

Decision 24-08-005 August 1, 2024

**BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking to  
Consider Strategies and Guidance for  
Climate Change Adaptation.

Rulemaking 18-04-019

**PHASE 2 DECISION UPDATING CLIMATE CHANGE  
ADAPTATION MODELING REQUIREMENTS AND REFINING  
THE CLIMATE ADAPTATION AND VULNERABILITY ASSESSMENTS**

**TABLE OF CONTENTS**

| <b>Title</b>   | <b>Page</b> |
|--|-------------|
| PHASE 2 DECISION UPDATING CLIMATE CHANGE ADAPTATION MODELING REQUIREMENTS AND REFINING THE CLIMATE ADAPTATION AND VULNERABILITY ASSESSMENTS..... | 1           |
| Summary .....  | 2           |
| 1. Background .....  | 3           |
| 1.2. Climate Science Developments .....  | 5           |
| 1.3. Procedural Background .....   | 7           |
| 1.4. Submission Date .....   | 8           |
| 2. Jurisdiction .....  | 8           |
| 3. Issues Before the Commission.....   | 9           |
| 4. Refinement of Climate Adaptation and Vulnerability Assessments Requirements .....   | 11          |
| 4.1. Single Reference Emissions Scenario for Use in Climate Adaptation and Vulnerability Assessments and Other Regulatory Proceedings.....       | 13          |
| 4.1.1. Party Comments.....   | 13          |
| 4.1.1.1. Single Reference Scenario for Use in Climate Adaptation and Vulnerability Assessments.....  | 13          |
| 4.1.1.2. Method to Update Reference Scenario.....  | 14          |
| 4.1.1.3. Reference Emissions Scenario for Use in Other Proceedings and for Long-Term Planning.....   | 15          |
| 4.1.2. Discussion .....  | 19          |
| 4.2. Global Warming Levels .....   | 20          |
| 4.2.1. Background on Global Warming Levels Approach .....  | 22          |
| 4.2.2. Party Comments.....   | 23          |
| 4.2.2.1. Use of Global Warming Level Approach for Climate Adaptation and Vulnerability Assessment Reports.....                                   | 23          |
| 4.2.2.2. Implementing the Global Warming Level Approach.....   | 25          |
| 4.2.2.3. Use of Global Warming Level Approach in Other Proceedings and for Long-Term Planning .....  | 27          |
| 4.2.2.4. Timing of Requiring Global Warming Level Approach.....  | 29          |
| 4.2.3. Discussion .....  | 29          |
| 4.3. Sensitivity Analyses and Bias Correction .....  | 32          |
| 4.3.1. Party Comments.....   | 32          |
| 4.3.2. Discussion .....  | 34          |
| 4.4. Source Data, Methodologies, Spatial Resolutions and Presentation of Results .....   | 35          |

|  |    |
|--|----|
| 4.4.1. Party Comments.....   | 36 |
| 4.4.2. Discussion .....  | 39 |
| 4.5. Method and Timing of Submittal of Climate Adaptation and<br>Vulnerability Assessment Reports and Workshops.....   | 40 |
| 4.5.1. Party Comments.....   | 41 |
| 4.5.2. Discussion .....  | 43 |
| 4.6. Investor-Owned Utilities’ Surveys of Third-Party Contracts for Climate<br>Risk Exposure Information .....   | 46 |
| 4.6.1. Party Comments.....   | 46 |
| 4.6.2. Discussion .....  | 48 |
| 5. Linkages Between Climate Adaptation and Vulnerability Assessments and<br>Risk Assessment and Mitigation Phase Filings Including Whether to Reflect<br>Short Term-Climate Risks in Climate Adaptation and Vulnerability<br>Assessments Filings ..... | 49 |
| 5.1. Party Comments .....  | 49 |
| 5.2. Discussion.....   | 52 |
| 6. Guidance Regarding Adaptation Investments Included in General Rate Case<br>or Stand-Alone Applications .....  | 53 |
| 6.1. Staff Proposal .....  | 55 |
| 6.2. Party Comments .....  | 60 |
| 6.3. Adopting Staff Proposal With Minor Modifications.....   | 64 |
| 7. Other Issues.....   | 68 |
| 7.1. Lexicon of Terms .....  | 68 |
| 7.1.1. Party Comments.....   | 69 |
| 7.1.2. Discussion .....  | 70 |
| 7.2. Additional General Strategies and Guidance for Climate Adaptation .....   | 71 |
| 7.2.1. Party Comments.....   | 71 |
| 7.2.2. Discussion .....  | 73 |
| 8. Summary of Public Comment .....   | 73 |
| 9. Comments on Proposed Decision.....  | 74 |
| 10. Assignment of Proceeding.....  | 74 |
| Findings of Fact.....  | 74 |
| Conclusions of Law .....   | 79 |
| ORDER .....  | 83 |

Attachment A – Climate Adaptation and Vulnerability Assessment Investment  
Proposal Guidelines

**PHASE 2 DECISION UPDATING CLIMATE CHANGE  
ADAPTATION MODELING REQUIREMENTS AND REFINING  
THE CLIMATE ADAPTATION AND VULNERABILITY ASSESSMENTS**

**Summary**

This decision adopts refinements to climate adaptation preparation guidance for investor-owned energy utilities provided in Decision (D.) 19-10-054 and D.20-08-046 to reflect climate science developments since 2018. It adopts the Shared Socioeconomic Pathway (SSP) greenhouse gas emissions scenario 3-7.0 as the reference scenario for energy utility use in the Climate Adaptation and Vulnerability Assessments (CAVA) ordered in D.20-08-046. It also recommends SSP 3-7.0 as the reference emissions scenario for use in proceedings other than Rulemaking 18-04-019 and for long-term infrastructure planning, as relevant. SSP 3-7.0 replaces the Representative Concentration Pathway emissions scenario 8.5 required in D.19-10-054.

This decision adopts the Global Warming Level approach as the basis of CAVA planning, replacing the targeted years approach adopted in D.20-08-046. It requires the energy utilities to begin applying the Global Warming Level approach starting with Southern California Edison Company's next CAVA submittal. It recommends that the energy utilities consider phasing in use of the Global Warming Level approach in emissions scenarios applied to forecasts and projections conducted in other proceedings, completing this transition by 2027.

This decision updates the timing of utility submittal of CAVAs, requiring CAVAs to be filed one year prior to energy utility Risk Assessment and Mitigation Phase (RAMP) applications starting with PG&E's next CAVA in 2027. This replaces guidance adopted in D.20-08-046, which required concurrent submittal of CAVA and RAMP documents.

This decision adopts guidance regarding energy utility presentation of CAVA Adaptation Investment proposals in general rate case or stand-alone<sup>1</sup> applications. It establishes a working group to develop and propose a lexicon of climate adaptation-related terms. This decision also eliminates requirements adopted in D.20-08-046 for energy utilities to survey existing third-party energy contract partners regarding their readiness for climate change.

This proceeding remains open.

## **1. Background**

The California Public Utilities Commission (Commission) established Rulemaking (R.) 18-04-019 on April 26, 2018 to consider strategies to integrate climate change adaptation matters in relevant Commission proceedings. As the Order Instituting Rulemaking (OIR) states, climate adaptation planning in a time of worsening climate impacts is a prudent next step to ensure the safety and reliability of services provided by regulated utilities.

The Commission adopted two substantive decisions in Phase 1: Decision (D.) 19-10-054, *Decision Addressing Phase 1 Topics 1 and 2* and D.20-08-046, *Decision on Energy Utility Climate Change Vulnerability Assessments and Climate Adaptation in Disadvantaged Communities (Phase 1, Topics 4 and 5)*.

---

<sup>1</sup> The June 2, 2023 Assigned Commissioner's Scoping Memo and Ruling and October 20, 2023 Administrative Law Judge's Ruling in this proceeding described the process by which investor-owned utilities may apply for funding of climate adaptation measures outside of their general rate case as "free-standing" or "freestanding" applications. Those applications will be referred to as "stand-alone" applications going forward.

Assigned Commissioner's Scoping Memo and Ruling available here:  
<https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M510/K465/510465632.PDF>.

Administrative Law Judge's Ruling available here:  
<https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M520/K563/520563878.PDF>.

D.19-10-054 defines climate change adaptation for Commission jurisdictional energy utilities and takes a number of other steps. Amongst these is that D.19-10-054 both orders the large investor-owned utilities (IOUs<sup>2</sup>) to use the climate scenarios and projections included in the most recent California Statewide Climate Change Assessment when analyzing climate risks<sup>3</sup> and orders IOUs to use Representative Concentration Pathway (RCP) 8.5 for analytical, investment and operational purposes.<sup>4</sup>

In D.20-08-046, the Commission:

- a. Requires IOUs to prepare and submit via advice letter Climate Adaptation and Vulnerability Assessments (CAVA) every four years, concurrent with the Risk Assessment and Mitigation Phase (RAMP) applications required pursuant to D.18-12-014;
- b. Requires the large IOUs to designate Climate Change Teams across departments reporting to an executive or senior vice president or above and clarifies that all IOU board members will oversee climate adaptation planning for infrastructure, operations and services;
- c. Defines Disadvantaged and Vulnerable Communities (DVC) for purposes of R.18-04-019 and considering vulnerability;
- d. Requires the large IOUs to prepare and file Community Engagement Plans (CEP) regarding DVCs every four years; and,
- e. Requires the IOUs to conduct and file surveys of the effectiveness of their CEPs every four years.

On May 21, 2021, SCE served and filed its CEP. On May 13, 2022, SCE submitted its 2022 CAVA as a Tier 2 Advice Letter. PG&E served and filed its

---

<sup>2</sup> Pacific Gas and Electric Company (PG&E), Southern California Gas Company (SoCalGas), and San Diego Gas & Electric Company (SDG&E) (collectively, the Sempra companies) and Southern California Edison Company (SCE).

<sup>3</sup> D.19-10-054 at Ordering Paragraph (OP) 3 and OP 6. D.19-10-054 identifies California's Fourth Climate Change Assessment as the basis of its recommendations.

<sup>4</sup> D.19-10-054 at OP 4.

CEP on May 15, 2023. Pursuant to D.20-08-046, PG&E's CAVA was due May 15, 2024.

## 1.2. Climate Science Developments

The assigned Commissioner initiated Phase 2 of R.18-04-019 to consider refinements to D.19-10-054 and D.20-08-046 to, among other actions, address climate science developments. Climate science developments identified in the assigned Commissioner's *Phase 2 Scoping Memo and Ruling* (Phase 2 Scoping Memo), included those related to the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Synthesis Report, issued on March 20, 2023. Key developments included the IPCC's use of SSPs<sup>5</sup> rather than RCPs<sup>6</sup> as the reference scenarios for their work, the IPCC's use and recommendation of the

---

<sup>5</sup> SSPs "...illustrate five different ways in which the world may evolve in the presence or absence of climate policy (SSP1, SSP2," and "...provide a set of integrated energy-land use-emissions scenarios, structured along the dimensions of socio-economic assumptions and radiative forcing outcomes. The scenarios are now defined by which socioeconomic narrative and mitigation target that they correspond to. For example, SSP1-2.6 represents the "sustainability" set of socioeconomic assumptions, which is in turn associated with emissions that causes 2.6 Watts per square meter (W/m<sup>2</sup>) of excess radiative forcing in the year 2100. SSP3-7.0 is the generally accepted "middle case", as it lies between RCP 6.0 and RCP 8.5 and represents the medium to high end of the range of future forcing pathways. (See "Staff Background Paper on Modeling Updates for Climate Adaptation and Vulnerability Assessments" (Staff Paper) at 8, Attachment B to the June 2, 2023 Assigned Commissioner's Phase 2 Scoping Memo and Ruling. Staff Paper available as of February 15, 2024, at: <https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M510/K444/510444319.PDF>.)

<sup>6</sup> RCPs describe four different pathways of anthropogenic greenhouse gas (GHG) emissions and atmospheric concentrations, air pollutant emissions, and land use for the 21st century. Each RCP represents a level of radiative forcing, which measures the combined effect of carbon concentrations that influence the climate to trap additional heat. RCP 8.5, which D.19-10-054 required for use in IOU CAVAs, represents a future with the highest carbon concentrations of all the RCPs, and resultingly the highest radiative forcing levels. RCP 8.5 can be interpreted as 8.5 W/m<sup>2</sup> of excess radiative forcing (*e.g.*, climate warming) in the year 2100, which translates to a global mean temperature increase of about 4.3° Celsius (or 32.9° Fahrenheit) relative to pre-industrial temperatures. The climate is extremely sensitive to increases in global mean temperature, so the RCP 8.5 scenario is associated with "catastrophic climate change impacts." (See Staff Paper at 5.)

“Global Warming Level” approach, and an increased emphasis on sensitivity analyses.<sup>7</sup>

Following Commission adoption of D.19-10-054, California began preparing its Fifth Climate Change Assessment.<sup>8</sup> Unlike California’s Fourth Climate Change Assessment, discussed in D.19-10-054, California Fifth Climate Change Assessment aligns with the IPCC’s Sixth Assessment Report.<sup>9</sup> As mentioned, the IPCC’s Sixth Assessment Report adopts and recommends use of SSP rather than RCP emissions scenarios as reference scenarios for climate forecasting. California’s Fifth Climate Change Assessment in turn draws upon a subset of SSPs rather than RCPs as the basis of its emission scenarios.<sup>10</sup>

As discussed by Staff, an additional best practice reported in the Sixth Assessment Report is the utilization of a Global Warming Level approach instead of a target years approach as the basis for assessing risk and adaptation options.<sup>11</sup> Staff explain that the Global Warming Level approach “helps mitigate temperature bias present in a subset [of] the CMIP6 [Coupled Model Intercomparison Project Phase 6] models, catalyzed from the increased sensitivity of the models to physical, chemical, and biological process inputs [footnote omitted]. It also largely separates climate projections from underlying

---

<sup>7</sup> Phase 2 Scoping Memo at 5-6. (See also Staff Paper at 5-6.)

<sup>8</sup> Governor’s Office of Planning and Research, Climate Assessment, Science and Research: California’s Fifth Climate Change Assessment, research priorities, and tools available as of February 15, 2024, at: <https://opr.ca.gov/climate/icarp/climate-assessment/#fifth-assessment>.

<sup>9</sup> IPCC Sixth Assessment Report information available as of February 15, 2024, at: <https://www.ipcc.ch/assessment-report/ar6/>.

<sup>10</sup> Staff Paper at 4.

<sup>11</sup> Staff Paper at 6.

socioeconomic scenario assumptions, as the climate generally acts uniformly at different [Global Warming Levels] regardless of how society gets itself there.”<sup>12</sup>

The Staff Paper also discusses increased emphasis on sensitivity analysis in the IPCC’s Sixth Assessment Report as the “best practice for risk modeling and adaptation planning. Sensitivity analysis entails the use of multiple models and scenarios to demonstrate the range of possible outcomes.”<sup>13</sup>

### **1.3. Procedural Background**

On February 21, 2023, the assigned Commissioner issued the *Ruling Announcing Phase 2 Planning and Noticing Workshop and Pre-hearing Conference*. On March 13, 2023, Commission Staff convened a workshop to discuss potential issues in scope during Phase 2.

On March 24, 2023, seven parties filed joint prehearing conference (PHC) statements and one party filed an additional PHC statement. The Assigned Administrative Law Judge (ALJ) convened a PHC on March 28, 2023 to discuss issues in scope, determine the need for hearing, and discuss the schedule for Phase 2 of this proceeding.

On June 2, 2023, the assigned Commissioner issued the Phase 2 Scoping Memo setting forth the issues, need for hearing, schedule, and category of Phase 2. The Phase 2 Scoping Memo provided questions regarding Tasks 1, 3, 5, and 6 as outlined in the scoping memo and invited party comment.<sup>14</sup>

---

<sup>12</sup> Staff Paper at 6.

<sup>13</sup> Staff Paper at 5.

<sup>14</sup> The Staff Paper and the March 13, 2023 workshop slides were appended to the Scoping Memo.

On July 3, 2023, parties filed opening comments on the questions regarding Tasks 1, 3, 5, and 6 contained in the Phase 2 Scoping Memo.<sup>15</sup> On July 13, 2023, parties filed reply comments on the questions.<sup>16</sup>

On September 13, 2023, Commission staff convened a joint workshop between proceedings R.18-04-019 and R.20-07-013 regarding linkages between RAMP and CAVA filings, a component of Task 1 in Phase 2 of R.18-04-019.

On October 2, 2023, Commission staff convened a workshop regarding Task 1 and Task 3 issues. On October 20, 2023, the assigned ALJ issued a ruling entering the October 2, 2023 workshop materials into the record and providing additional questions for party comment. On November 13, 2023, parties filed opening comments.<sup>17</sup> On November 20, 2023, parties filed reply comments.<sup>18</sup>

#### **1.4. Submission Date**

This matter was submitted on November 20, 2023 with parties filing of reply comments on the October 20, 2023 assigned ALJ ruling.

## **2. Jurisdiction**

The Commission has broad authority and jurisdiction over investor-owned public utilities, as provided in state statute, including Public Utilities (Pub. Util.) Code Sections 216, 222, 228, 399.11 through 399.31, 451, 761 784, 950 through 969.

In particular, public utilities have a responsibility to furnish and maintain service and facilities as necessary to promote public health and safety:

---

<sup>15</sup> The following parties filed opening comments: PG&E, SCE, the Sempra companies, Center for Accessible Technology (CforAT), and the Public Advocates Office at the California Public Utilities Commission (Cal Advocates).

<sup>16</sup> The following parties filed reply comments: PG&E, SCE, Cal Advocates, and the Small Business Utility Advocates (SBUA).

