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**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
(Filed April 26, 2018)

**SOUTHERN CALIFORNIA GAS COMPANY'S (U 904 G)
NOTICE OF AVAILABILITY OF TOPIC 5 WORKSHOP REPORT
AND APPENDICES**

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January 15, 2020

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OF THE STATE OF CALIFORNIA**

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To All Parties of Record in R.18-04-019:

Pursuant to Rule 1.9 of the Rules of Practice and Procedure of the California Public Utilities Commission (Commission), Southern California Gas Company (SoCalGas) hereby provides this Notice of Availability of the Topic 5 Workshop Report and Appendices filed with the Commission and served via this email on the official service list of R.18-04-019 on January 15, 2020.

The referenced submittal can be found on SoCalGas' website at:

<https://socalgas.com/regulatory/r-18-04-019>

Individuals may receive a paper copy of the Topic 5 Workshop Report and Appendices by directing requests in writing to:

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January 15, 2020

Order Instituting Rulemaking to
Consider Strategies and Guidance for
Climate Change Adaptation (R.18-04-
019): Working Group Session Report
on Topic 5 “Climate Change
Adaptation Decision-Making
Framework”

REPORT 4 OF 4

PREPARED BY SOUTHERN CALIFORNIA GAS COMPANY

DECEMBER 2019

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Introduction

This report describes and summarizes key issues addressed during the Topic 5 Working Group discussions to develop a climate adaptation decision-making framework as part of the Order Instituting Rulemaking to Consider Strategies and Guidance for Climate Change Adaptation (OIR) at the California Public Utilities Commission (CPUC). This report is the last of four reports that will be issued on the five topics in the OIR.

For this topic, the Working Group met at CPUC headquarters in San Francisco on November 15, 2019. The meeting was open to the public, and parties and non-parties to the proceeding participated.

Background and Framing Questions

Context for the Working Group Session Report

On April 26, 2018, the Commission adopted the Order Instituting Rulemaking (OIR or Rulemaking) to Consider Strategies and Guidance for Climate Change Adaptation (R.18-04-019). Phase 1 of this proceeding addressing electric and natural gas utilities considers:

- *How to define climate change adaptation for the electricity and natural gas utilities.*
- *Ways to address climate change adaptation issues in Commission proceedings and activities to ensure safety and reliability of utility operations.*
- *Data, tools, and resources necessary for utility planning and operations related to climate adaptation.*
- *Risks facing the electric and natural gas utilities with respect to climate change adaptation and the magnitudes of these risks.*
- *Guidance to electric and gas utilities on how to incorporate climate change adaptation into their planning and operations.*

The Commission posed a set of questions in the OIR. Parties filed their Comments on the OIR and responses to the questions on June 6, 2018.

On October 10, 2018, Assigned Commissioner Liane Randolph issued a Scoping Memo and Ruling for Phase 1. The Scoping Memo specified parties discuss issue areas and relevant questions in the proceeding in Working Groups followed by session reports summarizing the Working Group conversations. The Scoping Memo stated that “...it is not a goal at this time to reach consensus among participants but rather to develop a full understanding of the interplay of factors and externalities within each question, and to develop a range of recommendations that may be considered for adoption. The intent is to issue a guidance document to aid in utility planning for climate change adaptation.”¹

As part of this proceeding, the Working Group is asked to consider the following issues: “(1) definition of climate adaptation for utilities; (2) appropriate data sources, models and tools for utility decision-making; (3) guidelines for utility climate adaptation and planning; (4) identifying and prioritizing actions

¹ Assigned Commissioner’s Scoping Memo and Ruling, Filed 10/10/18. Order Instituting Rulemaking to Consider Strategies and Guidance for Climate Change Adaptation. R.18-04-019. p. 11.

to address the needs of vulnerable and disadvantaged communities; and (5) a framework for climate-related decision-making and accountability.” A final decision² was issued addressing Topics (1) and (2) on November 1, 2019.

Within each issue, the Scoping Memo specifies a set of questions for the Working Group to discuss at the workshops. Utilities take turns drafting the Working Group session reports. Working Group meeting attendees have an opportunity to make corrections to the draft session report and Parties to the proceeding are invited to comment on the final session report after it is issued. The Commission originally aimed to conclude the Phase 1 Working Group process and session reports by Summer 2019 and issue a Commission Decision by September 2019; however, D.19-10-059 extended the statutory deadline of this proceeding to September 30, 2020.

Topic 5 Scoping Memo Guiding Questions

The working group for Topic 5 aimed to make recommendations on developing a decision-making framework to carry out climate vulnerability assessments and adaptation measures.

The Scoping Memo included the following questions pertinent to this topic:

- How should the CPUC and utilities consider and apply climate risks to key utility functions (generation, transmission, distribution, storage) and major investments in long-life, climate-vulnerable assets?
- What additional reporting by utilities is necessary to enable decision-making and accountability?
- In which procedural venue(s) should climate adaptation-related proposals be made?

