tranche granularity in the RDF?

The following sections address each issue in this order:

1. Evaluation of post-test years and the related topic of tranche granularity;
2. Uncertainty-transparency pilot;
3. Tail risk consequence modeling for wildfire and non-wildfire risks;
4. Climate change;
5. Risk scaling;
6. Discount rates; and
7. Proposed RAMP reporting templates.

4. Evaluation of Post-Test Years

Workshop #1 addressed the following issue: Should the Commission provide more prescriptive guidance regarding Post-Test Year cost-efficiency calculations, potentially including a template with instructions?

At the beginning of Workshop #1, SPD summarized IOU methods of providing RSE information in GRC applications as follows:

- PG&E provided RSEs for each of the post-test years and included individual risk reduction and cost by year.
- The Sempra companies provided a single RSE for the sum of the three post-test years as well as aggregate RSEs for post-test years.
- SCE provided RSE information by tranche for each GRC post-test year and individual risk reduction and costs by year.[5]

The RDF does not currently require the IOUs to provide Post-Test Year RSE or CBR calculations; instead, the RDF requires IOUs to consider the benefits of any mitigations "that are expected to be implemented prior to the GRC period under review in the RAMP submission."[6] There is currently no expectation in the GRC proceedings that the IOUs should estimate costs or work units for individual years beyond the test year. However, without knowing the IOUs' expected cost-efficiency metrics calculations in each post-test year for their controls[7] and proposed safety mitigations, stakeholders and decision-makers are

[5] Workshop #1 Post-Workshop Final Report, contained in PG&E Reply Comments, August 17, 2023.

[6] D.22-12-027, Appendix A, A-10 and A-11.

[7] "Controls" are specific mitigations required by statute or Commission decision. The RDF requires the IOUs to present RSEs or CBRs for both controls and mitigations. *See* D.21-11-009 at Ordering Paragraph 1.c.

unable to determine the true risk reduction benefits from one post-test year to the next.[8]

SPD previously reported that the IOUs inconsistently present RSE calculations for mitigations beyond the Test Year in their RAMP mitigation proposals and GRC applications.[9] SPD's Workshop #1 Proposal observes that, to calculate risk reduction for each post-test year, both PG&E and SCE annually reset the baseline for evaluation of residual risk to be the start of each respective post-test year, which the Sempra companies have not yet done in their post-test year analyses.[10]

4.1. SPD Proposal

SPD recommends that the Commission require the IOUs to submit CBRs of mitigation programs for all post-test years assessed in a RAMP or GRC filing. SPD assert that this would "create additional transparency for decision-makers and stakeholders in understanding how much the IOUs intend to spend on proposed mitigations in each post-test year, the marginal risk reduction that is expected to result from the intended spending on proposed mitigations in each post-test year, and the cost-effectiveness of the proposed mitigations in each post-test year."[11]

Specifically, SPD recommends the Commission modify the RDF to require the IOUs to undertake the following:

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[8] SPD Workshop #1 Proposal at 2, issued via ALJ ruling on July 21, 2023.

[9] *See* Attachment A to Assigned Commission and ALJ Ruling issued on March 13, 2023, Phase 3 Roadmap proposal at 1. Pursuant to D.22-12-027, IOUs will transition from presenting RSEs to presenting cost-benefit risk ratios starting with PG&E's 2024 RAMP filing.

[10] SPD Workshop #1 Proposal at 2.

[11] *Id*. at 4.

a. Submit CBRs for each of the GRC post-test years, by tranche, for all controls and proposed mitigations; and,

b. Consider appropriately granular tranches, then prioritize which segments of the tranches will maximize risk reduction and effectiveness of mitigation from one post-test year to the next with the remaining residual risk.[12]

To implement these recommendations, SPD proposes that the Commission add a new Row 26 to the RDF that would state:

> GRC Post-Test Year Reporting: All Controls and Mitigation programs must include Cost-Benefit Ratios in each of the GRC post-test years and by Tranche.[13]

SPD asserts that for the post-test year CBRs to be useful, the underlying asset must be divided into enough risk tranches that the effect of prioritizing mitigations in the highest-risk tranches can be reflected in the baseline risk score at the end of each year. We discuss this proposal in Section 5.1.

4.2. Party Comments

Parties generally support a requirement that the IOUs submit CBRs in each of the GRC post-test years. SCE notes that it supports this requirement only if Commission assesses the post-test years in the GRC and RAMP in a manner that uses some form of budget-based forecasting and authorization, rather than a broad formula-based escalation rate.[14] The Sempra companies do not oppose this requirement but maintain that the post-test year CBR's usefulness will be limited by data and assumptions used in the calculations. The Sempra companies explain that it is challenging for an IOU to forecast, with certainty, activities and

[12] *Ibid*.

[13] *Id*. at Appendix A.

[14] SCE Workshop #1Opening Comments at 2.

costs that it will undertake for the three post-test years.[15] The Sempra companies state that post-test year cost forecasts or CBRs should not be the only basis of or required to be used for purposes of requesting or determining revenue requirements.[16]

Parties expressed a range of views regarding SPD's tranche granularity proposal for post-test year purposes.

Parties generally expressed interest in a reporting template for reporting post-test year CBRs, although PG&E and Sempra opposed this. EPUC/IS suggested that any reporting template include a cover page that summarizes key takeaways.[17]

4.3. Adoption of Post-Test Year Requirements

We adopt a new RDF requirement that the IOUs must present CBRs for each GRC post-test year as well as an aggregate CBR for the entire post-test year period and the entire GRC period. Parties generally supported this requirement, and it will add transparency and aid in decision making. We modify the RDF included in Appendix A of D.22-12-027 by adding the following to the existing row 26:

> GRC Post-Test Year Reporting: All Controls and Mitigation programs must include CBRs in each of the GRC post-test years as well as an aggregate CBR for the entire post-test year period and the entire GRC period, by Tranche.

We agree with the Sempra companies and do not require here that post-test year cost forecasts or CBRs form the only basis of IOU forecasts or revenue

[15] Sempra companies Workshop #1 Opening Comments at 3.

[16] Sempra companies Workshop #1 Opening Comments at 7.

[17] EPUC/IS Opening Comments on Workshop #1 at 6.

requests. As acknowledged in D.22-12-027, other factors inform appropriate mitigations and may be considered by IOUs and this Commission.[18] We also clarify that compliance activities, if these are currently established measures that are modifying risk, are controls.

We do not adopt SPD's recommended new terms and definitions as these have not been sufficiently vetted. Similarly, we do not adopt a post-test year reporting template as we do not have a proposed template before us. However, parties may continue to discuss the need for such a template, and as needed, we can consider a proposal in this area at a later date.

We consider and largely adopt SPD's tranche granularity proposal presented during Workshop #1 below. Workshop #6 addressed tranche granularity issues in depth, and we discuss and adopt new requirements in this area in section 5.4 below.

5. Tranche Granularity

Workshop #6 considered the issue of whether the Commission should provide additional guidance regarding tranche granularity in the RDF. The October 2023 assigned Commissioner's Ruling added to Phase 3 the issue of whether the Commission should provide additional guidance regarding tranche granularity in the RDF.

The RDF currently states:

[18] D.22-12-027, Appendix A at Row 26: "In the RAMP and GRC, 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. The utility is not bound to select its Mitigation strategy based solely on the Cost-Benefit Ratios produced by the Cost-Benefit Approach. Mitigation selection can be influenced by other factors including, but not limited to, funding, labor resources, technology, planning and construction lead time, compliance requirements, Risk Tolerance thresholds, operational and execution considerations, and modeling limitations and/or uncertainties affecting the analysis. In the GRC, the utility will explain whether and how any such factors affected the utility's Mitigation selections."

> The determination of Tranches will be based on how the risks and assets are managed by each utility, data availability and model maturity, and strive to achieve as deep a level of granularity as reasonably possible. The rationale for the determination of Tranches, or for a utility's judgment that no Tranches are appropriate for a given Risk Event, will be presented in the utility's RAMP submission. For the purposes of the risk analysis, each element (*i.e.*, asset or system) contained in the identified Tranche would be considered to have homogeneous risk profiles (*i.e.*, considered to have the same [Likelihood of Risk Event] LoRE and [Consequences of Risk Event] CoRE).[19]

5.1. SPD Proposal

SPD included a proposal regarding tranche granularity in their post-test year proposal, discussed at Workshop #1 as follows:

> [IOUs should c]onsider appropriately granular tranches, then prioritize which segments of the tranches will maximize risk reduction and effectiveness of mitigation from one post-test year to the next with the remaining residual risk.[20]
>
> IOUs could consider using combinations of quintiles of Likelihood of Risk Event (LoRE) and Consequence of Risk Event (CoRE). This approach would mean that portions of a risk with the highest 20 percent of LoRE would be grouped within a tranche, and the highest 20 percent of CoRE would be grouped in another tranche. In combination with other tranches, this system of tranche analysis would create a total of 25 LoRE/CoRE tranches.[21]

SPD argues that their post-test year proposal would be most useful if utilities divided the underlying asset into enough risk tranches such that the effect of prioritizing and implementing highest-risk tranche mitigations was

[19] D.22-12-027, Appendix A, Row 14.

[20] SPD Workshop #1 Proposal at 4.

[21] SPD Workshop #1 Proposal at 4 (emphasis added.)

reflected in a reduced baseline risk score at the end of each year. SPD explains that its proposed approach would "support a more practical presentation of risk reduction and CBRs to facilitate review and oversight by Commission staff and other stakeholders in the RAMP and GRC proceeding."[22]

Party comments on SPD's Workshop #1 tranche granularity proposal diverged widely and emphasized that guidance on tranche granularity for post-test years could not be delinked from the potential need for such guidance for GRC test years. TURN, in particular, recommended the Commission consider the issue of tranche granularity during Workshop #6. For this reason, as mentioned above, the October 2023 Assigned Commissioner's Ruling added the issue of whether the Commission should provide additional guidance on tranche granularity to the scope of Phase 3, scheduled this issue for discussion at Workshop #6, and directed TURN and the IOUs to also serve and file proposals in this area.

5.2. Party Proposals

Workshop #6 discussed TURN and IOU proposals regarding tranche granularity.[23]

5.2.1. TURN Proposal: 5 by 5 Rule

TURN's final tranche granularity proposal recommended the Commission adopt the following "5-5" rule for electric and gas infrastructure physical assets as a starting point for a minimum standard as follows:

> The risk between tranches may not be more than 5 percent;
> and, The number of miles or assets in a given tranche

[22] *Ibid*.

[23] *See* Workshop #6 slides in Attachment B, December 13, 2023 ALJ Ruling.

> should not represent more than 5 percent of the total asset count or milage count.[24]

Noting that the RDF requires utilities to strive "to achieve as deep a level of granularity as reasonably possible," TURN states the this has not always been achieved.[25] This lack of granularity in some RAMP reports to date is the dynamic driving their proposal, TURN states:

> True granularity will provide the most accurate view of the potential impact of risk mitigation spending and will empower the Commission to determine if the utility has identified the proper assets for mitigation, scope of mitigations and pace of the mitigation work. Unfortunately, the utilities' tranches have not reflected the granularity required to maximize the use of the RDF to identify the optimal risk mitigation portfolio.[26]

TURN further emphasizes that adherence to its proposal would require collection and utilization of asset level risk data:

> This proposal assumes the utility has a highly granular assessment of risk for its electric and gas infrastructure physical assets, which to our knowledge all utilities have accomplished for gas pipeline risk as well as for circuit segments related to electric distribution and transmission system risk, including wildfire. If utilities have not analyzed risk at this granular level, this represents a major lack of understanding of risk on the utility's system, a case for which utility risk modeling results and CBRs will not be very useful and the Commission should order immediate remedies to gather this relevant information.[27]

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[24] TURN Granularity Requirements Proposal, December 12, 2023 at 1.

[25] TURN highlights the, at the time, most recent Sempra companies' and PG&E's RAMP filings when making this assertion. *See* TURN Opening Comments on Workshop #1 at 2, August 17, 2023.

[26] *Ibid*.

[27] *Ibid*.

TURN further states that "it would be unreasonable for the utility to not be able to provide this level of information on its assets."[28] TURN asserts:

> Just the existence of the more granular data sets found in SCE and Sempra's RAMP and GRC workpapers suggests that assets are being managed and operated more granularly than just a few tranches.
>
> …When the utilities provide only a few tranches in the RAMP, the Commission cannot conclude that mitigations are properly targeted to serve the best use of ratepayer dollars. The RDF is intended to illuminate these decisions, and the adoption of minimum granularity requirements will ensure that the Commission is obtaining the information necessary to assess utility spending forecasts.[29]

5.2.2. IOUs' Proposals

The IOUs proposed two other potential methods to improve communications regarding tranche granularity.

5.2.2.1. Option 1: Provide Tranche Proposals in Pre-RAMP Workshop

The IOUs' "Option 1" suggests the IOUs provide their "preliminary" tranching proposals in the already-required pre-RAMP workshops, which currently focus on the final list of risks to be included in the RAMP.[30] The IOUs observe that the RDF currently requires that, subsequent to the workshop, and "based on input received from SPD, other interested CPUC staff, and interested parties, the utility will make its determination of the final list of risks to be addressed in its RAMP. The rationale for taking or disregarding input during the

[28] TURN Reply Comments on Workshop #6 at 7.

[29] TURN Reply Comments on Workshop #6 at 8-9.

[30] Joint IOU Tranching Proposal at 10, referring to the "pre-RAMP" workshops required in D.22-12-027, Appendix A at Row 12.

workshop will be addressed in the utility's RAMP."[31] The IOUs propose that these existing RDF requirements could be extended to include the IOUs providing preliminary RAMP risks *and tranching* proposals in the pre-RAMP workshop. The IOUs contend that this would afford parties an early opportunity to see the IOUs' tranching proposals for each RAMP risk and make recommendations.

5.2.2.2. Option 2: Provide Granular Data for Asset-Based Risks that have that Information Available

The IOUs propose a second approach to addressing the need for additional information about utilities' tranching approaches. The IOUs state that they share TURN's desire to have granular data reflected in risk models to demonstrate that the risk is being effectively managed, to the extent that granular data is available from asset-based planning models to accomplish this. The IOUs' Option 2 proposes that the Commission add the following language to Row 14 of the RDF, which addresses tranches:[32]

> Notwithstanding the guidance above, each utility should demonstrate:
>
> - If a risk is managed through granular, planning models (*e.g.*, PG&E's Wildfire Distribution Risk Model, Transmission Integrity Management Program - TIMP): how it maps the detailed asset-level information (*e.g.*, circuit segments) to tranches, the dimensions involved (failure modes, asset type, consequence profile, *etc.*), and how the mapping supports, or could support, actionable controls and mitigation programs.
> - If detailed planning models are not available, utilities will describe the dimensions involved (failure modes,

[31] *Ibid.*

[32] The IOUs' proposed additions would follow directly on the Row 14 language presented in the first paragraph of Section 5 above.

> consequence profiles), and how the chosen tranches support, or could be used to support, actionable controls and mitigation programs.
>
> • If more granular project-level information becomes available in reasonably reliable form, utilities will provide such information upon reasonable request.[33]

The IOUs assert that this second approach would allow utilities to explain how they manage risk in terms of the assets' physical properties and would avoid bias by capturing relevant context.

5.3. Party Comments

Parties' views diverged widely on tranche granularity proposals: EPUC/IS strongly support the TURN proposal and both TURN and EPUC/IS strongly oppose the IOU proposals. In contrast, the IOUs strongly oppose the TURN proposal.

The IOUs assert that TURN's proposal would create arbitrarily designed tranches that would not necessarily have homogeneous risk profiles and that would not reflect how the utility operates equipment and assets and manages key risks.[34] However, the IOUs also assert that TURN's proposal would require the creation of tranches based on LoRE and CoRE values and rests on unrealistic assumptions about IOUs' data and modeling capabilities.

SCE states:

> At its essence, TURN's proposal relies on being able to calculate LoRE and CoRE (expressed as expected loss in dollars) down to the asset level and based on the assumption that the probabilistic models are mature enough to capture them accurately. However, this line of thinking is problematic because asset planning models do not necessarily model risk

[33] Joint IOU Tranching Proposal at 12.

[34] SCE Reply Comments on Workshop #6 at 4-5.

> in this manner (*e.g.*, PG&E's Transmission Integrity Management Program – TIMP model)… statistical distribution should not supplant or consign away the use of physical/engineering-based approaches.[35]
>
> There are many ways in which it is practical to group tranches in a manner that reflects homogenous risk profiles without the need to arbitrarily create grouping of no less than twenty. Homogeneity could be used to describe similarity in tranche characteristics in terms of their operation, attributes (*e.g.*, age, construction material, hazard exposure), geographic setting, risk profile (*e.g.* LoRE and/or CoRE), or the manner in which federal or state guidance control how operations, construction, and management are to occur.[36]
>
> Arbitrarily mandating a division in a group of assets or a totality of risk would in effect ignore how the IOUs actually manage assets and operate, and what the data availability actually is.[37]
>
> Similarly, regarding data, the Sempra companies state:
>
> TURN's proposal assumes that IOUs possess data that allows all risks to be determined in uniform increments, which is neither true, practicable, nor reasonable.[38]

The Sempra companies further assert that the TURN proposal would reduce not enhance transparency:

> Given the high number of exceptions that would need to be made given the IOUs disparate data environments, overall transparency would likely be impaired by TURN's proposal.[39]

[35] SCE Opening Comments on Workshop #6 at 10-11.

[36] SCE Opening Comments on Workshop #6 at 16.

[37] SCE Opening Comments on Workshop #6 at 11-12.

[38] Sempra companies Opening Comments on Workshop #6 at 7.

[39] Sempra companies Opening Comments on Workshop #6 at 7.

PG&E argues that the RDF does not require IOUs to create tranches based on LoRE and CoRE scores, but instead, citing RDF Row 24, states that tranches can be "solely 'based on how the risks and assets are managed by each utility' although utility should '… strive to achieve as deep a level of granularity as reasonably possible.'" PG&E argues that previous decisions establishing the RDF:

> …recognize that achieving asset level LoRE and CoRE is perhaps not attainable in a reasonable timeframe nor necessary, otherwise it would have required their calculation at such a level.[40]

PG&E adds that it believes that the real intent of the "homogenous risk profile" clause is:

> …not to group assets by their LoRE and CoRE (which most likely are unavailable at the asset level and hence must be derived from aggregated information), but to assign standardized risk profiles (*i.e.*, likelihood and consequence probability distributions) to assets that have already been grouped into tranches 'based on how the risks and assets are managed by each utility.'[41]

Based on this observation, PG&E recommends that the phrase "considered to have the same LoRE and CoRE" be removed from Row 14.[42]

In contrast, EPUC/IS strongly supports TURN's proposal, calling it "reasonable…[g]iven the expanse of most gas and electric IOU rate bases and the billions of dollars of assets in service."[43] EPUC/IS states that the TURN proposal provides a "reasonable minimum granularity that will enable the Commission,

[40] PG&E Opening Comments on Workshop #6 at 9.

[41] PG&E Opening Comments on Workshop #6 at 10.

[42] PG&E Opening Comments on Workshop #6 at 10.

[43] EPUC/IS Opening Comments on Workshop #6 at 8.

Staff, and parties to understand and analyze the IOU proposals for increasingly expensive risk mitigation projects."[44]

EPUC/IS disagree that TURN's proposal would reduce transparency and argue that:

> The TURN proposal helps ensure that a minimal level of intelligibility is provided to decision-makers. Where the data do not exist, the IOUs must collect the data and develop the granular assets to do so, or request an exception.[45]

EPUC/IS do not support the IOUs' proposals. EPUC/IS state that the IOUs' proposals do not support an assessment of risk and cost-benefit analysis in homogenous LoRE/CoRE tranches, which should be the "fundamental, bedrock tranching methodology."[46]

Like TURN, EPUC/IS argue that if lack of data is a barrier, the Commission should take steps to address this barrier rather than adopting the IOUs' proposals:

> If an IOU has not done the work of collecting detailed asset data and modeling of all or certain portions of specific asset classes, the IOU should be required to either do the work, or demonstrate that the cost of doing so is grossly outweighed by the expected benefits. Cost Benefit Analysis and its predecessor, Risk-Spend Efficiency, both depend upon accurate and robust asset data. This was recognized by the Commission in Step 8 of the Ten Major Components of RAMP analysis.[47]
>
> The IOUs must collect the data and develop the asset models necessary to group asset segments (*e.g.*, miles of overhead conductor or high-pressure gas distribution pipeline) into

[44] EPUC/IS Opening Comments on Workshop #6 at 8.

[45] EPUC/IS Reply Comments on Workshop #6 at 19.