<sup>17</sup> The following parties filed opening comments: SCE, PG&E, the Sempra companies, Cal Advocates, SBUA, and CforAT.

<sup>18</sup> The following parties filed reply comments: SCE, PG&E, and SBUA.

Every public utility shall furnish and maintain such adequate, efficient, just, and reasonable service, instrumentalities, equipment, and facilities... as are necessary to promote the safety, health, comfort, and convenience of its patrons, employees, and the public. (Pub. Util. Code § 451.)

The Commission also has broad responsibility and authority to protect public health and safety:

The commission may supervise and regulate every public utility in the State and may do all things, whether specifically designated in this part or in addition thereto, which are necessary and convenient in the exercise of such power and jurisdiction. (Pub. Util. Code § 701.)

We recognize these broad authorities as we consider strategies for integrating climate change adaptation standards into our processes and those of the investor-owned utilities.

### **3. Issues Before the Commission**

The issues addressed in this decision are those included in Tasks 1, 3, and 5 in the Phase 2 Scoping Memo as follows:

Task 1: Refinements to CAVA Requirements for Large IOUs and CAVA Linkages to RAMP and General Rate Case (GRC) Proceedings

1. Should the Commission refine CAVA requirements adopted in D.19-10-054 and D.20-08-046 including, but not limited to:
  - 1.1. Specifications for the emissions scenario(s) to be used in the CAVA and for planning, investment and operational purposes?
  - 1.2. Required or optional use of multiple emission scenarios?
  - 1.3. Guidance on transparency requirements regarding source data, methodologies, assumptions, and models used in CAVA preparations?

- 1.4. Use of sensitivity analyses to explore climate outcomes under various emission scenarios?
  - 1.5. Utilization of consensus Global Warming Levels by year as the basis of CAVA analyses?
  - 1.6. Guidance regarding the presentation of a distribution of results?
  - 1.7. An additional focus on short-term climate risks (3-5 years and/or 5-10 years)?
  - 1.8. Additional guidance regarding submittal of CAVA reports, any associated workshops and/or consideration of altering the method of CAVA submittals?
2. Should the Commission provide additional guidance regarding the CAVAs to support a quantitative assessment of climate risks in RAMP filings?
3. Should the Commission provide additional guidance regarding inclusion or prioritization of proposed climate adaptation projects in GRC applications or in freestanding climate adaptation investment applications?

Task 3: Linkages Between R.18-04-019 and Other Commission Proceedings Beyond RAMP and GRC Proceedings

1. Should the Commission implement measures to integrate climate change considerations into other proceedings such that the climate projections reflected in the IOUs' CAVAs are factored into related regulatory planning processes or customer programs?<sup>19</sup>

Task 5: Cross-Cutting Issues

1. Should the Commission consider creating a lexicon of terms related to climate adaptation planning that considers terms used in other proceedings?

---

<sup>19</sup> This decision does not address the Phase 2 Scoping Memo Task 3, Issue 2 question of whether any feedback loops from other proceedings into R.18-04-019 are needed, because no party responded affirmatively in this area.

2. Should the Commission consider adopting additional general strategies and guidance for climate adaptation for use by all energy utilities?

Tasks 4 and 6 are not addressed in this decision but will be taken up by the Commission in a separate decision within this proceeding.

#### **4. Refinement of Climate Adaptation and Vulnerability Assessments Requirements**

D.19-10-054 required the large IOUs use RCP 8.5 as the baseline scenario for the CAVA and for climate adaptation planning, investment, and operational purposes.<sup>20</sup> D.19-10-054 adopted potentially contradictory guidance because it also required the IOUs to align future CAVA analyses with California's Fifth Climate Assessment.<sup>21</sup>

During the March 13, 2023 workshop, Commission staff stated that since 2018, the IPCC has transitioned from use of RCPs to SSPs as the basis of global climate scenario modeling. As of 2023, IPCC pathways are defined by five socioeconomic narratives and six radiative forcing levels,<sup>22</sup> in contrast to 2019, when the IPCC used only RCPs. Additionally, staff reported that the Fifth California Climate Assessment will include data for three SSP pathways but will not include data for RCP 8.5.

All parties supported updating the emission scenario requirements adopted in D.19-10-054 in their comments on questions appended to the Phase 2 Scoping Memo. However, parties also requested a workshop to further discuss modeling issues, particularly as related to Global Warming Levels, the potential

---

<sup>20</sup> D.19-10-054 at OP 4.

<sup>21</sup> D.19-10-054 at OP 3(b) and OP 6.

<sup>22</sup> These are: SSP1, SSP2, *etc.*, and radiative forcing levels 1.9, 2.6, 3.4, 6.0, 7.0, and 8.5. Radiative forcing levels measure the combined effect of GHG emissions and other factors such as atmospheric aerosol levels on climate warming.

for temperature bias, sensitivity analyses, linkages with other proceedings, and methods to further update any adopted emission scenario requirement in the future, if needed. The October 2, 2023 workshop addressed these topics and parties had the opportunity to comment on questions in these areas in response to the October 20, 2023 ALJ ruling.

This section addresses Task 1, Issue 1 in the Phase 2 Scoping Memo, including Issue 1 sub-issues. For ease of discussion, this section also addresses questions relating to Task 3, Issue 1, regarding measures that the Commission should take to integrate climate change considerations into other proceedings.

The Commission adopts the following refinements to CAVA requirements:

- a. It adopts the SSP GHG emissions scenario 3-7.0 as the reference scenario for energy utility use in the CAVAs ordered in D.20-08-046. SSP 3-7.0 replaces the RCP emissions scenario 3.5 required in D.19-10-054.
- b. It identifies SSP 3-7.0 as the recommended reference emissions scenario for use in proceedings other than R.18-04-019 and for long-term infrastructure planning.
- c. It adopts the Global Warming Level approach as the basis of CAVA planning, replacing the targeted years approach adopted in D.20-08-046.
- d. It identifies the reference cases of 1.5 degrees centigrade above pre-industrial levels of warming and 2 degrees centigrade above pre-industrial levels of warming and requires the IOUs to model these reference levels for CAVAs submitted through 2030. After 2030, it directs the IOUs to model to 2 and 2.5 degrees centigrade above pre-industrial levels of warming. Over both time periods, it authorizes the IOUs to model to other scenario levels if desired.
- e. It requires the IOUs to begin applying the Global Warming Level approach starting with SCE's next CAVA submittal.

- f. It recommends the IOUs phase in use of the Global Warming Level approach in emissions scenarios applied to forecasts and projections conducted in other proceedings, completing this transition by 2027.
- g. It updates the timing of utility submittal of CAVAs, requiring CAVAs to be filed one year prior to energy utility RAMP applications. This replaces guidance adopted in D.20-08-046, which required concurrent submittal of CAVA and RAMP documents.

**4.1. Single Reference Emissions Scenario for Use in Climate Adaptation and Vulnerability Assessments and Other Regulatory Proceedings**

Issues 1.1 and 1.2 of the Phase 2 Scoping Memo asks whether the Commission should refine CAVA requirements adopted in D.19-10-054 and D.20-08-046 including:

- a. Specifications for the emissions scenario(s) to be used in the CAVA and for planning, investment, and operational purposes?
- b. Required or optional use of multiple emission scenarios?

**4.1.1. Party Comments**

**4.1.1.1. Single Reference Scenario for Use in Climate Adaptation and Vulnerability Assessments**

All parties supported updating the emission scenario requirements adopted in D.19-10-054 in their comments on questions appended to the Phase 2 Scoping Memo and again in their comments on the October 20, 2023 ruling. Parties generally support the designation of SSP 3-7.0 as the reference scenario for use in CAVA processes, other proceedings, and for long-term planning and investment purposes, although SCE also identifies SSP 2-4.5 as potentially appropriate. PG&E, SCE, the Sempra companies, and Cal Advocates recommend the Commission adopt a singular reference scenario for analysis,

stating that a universal baseline would allow for easier sharing and standardization across proceedings. In response to the question of whether the Commission should allow IOUs the flexibility to diverge from use of the SSP 3-7.0 if the Commission adopts that as a reference case, the IOUs generally support this flexibility.

SCE notes that if the Commission moves away from a target year approach adopted in D.20-08-046, which required utilities to model results based on the “target years” of 20-30 years and 50 years from the year of their CAVA filing, outcomes from different SSPs would in any case be incorporated into the analysis. SCE states:

By using a warming level-based approach, utilities can assess physical response at each pre-defined warming level from models across multiple SSPs, which will allow for more robust assessment of physical climate risks over a wider range of climate futures. The timing of the assumed Global Warming Level can then be considered as a sensitivity. Parties should have flexibility to define sensitivities that best meet specific use cases.<sup>23</sup>

SCE contends that RCP 8.5 and SSP 5-8.5 are “too extreme” to use for planning purposes and that SSP 3-7.0 will “ensure prudence” in climate adaptation efforts.<sup>24</sup>

#### **4.1.1.2. Method to Update Reference Scenario**

The October 20, 2023 ruling requested party input on how a single reference scenario, if adopted, could be efficiently updated. The ruling asked whether the Commission should authorize the IOUs to file a Tier 3 Advice Letter

---

<sup>23</sup> SCE Comments on Phase 2 Scoping Memo at 8.

<sup>24</sup> SCE Comments on October 20, 2023 Ruling at 4.

to propose updates to any adopted SSP reference scenario, in the event that Cal-Adapt updates its recommended or utilized emissions scenario(s).

Parties split somewhat in their comments on this question. PG&E and SCE proposed the Commission authorize the IOUs to file a Tier 2 Advice Letter, rather than a Tier 3 Advice Letter, to update any adopted reference emissions scenario, arguing that a Tier 2 Advice Letter process would be more efficient while providing sufficient opportunity for party comment. The Sempra companies and Cal Advocates supported a Tier 3 Advice Letter approach. In response, SCE argues that the Tier 2 Advice Letter approach is superior given implied requirement that the reference scenario be updated only when “Cal-Adapt updates its recommended or utilized emissions scenario(s),” making this a technical determination appropriate for staff approval, not a matter for Commission consideration. SCE also observes that official guidance on the application of climate science in California is likely to continue to be provided in California’s Fifth Climate Assessment materials and related reports, in addition to originating with the Cal-Adapt Analytics Engine group, which is primarily a development rather than an advisory group.

Cal Advocates suggests that the Commission should adopt a process to allow non-IOU parties to request an update to the SSP reference scenario by alerting Commission staff and the R.18-04-019 service list, or a successor proceeding, if Cal-Adapt has an updated recommended SSP reference scenario.

**4.1.1.3. Reference Emissions Scenario for Use  
in Other Proceedings and for  
Long-Term Planning**

On the question of whether the Commission should define SSP 3-7.0 as a reference scenario to be used in other proceedings such as R.20-05-003 (Integrated Resources Planning [IRP] Proceeding) and R.21-06-017 (High

Distributed Energy Resources [DER] Proceeding) and for long-term investment planning (*e.g.*, greater than 30 years), the IOUs respond affirmatively. SCE recommends that the Commission begin requiring integration of climate data into forecasts in the IRP proceeding, because this would provide a “critical first step towards climate-informing systemwide analyses and has clear linkages with inputs sensitive to temperature projections.”<sup>25</sup> SCE recommends the following as priorities for integrating climate data:

- a. Proceedings with longer-term planning horizons (longer than five years, as opposed to near-term or real-time);
- b. Proceedings that define grid investment needs or resources to address needs (*i.e.*, those that incorporate load forecasts that are known to be influenced by future climate assumptions);
- c. Proceedings that define investment plans or approaches for long-life assets (*i.e.*, those that address physical infrastructure with asset life longer than 10 years, which will be exposed to future climate conditions); and,
- d. Proceedings that guide planning processes that currently incorporate weather information (*i.e.*, those that incorporate historical weather data and/or assumptions about the future)<sup>26</sup>

SCE states that R.18-04-019 can drive consistent and additive treatment of physical climate risk considerations in Commission proceedings (beyond RAMP and GRC proceedings) to create a more resilient energy system by:

- c. Defining a common baseline scenario for climate projections that can be used consistently, but with appropriate flexibility, in both CAVA analysis and other Commission proceedings;

---

<sup>25</sup> SCE Opening Comments on October 20, 2023 Ruling at 8.

<sup>26</sup> SCE Opening Comments on Phase 2 Scoping Memo Questions at 15-17.

- d. Recommending how consistent projections can be holistically integrated across identified proceedings and associated planning processes to ensure the system is planned for a consistent climate future across multiple proceedings; and,
- e. Identifying climate adaptation planning gaps (for example, major climate change risks in a specific proceeding that cannot be reflected in the underlying planning processes for that given proceeding) that may need to be addressed in either the existing, R.18-04-019, or other proceedings.<sup>27</sup>

PG&E emphasizes the importance of establishing a common denominator for planning and evaluation and a consistent approach under which to evaluate utility investments. This would benefit stakeholders and add transparency, PG&E states.<sup>28</sup> PG&E further states that climate projections should prioritize proceedings that already use climate and weather data for planning purposes and should replace any outdated historical meteorological assumptions.<sup>29</sup>

PG&E supports integrating climate data into IRP work but expresses some concerns about incorporating climate data into the High DER proceeding, stating that further understanding of how the California Energy Commission's (CEC) Integrated Energy Policy Report (IEPR) will use climate projections to develop expected load assumptions is needed before further integrating climate data into the High DER proceeding.

PG&E asks that the Commission also consider prioritizing integrating climate projections into the Long-Term Procurement Planning proceedings<sup>30</sup> and the Long-Term Natural Gas Planning (R.20-01-007) proceedings as second

---

<sup>27</sup> SCE Opening Comments on Phase 2 Scoping Memo Questions at 18.

<sup>28</sup> PG&E Opening Comments on October 20, 2023 Ruling at A-4.

<sup>29</sup> PG&E Opening Comments on Phase 2 Scoping Memo Questions at A-15.

<sup>30</sup> R.16-02-007 was the last Long-Term Procurement Planning proceeding but has been closed.

priorities. PG&E indicates it can share its best practices for integrating climate data into planning.

The Sempra companies state that proceedings targeting grid planning, load forecasting, capacity expansion, reliability planning should address climate resilience issues. The Sempra companies recommend that the Long-Term Gas Planning proceeding be a focus for integration of climate data and included as a topic in a technical workshop. The Sempra companies also stress the importance of the CEC IEPR forecast moving to using forward-looking climate projections instead of historical data. The Sempra companies state that they “believe the role of R.18-04-019 should be used to influence system and resource planning. R.18-04-019 has the potential to influence cross-agency (CEC, CARB [California Air Resources Board], CPUC, CAISO [California Independent System Operator]) alignment on climate action and provide clear guidelines for climate informed decision making across the energy sector.”<sup>31</sup>

Cal Advocates states that it does not support R.18-04-019 becoming an “umbrella proceeding.”<sup>32</sup>

CforAT states that it supports integration of climate projections into all Commission proceedings.<sup>33</sup> CforAT recommends reviewing the record in R.18-07-006 (Affordability Proceeding) for an example of a roadmap to consider additive treatment of climate risks over time.<sup>34</sup> CforAT emphasizes the importance of a consistent approach and that work integrating climate model data be undertaken and communicated in a manner supporting non-expert party

---

<sup>31</sup> Sempra companies Opening Comments on Phase 2 Scoping Memo Questions at 13.

<sup>32</sup> Cal Advocates Opening Comments on Phase 2 Scoping Memo Questions at 8.

<sup>33</sup> CforAT Opening Comments on Phase 2 Scoping Memo Questions at 1-2.

<sup>34</sup> CforAT Opening Comments on Phase 2 Scoping Memo Questions at 3-4.

understanding. CforAT recommends that IOUs provide information in a dedicated section of relevant filings about other scenarios and assumptions used in other key contexts, if this is the case, to amplify party understanding of modeling complexities.<sup>35</sup>

#### **4.1.2. Discussion**

We adopt SSP 3-7.0 as the reference scenario for use in CAVA reports. Parties generally agree that this is the most appropriate SSP to use and agree that it is no longer appropriate to use RCP 8.5. This new requirement to use SSP 3-7.0 replaces and supersedes OP 4 in D.19-10-054, which requires use of RCP 8.5 for planning, investment, and operational purposes.

We also identify SSP 3-7.0 as the recommended appropriate reference emissions scenario for long-term investment planning (greater than 30 years) and for integration into forecasts and projections, as appropriate, in other proceedings. As recommended, use of SSP 3-7.0 as the reference emissions scenario will ensure consistency and will improve the accessibility of approaches and results.

We concur with and adopt SCE's proposed framework presented in Section 4.2.1.3 to prioritize integrating future climate data into Commission proceedings, with the exception that we recommend, not require, the integration of climate data into forecasting, given that climate data is already incorporated into many proceedings through long-term resource modeling, and further integration may require further deliberation within those proceedings. We identify the following proceedings as the priorities for and potentially appropriate for integration of climate forecasts: R.20-05-003 (IRP proceeding),

---

<sup>35</sup> CforAT Opening Comments on October 20, 2023 Ruling at 2.

R.20-01-007 (Long Term Natural Gas Planning proceeding), and future Long-Term Procurement Plan proceedings. For the incorporation of climate science and modeling into long-term planning proceedings, the guidance provided here for IOUs to use SSP 3-7.0 as the reference emissions scenario should be considered best practice to align with the state's regular climate assessment process. Section 4.3.2.3 below discusses use of the Global Warming Level approach in R.18-04-019 and other proceedings.

In the event that Cal-Adapt or the California Climate Assessment group updates its recommended or utilized reference emissions scenario(s), we direct the IOUs to jointly file a Tier 2 Advice Letter to propose updating our adopted SSP reference scenario within 90 days of the reference emissions scenario changes. If an IOU's CAVA is due within six months of a change of reference emissions scenario(s), the IOU may wait until their next CAVA to incorporate the updated climate science. This is a sound approach that ensures timely attention to any newly-recommended SSP as well as sufficient opportunity for party comment and staff considerations of the merits of what is largely a technical matter.

