R.18-04-019 Phase II Launch Workshop

California Public Utilities Commission

WebEx Logistics

- All attendees are muted on entry by default.
- Questions can be asked verbally during Q&A segments using the "raise hand" function.
- The host will unmute you during Q&A portions [and you will have a maximum of 2 minutes to ask your question].
- Please lower your hand after you've asked your question by clicking on the "raise hand" again.
- If you have another question, please "re-raise your hand" by clicking on the "raise hand" button twice.
- Questions can also be written in the Q&A box and will be answered verbally during Q&A segments.

Workshop Agenda

Time	Activity
9:00	Introductions, Overview of Day, and Procedural Background
9:25	SCE Presentation on its CAVA
10:25	5-minute break
10:30	SCE Presentation on CEP, Climate Team
11:00	10-minute break
11:10	Potential Issues in Scope
11:30	Energy Division Staff Presentation: Potential CAVA Refinements
Noon	Lunch break
1:00	Energy Division- Additional Comments on Potential CAVA Refinements
2:00	Update from PG&E, SDG&E, and SoCalGas on CAVAs, CEPs, Climate Teams
3:30	10-minute break
3:40	Michelle Lee (née LaPena): A Tribal Perspective
3:55	Wrap Up and Next Steps

R.18-04-019 Procedural Background

R.18-04-019 – The Rulemaking

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

"The purpose of this Rulemaking...is to provide a forum for addressing **how energy utilities should plan and prepare for** increased operational risks due to **changing climate conditions**...Energy utilities need this guidance to plan to continue to fulfill their mission to provide safe, reliable, and affordable service..."

Climate Adaptation Procedural Background

- **D.19-10-054** – Defines Key Terms, Specifies Data Sources and Planning Standards for Climate Adaptation

- **D.20-08-046** – Directs Utilities to Conduct Climate and Vulnerability Assessments (CAVAs) on Utility Infrastructure and Services and Engage Disadvantaged and Vulnerable Communities on Climate Adaptation Needs

D.19-10-054 – Definitions and Data Sources

1. Defines climate adaptation for energy utilities in California;
2. Identifies the California Fourth Climate Assessment and any subsequent assessments as the primary source of climate forecasts, pathways, and scientific studies;
3. Establishes the criteria for any further data or models that energy utilities may develop to understand climate impacts.

- **Climate change adaptation** ~ Adjustment in natural and human systems to a new or changing environment. Entails strategic and data-driven response driving utility planning, facilities maintenance and construction, and communications, to maintain safe, reliable, affordable and resilient operations.

- **Models / Sources** ~ California Climate Change Assessment, CalEnviroScreen, Peer-reviewed methodologies.

D.20-08-046: Disadvantaged and Vulnerable Community (DVC) Definition and Community Engagement Plans (CEP)

DVC Definition

- Communities in the 25% highest scoring census tracts according to the most current versions of the CalEnviroScreen
- Census tracts that score in the highest 5% of Pollution Burden within CES but do not receive an overall CES score.
- California tribal lands.
- Median household incomes less than 60% of state median income.

CEP Preparation

- Meet with Community Based Organizations (CBOs) and DVCs to develop an outline of what the Community Engagement Plans should include.
- Disseminate their draft CEPs to all relevant CBOs, DVCs, and to parties on the service list of the proceeding before filing the plan in this proceeding for comment.
- Gauge interest and availability of CBOs for meaningful leadership roles.

CEP Requirements

- Filed one year before the CAVA
- Describe DVCs, impacts on them, and IOU response.
- Detail substantive outcomes and future for community engagement.
- Provide timeline for engagement with DVCs.
- Reporting and disclosure of CBO / community interactions past, present, and future

D.20-08-046: CAVA Requirements

- Every four years as a Tier 2 Advice Letter.
- Preceded by a Community Engagement Plan.
- Analysis of Temperature, Sea-Level Rise, Precipitation, Wildfire, and cascading events for utility-owned infrastructure & contracts.
- Use the Department of Water Resource's two-step vulnerability assessment methodology that 1) combines exposure and sensitivity to determine risk, and 2) combines risk and adaptive capacity to determine vulnerability.
- Sets intermediate and long-term timeframes for analysis. The intermediate focuses on the next 10-20 years while the long-term addresses the next 30–50 years. The decision considers the "key time frame" as the next 20–30 years.

CPUC Workshop on Climate Adaptation Phase 2

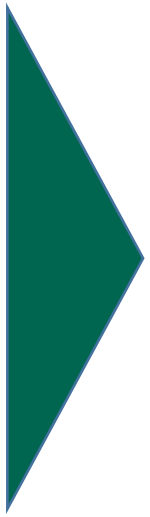
March 13th

Context and Agenda

Context

SCE prepared materials for today's workshop based on a set of guiding questions from Energy Division, with a focus on:

- Detailed examples of CAVA analysis
- Review of Adaptation Options
- CAVA and RAMP Integration
- Contract and System Analysis
- Community Engagement
- Climate Team Structure and Activities



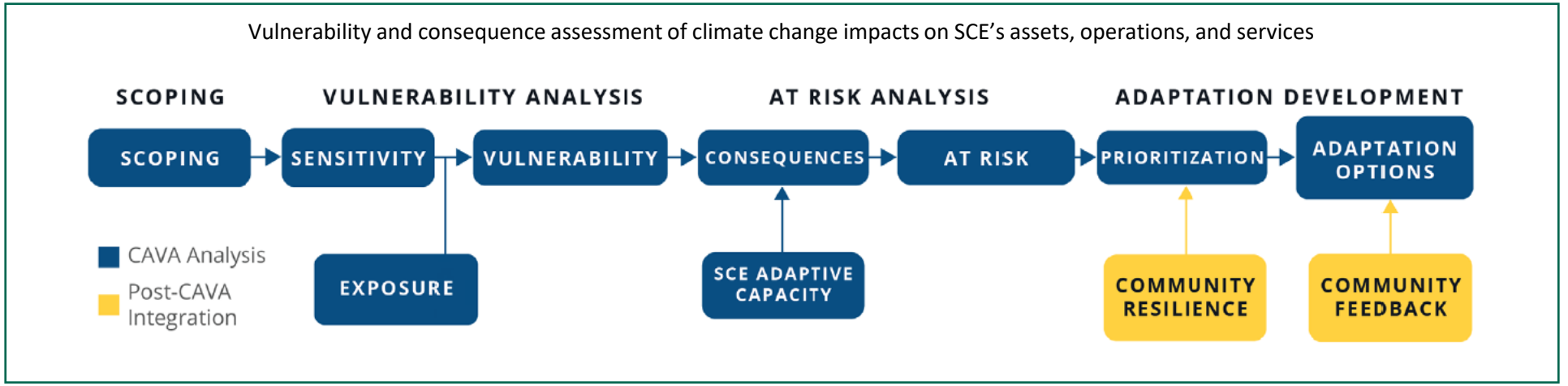
Agenda

- 9:25 – 10:25
  - CAVA Analysis and Findings
  - Adaptation Proposals
  - CAVA and RAMP Integration
  - Contract and System Analysis
  - Q&A
- 10:30 – 11:00
  - Community Engagement Plan
  - Climate Team Structure, Activities, and Accomplishments
  - Summary of Key Learnings
  - Q&A

CAVA Analysis and Findings

SCE's CAVA analysis aimed to identify adaptation options using a phased approach

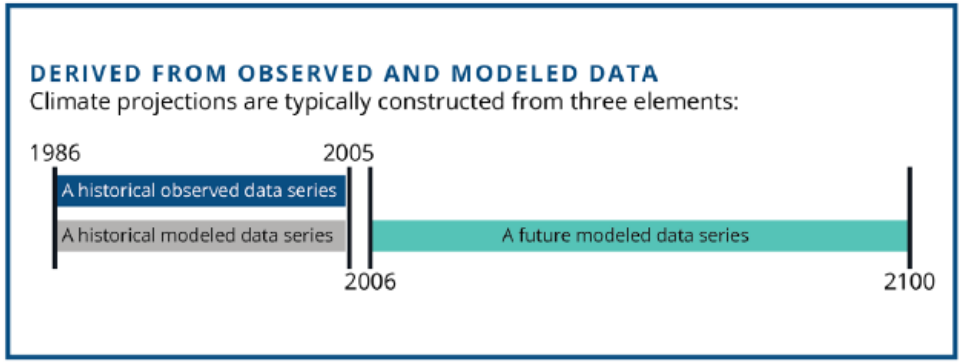
- SCE utilized a 4-step methodology for the majority of the CAVA analysis