On October 22, 2019, Commission staff issued a Staff Proposal on Topic 5 addressing the questions above.

Format of This Document Relative to Previous Reports

This report follows the format of the Topic 4 Working Group Session Report. The report endeavors to reflect participants’ positions as accurately as possible and attempts to carefully characterize the level of agreement reached (or not) within each session-related section.

Summary of Topic 5 Session 1: California Department of Water Resources’ Climate Change Vulnerability Assessment

Topic 5 Session 1: Presentation Summary

John Andrews from the Department of Water Resources (DWR) presented, accompanied by DWR staff Dr. Julie Ekstrom and Romain Maendly. See - Presentation from John Andrew and Julia Ekstrom on California Department of Water Resources’ Climate Change Vulnerability Assessment, Questions and Discussion for presentation slides.

DWR discussed its *Vulnerability Assessment and Adaptation Plan*, released in May 2019, which was the final phase of its three-part Climate Action Plan. After acknowledging that there are a variety of

² D. 19-10-054.

vulnerability assessment approaches, particularly due to differing terminology in the climate adaptation field, DWR gave a brief layout of the method it chose: combining exposure and sensitivity to determine risk and combining risk and adaptive capacity to determine vulnerability. These fed into each other; if a facility was assessed to be at low exposure, for example, DWR did not go through with the rest of the analysis for that facility.

DWR emphasized the importance of defining the scope of a vulnerability assessment and spent time early in the process refining this scope:

- DWR looked at six climate variables, noting that it chose not to look at precipitation (a commonly used climate variable) but instead analyzed the factors that influence precipitation trends (i.e. long-term persistent and short-term extreme hydrologic changes).
- DWR chose to conduct its vulnerability assessment under a mid-century time horizon from 2030–2070, since climate change projections are more solidified for this timeframe and it is close enough to the present that it remains relevant to project managers.
- DWR had specific “buckets” of what to look at, with a focus on its “people, places, and programs” (i.e. their facilities, operations, staff, and managed lands), rather than a broad analysis of the State’s water sector.

DWR also specified what was excluded from scope: projects not entirely under its control, such as the Sacramento-San Joaquin Delta or the electrical grid, as well as non-climate related or indirect climate-related hazards, such as seismic risk of delta levees, subsidence, and sedimentation behind dams. DWR wanted to ensure that it had control of projects to carry out adaptation measures identified in the vulnerability assessment. DWR used a variety of data and methods and worked with different agencies to understand the climate risks faced by its assets, operations, and staff.

- **Wildfire:** DWR partnered with CalFire to develop a wildfire risk map and found that overall vulnerability was low; however, the Upper Feather River is highly vulnerable. Although outside the scope of DWR’s vulnerability assessment, it decided to look at the Upper Feather River since it feeds the State Water Project. Most of the watershed is currently at low to moderate exposure, but this exposure may become moderate to high by mid-century.
- **Extreme heat:** DWR used an extreme heat model (GFDL2) to model the number of days exceeding temperature thresholds. Many of DWR’s employees are currently exposed to extreme heat; however, DWR did not foresee high vulnerability in this area due to existing staff heat protection programs. In the future, extreme heat may become much more prevalent, with up to twice as many days exceeding 95 and 105 degree Fahrenheit thresholds by mid-century.
- **Sea level rise (SLR):** DWR measured risk from both inundation and brackish water and found that while facilities are not vulnerable to changing salinity, some assets (particularly the State Water Project) are vulnerable to sea level rise. DWR also looked at Suisun Marsh, another resource not originally in the vulnerability assessment scope but that DWR still analyzed due to concerns of ecosystem impacts and found that this area will likely face inundation and variations in environmental conditions.
- **Long-term persistent hydrologic changes:** DWR collaborated with the University of Massachusetts, Amherst to perform new research for this climate variable. While many climate assessments use a top-down approach (e.g. downscaling global climate models), DWR wanted to use decision scaling, a bottom-up approach, to analyze hydrologic changes. This bottom-up

approach gives a probability of how degraded the future performance of an asset will be compared to current conditions.

- **Short-term extreme hydrologic changes:** DWR drew from the Central Valley Flood Protection Plan (CVFPP) and developed a map of 500-year FEMA floodplains and vulnerable facilities and offices. High-risk areas include areas throughout the Central Valley, particularly in the San Joaquin Valley.
- **Habitat and ecosystem services:** DWR manages many lands and is responsible for mitigation properties, right-of-way easements, and restoration projects. Under climate change, ecosystems may undergo species and habitat change, and certain mitigation or restoration parcels may no longer be suitable for target species. Some operations, such as fisheries, may also face risks.