#### **4.2. Global Warming Levels**

The Staff Paper appended to the Phase 2 Scoping Memo recommends that the Commission adopt the Global Warming Level approach used by the IPCC in its Sixth Assessment report in lieu of the requirement adopted in D.20-08-046 that the IOUs prioritize CAVA analyses around the "key" target time period of 20-30 years in the future as well as other "appropriate" target time periods in the future (10-20 years and 30-50 years).

Issue 1.5 of the Phase 2 Scoping Memo asks whether the Commission should refine CAVA requirements adopted in D.19-10-054 and D.20-08-046,

including the utilization of consensus Global Warming Levels by year as the basis of CAVA analyses. The October 20, 2023 Ruling asked more specific question in this area, such as:

- a. Should the Commission update the “key” (20-30 years) and “appropriate” (10-20 and 30-50 years) years approach required in D.20-08-046 to instead require the IOUs to use a Global Warming Level approach to conduct CAVA analyses?
- b. If yes, should the Commission require the IOUs to model CAVA results centering on an increase in global average surface temperatures by 1.5 and by 2 degrees centigrade as compared to pre-industrial levels? [footnote in original: Using a range of SSPs, the IPCC’s Sixth Assessment Report projects these Global Warming Levels to be reached by approximately 2032 (with a 2026-2038 range) and 2050 (with a 2034-2072 range). See Attachment B to this ruling, slide 19]. If yes, should the Commission authorize the IOUs to model results centering on additional Global Warming Levels (e.g., 1.75 or 2.5 degrees centigrade) if they wish?
- c. Should the Commission require IOUs to take approximately the following steps, constituting a “Global Warming Level approach,” to conduct their initial risk analyses for their service territories.
  - Select any model in the Cal-Adapt Analytics Engine and run analyses at 1.5 and 2 degrees Celsius Global Warming Level for each IOU’s service territory, explaining why a given model was selected;
  - Use model simulation years for the chosen model centered around the specified Global Warming Level (1.5 or 2 degrees Celsius) obtained from the Global Warming Level-by-year relationship developed for that particular model using the SSP 3-7.0 emissions scenario;
  - A “consensus” Global Warming Level-by-year relationship for the SSP-3-7.0 emissions scenario can be

developed to relate Global Warming Level to year using all models included in the Cal-Adapt Analytics Engine at the time the IOU begins its analysis; and,

- The “consensus” Global Warming Level-by-year relationship for the SSP 3-7.0 emissions scenario is developed by selecting the mean of all individual model Global Warming Level-by-year SSP 3-7.0 relationships assuming all available models have an equal probability of occurring.
- d. If the Commission adopts the Global Warming Level approach and SSP 3-7.0 as the reference scenario, should the Commission also require or recommend the IOUs conduct sensitivity analyses of their results? If yes, what sensitivity analysis method(s) should be required or recommended? Or should the sensitivity analysis approach used by a given IOU be left flexible as long as it is well-described?
  - e. Should the Commission also recommend that, as feasible, other proceedings use the Global Warming Level approach to minimize model bias?
  - f. Should the Commission require or recommend use of the Global Warming Level approach for longer term (*i.e.*, greater than 30 years) investment planning and operational purposes and related applications before this Commission?
  - g. Are there any barriers to implementing the Global Warming Level framework approach? Is the Global Warming Level framework approach sufficiently interpretable and reproducible for CAVA purposes?

#### **4.2.1. Background on Global Warming Levels Approach**

The IPCC’s Sixth Assessment Report identified use of the Global Warming Level approach as a best practice for climate modeling, instead of use of target years. Staff explain that that Global Warming Level approach helps mitigate temperature bias present in a subset of the Coupled Model Intercomparison

Project Phase 6 (CMIP6) models that form the basis of IPCC analyses. Staff state that the Global Warming Level approach separates climate projections from underlying socioeconomic scenario assumptions, as the climate generally acts uniformly at different Global Warming Levels regardless of how society gets itself there.<sup>36</sup>

Staff state that use of the Global Warming Level approach provides a “simple analytical fix” to the bias towards “hot models” that has emerged as the models have become more complex:

The simplest way to cure temperature bias is to develop a ‘consensus Global Warming Level by year’ that is an equally weighted reflection of relevant CMIP6 models [footnote omitted]. Consensus in this context translates to a multi-model mean, with each model holding equal weight in the derivation of the average. Producing a consensus Global Warming Level by year allows CMIP6 users to capture a range of projected future warming when assessing climate impacts in a given year.<sup>37</sup>

#### **4.2.2. Party Comments**

##### **4.2.2.1. Use of Global Warming Level Approach for Climate Adaptation and Vulnerability Assessment Reports**

In comments submitted following the October 2, 2023 workshop, PG&E states it supports the Commission updating the “key” (20-30 years) and “appropriate” (10-20 years and 30-50 years) years approach required in D.20-08-046 to instead require the IOUs to use a Global Warming Level approach to conduct CAVA analyses.<sup>38</sup> PG&E states that it considers the 1.5- and 2-degree

---

<sup>36</sup> Staff Paper at 3.

<sup>37</sup> Staff Paper at 7.

<sup>38</sup> PG&E Opening Comments on October 20, 2023 Ruling at A-1.

centigrade targets for use with the Global Warming Level approach to be appropriate, with the 2-degree centigrade target as the most important given the CAVA's focus on long-lived assets. PG&E requests that the Commission adopt only two Global Warming Level target levels and allow the IOUs the flexibility to consider other targets beyond those. PG&E notes that recent research indicates a roughly 50 percent chance the world will reach 1.5 degrees centigrade warming level by 2033 and a 2 degrees centigrade warming level by 2050.<sup>39</sup>

Following the October 2, 2023 workshop, the Sempra companies state that the Commission should align requirements with what is available in California's Fifth Climate Assessment and should not require the Global Warming Level approach if that isn't available in the Fifth Assessment at the time of their CAVA submittal.<sup>40</sup>

SCE strongly supports updating the target year approach adopted in D.20-08-046 with the Global Warming Level approach. The Global Warming Level approach is superior, SCE states, because it separates temporal and physical uncertainty, allows for a more streamlined characterization of probabilities, maximizes the amount of information considered, accounts for inherent temperature bias in Global Climate Models, and boosts confidence in climate projections by increasing sample size. According to SCE, this leads to greater confidence in projections, including for climatic extremes (low-probability, high-impact events).

SCE recommends the Commission adopt the 1.5 and 2 degrees centigrade above pre-industrial warming levels as key benchmarks, as this aligns with IPCC

---

<sup>39</sup> PG&E Opening Comments on October 20, 2023 Ruling at A-1.

<sup>40</sup> Sempra companies Opening Comments on October 20, 2023 Ruling at 1-2.

research and would help ensure consistency with global and national efforts to address climate change. SCE requests authorization to also adopt a 2.5 degrees centigrade warming level as a longer-term benchmark for planning for beyond 2050.

In response to the Sempra companies' concerns, SCE states that the Global Warming Level approach has been widely adopted and forms the basis of the United States' Fifth National Climate Assessment and the Sixth Assessment Report of the IPCC. SCE states that these reports' adoption of the Global Warming Level approach signals scientific consensus and buy-in at the most reputable scientific levels nationally and internationally. SCE also states that these data, sources, and methods will form the basis of the forthcoming California Fifth Climate Change Assessment.<sup>41</sup>

#### **4.2.2.2. Implementing the Global Warming Level Approach**

Regarding the specifics of implementing a Global Warming Level approach, SCE recommends minor adjustments to the approach summarized in the October 20, 2023 ruling. SCE contends that the following is the best method, because the Global Warming Level-by-year relationship is "used last:"<sup>42</sup>

- a. Select a warming level: Within the Cal-Adapt Analytics Engine, select all available GCMs [Global Climate Models] for the specified benchmark global warming level (*i.e.*, 2°C). This differs from the ruling's approach in that it specifies any (one) model. The advantage of taking all GCMs is that it maximizes sample size and leads to more robust analysis;
- b. Identify the distribution of outcomes: Use data to analyze physical climate response (*i.e.*, average August

---

<sup>41</sup> SCE Reply Comments on October 20, 2023 Ruling at 2.

<sup>42</sup> SCE Opening Comments on October 20, 2023 Ruling at 6.

- temperature at 2°C) reflected in each GCM selected. This differs from the ruling's approach in that the climate projection of interest is calculated prior to analyzing the temporal and physical range of outcomes;
- c. Select an outcome: Calculate (identify) climate projection of interest at specified "risk level" (*i.e.*, 50th percentile outcome for average August temperature at 2°C). This differs from the ruling's approach in that distributional outcome ("risk levels") are determined prior to assigning a Global Warming Level-by-year relationship using a reference scenario; and,
  - d. Define Global Warming Level-by-year relationship: Use the chosen reference scenario (SSP 3-7.0) to define a Global Warming Level-by-year relationship (*i.e.*, 50th percentile outcome for average August temperature in the median year for SSP 3-7.0 reaching 2°C, which would be 2047) to translate Global Warming Level results at 2°C to a 2047 timeframe that can be used to incorporate this projection into utility planning.<sup>43</sup>

PG&E does not provide detailed comments on the appropriate method of implementing the Global Warming Level approach. However, PG&E does recommend that, given that some global climate models are considered to be more representative than others for California and that some models suffer from the "hot model" problem, climate stakeholders and subject matter experts from Cal-Adapt or participants in the Fifth California Climate Change Assessment could align on a subset of the most applicable models to use in any adopted approach.

---

<sup>43</sup> SCE Opening Comments on October 20, 2023 Ruling at 5-6.

The Sempra companies do not comment on methods to implement the Global Warming Level approach but instead emphasize the importance of alignment with local, regional, and state stakeholders.<sup>44</sup>

**4.2.2.3. Use of Global Warming Level Approach in Other Proceedings and for Long-Term Planning**

PG&E expresses concerns about requiring a Global Warming Level approach in other proceedings or planning functions outside of the CAVA, stating that PG&E is still in the early stages of considering how to integrate climate projection datasets from Global Climate Models into other proceedings and utility functions. PG&E recommends utilities create a future target to plan towards in order to integrate use of the Global Warming Level approach.

PG&E states it is not clear what the implications are for integrating a Global Warming Level approach into other proceedings that have “time-bound” processes in contrast to the CAVA, which analyzes decadal scenarios. Thus, PG&E supports using the Global Warming Level approach in the IRP proceeding as an “Alternate” rather than “Conforming” scenario, stating that this would help Load-Serving Entities assess the impacts of climate change on their portfolios relative to a reference case.

PG&E does not currently support piloting a Global Warming Level approach within the High DER proceeding. PG&E states it is still evaluating the role of climate data in that case as well as how the CEC’s IEPR will use climate projections in developing the expected load assumptions.

SCE states that it supports use of the Global Warming Level framework with use of SSP 3-7.0 as the reference scenario for longer-term planning purposes

---

<sup>44</sup> Sempra companies Opening Comments on October 20, 2023 Ruling at 3.

and other proceedings.<sup>45</sup> SCE contends that, while there are unique considerations for how to best incorporate climate projections into filings in other proceedings, the Global Warming Level approach can be implemented in all proceedings that use meteorological data:

Most models used for planning incorporate climate information in relation to a discrete time period (*e.g.*, data representing a single year/season), and a Global Warming Level approach provides this information with higher confidence and fidelity than a target-year approach. Some models, like those used in the IRP, require multi-year time series data from present to 10+ years out. One potential approach to address this requirement is to draw General Circulation Models (GCMs) from the current level of warming (currently estimated to be ~1.1°C) [footnote omitted] and utilize these time series results directly. Outcomes from those time series can then be benchmarked against existing projections for 1.5°C and 2°C. This is an expanding area of climate research as well, so the Commission and IOUs should be open to incorporating advances in the medium-term climate forecasting research. Finally, GRC requests should be the product of planning processes that are climate-informed in their upstream inputs (like demand forecasts).<sup>46</sup>

SCE states that it seeks clarification regarding the phrase “climate-informed forecasting.”

The Sempra companies support consistent guidance on the reference scenario and other criteria for adaptation planning across Commission planning proceedings.<sup>47</sup>

---

<sup>45</sup> SCE Opening Comments on October 20, 2023 Ruling at 9.

<sup>46</sup> SCE Reply Comments on October 20, 2023 Ruling at 4.

<sup>47</sup> Sempra companies Opening Comments on October 20, 2023 Ruling at 4.

#### **4.2.2.4. Timing of Requiring Global Warming Level Approach**

Regarding the timing of when a Global Warming Level approach could be required, PG&E notes the importance of continued IOU reliance on outside climate change subject matter experts and the best available climate science. PG&E states that its May 2024 CAVA filing could not incorporate any new requirements.

SCE comments that IOUs with CAVA reports in preparation should be permitted to align the CAVA's with current requirements: the Global Warming Level requirement should pertain to future CAVA reports, SCE states. The Sempra companies request flexibility on the implementation of the Global Warming Level approach in their first CAVA filings due to the unknown data availability for variables such as wildfire and the unknown timelines needed for integration of the new framework.<sup>48</sup>

#### **4.2.3. Discussion**

We direct IOUs to use the Global Warming Level Approach as generally described by SCE in Section 4.3.2.2 above when preparing their CAVA reports. The IOUs shall apply the Global Warming Level approach to the reference benchmarks of 1.5 and 2 degrees centigrade above pre-industrial warming levels. The IOUs may also model additional scenarios if they wish, such as to 2.5 degrees centigrade above pre-industrial warming levels.

In the event that Cal-Adapt or the California Climate Assessment group updates its recommended use of the Global Warming Level Approach or of the benchmarks of 1.5 and 2 degrees centigrade above pre-industrial warming levels, we direct the IOUs to jointly file a Tier 2 Advice Letter to propose updating our

---

<sup>48</sup> Sempra companies Opening Comments on October 20, 2023 Ruling at 2.

adopted Approach or two benchmark degrees within 90 days of these changes. If an IOU's CAVA is due within six months of a change of Approach or benchmark degrees, the IOU may wait until their next CAVA to incorporate the updated climate science. This is a sound approach that ensures timely attention to any newly recommended Approach or benchmark degrees as well as sufficient opportunity for party comment and staff considerations of the merits of what is largely a technical matter.

If necessary, an IOU may deviate from the specific details of the Global Warming Level approach described in Section 4.3.2.2 above but must in this case describe in detail the method used in its CAVA submittal. This allows reasonable flexibility. As desired, an individual IOU or the IOUs as a group may seek input from Cal-Adapt experts regarding a subset of applicable models to inform its analyses as recommended by PG&E.

As discussed by staff and SCE, the Global Warming Level framework has replaced the target year approach as the best practice to project potential climate futures and avoid bias amongst the global scientific community. The approach has been recommended and used by the IPCC in its Sixth Assessment Report and was applied in the United States' Fifth National Climate Assessment. Requiring this approach will ensure IOU CAVAs remain current with the best scientific methods.

Regarding use of climate projections in other proceedings and for longer term (greater than 30 years) planning purposes, we emphasize the importance of incorporating consistent climate science into all long-term planning and note that proceedings like the IRP Proceeding already do so through long-term resource modeling that incorporates climate data. We additionally recommend that the IOUs consider phasing in use of the Global Warming Level approach, along with

our adopted SSP 3-7.0 reference emissions scenario, into relevant proceeding analyses and longer-term planning processes, ideally by 2027. As mentioned above, the climate science methodologies and data included here should be seen as best practice for long-term planning proceedings. This approach allows for a reasonable transition period in which these issue can be vetted within each individual proceeding while ensuring that analyses remain tied to the best available scientific methods.

The IOUs should consider incorporating climate data into R.20-05-003 (IRP), R.20-01-007 (Long Term Gas Planning), as well as future Long-Term Procurement Plan proceedings, with secondary consideration to R.21-06-017 (High DER proceeding) as further understanding emerges regarding the integration of climate data into the CEC's IEPR process. Prior to 2027, the IOUs should, where relevant, use the adopted SSP 3-7.0 reference emissions scenario in other proceedings and long-term planning as a best practice. As discussed by SCE, the exact details of how the Global Warming Level approach should be reflected in relevant proceeding forecasts and projections may undergo further refinement.

This is a reasonable approach that will provide the IOUs with time to gain experience with the Global Warming Level approach while also prioritizing its eventual application in relevant proceedings and planning.

As feasible, the Sempra companies should strive to apply the Global Warming Level approach starting with their 2025 CAVA report. Working to achieve this will support the Sempra companies transition to the best available scientific methods. Because it has prior experience preparing a CAVA and has strongly supported the Global Warming Level approach, SCE shall first apply this approach in its next CAVA report, required to be submitted in May, 2026.

All CAVA reports submitted in 2026 or later shall apply the Global Warming Level approach.

Any updates to our adopted reference emissions scenario, SSP 3-7.0, approved via the Tier 2 Advice Letter adopted in Section 4.2.2 should also apply to reference emissions scenarios used as best practice in other proceedings and in longer-term infrastructure planning.

### **4.3. Sensitivity Analyses and Bias Correction**

Issue 1.4 asks: Should the Commission refine CAVA requirements adopted in D.19-10-054 and D.20-08-046 including use of sensitivity analyses to explore climate outcomes under various emission scenarios? Questions on this issue in the October 20, 2023 ruling asked:

- a. If the Commission adopts the Global Warming Level approach and SSP 3-7.0 as the reference scenario, should the Commission also require or recommend the IOUs conduct sensitivity analyses of their results? If yes, what sensitivity analysis method(s) should be required or recommended? Or should the sensitivity analysis approach used by a given IOU be left flexible as long as it is well-described?
- b. Should the Commission require IOUs to use a specific approach to correct bias in their CAVA results in the absence of using a [global warming level] framework approach? Or should the Commission authorize flexibility as long as the approach taken is clearly described in the IOU's CAVA report?