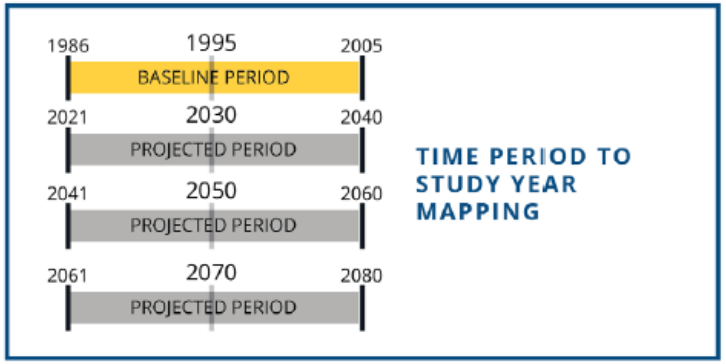


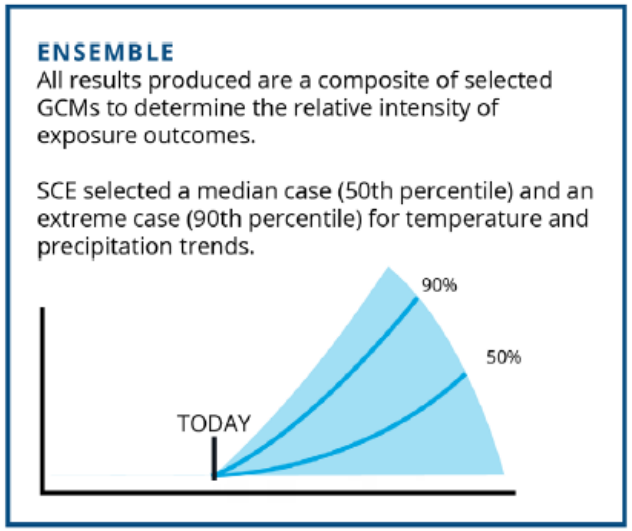
- The methodology provided multiple benefits, including:
  - Allowed analysis to be flexibly implemented for a wide range of different assets, operations, and services, each with different climate sensitivity and impact characteristics
  - Created a baseline analysis and consistent check points to guide work
  - Allowed CAVA to explore potential adaptation options* that could be later refined for GRC process
  - Identifies steps where community feedback can be integrated into adaptation prioritization and development

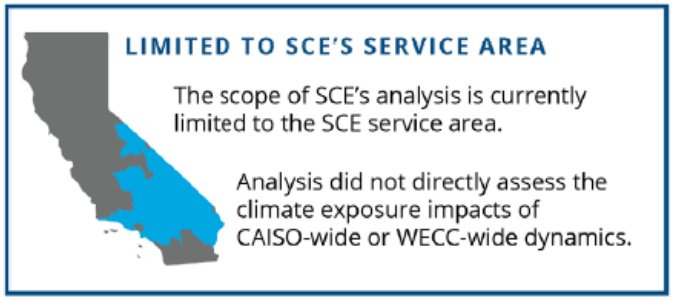
* SCE has utilized the term Adaptation Options to refer to Climate Adaptation Risk Reduction Projects, rather than Mitigation Options which generally refers to Climate Mitigation (ex. GHG reduction) Projects

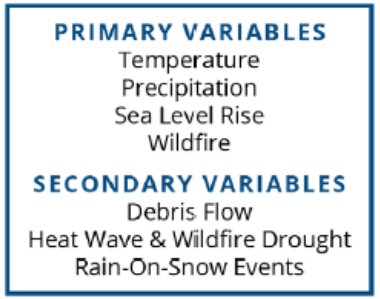
Climate projection methodology

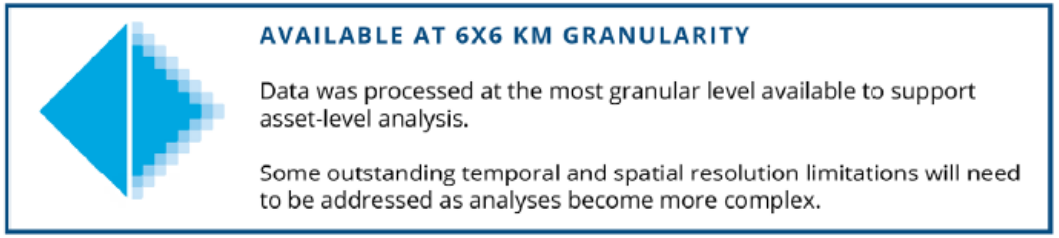












- Where possible, all climate insights developed through CAVA rely on the 10 priority GCMs identified by California's 4th Climate Assessment using an RCP 8.5 scenario
- Having a defined minimum set of primary climate variables, open ended cascading events, and flexibility in what and how to study for different assets, operations, and services was invaluable and should be continued in future CPUC guidance
- Climate science guidance from CPUC should continue to be informed by research recommendations from California's Climate Assessments

Climate hazard walkthrough 1: Temperature impacts on thermal generation (*single variable, high fidelity, and clear threshold allows for adaptation development*)

Scoping and Sensitivity

Thermal Resources identified for extreme heat analysis

- Ambient temperatures above 115°F may result in plants not being able to operate due to insufficient cooling, control equipment failure, SCADA equipment failure, etc.

Vulnerability Analysis

Plant exposed to temperatures that may make it unable to operate

- Temperatures are projected to exceed 115°F using 50th percentile temperature projections in 2030, 2050 and 2070

At-Risk Analysis

Plant outage consequences could have significant reliability and financial impacts

- Potential asset consequences include:
  - Operating damage
  - Lost market revenue
- Potential System Reliability Consequences

Adaptation Options

Exposure could be present by 2030, so cooling upgrades need to be considered

- In order to prevent potential shutdowns during critical periods, the plant should be considered for cooling upgrades or other options that reduce outage risk

Key Insights:

Flexibility needed to focus on the climate variables of largest impact to each asset, operation, or service (AOS)

Different AOS have different sensitivity thresholds, so flexibility on exposure projections (ex. 50th percentile) and time series (ex. Greater than one day) by AOS is needed

Consequences of this type of exposure need to be considered in a larger, regulatory planning process (ex. outage occurs while grid is stressed)

Unlike RAMP, CAVA considered potential adaptation options to 2030 exposure that are being further refined in the upcoming 2025-28 GRC

Climate hazard walkthrough 2: Debris flow impacts on T&D infrastructure (*Interacting variables, limited data, and ambiguous threshold points to further study*)

Scoping and Sensitivity	Vulnerability Analysis	At-Risk Analysis	Adaptation Options
Debris flow exposure is localized and needs to be considered for assets in high exposure areas	14,733 poles and 451 pad-mounted assets were identified as vulnerable to post-fire debris flow	There is no ability to recover load in these areas in the event of a debris flow due to infrastructure damage	Further studies are required to understand the true risk of debris flows at these locations
SCE primarily examined areas where debris flow (including wildfire, precipitation) exposure is heightened from climate change	SCE developed a relative exposure metric* for debris flow by overlaying wildfire projections (Cal-Adapt), precipitation projections (Cal-Adapt), and landslide susceptibility (USGS)	16 debris flow scenarios by identifying watersheds in the top 20% of the relative exposure metric with distribution assets along streamlines	Further study is required to understand the site-specific risks of debris flow events in priority areas There is a high degree of uncertainty around these risks, given their complexity, sequencing, and localized nature
Key Insights:			
Regional climatic dynamics drive prioritization of cascading, compounding and extreme events to study	*Interaction among climate variables is more complex to study than individual variables; flexibility in application allowed SCE to develop new metrics to understand exposure*	*Climate variables without specific thresholds, such as debris flow, may need to be considered on a relative basis from an exposure and consequence standpoint*	*Climate Science and Probabilistic planning methods need to mature to account for uncertainty*

* The developed metric intends to directionally capture where exposure is highest, but cannot be used for probabilistic estimation due to data quality limitations

Review of short-term potential adaptations* identified in CAVA

Potential Risk	CAVA Filing Potential 2025 – 2028 Adaptation Options
Distribution Outages	New wires to create ties between exposed circuits for increased operational flexibility
	Targeted substation and distribution transformer replacements
	PME/PMH switch derates for fully loaded switches in high temperature exposure locations
Thermal Generation Outages	Upgrading Heating, Ventilation, and Air Conditioning (HVAC) equipment to reduce likelihood of heat related outages
Employee Safety	Upgrading Heating, Ventilation, and Air Conditioning (HVAC) equipment in Vehicle Maintenance facilities at two service centers
Substation Outages	Construction of floodwalls at two substations
Distribution Outages	New wires to create ties between exposed circuits for increased operational flexibility
	Replace pad-mounted transformers, switches, and capacitors with waterproof equivalents
Dam Overtopping	Perform Stochastic Event Flood Modeling analysis for all high hazard dams to understand climate change effects on dam safety concerns
Catalina ARkstorm Studies	Develop ARkstorm and resulting debris flow exposure projections for Catalina island
Catalina Storms	Develop exposure projections for coastal storms based on Catalina islands unique characteristics