[46] EPUC/IS Opening Comments on Workshop #6 at 9.

[47] EPUC/IS Opening Comments on Workshop #6 at 9.

> homogenous LoRE/CoRE tranches. To not do this granular tranching risks lumping non-homogenous risk profile assets together, and sub-optimizing the cost effectiveness of selected mitigation measures. It also makes it near impossible for the Commission, Staff, and parties to 'unscramble the eggs' to understand what they are receiving in the way of risk reduction benefits for the billions of dollars proposed to be spent. The Commission's message to the IOUs should be clear and direct: 'collect the granular data and develop the granular asset models.'[48]

EPUC/IS argue that Commission guidance requiring a minimum number of tranches is necessary and will create:

> …consistency and transparency, which will lead to prudent decision making on spending scope and pace, ultimately impacting both cost-effectiveness and affordability.[49]
>
> The homogenous LoRE/CoRE tranching methodology can be used to prioritize capital budgets within the annual budgeting process to appropriately address and balance risk mitigation and cost of service management, simultaneously"[50]

Similarly, when commenting on the potential effects of very large and non-homogeneous tranches, should the Commission not provide additional guidance in this area, EPUC/IS argue that:

> The most significant implication of aggregating very granular data into just three tranches is loss of homogeneity (similar LoRE and CoRE values), which in turn increases the risk of sub-optimal mitigation selection, thus undermining both cost-effectiveness and affordability. Insufficient granularity is just as deleterious to Commission decision-making and ratepayer affordability as erroneous input data. Over-aggregation of asset-level data that should be otherwise analyzed on a

[48] EPUC/IS Opening Comments on Workshop #6 at 9-10.

[49] EPUC/IS Opening Comments on Workshop #6 at 10

[50] EPUC/ IS Opening Comments on Workshop #6 at 11.

> granular, homogenous LoRE/CoRE basis is antithetical to cost-effectiveness and prudent risk analysis. Such over-aggregation may be convenient and administratively efficient for the IOUs, however, it is imprudent from an economic ratemaking perspective and does not ensure that ratepayers receive the optimal risk reduction benefit for the dollars spent.[51]

TURN also opposes both utility proposals, stating that they "fail[] to establish clear requirements for granularity that will ensure additional information will be provided by the utilities."[52]

5.4. Adopting SPD's Tranche Granularity Proposal

We adopt SPD's proposed tranche granularity approach as a best practice and require IOUs to use this approach to determine tranches in most cases. We also adopt elements of the IOUs' proposals. Our requirements will enhance transparency and support flexibility.

To determine tranches pursuant to Row 14 of the RDF, the IOUs shall in most cases determine reporting tranches using combinations of quintiles of LoRE and CoRE. This would mean that portions of a risk with the highest 20 percent of LoRE and highest 20 percent of CoRE would be grouped within a tranche. Another tranche would be composed of portions of risk with the highest 20 percent of LoRE and the second highest 20 percent of CoRE, and so on. This system of tranche analysis would create a total of 25 LoRE/CoRE tranches. Each utility should submit more granular data in workbooks included in the RAMP and GRC filings if it is available.

[51] EPUC/ IS Opening Comments on Workshop #6 at 12.

[52] TURN Opening Comments on Workshop #6 at 8.

If the assets or system associated with a given risk are less than 25 in number, the IOU may use an alternative means of determining homogeneity of risk profiles, including quartiles or other smaller percentiles of LoRE and CoRE, but this alternative means must be described in detail in the RAMP filing.

If an IOU prefers to determine tranches not based on homogeneous risk profiles using LoRE and CoRE quintiles, or they wish to use a percentile ranking approach that would result in more than 25 reporting tranches, the IOU must submit a White Paper describing its preferred method for determining tranches along with relevant workpapers to SPD no later than 45 days before their first pre-RAMP workshop and must serve the White Paper to the service list of R.20-07-013 on the same timeframe.[53] This alternative approach to creating tranches shall be discussed in the pre-RAMP workshop, a requirement that reflects the first of the IOUs' two proposed approaches. The IOU must also include the White Paper in its RAMP filing, clearly indicating any changes to the previously served version.

Additionally, to address potential data gaps and support implementation of the LoRE/CoRE quintile approach, the IOUs shall immediately begin a data assessment and collection process to support their RDF analyses, with a particular focus on asset and system data that can inform the creation of tranches that exhibit homogeneous risk profiles. Six months from issuance of this decision, each IOUs shall file a report summarizing their findings and accomplishments regarding increasing data availability and quality as well as a five-year plan to continuously improve data availability and quality for

[53] *See* D.22-12-027, Appendix A at Row 12 for a discussion of current "pre-RAMP workshop" requirements.

application to the RDF. Such reports will be subject to comments and reviewed in this proceeding.

There is an urgent need to ensure that the IOUs provide more granular reporting tranches than they have in the past. We have carefully considered IOUs' arguments against it but are convinced that these reporting tranches should wherever possible be based on divisions of LoRE and CoRE that demonstrate homogeneity within a risk profile.

Filing of RAMP analyses using LoRE/CoRE quintile tranches will aid the Commission and parties understand if a utility is requesting funding for mitigations in the riskiest portions of their infrastructure and/or management system. This is essential if the Commission is to ensure strategic targeting of mitigations such that the greatest risk reduction benefits are achieved at the lowest cost, while taking into account the need to minimize risks as quickly as possible. Ensuring the greatest risk reduction benefits are achieved at the lowest cost is essential to ensuring just, reasonable, and affordable rates.

Additionally, because we have in Section 4.3 adopted requirements that the IOUs file their post-test year CBRs, tranche design according to quintiles of LoRE and CoRE will help the Commission readily see if an IOU is targeting mitigations in the riskiest portions of their infrastructure or management system in the test year before then addressing progressively less risky portions in the following three post-test years of a GRC cycle. Adopting this requirement would support the Commission's mandate to ensure the IOUs strategically reduce the most destructive and catastrophic risks that face Californians today and each successive year, so that the IOUs are always addressing the highest relative risks first.

Indeed, we have previously used an assessment of risk based on LoRE/CoRE quintiles to assess risks and strategically prioritize an IOU's risk reduction efforts. D.23-11-069 discusses this Commission's use of PG&E LoRE/CoRE quintiles of risk for wildfire risk, including our use of the quintiles to prioritize and pace system hardening, including both undergrounding and covered conductor efforts in a way that addresses priority risks first but also minimizes costs to ratepayers.[54] PG&E discussed its use of the LoRE/CoRE quintiles in comments on Workshop #6 questions, stating that PG&E changed its tranching methodology from the 2020 RAMP to the 2023 GRC as a part of "continuous improvement in risk modeling as more granular risk data is available and also in response to external feedback and to improve the usability of the risk models."[55] We agree that moving to the LoRE/CoRE quintile tranching approach represents an improvement over other methods that should generally apply to all IOUs, as discussed above.

We find unpersuasive IOUs' arguments that implementing a LoRE/CoRE quintile tranche design requirement would be counterproductive or impossible because it does not reflect "how utilities manage their infrastructure." Indeed, initiating changes in how the IOUs manage safety risks associated with their infrastructure is precisely the aim of this requirement. Ensuring just and reasonable rates while also ensuring safety and reliability is this Commission's central mission. We need improvements in how the IOUs strategically manage and reduce risks while reducing costs.

[54] *See* D.23-11-069 at 251 and 268-271.

[55] PG&E Opening Comments on Workshop #6 at 16.

Where the LoRE/CoRE quintile approach to tranche design is challenging due to data limitations, we agree with TURN and EPUC/IS that utility data availability and collection to support RDF analyses must be improved. Indeed, as noted by EPUC/IS, data quality had been identified as a key need as early as 2016, in the precursor proceeding, A.15-05-002 *et al* and again in D.18-12-014, where, to prepare RAMP filings, IOUs are directed: "for those business areas with less data, improve the collection of data and provide a timeframe for improvement."[56]

It is therefore reasonable here to require the IOUs to undertake immediate efforts to address data availability and quality and file in six months an initial report summarizing their efforts as well as a five-year plan. Such reports will be subject to comments and reviewed in this proceeding. As feasible, given other priorities, we also intend to take up the topic of data collection and availability for RDF purposes in a later phase of this proceeding or a successor proceeding.

We recognize that not all IOU assets or systems number greater than 25 and, in those instances, our approach permits an IOU to use an alternative means of determining homogeneity of risk profiles. This provides needed flexibility. In this case, it is reasonable to require an IOU to describe in detail its approach in its RAMP filing.

While we strongly believe that tranche design using a CoRE/LoRE quintile approach (or quartile or similar approach if assets are few in number) is the best practice that will support this Commission making appropriate determinations regarding targeting of and levels of mitigation funding for the riskiest assets, our approach ensures flexibility as needed for alternative approaches. It is

[56] D.18-12-014 at 34. *See also* D.16-08-018 at Ordering Paragraph 11, Conclusions of Law 23, 24 and 38, Findings of Fact 77, 78, 79, and at 162 – 163.

reasonable, however, in such instances (of alternative approaches) to require advance circulation of a White Paper explaining the alternative approach prior to the pre-RAMP workshop, where the approach will be examined and discussed. We note that SPD and parties may challenge such an alternative IOU approach within the related RAMP and GRC proceedings. Additionally, we note that decisionmakers in such proceedings have the authority to order an IOU to refile their analysis using the LoRE/CoRE quintile approach identified here as the best practice to ensure sufficient tranche granularity, as they deem fit.

We decline to adopt TURN's proposal because, contrary to some of the IOUs' arguments to the contrary, we do not see TURN's proposal as ensuring homogeneity of tranche design based on risk scores (LoRE/CoRE). As discussed above and commented on by EPUC/IS, homogeneous tranches based on risk scores will aid this Commission in ensuring strategic targeting and funding levels for mitigations while reducing costs. We appreciate TURN's proposal as it initiated discussion and our Phase 3 work in this very important area. At present, we do not think it necessary to require a minimum tranche design that would typically result in more than 25 tranches for the priority areas of physical grid and pipeline assets, as proposed by TURN. We may return to this proposal at a later date as needed, particularly regarding the electric and gas physical assets emphasized by TURN.

We decline to adopt either of the IOUs' proposals in full, although our adopted requirements draw on both proposals. Our goal with our requirements is to ensure a sufficient number of relatively homogeneous tranches to enable strategic targeting of mitigations and funds. We believe the CoRE/LoRE quintile tranche system best advances this goal. Because of this, we decline to adopt PG&E's recommendation to remove identification of LoRE/CoRE as a

representation of how to accomplish tranche homogeneity; instead, we strengthen this language in the RDF to reflect the requirements adopted here.

We adopt the following modifications to Row 14 as follows (additions underlined):[57]

14.	Definition of Risk Events and Tranches	Detailed pre- and post-mitigation analysis of Mitigations will be performed for each risk selected for inclusion in the RAMP. The utility will endeavor to identify all asset groups or systems subject to the risk and each Risk Event associated with the risk. For example, if Steps 2A and 2B identify wildfires associated with utility facilities as a RAMP Risk Event, the utility will identify all Drivers that could cause a wildfire and each group of assets or systems that could be associated with the wildfire risk, such as overhead wires and transformers. For each Risk Event, the utility will subdivide the group of assets or the system associated with the risk into Tranches. Risk reductions from Mitigations and ~~Risk Spend Efficiencies~~ Cost-Benefit Ratios will be determined at the Tranche level, which gives a more granular view of how Mitigations will reduce Risk. The determination of Tranches will generally be based on how the risks, as a product of LoRE and CoRE, and assets are managed by each utility, data availability and model maturity, and strive to achieve as deep a level of granularity as reasonably possible. The rationale for the determination of Tranches, or for a utility's judgment that no Tranches are appropriate for a given Risk Event, will be presented in the utility's RAMP submission. For the purposes of the risk analysis, ~~each~~ all of the elements (i.e., assets or system) contained in the identified Tranche would be considered to have homogeneous risk profiles,

[57] We also correct here an accidental error in Row 14 contained in Appendix A to D.22-12-027, substituting "Cost-Benefit Ratios" for the phrase "Risk Spend Efficiencies" as indicated.

		meaning they should ~~(i.e., considered to~~ have the same LoRE and CoRE~~)~~. The best practice for determining the homogeneity of risk profiles in reporting Tranches is the use of quintiles of LoRE and quintiles of CoRE, resulting in 25 reporting tranches. The utility can and should submit more granular data in workbooks included with RAMP and GRC filings if it is available, but that more granular data shall be aggregated into at least 25 reporting tranches with homogeneous risk profiles. If the assets or system associated with a given risk are less than 25 in number, the utility may use an alternative means of determining homogeneity of risk profiles, including quartiles or other smaller divisions of LoRE and CoRE, but this alternative means must be described in detail in the RAMP filing. If a utility desires to use an alternative determination of Tranches not reflecting 25 homogenous risk profiles based on LoRE and CoRE, or they wish to use a percentile ranking approach that would result in more than 25 reporting Tranches, the utility must submit a White Paper describing their preferred method for determining Tranches and relevant workpapers to SPD no later than 45 days before their first pre-RAMP workshop and must serve the White Paper to the service list of R.20-07-013 or a successor proceeding as well as the service list of the utility's most recent RAMP application proceeding no later than 45 days before their first pre-RAMP workshop. The utility must also include the White Paper in its RAMP filing, clearly indicating any changes to the previously served version. An IOU may submit this White Paper without prejudice to the right of parties to the RAMP or GRC to challenge such alternative determination of tranches.

6. Uncertainty: Transparency Pilot

In this section, we adopt minor clarifications to the Transparency Pilot Guidelines included in D. 21-11-009 and direct PG&E and the Sempra companies to serve and file their tests of the Transparency Pilot Guidelines as modified in

this decision 60 days after their next RAMP filings, which are currently due May 15, 2024, for PG&E and May 15, 2025, for the Sempra companies.[58]

6.1. Background

The second Workshop #1 topic was the Transparency Pilot Guidelines proposed by PG&E. In D.21-11-009, the Commission required SCE to pilot the Transparency Guidelines proposed by PG&E during Phase 2 of this proceeding and to serve the results of its efforts to the SCE 2022 RAMP proceeding service list, which SCE did on July 12, 2022.[59]

On June 13, 2023, SCE filed its SCE Transparency Submission with information on SCE's experience implementing the Transparency Pilot Guidelines. SCE and PG&E led discussions regarding the Transparency Pilot Guidelines during Workshop #1. On July 21, 2023, PG&E filed a summary of Workshop #1 that included the slides presented during the workshop. Also on July 21, 2023, an assigned ALJ ruling sought comment on questions related to the PG&E Workshop #1 report and Workshop #1 discussions. Parties filed opening and reply comments on these questions on August 10, 2023, and August 17, 2023. PG&E's August 17, 2023 reply comments contained the final Workshop #1 report, which included minor edits in response to parties' comments.

The Phase 3 issue in scope on this matter is:

> Whether the Transparency Pilot Guidelines, as modified and appended to D.21-11-009, should be further modified and adopted for use by the IOUs, whether the framework should

[58] SCE's next RAMP filing is due May 15, 2026.

[59] Phase 3 Scoping Memo at 4. At the time D.21-11-009 was adopted, SCE's next RAMP filing preceded PG&E's next RAMP filing.

continue to be piloted or tested, or whether some other course of action is more appropriate?[60]

D.21-11-009 recommends that future party discussions of Transparency Pilot Guidelines also discuss a related Cal Advocates' proposal and the lessons learned from the Risk Quantification Framework included in SDG&E and SoCalGas's most recent RAMP filing.[61]

6.2. Transparency Pilot Guidelines

As described in D.21-11-009, the Transparency Pilot Guidelines identify two new elements for inclusion in future RAMP reports to address data transparency and uncertainties.[62] The first element is a set of standard workpaper templates, and the second is a set of criteria for assessing the quality of data estimates used in the RAMP. D.21-11-009 specifies the elements as follows:

1. Standard Workpaper Templates: comprised of three data tables per Risk, corresponding to the input parameters, output calculations and the list of models used in quantifying the Risk.
2. Estimate Quality Criteria: a set of criteria, to be developed by the TWG, to objectively assess the Estimate Quality associated with the information presented in the data tables above.[63]

6.2.2. Risk Results Table

The Transparency Pilot Guidelines include a Risk Results Table, as follows:

Column	Description
Risk	Name of Risk
Tranche	Name of Tranche
Year	Year for which the Value pertains to

[60] Phase 3 Scoping Memo at 13.

[61] *See* D.21-11-009 at 38-39 and Cal Advocates Comments on Phase 1 SPD Proposal at 36, June 29, 2021.

[62] D.21-11-009 at Appendix C, "PG&E Transparency Proposal as Modified."

[63] *Ibid*.

Mitigation	One of: • Name of Mitigation • "Baseline": The Values represent baseline estimates • "All": Values are for Post Mitigation estimates assuming all the proposed mitigations are in place.
Attribute	One of: • Name of MAVF Attribute: e.g., for PG&E, "Safety", "Electric Reliability" • "Overall": Values represent the overall MARS score, or are not related to Attributes (e.g., likelihood estimates are not related to Attributes)
Value	Numerical value
Result Type	See table below for valid Result Types
Estimate Quality	"High", "Medium", "Low". The qualitative degree of certainty/confidence associated with the output. See discussion in the Estimate Quality section below.
Confidence Interval	Quantitative confidence interval of estimate/calculation. This field is only populated with numerical values if such values are applicable and can be readily determined based on available data and established statistical principles, otherwise "N/A".

Parties comment that the Transparency Pilot Guidelines and specifically the risk results template is generally useful. TURN and MGRA proposed some clarifications to the table as follows:

TURN:

- The results should be provided by attribute rather than on an overall basis;
- The table should include an additional column with probability; distribution of the value or, alternatively the low/high cases for the attribute value; and
- Rather than (or in addition to) the estimate quality, the utility should provide the actual data sources for the estimate.[64]

MGRA:

- Tranches should only be divided up by calendar year in cases where yearly trends will be apparent;

[64] TURN Opening Comments on Workshop #1 at 8-9.

- The IOUs should provide an individual column for each "Result Type", which would allow different risk drivers and mitigations to be compared directly against each other value-by-value, rather than having to skip through the document to identify matching values; and
- The estimate quality is coarse grained and needs to be better defined, preferably with numerical values if possible. Estimate Quality values of "Low" should have an additional column describing how and when the company plans to improve the estimate.[65]

6.2.3. Discussion

We make several small changes to the risk results table in response to party comments. With regard to TURN's recommendation that the utility should provide the actual data sources for the estimate in addition to an evaluation of estimate quality, we agree and made this modification by adding "justification" and "reference" rows for this table. This will continue to add transparency.

We do not modify the risk results table to require presentation of results by attribute as recommended by TURN, because parties can already do that by using the workbooks provided by the IOUs in association with their RAMP filings in tandem with data sort and pivot tables. We do not adopt TURN's second recommendation because the suggestion to add an additional column was unclear. Additionally, it appears that most of the information suggested by TURN here should be provided in the sensitivity table.

Similarly, we do not adopt MGRA's first and second suggestions because parties can already conduct such analyses using filter, data sort and pivot table functions. We also do not agree with MGRA that the IOUs should be required at this stage to quantify their estimate quality observations as doing so might result

[65] MGRA Opening Comments on Workshop #1 at 6.

in quantification of inherently qualitative estimates. Additionally, we do not add the extra column recommended by MGRA for the IOUs to describe when the company plans to improve the estimate. However, when an IOU deems an estimate quality to be "low," it must provide a description of how and when the company plans to improve the estimate in the "justification" column just discussed.

We direct PG&E and the Sempra companies to continue to use and test the Transparency Pilot Guidelines as modified in this decision in conjunction with their next RAMP filings, which are due May 15, 2024, for PG&E and May 15, 2025, for the Sempra companies. PG&E shall serve and file its test of the Transparency Pilot Guidelines to the service list of PG&E's 2024 RAMP application proceeding no later than 80 days following its 2024 RAMP filing. The Sempra companies shall serve and file their test of the Transparency Pilot Guidelines to the service list of the Sempra companies' 2025 RAMP application proceeding no later than 60 days following their 2025 RAMP filings. PG&E and the Sempra companies shall additionally serve and file their respective tests of the Transparency Pilot Guidelines in this proceeding at the same time.