#### **4.3.1. Party Comments**

Regarding sensitivity analyses and addressing temperature bias, the IOUs oppose specific Commission requirements in this area and advocate for the Commission allowing flexibility in the way IOUs cure temperature bias. The Sempra companies recommend that the IOUs should be authorized to correct

bias in model temperatures using historical observed temperature data.<sup>49</sup> The Sempra companies note that one method to address bias may be to remove from their analyses models known to have “problematically high climate sensitivities” as evaluated in the IPCC’s Sixth Assessment Report.<sup>50</sup>

PG&E contends that “an overly prescriptive requirement to conduct sensitivity analysis may be counter-productive and would end up creating a process focused on meeting strict requirements instead of allowing the flexibility for utilities to develop the necessary analysis to fully understand its changing risk landscape.”<sup>51</sup> PG&E states it sees sensitivity analyses as more appropriate to perform once potential CAVA climate adaptation investment proposals are screened for potential inclusion as funded projects, not during the CAVA process. PG&E opposes any specific bias correction requirements stating that bias correction should have occurred upstream in the data process.

SCE states that flexibility should be permitted regarding sensitivity analyses, but the Commission should require IOUs to provide a clear and comprehensive description of the approach they choose to employ in their CAVA filings. However, SCE also states that a good way to address uncertainty in climate projections using the Global Warming Level approach is to assess the plausible range of timing within projections at a benchmark level of warming.<sup>52</sup> SCE contends that the IOUs should be permitted to maintain flexibility as to the bias correction methods it utilizes in utility CAVA filings.

---

<sup>49</sup> Sempra companies Opening Comments on October 20, 2023 Ruling at 5.

<sup>50</sup> Sempra companies Opening Comments on October 20, 2023 Ruling at 6.

<sup>51</sup> PG&E Comments on October 20, 2023 Ruling at A-3.

<sup>52</sup> SCE Opening Comments on October 20, 2023 Ruling at 7.

CforAT contends that IOUs must explain why modeling choices were made to allow for review and comment. CforAT recommends that IOUs be required to provide both raw and adjusted CAVA results, as well as a thorough explanation of the approach the IOUs used to correct bias.

In response to CforAT's comments, PG&E states that the qualitative nature of the CAVA assessments, as outlined by D.20-08-046, does not result in raw and adjusted results based on future climate hazards, and again emphasizes that many methodological choices are upstream from the IOU (*e.g.*, with Cal-Adapt). SCE similarly argues that providing raw data will be less relevant to reviewers than providing pertinent input datasets. SCE states that, in its raw form, climate data from California's Fifth Climate Assessment is approximately one to two petabytes of information. Finally, SCE asserts the CAVA filing is the appropriate venue to explain methodologies and rationale.

#### **4.3.2. Discussion**

Regarding sensitivity analysis, we require the IOUs, when using the Global Warming Level approach directed above, to assess and report on the plausible range of timing within projections at a benchmark level of warming. IOUs shall provide this information for, at minimum, the 50th percentile outcomes using the Global Warming Level approach. We authorize and encourage the IOUs to conduct additional sensitivity analyses of their CAVA results as desired, providing a clear and comprehensive description of any additional approach they choose to employ. These are reasonable requirements that will help ensure robust CAVA analyses.

We do not require the IOUs to implement any specific bias correction methods when preparing their CAVA reports. As stated by Staff, the Global

Warming Level approach “helps mitigate temperature bias,”<sup>53</sup> and this inherent correction of bias represented by the Global Warming Level approach is largely sufficient.

However, we direct the IOUs to actively attend to potential areas of bias within their analyses and to act to correct bias observed in their data. When doing so, each IOU shall limit their bias correction methods to peer reviewed approaches (*i.e.*, the best climate science methods available) and shall provide a clear and comprehensive description of the approach taken and their rationale for correcting bias in their CAVA submittal. This is a reasonable approach that will ensure sound analyses as well as flexibility.

#### **4.4. Source Data, Methodologies, Spatial Resolutions and Presentation of Results**

Issue 1.3 of the Phase 2 Scoping Memo asks, should the Commission refine CAVA requirements adopted in D.19-10-054 and D.20-08-046 including regarding guidance on transparency requirements regarding source data, methodologies, assumptions, and models used in CAVA preparations? Issue 1.6 of the Phase 2 Scoping Memo asks, should the Commission refine CAVA requirements adopted in D.19-10-054 and D.20-08-046 including regarding guidance on the presentation of a distribution of results?

Also in this area, questions appended to the Phase 2 Scoping Memo asked:

- a. What additional requirements, if any, should the Commission adopt regarding IOU disclosure of the following in their CAVA reports: Source data (*year, etc.*); Infrastructure data; Methodologies; Assumptions; Models used; and, the Full distribution of variable outcomes (median and tail-ends).

---

<sup>53</sup> Staff Paper at 6.

- b. Should the Commission require the IOUs to conduct CAVA analysis at specific spatial resolutions (45 kilometers (km), 9 km, or 3 km), or require sensitivity analyses across spatial resolutions?
- c. Should the Commission require the IOUs to report their CAVA modeling results across the full distribution of outcomes (*i.e.*, median and tail-ends), or in some other way?

#### **4.4.1. Party Comments**

Regarding disclosure of source data and other aspects of their CAVA analyses, PG&E states that existing Commission guidance in R.18-04-019 requires clear articulation of all of the above listed study elements, excluding reporting of a full distribution of variable outcomes. SBUA and CforAT indicate a preference for transparency and greater information-sharing and broadly supports disclosure requirements that would set out detailed lists of materials that IOUs would be required to disclose in their CAVA Reports.<sup>54</sup> Cal Advocates recommends the Commission require IOUs to disclose how CAVA-identified risks affect risks and mitigations submitted in RAMP reports.

Regarding spatial analyses, PG&E does not support a Commission requirement to conduct CAVA analysis at specific spatial resolutions. PG&E states that utilities need to have the flexibility to conduct resilience analysis at the resolution required for the specific application.<sup>55</sup> The Sempra companies recommend against requiring sensitivity analysis across various spatial resolutions, stating that utilities need to have the flexibility to conduct resilience

---

<sup>54</sup> SBUA Opening Comments on Phase 2 Scoping Memo Questions at 1; CforAT Opening Comments on Phase 2 Scoping Memo at 1-2.

<sup>55</sup> PG&E Comments on Phase 2 Scoping Memo Questions at A-4.

analysis at the resolution required for the specific application.<sup>56</sup> SCE does not support a Commission requirement to conduct CAVA analysis at specific spatial resolutions. SCE states that utilities need to have the flexibility to conduct resilience analysis at the resolution required for the specific application.<sup>57</sup>

Cal Advocates states that the Commission should continue to require CAVA analyses to use the highest possible resolution, consistent with its previous finding that “[a]s much as possible, climate data should provide the geographical resolution and temporal resolution required for the research or planning at hand.”<sup>58</sup>

Regarding presenting a full distribution of outcomes, PG&E does not support a Commission requirement to report the full distribution of outcomes for every asset analyzed in the CAVAs. PG&E states that there is likely little benefit there in a directive to provide climate projection data in CAVA that is divorced from subsequent impact analysis.<sup>59</sup> The Sempra companies support reporting CAVA modeling results across different percentiles (*e.g.*, [percentile] P50, P90, P95, P99) to provide a more comprehensive understanding of the potential risks and uncertainties associated with climate change impacts.<sup>60</sup>

SCE opposes the Commission requiring the IOUs to report their CAVA modeling results across the full distribution of outcomes. To achieve the desired transparency across potential future climate outcomes, SCE suggests the

---

<sup>56</sup> Sempra companies Comments on Phase 2 Scoping Memo Questions at 5.

<sup>57</sup> SCE Opening Comments on Phase 2 Scoping Memo Questions at 10.

<sup>58</sup> Cal Advocates Opening Comments on Phase 2 Scoping Memo Questions at 3, citing D.19-10-054, Finding of Fact 21 at 54.

<sup>59</sup> PG&E Comments on Phase 2 Scoping Memo Questions at A-5.

<sup>60</sup> Sempra companies Opening Comments on Phase 2 Scoping Memo Questions at 6.

Commission consider requiring CAVAs to report a distribution of climate exposure outcomes when possible or a description of why providing the distribution may not be feasible. SCE states that some climate variables may not be mature enough to provide a realistic distribution (for example, extreme events that are not yet well understood) and some applications may require distribution targets guided by risk tolerances considered by IOUs when managing specific asset failure risks (for example, one-in-1,000-year standards for failure of specific systems).

SCE further recommends that any Commission guidance in this area is focused on guiding principles that promote transparency of potential exposure outcomes, and not on specific data requirements, as the latter may not be meaningful under the wide range of climate data use cases.<sup>61</sup>

Cal Advocates supports a Commission requirement for the IOUs to report findings across a full distribution of outcomes. Cal Advocates references the Phase 1 Working Group 2 report that guided D.19-10-054, which stated “[a]nalyzes should, where possible, avoid using simulations from single [Global Climate Models], but rather use analytical approaches that allow exploration of extremes and the range of potential outcomes in order to gage uncertainty and to better understand extreme event likelihood. IOUs should, therefore, report out the full distribution of outcomes.”<sup>62</sup>

---

<sup>61</sup> SCE Opening Comments on Phase 2 Scoping Memo Questions.

<sup>62</sup> Cal Advocates Opening Comments on Phase 2 Scoping Memo Questions at 3, referencing the Administrative Law Judge’s Ruling Regarding March 15, 2019 Working Group 2 Report, Attachment 1, March 15, 2019 at 13.

#### **4.4.2. Discussion**

We require the IOUs to continue to clearly state the data sources, methodologies, assumptions, and models used when presenting their hazard analyses in the CAVAs. When doing so, each IOU shall utilize a table that presents this information in a clear and easy to understand manner. The IOUs are encouraged to coordinate on how best to present this information consistently in table format.

As part of this, the IOUs shall provide transparency into the data sets they have used for their CAVA analyses by clearly naming the infrastructure data set and the last time this was updated. Regarding infrastructure data used for CAVA analyses, the IOUs should use infrastructure data that is consistent with that used for related proceedings and for their Wildfire Mitigation Plans. To the extent that particular guidance from D.20-08-046 was not modified here, IOUs shall continue to adhere to guidance adopted in D.20-08-046 regarding disclosure of data and methodologies.

Requiring inclusion in CAVAs of comprehensive and clear source data summary tables will help ensure transparency and aid in Commission review. Requiring clear labeling of data sets used and use of infrastructure data in CAVAs consistent with that used for related planning proceedings and for their Wildfire Mitigation Plans also provides transparency, minimizes confusion and will support use of the most up-to-date data sets.

We do not adopt here any new prescriptive requirements for spatial resolutions. We agree with the utilities that flexibility is needed given that appropriate spatial resolutions will vary depending on what hazard is being analyzed, and which data is available. However, the IOUs shall generally strive to conduct their CAVA analyses at the smallest spatial resolution feasible for any

given set of IOU infrastructure and provide an explanation for why they have chosen a particular spatial resolution. This is a reasonable approach given the differing data sets available and types of infrastructure likely to be impacted by climactic changes.

We have above required the IOUs to use the Global Warming Level approach for future CAVA filings. Thus, we adopt only modest additional requirements here regarding the presentation of a distribution of results. In addition to the base 50th percentile estimate of plausible range of timing within projections at a benchmark level of warming, each IOU should also utilize the plausible range of results within a given climate projection, as feasible. IOUs should explain why a given range of results was chosen. These are reasonable requirements that will aid in understanding the range of plausible future outcomes and attendant infrastructure impacts.

#### **4.5. Method and Timing of Submittal of Climate Adaptation and Vulnerability Assessment Reports and Workshops**

Task 1, Issue 1.9 of the Phase 2 Scoping Memo asks if the Commission should refine CAVA requirements adopted in D.19-10-054 and D.20-08-046 including... [providing] “additional guidance regarding submittal of CAVA reports, any associated workshops and/or consideration of altering the method of CAVA submittals.”

D.20-08-046 requires the IOUs to submit their completed CAVAs via Tier 2 Advice Letter on May 15, one year before their RAMP applications are due. In May 2022, SCE submitted the first IOU CAVA report in Advice Letter 4793-E, which the Commission’s Deputy Executive Director for Energy and Climate Policy approved via disposition letter on October 7, 2022. Pursuant to

D.20-08-046, PG&E's CAVA was due in May 2024. No intervenors commented on or protested SCE's CAVA report.

The Phase 2 Scoping Memo noted this history and stated that SCE had recommended in its 2022 CAVA submittal that the Commission consider having the IOUs file their CAVAs one year in advance of RAMP applications rather than concurrently as required in D.20-08-046.<sup>63</sup> SCE recommended this change during the March 13, 2023 workshop and Commission Staff also led discussion on this topic.<sup>64</sup>

The October 20, 2023 ALJ ruling asked several questions regarding the need to change the format of the CAVA submittals, including:

- a. Should the Commission continue to require IOUs to submit CAVAs via advice letter?
- b. Should the Commission update the D.20-08-046 requirement to require the IOUs to formally file their CAVA reports in R.18-04-019, or a subsequent climate adaptation rulemaking?
- c. Should the Commission require the IOUs to present their CAVA methods and results in a workshop prior to submittal of their CAVAs via advice letter or prior to formally filing the CAVA?

#### **4.5.1. Party Comments**

The IOUs state that the advice letter process is the correct process for CAVA reports to be submitted to the Commission and this process should continue to be used. SCE states that formal filing of CAVA reports is not warranted because the CAVAs are not vehicles for any requests to the Commission for project or budget approvals. SCE observes that, instead,

---

<sup>63</sup> Phase 2 Scoping Memo at 4.

<sup>64</sup> March 13, 2023 Workshop slides, Attachment C to Phase 2 Scoping Memo at 35 and 53.

D.20-08-046 requires the inclusion of the main CAVA findings in a chapter of the subsequent GRC application, as well as proposals addressing vulnerabilities and a summary of long-term goals. SCE argues that an advice letter process also allows for timely approval of CAVAs so that CAVA findings can be included in the following year's GRC application.

SCE asserts that the current advice letter process and Energy Division staff review is appropriate because the CAVAs are focused on technical, science-based evaluations, data sets and projections, and the advice letter process allows for party comment or protests. SCE argues that the CAVAs do not present any matter for decision to a Commission decisionmaker.

The IOUs all support offering a workshop to present their CAVA reports to parties. However, PG&E states that preparing a CAVA report takes significant time and, as such, comments on methodologies or pre-results would not be overly helpful and the utility would not be able to change methodologies based on this feedback unless the workshop were held well in advance of the filing. For this reason, PG&E states that it could be more useful for workshops presenting key results and findings from utility CAVAs to occur after the required advice letter submittal. SCE asserts that utilities can present a summary of their CAVA findings at a workshop where parties can ask questions. This process could assist parties in responding to an advice letter, SCE contends. The Sempra companies state that a workshop held before submittal of an advice letter would allow parties to voice concerns and provide input and could reduce the likelihood of a protest to an advice letter, which would be administratively efficient.

Cal Advocates, CforAT, and SBUA support requiring utilities to formally file the CAVA reports in R.18-04-019 or a successor proceeding, with a period for

stakeholder comments. Cal Advocates contends that the CAVAs may have a significant impact on utility planning based on specified modeling assumptions and methodologies. Because of this, and due to the subjectivity of interpreting model results and the climate adaptation projects that could come from them, the advice letter process is insufficient, Cal Advocates contends. Cal Advocates asserts that the advice letter process provides limited opportunities for stakeholder input and is mainly appropriate for “utility requests that are expected neither to be controversial nor to raise important policy questions.”<sup>65</sup> Transparency would be increased with a formal filing requirement, Cal Advocates argues. Cal Advocates states that once filed as a report, the CAVA should be approved if it demonstrates the modeling methodologies and results required by the Commission.

CforAT strongly supports a formal filing requirement and suggests that CAVA reports could also be filed in individual IOU-specific proceedings. CforAT states that formal filing process is easier for stakeholders such as community organizations that are not familiar with Commission proceedings. CforAT also notes that a formal filing process better allows for intervenors to be compensated for their efforts. CforAT supports a workshop process and recommends bifurcation of any workshop into expert and lay sessions.

No parties commented on SCE’s suggested modification of the timing of the CAVA filing to occur one year prior to RAMP filings.

#### **4.5.2. Discussion**

We modify the requirement adopted in D.20-08-046 that the IOUs’ CAVA reports be filed concurrent with their RAMP reports to instead require each IOU

---

<sup>65</sup> Cal Advocates Comments on October 20, 2023 ruling at 7, citing General Order 96-B Section 5.1.

to submit its CAVA no later than May 15 of the year prior to their RAMP application filing, on an ongoing basis. This new schedule will begin in 2027 with PG&E, as indicated below. The Sempra companies’ May 2025 and SCE’s May 2026 CAVA filing dates adopted in D.20-08-046 remain in place.