Potential Risk	CAVA Filing Potential 2025 – 2028 Adaptation Options
Transmission Outages	Increased inspections and vegetation management to reduce likelihood of fire damage
	Expand remote inspection technology, LiDAR & Satellite Imagery
Subtransmission Outages	Fire wrapping poles, increased inspections, vegetation management, and pole brushing to reduce likelihood of fire damage
	Expand remote inspection technology, LiDAR & Satellite Imagery
Distribution Outages	New underground wires solutions to create ties between exposed circuits for increased operational flexibility
	Expand remote inspection technology, LiDAR & Satellite Imagery
Big Creek Hydro System Outages	Vegetation Studies to understand wildfire risk profile after Creek Fire
	Based on vegetation study results, installing redundant power and communication equipment to maintain necessary water management capabilities during wildfire events
Employee Safety	Upgrading Heating, Ventilation, and Air Conditioning (HVAC) equipment in Vehicle Maintenance facilities at one service center
Distribution Outages	New underground wires solutions to create ties between exposed circuits for increased operational flexibility
	When retrofitting these assets to mitigate other risks, consider undergrounding exposed overhead lines and equipment
Big Creek Outages	Install debris booms near fire damaged areas to prevent debris flow into water systems
Climate Science Gaps	Studies to better understand nature of climate risk in areas of highest impact to SCE AOS

Temperature | Precipitation, Flooding, Sea Level Rise | Wildfire | Cascading Events | Other

All electric utility adaptation options identified in CAVA were reflected in the Climate Adaptation appendix in the RAMP

Time horizon utilized for adaptation development (2030) informed by 2025 GRC funding window (2025 – 2028)

*Adaptations described within CAVA are synonymous with Mitigations as described in RAMP

Long-term (2050-2070) climate vulnerabilities will drive significant adaptation needs

Potential 2025–2028 Transmission Adaptation Options
Increased inspections, vegetation management, and tower clearing to reduce likelihood of fire damage
Expand remote inspection technology, LiDAR, and satellite imagery

Near term adaptation options being considered for transmission infrastructure as an example are not sufficient to address longer term adaptation needs

Potential Long-Term Transmission Adaptation Options
Construct new transmission lines, upgrade existing conductor to use high temperature - low sag conductor, curtail generation to reduce line sag
Increase tension on conductor to reduce sag and increase clearances by adding or removing sections of conductor, wire shifting, hardware changes, and retensioning wires
Increase clearances around lowest sag point by re-grading areas and removing foreign obstructions
Decrease sag and increase clearances by installing an intersect tower, replacing tower, or raising tower
Underground higher risk lines to eliminate any potential sag and/or clearance issues
Use Transmission Line Ratings Remediation data to re-evaluate At-Risk circuits due to temperature increase
Perform a general survey to statistically describe the typical margin of safety for line clearances
Create design thresholds of maximum allowable ambient temperature that would require certain lines to be derated
Update allowable sag standards to include temperature projections driven by climate change and anticipated load increases
Build channels to divert runoff away from substation
Raise substation sensitive control room equipment to a height that would have significantly less probability of being exposed to water
Collect water offsite to prevent water from entering the substation
Construct new transmission lines around vulnerable substations in areas not impacted by flood to provide additional paths for power to flow to individual distribution systems, increase thermal capacities, and continue to serve impacted customers during the substation outage
Build new redundant transmission and subtransmission circuits such that if a group of high-risk circuits are de-energized, customers can still receive power through a different path
Move currently overhead transmission and subtransmission circuits to underground so they can remain energized during a wildfire
Research the ability to install covers on insulators to prevent soot and debris buildup during a fire and eliminate the need for insulator washing
Relocate substations away from debris flow paths
Block debris from penetrating through the substation and leveling critical equipment
Stabilize slopes near substation to prevent debris flow from occurring
Construct new transmission lines around vulnerable substations in areas not impacted by debris flow to provide additional paths for power to flow to individual distribution systems, increase thermal capacities, and continue to serve impacted customers during the substation outage

Temperature | Precipitation, Flooding, Sea Level Rise | Wildfire | Cascading Events | Other

CAVA and RAMP Integration

CAVA and RAMP Integration

Has SCE thought about how they could layer a climate hazards analysis into the RAMP, and if so, how would that be conducted and what are the challenges?

Since D.18-12-014 and D.22-12-027 require the IOUs to use a Bowtie risk analysis in their RAMPs, how can data or information produced through the CAVA analysis be used to assess climate change-related risks in RAMP filings, both in the short- and long-term? What information is needed from the CAVA process to accomplish this?

Climate change impact from sea-level rise, drought, heat-wave, cascading events, and wildfire frequency increased significantly over years, yet IOUs are not considering the climate impact as a risk driver in their RAMP applications. What approach could IOUs incorporate into the RAMP to include and mitigate the climate change-related risks identified in the CAVAs?

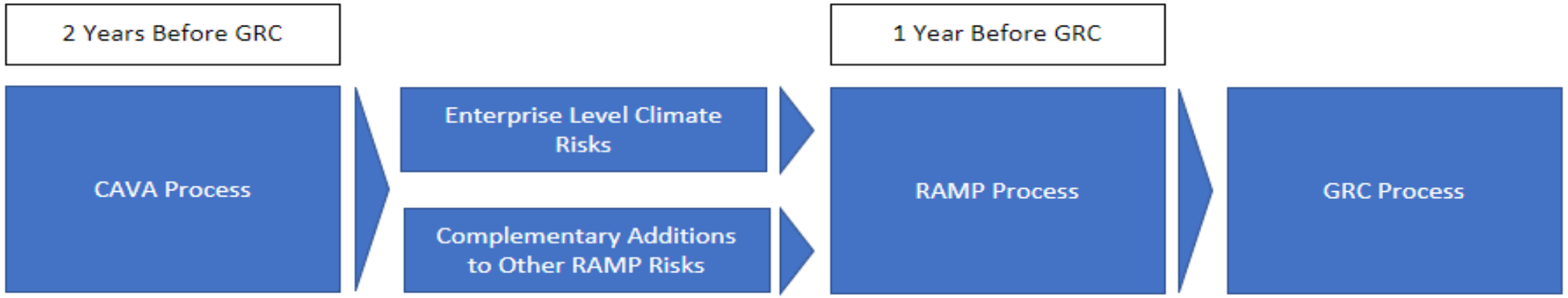
'Climates hazards analysis' is a broad term. SCE has addressed climate change-driven risks in its 2022 RAMP Report, including a dedicated climate change appendix.

RAMP principally is limited to examining the top safety risks that the utility faces in the shorter-term (2025-2028). Climate change impacts manifest over the long-term and not only in safety, but reliability, financial, and other key areas.

Further studies are needed to better understand risk magnitude and other risk parameters in order to better inform the prudent selection of appropriate adaptations beyond the RAMP 4-year window

Staggering the CAVA and RAMP filing dates may allow for more meaningful integration with RAMP filing

- To refine alignment between CAVA and RAMP, the Commission should consider placing some separation between the filing date of the CAVA and the filing date of the RAMP
- Staggered filings may allow for a more orderly process in first finalizing the CAVA analyses, results, adaptation options, and then incorporating that final work product into the RAMP preparation process
- Commission feedback on CAVA can then be incorporated as applicable as the RAMP is developed



Contract and System Analysis

System reliability risks induced by climate change need to be understood across system planning processes and require new regulatory frameworks

Decision required SCE to survey and include a contingency plan for 3rd party resources

- Ordering Paragraph 9-2: Identify facilities they have third-party contracts; communicate with operators and ask them to report the facility's exposure to climate risk. The risk assessment shall include the IOUs' contingency planning in case the third-party asset experiences failure due to climate change.

Survey approach did not result in sufficient feedback to understand risks to system resiliency

- Inconsistent and/or insufficient level of detail in 3rd parties' responses prevented SCE from performing the required risk assessment
- Data requirements from 3rd party operators to depict potential climate change risks are new and potentially conflicting; existing contractual terms may be insufficient to induce 3rd parties to provide a sufficient and consistent level of detail in their responses to understand the reliability impacts of these contracts

A regulatory framework that governs existing/ new independent power producers' climate impact disclosures is needed

SCE performed an internal analysis to understand potential temperature-driven capacity losses of SCE service area generation resources

- Majority of system resources that will be relied on in 2030 and 2050 are not currently under contract / built and could not be studied with survey approach
- Analysis is directional and meant to understand potential system vulnerabilities; further refinement and analysis is needed before specific adaptations can be considered

Nameplate MW of SCE Area Resources Studied for Capacity Loss

Generation Type	Gas*	Hydro	Solar	Battery	Wind
MW in SCE Territory (2030)	20,000	3,000	8,000	4,000	5,000
MW in SCE Territory (2050)	20,000	3,000	33,000	24,000	5,000

Planned resources based on SCE's Pathways 2045 assumptions

*From CEC database, assumes no retirements of existing resources in order to understand potential risks for thermal plants in 2050

SCE system analysis' detailed findings

- Thermal resources exposed to temperature-based forced outage conditions may double in capacity (MWs) and triple in frequency by 2030
- Extreme heat can lower available capacity of Thermal and Solar portfolio by 10%+ depending on scenario
- Extreme heat lowering solar production and battery charging rates will reduce available discharge energy to address energy needs outside of solar generating hours
- Fire activity projected to increase at a greater rate at Northern California interties than along SCE transmission lines through the end of the century, potentially impacting availability of imports

Potential supply shortages, coupled with a projected 6% increase in peak demand by 2030 from increased temperature, highlights the need to incorporate climate change impacts in resource planning processes