6.2.4. Risk Sensitivity Table

Transparency Pilot Guidelines includes a Risk Sensitivity Table as follows:

Column	Description	Changes
Risk	Name of Risk	
Tranche	Name of Tranche	
Outcome	Outcome or "Overall"	
Attribute or Driver/Sub-Driver	One of: • Name of MAVF Attribute: e.g., for PG&E it can be "Safety", "Reliability – Electric" "Overall": Values represent the overall MARS score, Driver/Sub-Driver: Name of Driver/Sub-Driver	

Year	Year	
Mitigation	One of: • Name of Mitigation • "Baseline": The Values represent baseline estimates	
Distribution	E.g., "Poisson", "Log-normal", "N/A"	
Parameter	The type of parameter and what it applies to: • Baseline LoRE mean • Baseline CoRE mean • Baseline CoRE stdev • Mitigation LoRE Effectiveness • Mitigation CoRE Effectiveness • Etc.	
Value	Assumed value of the Parameter	
Negative Sensitivity	Numerical value representing the change in Risk score when the Parameter is decreased by an incremental amount	New Column J on the tab titled "eg_risk_sensitivity_analysis_tb" in the spreadsheet
Positive Sensitivity	Numerical value representing the change in Risk score when the Parameter is increased by an incremental amount	New Column K on the tab titled "eg_risk_sensitivity_analysis_tb" in the spreadsheet. This entry replaced the Sensitivity column.
Estimate Quality	"High", "Medium", "Low". The degree of confidence associated with the estimate/calculation. See discussion in the Estimate Quality section below	
Justification	Tag that contains the criteria that lead to the Estimate Quality determination. E.g., "Quantitative-Limited Internal Data". See Estimate Quality section below	
Reference	Text field providing reference to further documentation, if necessary.	

The Risk Sensitivity Table quantifies how much a risk result (*e.g.*, risk score) would change if a specified parameter changes by a predetermined amount.

Parameters

PG&E comments that the Risk Sensitivity Table provides a useful means to explain the role and importance of specified parameters and assumptions to Risk scores and should continue to be used in RAMP submittals. However, PG&E

suggests that the Risk Sensitivity Table be modified to include an additional calculation for Sensitivity, which would represent slope:

> Sensitivity = (High Case Score – Low Case Score) / (High Case Value – Low Case Value)

PG&E demonstrated in Workshop #1 how they derived slope from the test values found in SCE's transparency pilot workbooks.[66]

The Sempra companies comment that stringent requirements should be set for sensitivity analysis requests since resources are limited and an indefinite amount of sensitivity analysis requests would be inefficient.[67] TURN contends that it and SCE define sensitivity analysis differently but supports PG&E's proposed definition. TURN states that it would be helpful if the data in question were provided in a working model that would allow the intervenors to adjust inputs and test different scenarios.

MGRA finds the Sensitivity Results Table useful and offers some recommendations to improve it. MGRA notes that PG&E only proposes including two points along a slope in a sensitivity analysis, "positive sensitivity" and "negative sensitivity," which will often be redundant. These might better be replaced by "slope at expected value," MGRA argues. MGRA additionally comments that applying confidence levels of 10th and 90th percentile ranges is very important, which SCE did not do.

MGRA proposes that calculations in the Risk Sensitivity Analysis Table should include not only the Lower and Upper Test Values, but also the following values, from which the slope could be derived:

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[66] Workshop #1 Report at 11, included in PG&E Workshop #1 Reply Comments, August 17, 2023.

[67] Sempra companies Opening Comments on Workshop #1 at 8.

- Expected Value
- Expected Value + 1% (Alternatively slope at Expected Value)
- 10% of range
- 90% of range

MGRA comments that tranches should only be divided up by calendar year in cases where yearly trends will be apparent.

Sensitivity and Scenario Analysis

SCE's Transparency Submission provides SCE's interpretation of the terms "sensitivity analysis" and "scenario analysis" in the context of the pilot. SCE defines these terms as:

> Sensitivity Analysis – SCE interprets a sensitivity analysis as a small change in the "mitigation effectiveness parameter," such as changing the parameter by a positive 1% and also by a negative 1%.
>
> Scenario Analysis – This analysis addresses the question of what is the impact to RSEs if the mitigation effectiveness is changed based on a set of "high" and "low" case assumptions. This analysis is done at the portfolio/mitigation level and not calculated for each individual risk driver combination.[68]

SCE's Transparency Submission test of the Risk Sensitivity Table included scenario analyses for some risks and sensitivity analyses for others.

Other Features

We note several other features of SCE's test of the Risk Sensitivity Table. First, we note that SCE's Transparency Submission addressed parameters relevant to the calculation of RSEs but not parameters relevant to Risk Scores, which are also indicated as the focus area in the modified Transparency Pilot

[68] SCE Transparency Submission at Appendix B, at 2 -3.

Guidelines. Second, SCE's tests modified selected parameters sequentially while other parameters were held constant, rather than modifying several parameters at once.[69] This is implied by treatment of the lambda parameter ($\lambda 1$,$\lambda 2$) in the Risk Sensitivity Analysis Table, but the guidelines do not explicitly require this. Third, SCE added a column summarizing "Original RSE" in the table. Fourth, because SCE focused on the parameter of effectiveness of mitigation programs that do not have probability distributions, it did not complete the "Confidence Levels" row in the table.

The July 21, 2023 ALJ Ruling asked parties to comment on a range of questions pertaining to the Risk Sensitivity Table and whether it can be improved.[70]

6.2.5. Party Comments

PG&E states that it prefers the current approach in the Risk Sensitivity Table as a meaningful initial step. TURN states that each of the two analyses (sensitivity and scenario) provided by SCE in its pilot materials was completed on a different risk, leaving TURN unable to compare the two approaches directly.

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[69] SCE Transparency Submission at Appendix B, at 2 – 3.

[70] Questions included: Does a scenario analysis help provide the same amount of transparency that a sensitivity analysis can provide? If an IOU's sample risk does not assume a probability distribution, what analytical method/approach should be used to assess the impact of uncertainty on key parameters used in the risk modeling process? Did the criteria employed for determining Estimate Quality help you to assess the Quality of the Data and calculations? Are there suggestions or modifications that you would make to the criteria? Can the Estimate Quality Criteria approach employed in the Transparency Pilot Guidelines appended to D.21-11-009 be improved or refined? What is the best approach for ensuring that future test drives of the Transparency Pilot Guidelines use all of the fields in the excel spreadsheet templates by inputting actual results other than "N/A"? Are there other kinds of analyses that you are considering that are not currently supported by the Transparency Pilot Guidelines appended to D.21-11-009?

MGRA states that sensitivity and scenario analysis are complimentary, and both should be conducted. MGRA observes that SCE selected parameters without a distribution for some of their analyses, so a statistical analysis would have been impossible. MGRA further states that if a scenario analysis is used to denote a particular combination of parameters, possibly at extrema, this is also valuable information, which can reveal limitations or vulnerabilities in safety systems.[71] In response to SCE's treatment of the table's Confidence Levels row (no information was provided), MGRA recommends three additional options for ways for utilities to estimate probability distributions when these are not easily calculated. The three options MGRA identified are: measured data distributions; Monte Carlo generated distributions; and Subject Matter Expert (SME) best estimates of risk distributions.[72]

PG&E states that it intends to address all Risk Sensitivity Table fields in its test drive, whereas the Sempra companies objected to completing fields where the value may be meaningless. TURN and MGRA urged that the utilities complete all fields. MGRA urged that the utilities address a diversity of risks in their tests.

TURN recommends that the Commission adopt as a key goal of transparency efforts the "repeatability" of results, meaning the ability to understand utility inputs and derive utility results, as well as the ability to easily model alternatives to the utility proposal and generate CBRs based on a different set of assumed mitigations and costs. TURN contends that the Transparency Pilot Guidelines does not currently offer replicability and is missing key items of

[71] MGRA Opening Comments on Workshop #1 at 7.

[72] *Ibid*.

information that TURN would need to replicate the result, such as the discount rate used by the utility. TURN urges the Commission to explore a set of standards to require that key inputs be able to be easily changed in a spreadsheet. These include, but are not limited to, unit costs, miles, or number of assets subject to a mitigation, mitigation effectiveness values, and other key inputs.[73]

During Workshop #1, SPD staff stated that they would have liked to see the utilities also perform sensitivity on the alternative mitigation portfolios.[74]

6.2.6. Discussion

Parameters

We recognize the importance of slope with regard to understanding sensitivity in the Risk Sensitivity Table as commented on by PG&E. However, to ensure the Risk Sensitivity Table is not excessively large, we do not find it necessary to include slope as a field in the table. As demonstrated by PG&E during Workshop #1, parties, if they so desire, can derive the calculation of slope from the data points that are included within the Risk Sensitivity Table.

We adopt MGRA's recommendation regarding the best way to understand the shape of a risk function in the Risk Sensitivity Table, as follows, and add these fields to the table:

- Expected Value
- Small Perturbation: Expected Value + 1% of range
- Lower test value: 10th percentile of range
- Upper test value: 90th percentile of range

[73] TURN Opening Comments on Workshop #1 at 11-12.

[74] Workshop #1 Report at 11.

Requiring all four of these data points in the Risk Sensitivity Table provides raw data that reviewers can analyze for various purposes, including the calculation of slope of a risk function. These data points capture the behavior in the region of the mean, which is important for calculating modest perturbations, and assist in identifying non-linear behavior at extreme values.

Sensitivity and Scenario Analysis

We agree with MGRA that sensitivity analyses and scenario analyses are both useful and may apply to different parameters. Scenario analyses are useful ways to analyze changes to multiple parameters at the same time. Including them in transparency tests will help evaluate their usefulness.

We build upon SCE's distinctions between sensitivity and scenario analysis and discussion at Workshop #1 and adopt general definitions for these terms that are generalizable to a variety of parameters found in the IOUs' risk models. We adopt the below definitions for purposes of the Transparency Pilot Guidelines:

> **Sensitivity Analysis:** a change in a parameter of the risk model, such as by changing the expected value of the parameter by a positive 1% or utilizing the value found at the 10th or 90th percentile of the distribution of the parameter. When conducting a sensitivity analysis, it is assumed that the reporting parameter will be allowed to change while other parameters will be held constant. Parameters are grouped into two general types, Baseline or Mitigation Program, depending on whether they are used to calculate Baseline Risk Scores, or represent the effectiveness of mitigation programs (*e.g.*, the amount of reduction, in percentages, that a mitigation will reduce the mean by) that impact the calculation of CBRs. In addition to the expected value of a reported parameter, a sensitivity analysis will record three other test values:
>
> - A small perturbation;

- An upper test value; and
- A lower test value

The calculated negative and positive sensitivities of the Risk score or CBR at the expected value, small perturbation, upper test value and lower test value to changes in the value of the parameter are also provided. These are obtained by determining the small perturbation, Upper Test Value and Lower Test Values for the parameter (*e.g.*, 10th or 90th percentile of the range of the parameter) and, calculating the Risk Score or CBR using these values.

Scenario Analysis: addresses the question of the impact to risk scores or CBRs if multiple Parameters at the portfolio/mitigation level are changed based on a set of "high" and "low" case assumptions. This analysis is done at the portfolio/mitigation level and not calculated for each individual risk driver combination. The high scenario analysis would calculate the Risk score or CBR when multiple Parameters at the portfolio/mitigation level are all increased to the 90th percentile of the range of each Parameter. The low scenario analysis would calculate the Risk score or CBR when multiple Parameters at the portfolio/mitigation level are all decreased to the 10th percentile of the range of each Parameter.

In future tests of the Transparency Pilot Guidelines, the utilities should apply these terms and the relevant approaches and provide the resulting information as appropriate depending on the parameter. PG&E and the Sempra companies may propose clarifications to these definitions as needed in their filings.

Additionally, we confirm and adopt SPD's recommendation during Workshop #1 that it would be helpful for the utilities to also perform sensitivity analyses on an alternative mitigation for each risk using the Transparency Pilot Guidelines. PG&E and the Sempra companies shall include sensitivity analyses

of at least one primary and one alternative mitigation in their upcoming Transparency Pilot Guidelines test filings.

When mitigation programs do not generate probability distributions, rather than leaving the Confidence Levels row empty, as done by SCE in its test, we encourage utilities to test additional methods to describe distribution functions for such parameters in the Confidence Levels row, as suggested by MGRA, as follows, in descending order of preference:

- Measured data distributions;
- Monte Carlo generated distributions; and
- SME best estimates of risk distributions.

This will assist the Commission and parties in understanding uncertainties associated with parameters.

Other Features

We generally agree with intervenors that utilities must strive to complete all fields in the Sensitivity Results Table to the best of their ability. This will aid in Commission's and parties' understanding of the information available to utilities and its limits, as well as utility approaches. This should include completing the Estimate Quality field, which SCE often left blank.

We require that future utility sensitivity tests modify selected parameters while holding other parameters constant. This is implied by treatment of the lambda parameter ($\lambda 1$,$\lambda 2$) in the Risk Sensitivity Analysis Table and the approach taken by SCE. This approach is reasonable as it will provide the most useful information to the Commission and parties.

We clarify that future utility tests using the Transparency Pilot Guidelines as updated by this decision must pertain to Risk Scores as well as cost-efficiency metrics (*i.e.* CBRs), as stated in the original guidelines. It would be helpful for the

Commission and parties to review parameters that have an impact on risk scores relevant to at least two risk events. Therefore, at minimum, PG&E and the Sempra companies shall apply the guidelines to parameters that have an impact on risk scores relevant to at least two risk events.

We found SCE's addition of a column summarizing "Original RSE" in the Risk Sensitivity Table to be useful and modify the Transparency Guidelines in this way as well.

We do not adopt TURN's recommendations regarding adopting "replicability" of the Risk Sensitivity Table as a goal in application of the Transparency Pilot Guidelines. We agree with parties that the current approach is not well suited to integration with advanced modeling software used by the utilities to provide the requested information, as pointed out by PG&E in comments.[75] Additionally, this was not an original goal of the proposal, and we believe that deeper consideration of this goal and its' implications is required prior to adopting it.

The Transparency Pilot Guidelines as updated in this decision is attached to this decision as Appendix B.

7. Tail Risk Consequence Modeling: Wildfires

The RDF currently requires IOUs to use a CBR approach and present expected values for risks included in the analysis. However, Row 24 of the RDF allows utilities to also present alternative values, such as "tail values," in addition to the expected value.[76]

[75] PG&E Reply Comments on Workshop #1 at 5.

[76] D.22-12-027, Appendix A at Row 24.

Phase 1 of this proceeding considered whether the Commission should identify one or more best practices for IOU modeling of wildfire risks with tail values, also called "tail risks." Tail risks represent low probability, high-consequence events. Phase 1 focused on the power law probability distribution function as a potential best practice.

The Commission, in D.21-11-009, declined to adopt any wildfire risk modeling best practices for use in the RDF, including use of the power law probability distribution method. However, D.21-11-009 noted PG&E's intent to use the power law distribution function to model wildfire risk consequences and directed Commission staff to provide a follow-up recommendation on this topic in later stages of this proceeding. Accordingly, the Phase 3 Roadmap proposal identified tail risk as a high priority for further work.[77]

The Phase 3 Scoping Memo includes the following issue regarding wildfire modeling and tail risk:

> Should the Commission require use of the power law probability distribution function to model wildfire risk, recommend use of this approach as a best practice, or take some other course of action to ensure appropriate modeling of wildfire tail risk and communication of associated uncertainties in IOU RAMP filings?

Workshop #2, held on July 26, 2023, focused on this issue in the context of a White Paper and presentation offered by MGRA. On August 1, 2023, MGRA filed a White Paper entitled, "Tail Risk and Event Statistics for Utility Planning."[78] The White Paper included a detailed set of recommendations. On

[77] SPD Phase 3 Roadmap proposal at 4.

[78] MGRA, Tail Risk and Event Statistics for Utility Planning White Paper (MGRA White Paper), August 1, 2023, available as of December 14, 2023 at: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M516/K047/516047299.PDF.

July 31, 2023, an ALJ ruling sought comment on MGRA's proposal and issues discussed at Workshop #2. Parties filed opening and reply comments on these issues on September 8, 2023, and September 15, 2023, respectively.

7.1. MGRA Proposal

With reference to potential actions in scope in Phase 3 and within the Commission's jurisdiction, MGRA's White Paper made a number of recommendations including:

- Wildfire risk models should either 1) directly use an appropriate power law distribution, such as the base distribution for a Monte Carlo simulation or 2) be able to show that their model produces results that are consistent with a power law when appropriately weighted for probability and consequence;
- PG&E's estimation of safety and financial caps is rigorous and should be adopted as a best practice. PG&E applied a truncated power law method to develop these caps;
- Risk models using simulation must be able to incorporate consequence events from the largest and most destructive wildfires;
- "Worst case" simulations should be considered for utility service areas consisting of extended wildfire simulations in combination from input by SMEs with strategic firefighting knowledge; and
- It may be beneficial to model "worst case" plume wildfire events in selected areas using models capable of incorporating wildfire and atmospheric dynamics to determine the tail risk from this class of event.[79]

MGRA's White Paper includes a summary of earlier PG&E work in which PG&E posits a maximum consequence size for wildfires roughly equal to five

[79] MGRA White Paper at 46-47.

times the losses faced in the Camp fire.[80] MGRA's White Paper summarizes how PG&E tested a number of truncation values – from 1.5 to 100 times the losses of the Camp fire – for goodness of fit to existing data.[81] As discussed by MGRA, PG&E previously performed tests of how likely the exceedance of a catastrophic safety consequence value was for different cutoffs and for comparison the lognormal distribution, as summarized in Table 1 below, included in MGRA's White Paper.

a. Table 1: Calculated Survival Probability Using Truncation Points Set at Various Multipliers of the Maximums Observed[82]

Safety Catastrophic	lognormal	P1D Multiplier 1.5	P1D Multiplier 5	P1D Multiplier 10	P1D Multiplier 20	P1D Multiplier 50	P1D Multiplier 100
>= 1	88%	100%	100%	100%	100%	100%	100%
>= 5	42%	33%	28%	26%	24%	22%	21%
>= 10	22%	20%	16%	14%	13%	12%	11%
>= 50	1.7%	4.9%	4.0%	3.5%	3.0%	2.6%	2.3%
>= 100	0.3%	1.9%	2.0%	1.8%	1.6%	1.3%	1.2%
>= 200	0.05%	0.00%	0.83%	0.86%	0.79%	0.68%	0.60%

b. The columns represent the different tests that PG&E conducted, and the rows are the estimated number of deaths. As we can see from Table 1, the truncated distribution that recommended a multiplier of 5 (highlighted in blue) was the most likely to capture the extreme events that would exceed 100 or 200 deaths. MGRA's White Paper discusses how, using this method, PG&E decided to use a multiplier of 5 "to strike the

[80] MGRA White Paper at 2, referencing a PG&E Power Law Distribution White Paper, September 3, 2021, available as of January 19, 2024 at: https://data.mendeley.com/public-files/datasets/8nds4cx88k/files/c0178e67-92fc-4ab3-9ea7-7fdcdf3b4556/file_downloaded.

[81] *Id*. at 22, referring to a "PG&E 2021 Power Law White Paper," at 6.

[82] *Ibid,* referring to PG&E Power Law White Paper at 16, Table C2.

> balance of not flattening the curve too much but also preserve the tail risk of extreme events."[83]

MGRA's proposal also criticized SCE's Integrated Wildfire Mitigation Strategy (IWMS) as a different way to calculate tail risk because "it has no probability component."[84] MGRA expresses concern that the selection and scoping of SCE's preferred wildfire mitigations only took consequence into consideration, which MGRA observes falls outside of the requirements in D.22-12-027 that define risk as the product of likelihood and consequence. Additionally, MGRA notes that SCE's use of IWMS addresses tail risk "solely by using consequence and not probability is related to the idea of risk tolerance, and needs further review by the Commission."[85]

7.2. Party Comment

The IOUs oppose a new Commission requirement that IOUs use a power law distribution to model RDF wildfire risks. They advocate flexibility for an IOU to determine the most appropriate tail risk and wildfire modeling approach, as currently provided for in the RDF. SCE argues: "we believe there are no additional benefits associated with using a power law method to model wildfire risk when more granular and utility-specific data is readily available….To fulfill the applicable requirements, SCE uses a physics-based model rather than an extrapolated statistical model."[86] The Sempra companies state, "the IOUs should have the flexibility to select the appropriate modeling technique based upon the preponderance of data underlying a particular risk, including non-wildfire

[83] MGRA White Paper at 23.

[84] MGRA White Paper at 41

[85] MGRA White Paper at 43.