The DWR vulnerability assessment serves as a base from which to build their Adaptation Plan, which will help DWR prioritize which climate resilience efforts to carry out, such as infrastructure improvements and enhanced maintenance and operating procedures. DWR will undergo this adaptive management approach as an adaptive and iterative process that may develop and change over time.

Topic 5 Session 1: Discussion

After DWR's presentation, workshop participants asked about the process to develop the vulnerability assessment and DWR's planned next steps.

- a) **DWR put considerable thought into refining its scope.** In response to a question from the Public Advocates Office about the thought process behind including aspects beyond infrastructure, DWR responded that after undergoing much brainstorming and discussions with executive management, the project team came to the conclusion that staff and managed lands needed to be prioritized because they were part of the overall water system, for which DWR was responsible. Extreme heat, for example, would be a climate impact that could impede staff's ability to conduct scientific surveys that inform data for real-time operations.

Southern California Gas Company (SoCalGas) asked about the internal process on choosing which variables to analyze and whether or not DWR considered cascading impacts, to which DWR responded that it reviewed a large literature of science and found hydrology and ecosystems to be important to include, among others. The vulnerability assessment also includes a chapter on cascading failures between both climate and non-climate vulnerabilities; however, DWR acknowledged the chapter could use more depth in its analysis. Overall, defining the scope took several months.

- b) **While DWR carries out programs related to disadvantaged communities, these were not included in the scope for their vulnerability assessment.** The Asian Pacific Environmental Network (APEN) asked how DWR's vulnerability assessment informs programs serving communities and customers, as well as how the vulnerability assessment engages them. DWR mentioned several programs it is carrying out that serve communities specifically, such as regulatory programs associated with reservoirs, the Sustainable Groundwater Management Act, and the Integrated Regional Water Management grant program. DWR also has partnerships with the California Water Commission, which has assessed storage project vulnerabilities separately from DWR, and Central Valley Flood Protection Board on community-serving

initiatives. However, these activities and programs are not included in the scope of the vulnerability assessment. DWR also noted it does not serve residential customers.

The Green Power Institute asked whether the vulnerability assessment process addressed effects of climate change on consumer demand. DWR responded that their vulnerability assessment on operations side assumed same infrastructure and same demand and acknowledged this was a flaw, but noted that two small studies are now underway on the Tuolumne watershed (looking at demand changes).

The California Environmental Justice Alliance (CEJA) asked how communities might be affected if DWR infrastructure fails. DWR responded it did not find any outright climate-induced infrastructure failures that would affect a community, focusing on vulnerabilities and risks that DWR could act on or influence directly.

- c) **DWR's vulnerability assessment will lead into a longer-term adaptation process.** ICF, supporting SoCalGas and San Diego Gas & Electric (SDG&E), asked DWR how the vulnerability assessment work will influence specific decisions for adaptation. DWR responded that adaptation work is in process and that an official adaptation plan may not come out until early 2020. However, DWR is carrying out some adaptation work – related to the recent drought, for example – that were not included in the vulnerability assessment's scope. As DWR continues to develop its adaptation plan, it intends to create a framework for its adaptation process, considering options such as adaptive management and flexible adaptation pathways. In response to a question from Commissioner Randolph about a timeframe for vulnerability assessment updates, DWR said that it plans on updating it every five years.

Southern California Edison (SCE) asked how DWR's vulnerability assessment aligns with annual infrastructure and capacity planning efforts and if DWR takes climate information into account when conducting routine planning and operations processes. DWR said it has been incorporating climate change into its planning in an ad-hoc way but intends on having more consistency between its analyses. It is currently using a framework for its climate action plan that project managers can apply to their work and has an asset management plan for the State Water Project that incorporates climate change considerations. The Green Power Institute asked if DWR and utilities can make climate change fundamental to planning and engineering operations rather than have separate climate planning groups. DWR emphasized that it is trying to make considerations of climate change integrative rather than siloed. Its climate change team consists of representatives from every department who meet regularly; in addition, there is a core team that conducts adaptation and technical work.

Summary of Topic 5 Session 2: Southern California Edison High-Level Planning for Utility Planning around Climate Adaptation

Topic 5 Session 2: Presentation Summary

SCE presenters Tyson Laggenbauer and Kit Batten discussed SCE's progress in integrating climate adaptation into utility planning. The slides of the presentation are provided in - Presentation from SCE Staff on 'High-Level Planning for Utility Planning around Climate Adaptation', Questions and Discussion.

SCE completed its Risk Assessment Mitigation Phase (RAMP) filing in 2018, which included a climate change risk assessment divided into near-term (2018-2023) and long term (2018-2050) impacts. This led to the formalization of SCE's Climate Adaptation and Severe Weather (CASW) program in 2018, which aims to connect climate change work across the company and develop a strategy to address this risk. The concepts used in SCE's approach were similar to those in DWR; however, instead of combining exposure and sensitivity into risk, SCE combined them into "impact", which then combined with adaptive capacity to form a vulnerability rating. SCE compared its climate adaptation approach with the CPUC staff proposal to show how their steps aligned.