System planning processes to be climate informed

Planning Process	Implications from regional climate impacts	Resource/Grid Planning and Investment Implications
System Demand Forecast	• Increased frequency of maximum temperature events and coincident load peak across state • Reduced behind the meter solar output due to maximum temperatures	• Climate change informed load scenarios (including impacts on DERs) serves as basis for statewide and local resource and grid planning
Integrated Resource Planning and Resource Adequacy	• Increased frequency of reduced or uncertain availability of solar, battery storage, thermal, and imports due to temperature events	• Accounting for climate impacts on supply and demand results in climate-informed system capacity needs and highlights value of technological and geographical diversity
Transmission Planning Process	• Reduced availability of imports from heightened regional wildfire risk • Reduced capacity of transmission system during more frequent maximum temperature days	• CAISO and CPUC should consider climate change impacts when defining future transmission needs and topology

Climate change poses heightened systemic risks on California's generation and grid resources, supporting the inclusion of climate change impacts in system planning processes

Q&A

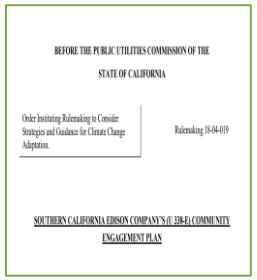
Climate Adaptation Community Engagement

DVC* engagement connects our climate vulnerability assessment to our adaptation implementation plans

January 2021-May 2021

SCE Community Engagement Plan

Outreach to community leaders on adaptive capacity and adaptation engagement, to inform SCE's Community Engagement Plan filed in May 2021


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

SOUTHERN CALIFORNIA EDISON COMPANY'S (U 338-E) COMMUNITY ENGAGEMENT PLAN

October 2021-March 2022

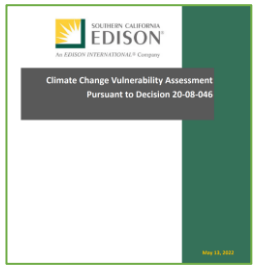
CAVA Community Engagement

Climate Resilience Leadership Group (CRLG) developed engagement plans and materials, plus administered ~800 surveys across over 70 CPUC-designated DVCs to inform CAVA.

May 2022

CAVA Filed

Climate Adaptation and Vulnerability Assessment (CAVA) released by SCE as a first-of-its kind utility look into 2030-2070 grid impacts across 50,000-square-mile service area



2025 - 2028

Adaptation Implementation Plans

SCE's Adaptation Implementation Plans will incorporate equity metrics, which are informed or validated by the results of our DVC community engagement

**DVC=Disadvantaged Vulnerable Community*

Community engagement findings are integrated in CRM and CIM methodologies, which will be used to guide adaptation implementation plans

Metric	What It Is	How It Can Potentially Be Used	How It Was Informed By Community Feedback
Community Resilience Metric (CRM)	A set of scores measuring the sensitivity and corresponding adaptive capacity of a particular community to potential loss of utility service	Inform locational prioritization of adaptation actions, in conjunction with other planning and operational considerations	Based on a series of workshops with environmental and social justice subject matter experts as well as SCE's Community Resilience Leadership Group (CRLG)
Community Impact Metric (CIM)	Set of indicators measuring the positive, negative or neutral effect of an adaptation action on the community it is deployed in	One of the factors used to evaluate adaptation alternatives for a given community	Indicators determined using a combination of research, benchmarking and community input. SCE proposes using feedback from surveys co-developed and administered by CRLG member organizations during actual alternative evaluation

The CRM fulfils the Commission's directive of assessing communities "Adaptive Capacity"; it can be an effective mechanism for promoting equity in DVCs when incorporated into SCE's adaptation implementation plans

The CIM allows SCE to assess the impact of the implementation of adaptation options in DVCs, and again can be used to potentially adjust SCE's adaptation implementation plans to promote equity in DVCs

Community Engagement Insights

- Partners should be compensated for their time—plus offered capacity-building opportunities (e.g., to develop, learn, and act on what they start to learn about climate adaptation)

- Co-production of materials with communities contributed to better overall effectiveness of feedback informing CRM and CIM metrics

- Better planning of community engagement across proceedings, leveraging existing CRLG structure where appropriate, will result in less burden on community partners

- CAVA findings have yet to influence customer programs, with “untapped” potential opportunities including high-heat-hazard-informed approaches to distributed incentive program resources

SCE’s CRLG process is an effective community engagement approach and can be utilized to further build capability among community partners

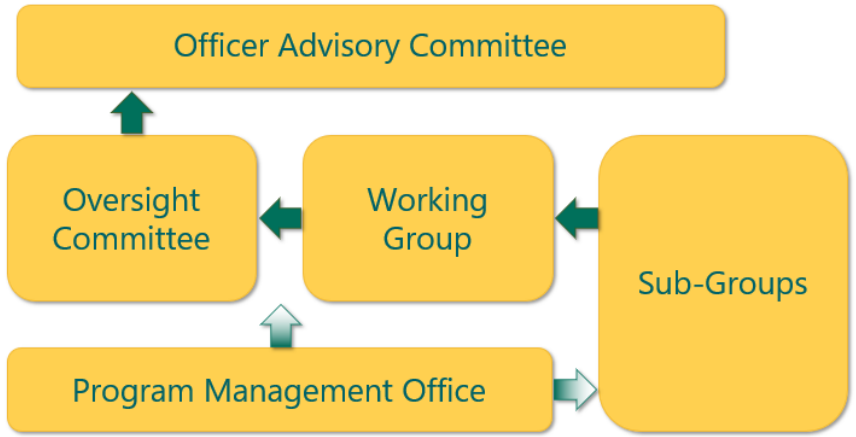
Update on Climate Team

Climate team organization and activities

- SCE continues to utilize the cross-departmental Climate Adaptation team created for the CAVA, with representation from many areas including but not limited to:
  - Transmission and Distribution
  - Generation
  - Information Technology
  - Risk Management
  - Corporate Real Estate
  - Energy Procurement and Management
  - Local Public Affairs
  - Business Resiliency

- SCE also continues to utilize the same team and governance structure, which is ultimately led by SCE's Executive Vice President of Operations (SCE's Designated Climate Officer)

Governance Structure



Accomplishments and upcoming activities

Recent Accomplishments

1. Integrated Climate Change Projections into:
    1. Consumption Load Forecast (Cal-Adapt: temperature)
    2. 2022 Integrated Resource Plan (Cal-Adapt: temperature)

2. Engaged with Cities and Counties that have completed Climate Vulnerability Assessments to identify joint benefit adaptation opportunities

3. Incorporated high level climate trends into SCE's 2023 Wildfire Mitigation Plan filing

Major Upcoming Activities

1. Refining adaptation options from CAVA into GRC proposals

2. Incorporate Climate Change Projections into key planning processes, with a near-term focus on integrating Cal-Adapt temperature projections into:
    1. Load Forecasting, Additional Elements
    2. Transmission and Distribution Planning Processes
    3. Asset Management Programs
    4. Loss of Load Expectation Analysis (Reliability Analysis)

3. Integration of new climate data from California's 5th Climate Change Assessment

4. Post-CAVA Community engagement effectiveness survey

5. Continue engagement with Cities and Counties to identify joint benefit adaptation opportunities

Summary of Key Learnings

Summary of key learnings to guide phase 2 scope

Key Findings
Climate adaptation guidance should continue to follow research from California's Climate Assessments • Same minimum set of primary climate variables (Temperature, Precipitation, Wildfire, Sea Level Rise) should be studied • Flexibility for studying extremes in cascading, coincident, and sequential events in future CAVAs is needed
The CAVA filing timing should be updated to be one year before the RAMP filing to facilitate integration
Identification and integration of climate projections into key regulatory planning proceedings (ex. IRP, RA), to consistently reflect climate impacts across planning processes, is needed to develop future resource portfolios that are resilient to climate change impacts.
SCE Intends to continue using CRLG approach as it as an effective mechanism to conduct community engagement
SCE intends to continue developing and implementing proposed CRM and CIM equity metrics to consider equity considerations in climate-informed investments

Potential Phase II Issues

Administrative Law Judge Cathleen Fogel

1. Should the Commission refine any CAVA requirements as adopted in D.19-10-054 or D.20-08-046?

a. Timing of filing and/or type of filing?
b. Data sources or methodologies used in CAVAs?
c. Community Engagement Plan (CEP) process and/or how the CEP informs CAVAs?
d. Format or organization of CAVAs?
e. Commission review and approval process for adaptation proposals?
f. Other areas?

2. How should the CAVA be used to inform other proceedings or IOU activities?

a. What should be the relationship between the CAVA and RAMP filings?
   - In terms of climate hazard forecasts /risk assessment?
   - In terms of adaptation / risk mitigation proposals?

b. Are there other proceedings and/or IOU activities that the CAVA should inform? If so, how?

c. Are additional Commission actions needed to avoid potential "stranded asset" investments identified in CAVAs?