[86] SCE Opening Comments on Workshop #2, September 8, 2023 at 10.

risks."[87] PG&E opposes a requirement but calls the power law distribution approach an "important tool in the toolbox" of statistical distributions available for wildfire modeling.[88]

TURN does not oppose use of the power law model but emphasizes it can be applied "when calculating the *expected value* of the risk consequence in the enterprise risk model, if the approach accurately fits the historical and future consequences of wildfire."[89] TURN emphasizes that utilities should include impacts of fire suppression in their wildfire models, calling this a "major oversight" of consequence estimation techniques.[90]

SCE opposes this TURN recommendation, arguing that a May 2023 Office of Energy Infrastructure Safety (Energy Safety) workshop concluded that, "it would not be prudent to directly incorporate suppression into wildfire risk modeling," due to the challenges.

MGRA disagrees with SCE's assertions regarding its modeling approach. SCE states that "[t]he simulations used by SCE, while accurate for short durations, lack accuracy for larger fires, and it is these larger fires that often present the largest 'tail risk' because they threaten so many homes in the wildland urban interface."[91] MGRA states that power law models are also "physics models" and are well vetted. MGRA calls SCE's model "incomplete," and "unable to accurately estimate the magnitude of maximum losses."[92] MGRA

[87] Sempra companies Reply Comments on Workshop #2, September 15, 2023 at 2.

[88] PG&E Opening Comments on Workshop #2 at 4.

[89] TURN Opening Comments on Workshop #2 at 1, emphasis added.

[90] *Ibid*.

[91] MGRA Reply Comments on Workshop #2 at 5.

[92] *Id*. at 10.

contends that valid utility wildfire risk models should be observed to follow a power law distribution. MGRA notes that PG&E and the Sempra companies have adopted MGRA's recommended use of a truncated power law analysis in their enterprise risk analyses.

7.3. Truncated Power Law Distribution Model as a Best Practice for Wildfire Tail Risk: Consequence Modeling

This decision identifies a power law distribution model as a best practice for wildfire tail risk modeling. We do not require IOUs to model tail risk, but if an IOU elects, pursuant to Row 24, to present an alternative value to the expected value (*i.e.*, a tail value), we add two additional requirements.

First, the utility should use a truncated power law distribution to model tail value in wildfire risks, which we consider to be a best practice. Emulating PG&E's approach, the utility should conduct multiple tests of truncation values to determine goodness of fit to existing data and then include the results in their RAMP application. The utility must then submit both models with its RAMP filing, i.e. its expected value model and its tail risk model.

Second, if the utility considers an alternative modeling method to the truncated power law to be a better fit for their wildfire risk analysis, they may use this alternative approach to model tail value risks, in addition to modeling the expected value, as required in Row 24. In this case, however, we require the IOU to submit to SPD and serve to the service list of R.20-07-013, or a successor proceeding, and the IOU's most recent RAMP application proceeding, a White Paper submission with a clear justification of its approach, and related workpapers, no later than 45 days before their first pre-RAMP workshop. The IOU shall also include the White Paper in its RAMP filing, clearly indicating any changes to the served version.

Based on the record, we conclude that a truncated power law ensures the best fit of data to the statistical models and will best enable this Commission to ensure that utility wildfire modeling appropriately reflects considerable wildfire tail risks but does not over-estimate these risks. Utility use of truncated power law distributions, as discussed by MGRA in its White Paper, will help to ensure that risk estimation is capped at a level reflecting historical data. This requirement will assist this Commission in determining appropriate levels of utility spending to mitigate wildfire tail risks.

However, SCE's objections to required use of the truncated power law distribution to model wildfire tail risks convince us to permit a utility to use an alternative approach, if it provides a White Paper submission with a clear justification of its approach that also demonstrates the alternative approach's results as compared to a truncated power law approach. This will provide the flexibility SCE seeks while retaining procedures to ensure that any approach taken is sound and well-justified.

We agree with MGRA that any approach to modeling tail risks must be risk-informed, meaning that all modeling approaches must be based on a product of LoRE and CoRE. As such, a White Paper that presents justification for a model based purely on consequences will be rejected because such a model is fundamentally at odds with the RDF as written in D.22-12-027.

Although MGRA states that the truncated power law distribution is currently the best approach to model wildfire consequences in all instances, MGRA also recognizes that there are certain aspects of risk modeling that continue to require refinement, such as properly vetting and comparing results from both 8-hour and 24-hour simulations produced using a commonly-used

wildfire size distribution model (Technosylva).[93] Although SCE claims that power law distribution metrics produce a distribution skewed toward larger wildfires,[94] we are not convinced. Therefore, our approach properly advances the truncated power law approach as the best practice while providing for flexibility through the use of White Paper submissions that should help address remaining knowledge gaps.

We do not direct the IOUs to incorporate "worst case" plume wildfire events or simulations in their wildfire models. The record before us on this issue is insufficient to support a decision on that issue. As appropriate, this issue could be considered again in more detail in later phases of this proceeding.

We modify Row 24 of the RDF as follows to reflect our adopted requirements (additions underlined):

24.	Use of Expected Value for CoRE; Supplemental Calculations	The utility will use expected value for the Cost-Benefit Approach-based measurements and calculations of CoRE in Rows 13, 18, 19, 21, 22, and 23. If a utility chooses to present Alternative Analysis of monetized pre- and post-mitigation CoRE using a computation in addition to the expected value of the Cost-Benefit Approach, such as tail value, it does so without prejudice to the right of parties to the RAMP or GRC to challenge such Alternative Analysis. <u>In the case of wildfire risks, if the utility choose to present an Alternative Analysis regarding tail value, the utility: (a) should use a truncated power law distribution method as a best practice by conducting multiple tests of truncation values to determine goodness of fit to existing data and then include the results in their RAMP application; and, (b) may use an alternative modeling method to the truncated power law, and submit to SPD and serve to the service list of R.20-07-013, or a successor proceeding, and the utility's most recent RAMP application proceeding a White Paper</u>

[93] MGRA White Paper at 37.

[94] SCE Opening Comments at 7. However, note that SCE appears to be referencing simulation runs that are only considering wildfire consequences not also the likelihood or probability of such consequences.

		and related workpapers clearly justifying its approach not later than 45 days before its first pre-RAMP workshop. The utility must also include the White Paper in its RAMP filing, clearly indicating any modifications to the earlier served version.

8. Tail Risk Consequence Modeling: Non-Wildfire Risks

As discussed above, the RDF currently requires IOUs to use a CBR approach and present expected values for risks included in the analysis. Row 24 of the RDF allows utilities to also present alternative values, such as "tail values," in addition to the expected value.[95] Regarding non-wildfire tail risks, the Phase 3 Scoping Memo asked if additional Commission guidance was needed regarding modeling of low probability, high consequence events more generally in the RDF and in RAMP filings?[96] Tail risks represent low-probability, high-consequence events.

Workshop #6 held on December 6, 2023, considered Tail Risks: Consequence Modeling for non-wildfire risks. The IOUs offered a presentation and proposal in this area. SCE presented regarding hydroelectric dam risks and the Sempra companies presented regarding the natural gas system.[97]

On December 12, 2023, SCE and the Sempra companies filed a "Joint Utility Whitepaper on Methods to Incorporate Tail Risk into Utility Risk

[95] D.22-12-027, Appendix A at Row 24.

[96] Phase 3 Scoping Memo at 13.

[97] Ruling Entering Workshop Materials into the Record and Setting Comment Schedule, December 13, 2023 at 17-29.

Modeling" (Joint Utility Tail Risk Proposal)[98] and the Sempra companies filed an additional "Workshop 6 Tail Risk Proposal" (Sempra Tail Risk Proposal).[99]

8.1. IOUs' Proposal

The Sempra Tail Risk Proposal asserts that, "for certain aspects of their operations, tail risk is the primary driver for risk mitigation decisions."[100] The Sempra companies assert that:

> For those aspects of the Companies' operations for which tail risk events are a central driver – such as managing risks related to wildfire, medium-pressure and high-pressure gas operations, and electric infrastructure integrity – a *framework oriented on expected value is inappropriate* and could potentially lead to underinvestment…[101]

The Sempra companies go on to assert that:

> Where tail risk exists, the RDF must continue to allow for recognition that the *prevention of tail risks is the primary lens* through which risk attitude and, ultimately, [benefit / cost] B/C ratios are developed;[102] and,
>
> Sound application of risk tolerance dictates that it is reasonable and prudent to *manage risk in defense of tail risk outcomes, not expected value outcomes*.[103]

The Sempra companies argue that "if the Companies manage to 'expected value' losses where tail risk exists, the worst-case outcomes remain unmitigated

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[98] Joint Utility Whitepaper, available as of December 14, 2023 at: https://docs.cpuc.ca.gov/SearchRes.aspx?DocFormat=ALL&DocID=521449075.

[99] "SoCalGas and SDG&E Tail Risk Discussion in Advance of Technical Working Group #6 Risk Informed Decision-Making Proceeding (R.20-07-013)," December 12, 2023, available as of January 25, 2024 at: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M521/K330/521330782.PDF

[100] Sempra Tail Risk Proposal at 1.

[101] Sempra Tail Risk Proposal at 1, emphasis added.

[102] *Ibid*, emphasis added.

[103] *Id*. at 2, emphasis added.

or undermitigated."[104] And, they assert that, "not all aspect of the Companies operations are exposed to catastrophic risk, and we calibrate our mitigations accordingly."[105]

The Joint Utility Tail Risk Proposal describes "methods to derive tail risk values using generally-accepted risk management practices," and state that "we believe the need to produce expected values may be irrelevant for certain low-probability, high-consequence risks."[106]

The Joint Utility Tail Risk Proposal first presents a summary of SCE's assessment of hydro dam risks based on a methodology established by the United States Bureau of Reclamation (USBR) in the mid-1990s. The USBR methodology is based on the As Low as Reasonably Practicable (ALARP) framework.[107] A second Sempra company example discusses pipeline safety, referencing the Transmission Integrity Management Program (TIMP), the Distribution Integrity Management Program (DIMP) and the Storage Integrity Management Program (SIMP). TIMP is required under federal regulation 49 CFR Part 192, Subpart O, and DIMP is required by 49 CFR Part 192, Subpart P. SIMP is not a federally mandated term.[108] The Sempra companies discuss the potential reliability impacts of an Aliso Canyon "outage/retirement," and assert concern that:

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[104] *Id*. at 4.

[105] *Id*. at 5.

[106] Joint Utility Tail Risk Proposal at 1. Available as of January 24, 2024 at: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M521/K449/521449075.PDF.

[107] *Id*. at 2-3.

[108] SoCalGas uses the SIMP term as an Integrity Risk Management framework to comply with the Federal regulations regarding underground natural gas storage facilities, specifically 49 CFR Part 192.12.

> Instituting a "minimum" requirement of expected value and ignoring or undervaluing the potential consequences of tail events could arguably support the conclusion that all mitigations (outside of compliance) should be suspended whenever a system operates free of incident and should only be funded after an incident has occurred.[109]
>
> The Joint Utility Tail Risk Proposal requests:
>
> that the Commission modify the language in D.22-12-027 at Appendix A, A-14, row 24 as shown below in Table 1 to allow utilities to present an analysis of monetized pre-and post-mitigation [consequences of a risk event] CoRE using a computation relevant to a tail risk value, rather than the expected value.

Building on these examples, the Joint Utility Tail Risk Proposal proposes that the Commission modify Row 24 of the RDF to remove the existing requirement for utilities to model expected values as follows:

Row No	Element Name	Element Description and Requirements
24	Use of ~~Expected~~ Values for CoRE~~;~~ ~~Supplemental Calculation~~	The utility will use ~~expected value~~ the appropriate value associated with each individual risk for the Cost-Benefit Approach-based measurements and calculations of CoRE in Rows 13, 18, 19, 21, 22, and 23. If a utility chooses to present alternative calculations of monetized pre- and post-mitigation CoRE using a computation ~~in addition to the~~ different from the expected value ~~of~~ in the Cost-Benefit Approach, such as tail value, it will provide justification of its approach, and does so without prejudice to the right of parties to the RAMP or GRC to challenge such Alternative Analysis.

[109] *Id*. at 7.

8.2. Party Comments

MGRA asserts that the record in this area is not complete, and the utility proposal should not be adopted. MGRA assert that, "[t]he utilities also do not define where 'normal' risk leaves off and 'tail risk' begins, leaving the meaning of 'tail risk value' undefined. MGRA's comments and whitepaper support the position that tail risks need special handling, but this handling can be done within the RDF as currently constituted."[110] MGRA asserts that "[u]tilities should be permitted to incorporate alternative analyses for comparison, or as a recommended alternative."[111] MGRA strongly objects to utility presentation of only the potential consequences of risk events instead of analysis based on both likelihood and consequences:

> What the Commission should not accept is any deviation from a risk-based approach, specifically by providing only consequences calculations. For the purpose of this proceeding risk has been defined as probability times consequence. In the case where the utility believes that the mathematical treatments available underweight the tail-risk losses, it has the option of addressing the tail risk as a separate risk driver, with its own consequences and probability, and its own specific mitigations. This approach would be acceptable under current and modified RDF frameworks and might address utility concerns regarding average value calculations.[112]

Regarding the need to address risk tolerance prior to considering the Joint Utility proposal, MGRA adds:

> Determination of risk is a quantitative issue, and so incorporating non-wildfire tail-risk into risk calculations is a valuable exercise, even if it is not clear from utility proposals

[110] MGRA Reply Comments on Workshop #6 at 3.

[111] MGRA Opening Comments at 2.

[112] MGRA Opening Comments on Workshop #6 at 7.

> exactly how this should be done in specific cases. The Commission should request specificity in utility proposals for dealing with individual tail risks. These proposals must contain not only consequences, but mitigation cost and effectiveness, and some level of probability calculation.[113]

EPUC/IS contend that the Joint Utility proposal to modify Row 24 may be reasonable, but that EPUC/IS do "not support the adoption of the Joint IOU proposal, unless the utilities are expressly obligated to provide complete transparency as to their assumptions and calculations, and can demonstrate cost effectiveness."[114] Additionally, EPUC/IS strongly disagree with the Sempra companies' characterization of the both the 2010 San Bruno and the 2018 Merrimack Valley gas explosion as representing tail risk and discuss their concerns at length. EPUC/IS conclude that "tail risk analysis could also be applied, but as a supplement to—rather than a replacement of—the foundational Cost Benefit analysis."[115]

Regarding the need to address risk tolerance prior to considering the Joint Proposal, EPUC/IS contend that:

> the topic of risk tolerance does not need to be completely resolved prior to the Commission providing additional guidance on tail risk. However, EPUC/IS emphasize that what does need to be resolved is an identification of the asset classes to which tail risk analysis can be appropriately applied, and Commission guidance as to whether it can be applied as a sole metric, or merely as an adjunct metric to Cost Benefit analysis. Ultimately, customers' risk tolerance will be

[113] MGRA Opening Comments on Workshop #6 at 7-8.

[114] EPUC/IS Reply Comments at 8.

[115] EPUC/IS Reply Comments on Workshop #6 at 3.

> based in large part on the cost of mitigating the tail risk, and the utility's overall success in managing rate affordability.[116]

TURN does not support the Joint Utility proposal. TURN states that the RDF currently allows the utility to provide tail risk information alongside results based on the expected value. TURN notes that there is no restriction on the ability of the utility to present the tail risk, and when it is provided the expected value provides a useful data point for comparison. TURN does not oppose the presentation of tail risk information as is currently the case but strongly opposes any change to the RDF to update current guidance on this issue.[117]

PG&E states that it supports the Joint Utility proposal. PG&E states that transparency may be increased due to inclusion of the requirement in the utility proposal that the utility "will provide justification of its approach."[118] EPUC/IS and TURN strongly disagree with PG&E's view here, with EPUC/IS stating that "transparency can be compromised if Cost Benefit analysis is supplanted, rather than augmented, by alternative methods."[119]

Regarding use of tail values versus expected values, PG&E states that:

> It would be appropriate to use a value other than an expected value in the case where averages based on existing data might not be indicative of the expected value (if it exists), *e.g.*, for Pareto distributions with parameter $\alpha<3$. These distributions belong to a class where the expected value is dominated by disproportionately large but infrequent events, making the estimate of expected values highly uncertain, *e.g.*, when modeling catastrophic wildfires.[120]

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[116] EPUC/IS Reply Comments on Workshop #6 at 8-9.

[117] TURN Opening Comments on Workshop #6 at 3.

[118] PG&E Opening Comments on Workshop #6 at 4.

[119] EPUC/IS Reply Comments on Workshop #6 at 5-6.

[120] PG&E Opening Comments on Workshop #6 at 4-5.

> … On the other hand, in cases where there is high certainty and stable averages to the distribution, using an expected value may be appropriate, such as for the Motor Vehicle Incident risk.[121]

MGRA counters this PG&E argument by asserting that:

> Taking into account tail risk distributions that may be pathological such as the power law describing wildfire size and loss distributions, then an expected value analysis will still provide correct estimates of risk… Adhering to a systematic risk analysis approach rather than an ad-hoc concentration on specific catastrophic risks has the advantage that 'garden variety' risks that may be much more common with lower consequences are not underweighted, as might be the case if only catastrophic tail-risks are considered.[122]

TURN agrees with MGRA and further comments:

> To the extent that a collection of assets is at risk for causing a catastrophic event *the asset class should be considered as granularly as possible so that the effects of the extreme event are properly captured by the expected value of the consequences over the tranches that comprise the asset class*. TURN further cautions that focusing only on tail value could result in certain lower consequence risks persisting without mitigation.[123]

The Joint Utilities support their own proposal in comments. The Sempra companies express concern over expected values as the "default value."[124] The Sempra companies argue that the Joint Proposal would "provide for increased transparency over current requirements because it would promote RAMP reporting that more closely aligns with how risk management decisions are

[121] PG&E Opening Comments on Workshop #6 at 5.

[122] MGRA Opening Comments on Workshop #6 at 1-2.

[123] TURN Reply Comments on Workshop #6 at 5, emphasis added.

[124] Sempra companies Opening Comments on Workshop #6 at 2.

developed."[125] SCE echoes this refrain, stating that the most important benefit of the Joint Utility proposal would be that:

> the utility would not be forced to present a risk score (*e.g.*, expected value) that, in many cases, would be inconsistent with the way in which the utility manages risks and mitigations and/or may be in conflict with governmental guidance, state or federal policy objectives, or industry best practices.[126]

8.3. Declining to Modify Existing RDF Requirements for the Presentation of Expected Values

We decline to adopt the Joint Utilities' proposal at this time, and we also do not intend to do so in the near future.

First, we are not convinced of utility arguments to remove the Row 24 RDF requirement that utilities must present expected values. Calculation of the expected value remains a sound requirement because it provides results that are intuitively understandable to decision-makers and parties, and is a standard risk assessment practice. The existing Row 24 requirements are sound and appropriate. The RDF authorizes a utility to present a tail risk analysis but does not require this. Both analyses may then inform Commission decision-making regarding appropriate mitigation funding levels, in a manner that soundly assesses risk in the context of ensuring just and reasonable rates.

Second, the Joint Utility proposal would remove the requirement to present expected values for all risks, not just for utility infrastructure deemed to be more subject to tail risks. This would be inappropriate, as even the utilities assert that only some risks comprise tail risks yet fail to specify which ones. The

[125] Sempra companies Opening Comments on Workshop #6 at 3.

[126] SCE Opening Comments on Workshop #6 at 6.

Joint Utility Proposal fails to present any analysis or objective criteria to assist the Commission in identifying which utility assets are uniquely subject to tail risks. Comments by EPUC/IS persuasively rebut the Sempra companies' assertion that certain gas risk events discussed in the Sempra proposal comprise tail risks. We agree with EPUC/IS that the San Bruno and Merrimack Valley gas explosions appear to portray the tremendous consequences of poor personnel training and oversight requirements rather than unique tail risks.

Based on the foregoing, we are concerned that granting the Joint Utility request at this time could support utility assessment and management of risks based on a "worst-case scenario" or "worst-case consequences" only, rather than on an analysis that also considers the likelihood of such consequences. We strongly disagree that this would be appropriate. Such an approach is counter to the objectives and benefits of the RDF framework, as funding decisions with this as the basis could dramatically increase ratepayer costs to mitigate potential catastrophic risks that are not only highly unlikely but also extremely expensive to mitigate.

Third, the Joint Proposal curiously fails to recognize or discuss the existence of risk reduction programs that comprise "controls," required by law or regulation, including TIMP and DIMP, or already underway, such as routine vegetation management programs. These programs require specific inspection and maintenance regimes, or represent longstanding risk reduction efforts, for which costs should be reduced as much as practicable. Expected value assessments can help the Commission determine appropriate funding levels for controls, because these programs in no way can be said to comprise only tail risks for which the presentation of only a tail value would be appropriate.

Further, we strongly disagree that presentation of expected value must necessarily be in conflict with the "way in which the utility manages risks and mitigations," as argued by SCE. Indeed, we see use of the expected value as essential to assessing and managing risks in a manner that minimizes costs to ratepayers. That some utilities have not embraced this benefit of the RDF is concerning.