**Table 1: Adopted Years of CAVA Filings and RAMP Filing Years**

| <b>Year</b> | <b>IOU (CAVA Report)</b> | <b>IOU (RAMP Report)</b> |
|-------------|--------------------------|--------------------------|
| 2024        | PG&E                     | PG&E                     |
| 2025        | Sempra companies         | Sempra companies         |
| 2026        | SCE                      | SCE                      |
| 2027        | PG&E                     |                          |
| 2028        | Sempra companies         | PG&E                     |
| 2029        | SCE                      | Sempra companies         |
| 2030        |                          | SCE                      |
| 2031        | PG&E                     |                          |
| 2032        | Sempra companies         | PG&E                     |
| 2033        | SCE                      | Sempra companies         |
| 2034        |                          | SCE                      |
| <i>Etc.</i> | <i>Etc.</i>              | <i>Etc.</i>              |

Requiring CAVA reports to be submitted one year before RAMP reports on an ongoing basis will help ensure careful consideration of climate impacts and attendant climate adaptation needs in RAMP filings and subsequent GRC applications.

This decision does not modify the requirement that the IOUs submit their CAVA reports as Tier 2 Advice Letters. A more developed record is needed before modifying this requirement. We find that the parties have raised important issues regarding the process for submitting and approving the IOUs

CAVAs and will address the issue of CAVA submission in the next phase of this proceeding.

Instead of modifying the CAVA submission process, we require additional processes that should support non-IOU party engagement with the CAVA process. First, we require each IOU to convene a workshop presenting their near-final CAVA report findings and high-level methods no less than 90 days prior to the advice letter submittal due date for their respective CAVA reports. The IOU shall notice this workshop at least 20 days prior to the workshop and shall serve workshop slides at least five days prior to the workshop to the service list of R.18-04-019 or a successor proceeding. Interested stakeholders will be provided with the opportunity to ask questions during the workshop and an opportunity to provide the IOU with informal written comments on the workshop slides no later than five days after the workshop. The IOU must include in its CAVA a short appendix summarizing its dispensation of these informal stakeholder comments. Each IOU shall open the workshop with a short educational session for non-experts regarding climate science terms and concepts that will be utilized during the main portion of the workshop. Additionally, the IOUs are encouraged to work with Energy Division staff and relevant stakeholders on a CAVA format that promotes readability and consistency across IOUs. The IOUs should also provide notice to Tribal government representatives ahead of the workshops, and prior to submission of the Tier 2 Advice Letters containing their CAVA. As noted in the March 13, 2023 Workshop, effective Consultation involves high-level conferences with Tribal leadership and technical staff.

Requiring the IOUs to convene workshops to present their CAVA findings and high-level methods prior to submittal of a Tier 2 Advice Letter containing

the CAVA will help ensure non-IOU party engagement with the CAVAs while also supporting efficient Commission staff review of what is a technical analysis without directly associated funding requests.

#### **4.6. Investor-Owned Utilities' Surveys of Third-Party Contracts for Climate Risk Exposure Information**

The Phase 2 Scoping Memo identifies a series of issues in scope but did not limit consideration of issues to just those named. A question appended to the Phase 2 Scoping Memo asked about the appropriate role of R.18-04-019 to influence system and resource planning, including but not limited to the CAVA survey requirements for third-party contracts adopted in D.20-08-046.

In comments on the Phase 2 Scoping Memo, the IOUs identified the requirement adopted in D.20-08-046 that the IOUs survey of third-party contracts or facilities for climate risk exposure information as meriting reconsideration.

D.20-08-046 states that IOUs shall,

“[i]dentify facilities they have third-party contracts with for power, capacity, or reliability in their vulnerability assessments. During the vulnerability assessment process, IOUs shall communicate with the operators of these third-party contract facilities and ask them to report the facility’s exposure to climate risk. In the vulnerability assessment, the risk assessment shall include any exposure to climate risks that facility operators report, and the IOUs’ contingency planning in case the third-party asset experiences failure due to climate change.”<sup>66</sup>

##### **4.6.1. Party Comments**

PG&E states that it fully supports efforts to make energy system planning processes climate informed and is working towards this objective. However,

---

<sup>66</sup> D.20-08-046 at OP 9.2. OP 14 of D.20-08-046 contains similar requirements.

PG&E recommends the Commission remove the requirement adopted in D.20-08-046 that IOUs survey third-party contracts or facilities for climate risk exposure information. PG&E contends that counterparties do not have high quality, actionable information to share and any supply risk is mitigated by PG&E's existing safeguards for ensuring supply, capacity, and reliability. Additionally, PG&E states that a meaningful analysis of climate risk exposure would require much more in-depth analysis of the particular adaptive capacity of a given counterparty, which seems challenging considering the difficulty of procuring more basic information, and an unnecessary level of effort given existing supply, capacity, and reliability risk mitigations.<sup>67</sup> PG&E states that it has not found the survey responses to be helpful in gathering decision-relevant information. Climate vulnerability analysis is an emerging discipline, and many parties lack the resources and expertise needed to meaningfully respond, PG&E states. SBUA disagrees with PG&E's recommendation regarding subparagraph 2 of OP 9 of D.20-08-046 on the grounds that PG&E's recommendation is not adequately supported.<sup>68</sup>

SCE also supports eliminating this requirement. SCE states that the IOUs represent only a portion of entities who have contracts with third-party providers and IOUs do not have the ability to get full data on risks in the contracting process. Moreover, SCE argues that asking for the information required for evaluation of climate risks may disadvantage an IOU seeking this data in future procurement efforts if this requirement is not being applied consistently across all power procurement market participants. SCE contends

---

<sup>67</sup> PG&E Opening Comments on Phase 2 Scoping Memo Questions at A-12 to A-13.

<sup>68</sup> SBUA Reply Comments on Phase 2 Scoping Memo Questions at 3.

that the CAVA is not the appropriate mechanism for obtaining consistent and meaningful information on these third-party providers' climate risks to support other planning processes and needs, and this activity should be reassigned away from IOUs to appropriate governing agencies.<sup>69</sup>

SCE states that the information it gathered to satisfy this requirement during its first CAVA preparation was not helpful in understanding supply risks to system resiliency. SCE states that, first, inconsistent and/or insufficient level of detail in third parties' responses prevented SCE from performing the risk assessment processes ordered in D.20-08-046. Second, SCE states that data requirements for third-party operators to depict potential climate change risks are new and potentially conflicting, given the supplier-purchaser relationship between these third-party operators and the IOUs requesting climate risk information. SCE states that existing contractual terms may be insufficient to induce third parties to provide a sufficient and consistent level of detail in their responses to assess the reliability impacts of climate exposure on these contracts.

SCE proposes that, instead of requiring surveys of third-party generators, the Commission or state should develop a regulatory framework that governs new and existing power producers' climate impact disclosures. This would facilitate the needed transparency and consistency of disclosure data required to assess the climate risks D.20-08-046 envisioned, SCE states.<sup>70</sup>

#### **4.6.2. Discussion**

We are persuaded by the IOUs' arguments that the requirement from OP 9.2 in D.20-08-046 for IOUs to survey third-party contracts or facilities for

---

<sup>69</sup> SCE Opening Comments on Phase 2 Scoping Memo Questions at 20.

<sup>70</sup> SCE Opening Comments on Phase 2 Scoping Memo Questions at 14.

climate risk exposure information is not currently addressing its intended purpose. Therefore, we hereby eliminate this requirement. The question of how best to capture climate risk information from third-party contracts or facilities may be addressed in a future proceeding.

**5. Linkages Between Climate Adaptation and Vulnerability Assessments and Risk Assessment and Mitigation Phase Filings Including Whether to Reflect Short Term-Climate Risks in Climate Adaptation and Vulnerability Assessments Filings**

Task 1, Issue 2 of the Phase 2 Scoping Memo asks, should the Commission provide additional guidance regarding the CAVAs to support a quantitative assessment of climate risks in RAMP filings? Task 1, Issue 1.7 of the Phase 2 Scoping Memo asks, should the Commission refine CAVA requirements adopted in D.19-10-054 and D.20-08-046 including regarding requiring an additional focus on short-term climate risks (3-5 years and/or 5-10 years)? Related questions appended to the Phase 2 Scoping Memo asked:

- a. Should the Commission adopt additional guidance regarding the CAVAs to support a quantitative assessment of climate risks in RAMP filings? If yes, what additional guidance, requirements or specific CAVA outputs are needed?
- b. Should the Commission require the IOUs to include short-term (*i.e.*, 3-5-year or 5-10-year) climate projections within their CAVA reports?

**5.1. Party Comments**

PG&E supports guidance that clarifies the relationship between CAVAs and the RAMP process. PG&E states that any such guidance must acknowledge the substantial differences between the risk and climate assessment efforts. PG&E recommends that, in the near-term, guidance should focus broadly on

how resilience investment decisions should be made alongside operational risk decisions. PG&E does not support Commission guidance to evaluate short-term climate hazards in the CAVA. PG&E views this as duplicative to RAMP work, as the two timeframes listed (3-5 years or 5-10 years) are essentially the same for the purposes of climate hazard analysis. This is because it is best practice for projection results to be averaged over two to three decades around the target year to avoid overprediction, PG&E asserts.<sup>71</sup>

The Sempra companies state that it would not be beneficial to look at climate projections in the three-to-five-year time frame within CAVA reports. The Sempra companies state that existing Commission guidance on timeframes is consistent with best practice to average two to three decades around the target year for robust predictive value.<sup>72</sup>

SCE states that it would be premature for the Commission to provide guidance or additional requirements regarding specific CAVA outputs to inform RAMP filings at this time. SCE states that requirements to include climate projections for time horizons shorter than 10 years are not necessary in future CAVAs. SCE notes:

Given the uncertainty of when specific climate events will occur, that projections may not show meaningful differences at 5 year timeframe vs a 10 year timeframe (which is why the original CAVA guidance of studying 10-20 years, 20-30 years, and 30-50 year study timeframes is appropriate), and that adaptations pursued within the next 10 years will most likely need to be able to withstand 10-year-out and longer climate conditions, SCE finds the 10-year climate projection horizon to

---

<sup>71</sup> PG&E Opening Comments on Phase 2 Scoping Memo Questions at A-6 to A-8.

<sup>72</sup> Sempra companies Opening Comments on Phase 2 Scoping Memo Questions at 9.

be an appropriate proxy for informing short term needs and investments.<sup>73</sup>

SCE further states that for processes and/or proceedings informed by CAVA findings with shorter time horizons, such as the RAMP filing, flexibility in generating and applying climate projections with a shorter time horizon is needed.

Cal Advocates supports the inclusion of short-term projections (six years) in the CAVA reports to support GRC investment decisions. Cal Advocates argues that the Commission should require CAVAs to detail how each CAVA-identified risk affects computation of the corresponding risks and mitigations submitted in RAMP reports and GRCs. Cal Advocates further states that the “CAVA should disclose details on how the CAVA identified risk affects the Likelihood of Risk Event (LoRE), Consequence of Risk Event (CoRE), and the resultant risk score for RAMP risks. This assessment should rely on the short-term climate projections.”<sup>74</sup> Cal Advocates recommends that the Commission require IOUs to assess each climate change effect and its resultant impact on any associated RAMP risks within the rate case period that the CAVA is submitted:

The Commission should require RAMP, CAVA, and GRC filings to use consistent and common risk assessment practices to efficiently incorporate IOU climate change risk assessment and mitigation development across multiple proceedings... this includes developing cost-benefit ratios for the mitigations proposed in the CAVAs using the CAVA-identified risks.<sup>75</sup>

---

<sup>73</sup> SCE Opening Comments on Phase 2 Scoping Memo Questions at 12.

<sup>74</sup> Cal Advocates Opening Comments on Phase 2 Scoping Memo at 4.

<sup>75</sup> Cal Advocates Opening Comments on Phase 2 Scoping Memo at 5.

## 5.2. Discussion

We note that the recent Phase 3 Decision in the *Rulemaking to Further Develop a Risk-Based Decision-Making Framework for Electric and Gas Utilities* (R.20-07-013) allows IOUs to identify CAVA report inputs and results in RAMP applications. In addition, the Phase 3 Decision also allows the incorporation of analyses of CAVA data to quantitatively estimate the impact of climate change on a given risk and requires the consideration of risk reduction benefits of any climate adaptation investment resulting from CAVA analyses into each IOU's Climate Pilot White Paper. We do not adopt here any modifications to the CAVA reports to facilitate consideration of climate data in RAMP processes nor do we require IOUs to include in their CAVA analyses climate impact analyses over a three-to-five-year timeframe. First, in Section 4.2.3 above, we require IOUs to implement the Global Warming Level approach in CAVA analyses starting in 2026 (SCE) and beyond (all IOUs). Thus, this decision does not require analyses around specific target timeframes (10-20 years; 20-30 years; or 30-50 years).

Second, we concur with the IOUs that the timeframes of 3-5 years and 5-10 years are essentially the same for the purposes of climate hazard analysis. Analytical results would typically be similar across these two timeframes given the need to average across decades to avoid over prediction.

However, if an IOU plans to use CAVA data in the subsequent and related RAMP report, we recommend that the IOU should include the shorter-term data, analysis, and results that its RAMP analysis will rest upon in the preceding CAVA report. This will facilitate consideration of the impact of climate hazards on IOU risks in RAMP reports.

This requirement is reasonable given our nascent understanding of the relationship between these quite different risk assessment processes: CAVA reports assess the risks that climate hazards pose to IOU infrastructure, operations, and services, are based on decadal timeframes, and rely on downscaled global climate data. RAMP reports assess, rank, and discuss mitigation options for risks posed by IOU infrastructure, operations, or services and are primarily based on historical observed data within IOU service territories. The two risk assessment approaches are related, but not identical.

If, over time, RAMP analyses prove unable to capture short-term hazard analysis at the system level in a robust way, we may return to this issue again at a later date.

We do not adopt Cal Advocates recommendations. Because the CAVAs and RAMPs use considerably distinct risk assessment methods and data sources, and address different time periods, requiring inclusion in CAVAs of such details regarding RAMP risks and mitigations is not useful at this time. However, we have above recommended that the IOUs, if they intend to use CAVA climate data in their subsequent assessment of RAMP risks, include in their CAVAs the shorter-term data, analysis, and results that its RAMP analysis will rest upon.

## **6. Guidance Regarding Adaptation Investments Included in General Rate Case or Stand-Alone Applications**

Task 1, Issue 3 of the Phase 2 Scoping Memo asks, should the Commission provide additional guidance regarding inclusion or prioritization of proposed climate adaptation projects in GRC applications or in freestanding climate adaptation investment applications?

D.20-08-046 includes guidance on how the CAVAs must inform infrastructure investment proposals and adopts requirements for adaptation

investments included in GRC filings. However, D.20-08-046 also allows IOUs to propose adaptation investments in stand-alone applications.<sup>76</sup> Regarding including adaptation investments proposed in GRC applications, D.20-08-046 adopts the following:

- a. Requires the IOUs to include in their GRC filings the main takeaways from their CAVAs as a separate section or chapter that contains, at a minimum: 1) a list of climate vulnerabilities, 2) proposals addressing those vulnerabilities (with options), and 3) long-term goals for adapting to climate risks;<sup>77</sup>
- b. States that the CAVAs should identify any challenges the IOUs will face due to climate change and describe possible solutions ranging from easy to difficult but that the specific projects and climate change mitigations themselves will be chosen in the GRC or other proceeding seeking project funding;<sup>78</sup>
- c. States that requests for funding equity needs for DVCs should be included either in the IOU's GRC applications or other separate proceedings;<sup>79</sup>
- d. States that when IOUs begin to seek funding to adapt their infrastructure, operations and services to climate change in DVCs, such requests may include extra treatment, including funding, outreach, and education, to promote equity between communities with low adaptive capacity and those outside DVCs with higher incomes or other indicia of strong ability to adapt to climate change;<sup>80</sup> and

---

<sup>76</sup> D.20-08-046 at 16, 35, and 92-93 and Finding of Fact 26.

<sup>77</sup> D.20-08-046 at OP 12.

<sup>78</sup> D.20-08-046 at Conclusion of Law 56.

<sup>79</sup> D.20-08-046 at Conclusion of Law 11.

<sup>80</sup> D.20-08-046 at Finding of Fact 9.

- e. States that the CAVAs may be used as part of a process for informing the GRC as to climate risks and vulnerabilities the utility will be facing in the long term of 20 to 50 years.<sup>81</sup>

Beyond these points, D.20-08-046 does not provide additional specific guidance as to how IOUs should present adaptation investments resulting from their CAVAs in the GRC nor what information should be provided.

### 6.1. Staff Proposal

Commission Staff presented their *Staff Proposal for Revisions to Climate Adaptation Investment Guidance in R.18-04-019* (Staff Proposal) during the October 2, 2023 workshop. The October 20, 2023 ALJ ruling provided the Staff Proposal for party comment.

The Staff Proposal recommends the following:<sup>82</sup>

#### General Requirements

1. ***Incrementality***: Infrastructure investment proposals that are presented in the CAVA-dedicated chapter of the IOU GRC or a stand-alone application should be termed “CAVA Investment Proposals,”<sup>83</sup> and must be **demonstrably incremental** to those investments approved for reliability, safety, and resiliency purposes in the most recent GRC.
  - a. CAVA Investment Proposals should be defined as “a specific utility proposal to adopt utility infrastructure, operations or services to climate vulnerabilities, drawing on an ‘adaptation option’ identified in the utility’s CAVA. May be proposed in a GRC or a [stand-alone] application. Will generally include a specific proposed funding level.”<sup>84</sup>

---

<sup>81</sup> D.20-08-046 at Finding of Fact 35.

<sup>82</sup> Staff Proposal at 3-8.

<sup>83</sup> See Section 7.1 below for additional discussion regarding a lexicon of terms for R.18-04-019.

<sup>84</sup> Staff Proposal at 1.

2. **Prioritization:** CAVA Investment Proposals should be prioritized for those portions of infrastructure that are classified in the CAVA as high-risk and low-adaptive capacity within the 10-20-year analytical timeframe. If infrastructure deemed as high-risk, low-adaptive capacity in the later analytical timeframes is proposed for investment, the IOUs should provide justification for why the investment is necessary to be made in advance. Such justification should include factors related to the project development timeline, including but not limited to permitting timelines for infrastructure siting and interconnection timelines.