3. What feedback loops into the CAVA from other proceedings or IOU activities are needed, if any?

a. Is incident data from risk events being collected to inform the CAVAs?
   - E.g. risk events driven by severe winter rainstorms

b. Is data on mitigated safety risks informing the CAVAs?
   - E.g. Areas where the establishment of microgrids may reduce risks driven by climate hazards

Additional Potential Issues

(4) Is there a need for improved interagency coordination on climate adaptation? If so, what improvements are needed?

(5) Should the CAVA process be expanded to the electric Small and Multi-Jurisdictional Utilities (SMJUs)? If so, how?

Next Steps

- March 28 Pre-hearing conference will discuss issues of scope and schedule.
- Parties are encouraged to meet prior to the PHC to collaboratively discuss potential issues in scope and schedule.
- Parties doing so may file Joint Pre-PHC statements no later than March 24.
- Parties wishing to participate in PHC must identify one speaker no later than March 21.

- Questions?

Climate Adaptation Proceeding Phase II

Staff Observations and Initial Recommendations for the Climate And Vulnerability Assessments

Adam Banasiak and Kristin Rounds
Climate and Equity Initiatives Team
Energy Division
March 13, 2023

California Public Utilities Commission

Overview -

1. Fitting the CAVA Together with Other Proceedings

5 Min Q&A

1-hr LUNCH

2. Analytical Methods- Timeframe & Utility Data

5 Min Q&A

3. Analytical Methods- Scenario Baselines for Planning

10 Min Q&A

4. Looking to the Future
5. Next Steps

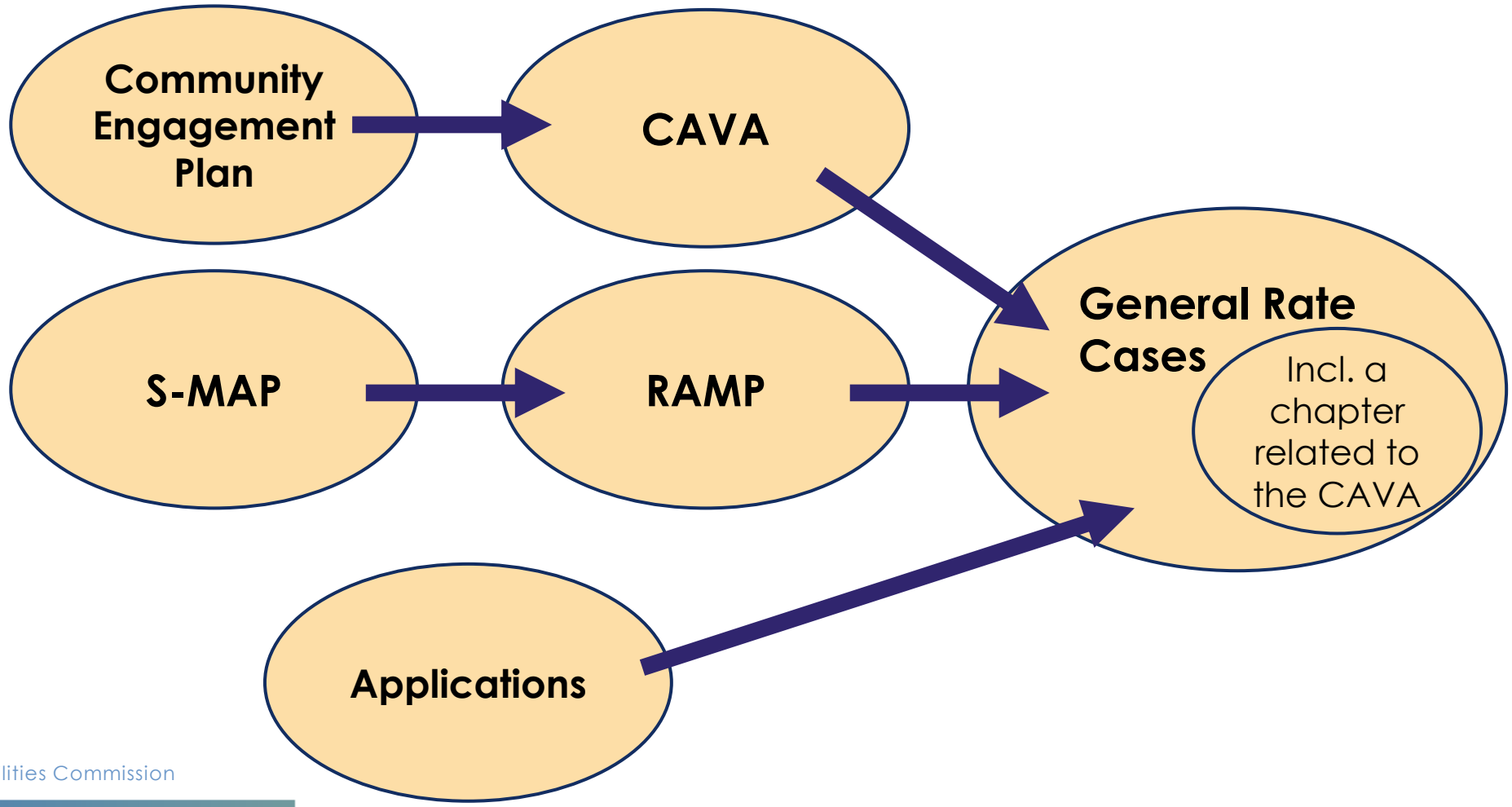
Where are we in the Climate Adaptation Vulnerability Assessment process?

	2021	2022	2023	2024	2025	2026
SCE	**CEP**	**CAVA**	**GRC**			
PG&E			**CEP**	**CAVA**	**GRC**	
SoCalGas				**CEP**	**CAVA**	**GRC**
SDG&E				**CEP**	**CAVA**	**GRC**

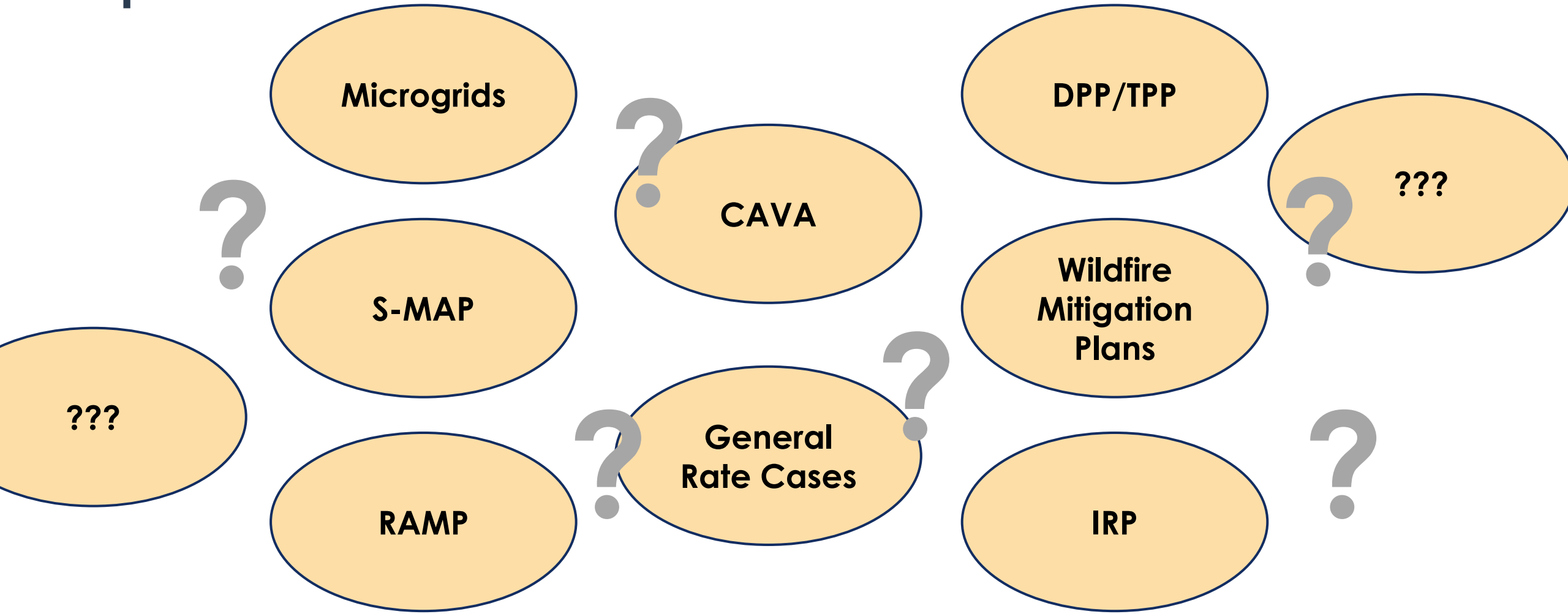
- CEP – Community Engagement Plan
- CAVA – Climate Adaptation Vulnerability Assessment
- GRC – General Rate Case