Fourth, as noted by MGRA, the record regarding non-wildfire tail risks requires further development. Further, as discussed in Workshop #6, questions surrounding non-wildfire tail risks are closely related to the concept of risk tolerance, which is slated for work in Phase 4 of this proceeding.

For these reasons, we decline to adopt the Joint Utility proposal. As appropriate, consideration of this issue may continue in later phases of this proceeding.

9. Climate Change and the RDF

This section discusses three proposals for how the IOUs could quantitatively reflect climate hazards in the RDF: two proposals offered by SPD, and one offered by PG&E. It considers whether the IOUs should be required to quantitatively reflect climate hazards in their RAMP filings for relevant risks or whether the IOUs should instead be authorized to pilot various approaches to doing so. It concludes by directing PG&E to pilot its proposed approach and for SCE and the Sempra companies to pilot SPD's Approach 2 to quantitatively consider the impact of climate hazards on relevant RAMP risks. This section directs the IOUs to serve and file their pilot analyses sequentially, directing PG&E to file its pilot no later than September 15, 2025, and the Sempra companies and SCE, to file their pilots no later than May 15, 2026. This section

additionally authorizes but does not require IOUs to quantitatively reflect climate hazards in their RDF analyses and RAMP filings.

9.1. Background

D.22-12-027 does not provide explicit guidance for how IOUs should reflect climate hazards in their RAMP filings. The primary guidance the Commission has thus far adopted regarding climate change occurred in R.18--04-019, *Rulemaking to Consider Strategies and Guidance for Climate Change Adaptation*. D.20-08-046, issued in R.18-04-019, orders the IOUs to prepare Climate Adaptation Vulnerability Assessments (CAVAs) addressing the climate hazards of wildfires, flooding, precipitation, cascading events and sea level rise, amongst other actions.[127] Until now, the IOUs' RAMP filings have primarily addressed climate change in their RAMP filings as a cross-cutting issue and via qualitative assessments of risks.[128]

To facilitate coordination across proceedings, Workshop #3 was convened jointly with parties to R.18-04-019 on September 13, 2023. R.20-07-013 issues discussed at the workshop consisted of presentations and a series of questions related to the R.20-07-013 Phase 3 issue in scope, which is:

> whether analyses or outputs from the IOUs' CAVAs should inform quantitative risk modeling of climate hazards using the RDF, and more generally, how climate change hazards should be reflected in RAMP filings.[129]

[127] D.20-08-046, Ordering Paragraph 9.11.

[128] SPD Phase 3 Roadmap proposal at 2.

[129] Phase 3 Scoping Memo at 13.

During the workshop, Commission Energy Division staff presented on issues in scope in R.18-04-019 and Commission SPD staff and PG&E presented on issues in scope in R.20-07-013.[130]

On September 19, 2023, PG&E filed its climate change Workshop #3 proposal, entitled "Continuous Improvement in Investor-Owned Utility Risk Management: Integrating Enterprise Risk Modeling and Climate Vulnerability Assessment to Enhance IOU Resilience" (PG&E Climate Proposal). An assigned ALJ ruling entered SPD's "Proposal on Climate Change and the Risk-Based Decision-Making Framework" (SPD Climate Proposal) into the proceeding record on September 9, 2023. A September 20, 2023, assigned ALJ ruling invited party comment on a series of questions related to the Phase 3 issue in scope regarding climate change.

9.2. SPD Proposal

SPD offered two options for potential Commission guidance on better integrating climate hazards into the RDF. SPD states that either proposal would support the use of climate data to identify new risks, which, if in the top 40 percent of safety risks, should be reflected in the RAMP and comprise analyses to determine LoRE or CoRE scores. SPD states that, for either option, prior adaptation, resiliency or mitigation investments that may affect risks impacted by climate change must be reflected in analyses, to avoid over estimating risks or double recovery.[131]

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[130] *See* Workshop #3 slides in Attachment A to the September 20, 2023 ALJ Ruling.

[131] SPD Climate Proposal, Attachment B to ALJ Ruling, September 20, 2023 at 11-13, available as of December 15, 2023 at: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M520/K471/520471113.PDF.

9.2.1. SPD Approach 1: Further RAMP-CAVA Integration

SPD's Approach 1 recommends that the IOUs incorporate data inputs into the CAVA and/or CAVA results into their future RAMP applications. To accomplish this, SPD states that the Commission could: (a) adjust language within the RDF; (b) create a procedure for incorporating data inputs into the CAVA and/or CAVA results within the RAMP; and (c) create a reporting template for CAVA results. SPD contend that this approach would harmonize RAMP applications with climate-related regulatory requirements found in proceedings across the Commission. SPD provided detailed recommendations for modifications to the RDF to accommodate Approach 1 as well as a potential template for IOUs to report relevant CAVA results in their RAMP filings.[132]

9.2.2. SPD Approach 2: Refining the RDF to Incorporate Climate Data, Models and Projections

SPD's Approach 2 recommends the Commission consider providing guidance that builds on the approaches already used by the IOUs to incorporate climate data, models and projections into their RAMP filings. SPD state that the benefit of this second approach is that it would allow the IOUs the flexibility to incorporate cutting-edge climate science beyond that included in the CAVA, which SPD contends may be more relevant to a given RDF risk event as compared to data inputs limited to those used in the CAVA and/or CAVA results. Approach 2 could be accomplished by: (a) adjusting RDF language; and (b) creating a procedure for incorporating climate data, models, and projections into the RAMP. SPD provides a detailed outline of RDF modifications necessary

[132] SPD Climate Proposal, Attachment B to ALJ Ruling, September 20, 2023, at 11-13.

to accomplish Approach 2. SPD also summarizes the potential limitations of both Approach 1 and Approach 2.[133]

SPD Approach 2 recommends the following changes to language in the RDF (SPD's recommended additions are underlined):[134]

No.	Element Name	Element Description and Requirements
8.	Risk Identification and Definition	Utilities' risks are defined in their respective Enterprise Risk Registers. The Enterprise Risk Register is the starting point for identifying the risks that will be included in the RAMP. The process for determining these risks will be described in the RAMP. The RAMP will consider risks using the same risk definitions as in the ERR. Each RAMP filing will highlight any changes to the ERR from the previous RAMP or GRC filings. <u>The ERR must consider any risks that can be identified through the use of climate data, models and projections. See the Procedure for Incorporating climate data, models and projections in the RAMP for details.</u>
11.	Identification of the Frequency of the Risk Event	The identified Frequency of a Risk Event should reflect the unique characteristics of the utility. For each enterprise risk, the utility will use actual results and/or SME input to determine the annual Frequency of the Risk Event. The utility should use utility specific data, if available. If data that is specific to the utility is not available, the utility must supplement its analysis with subject matter expertise. In addition, if data reflecting past results are used, that data must be supplemented by SME judgment that takes into account the Benefits of any

[133] *Id*. at 14-16.

[134] SPD Climate Proposal, Attachment B to ALJ Ruling, September 20, 2023, at 14-16.

		Mitigations that are expected to be implemented prior to the GRC period under review in the RAMP submission. The utility will take into account all known relevant Drivers when specifying the Frequency of a Risk Event. Drivers should reflect current and/or forecasted conditions and may include both external actions as well as characteristics inherent to the asset. For example, where applicable, Drivers may include: the presence of corrosion, vegetation, dig-ins, earthquakes, windstorms or the location of a pipe in an area with a higher likelihood of dig-ins. When considering what climate data, models and projections are appropriate inputs for calculating the impact of climate change on the Frequency of a Risk Event, Drivers should reflect both current and forecasted conditions and may include both external actions as well as characteristics inherent to the asset.
16.	Expressing Effects of a Mitigation	The effects of a Mitigation on a Tranche will be expressed as a change to the Tranche-specific pre-mitigation values for LoRE and/or CoRE. The utility will provide the pre- and post-mitigation values for LoRE and CoRE determined in accordance with this Step 3 for all Mitigations subject to this Step 3 analysis. When calculating the effects of Mitigations, utilities must also consider the mitigation of risk achieved by adaptation-related investments identified in a previous GRC or other cost recovery venue that will continue to have an effect during the four-year RAMP cycle. See the Procedure for Incorporating Climate Data Models and Projections in the RAMP for details.

SPD Approach 2 recommends the following Draft Procedure for Incorporating Climate Data, Models and Projections into the RAMP (Draft Procedure):[135]

- Identify any risks associated with the results of climate change-related data, models and projections relevant to the IOU's service territory and compile into a list.
- Compare the list of risks related to climate change-related data, models and projections with the ERR used to prepare the RAMP as outlined in Step 1B: Row 8 of the RDF.
- Add any unique risks related to climate change-related data, models and projections to the ERR.
- Complete Step2A: Rows 9-11, Step 2B: Row 12 and Step 3: Rows 13-25 as outlined in the RDF.
- Consider what climate change-related data, models and projections are appropriate inputs for inclusion in completing Step 2A: Row 10 to calculate potential Consequences of a Risk Event that properly reflects the impact of climate change, including how the climate change-related data, models and projections can affect the Outcomes of a Risk Event.
- Consider what climate change-related data, models and projections are appropriate inputs for inclusion in completing Step 2A: Row 11 to calculate the Frequency of a Risk Event that properly reflects the impact of climate change, including how the climate change-related data, models and projections can affect the Exposure or Drivers of a Risk Event.
- Collect adaptation-related investments identified in a previous GRC or other cost recovery venue that tie back to a specific risk(s) in the ERR into a list.
- Compile a list of adaptation-related investments that have cost forecasts that were approved in the IOU's previous

[135] SPD Climate Proposal, Attachment B to ALJ Ruling, September 20, 2023, at 15-16.

GRC or other cost recovery venues and serve to reduce near-term risk (10-year timeframe).

- Calculate the risk reduction effects of the adaptation-related investments in Step 8 of this procedure that will continue to have an effect during the current four-year RAMP cycle [footnote 40].[136]
- Include these adaptation-related investments within Step 3: Row 16 denoting them as a mitigation as outlined in the RDF and note in the narrative description of these mitigations that the associated costs will be excluded from consideration in this RAMP filing because their funding has already been approved by a previous GRC or other cost recovery venue [footnote 41].[137]
- Complete Step 3: Rows 17-25 as outlined in the RDF.

9.3. PG&E Proposal

PG&E recommends the Commission establish a pilot phase for its CAVA/RDF Integrated Framework. PG&E proposes that the Commission and parties conduct a gap assessment at the conclusion of any pilots to determine next steps. In the meantime, PG&E proposes the Commission afford IOUs the flexibility to continue their current climate modeling efforts and make the case for climate-based investment in the manner most appropriate to their circumstances.[138]

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[136] Footnote 40 in SPD Climate Proposal: Note that the risk reduction benefits from these GRC-funded adaptation-related investments may not begin until the adaptation-related investments have been implemented thereby affecting future RAMP filings.

[137] Footnote 41 in SPD Climate Proposal: Note that since the cost of these adaptation-related investments is already incorporated into the GRC or a Memorandum Account, it will not be necessary to Complete Step 3: Row 25 for these mitigations.

[138] PG&E Climate Proposal at 6, available as of December 15, 2023 at: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M520/K471/520471076.PDF.

PG&E's proposed initial CAVA/RDF Integrated Framework includes the following elements:

a. Cumulative Risk Measures. PG&E proposes utilizing a cumulative view of climate risk within RAMP to ensure the impacts of climate change are more clearly represented than if only represented in the LoRE or CoRE scores. The approach can accommodate: (a) new risks identified in CAVA; (b) cascading events (defined as new risks).

b. Scenario-Based Approach to Hazard Quantification. PG&E proposes using the climate scenarios established in CAVA to quantify Climate Hazards (Cross Cutting Factors). Impacts from different scenarios can be probability-weighted. Additionally, where possible, the probability distribution/stochastic process for climate hazards can also be determined to find the expected value for the climate change impact over its distribution, using Monte-Carlo trials.

c. Confidence Ranges. The Cumulative Measures above should not be point estimates; ranges for Risk values should be developed based on, for example, 10th-50th-90th percentile Hazard scenarios.

d. Scenario-based approach to Modeling Cascading Events. PG&E proposes that cascading events be specifically defined by scenarios and that Risk Events (i.e., bowties) be created to incorporate them into the RDF.

e. Uncertainty Analyses. Elements of the Transparency Pilot Guidelines that was piloted in D.21-11-009 can be used to quantify the uncertainty and sensitivity of risk values to the underlying climate Hazard assumptions.

PG&E makes three other recommendations:

f. Qualitative flagging of discrepancies between RAMP risk findings and longer-term CAVA risk findings. This should seek to identify areas that merit a deeper analysis of how the risk in question may change over time outside of the RAMP period.

g. Follow-On Analyses: Using CAVA results to identify assets or asset families at greater relative risk, which may be used to select targets for in-depth quantitative analyses of specific assets and risks.

h. Importance of resilience partnerships: Methodologies used should support transparency and community partnerships.[139]

9.4. Party Comment

9.4.1. Quantitatively Reflecting Climate Hazards in RAMP Filings

The IOUs and TURN generally oppose a new Commission requirement that the IOUs quantitatively consider in the RDF the impact of climate hazards on relevant RAMP risks. The IOUs note that quantitative methods to comprehensively assess climate change in the RDF are still being assessed and that there is a lack of a clear consensus or high confidence in climate data and/or a lack of strong linkages between climate hazards and quantifiable associated impacts on downstream risk events. The IOUs argue that climate change should continue to be considered in the development of RAMP reports, but mandating a prescriptive approach at this time is premature.

The Sempra companies state that they see value in exploring elements that can meaningfully inform their RAMP reports during their development of RAMP and CAVA reports. These elements may include more detailed identification of climate hazard risks to infrastructure and more thorough analysis of projects that may influence or be influenced by climate change, the Sempra companies state.[140] However, the Sempra companies contend that

[139] *Id*. at 5.

[140] The Sempra companies Opening Comments on Workshop #3 at 6.

prematurely establishing a prescriptive requirement could inadvertently create a methodology that lacks usefulness.[141]

PG&E argues that climate hazard scenarios are not easily classified into either LoRE or CoRE calculations and PG&E is only just beginning to explore the availability and suitability of the various climate data as it pertains to the RDF. Further, PG&E contends that there continue to be new developments and progress in climate science, including new analytical tools and methodologies, which are best considered in a pilot before locking such approaches into the RDF. Management of uncertainties in this area will be a challenge, PG&E asserts.[142]

SCE states that there may not be a high enough confidence in underlying data, clear enough linkages between climate hazards and the underlying climate variables, and a level of quantifiable certainty to readily quantify the incremental climate impacts associated with long term climate patterns that would be distinct from normal interannual or decadal variability associated with historical weather data for a near term time period. SCE argues that utilities should be cautious in describing the rate of likely change associated with climate change and related uncertainties.[143]

Of the two SPD approaches, the IOUs generally support Approach 2 as providing more flexibility to consider climate data and methodologies beyond those used in the CAVA reports and as providing for more aligned timing in preparing the analyses. However, SCE recommends two modifications to the language changes suggested by SPD Approach 2[144]:

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[141] Sempra companies Opening Comments on Workshop #3 at 9.

[142] PG&E Opening Comments on Workshop #3 at 4-5.

[143] SCE Opening Comments on Workshop #3 at 8.

[144] SCE Opening Comments on Workshop #3 at 4, emphasis added.

RDF Row	SPD Approach 2 Proposed Language Additions	SCE Proposed Modifications
8.[Risk Identification and Definition]	The ERR must consider any risks that can be identified through the use of climate data, models and projections. See the Procedure for Incorporating climate data, models and projections in the RAMP for details.	Utilities should, as relevant and/or readily available, consider any risks that can be identified through the use of climate data, models and projections. See the Procedure for Incorporating climate data, models and projections in the RAMP for details.
11.[Identification of the Frequency of the Risk Event]	When considering what climate data, models and projections are appropriate inputs for calculating the impact of climate change on the Frequency of a Risk Event, Drivers should reflect both current and forecasted conditions and may include both external actions as well as characteristics inherent to the asset.	When considering what climate data, models and projections are appropriate inputs for calculating the impact of climate change on the exposure, Frequency of a Risk Event, Drivers *and/or consequences* of a risk event should reflect both current and forecasted conditions and may include both external actions as well as characteristics inherent to the asset.

In contrast with the IOUs, TURN slightly prefers SPD's Approach 1, as it relies on data sources previously vetted through the CAVA process.[145]

TURN proposes that the Commission authorize but not require IOUs to identify known climate hazards in the RAMP, including identifying any asset or

[145] TURN Opening Comments on Workshop #3 at 3-4.

investment that will be impacted by climate change.[146] Any asset identified as at risk or vulnerable to climate change in an IOU's CAVA report should be identified by the RDF and included in RAMP filings, TURN contends. To the extent that these assets are vulnerable to a risk event caused or accelerated by climate change, the utility and the Commission should assess the investment strategy with that information in mind. In particular, the IOUs should seek to avoid, if possible, any long-term asset strategy now that would be at risk in the future because of climate change impacts.[147]

TURN states that the utility could take several approaches to justifying its discussion of assets at risk to climate change in the RAMP, including identify the data sources relied on in the CAVA or in another Commission proceeding supporting their conclusion.[148]

9.4.2. Climate Change Pilots

In addition to its recommendation that the Commission clearly authorize the IOUs to identify known climate hazards in their RAMP reports, TURN also recommends the Commission require the IOUs to pilot the incorporation of climate hazards in the RDF to determine if and how the incorporation of climate change information alters the results of risk assessment. TURN contends that if more than one approach is piloted, the results can be compared, which would assist the Commission ensuring that climate change impacts are adequately considered.[149]

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[146] TURN, Opening Comments on Workshop #3 at 2-3.

[147] TURN, Opening Comments on Workshop #3 at 6.

[148] *Id*. at 3.

[149] *Id*. at 2.

The IOUs generally support a requirement to pilot integration of quantitative climate data into the RAMP. PG&E recommends it submit its climate pilot study based on its proposal outlined in Section 9.3 above in Q4 of 2025. PG&E requests that it be authorized to separate the climate pilot study results from its RAMP filings. PG&E states that it is critical that the Commission and parties fully focus on the content of PG&E's next RAMP filing and not be distracted by a climate analysis at the same time. SCE and the Sempra companies agree with this PG&E request.

SCE does not oppose conducting its own pilot to explore methods to quantitatively integrate climate hazard data into the RDF. SCE would prefer to pilot SPD's Approach 2 as compared to piloting PG&E's proposed approach and suggests some minor modifications to SPD's recommendations pertaining to Rows 8 and 11 of the RDF as noted above. Although the Sempra companies acknowledge there may be advantages to piloting the climate analysis before their next RAMP filing, these utilities state they would prefer to submit a pilot of this approach one year following submittal of their 2025 RAMP filings.[150] The Sempra companies state this timeline would ensure that their climate SMEs are able to appropriately focus their efforts on the pilot.[151]

TURN argues that it would be most useful if all the IOUs submitted results of a quantitative climate hazard data pilot at the same time as this would allow for comparison of results.[152] TURN also argues that it would be most useful if the

[150] Sempra companies Opening Comments on Workshop #3 at 3 and 7.

[151] Sempra companies Opening Comments on Workshop #3 at 8.

[152] TURN Opening Comments on Workshop #3 at 4.

IOUs each pilot a different approach so that a diversity of methods could be considered.[153]

SCE strongly disagrees with TURN's proposal that SCE should be mandated to conduct a pilot before SCE's next RAMP filing. SCE objects as follows: (a) SCE has already completed a CAVA using data from the 4th California Climate Assessment; (b) the 5th California Climate Assessment is not yet complete; (c) the IOUs are awaiting additional guidance on conducting their next CAVA reports in an upcoming Phase 2 decision in R.18-04-019; and (d) PG&E and Sempra are conducting their own CAVA reports.[154]

9.4.3. Pilot Approval Process and Data Elements

SCE recommends that a potential climate pilot approval process could be an acknowledgement that utilities have laid out their planned approach in a RAMP pre-filing workshop for feedback from stakeholders.[155] SCE also proposes several elements it may wish to consider in its pilot. SCE states that utilities could, for instance:

a. Present a mapping of the climate hazards considered to the appropriate enterprise risk register (ERR) risks and ultimately to the selected RAMP risks as outlined in the Staff Approach 2, along with a narrative describing how and why climate hazards were or were not integrated along each step of the process;

b. Determine which climate hazards are relevant to the utility's service territory;

[153] TURN Opening Comments on Workshop #3 at 5.

[154] SCE Opening Comments on Workshop #3 at 3.