#### CAVA Investment Proposal Information Requirements

When presenting CAVA Investment Proposals either in the CAVA-dedicated chapter of the GRC or in a stand-alone application, the IOUs should provide the following information:

1. **Cost-Effectiveness:** Comparative cost forecasts between the proposed infrastructure investment and alternative adaptation options identified in the CAVA for the purposes of demonstrating that the proposed investment is the least-cost, best-fit option.
2. **Justification of Investment:** Description of the constraints that prevent the CAVA Investment Proposal from being accounted for in the spending categories of (included but not limited to) wildfire mitigation and RAMP, along with a detailed description of the controls the IOU will implement to ensure that costs related to CAVA investments are not duplicative of any other costs presented for approval or already approved by the Commission.

#### CAVA Investment Proposal Sensitivity Analysis Requirements

The IOUs should provide a sensitivity analysis for CAVA Investment Proposals that is supplemental to any sensitivity analyses conducted in the CAVA. Such supplemental sensitivity analysis should be limited to those CAVA Investment Proposals that exceed the specific cost thresholds as outlined below.

1. ***Guiding Principles for Sensitivity Analysis:*** General and flexible guidelines in the form of guiding principles based on Decision-Making Under Deep Uncertainty (DMDU) should be used to determine the scope of required sensitivity analyses for CAVA Investment Proposals at this time [footnotes omitted]. Staff's Proposed Guiding Principles for CAVA Investment Proposal Sensitivity Analysis are that such analyses should:
  - a. Consider multiple climate futures as a way to demonstrate both the likelihood of risk and the ability of the investment to perform reliably;
  - b. Consider key vulnerability thresholds, beyond which systems will have problems or cannot operate effectively; and
  - c. Help decision-makers understand where the deepest sources of uncertainty are in the analysis.
2. ***Criteria for When Sensitivity Analysis is Required:*** The IOUs should apply the proposed CAVA Investment Proposal Sensitivity Analysis Guiding Principles using the same cost thresholds adopted in D.22-12-027,<sup>85</sup> which requires supplemental analysis for specific RAMP programs. The Commission should require IOUs to conduct the proposed sensitivity analysis – and provide the results of the analysis in either the CAVA chapter of its GRC application or in a stand-alone application – for any CAVA Investment Proposal that meets the following criteria:
  - a. The investment was not addressed in the RAMP or wildfire mitigation chapters;
  - b. The IOU justifies the program primarily on the basis of reducing high-climate risk and improving low-adaptive capacity, as identified in the CAVA;
  - c. The investment is associated with the portion of the electric system under Commission jurisdiction (Electric

---

<sup>85</sup> See D.22-12-027, Appendix A at 17, Row 28.

Operations) or with the natural gas transmission or distribution pipeline system or storage facilities (Gas Operations); and

- d. The Commission jurisdictional forecast cost of the program in the GRC or stand-alone application equals or exceeds the following thresholds:
  - PG&E, SCE, and SoCalGas: cumulative \$75 million over four years for capital programs, and \$15 million in the test year for expense programs;
  - For SDG&E, cumulative \$37.5 million over three years for capital programs and \$7.5 million in the test year for expense programs.

The proposed sensitivity analysis should not be required for the following:

- a. Administrative and general programs;
- b. Work requested by other programs; or,
- c. An expense program that is associated with routine operations and maintenance or restoring service after events such as emergency conditions, storms, and unplanned outages.

**3. Approach to Determining Dollar Thresholds:** The following approach should be used to determine whether a CAVA Investment Proposal falls below the dollar thresholds discussed in Section(2)(d) above (“Criteria for Sensitivity Analysis”), and utilities shall not “break up” programs into component parts in order to avoid performing the proposed sensitivity analysis. D.22-12-027 defines “program” as a “CPUC jurisdictional effort within Electric Operations or Gas Operations consisting of projects, activities, and/or functions with a defined scope that is intended to meet a specific objective.”<sup>86</sup>

Regarding CAVA Investment Proposals, the Commission should define “program” for each utility as follows:

---

<sup>86</sup> D.22-12-027, Appendix A at A-17.

- a. PG&E: For PG&E's gas operations and electric distribution operations, programs should be defined at the Maintenance Activity Type (MAT) level and not at levels that further subdivide activities within the MAT. For example, if the MAT includes two sets of activities, both activities together should comprise a program for the purposes of this guidance. Any existing MAT codes for a capital or expense program should be subject to change as new programs or projects are developed and previous programs or projects are discontinued or modified.
- b. SCE: For SCE, programs should be defined at the GRC Activity and Work Breakdown Structure (WBS) levels for expense and capital, respectively, as shown in pages 1 to 19 in the workpapers for SCE-01 in its 2018 GRC Application, A.16-09-001, and not at levels that further subdivide activities within the GRC Activity code and the WBS level. For example, if the GRC Activity code or WBS includes two sets of activities, both activities together should comprise a program for the purposes of this guidance. The activities in each GRC may be different from the ones noted here as new programs or projects are developed and previous programs or projects are discontinued or modified.
- c. SoCalGas/SDG&E:
  - i. Capital Programs: Capital programs should be defined at the budget code level and not at levels that further subdivide activities within the budget code. For example, if the budget code includes two sets of activities, both activities together comprise a program for the purposes of this guidance. Sometimes, a capital program is presented as a series of budget codes. If a capital program is represented by multiple budget codes, SoCalGas and SDG&E should add the sum total of the budget codes for each of the respective capital programs to determine applicability under the capital program dollar threshold identified in 1(d) of this guidance.

- ii. Expense Programs: An expense program should be presented by workpaper, which typically contains a single cost center or a group of cost centers. For purposes of determining applicability under this guidance for an expense program, SoCalGas and SDG&E should respectively review the Test Year request for each workpaper for each utility and if the total expense for the workpaper meets the applicable expense threshold in 1(d) of this guidance, SoCalGas and SDG&E should then determine whether any amounts within the selected workpaper relate to activities that are not required to undergo supplemental sensitivity analysis in accordance with the exclusions in specified in this guidance. Such amounts should be deducted from the total Test Year costs for the workpaper for purposes of determining whether the dollar threshold in 1(d) of this guidance is met.
- iii. General: Any existing budget codes or workpapers for a capital or expense program should be subject to change as new programs or projects are developed and previous programs or projects are discontinued or modified.

## **6.2. Party Comments**

Cal Advocates supports the Staff Proposal and offers some additional recommendations. Cal Advocates recommends the Commission: (a) define “high risk” infrastructure; (b) require IOUs to submit a signed attestation by an officer of the company that funds requested for CAVA Adaptation Investments are incremental to any other requested funds; and, (c) not authorize IOUs to propose adaptation proposals in GRC filings that do not originate with CAVA analyses and that do not comprise “CAVA Investment Proposals” as defined by Staff. Cal Advocates notes that R.20-07-013 is developing methodologies for reflecting climate hazards in the IOUs’ short term risk assessments (RAMP

filings) and that, along with methodologies for longer-term climate adaptation investments adopted in R.18-04-019, should suffice to address climate investment needs. Cal Advocates expresses concern that IOUs should not be permitted to bypass these two robust frameworks when proposing climate adaptation investments as this would be duplicative and unnecessary.

SBUA proposes that that IOUs should be “maximally required to seek climate adaptation-related funding in GRCs as opposed to stand-alone applications,” but is not clear that the “bright line” Cal Advocates proposes is warranted given GRC’s four-year cycles.<sup>87</sup> SBUA proposes that a clear justification for any climate adaptation proposal is the central need.

PG&E opposes Cal Advocates suggestion for an officer attestation in reply comments, stating that this would add an administrative step without adding substantive value. PG&E also opposes Cal Advocates proposal that the Commission should not authorize the IOUs to include adaptation proposals in GRC filings that do not originate with the CAVAs and that do not comprise CAVA Investment Proposals as defined by Staff. PG&E states:

Given that average global temperatures are now projected to surpass the critical policy threshold of 1.5 degrees Celsius as soon as 2029, PG&E asks that the Commission maintain the opportunity for climate resilience investment proposals outside of the four-year rate case cycle. PG&E acknowledges that any such investment proposal would need to be supported by CAVA analysis and subsequent cost-benefit analysis.<sup>88</sup>

CforAT states that it is difficult for smaller intervenors to participate in GRC proceedings and that, regardless of where adaptation proposals are filed,

---

<sup>87</sup> SBUA Reply Comments to October 20, 2023 Ruling at 2-3.

<sup>88</sup> PG&E Reply Comments to October 20, 2023 Ruling at A-3.

the IOUs should include “lay-level” narratives, outlining why the proposed investment(s) are uniquely part of a climate adaptation strategy and how the proposed investment will impact customers in terms of bill impacts and adaptive benefits. SBUA generally supports CforAT’s recommendation in reply comments, but SCE opposes it, stating that a “compliance requirement” of this type would be burdensome and duplicative.

SBUA comments that the Staff’s definition of incrementality is not sufficiently clear. SBUA notes that it understands the term as referring to investments that do not duplicate spending approved, denied, or foregone in a previous proceeding that could not have reasonably been requested in that proceeding, but this definition may be overly restrictive for this context as changing circumstances may justify requesting previously denied costs.

PG&E supports the general direction of the Staff proposal. PG&E supports Staff’s proposal regarding incrementality but states that it is not yet clear how the requirement would apply to investments in capacity and reliability. PG&E does not believe that Staff’s proposal that IOUs compare in the GRC the costs of the IOU’s chosen CAVA adaptation investment versus alternatives is necessary. PG&E does not support Staff’s suggested use of DMDU as a guiding principle to justify incremental CAVA Adaptation Investments, specifically objecting to having to “consider multiple climate futures.” PG&E states that this is a unique requirement not applied to other GRC investments that “may disincentivize proactive climate adaptation.”<sup>89</sup>

PG&E generally supports Staff’s proposals regarding sensitivity analysis and methods to determine dollar thresholds for this, for natural gas and electric

---

<sup>89</sup> PG&E Opening Comments on October 20, 2023 Ruling at A-10.

operations. For other investment categories, however, such as shared services, electric generation, and employee health and safety, PG&E proposes to use the Major Work Categories (MWC) to determine the need for sensitivity analysis based on the investment threshold, rather than the MAT codes proposed by Staff.

SCE generally supports the Staff proposal and provides commentary regarding Staff's suggested requirements for IOU justification of a proposal. SCE notes that some RAMP mitigation measures may have similar safety, reliability and resiliency benefits to CAVA Investment Proposals, particularly regarding wildfire. But, SCE states, RAMP investments aim to reduce the risk of utility-caused wildfires while CAVA Investment Proposals seek to reduce the risk of climate impacts on utility infrastructure.

SCE states that it supports a justification of investments that notes the differences in potential timing, scope, location, or other measure of incrementality as alternative metrics to reliability, safety or resiliency. SCE states that it generally supports use of DMDU but there may be unforeseen challenges in implementing this approach. Therefore, SCE recommends the DMDU approach should be adopted as a guiding best practice rather than a requirement, and only used for the justification of substantial or complex CAVA Investment Proposals. SCE supports Staff's sensitivity analysis criteria but notes that the thresholds identified apply to a three-year cycle and GRC cycles are now four years, so the totals should be modified accordingly.

SCE also recommends the following guiding principles for prioritization of adaptation options:

- a. Address Near Term Risks: 2030 exposure projections validate that the risks these requested measures are meant to address could occur by 2030;

- b. Mitigate Cost of Inaction: The requested adaptations address 2030 climate risks with the highest relative safety, reliability, or financial consequences; and,
- c. Part of Least Regrets Path: Proposed adaptations are not expected to become obsolete as climate projections and analytical methods mature.<sup>90</sup>

The Sempra companies focus on linkages and differences between RAMP risks and CAVA Adaptation Investments in their comments, noting that R.20-07-013 is developing guidelines to reflect the potential impact of climate hazards on short term risks. As such, the Sempra companies support Staff's proposals to the extent they don't conflict with requirements relative to climate hazards and RAMP adopted in R.20-07-013. The Sempra companies request greater flexibility regarding Staff's proposed sensitivity analysis criteria. The Sempra companies note that R.20-07-013 climate-related requirements could mean that RAMP risks in a sense comprise climate-adaptation related investment proposals. The Sempra companies argue that requirements adopted in R.18-04-019 should not inhibit integration of climate risks into RAMP risk assessment processes.

### **6.3. Adopting Staff Proposal With Minor Modifications**

We adopt the Staff Proposal with minor modifications. The IOUs shall adhere to the elements included in the Staff Proposal, which we now call the CAVA Investment Proposal Guidelines (Guidelines), whether offering CAVA Investment Proposals in their GRC applications or in stand-alone applications. The Guidelines are sound and will greatly assist this Commission in ensuring

---

<sup>90</sup> SCE Opening Comments on Phase 2 Scoping Memo Questions at 13.

that only incremental and well-vetted climate adaptation proposals appear before us.

The IOUs should strive to include CAVA Investment Proposals only in their GRC applications, but we do not restrict IOUs to only offering CAVA Investment Proposals in this venue. We agree with PG&E that some flexibility is required given our lack of understanding of exactly how climate impacts will unfold in the future. Regardless of the venue, however – whether offered in GRC or stand-alone applications – all IOU investment proposals aimed at addressing climate adaptation requirements in the 10-20-year or longer timeframe, *i.e.*, “CAVA Investment Proposals,” must be grounded in a CAVA analysis and must strive to adhere to the Guidelines adopted here.

We acknowledge, as reflected in party comments, that our understanding of the nuances of implementing the Guidelines will grow as they are applied in practice. Thus, where opportunities remain for nuanced interpretations – regarding the specific definitions of “incremental”, “high-risk”, or “low-adaptive capacity” – the IOUs shall explain in detail how they applied these terms in the relevant application and why. The Guidelines provide a much-needed structure for IOU presentation of climate adaptation proposals- they are generally very clear and thorough yet provide considerable flexibility. As needed, they can be further refined in the future.

We adopt only minor modifications to the Staff Proposal as follows: First, we adopt Cal Advocates’ suggestion that the IOUs be required to include an officer attestation regarding incrementality for CAVA Investment Proposals. This is a minor additional administrative requirement for IOUs that will assist this Commission in ensuring appropriate cost oversight. Second, we modify the dollar thresholds for when a sensitivity analysis is required by extending Staff’s

proposal from three to four years, which changes the threshold for PG&E and SCE to \$100 million over four years for capital programs and for SDG&E to \$50 million over four years for capital programs. Third, we authorize PG&E to use MWCs to determine the need for sensitivity analysis for the investment categories of shared services, electric generation, and employee health and safety, in addition to the MAT approach, if they wish. For natural gas and electric operations PG&E shall use the MAT categories to determine the need for sensitivity analysis as proposed by Staff. Fourth, although we do not provide specific requirements, the IOUs shall ensure that any CAVA Investment Proposal includes, amongst other information provided, a “lay” narrative explanation sufficiently clear so as to be understandable to parties and Commission staff without specific technical expertise in climate modeling or related fields. These are reasonable modifications that will provide some flexibility in applying the guidelines while supporting party and Commission understanding.

We retain Staff’s proposals regarding the inclusion of comparative cost forecasts for the CAVA Investment Proposals and other adaptation options identified as potentially addressing the climate risk in the CAVA, despite PG&E’s objections to this. Since we are addressing long timeframes, this additional analysis will help us ensure that IOUs are minimizing costs and maximizing adaptation benefits to the extent possible in their proposals. This is a relatively minor requirement and we do not believe that it will disincentivize proactive climate adaptation.

Additionally, we retain Staff’s proposed application of the DMDU principles as part of the Guidelines. Since CAVA Investment Proposals will address long timeframes with uncertain climate conditions, application of a sensitivity analysis that considers multiple potential climate futures will add

analytical rigor and help ensure that the IOUs are being adaptive, flexible, and thoughtful in their proposals for adaptation investments that may in some cases require the expenditure of considerable ratepayer funds. This is reasonable. We note also that Staff only proposed that the DMDU principles be applied to funding requests exceeding identified cost thresholds, thus addressing SCE's concern that the DMDU principles only be applied to the most complex CAVA Investment Proposals. IOUs may describe in their applications any unforeseen challenges in applying the DMDU principles, as suggested by SCE.

SCE and the Sempra companies provide helpful observations regarding the relationship between RAMP risks, which may in the future increasingly reflect climate impacts and/or address climate adaptation requirements needed with 10 years or longer. SCE notes that mitigations to address RAMP risks aim to reduce risks directly related to utility infrastructure, operations, or services, whereas climate adaptation investments seek to reduce risks to utility infrastructure, operations, or services from climate change. As SCE notes, mitigation investments to reduce RAMP risks may likewise also reduce risks to utility infrastructure from climate change, in this way supporting climate adaptation. This is particularly true where a mitigation investment to address a short-term risk produces long-term benefits, for example over a 50 or 60-year timeframe.

Where such potential overlap exists, we require the IOUs in their justification of a CAVA Investment Proposal, to identify protections arising from RAMP mitigation or related resiliency investments that contribute to addressing the climate risk that the CAVA Investment Proposal also seeks to address. In this way, through an analysis of related RAMP mitigation or resiliency investments, the IOUs must ensure incrementality and avoid duplication of costs and

investments. It is reasonable that this analysis also include, as identified by SCE, a discussion of differences in potential timing, scope, location, or other measures of incrementality.