D.20-08-046: CAVA Information Flow

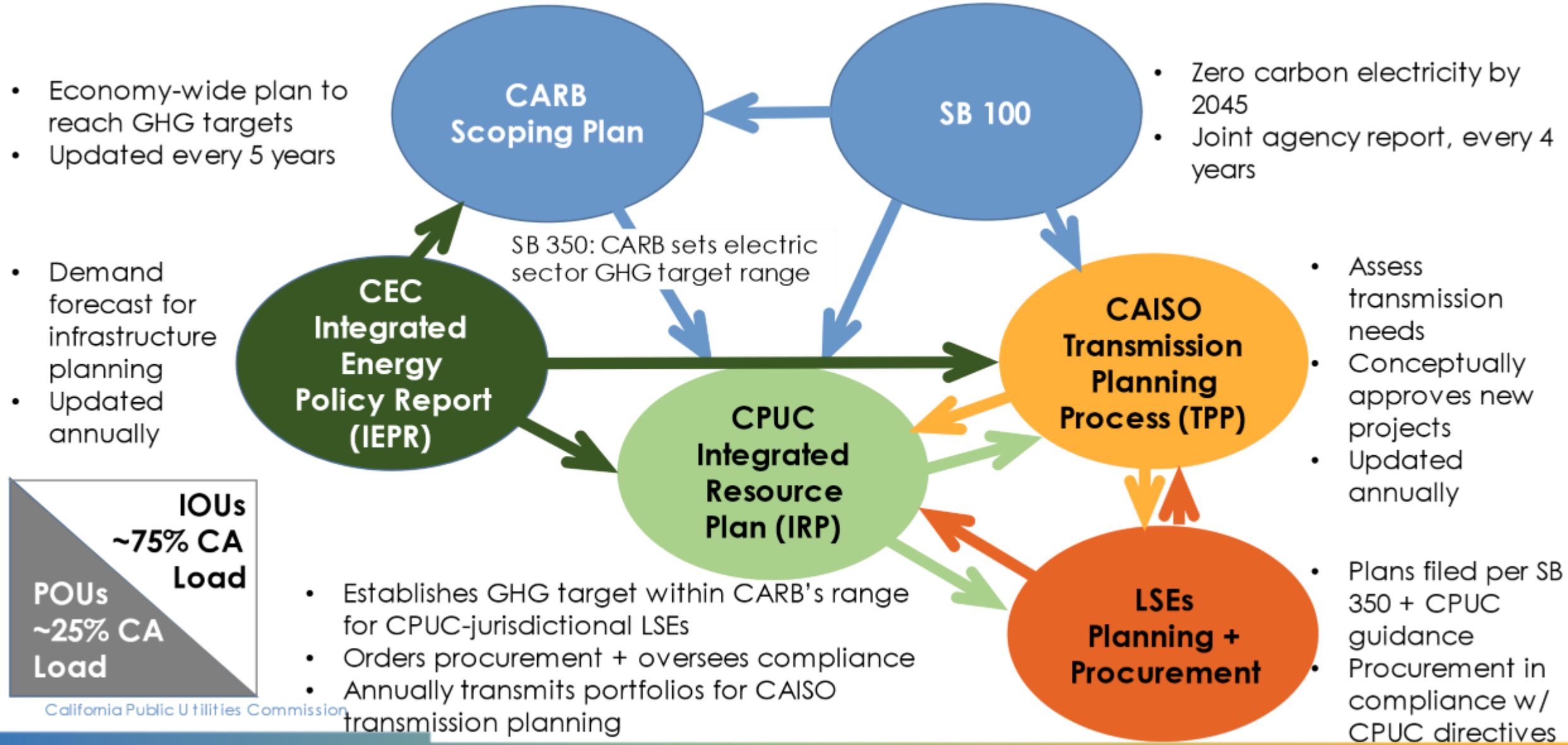
- T-2 years
- T-1 years



Many Proceedings (Should) Consider Climate Change Impacts



CA's Electricity Planning Ecosystem is Complex



- Economy-wide plan to reach GHG targets
- Updated every 5 years

- Zero carbon electricity by 2045
- Joint agency report, every 4 years

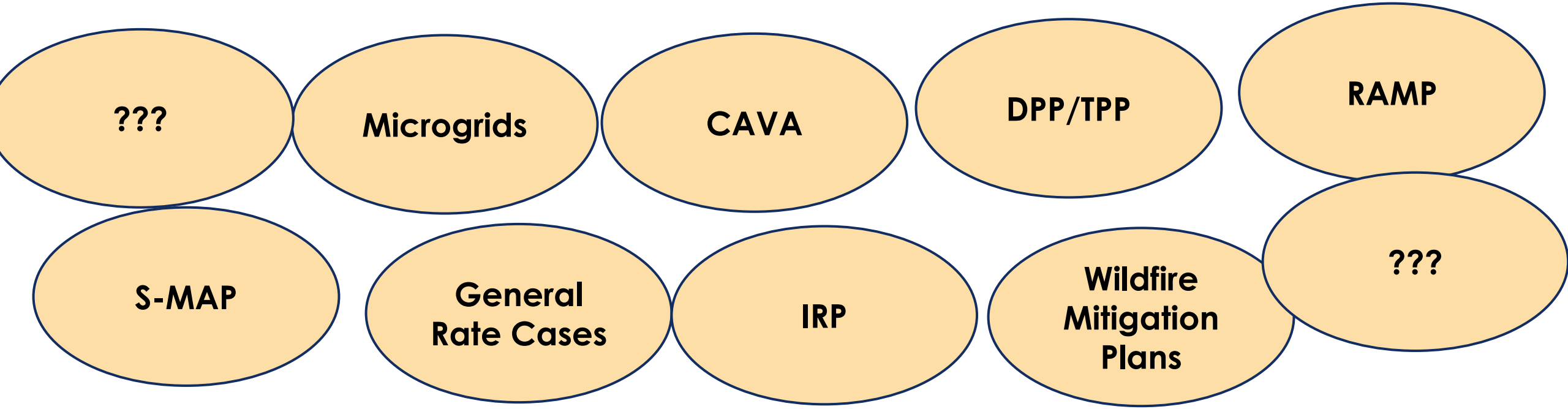
- Demand forecast for infrastructure planning
- Updated annually

- Assess transmission needs
- Conceptually approves new projects
- Updated annually

- Establishes GHG target within CARB's range for CPUC-jurisdictional LSEs
- Orders procurement + oversees compliance
- Annually transmits portfolios for CAISO transmission planning

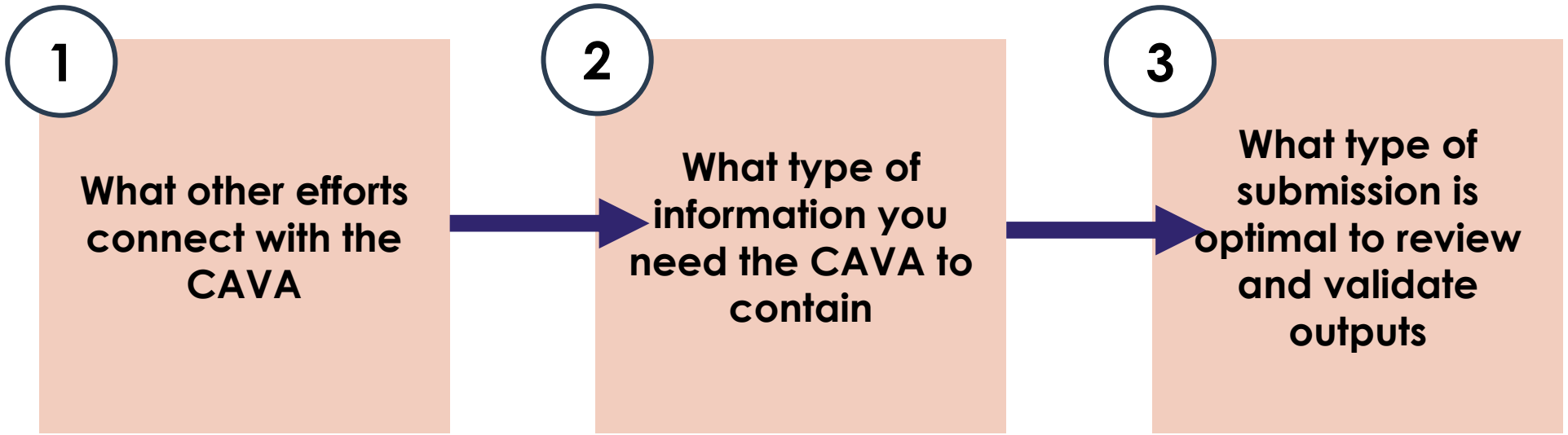
- Plans filed per SB 350 + CPUC guidance
- Procurement in compliance w/ CPUC directives

Many Proceedings Should Consider Climate Change Impacts



- What inputs, outputs, and feedback loops keep our decisions streamlined and harmonious?