[155] SCE Opening Comments on Workshop #3 at 6.

c. Describe which climate variables (primary and/or secondary) are relevant to climate hazards in utility service territories;

d. Describe (qualitatively) the associated uncertainty, confidence level of those climate variables, and the linkages between climate variables and climate hazards within the prescribed timing of the next RAMP analysis, and relevant to the utility's service territory;

e. Determine to what extent there is a high enough confidence level in the supporting data and enough supporting evidence to make a clear linkage between climate hazards and a risk to develop a quantitative assessment of climate hazard impacts, including a high-level description of potential climate impacts to a given risk exposure, driver, outcomes, and/or consequences;

f. If there is not a high enough confidence in the supporting data, nor enough supporting evidence to make a clear linkage to a particular risk including risk components, then provide opportunity to off ramp that risk from climate integration;

g. If there is not a high enough confidence in the supporting data, but there is supporting evidence to make a clear linkage between climate hazard and a risk including risk components, then develop a qualitative assessment of those linkages;

h. If there is a high enough confidence in the supporting data, and there is enough supporting evidence to make a clear linkage between climate hazard and a risk including risk components, then develop a qualitative assessment of those linkages;

i. For those ERR risks that meet the criteria set forth in step g above, develop a quantitative assessment of climate impacts on those risks. This assessment should include an assessment of the climate impacts to at least one of the following risk components: exposure, driver, outcome, or consequence. The utility should also identify which portion

of each risk component is incremental to the baseline assessment, if known; and

j. For this analysis, utilities should maintain the flexibility to modify the expected value and or tail risk value to incorporate potential increasing climate impacts.[156]

SCE suggests that the criteria that the Commission set forth for data that utilities may develop to understand climate impacts in R.18-04-019 should be used as a guide and vetting to determine data sources that are appropriate to quantitatively consider climate hazards in the RDF.[157]

The Sempra companies contend that the previously established workshop process for RAMP filings could serve as a guidepost for a climate pilot approval process. With a longer (*e.g.*, two-year) timeframe for a required pilot study, the Sempra companies state that they would be open to presenting at one or more workshops to illustrate their climate pilot process and the potential integration of an approach into RAMP filings.[158] The Sempra companies advocate for a flexible approach in which RAMP risks are evaluated in the context of climate hazards, as appropriate and where supported by sufficient data.[159] The Sempra companies suggest the Commission allow the IOUs flexibility to determine the extent to which climate data can be used to inform their respective RAMP reports as well as the climate pilot.[160]

[156] SCE Opening Comments on Workshop #3 at 6-7.

[157] SCE Opening Comments on Workshop #3 at 8-9. SCE refers here to D.19-10-054, Findings of Facts 19 – 21 and 23- 24.

[158] Sempra companies Opening Comments on Workshop #3 at 8.

[159] Sempra companies Opening Comments on Workshop #3 at 2.

[160] Sempra companies Opening Comments on Workshop #3 at 10.

With regard to ERR risks, PG&E presents criteria with which utilities could potentially prioritize which climate hazards to consider and recommends prioritizing climate hazards to consider based on:

- Findings from utility CAVAs;
- Judgment of utility SMEs;
- Company strategic investment priorities;
- Availability of internal resources; and
- When available, hazard quantification results related to the likelihood of the hazard occurrence and the changes in consequences from climate change impacts.[161]

PG&E also offers the below Table 1 as decision matrix for inclusion of climate data in risk modeling.

Table 1:
PG&E's proposed decision matrix for inclusion of climate data in risk modeling:

Classification of Need for Climate Data Inputs	**Complexity & Cost of Climate Hazard Impact Quantification**		
Expected Impact of Climate Hazards to Risk Event	Low	Moderate	High
Low	Subject to utility discretion	No modeling recommended	No modeling recommended
Moderate	Include climate impact	Subject to utility discretion	No modeling recommended
High	Include climate impact	Include climate impact	Subject to utility discretion

[161] PG&E Opening Comments on Workshop #3 at 5.

PG&E recommends that R.18-04-019 consider the question of appropriate vetting of climate data sources, including data intended to be integrated into the RDF.[162]

TURN argues that all data sources and assumptions relied on by the utility in its climate pilot should be included in concurrently submitted work papers.[163] TURN further asserts that climate data sources for integration into the RDF should preferably have been vetted and relied upon in another Commission proceeding or used in the CAVA. However, TURN contends that if a utility intends to rely on a new data source that has not been vetted at the Commission, it would be best if consideration of that new data source occur or at least begin before the RAMP is filed.[164]

No party argues that all RAMP risks should be required to be "climate informed."

9.4.4. Consideration of the Risk Reduction Benefits of Adaptation Investments

SCE states that only the risk reduction benefits of adaptation investments funded through a previous GRC decision should be considered in subsequent RAMP filings or related climate pilots, meaning that the risk reduction benefits of high-level "adaptation options" identified in a CAVA but not funded through a previous GRC decision should not be considered, according to SCE.[165] PG&E states that it is not opposed to identifying and describing in its climate pilot the effect, or lack thereof, that "adaptation options" discussed in CAVA reports and

[162] PG&E Opening Comments on Workshop #3 at 6.

[163] TURN Opening Comments on Workshop #3 at 5.

[164] TURN Opening Comments on Workshop #3 at 6.

[165] SCE Opening Comments on Workshop #3 at 4.

funded in an applicable GRC decision, might have on RAMP risks. PG&E does not comment on whether it could also consider "adaptation-related investments proposed or approved in other proceedings, including 'resiliency' investments," as proposed in SPD's Approach 2.[166] The Sempra companies state that if an adaptation activity has multiple benefits – climate, resiliency, direct safety or reliability – then the benefit should be considered regardless of the approach. TURN concurs that information on how adaptation-related investments could impact other RAMP risks would be helpful in assessing the benefits and costs of the investment to utility customers.[167]

9.5. Authorizing Utilities to Quantitatively Consider Climate Change Impacts in RAMP Filings

Climate change is already impacting the frequency and intensity of weather events, including wildfires, precipitation, and storm surges and this, in turn, may influence utility safety risks. Exactly how climate change is impacting utility safety risks is less certain, however, as changes over time will be variable and it is challenging in the short term to causally attribute various weather changes to climate change alone. Thus, while it is important that utilities and the Commission consider climate change impacts on utility short term safety risks, we must do so in a balanced and measured way that allows for adjustment and flexibility as we learn more. Because mitigating safety risks has substantial cost implications to ratepayers, it is critical that we not overestimate the impact of climate change on such risks. Finding an appropriate balance between considering climate-induced additional risks but not overestimating this will be

[166] PG&E Opening Comments on Workshop #3 at 3.

[167] TURN Opening Comments on Workshop #3 at 4.

critical. It may take some years for IOUs and the Commission to develop, test, and refine methodologies for accomplishing this.

Currently, the RDF permits but does not require the IOUs to consider quantitative climate risk data when using the RDF to develop their RAMP filings. This current authorization is reflected in D.22-12-027 regarding estimation of the frequency of risk events in the phrase, "[d]rivers should reflect current and/or forecasted conditions," as well as in the authorization for utilities to use actual results and/or subject matter expertise to estimate the frequency of risk events.[168] Similarly, regarding identification of the potential consequences of a risk event, the RDF Row 10 authorizes IOUs to use "actual results, available and appropriate data…and/or Subject Matter Experts (SMEs) to identify potential Consequences of the Risk Event," implying but not clearly specifying that the IOUs may use forecast data, including forecast data that reflects climate hazards, to develop their CoREs.

This decision does not eliminate or significantly change this current authorization but rather clarifies it. We adopt the following additional guidance, in concurrence with recommendations from TURN:

- The IOUs may quantitatively consider climate change impacts in their RAMP filings, including through use of forecasts and SME input. Data and analysis used for this purpose shall meet the data standards indicated in decisions adopted in R.18-04-019 and must be provided in full in work papers submitted at the time of the RAMP filing;
- When quantitatively consider climate change impacts in the RAMP filing, the IOUs should clearly identify the known climate hazards considered;

[168] D.22-12-027, Appendix A at Row 11.

- Any assets identified by an IOU as at risk or vulnerable to climate change in its CAVA report should be identified in the IOU's RAMP filings; and
- The IOUs should seek to avoid, if possible, any long-term asset investment strategy that would be at risk in the future because of climate change impacts.

Guidance regarding data standards indicated in D.19-10-054, developed in R.18-04-019, includes the following:

- Utilities should prioritize the use of peer-reviewed data over non-peer reviewed data;
- Data should provide the geographical and temporal resolution required for the research or planning at hand;
- Utilities should align their analysis based on the most recent Statewide Climate Change Assessment; and,
- If third party analyses are used, they should be based on the same climate scenarios as the most recent Statewide Climate Change Assessment.[169]

These are reasonable requirements that will assist in appropriate consideration of climate risks even while more detailed and nuanced methods are piloted, as discussed below.

9.6. Directing Preparation of Climate Pilot White Papers

This decision directs each IOUs to pilot an approach to quantitatively consider the impact of climate hazards on relevant RAMP risks as further outlined below. We direct the IOUs to serve and file in this proceeding Climate Pilot White Papers describing in detail the approach taken by each IOU, the data sources used and the rationale for this, a description and discussion of the analysis undertaken, and a reflection on lessons learned. The IOUs shall serve

[169] D.19-10-054 at Findings of Fact 20 – 24.

and file their Climate Pilot White Papers sequentially. PG&E shall serve and file its Climate Pilot White Paper no later than September 15, 2025. The Sempra companies and SCE shall serve and file their respective Climate Pilot White Papers no later than May 15, 2026.

Although we authorize the IOUs to quantitatively consider climate impacts in their RAMP filings in Section 9.5 above, the proceeding record has convinced us that accomplishing that is not a simple or straightforward task. Thus, we believe requiring an additional pilot analysis approach in the form of Climate Pilot White Papers will assist the IOUs, parties, and the Commission in better understanding the challenges and potential methods in so doing, as well as their strengths and weaknesses. This allows flexibility and the opportunity for learning and innovation even as climate impacts and related risk adjustments may become more pronounced over this study period.

As appropriate and as other proceeding activities permit, Commission staff will convene a workshop in this proceeding to discuss the Climate Pilot White Papers after all three white papers have been filed to assess the full results and discuss next steps. This approach ensures the utilities will have sufficient time to develop their unique approaches and accommodates other important work planned in this proceeding in future phases, while still providing the opportunity to compare the pilot results before this proceeding considers the need for additional guidance in this area.

General Requirements

Consistent with SPD's Approach 2, each pilot shall incorporate consideration of the risk reduction benefits of any climate adaptation investments resulting from CAVA analyses funded in previous GRC decisions and any adaptation-related resiliency or similar investments funded through

previous GRC decisions or other relevant decisions that may reduce RAMP risks. We believe this approach can be reasonably accomplished. Testing this will help develop parties and the Commission to develop techniques and practices necessary to avoid double recovery for similar investments and will contribute to the development of any future guidance in this area.

More generally, we authorize the IOUs to implement SPD's Approach 2 in their white papers, meaning that we do not limit the IOUs consideration of climate data to that informing or produced by their CAVA analyses. The Climate Pilot White Papers shall describe in detail the approach taken, data sources used, analysis, and lessons learned. Data sources used in the pilots shall meet the standards developed in R.18-04-019, and data used shall be provided in detailed workpapers accompanying the filing.

The IOUs in their pilots shall follow and report on their experience implementing SCE's modifications to Row 8, as summarized in Section 9.4.1 above. We do not adopt SCE's recommended modification to Row 11 of the RDF with respect to the pilots as that row concerns the frequency of a risk event, not consequences. Section 9.5 above discusses and clarifies existing authorization in the RDF with regarding to the estimation of risk event consequences.

The IOUs shall adhere to the following guidelines when developing their Climate Pilot White Papers:

PG&E:

PG&E shall implement its CAVA/RDF Integrated Framework as generally described in Section 9.3 above. PG&E may deviate from its proposed framework as needed and shall describe any deviations and associated rationale in its filing. PG&E may apply its proposed risk prioritization criteria and its data analysis

matrix as described above in Section 9.4.3 when developing and implementing its pilot.

Sempra companies and SCE

The Sempra companies and SCE shall each or jointly provide 30-day advance notice to the service list of this proceeding of a workshop they each or jointly convene during 2025 or 2026, where the Sempra companies and SCE shall describe their planned pilot approach and informally take feedback orally and in writing from interested parties. The Sempra companies and SCE shall provide parties with a written description of their planned approach and/or a detailed PowerPoint presentation prior to the workshop and shall allow no less than 10 days for parties to provide informal comments following it. The Sempra companies and SCE shall reflect the comments and their disposition of them in their filed Climate Pilot White Papers.

The Sempra companies and SCE shall implement SPD's Approach 2 by generally following the proposed language changes to the RDF and the Draft Procedure described in Section 9.2.2 above, with the exception that the utilities may follow SCE's recommended language in Row 8 as described in Section 9.4.1. The Sempra companies and SCEs' Climate Pilot White Papers shall describe in detail how SPD's Approach 2 and related proposed RDF modifications impacted their decision-making when following the Draft Procedure. The Sempra companies and SCE may integrate into their pilot any of the proposed pilot elements proposed by PG&E and SCE as described in Section 9.4.3 above.

Our adopted Climate Pilot White Paper requirements are reasonable and practicable. The Climate Pilot White Papers will significantly advance our understanding of the challenges and potential benefits of integrating quantitative climate data into RAMP analyses. Requiring the IOUs to consider and reflect in

their Climate Pilot White Papers the impact of any GRC-funded adaptation investments and any adaptation-related investments proposed or approved in other proceedings will advance understanding of the challenges and benefits of doing so.

Our requirements provide opportunities for party input and a timeframe and manner for utilities to respond to parties' suggestions. They also support flexibility and the opportunity to innovate, as requested by the IOUs in comments. Testing the integration of quantitative climate data into RAMP analyses will support Commission development of further guidance in this important area as determined necessary.

10. Risk Scaling

The topic of Workshop #4 was risk scaling, formerly known as "risk attitude." In particular, Workshop #4 sought party input on whether there should be a minimum requirement for the risk scaling function and whose preferences should be represented by the risk scaling function. Risk scaling refers to applying a function to the full range of an attribute to capture one's attitude towards varying consequences of risk events, particularly high-consequence outcomes at the tail end of a probability distribution of the attribute. As the term "attitude" suggests, a risk scaling function is inherently axiological, or values-based, and derives from someone's preferences. In the case of a convex risk function (*i.e.*, disutility function), one's risk attitude would be described as "risk-averse," as a convex risk function implies an increasing sensitivity (*i.e.*, aversion) to extreme outcomes. In the case of a concave risk function, one's risk attitude would be described as "risk-seeking" since a concave risk function implies a decreasing sensitivity to extreme outcomes. For a linear risk function, one's risk attitude would be described as "risk neutral," as they are indifferent between the

range of outcomes. The present RDF describes how the IOUs *must* apply a chosen risk scaling function when developing their RAMP filings. In particular, RDF Row 7 notes that the Risk Attitude Function can be applied to Monetized Levels of an Attribute (or Attributes) to yield a Risk-Adjusted Level for that Attribute (or Attributes).

10.1. Proposals

10.1.1. PG&E

PG&E's proposal recommends the use of a market-based approach to developing Risk Scaling Functions. PG&E proposes changing Row 7 of the RDF to add the following language:

> Evidence-based approaches can also be considered, such as, but not limited to, a market-based approach where applicable, that:
>
> 1. Does not result in Risk-Adjusted Values lower than the expected monetized value of the Attribute levels.
> 2. Notwithstanding the above, results in values consistent with prices and/or estimates from risk transfer markets, and/or public policy towards risk transfer, to the extent such pricing is applicable and available.
>
> IOUs are required to provide evidence, assumptions and methods used in determining their risk-scaling functions, and clearly and transparently explain how these elements are used.

PG&E argues that a risk scaling function based on market data (*i.e.*, a market-based approach), particularly data from insurance and capital markets, encode societal risk preferences. Additionally, PG&E argues that a market-based approach creates consistency and alignment, since the Commission already oversees the IOUs' insurance and capital market activities. PG&E notes a few additional benefits of a market-based approach. First, a market-based approach will allow IOUs to be able to periodically update their risk scaling function to

reflect changing risk preferences. Second, a market-based approach provides the flexibility to incorporate societal values based on real-world events and concerns, such as prioritizing environmental and social justice. Finally, while PG&E uses the example of wildfire risk to demonstrate its market-based approach to risk scaling, it notes that it may be possible to have Risk-specific risk scaling functions based on catastrophe bond markets for a variety of Risks (*e.g.*, earthquakes, cyberattacks, floods, *etc.*).

10.1.2. TURN

In its proposal, TURN recommends that the IOUs be required to use a risk-neutral (*i.e.*, linear) risk scale as a minimum requirement and, if an IOU prefers to use the results from the application of a risk-averse risk scaling function, this must be done in addition to the use of a risk-neutral risk scaling function. TURN argues that a risk-averse risk scaling function leads to illogical results, such as valuing a reduction of fatalities from 11 fatalities to 10 fatalities more than a reduction from 1 fatality to no fatalities. TURN also argues that the use of a risk-averse risk scaling function makes mitigations appear more valuable than they would be if they were evaluated using a risk-neutral scaling function. Finally, TURN argues that a risk-neutral risk scaling function simplifies analysis and increases transparency. TURN's proposed language change to Row 7 of the RDF is:

> "Apply a Risk Attitude Scaling Function to the Monetized Levels of an Attribute or Attributes (from Row 6) to obtain Risk-Adjusted Levels. The Risk Attitude Scaling Function specifies attitude towards different kinds of Outcomes uncertainty including capturing aversion to extreme Outcomes or indifference over a range of Outcomes neutrality.
>
> The Risk Attitude Scaling Function can be linear or non-linear. For example, the Risk Attitude Scaling Function is linear to

express a risk-neutral attitude if avoiding a given change in the Monetized Attribute Level does not depend on the Attribute Level. Alternatively, the Risk Attitude Scaling Function is non-linear to express a risk-averse or risk-seeking attitude if avoiding a given change in the Monetized Attribute Level differs by the Attribute Level.

The utility will use a linear risk scaling function to the Monetized Levels of an Attribute or Attributes (from Row 6) to obtain Risk-Adjusted Levels. A utility may also choose to present alternative Risk-Adjusted Levels relying on a convex scaling function. It does so without prejudice to the right of parties to the RAMP or GRC to challenge such convex scaling function. "

10.2. Party Comments

On the question of the use of risk scaling, there is a consensus that risk-seeking (*i.e.*, concave) risk scaling functions should be avoided. Regarding TURN's proposal to make the presentation of results using linear risk scaling a minimal requirement, PG&E, SCE, and the Sempra companies all argue for maximal flexibility for the IOUs in selecting a risk scaling function that they deem reasonable and oppose TURN's position on linear risk scaling functions, both as a minimum requirement and conceptually. In particular, PG&E and the Sempra companies argue that the risk preferences of California ratepayers are not known and, consequently, the linear risk scaling function proposed by TURN is a mere assumption of a risk-neutral society. SCE argues that statutory mandate (*i.e.*, Senate Bill (SB) 901) and state and federal rules and guidelines are designed to require the utilities to mitigate tail-risk type events associated with catastrophic wildfire and hydropower dam failure. SCE claims that the IOUs could create a risk-averse scaling function that would "capture the full extent of

the uncertainty that these types of tail risk events represent."[170] MGRA notes that, for some kinds of risks (*e.g.*, wildfires), risk scaling is not necessary if the appropriate distribution is used to model these risks but otherwise supports TURN's recommendation on using linear risk scaling as a minimum requirement. Moreover, in reply to SCE's comments, MGRA notes that there "is no explicit necessity to inject a risk scaling function in order to incorporate uncertainty properly."[171] PCF supports TURN's recommendation to use a linear risk scale for risk scaling and argues that a linear risk scale increases transparency and understandability. PCF suggests that if the Commission adopts the language changes to the RDF proposed by TURN, the IOUs should be required to justify the inclusion of any results that are not based on a linear risk scaling function.

In response to PG&E's proposal to use a market-based approach to risk scaling, parties generally support PG&E piloting the market-based approach[172] and oppose changing the RDF languages PG&E proposes. On the latter point, the Sempra companies again argue for the necessity of IOUs having flexibility in how they approach risk scaling and recommend removing bullets 1 and 2 of PG&E's proposed RDF language change. TURN notes that the current language of Row 7 of the RDF does not bar PG&E from using a market-based approach to risk scaling and that the changes to Row 7 of the RDF proposed by TURN also do not preclude PG&E from presenting a market-based risk scaling approach alongside the proposed linear risk scaling minimum requirement. PCF opposes

[170] SCE Opening Comments to Workshop #4 at 4.