SCE incorporates climate change impacts into utility planning via two separate processes: including climate risks in annual capacity planning and conducting an infrastructure vulnerability assessment. In the former, SCE factors temperature changes into the California Energy Commission (CEC) Integrated Energy Policy Report (IEPR) to understand future customer demand. Engineers then analyze SCE infrastructure to determine if it can satisfy this demand; if not, SCE may begin to look at risk mitigation. SCE also mentioned including climate models into the IEPR forecast so that they will automatically be included in their planning processes.

Meanwhile, the vulnerability assessment serves as a high-level process that enables SCE to identify specific high-risk areas most vulnerable to potential climate change impacts. This allows SCE to prioritize locations to modify operations, make infrastructure changes, and assist communities affected by vulnerable infrastructure. Then, SCE can begin to develop both near-term and longer-term adaptation measures by working with communities. SCE stressed the importance of having a climate adaptation process that is both iterative and high-level, so that planning can begin where risks are assessed as highest.

Topic 5 Session 2: Discussion

Following the presentation was a brief discussion in which workshop participants asked SCE about the progress of its vulnerability assessment and how that would encompass other aspects, such as operations and communities.

- a) **SCE's next steps include moving from its high-level analysis to more closely studying specific climate risks and regions.** One student from University of California, Berkeley (UCB) asked where SCE was in making engineering decisions and what successes and pitfalls it had encountered integrating climate into infrastructure. Grid Alternatives asked if SCE had yet upgraded its assets in response to new climate forecasts. SCE responded that it has completed its high-level assessment and is now assessing in more detail specific climate impacts on certain geographies. It is early in its engineering studies and has conducted deeper analyses in some

areas (e.g. wildfires, as these are the more immediate risk) but needs to do the same for other hazards, such as temperature.

- b) **Some participants expressed the importance of including operations and communities, not just infrastructure, into the vulnerability assessment process.** Both APEN and CEJA asked SCE about looking at climate effects on operations and communities, as well as what its community engagement process looked like. SCE responded that it has yet to conduct a specific analysis on customers and plans on identifying vulnerable communities by seeing which areas are affected by climate-vulnerable infrastructure. SCE will then work with these identified communities and see how it may supplement any ongoing adaptation measures. SCE plans on obtaining guidance from the OIR process moving forward.

CEJA asked SCE about looking at the links between climate change effects on Public Safety Power Shutoffs (PSPS) events. SCE responded that PSPS events were more of a near-term risk and part of a different process than the workshop's discussion of a longer-term adaptation framework. The Green Power Institute replied that PSPS events still had to do with the longer-term process, however, as climate change has already influenced the likelihood and severity of such events, and because of a lack of climate-risk planning in the past. SCE affirmed that it will be incorporating lessons learned from the consequences that have come out of PSPS events.

Summary of Topic 5 Session 3: ICF Flexible Adaptation Pathways Approach

Topic 5 Session 3: Presentation Summary

Dr. Robert Kay from ICF gave a presentation on using the flexible adaptation pathway approach as a method of planning and carrying out a climate adaptation process. The slides of the presentation are provided in - Presentation from ICF Staff on Flexible Adaptation Pathways Approach, Questions and Discussion.

Flexible adaptation pathways consist of a collection of adaptation measures that can be sequenced to address the same risk. For example, building a flood barrier, having backup assets to provide electricity, and developing a restoration plan are all measures that can increase utility resilience against coastal flooding. Planners can switch between these different measures depending on their changing budgets, climate risk, and importance of protecting an asset and other external factors, such as technology changes. A project manager may wish to start the adaptation process with a less expensive measure, for example, with the option to switch to another measure if climate projections become worse than initially conceived.

Dr. Kay stated that as the staff proposal currently standards, the release of a California Climate Change Assessment (CCCA) leads to a utility's vulnerability assessment, which then leads to adaptation planning and financing, and afterwards implementation. This process would be repeated with each subsequent release of a new CCCA, requiring utilities to develop a new vulnerability assessment, adaptation plan, and implementation process each time.

With the alternate pathways approach, the next CCCA would lead to an initial vulnerability assessment, which would then bring about adaptation planning and implementation. However, instead of developing brand new vulnerability assessments and adaptation plans per CCCA update, utilities could instead refresh climate projections used in planning if necessary and determine whether the new projections require any changes to the ongoing financing or adaptation implementation.