The Future: Putting the CAVA into the Planning Ecosystem



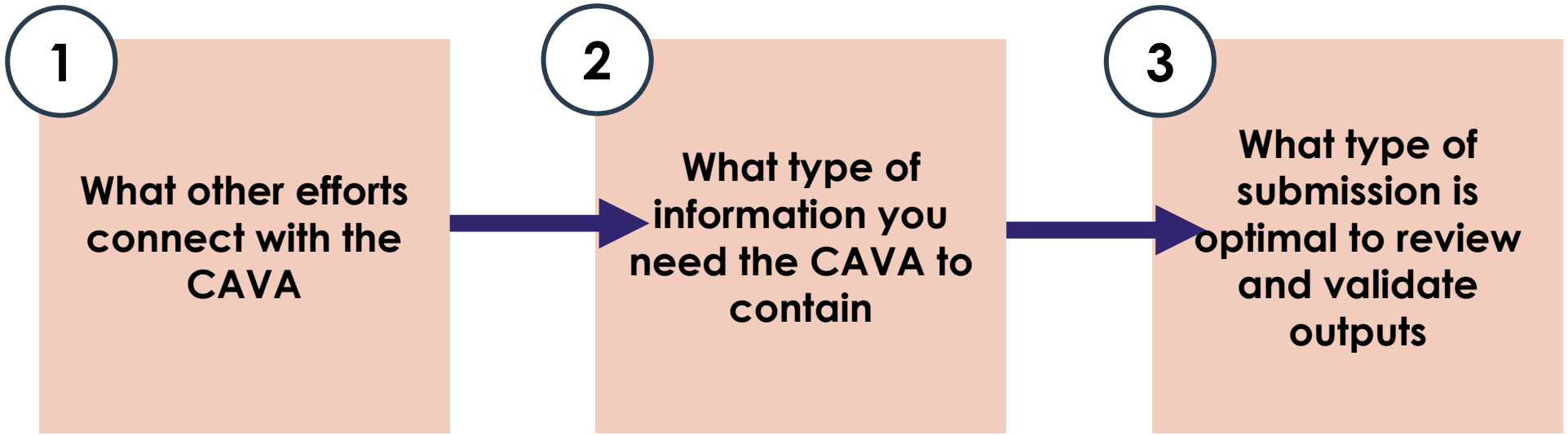
What information should the CAVA provide and what should be provided elsewhere?

- D.20-08-046 requires IOUs to provide two distinct things – Step 1 Risk Analysis and Step 2 Possible Adaptations. Both seemed during staff review to be incomplete in D.20-08-046 in some way:
  - D.20-08-046 does not require the risk analysis to detail the models or inputs used in a way that would allow for easy re-creation or investigation.
  - D.20-08-046 doesn't require that the possible adaptation be ranked with any set of metrics, cost-benefit or other criteria parties discussed beforehand.
- How can we better link the CAVA to utility planning and on-the-ground outcomes? How do we avoid redundancy in modeling and equity efforts?

What information should the CAVA provide?

- Should the focus be on risk analysis only, and then the utilities perform more detailed adaptation analysis in separate venues like the RAMP?
  - This keeps Step 1 – Climate Risk Analysis in the CAVA and creates a proceeding where those expert and parties can contribute. Retains the majority of the existing CAVA.
  - Allows the Risk Analysis to be exported to other proceedings where subject matter experts in narrower areas – distribution planning, generation, microgrids, etc. – can combine that climate risk information with other context and specifics.
  - Encourage interaction/comment from parties.
- This change disconnects the CAVA to the GRC pipeline.

The Future: Putting the CAVA into the Planning Ecosystem



Form follows Function: Organization, Type of Filing & Timing

- Is an advice letter the best type of filing for the information the CAVA will contain?
- Does there need to be better guidance on how to assemble and present the CAVA to make getting the information you need from it easier? Do we need a template?
- Who is the audience?
- Does the existing timeline, submittal of the CAVA one year before the GRC, make sense depending on how information needs to flow in and out of the CAVA?

5 Minute Q&A

Analytical Methods of the CAVA

Timeframe of Focus, Inputs and Assumptions, and Standardization

Analytical Requirements for the CAVA

D.19-10-054 - Data Sources

1. Identifies the California Fourth Climate Assessment and any subsequent assessments as the primary source of climate forecasts, pathways, and scientific studies.
2. Establishes the criteria for any further data or models that energy utilities may develop to understand climate impacts.
3. Directs the use of Representative Concentration Pathway (RCP) 8.5, aka "business-as-usual" scenario.

D.20-08-046 - Risks, Methods, and Timeframes

1. Requires analysis of Temperature, Sea-Level Rise, Precipitation, Wildfire, and cascading events for utility-owned infrastructure & contracts.
2. Directs IOUs to use the Department of Water Resource's two-step vulnerability assessment methodology that 1) combines exposure and sensitivity to determine risk, and 2) combines risk and adaptive capacity to determine vulnerability.
3. Sets intermediate and long-term timeframes for analysis. The intermediate focuses on the next 10-20 years while the long-term addresses the next 30–50 years. The decision considers the “key time frame” as the next 20–30 years.

Potential Refinement: Timeframe of Focus

- Impacts from climate change are happening real-time, with tangible and measurable effects on utility service and infrastructure.
- Evaluation of historical weather patterns is already baked into most CPUC planning processes. Forward-looking non-stationary weather data is currently not assessed in these processes at all, let alone with the level of depth provided in the CAVA.
- **Should near-term climate-hazard modeling be prioritized along with long-term in the CAVA?**
- **Further, how should near-term climate hazards inform long-term planning?**

Potential Refinement: Utility Data

- It is unclear which infrastructure datasets are being used to inform climate risk analysis in the CAVA. More transparency is needed into what the IOUs are basing their analysis on.
- There should be consistency in the use of infrastructure datasets- whatever underlies the analysis for Wildfire Mitigation Plans, RAMPs, and GRCs should be used for the CAVAs (making accommodations for timing).
- Energy Division is interested in post-emergency event reporting that can be used to inform best practices for adaptation.
  - How do utilities collect data on emergency events (where outages were located, what infrastructure was affected and how, etc.)? Where is this data published? Should data on risk events driven by climate hazards and the associated utility response be included in CAVA filings? If so, how?

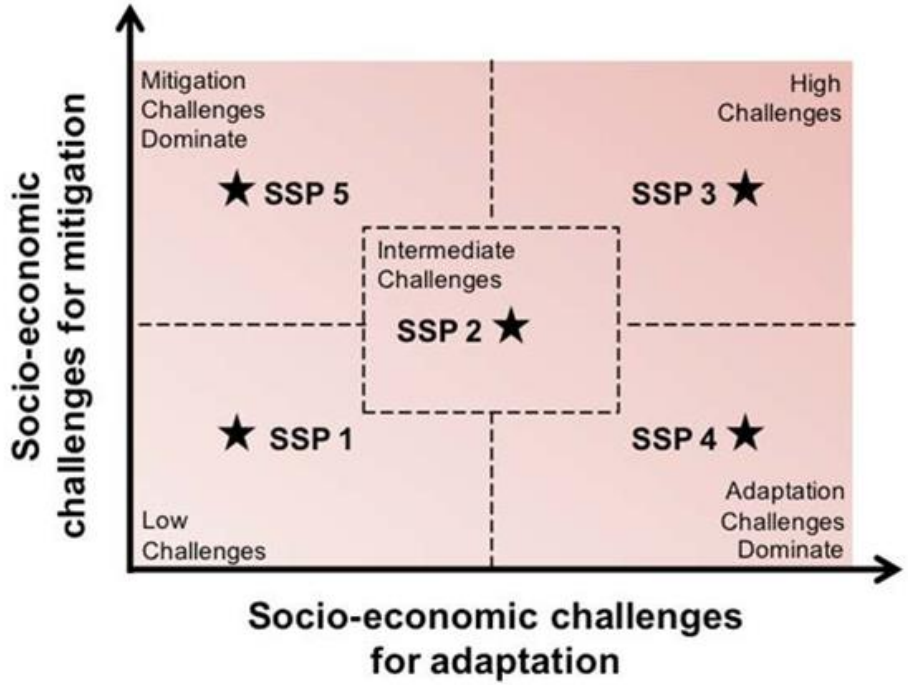
5 Minute Q&A

Necessary Refinement: Moving Away from Use of RCP 8.5

- D.19-10-054 laid out three specific requirements in relation to the use of RCP 8.5
  - **OP 3**: "**The energy utilities shall adhere to at least the same climate scenarios and projections used in the most recent California Statewide Climate Change Assessment when analyzing climate impacts**, climate risk, and climate vulnerability of utility systems, operations, and customers. Third party analyses or datasets used by the energy utilities should be derived from or based on the same climate scenarios and projections as the most recent Statewide Climate Change Assessment."
    - **OP3b:** "If the Fifth Assessment or future Assessment updates these climate scenarios and projections, the **energy utilities shall align their analyses with the newly adopted scenarios and projections**."
  - **OP 4:** "Energy utilities are directed to use the business-as-usual Representative Concentration Pathways 8.5 for planning, investment and operational purposes."
  - **OP 6**: "**If the Fifth Assessment or a future Assessment updates these models, representative concentration pathways, climate scenarios or projections, the energy utilities shall align their analyses with those updates** by filing a Tier 3 Advice Letter with Energy Division within six months of the new Assessment update. "

Necessary Refinement: Moving Away from Use of RCP 8.5

- Representative concentration pathway (RCP) 8.5 is one of several scenarios developed by climate experts to provide plausible descriptions of the future, based on socio-economic scenarios of how global society grows and develops.
- Each RCP represents a level of radiative forcing, which measures the combined effect of greenhouse-gas emissions and other factors (such as atmospheric aerosol levels) on climate warming.
  - RCP 8.5 = 8.5 W per square meter excess radiative loading in the year 2100 due to anthropogenic carbon emissions. Current baseline is 340 W/m2
- The RCPs were used for the IPCC 5th Assessment Report, but the IPCC has since transitioned to the use of Shared Socio-economic Pathways (SSPs).
- Cal-Adapt will be updated to include the latest IPCC data in 2023, **which will no longer include RCP baselines**. They will be replaced with SSPs.