Finally, the requirements adopted here in no way inhibit integration of climate risks into RAMP risk assessment processes, a concern raised by the Sempra companies. As discussed above, the CAVA reports will retain their focus on mid- to long-term climate risks and adaptation options (*i.e.*, 10 years or longer), as shall the related CAVA Investment Proposals. In contrast, RAMP-driven safety mitigations focus on addressing risks during the relevant four-year GRC period. Thus, we see related but different timeframes and risk assessment methods. As discussed above, IOUs should identify RAMP mitigation and resiliency investments that contribute to mitigating the climate risk addressed in the proposal in their CAVA Investment Proposals.

## **7. Other Issues**

### **7.1. Lexicon of Terms**

Task 5, Issue 1 of the Phase 2 Scoping Memo asks, should the Commission consider creating a lexicon of terms related to climate adaptation planning that considers or includes terms used in other proceedings?

Currently, there is no lexicon of key terms for R.18-04-019. This has led to some confusion as terms such as “risk” or “exposure” are relevant for climate adaptation planning as well as for modeling short-term safety risks in RAMP filings. The latter is the focus of R.20-07-013, which does have a lexicon of terms.

Given this, the October 20, 2023 ALJ ruling included a draft list of terms and asked if the Commission should adopt a lexicon for use in R.18-04-019. The ALJ Ruling also asked if parties would be willing to participate in a working group to develop consensus definitions of key terms.

### **7.1.1. Party Comments**

Parties support developing a lexicon of terms for R.18-04-019. The IOUs all expressed willingness to actively participate in a working group to develop such terms. SCE states that parties should work toward harmonizing or combining the terms in this proceeding with that of the lexicon used in R.20-07-013 to facilitate integration between long term and short-term decision making. SCE states that consideration should be given specifically to terms, such as “likelihood,” “consequence,” and “exposure.”

PG&E states that it supports the use of definitions that have either already been established in other Commission proceedings or in the prevailing international policy literature, in this case best represented by the products of the United Nations Framework Convention on Climate Change (UNFCCC). PG&E states that the Commission should limit the number of instances where a term is defined differently across separate Commission proceedings or utility functions. PG&E provides detailed feedback on the draft list of terms provided in the October 20, 2023 ruling.<sup>91</sup>

The Sempra companies support creating a lexicon of terms for use in R.18-04-019 as well as across other proceedings where climate change is considered. The Sempra companies support aligning with IPCC definitions when developing the lexicon. The Sempra companies provide detailed feedback on the draft list of terms provided in the October 20, 2023 ruling.<sup>92</sup>

CforAT recommends that, prior to any formal adoption of a lexicon of R.18-04-019 terms, the Commission should direct any working group convened

---

<sup>91</sup> PG&E Opening Comments on October 20, 2023 Ruling at A-11.

<sup>92</sup> Sempra Companies Opening Comments on October 20, 2023 Ruling at 10.

for the purpose of developing such a lexicon to make a presentation to interested parties who were not part of the working group, including specifically parties without detailed expertise on climate issues. CforAT states that it could add value by providing feedback on a consensus list of terms and definitions for a R.18-04-019 lexicon to indicate which definitions were difficult for lay understanding, implying the need for further refinement of the proposed term or the addition of a lay explanation. CforAT argues that the Commission should consider adopting a lexicon including both technical definitions of terms and definitions geared towards those with a lay understanding.<sup>93</sup>

### **7.1.2. Discussion**

We establish a R.18-04-019 lexicon working group. The IOUs shall jointly convene this group, striving to facilitate the participation of all other interested parties, and shall prepare working group summary documents and generally manage the administrative aspects of the working group. Commission staff may attend working group meetings but are not responsible for administrative tasks to support it.

The working group should strive to develop a list of key terms in this and related proceedings (*e.g.*, R.20-07-013 and R.19-09-009, *etc.*) and to develop consensus definitions for these key terms. The working group shall first consult with IPCC and UNFCCC sources when developing consensus definitions. The list of terms shall include similar terms defined differently in different proceedings (*i.e.*, “risk,” “mitigation,” and “exposure,” *etc.*).

As feasible, the working group shall propose definitions for terms used in R.18-04-019 such that definitions are consistent across proceedings. Where this is

---

<sup>93</sup> CforAT Opening Comments on October 20, 2023 Ruling at 5-6.

not feasible, the working group may propose minor modifications to key terms defined differently across proceedings to aid in understanding, *i.e.*, “climate risk” versus “risk,” and “GHG emissions mitigations” versus “risk mitigations.” The working group may also propose new definitions to terms currently defined differently in different proceedings if the working group asserts that the newly proposed definition could be consistent across multiple proceedings.

The working group shall file its report including consensus definitions and any non-consensus areas no later than one year from issuance of this decision. Prior to doing so, the working group shall invite all parties to a working group session where planned definitions are presented, and feedback sought from parties not participating in the working group on an ongoing basis. This process should seek to identify and improve definitions of terms difficult for lay audiences to understand or add a lay explanation of difficult to understand terms.

Establishing a working group to develop a list of key terms and consensus definitions, to the extent possible, will assist in providing clarity to concepts used in CAVA reports and CAVA Investment Proposals and will help reduce confusion regarding terms across related proceedings.

## **7.2. Additional General Strategies and Guidance for Climate Adaptation**

Task 5, Issue 2 of the Phase 2 Scoping Memo asks, should the Commission consider adopting additional general strategies and guidance for climate adaptation for use by all energy utilities?

### **7.2.1. Party Comments**

PG&E and the Sempra companies state that they consider their work on Wildfire Mitigation Plans to be “no regrets” climate adaptation work. Additionally, PG&E states that its Climate-Informed Design Guidance effort can

be considered a no regrets strategy. PG&E describes this work as a partnership between PG&E's Climate Resilience Team and its Electric Asset Management standards groups. PG&E states that this work seeks to identify PG&E standards that rely on historical meteorological information that should be updated to reflect the impact of climate change. PG&E contends that this is crucial near-term, no-regrets work because updating the underlying standards will enable improved resilience over time as the asset base is replaced with new equipment designed for future conditions.<sup>94</sup>

SCE contends that it is premature to adopt additional strategies and guidance for all IOUs to use at this time. SCE observes that climate science is evolving quickly but gaps remain that preclude IOUs from characterizing key climate events in terms of frequency and magnitude, which are necessary inputs for guiding how IOUs should adapt to these climate events. Additionally, SCE argues that the electric utility industry is just starting to address climate resilience as reflected in an Electric Power Research Institute (EPRI) ClimateREADi multi-year Resilience and Adaptation Initiative, which SCE states is aimed at developing appropriate investment decision frameworks to guide electric utilities' investment decisions. SCE contends that, once key climate science gaps have been addressed, and industry-wide decision-making frameworks widely adopted, the Commission should incorporate these learnings and frameworks in its additional guidance to IOUs for conducting their CAVAs.

With regards to "early actions," SCE states that it found it useful to frame 2030 climate impacts and risks as short-term risks to be addressed as part of a "least regrets" approach of managing climate risks. SCE states that it found the

---

<sup>94</sup> PG&E Opening Comments on Phase 2 Scoping Memo Questions at A-16 to A-17.

2025-2028 GRC cycle to be an appropriate funding mechanism to fund climate adaptation investments aimed at addressing these short-term risks.<sup>95</sup>

The Sempra companies state that the Commission could emphasize the consideration of future climate conditions in the design of infrastructure, particularly infrastructure with relatively long service life as no regrets and/or early actions activities.

### **7.2.2. Discussion**

We do not adopt any early action or no regrets climate adaptation planning requirements for the IOUs at this time. We agree with PG&E that review of infrastructure design and planning standards should comprise a foundational early action activity. We intend to initiate this work, as described in Task 6 of the Phase 2 Scoping Memo, shortly. Task 6 of the Phase 2 Scoping Memo, asks: should the Commission update any General Orders to ensure they appropriately reflect climate adaptation needs? If so, which General Orders merit consideration? What process should be used to update them?

## **8. Summary of Public Comment**

Rule 1.18 of the Commission's Rules of Practice and Procedure (Rules) 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.

No public comments were filed regarding this proceeding.

---

<sup>95</sup> SCE Opening Comments on Phase 2 Scoping Memo Questions at 21-22.

## **9. Comments on Proposed Decision**

The proposed decision of Commissioner Darcie L. Houck in this matter was mailed to the parties in accordance with Pub. Util. Code Section 311 and comments were allowed under Rule 14.3. Comments were filed on July 15, 2024, and reply comments were filed on July 22, 2024, by SBUA, PG&E, CforAT, and SCE. Changes have been made throughout the decision in response to these comments.

## **10. Assignment of Proceeding**

Darcie L. Houck is the assigned Commissioner and Jonathan Lakey is the assigned ALJ in this proceeding.

### **Findings of Fact**

1. The IPCC in its Sixth Assessment Synthesis Report, released on March 20, 2023, used SSPs as the basis of its reference emissions scenarios rather than RCPs, used and recommended use of the Global Warming Level approach rather than a target years approach to benchmark climate scenarios, and increased its emphasis on sensitivity analysis.
2. California's Fifth Climate Change Assessment in turn draws upon a subset of SSPs rather than RCPs as the basis of its emission scenarios.
3. D.19-10-054 adopted potentially contradictory guidance because while it required the IOUs to use RCP 8.5 as the baseline scenario for climate adaptation planning in the CAVAs, investment and operational purposes, it also required the IOUs to align future CAVA analyses with California's Fifth Climate Assessment.
4. SSP 3-7.0 is the appropriate reference scenario for use in CAVA reports, in other proceedings and for long-term infrastructure planning as this will ensure consistency and improve the accessibility of methods and results.

5. For increased consistency and transparency in the use of climate data across cognate proceedings, it is reasonable for this Commission and IOUs to consider integrating climate data into other proceedings: (a) with longer-term planning horizons (longer than five years, as opposed to near-term or real-time); (b) that define grid investment needs or resources to address needs (*i.e.*, those that incorporate load forecasts that are known to be influenced by future climate assumptions); (c) that define investment plans or approaches for long-life assets (*i.e.*, those that address physical infrastructure with asset life longer than 10 years, which will be exposed to future climate conditions); and, (d) that guide planning processes that currently incorporate weather information (*i.e.*, those that incorporate historical weather data and/or assumptions about the future).

6. It is reasonable to authorize the IOUs to submit a Tier 2 Advice Letter to update the reference scenario from SSP 3-7.0 to another scenario in the event that Cal-Adapt and/or the California Climate Assessment group updates its recommended or utilized reference emissions scenario(s).

7. Requiring IOUs to use the Global Warming Level approach to prepare CAVA reports aligns with best scientific practices as seen in the IPCC's Sixth Assessment Report and in the United States' Fifth National Climate Assessment.

8. Requiring the IOUs to use warming levels of 1.5 and 2 degrees centigrade above pre-industrial levels as the basis for their Global Warming Level analyses aligns with scientific best practices and current understanding of future climatic changes.

9. It is reasonable to authorize the IOUs to submit a Tier 2 Advice Letter to update the Global Warming Level Approach or pre-industrial warming level benchmarks in the event that Cal-Adapt or the California Climate Assessment group updates its Approach or pre-industrial warming level benchmarks

because a Tier 2 Advice Letter ensures timely attention to any newly-recommended Approach or pre-industrial warming level benchmarks while allowing sufficient opportunity for party comment and staff consideration of these changes.

10. Authorizing IOUs to deviate from the specific details of Global Warming Level approach described in Section 4.3.2.2 of this decision if it describes in detail the method used in its CAVA submittal allows reasonable flexibility.

11. Recommending that the IOUs consider phasing in use of the Global Warming Level approach, along with our adopted SSP 3-7.0 reference emissions scenario, into relevant proceeding analyses and longer-term planning processes and to achieve this no later than 2027 provides a reasonable transition period while ensuring that analyses remain tied to best available scientific methods.

12. Striving to integrate the Global Warming Level approach into its 2025 CAVA submittal will support the Sempra companies' transition to the best available scientific methods but should not be required.

13. It is feasible to require the IOUs, when using the Global Warming Level approach, to assess and report on the plausible range of timing within projections at a benchmark level of warming, to provide this information for, at minimum, the 50th percentile outcomes, and include a plausible range of results within a given climate projection.

14. Requiring IOUs to explain why a given range of results was chosen helps ensure robust analyses and will improve understanding of the range of plausible future outcomes and attendant infrastructure impacts.

15. Requiring inclusion in the CAVAs of comprehensive and clear source data summary tables will help ensure transparency and aid in Commission review.

16. Requiring clear labeling of data sets used and use of infrastructure data in CAVAs consistent with that used for related proceedings and for their Wildfire Mitigation Plans also provides transparency, minimizes confusion and will support use of the most up-to-date data sets.

17. Flexibility regarding the spatial resolution of analyses within the CAVAs is reasonable given that the appropriate spatial resolution will vary depending on what hazard is being analyzed, and which data is available.

18. Requiring CAVA reports to be submitted one year before RAMP reports will help ensure careful consideration of climate impacts and attendant climate adaptation needs in RAMP filings and subsequent GRC applications.

19. Requiring the IOUs to convene workshops to present their CAVA findings and high-level methods prior to submittal of a Tier 2 Advice Letter containing the CAVA will help ensure non-IOU party engagement with the CAVAs while also supporting efficient Commission staff review of what is a technical analysis without directly associated funding requests.

20. The third-party contract or facilities surveys that the IOUs are required to undertake under OP 9.2 of D.20-08-046 are not currently addressing their intended purpose because third-party providers often do not have high quality, actionable information to share.

21. If an IOU plans to use CAVA data in the subsequent and related RAMP report, requiring that IOU include the shorter-term data, analysis, and results that its RAMP will rest upon in the preceding CAVA report will facilitate consideration of the impact of climate hazards on IOU risks in RAMP reports.

22. CAVA and RAMP risk analyses are not identical, and we have a nascent understanding between their quite different risk assessment processes.

23. Staff's proposed CAVA Investment Proposal Guidelines are sound and adopting them with minor modifications will greatly assist this Commission in ensuring that only incremental and well-vetted climate adaptation proposals appear before us.

24. Our understanding of the nuances of implementing the Guidelines will grow as they are applied in practice, thus some flexibility regarding interpretations of terms used in the Guidelines is appropriate, if clearly explained.

25. Adopting minor modifications to Staff's proposed Guidelines will support additional cost oversight and party and Commission understanding while also providing the IOUs with some flexibility in applying the Guidelines.

26. Requiring the inclusion of comparative cost forecasts for alternative adaptation options in CAVA Investment Proposals will help us ensure that IOUs are minimizing costs and maximizing adaptation benefits, to the extent possible, and is a relatively minor requirement that does not appear to disincentivize proactive climate adaptation.

27. Requiring sensitivity analyses in CAVA Investment Proposals that consider multiple potential climate futures will add analytical rigor and help ensure that the IOUs are being adaptive, flexible, and thoughtful in their proposals for adaptation investments that may in some cases require the expenditure of considerable ratepayer funds.

28. Requiring IOU CAVA Investment Proposals to identify protections arising from RAMP mitigation or related resiliency investments that contribute to addressing the climate risk in question will help ensure a thorough analysis of related RAMP mitigation or resiliency investments, incrementality, and avoid duplication of costs and investments.

29. Establishing a working group to develop a list of key terms and consensus definitions, to the extent possible, as described in Section 7.1.2 will assist in providing clarity to concepts used in CAVA reports, CAVA Investment Proposals, climate modeling integrated into other proceedings and climate modeling integrated into IOU long-term infrastructure planning and will help reduce confusion regarding terms across related proceedings.

30. The current statutory deadline for this proceeding is December 31, 2024, but Task 6 of Phase 2 regarding General Orders remains pending.

### **Conclusions of Law**

1. The Commission should adopt SSP 3-7.0 as the reference GHG emissions scenario for use in the CAVAs, proceedings other than R.18-04-019 and in long-term infrastructure investment planning.

2. The Commission should adopt the prioritization criteria identified in Finding of Fact 5 and should direct the IOUs to consider integrating climate data into the following proceedings: R.20-05-003 (IRP proceeding), R.20-01-007 (Long Term Natural Gas Planning proceeding), and future Long-Term Procurement Plan proceedings.

3. The Commission should authorize the IOUs to submit a Tier 2 Advice Letter to update the reference scenario from SSP 3-7.0 to another scenario in the event that Cal-Adapt and/or the California Climate Assessment group updates its recommended or utilized reference emissions scenario(s). Any update to SSP 3-7.0 as the reference scenario approved by Commission staff or the full Commission should apply across all RAMP and GRC proceedings and for the IOUs' long-term infrastructure planning.

4. The Commission should require SCE to use the Global Warming Level approach starting with its 2026 CAVA submittal and should require all IOUs to

use this approach starting in 2026 and should encourage but not require the Sempra companies to use this approach starting in 2025.

5. The Commission should authorize the IOUs to submit a Tier 2 Advice Letter to update the Global Warming Level Approach or two benchmark degrees to another Approach or two benchmark degrees in the event that Cal-Adapt or the California Climate Assessment group updates its recommended or utilized Approach or two benchmark degrees. Any update to the Global Warming Approach and/or 1.5 and 2 degrees centigrade above pre-industrial warming levels approved by Commission staff or the full Commission should apply across all RAMP and GRC proceedings and for the IOUs' long-term infrastructure planning.

6. The Commission should recommend that the IOUs consider phasing in use of the Global Warming Level approach, along with our adopted SSP 3-7.0 reference emissions scenario, into relevant proceeding analyses and longer-term planning processes.

7. The Commission should require the IOUs, when using the Global Warming Level approach, to assess and report on the plausible range of timing within projections at a benchmark level of warming, to provide this information for, at minimum, the 50th percentile outcomes, and include a plausible range of results within a given climate projection, as feasible. IOUs should explain why a given range of results was chosen.