ICF gave an example of a flexible adaptation pathway using work done with SDG&E's natural gas assets and also cited other reports that have used or considered pathways, such as the AB 2800 Climate Safe Infrastructure Working Group report and Los Angeles County Metropolitan Transportation Association (LACMTA)'s Climate Action and Adaptation Plan (CAAP). Flexible adaptation pathways integrate climate adaptation considerations into existing decision-making and allow for collaboration with local communities. However, using pathways can be a complicated process that involves defining triggers and thresholds and setting up monitoring systems and governance processes and require a careful balance between certainty and flexibility.

Topic 5 Session 3: Discussion

Participants asked questions to ICF about how flexible adaptation pathways may consider variables such as time, non-climate related changes to the grid, and economic analyses.

- a) **The adaptation pathways approach allows for flexibility in planning so that project managers can prioritize what matters most to their resilience efforts.** The Public Advocates Office observed that the pathways approach appears to favor longer time horizons because longer time horizons would provide more opportunities/flexibility for adjustments. ICF stated this was accurate and clarified that pathways allow planners to consider multiple timeframes at once, and that some decisions on large investment decisions may need to be made on shorter timeframes. SCE asked if pathways account for technological change, and ICF responded that they can account for all types of changes – whether climatic or technological – and that planners just need to adjust their investment profile.
- b) **There is still room to further develop details in the pathways approach as it pertains to economic assessments.** The Public Advocates Office asked how discount rates are chosen when conducting cost-benefit analyses for “flexible adaptation pathways” and how these influence choices. ICF responded that the choice of discount rates dramatically changes which pathways appear viable. ICF clarified though that it did not undertake an economic assessment as part of their pathways approach, and that such assessments would need to develop new approaches to properly capture the costs and benefits of turning to different options along the paths.

Summary of Topic 5 Session 4: CPUC Staff Presentation of Steps 1-3

Topic 5 Session 4: Presentation Summary

In the final session, CPUC staff member David Matusiak presented on the scoping memo questions and staff proposal for Topic 5 of the OIR proceeding, with a workshop goal in mind of developing a climate change adaptation decision-making framework for investor-owned utilities. The slides of the presentation are provided in - CPUC Staff Presentation of Steps 1-3 and Questions.

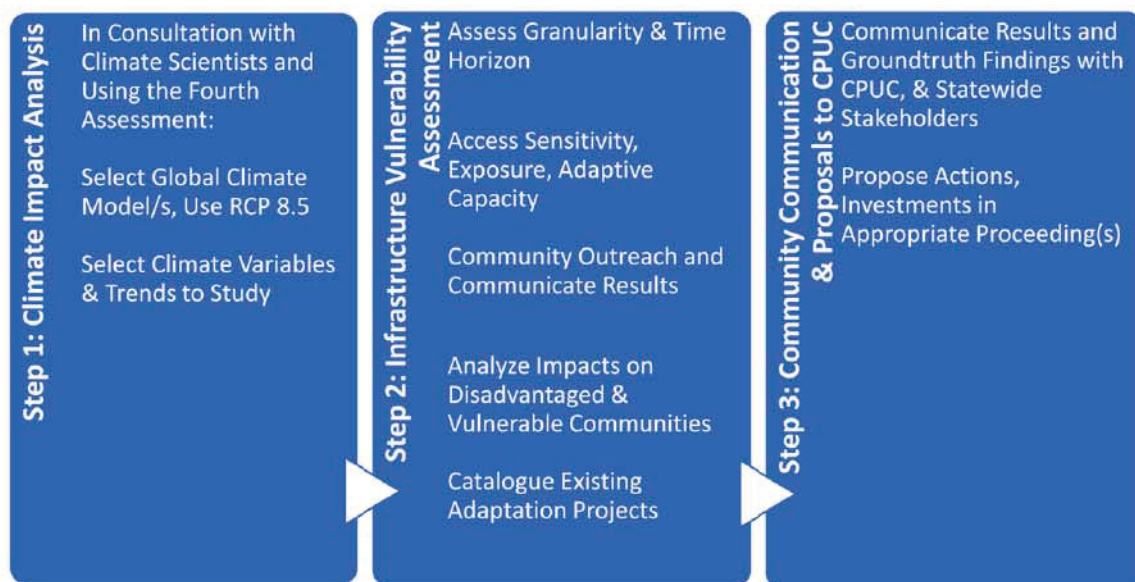
The presentation included the following scoping memo questions:

1. How should the CPUC and utilities consider and apply climate risks to key utility functions (generation, transmission, distribution, storage) and major investments in long-life, climate-vulnerable assets?
2. What additional reporting by utilities is necessary to enable decision-making and accountability?
3. In which procedural venue(s) should climate adaptation-related proposals be made?

In response to these questions, CPUC staff suggested that a vulnerability assessment could consider and apply climate risks to key utility functions; that utilities could also report climate change impacts, impacts on vulnerable communities, and consider longer time horizons; and that the RAMP, GRC, or another process could be used to make climate adaptation-related proposals.