[171] MGRA Reply Comments to Workshop #4 at 8.

[172] The Sempra companies, MGRA, and TURN.

both PG&E piloting the market-based approach as well as the RDF language changes proposed by PG&E.

10.3. Discussion

We are persuaded of the need to impose restrictions on risk scaling within the RDF. While TURN's proposal provides an effective way of seeing the impact of risk scaling on the ranking of mitigations, we find that applying linear risk scaling is not necessary for all mitigations. We also agree with MGRA that the purpose of the risk scaling function is not to address uncertainty. The concern with uncertainty can be addressed through the topic of tail risk, as addressed in Rows 5 and 24 of the RDF and affirmed with this decision (see Sections 7 and 8 above). To ensure that IOUs will transparently demonstrate to decisionmakers that the risk scaling function is not being used to address uncertainty in the model, but instead is focused on expressing the axiological preferences of the utility, we include additional language to Row 7 that draws from TURN's proposal. As there is nothing currently barring the IOUs from using a market-based approach to risk scaling, we see no need to adopt the changes to Row 7 of the RDF proposed by PG&E. Building on parties' agreement that a nonlinear scaling function should always be convex (*i.e.* risk-averse), we make that preference explicit within Row 7. We adopt the following modification to Row 7 of the RDF:

7.	Cost-Benefit Approach Principle 6 – Risk-Adjusted Attribute Levels	Apply a Risk ~~Attitude~~ Scaling Function to the Monetized Levels of an Attribute or Attributes (from Row 6) to obtain Risk-Adjusted Attribute Levels. The Risk ~~Attitude~~ Scaling Function ~~specifies attitude towards~~ is an adjustment made in the risk model due to different ~~kinds~~magnitudes of Outcomes, ~~including capturing~~ which can capture aversion ~~to extreme Outcomes~~ or indifference ~~over a range of~~towards those Outcomes.

		The Risk ~~Attitude~~ Scaling Function can be linear or convexly non-linear. For example, the Risk ~~Attitude~~ Scaling Function is linear to express ~~a risk-neutral attitude~~indifference if avoiding a given change in the Monetized Attribute Level does not depend on the Attribute Level. Alternatively, the Risk ~~Attitude~~ Scaling Function is convexly non-linear to express ~~a risk-averse or risk-seeking attitude~~aversion if a change in the Attribute level results in an increasing rate of change in the Risk-Adjusted Monetized Attribute Level as the Level of the Attribute increases~~if avoiding a given change in the Monetized Attribute Level differs by the Attribute Level~~. When completing Rows 5 and 24 in the RDF, if a utility chooses to address tail risk using the power law or other statistical approach and chooses to present Risk-Adjusted Levels by relying on a convex scaling function, then it must supplement its analysis by also presenting Risk-Adjusted Attribute Levels by relying on a linear scaling function.

To ensure consistency in the RDF, we also make the following change to the definition of Risk Scaling Function as listed in Appendix A:

Risk Scaling~~Attitude~~ Function: A function or formula that specifies an attitude towards different magnitudes of Outcomes including capturing aversion to extreme Outcomes or indifference towards those Outcomes.~~A function or formula applied to Monetized Levels of an Attribute to express the attitude towards uncertainty, i.e. risk aversion, neutrality or seeking.~~

11. Discount Rates

One of the topics of Workshop #5 was the use of discount rates in the RDF CBR calculation. Discount rates are necessary to account for the time-value of money and to put future costs and future benefits in present-day dollars. This allows for comparisons both between costs and benefits within a risk mitigation

as well as comparisons across risk mitigations. The use of discount rates is implicit in the RDF CBR calculations. The questions motivating the discussion on discount rates were whether the different kinds of costs and benefits (*e.g.*, financial versus monetized) should have different discount rates, whether different kinds of mitigations warrant different discount rates, and what the applied discount rates should be. Both SPD and TURN provided proposals on discount rates.

11.1. Proposals

11.1.1. SPD

SPD recommends that the CBR allow for the use of different discount rates in the numerator and denominator. They note that the benefits portion of the CBR (*i.e.*, the numerator) is comprised of attributes that are financial as well as those that are monetized but not truly financial (*e.g.*, safety and reliability benefits) while the costs portion of the CBR (*i.e.*, the denominator) is truly financial. Since these components are different in kind, SPD recommends using different discount rates in the numerator and denominator of the CBR. In particular, a discount rate that is based on the Weighted Average Cost of Capital (WACC), the utilities' opportunity cost for these financial components, should be used for the financial impact component of the numerator and the mitigation cost component in the denominator. For the safety and reliability components in the numerator, SPD recommends the use of a discount rate based on the effective compounded rate of the projected average inflation rate, the projected per-capita real growth rate of wages over the general rate case period, and the social rate of time preference. These metrics account for the differences in the value of a statistical life (VSL) across time.

11.1.2. TURN

TURN presents several recommendations in its proposal. First, TURN recommends removing inflation from the numerator and denominator of the CBR and then applying the real discount rate (*i.e.*, discounting beyond the effect of inflation). TURN argues that the effect of inflation is distinct from the real discount rate. Second, TURN recommends that the Commission establish a common framework for the calculation of program costs and recommends that costs of programs be calculated as the present value of revenue requirement for the full depreciation life of assets. Third, TURN recommends that only one discount rate be used in both the numerator and the denominator. Finally, TURN recommends the use of sensitivity analysis in the application of the real discount rate, using a relatively low societal discount rate of around 3 percent and the IOU's weighted average cost of capital of around 7 to 8 percent.

11.2. Party Comments

Parties were split on the question of whether different discount rates should be allowed in the numerator and denominator of the CBR. EPUC/IS, PCF, and TURN argue that, for the sake of transparency, consistency, and understandability, the numerator and denominator should both use the same discount rate. They note that different discount rates in the numerator and denominator of the CBR carries the risk of inferring incorrect conclusions and differing discount rates may lead to a bias towards multi-year projects over projects with a more immediate implementation. PG&E contends that it is not strictly necessary to use the same discount rate in the numerator and denominator of the CBR but is not convinced that the default should be different discount rates in the numerator and denominator. PG&E also notes that having the same discount rate in both the numerator and denominator of the CBR

improves transparency and reduces bias. SCE and the Sempra companies both agree with the SPD proposal that the numerator, contingent on the type of component, and denominator should have different discount rates and urge allowing flexibility for the IOUs in determining what discount rates to use in both the numerator and denominator.

On the question of how the choice of discount rate should be impacted by the different types of benefits, EPUC/IS argues that the WACC should be used for costs and benefits of all kinds, while PCF again noted that having different discount rates for the different benefit components reduces transparency. PG&E argues that the different types of benefits should not affect the choice of discount rate. SCE and the Sempra companies support the SPD proposal in using different discount rates for the different benefit components.

On the question of whether dual-rate discounting can be used for mitigations that demonstrate social benefit, PG&E argues that, while it might be possible to use dual-rate discounting to recognize social benefits, this is not necessary with the monetized benefits currently in use in the numerator as these already include their opportunity costs because they are based on willingness-to-pay and, as such, should use financing costs to determine the discount rate.

On the question of whether different discount rates should be used to adjust costs associated with different types of mitigations, no parties were in support. The Sempra companies reiterated their desire that IOUs have flexibility in determining discount rates. TURN noted that using different discount rates for different kinds of mitigations makes it impossible to compare CBRs across mitigations.

11.3. Discussion

Discount rates are inherently axiological. This makes consensus on what discount rates are most appropriate in a given context unlikely. Even with extensive party comments on discount rates, considerable uncertainty remains. Due to this uncertainty, we are persuaded of the need for sensitivity analysis in determining how sensitive a given mitigation's CBR is to different discount rate(s). Additionally, we find the logic of the SPD proposal persuasive in noting that the safety and reliability benefit components of the CBR are different in kind from the financial components of the CBR, and this justifies the use of different discount rates in the numerator and denominator of the CBR. However, several parties noted concerns that regarding CBRs with different discount rates in the numerator and denominator and specifically identified challenges of transparency, understandability, and the possible introduction of "bias."

To ameliorate concerns about both uncertainty in selecting a discount rate as well as concerns about the understandability and transparency of using dual discount rates, the approach we adopt here is to direct the IOUs to use three discount rate scenarios for mitigations. For each mitigation, the IOUs must provide three discount rate scenarios of the CBR according to the following methodologies:

a) Societal Discount Rate Scenario: apply the latest available near-term social rate of time preference (SRTP) provided by the U.S. Office of Management and Budget (OMB) in Circular A-4, [173] as the discount rate to all components in both the numerator and denominator of the CBR. The latest available near-term SRTP is 2%,

[173] Currently available at: https://www.whitehouse.gov/wp-content/uploads/2023/11/CircularA-4DiscountHistory.pdf

b) WACC Discount Rate Scenario: apply the IOU's most recent Weighted-Average Cost of Capital as the discount rate for all components in both the numerator and denominator of the CBR, and

c) Hybrid Discount Rate Scenario: apply the discount rate derived from the effective compounded rate of the 10-year effective average inflation rate as measured by the California statewide consumer price index[174], the 10-year effective average per-capita real growth rate of wages as measured by California statewide mean hourly and total wages for all occupations[175], and the most recent near-term SRTP used in the Societal Discount Rate Scenario, to the safety and reliability components of the numerator and apply the IOU's most recent WACC as the discount rate for the financial components of the numerator and denominator of the CBR.

The 10-year effective average inflation rate shall be calculated as:

10-year effective average inflation rate =

$(CPI_{T} / CPI_{T-10})^{1/10} - 1$, where CPI is the California statewide consumer price index and T is the most recent year for which the CA statewide CPI is available.

The 10-year effective average per-capita real growth rate of wages shall be calculated as:

10-year effective average per-capita real growth rate of wages =

$[(\text{mean hourly wage}_{T} / \text{mean hourly wage}_{T-10}) / (CPI_{T} / CPI_{T-10})]^{1/10} - 1$, where T is the most recent year for which

[174] The most recent 10-year data for the California statewide consumer price index are available from the State of California Department of Industrial Relations at: http://dir.ca.gov/oprl/CPI/CPICalculator/CpiCalculator.aspx

[175] The most recent 10-year data for the California statewide mean hourly and annual wages for all occupations, with the Standard Occupational Classification (SOC) code of 00-0000, are available from the State of California Employment Development Department's Occupational Employment and Wage Statistics (OEWS) program at: https://labormarketinfo.edd.ca.gov/data/oes-employment-and-wages.html

> mean wage data[176] and CPI are available. Care should be taken to ensure the 10-year time periods match between the mean hourly wages and the consumer price index.

Therefore, the hybrid discount rate for the safety and reliability terms is equal to:

> $[(CPI_{T} / CPI_{T-10})^{1/10}] \times [(\text{mean hourly wage}_{T}/\text{mean hourly wage}_{T-10}) / (CPI_{T} / CPI_{T-10})]^{1/10} \times (1 + \text{near-term SRTP}) - 1$

To reflect this, we adopt the following modification to Row 25 of the RDF:

25.	Cost-Benefit Ratios Calculation	The Cost-Benefit Ratio calculation should be calculated by dividing the dollar value of Mitigation Benefit by the Mitigation cost estimate. The values in the numerator and denominator should be present values to ensure the use of comparable measurements of Benefits and costs. The Benefits should reflect the full set of Benefits that are the results of the incurred costs. <u>Specifically, when calculating CBRs for each mitigation, the IOUs must provide the following three scenarios:</u> <u>a) Societal Discount Rate Scenario</u> <u>b) Weighted-Average Cost of Capital Discount Rate Scenario, and</u> <u>c) Hybrid Discount Rate Scenario</u> For capital programs, the costs in the denominator should include incremental expenses made necessary by the capital investment.

12. RAMP Reporting Templates

The other topic discussed at Workshop #5 was the use of Risk Mitigation reporting templates. This topic was raised and led by Cal Advocates, who provided the sole proposal on Risk Mitigation reporting templates.

[176] Mean annual wage data may be used instead of mean hourly wage data.

12.1. Cal Advocates Proposal

Cal Advocates explains that the IOUs' previous RAMP and GRC filings lack a standard template to collect and consolidate the more granular project-level data necessary to support IOUs' proposed risk mitigation programs and show how the utilities determine specific targets and forecasts. Cal Advocates provides a definition of a project as a set of tasks with a defined timeline, for which there are a specific set of goals, and which include scoping, estimating, planning, scheduling, tracking, unit cost, budget, and assessment.

In response to this need, Cal Advocates provides two draft templates, a Sample Mitigation Program Selection Template and a Sample Mitigation Program Progress Template (the templates). Cal Advocates recommends the use of these templates, filed annually by the IOUs, to allow the Commission and parties to critically assess: (1) the cost-effectiveness and performance effectiveness of proposed risk mitigation projects and their alternatives; (2) compare, contrast, and evaluate the ratepayer impacts of risk mitigation proposals; and (3) clearly demonstrate that utilities are prioritizing work in the riskiest areas. Cal Advocates argues that the templates should include mitigation project location spatial data to enable mapping of mitigation project progress and support assessments of how mitigation projects target, prioritize, and address an IOUs' highest risks. In order to ensure the templates continue to align with their stated objectives, Cal Advocates recommends that the Commission allow SPD to make revisions and improvements to the templates as SPD deems appropriate. Finally, Cal Advocates argues that the use of the templates should begin with the 2025 filings and continue with annual updates.

12.2. Party Comments

The parties are split on whether the templates proposed by Cal Advocates should be required for RAMP and GRC filings. PCF and TURN are in support of use of the templates, with PCF claiming that SDG&E's and SoCalGas' 2021 RAMP Reports failed to contain the minimum information necessary for the parties and the Commission to track risk reduction programs from the RAMP to the GRC and through to the Risk Spend Accountability Report (RSAR) as required by previous Commission decisions. TURN acknowledges that while it is preferable to consider funding requests at the greatest level of granularity possible, project level information may be aspirational for some categories of work.

PG&E, SCE, and the Sempra companies are opposed to the use of the templates. PG&E gives several reasons for its strong opposition to the templates. First, and similar to the Sempra companies, PG&E argues that the information requested in the templates is already provided at the program or MAT code level in the RAMP, GRC, or RSAR. Second, PG&E argues that the templates have significant overlap with the objectives of the Risk Mitigation Accountability Report (RMAR), which will be considered in a future phase of this proceeding or a successor proceeding; as such, PG&E argues that the conversation on reporting should be taken up then. Third, PG&E claims a high burden on the IOUs will result from the use of the templates from the significant data gathering and documentation required by the consolidation necessary for the templates. Fourth, PG&E notes that mitigation project level information is not appropriate for nor required by the RAMP, which requires mitigation program level analysis. Relatedly, PG&E notes that project level information, such as electric circuits and pipeline segments, are generally not available on a forecast basis and may be

revised in real time as conditions change. Fifth, PG&E notes that some information will not be available until after the project completion while other information cannot be understood in the context of RAMP and S-MAP. Sixth, PG&E notes the security risks posed to critical infrastructure by sharing the spatial location information requested in the Cal Advocates proposal and argues that this goes beyond the requirements of the RAMP and GRC. Finally, PG&E argues that the question of whether the IOUs are prioritizing the riskiest areas first does not belong in RAMP as it is addressed in the GRC, wherein the IOUs explain their operation risk evaluation and deployment models.

SCE's argument broadly mirrors PG&E's, particularly on the points of the burden of gathering and providing the requested data, the duplication of other information gathering efforts in responding to the templates, the overlap of templates with the objectives of the RMAR to be discussed in Phase 4 of this proceeding or a successor proceeding, and the timing of the templates relative to the availability of data. In line with PG&E's comments, the Sempra companies argue that the Mitigation Project Selection template is not practical at the requested level of detail.

On the question of the timing of the use of the templates, PCF agrees with Cal Advocates that the Commission should require the use of the templates beginning with 2025 filings and continuing with annual updates. SCE argues that, if use of the templates is adopted by the Commission, the IOUs should not be required to use them until the IOUs' respective next RAMP filings and the use of the templates should not be imposed as a GRC requirement.

No parties are in support of requiring the IOUs to pilot the templates.

On the question of what information and variables should or should not be included in the Risk Mitigation Project Selection template, PG&E, SCE, and the

Sempra companies argue that the information sought in the Mitigation Project Selection template is already shared at the program level via other channels, such as the RAMP Report and GRCs. PCF suggests the addition to the Mitigation Project Selection template of a variable that tracks the greenhouse gas (GHG) emissions associated with each mitigation and suggests that the information on alternative measures should be presented on the same axis as the measure itself. TURN recommends that the CBR of mitigations, the inputs to the CBR, and the CBR for alternative mitigations be included in the Mitigation Project Selection template. The Sempra companies argue that the variables "Forecast Total Project Units to Complete Over Project Timeline," "Forecast Project per Unit," "Forecast Total Cost of Mitigation Project," and "Timeline for Installation" should not be included in the Mitigation Project Selection template.

On the question of what information and variables should or should not be included in the Mitigation Project Progress template, PG&E, SCE, and the Sempra companies do not support any form of the Mitigation Project Progress template.

On the question of if the term "project" needs to be defined within the RDF, parties are split. PG&E, SCE, and the Sempra companies are opposed to defining the term "project" in the RDF. PG&E argues that previous RAMP decisions clearly define the terms "program" and "mitigation" and find that program level analysis, not project level analysis, is applicable to the RDF. SCE argues that extending the scope of the RAMP and GRC filings to the project level is a massive expansion of the requirements of the RDF that they oppose. The Sempra companies note that the introduction of the term "project" has impacts beyond reporting, such as tranching and the quantification of risk. PCF supports the use of the common, dictionary definition of the term "project" and requests

that, should the Commission define the term "project," it should take care to avoid creating unnecessary ambiguity on whether risk reduction proposals constitute projects. TURN proposes defining a project as a self-contained set of activities which can be independently assessed for its ability to reduce risk, costs, and timing and which can be scheduled, mapped, and prioritized.

On the question of whether risk mitigation data at the project level can help decisionmakers address the concern of rising utility rates in California, PCF and TURN argue that project level data increases accuracy in costing mitigations and ensuring the prioritization of the most cost-effective mitigations. PG&E, SCE, and the Sempra companies argue that the inclusion of rate affordability in assessing risk mitigations should be avoided, as there are complex issues that determine rates and this issue is better addressed in GRCs.

12.3. Discussion

We are persuaded of the benefit of receiving the information Cal Advocates proposes in the templates. However, the process, timing, and lexicon for the Risk Mitigation templates need further development in this or a successor proceeding. Parties are not in agreement on a definition of project or how such a definition should guide the IOUs in their development of RAMP and GRC filings. Additionally, we agree with PG&E and SCE that the objective of the Mitigation Project Progress template overlaps with the objective of the RMAR. Both a definition of project and RMAR will require robust discussion during a workshop before this proceeding can make a ruling on the use of templates. We intend to explore the application of a definition of project and the RMAR in this or a successor proceeding.

To support the further refinement of the Mitigation Project Selection template and the Mitigation Project Progress template, we authorize

continuation of the Technical Working Group (TWG) established in D.21-11-009. We authorize Commission's staff and parties participating in the TWG to prepare and propose recommendations for refining the Mitigation Project Selection template and Mitigation Project Progress template for consideration of inclusion within the RDF. IOUs will also be afforded the opportunity to formally propose alternative templates that achieve the same goal of transparency, consistency across IOUs, and ease of use when it comes to assessing the data that informs selection and reporting progress of mitigations. Opportunities for workshop discussions and formal comment on all proposals will be provided.

13. Summary of Public Comment

Rule 1.18 allows any member of the public to submit written comment in any Commission proceeding using the "Public Comment" tab of the online Docket Card for that proceeding on the Commission's website. Rule 1.18(b) requires that relevant written comment submitted in a proceeding be summarized in the final decision issued in that proceeding.

There are no public comments on this proceeding at this time.

14. Comments on Proposed Decision

The proposed decision of Commissioner John Reynolds in this matter was mailed to the parties in accordance with Section 311 of the Public Utilities Code and comments were allowed under Rule 14.3 of the Commission's Rules of Practice and Procedure. Comments were filed on _____, and reply comments were filed on _____ by _____.

15. Assignment of Proceeding

John Reynolds is the assigned Commissioner and Cathleen A. Fogel and Jonathan Lakey are the assigned ALJs in this proceeding.

Findings of Fact

1. The IOUs inconsistently present RSE calculations for mitigations beyond the Test Year in their RAMP mitigation proposals and GRC applications.

2. Requiring the IOUs to present CBRs for each GRC post-test year as well as an aggregate CBR for the entire post-test year period and the entire GRC period will add transparency and aid in decision making.