8. The Commission should recommend that the IOUs consider phasing in use of the Global Warming Level approach, along with our adopted SSP 3-7.0 reference emissions scenario, into relevant proceeding analyses and longer-term planning processes.

9. The Commission should encourage and authorize additional sensitivity analysis approaches and inclusion in the CAVA of a clear and comprehensive description of any additional approach employed.

10. The Commission should require the IOUs to include in their CAVAs comprehensive and clear source data summary tables, should require the IOUs to clearly name the infrastructure data set used and the last time it was updated, and should require the IOUs to base their CAVAs on infrastructure data that is consistent with that used for related planning proceedings and for their Wildfire Mitigation Plans.

11. The Commission should require the IOUs to generally strive to conduct their CAVA analyses at the smallest spatial resolution feasible for any given set of IOU infrastructure.

12. The Commission should update the guidance adopted in D.20-08-046 to require IOUs to submit their CAVA reports on May 15, one year before each IOU's RAMP filing is due, rather than concurrent with RAMP filings, starting with PG&E's next CAVA in 2027.

13. The Commission should require each IOU to convene a workshop presenting their near-final CAVA report findings and high-level methods no less than 90 days prior to the advice letter submittal due date for their respective CAVA reports, require each IOU to notice this workshop at least 20 days prior to the workshop and to serve workshop slides at least five days prior to the workshop to the service list of R.18-04-019 or a successor proceeding, to provide workshop attendees with the opportunity to ask questions during the workshop, to provide an opportunity for parties to submit to the IOU informal written comments on the workshop slides no more than five days after the workshop, to include in its CAVA a short appendix summarizing its dispensation of these

informal stakeholder comments, and to open the workshop with a short educational session for non-experts regarding climate science terms and concepts that will be utilized during the main portion of the workshop.

14. The requirement established in OP 9.2 of D.20-08-046 that the IOUs conduct third-party contract or facilities surveys for climate risk exposure information should be eliminated.

15. The Commission should adopt Staff's proposed CAVA Investment Proposal Guidelines with the following modifications, and should require the IOUs to adhere to the Guidelines for all climate adaptation-related investments aimed at addressing climate adaptation requirements in the 10-20-year or longer timeframe, whether included in a GRC or a stand-alone application: (a) the IOU shall include an officer attestation regarding incrementality for CAVA Investment Proposals; (b) modification of the dollar thresholds for when a sensitivity analysis is required by extending Staff's proposal from three to four years, which changes the threshold for PG&E and SCE to \$100 million over four years for capital programs and for SDG&E to \$50 million over four years for capital programs; (c) authorizing PG&E to use MWCs to determine the need for sensitivity analysis for the investment categories of shared services, electric generation, and employee health and safety, in addition to the MAT approach, if they wish; (d) requiring the IOUs to include in their proposal a "lay" narrative explanation sufficiently clear so as to be understandable to parties and Commission staff without specific technical expertise in climate modeling or related fields; and (e) requiring the IOUs in their justification of a CAVA Investment Proposal, to identify protections arising from RAMP mitigation or related resiliency investments that contribute to addressing the climate risk that the CAVA Investment Proposal also seeks to address.

16. The Commission should establish a lexicon working group for R.18-04-019 with the scope set forth in Section 7.1.2 and should require the IOUs to jointly file a working group report no later than one year from issuance of this decision.

## **O R D E R**

### **IT IS ORDERED** that:

1. Pacific Gas and Electric Company (PG&E), Southern California Edison Company, Southern California Gas Company, and San Diego Gas & Electric Company (collectively, the IOUs) shall, on an ongoing basis, submit to the Commission's Energy Division as Tier 2 Advice Letters the Climate Adaptation and Vulnerability Assessments (CAVA) two years before the filing date of their general rate case applications. The IOUs shall, on the same date, serve their CAVAs to the service list of this proceeding (or a successor proceeding) and to the service list of their most recent Risk Assessment Mitigation Phase proceedings. This requirement begins with PG&E's next CAVA, which shall be submitted in 2027. This Ordering Paragraph supersedes in its entirety OP 11 of D.20-08-046.

2. Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company, and San Diego Gas & Electric Company (collectively, IOUs) shall use the Shared Socioeconomic Pathway (SSP) 3-7.0 emissions scenario as the reference scenario for use in the Climate Adaptation and Vulnerability Assessments ordered in Decision (D.) 20-08-046, Ordering Paragraph (OP) 9. The IOUs shall submit to the California Public Utilities Commission (Commission) a Tier 2 Advice Letter to update the reference scenario from SSP 3-7.0 to another scenario in the event that Cal-Adapt or the California Climate Assessment group updates its recommended or utilized reference emissions scenario(s), no later than 90 days after such an event.

Approval by the full Commission or Commission staff, via the advice letter approval process, of an update to SSP 3-7.0 as the reference scenario shall apply across all Risk Assessment and Mitigation Phase and General Rate Case proceedings and for IOU long-term infrastructure planning. The requirements of this Ordering Paragraph supersede those adopted in D.19-10-054 at OPs 3, 4, and 6 with the exception that the requirement of OP 3 of D.19-10-054 that third party analyses or datasets used by the IOUs should continue to be derived from or based on the same climate scenarios and projections as the most recent Statewide Climate Change Assessment remains in place.

3. Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company, and San Diego Gas & Electric Company should, where relevant, integrate climate forecasts using the Shared Socioeconomic Pathway (SSP) 3-7.0 reference emissions scenario into other proceedings: (a) with longer-term planning horizons (longer than five years, as opposed to near-term or real-time); (b) that define grid investment needs or resources to address needs (*i.e.*, those that incorporate load forecasts that are known to be influenced by future climate assumptions); (c) that define investment plans or approaches for long-life assets (*i.e.*, those that address physical infrastructure with asset life longer than 10 years, which will be exposed to future climate conditions); and, (d) that guide planning processes that currently incorporate weather information (*i.e.*, those that incorporate historical weather data and/or assumptions about the future).

4. Applying the criteria set forth in Ordering Paragraph 2, Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company, and San Diego Gas & Electric Company should, where relevant, prioritize in the short- to medium-term integrating climate forecasts based on the

Shared Socioeconomic Pathway 3-7.0 reference emissions scenario into the following proceedings: Rulemaking (R.) 20-05-003 (Integrated Resource Planning proceeding), R.20-01-007 (Long Term Natural Gas Planning proceeding), and future Long-Term Procurement Plan proceedings.

5. Pacific Gas and Electric Company, Southern California Gas Company, and San Diego Gas & Electric Company shall use the Global Warming Level approach discussed in this decision, generally employing the methodology indicated in Section 4.3.2.2 of this decision, in any Climate Adaptation and Vulnerability Assessment submitted in 2026 or later.

6. Southern California Edison Company shall use the Global Warming Level approach in its Climate Adaptation and Vulnerability Assessments starting in 2025, generally employing the methodology indicated in Section 4.3.2.2 of this decision.

7. Southern California Gas Company and San Diego Gas & Electric Company are encouraged but not required to use the Global Warming Level approach starting in 2025.

8. For Climate Adaptation and Vulnerability Assessments (CAVA), Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company, and San Diego Gas & Electric Company shall conduct their CAVAs using, at minimum, the benchmark global warming levels of 1.5 and 2 degrees centigrade above pre-industrial levels and may analyze levels beyond that.

9. When using the Global Warming Level approach, Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company, and San Diego Gas & Electric Company (collectively, IOUs) shall assess and report on the plausible range of timing within projections at a

benchmark level of warming, and shall provide this information for, at minimum, the 50th percentile outcomes, and, to the extent possible, include a plausible range of results within a given climate projection, as feasible. IOUs should explain why a given range of results was chosen.

10. Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company, and San Diego Gas & Electric Company (collectively, IOUs) shall include in their Climate Adaptation and Vulnerability Assessment (CAVA) comprehensive and clear source data summary tables as discussed in this decision, shall clearly name the infrastructure data set used and the last time it was updated, shall base their CAVAs on infrastructure data that is consistent with that used for related proceedings and for their Wildfire Mitigation Plans, and shall generally strive to conduct their CAVA analyses at the smallest spatial resolution feasible for any given set of IOU infrastructure.

11. Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company, and San Diego Gas & Electric Company (collectively, IOUs) shall each convene a workshop presenting their near-final Climate Adaptation and Vulnerability Assessment (CAVA) findings and high-level methods no less than 90 days prior to the advice letter submittal due date for their respective CAVA reports, shall notice this workshop at least 20 days prior to the workshop and to serve workshop slides at least five days prior to the workshop to the service list of Rulemaking 18-04-019 or a successor proceeding, shall provide workshop attendees with the opportunity to ask questions during the workshop, shall provide an opportunity for parties to submit to the IOU informal written comments on the workshop slides no more than five days after the workshop, shall include in its CAVA a short appendix summarizing its dispensation of these informal stakeholder comments, and shall

open the workshop with a short educational session for non-experts regarding climate science terms and concepts that will be utilized during the main portion of the workshop.

12. Ordering Paragraph 9.2 of Decision 20-08-046 is rescinded.

13. Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company, and San Diego Gas & Electric Company shall adhere to the Climate Adaptation and Vulnerability Assessment (CAVA) Investment Proposal Guidelines included in Attachment A when proposing climate adaptation investments based on their CAVA analyses.

14. A Rulemaking 18-04-019 lexicon working group is established with the scope indicated in this decision. Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company, and San Diego Gas & Electric Company shall jointly convene this group and shall to jointly serve and file a working group report no later than one year from issuance of this decision.

15. Rulemaking 18-04-019 remains open.

This order is effective today.

Dated August 1, 2024, at San Francisco, California.

ALICE REYNOLDS

President

DARCIE L. HOUCK

JOHN REYNOLDS

KAREN DOUGLAS

Commissioners

Commissioner Matthew Baker recused himself and did not participate in the vote of this item.

# **ATTACHMENT A**

## **CLIMATE ADAPTATION AND VULNERABILITY ASSESSMENT INVESTMENT PROPOSAL GUIDELINES**

## **Attachment A: Climate Adaptation and Vulnerability Assessments Investment Proposal Guidelines**

### General Requirements

1. ***Incrementality:*** Infrastructure investment proposals that are presented in the CAVA-dedicated chapter of the IOU GRC or a stand-alone application are termed “CAVA Investment Proposals,” and must be **demonstrably incremental** to those investments approved for reliability, safety, and resiliency purposes in the most recent GRC.
  - a. The IOU shall append an officer’s attestation to the proposal verifying the incrementality of the CAVA Investment Proposal.
  - b. CAVA Investment Proposals are defined as “a specific utility proposal to adopt utility infrastructure, operations or services to climate vulnerabilities, drawing on an ‘adaptation option’ identified in the utility’s CAVA. May be proposed in a GRC or a stand-alone application. Will generally include a specific proposed funding level.”
2. ***Prioritization:*** CAVA Investment Proposals must be prioritized for those portions of infrastructure that are classified in the CAVA as high-risk and low-adaptive capacity within the 10-20-year analytical timeframe. If infrastructure deemed as high-risk, low-adaptive capacity in the later analytical timeframes is proposed for investment, the IOU must provide justification for why the investment is necessary to be made in advance. Such justification must include factors related to the project development timeline, including but not limited to permitting timelines for infrastructure siting and interconnection timelines.
3. The CAVA Investment Proposal will include a “lay” narrative explanation sufficiently clear so as to be understandable to parties and Commission staff without specific technical expertise in climate modeling or related fields.

CAVA Investment Proposal Information Requirements

When presenting CAVA Investment Proposals either in the CAVA-dedicated chapter of the GRC or in a free-standing application, the IOUs must provide the following information:

1. ***Cost-Effectiveness:*** Comparative cost forecasts between the proposed infrastructure investment and alternative adaptation options identified in the CAVA for the purposes of demonstrating that the proposed investment is the least-cost, best-fit option.
2. ***Justification of Investment:*** Description of the constraints that prevent the CAVA Investment Proposal from being accounted for in the spending categories of (included but not limited to) wildfire mitigation and RAMP, along with detailed description of the controls the IOU will implement to ensure that costs related to CAVA investments are not duplicative of any other costs presented for approval or already approved by the Commission.

CAVA Investment Proposal Sensitivity Analysis Requirements

The IOUs must provide a sensitivity analysis for CAVA Investment Proposals that is supplemental to any sensitivity analyses conducted in the CAVA. Such supplemental sensitivity analysis should be limited to those CAVA Investment Proposals that exceed the specific cost thresholds as outlined below.

1. ***Guiding Principles for Sensitivity Analysis:*** General and flexible guidelines in the form of guiding principles based on Decision-Making Under Deep Uncertainty (DMDU) must be used to determine the scope of required sensitivity analyses for CAVA Investment Proposals at this time [footnotes omitted]. Staff's Proposed Guiding Principles for CAVA Investment Proposal Sensitivity Analysis are that such analyses should:
  - a. Consider multiple climate futures as a way to demonstrate both the likelihood of risk and the ability of the investment to perform reliably;

- b. Consider key vulnerability thresholds, beyond which systems will have problems or cannot operate effectively; and
  - c. Help decision-makers understand where the deepest sources of uncertainty are in the analysis.
2. ***Criteria for When Sensitivity Analysis is Required:*** The IOUs must apply the proposed CAVA Investment Proposal Sensitivity Analysis Guiding Principles using the same cost thresholds adopted in D.22-12-027,<sup>96</sup> which requires supplemental analysis for specific RAMP programs. The Commission requires IOUs to conduct the proposed sensitivity analysis – and provide the results of the analysis in either the CAVA chapter of its GRC application or in a stand-alone application – for any CAVA Investment Proposal that meets the following criteria:
- a. The investment was not addressed in the RAMP or wildfire mitigation chapters;
  - b. The IOU justifies the program primarily on the basis of reducing high-climate risk and improving low-adaptive capacity, as identified in the CAVA;
  - c. The investment is associated with the portion of the electric system under Commission jurisdiction (Electric Operations) or with the natural gas transmission or distribution pipeline system or storage facilities (Gas Operations); and
  - d. The Commission jurisdictional forecast cost of the program in the GRC or stand-alone application equals or exceeds the following thresholds:
    - PG&E, SCE, and SoCalGas: cumulative \$100 million over four years for capital programs, and \$15 million in the test year for expense programs;

---

<sup>96</sup> See D.22-12-027, Appendix A at 17, Row 28.

- For SDG&E, cumulative \$50 million over four years for capital programs and \$7.5 million in the test year for expense programs.

The proposed sensitivity analysis is not required for the following:

- a. Administrative and general programs;
  - b. Work requested by other programs; or,
  - c. An expense program that is associated with routine operations and maintenance or restoring service after events such as emergency conditions, storms, and unplanned outages.
3. ***Approach to Determining Dollar Thresholds:*** The following approach will be used to determine whether a CAVA Investment Proposal falls below the dollar thresholds discussed in Section(2)(d) above (“Criteria for Sensitivity Analysis”), and utilities shall not “break up” programs into component parts in order to avoid performing the proposed sensitivity analysis. D.22-12-027 defines “program” as a “CPUC jurisdictional effort within Electric Operations or Gas Operations consisting of projects, activities, and/or functions with a defined scope that is intended to meet a specific objective.”<sup>97</sup>

Regarding CAVA Investment Proposals, the Commission defines “program” for each utility as follows:

- a. PG&E: For PG&E’s gas operations and electric distribution operations, programs is defined at the Maintenance Activity Type (MAT) level and not at levels that further subdivide activities within the MAT. For example, if the MAT includes two sets of activities, both activities together should comprise a program for the purposes of this guidance. Any existing MAT codes for a capital or expense program is subject to change as new programs or projects are developed and previous programs or projects are discontinued or modified. For

---

<sup>97</sup> D.22-12-027, Appendix A at A-17.

shared services, electric generation, and employee health and safety, PG&E may use the Major Work Categories (MWCs) to determine the need for sensitivity analysis based on the investment threshold.

- b. SCE: For SCE, programs are defined at the GRC Activity and Work Breakdown Structure (WBS) levels for expense and capital, respectively, as shown in pages 1 to 19 in the workpapers for SCE-01 in its 2018 GRC Application, A.16-09-001, and not at levels that further subdivide activities within the GRC Activity code and the WBS level. For example, if the GRC Activity code or WBS includes two sets of activities, both activities together should comprise a program for purposes of this guidance. The activities in each GRC may be different from the ones noted here as new programs or projects are developed and previous programs or projects are discontinued or modified.
- c. SoCalGas/SDG&E:
  - i. Capital Programs: Capital programs are defined at the budget code level and not at levels that further subdivide activities within the budget code. For example, if the budget code includes two sets of activities, both activities together comprise a program for the purposes of this guidance. Sometimes, a capital program is presented as a series of budget codes. If a capital program is represented by multiple budget codes, SoCalGas and SDG&E should add the sum total of the budget codes for each of the respective capital programs to determine applicability under the capital program dollar threshold identified in 1(d) of this guidance.
  - ii. Expense Programs: An expense program must be presented by workpaper, which typically contains a single cost center or a group of cost centers. For purposes of determining applicability under this guidance for an expense program, SoCalGas and SDG&E should respectively review the Test Year

request for each workpaper for each utility and if the total expense for the workpaper meets the applicable expense threshold in 1(d) of this guidance, SoCalGas and SDG&E should then determine whether any amounts within the selected workpaper relate to activities that are not required to undergo supplemental sensitivity analysis in accordance with the exclusions in specified in this guidance. Such amounts should be deducted from the total Test Year costs for the workpaper for purposes of determining whether the dollar threshold in 1(d) of this guidance is met.

- d. General: Any existing budget codes or workpapers for a capital or expense program are subject to change as new programs or projects are developed and previous programs or projects are discontinued or modified.

**(END OF ATTACHMENT A)**