CPUC staff then showed its proposal for developing a climate decision-making framework (Figure 1).

Figure 1: CPUC staff proposal for Topic 5



CPUC staff reviewed the staff proposal, outlining specific details.

- **Step 1: Climate impact analysis.** The global climate models used would be the ten included in the Fourth California Climate Change Assessment (CCCA4), and the climate variables and trends studies will include temperature, sea level rise, wildfire, subsidence, and hydrology, all under Representative Concentration Pathway (RCP) 8.5.
- **Step 2: Infrastructure vulnerability assessment.** The vulnerability assessment will include community outreach and communication, analysis of disadvantaged communities (DACs) and vulnerable communities, and existing adaptation and green infrastructure projects. The latter will be in the assessment as some communities may not require as much adaptation investment from utilities as other communities; for example, a DAC may need to urgently fix a damaged substation, while a wealthier coastal community may already be building a seawall and thus be more protected. The CPUC specified definitions and a potential mid-century timeline, but is still looking into what assets should be included.

- **Step 3: Community communication and proposals to CPUC.** The infrastructure vulnerability assessment from Step 2 will lead to results that then feed into adaptive capacity and green infrastructure alternatives. The results of the vulnerability assessment will go through a process such as the GRC, RAMP, S-MAP and IEPR. Utilities should consider decisions made by other state agencies to avoid spending money and effort on decisions that are discordant with those agencies – for example, a piece of infrastructure may not exist in the future, or a population may move from its current location due to climate hazards.

Topic 5 Session 4: Discussion

To begin discussion and take input from workshop participants, CPUC staff asked five questions about the proposed climate adaptation decision-making framework.

Please comment on the proposed climate change adaptation decision-making framework overall.

- a) The overall staff proposal aligns with the IOUs' visions, but there are concerns about how closely utilities must follow the process (apparent agreement with some outstanding questions).** SCE views the staff proposal as being similar to its own vision but clarified that it would be helpful if the CPUC articulated a vision where utilities first identify risks and then focus on high-risk areas, rather than looking at the entire system. SCE also wishes to distinguish between annual planning capacity and vulnerability assessments, seeing these as separate exercises. CPUC staff responded that taking a first look at the overall system is necessary to determine which areas are at high risk to climate hazards, and that once a final report emerges for the vulnerability assessment, that could be integrated into the decision-making process. Pacific Gas & Electric (PG&E) remarked that it views the vulnerability assessment process as complement to the RAMP process. While the RAMP and vulnerability assessment have different time horizons, the vulnerability assessment may lend another lens to inform decision-making.

SoCalGas asked if all utilities will be required to assess the same climate variables or if utilities get to decide which variables are most pertinent in their analysis, as well as whether gas and electric utilities will have any difference in the hazards they analyze. CPUC staff responded that while some climate hazards may have larger impacts on gas or electric assets or that some variables may be more or less significant in one utility territory over another due to geographical and climactic differences, all climate hazards outlined in the proposal are important.

- b) The community impact analysis is unclear in what's being requested of the IOUs, particularly pertaining to whether the vulnerability assessment will look at just infrastructure or also other aspects, such as operations (agreement in principle with many outstanding questions).** CEJA pointed out the community impact analysis identified in the staff proposal and the importance in determining what this will look like and include, as no model exists for it yet. For example, this may require looking past not just how service failures affect certain equipment, but also at how service failures may affect communities that don't have the resources to respond to them and how incremental climate change may affect the energy burden of residents. CEJA also reiterated concerns about limiting the vulnerability analysis to just infrastructure and encouraged the CPUC to also consider operations, which have implications for programs such as demand-response.

SoCalGas also expressed concern on what the community impact analysis would look like and what a reasonable stakeholder commitment is for an IOU, as local governments should own their own vulnerability assessment process as per SB 379. SCE echoed this, having interpreted the staff proposal to focus on utility infrastructure and the downstream impacts of failure to customers. PG&E stated that SB 379 provides a mandate for cities to address climate vulnerability, but that in reality, multiple sectors (e.g. transportation, water, Strategic Growth Council, Office of Planning & Research) may need to be brought together to respond to climate incidents.

- c) **There are different interpretations for what constitutes a “climate scientist” and what the best option is for having experts help utilities in developing their vulnerability assessment (no apparent agreement).** SoCalGas asked what is defined by a “climate scientist”, who would assist utilities with their vulnerability assessments, and the CPUC did not have an official definition. CEJA suggested that because climate science does not have significant regional variation in California, the CPUC could put together an expert panel of scientists for IOUs to rely on. CEJA preferred this over the option of having multiple or contracted scientists that IOUs can choose due to potential conflicts of interest. The Public Advocates Office agreed with CEJA on concerns of transparency and said that if the CPUC required a technical panel, it could make it an open and transparent process, whereas having utilities hire their own climate scientists could raise questions of transparency and legitimacy.