3. Parties can derive the calculation of slope in the Risk Sensitivity Table from the data points included in the table.

4. These values provide the best way to understand the shape of a risk function: expected value; small perturbation (expected Value + 1% of range); lower test value (10th percentile of range); and upper test value (90th percentile of range).

5. Sensitivity analyses and scenario analyses are both useful and may apply to different parameters.

6. It is reasonable to define the terms sensitivity analysis and scenario analysis for purposes of the Transparency Pilot Guidelines tests, to require the utilities to apply these terms and the relevant approaches and provide the resulting information, as appropriate, depending on the parameter, and to allow utilities performing the tests to propose modifications to these definitions as needed.

7. It would be helpful for the utilities to perform sensitivity analyses on a primary and an alternative mitigation using the Transparency Pilot Guidelines, as well as on two Risk Scores.

8. When mitigation programs do not generate probability distributions, it would assist the Commission and parties in understanding uncertainties associated with parameters if the utilities test additional methods to describe

distribution functions for such parameters in the Confidence Levels row of the Risk Sensitivity Table such as, in descending order of preference: (a) measured data distributions; (b) Monte Carlo generated distributions; and (c) SME best estimates of risk distributions.

9. It will aid in Commission's and parties' understanding of the information available to utilities and its limits, as well as utility approaches, if utilities complete all fields in the Sensitivity Results Table, including the Estimate Quality field.

10. It is reasonable that future utility sensitivity tests of the Risk Sensitivity Analysis Table modify selected parameters while holding other parameters constant and that future tests pertain to Risk Scores as well as cost-efficiency metrics (*i.e*. CBRs).

11. There is an urgent need to ensure that the IOUs provide more granular reporting tranches than they have in the past.

12. Submittal of RAMP analyses using LoRE/CoRE quintile tranches will help the Commission and parties understand if a utility is requesting funding for mitigations in the riskiest portions of their infrastructure and/or management system.

13. Tranche design according to quintiles of LoRE and CoRE will support the Commission in determining if an IOU is targeting mitigations in the riskiest portions of their infrastructure or management system in the test year before then addressing progressively less risky portions in the following three post-test years of a GRC cycle.

14. Improvement is needed in utility data availability and collection to support RDF analyses to address potential data gaps and support implementation of the LoRE/CoRE quintile approach.

15. Because not all IOU assets or systems number greater than 25, permitting an IOU to use an alternative means to the LoRE/CoRE quintile approach of determining the homogeneity of a tranche risk profile provides needed flexibility, but should be explained.

16. We do not presently find it necessary to require a minimum tranche design that would typically result in more than 25 tranches for the priority areas of physical grid and pipeline assets.

17. MGRA's White Paper, "Tail Risk and Event Statistics for Utility Planning," includes a summary of earlier PG&E work in which PG&E posits a maximum consequence size for wildfires roughly equal to five times the losses faced in the Camp fire.

18. A truncated power law ensures the best fit of data to the statistical models and will best enable the Commission to ensure that utility wildfire modeling appropriately reflects considerable wildfire tail risks but does not over-estimate these risks.

19. Utility use of truncated power law distribution, by conducting multiple tests of truncation values to determine goodness of fit to existing data, will improve modeling of wildfire tail risk and help ensure that risk estimation is capped at a level reflecting historical data.

20. There are certain aspects of risk modeling that continue to require refinement, such as properly vetting and comparing results from both 8-hour and 24-hour simulations produced using a commonly used wildfire size distribution model.

21. Identifying a truncated power law distribution approach as the best practice to modeling wildfire tail risk while allowing other approaches if

submitted and justified in advance provides flexibility and will help address remaining knowledge gaps.

22. Until now, the IOUs' RAMP filings have primarily addressed climate change in their RAMP filings as a cross-cutting issue and via qualitative assessments of risks.

23. Quantitatively considering climate hazards in RAMP filings is not a simple or straightforward task.

24. While it is important that utilities and the Commission consider climate change impacts on utility short term safety risks, we must do so in a balanced and measured way that allows for adjustment and flexibility as we learn more.

25. Requiring all IOUs to conduct a pilot analysis and prepare Climate Pilot White Papers will assist the IOUs, parties and this Commission in better understanding the challenges and potential methods associated with quantitatively reflecting climate hazards in the RDF.

26. Requiring the IOUs to consider and reflect in their Climate Pilot White Papers the impact of any GRC-funded adaptation investments and any adaptation-related investments proposed or approved in other proceedings, including resiliency-related investments, will advance the understanding of the challenges and benefits of doing so.

27. Testing the integration of quantitative climate data into RAMP analyses will support Commission development of further guidance in this important area as determined necessary.

28. The present RDF describes how the IOUs must apply a chosen risk scaling function when developing their RAMP filings.

29. The use of risk-seeking risk scaling functions should be avoided.

30. Risk scaling is not necessary for some kinds of risks (e.g., wildfires) if the appropriate distribution is used to model these risks.

31. The current language of Row 7 of the RDF does not bar IOUs from using a market-based approach to risk scaling.

32. Applying linear risk scaling is not necessary for all mitigations but is necessary in some cases to promote transparency.

33. The purpose of the risk scaling function is not to address uncertainty but to capture one's attitude towards different magnitudes of risk events.

34. Discount rates are necessary in the CBR to account for the time-value of money and to put future costs and future benefits in present-day dollars.

35. Discount rates in CBR allow for comparisons both between costs and benefits within a risk mitigation as well as comparisons across risk mitigations.

36. The use of discount rates is implicit in the RDF CBR calculations through the required use of present values.

37. The benefits portion of the CBR is comprised of attributes that are financial as well as those that are monetized but not truly financial while the costs portion of the CBR is truly financial.

38. The financial components of the CBR are different in kind from the monetized safety and reliability components of the CBR.

39. A discount rate based on the effective compounded rate of the projected average inflation rate, the projected per-capita real growth rate of wages over the general rate case period, and the social rate of time preference accounts for the differences in the value of a statistical life across time.

40. Using the same discount rate in both the numerator and denominator of the CBR improves transparency and understandability.

41. There is considerable uncertainty regarding the most appropriate discount rates.

42. Uncertainty of the most appropriate discount rates to use in the CBR warrants the use of sensitivity analysis using a range of discount rates for each mitigation.

43. The IOUs' previous RAMP and GRC filings lack a standard template to collect and consolidate the more granular project-level data necessary to support the IOUs' proposed risk mitigation programs and show how the utilities determine specific targets and forecasts.

Conclusions of Law

1. The Risk-Based Decision-Making Framework adopted in D.22-12-027 should be modified as discussed in this decision and the Risk-Based Decision-Making Framework, as modified (attached to this decision as Appendix A), should be adopted.

2. The Commission should adopt a new "Row 26" to add language to the RDF included in Appendix A of D.22-12-027 as follows: GRC Post-Test Year Reporting: All Controls and Mitigation programs must include CBRs in each of the GRC post-test years and by Tranche.

3. The Commission should require PG&E to serve and file its test of the Transparency Pilot Guidelines to the service list of PG&E's 2024 RAMP application proceeding no later than 80 days following its 2024 RAMP filing.

4. The Commission should require the Sempra companies to serve and file their test of the Transparency Pilot Guidelines to the service list of the Sempra companies' 2025 RAMP application proceeding no later than 60 days following their 2025 RAMP filings.

5. The Commission should require PG&E to serve and file its test of the Transparency Pilot Guidelines in R.20-07-013 no later than 80 days following its 2024 RAMP filing.

6. The Commission should require the Sempra companies to serve and file their test of the Transparency Pilot Guidelines in R.20-07-013 no later than 60 days following their 2025 RAMP filing.

7. The Commission should require PG&E and the Sempra companies to serve and file their respective tests of the Transparency Pilot Guidelines in R.20-07-013 no later than 60 days following their 2024 and 2025 RAMP filings, respectively.

8. It is not necessary to add slope to the Risk Sensitivity Table.

9. Within the Transparency Pilot, it is reasonable to require the inclusion of: (a) expected value; (b) small perturbation: expected Value + 1% of range; (c) lower test value: 10th percentile of range; and (d) upper test value: 90th percentile of range in the Risk Sensitivity Table provides raw data that can be analyzed for a variety of purposes, including capturing behavior in the region of the mean and assisting in identifying non-linear behavior at extreme values.

10. For the purposes of the Transparency Pilot Guidelines, the Commission should define sensitivity analysis and scenario analysis as indicated in Section 6.2.6, should require the utilities performing the tests to apply these terms and the relevant approaches and provide the resulting information as appropriate depending on the parameter, and should authorize the utilities propose clarifications to these definitions as needed in their filings.

11. The Commission should require PG&E and the Sempra companies to include sensitivity analyses of at least one primary and one alternative mitigation and at least two Risk Scores in their upcoming filings of their Transparency Pilot Guidelines tests.

12. When mitigation programs do not generate probability distributions, the Commission should encourage utilities to test additional methods to describe distribution functions for parameters in the Confidence Levels row of the Risk Sensitivity Table such as, in descending order of preference: (a) measured data distributions; (b) Monte Carlo generated distributions; and (c) SME best estimates of risk distributions.

13. Utilities should strive to complete all fields in the Sensitivity Results Table, including the Estimate Quality field.

14. Utilities should modify selected parameters while holding other parameters constant in future tests of the Risk Sensitivity Analysis Table.

15. Future utility tests using the Transparency Pilot Guidelines as updated by this decision should pertain to Risk Scores as well as cost-efficiency metrics (*i.e.* CBRs), as stated in the original guidelines presented in D.22-12-027.

16. The Commission should require the IOUs to, in most cases, determine reporting tranches in the RDF by using combinations of quintiles of LoRE and CoRE, where portions of a risk with the highest 20 percent of LoRE would be grouped within a tranche and the highest 20 percent of CoRE would be grouped in another tranche.

17. Where data is available, the Commission should require the IOUs to also submit more granular data regarding tranches based on LoRE and CoRE scores in workbooks included in their RAMP and GRC filings.

18. To address potential data gaps and support implementation of the LoRE/CoRE quintile approach, the Commission should require the IOUs to immediately begin a data assessment and collection process to support their RDF analyses.

19. Six months from issuance of this decision, the Commission should require each of the IOUs to file for comment and discussion a report summarizing their findings and accomplishments regarding increasing data availability and quality as well as a five-year plan to continuously improve data availability and quality for application to the RDF.

20. If the assets or system associated with a given risk are less than 25 in number, the Commission should authorize an IOU to use an alternative means of determining homogeneity of risk profiles, including quartiles or other smaller divisions of LoRE and CoRE and should require that this alternative means is described in detail in the RAMP filing.

21. If an IOU prefers to determine tranches not based on homogenous risk profiles using LoRE and CoRE quintiles, or they wish to use a percentile ranking approach that would result in more than 25 reporting tranches, the Commission should require that an IOU submit a White Paper describing its preferred method for determining tranches along with relevant workpapers to SPD no later than 45 days before their first pre-RAMP workshop and must serve the White Paper to the service list of R.20-07-013 on the same timeframe. The tranching approach shall be discussed in the pre-RAMP workshop. The Commission should require the IOU to also include the White Paper in its RAMP filing, clearly indicating any changes to the previously served version.

22. The Commission should identify a power law distribution model as a best practice for wildfire tail risk modeling with regard to the optional modeling of tail risk, in addition to expected value, in Row 24 of the RDF.

23. If an IOU elects to model wildfire tail risk pursuant to Row 24 using the truncated power law approach, the Commission should require the utility to

submit both its expected value model and its tail risk model with its RAMP filing.

24. If an IOU elects to use a method other than truncated power law to model wildfire tail risk pursuant to Row 24, in addition to presenting the required expected value, the Commission should require the IOU to provide to SPD and serve to the service list of R.20-07-013 a White Paper submission justifying its approach, and related workpapers, no later than 45 days before the IOU's first pre-RAMP workshop and to also attach the White Paper and related work papers to their RAMP filing, clearly indicating any modifications to the previously served White Paper.

25. It is reasonable to clarify that utilities are authorized to quantitatively reflect climate hazards in their RAMP filings if they use data that adheres to standards adopted in D.19-10-054, and, more generally, in R.18-04-019 or a successor proceeding.

26. The Commission should clarify the following regarding quantitatively reflecting climate hazards in RAMP filings: (a) The IOUs may quantitatively consider climate change impacts in their RAMP filings, including through use of forecasts and SME input. Data and analysis used for this purpose shall meet the data standards indicated in decisions adopted in R.18-04-019 and must be provided in full in work papers submitted at the time of the RAMP filing; (b) When quantitatively consider climate change impacts in the RAMP filing, the IOUs should clearly identify the known climate hazards considered; (c) Any assets identified by an IOU as at risk or vulnerable to climate change in its CAVA report should be identified in the IOU's RAMP filings; and (d) The IOUs should seek to avoid, if possible, any long-term asset investment strategy that would be at risk in the future because of climate change impacts.

27. The Commission should clarify the following regarding the use of climate hazard data in RAMP filings: (a) Utilities should prioritize the use of peer-reviewed data over non-peer reviewed data; (b) Data should provide the geographical and temporal resolution required for the research or planning at hand; (c) Utilities should align their analysis based on the most recent Statewide Climate Change Assessment; and (d) If third party analyses are used, they should be based on the same climate scenarios as the most recent Statewide Climate Change Assessment.

28. The Commission should require all utility Climate Pilot White Papers to: (a) describe in detail the approach taken, data sources used, analysis, and lessons learned; (b) only use data sources that meet the standards developed in R.18-04-019 and provide workpapers; and (c) consider the risk reduction benefits of any climate adaptation investments resulting from CAVA analyses funded in previous GRC decisions and any adaptation-related resiliency or similar investments funded through previous GRC decisions or other relevant decisions that may reduce RAMP risks.

29. The Commission should require PG&E in its Climate Pilot White Paper to implement its CAVA/RDF Integrated Framework as described in Section 9.3 of this decision, describing any deviations and their rationale.

30. The Commission should require the Sempra companies and SCE in their Climate Pilot White Papers to implement SPD's Approach 2 by generally following the proposed language changes to the RDF and the Draft Procedure described in Section 9.2.2, with the exception that the utilities may follow SCE's recommended language in Row 8 as described in Section 9.4.1, and following other guidance discussed in Section 9.6.

31. When 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 the Commission should require the utility to also present Risk-Adjusted Attribute Levels by relying on a linear scaling function.

32. The Commission should require the utilities to provide three discount rate scenarios of the Cost-Benefit Ratio including the Societal Discount Rate Scenario, the Weighted Average Cost of Capital Scenario and the Hybrid Discount Scenario.

33. The Commission should authorize the RDF TWG established in D.21-11-009 to prepare and propose recommendations for refining the Mitigation Project Selection template and Mitigation Project Progress template for consideration of inclusion within the RDF.

34. This proceeding should remain open.

O R D E R

IT IS ORDERED that:

1. The Risk-Based Decision-Making Framework adopted in Decision 22-12-027 is modified as discussed in this decision and the Risk-Based Decision-Making Framework, as modified, is adopted and is attached to this decision as Appendix A.

2. Southern California Gas Company (SoCalGas) and San Diego Gas & Electric Company (SDG&E) (collectively the Sempra companies) and Pacific Gas and Electric Company (PG&E) shall utilize and test the Transparency Pilot Guidelines adopted in this decision. PG&E shall serve and file its tests to the service list of PG&E's 2024 Risk Assessment and Mitigation Phase (RAMP) application proceeding no later than 80 days following PG&E's 2024 RAMP filing. The Sempra companies shall serve and file its test to the service list of the

Sempra companies' 2025 RAMP application proceeding no later than 60 days following the Sempra companies' 2025 RAMP filing. PG&E shall serve and file their test of the Transparency Pilot Guidelines in Rulemaking 20-07-013 no later than 80 days following PG&E's 2024 RAMP filing. The Sempra companies shall serve and file their test of the Transparency Pilot Guidelines in Rulemaking 20-07-013 no later than 60 days following the Sempra companies' 2025 RAMP filing. PG&E and the Sempra companies shall include sensitivity analyses of at least one primary and one alternative mitigation and at least two Risk Scores in these Transparency Pilot Guidelines test filings, shall strive to complete all fields in the Sensitivity Results Table, and shall modify selected parameters while holding other parameters constant in tests using the Risk Sensitivity Analysis Table. When mitigation programs do not generate probability distributions, PG&E and the Sempra companies should test additional methods to describe distribution functions for parameters in the Confidence Levels row of the Risk Sensitivity Table such as, in descending order of preference: (a) measured data distributions; (b) Monte Carlo generated distributions; and (c) Subject Matter Expert best estimates of risk distributions.

3. The following approaches to address climate change within the Risk Assessment Mitigation Phase (RAMP) are adopted:

    a. Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company and San Diego Gas & Electric Company (collectively investor-owned utilities or IOUs) may quantitatively consider climate change impacts in their Risk Assessment and Mitigation Phase (RAMP) filings, including through use of forecasts and Subject Matter Expert input. Data and analysis used for this purpose shall meet the data standards indicated in Decision 19-10-054 and more generally as adopted in Rulemaking 18-04-019 or a

successor proceeding, as discussed in this decision, and must be provided in full in work papers submitted at the time of the RAMP filing;

b. When quantitatively considering climate change impacts in the RAMP filing, the IOUs should clearly identify the known climate hazards considered;

c. Any assets identified by an IOU as at risk or vulnerable to climate change in its most recent Climate Adaptation and Vulnerability Assessment report, as required in D.20-08-046, should be identified in the IOU's RAMP filings; and,

d. The IOUs should seek to avoid, if possible, any long-term asset investment strategy that would be at risk in the future because of climate change impacts.

4. Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company and San Diego Gas & Electric Company (collectively investor-owned utilities or IOUs) shall immediately begin a data assessment and collection process to support the Risk-Based Decision-Making Framework (RDF) analyses required in this decision, with a particular focus on asset and system data that can inform the creation of tranches that exhibit homogenous risk profiles. No later than six months from issuance of this decision, each IOU shall file a report summarizing their findings and accomplishments regarding increasing data availability and quality as well as a five-year plan to continuously improve data availability and quality for application to the RDF.

5. Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), Southern California Gas Company (SoCalGas) and San Diego Gas & Electric Company (SDG&E) (collectively investor-owned utilities or IOUs) shall each prepare a Climate Pilot White Paper as described in this decision (elaborate as needed). PG&E shall file its Climate Pilot White Paper no later than

September 15, 2025, and the Sempra companies and SCE shall file their Climate Pilot White Papers no later than May 15, 2026. The Climate Pilot White Papers shall include, at minimum:

a. A detailed description of the approach taken by each IOU, the data sources used and the rationale for this, a description and discussion of the analysis undertaken, and a reflection on lessons learned;

b. Use of data that meet the data standards indicated in Decision 19-10-054 and more generally as adopted in Rulemaking 18-04-019 or a successor proceeding, as discussed in this decision, identify the data sources and provide work papers containing the data in conjunction with the White Papers;

c. Consideration of the risk reduction benefits of any climate adaptation investments resulting from Climate Adaptation and Vulnerability Assessment (CAVA) analyses and funded in previous general rate case decisions and any adaptation-related resiliency or similar investments funded through previous GRC decisions or other relevant decisions that may reduce Risk Assessment and Mitigation Phase (RAMP) risks;

d. For PG&E, generally implement PG&E's CAVA/Risk-Based Decision-Making Framework Integration Framework as described in this decision; and

e. For SCE, SoCalGas and SDG&E, implement Safety and Policy Division's Approach 2 as described in this decision.

6. Southern California Gas Company (SoCalGas), San Diego Gas & Electric Company (SDG&E) and Southern California Edison Company (SCE) shall each or jointly convene a workshop in 2025 or 2026 to describe their planned Climate Pilot White Paper approaches. As part of this, SoCalGas, SDG&E and SCE shall each or jointly provide 30-day advance notice to the service list of Rulemaking 20-07-013, or a successor proceeding, of the workshop, shall provide parties with

a written description of their planned approach and/or a detailed PowerPoint presentation at least seven days prior to the workshop; shall facilitate opportunities for questions and input during the workshop; shall allow no less than 10 days for parties to provide informal written comments following the workshop; and shall include party comments and their disposition of them in their final filed Climate Pilot White Papers.

7. The Risk-Based Decision-Making Framework (RDF) Technical Working Group authorized in Decision 21-11-009 Ordering Paragraph 2, is authorized to prepare and propose recommendations for refining the Mitigation Project Selection template and Mitigation Project Progress template for consideration of inclusion within the RDF.

8. Rulemaking 20-07-013 remains open.

This order is effective today.

Dated _____, 2024 Sacramento, California.