PG&E countered that as IOUs will need to get granular in their infrastructure analysis, it is more useful to contract with experts to have a high-quality vulnerability assessment. SCE echoed this, mentioning that utilities consult private-sector experts and college academics for a variety of reasons already, and that it was concerned about the CPUC building in language related to this into its decision since it may become a compliance requirement. CPUC staff commented that there are hybrid options for consulting a climate scientist (e.g. the CPUC preselects a list of experts for the utilities to select from or approves the experts the utilities work with).

- d) **Participants made various comments on suggestions related to updating data sources and funding (some apparent agreement).** SCE noted that it is planning on using current CalEnviroScreen and Healthy Places Index data to look at disadvantaged populations, but population dynamics may change in the future and these tools may not be able to capture that. APEN responded that CalEnviroScreen is updated regularly and tries to capture changing demographics. Though CalEnviroScreen and similar tools may not capture climate impacts on changing communities, they are not static and should still be used.

The Public Advocates Office commented that current state inter-agency climate change action teams could have more representation and asked if there is a way to leverage climate vulnerability work already planned and undertaken in the ratepayer funded Energy Program Investment Charge (EPIC), rather than potentially charging ratepayers twice for the same kinds of studies.

Climate Resolve commented that there is no mandate to regularly update the California Climate Change Assessments and that the CPUC should use a broader foundation of science rather than just basing vulnerability assessment updates on the CCCAs.

Are the definitions of exposure, sensitivity, risk and adaptive capacity appropriate for California's energy utilities, or should they be modified? If yes, what modifications should be made and why?

- a) **Definitions of exposure, sensitivity, risk, and adaptive capacity should include operations and community, not just infrastructure, and particularly prioritize disadvantaged communities (apparent agreement with some outstanding questions).** The Public Advocates Office commented that the definitions in general seem focused on infrastructure and should also include rules and operations (e.g., maintenance schedules and PSPS)—specifically in considering adaptive capacity. APEN agreed, stating that the definitions are missing perspectives of sensitivity and adaptive capacity of communities and customers. For example, sensitivity could include socioeconomic factors, while adaptive capacity could include transit accessibility to resource centers. Furthermore, disadvantaged communities should be called out by name to explicitly search out ways to support them. Environmental justice organizations can support utilities in developing these definitions.

SCE responded that it has been categorizing vulnerable communities by defining them as communities most affected by infrastructure vulnerable to climate hazards. SCE was also concerned about what counts as a community – for example, city versus census tract – and what the appropriate level of engagement is, particularly with cities that already have their own vulnerability assessment and adaptation plan. APEN replied that a vulnerability assessment should look at the intersection of infrastructure and communities and not prioritize one over the other. CPUC staff agreed that looking at infrastructure and then communities is a logic flow rather than a prioritization, and Grid Alternatives commented that if a utility finds a vulnerable piece of infrastructure, the most disadvantaged communities affected by that should then be prioritized since they may not have the capacity otherwise to adapt.

CEJA agreed with APEN's comments and suggested that definitions include adjustments in daily events, as well as more extreme events, to capture effects related to energy burden.

- b) **Definitions should be updated to align with best practices (some apparent agreement).** DWR recommended updating concepts of exposure, sensitivity, risk, and adaptive capacity to be in line with the most recent Intergovernmental Panel on Climate Change (IPCC) report. There was mention that D.19-10-054 already defined adaptation for the purpose of the proceeding.

Is the guidance complete on outreach and coordination with the community, and particularly disadvantaged and vulnerable communities? Should the utilities undertake deeper partnerships with organizations, and if yes, how should they determine which organizations?

Workshop facilitators and participants perceived that the discussion under the first question addressed this question, so for the sake of time, discussion on this question was skipped.

Are there any further elements unique to climate change adaptation that may be included in a utility proposal (aside from adaptive capacity and green infrastructure alternatives)?

- a) **Extra guidance on translating climate variables into utility planning, as well as addressing technology further down the pipeline, would be helpful (some apparent agreement).** A student from UCB asked for guidance on impact models or methodologies that can be used to translate climate variables to utility planning. For example, using temperature to estimate load variables, but other climate hazards may be used to help with planning as well. The Public Advocates Office commented that utilities should consider what DWR did in its vulnerability assessment, but that the energy sector may have slightly different climate consideration than the water sector; for example, DWR only considered extreme heat, whereas it would be appropriate for the energy sector to also look at changes in daily or seasonal averages which impact load.

A UCB student also asked if the CPUC can offer guidance on new technologies, particularly that related to monitoring (e.g. weather forecasting, real-time risk information). One could look to universities to see upcoming technology and potentially expedite the process of releasing those. CPUC staff said that it may be difficult to plan for technology that doesn't exist yet but overall agreed and stated that this relates back to EPIC and potential funding for technology.

- b) **The staff proposal should consider enhancements to operations, particularly in relation to disadvantaged communities (some apparent agreement).** CEJA commented there are opportunities to include operational changes in the staff proposal. For example, utilities could improve their ways of communicating with communities about PSPS events and resources to deal with those. As these events may become more frequent and severe in the future, utilities should have better responses to those. This has to do more with operations than infrastructure. The Public Advocates Office supported this statement. The CPUC stated this could be part of the adaptive capacity component in the proposal. An online commenter from the Leadership Counsel for Justice and Accountability said that many vulnerable communities are also unincorporated and rural, and any definition of community should recognize this.
- c) **Utilities should look at the greenhouse gas mitigation as part of their climate adaptation measures (no apparent agreement).** Climate Resolve suggested that utilities also analyze greenhouse gas (GHG) emissions in their climate adaptation actions and SCE responded that many GHG-reducing measures may not be well adapted to climate change.

How can the CPUC ensure that climate change-driven risks and changes are systematically incorporated into its decision-making and planning processes?

- a) **There are benefits in looking at immediate and long-term time horizons for the vulnerability assessment, or even multiple timeframes for different objectives (no apparent agreement).** A student from UCB expressed concern about the timescale as an imminent climate threat is already occurring as shown by PSPS events and we should already be having conversations with local governments about alerts, evacuation, and sheltering, as well as provide distributed energy to broaden resilience. ICF, supporting SoCalGas and San Diego Gas & Electric (SDG&E), commented that one fixed timeframe may not be useful in supporting community resilience since it can result in missing opportunities that may exist on a shorter or longer time horizon, and suggested looking at multiple types of decisions over different periods of times.

PG&E wishes to look into 2050 and 2080 timeframes due to its long-lived infrastructure, and suggest having two scopes: one for a vulnerability assessment conducted on infrastructure and one for community engagement. SCE also agreed that the vulnerability assessment should have a long-term time horizon to avoid building assets in a vulnerable location, and that while utilities can address imminent risks immediately, the vulnerability assessment should be used as a tool to look at long-term changes. SCE stated that most infrastructure planning only goes ten years out due to a lack of credibility in granular forecast planning past that. SCE also remarked that many of the day's comments were about PSPS events and how to respond to them, but other proceedings would be discussing those, so it would be best not to duplicate those efforts.

Commissioner Randolph continued from this point, noting the difference between planning for the current emergency of PSPS events and planning for a future emergency through the vulnerability assessment, and suggested not letting recent events overshadow longer-term planning. Randolph also highlighted the opportunity to learn from impacts of PSPS events; although it is an operational issue, it stems from a failure in infrastructure and directly affects communities, showing how all three aspects are intertwined.

Conclusion

Table 1 shows a summary of consensus items from the Topic 5 Session 4 discussion.

Table 1: Matrix of consensus items

Consensus Level	Discussion topic
Much expressed agreement/potential consensus	None
Apparent agreement/potential consensus	None
Some apparent agreement	<p>Participants made various comments on suggestions related to updating data sources and funding.</p> <p>Definitions should be updated to align with best practices.</p> <p>Extra guidance on translating climate variables into utility planning, as well as addressing technology further down the pipeline, would be helpful.</p> <p>The staff proposal should consider enhancements to operations, particularly in relation to disadvantaged communities.</p>
Apparent agreement with some outstanding questions	<p>The overall staff proposal aligns with the IOUs' visions, but there are concerns about how closely utilities must follow the process.</p> <p>Definitions of exposure, sensitivity, risk, and adaptive capacity are useful in considering utility management of climate driven hazards.</p>

Consensus Level	Discussion topic
Some apparent agreement with significant outstanding questions	N/A
Agreement in principle with many outstanding questions	The community impact analysis is unclear in what's being requested of the IOUs, particularly pertaining to whether the vulnerability assessment will look at just infrastructure or also other aspects, such as operations.
No apparent agreement	<p>There are different interpretations for what constitutes a "climate scientist" and what the best option is for having experts help utilities in developing their vulnerability assessment.</p> <p>Utilities should look at the greenhouse gas mitigation as part of their climate adaptation measures.</p> <p>There are benefits in looking at immediate and long-term time horizons for the vulnerability assessment, or even multiple timeframes for different objectives.</p> <p>It is still unclear if the IOUs will analyze the same climate hazards and risks or if it is up to each IOU to select hazards that present the greatest risk. DWR did not appear to be replicating an existing hazard selection methodology, and selected hazards based themselves.</p> <p>There is disagreement about the degree to which PSPS events should be looked to as an example of how climate change can impact vulnerable communities and how lessons learned from PSPS events should be incorporated into the decision-making framework.</p>

Appendices