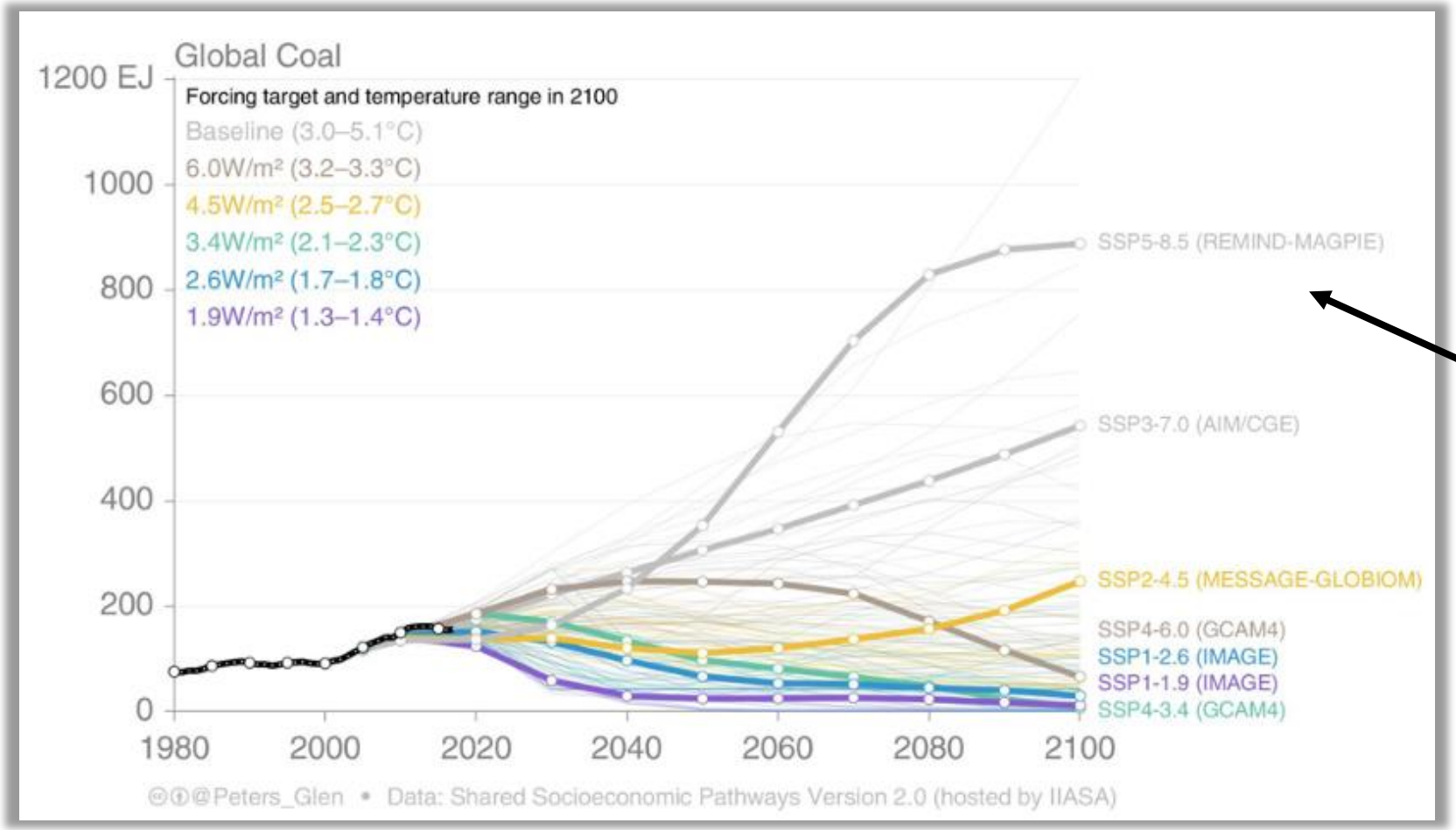
Potential Refinement: Choice of SSP Planning Baseline, Need for Sensitivity Analysis

- The new SSPs offer five pathways that are defined by socioeconomic narratives and levels of radiative forcing. There are 5 socioeconomic narratives (SSP1, SSP2, etc.) and 6 forcing levels (1.9, 2.6, 3.4, 6.0, 7.0, 8.5) analyzed in the 6th IPCC Assessment. Scenarios are now defined by which socioeconomic narrative and mitigation target they correspond to.
- Cal-Adapt is updating its database to include data from the most recent IPCC Assessment. In 2023, the Cal-Adapt analytics engine is set to include data for **SSP 2-4.5, SSP3-7.0, SSP5-8.5.**
- With Cal-Adapt's (and the California Change Climate Assessment's) move away from RCPs, Staff recommend the Commission consider a new baseline for CAVA planning purposes.

Which Shared Socioecomic Pathway Baseline Should Link to Investments?

- RCP 8.5 was once termed the "business-as-usual" scenario that was recommended for use by policy makers when assessing mitigation and adaptation options. That designation has now been given to SSP3-7.0, which shows corresponding levels of emissions.
- Some energy experts have challenged the designation of these scenarios as "business-as-usual," stating they are based on socioeconomic assumptions that are highly unlikely (Hausfather and Peters 2020).

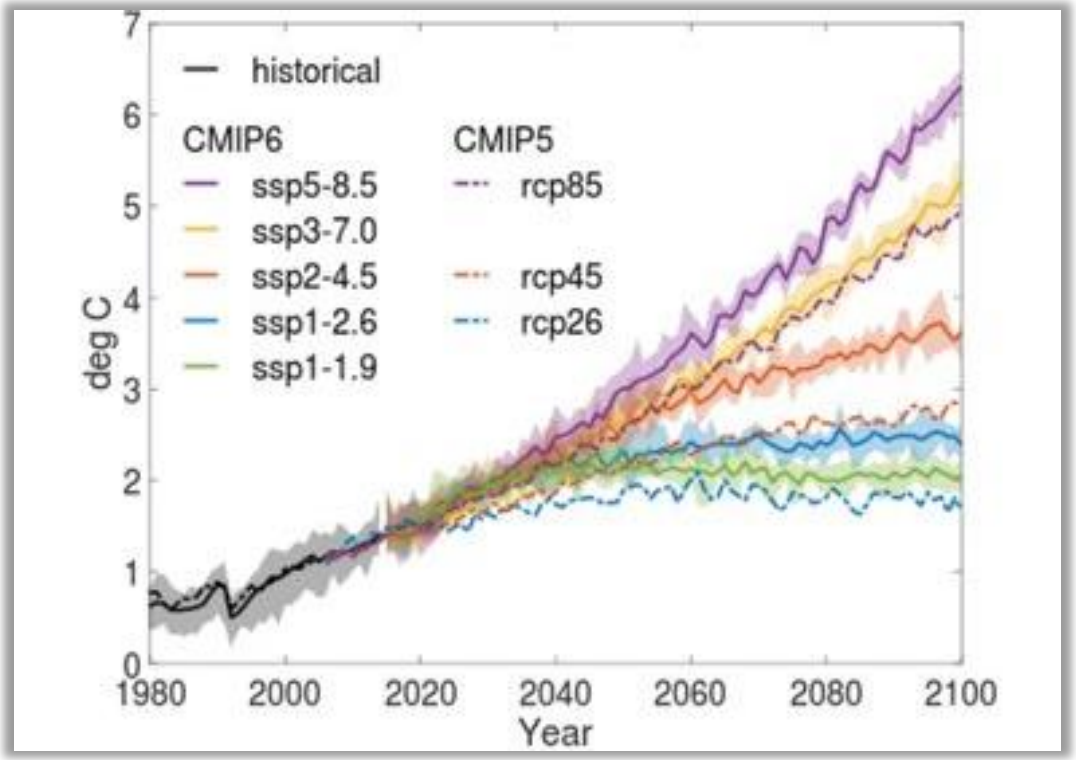
RCP 8.5 and SSP3-7.0 assume significant amounts of coal consumption in the future global economy



This scenario assumes that coal use will increase to 6.5x the amount that is currently used for global energy production

Which SSP Baseline Should Link to Investments?

- Uncertainty in carbon cycle feedback loops makes the relationship between emissions output and atmospheric carbon concentrations hard to predict.
  - A level of emissions typically associated with a high level of atmospheric carbon concentrations (RCP 7) could lead to an even higher level of atmospheric concentration (for example RCP 8.5) once carbon feedback loops kick-in.
- The scenario baselines don't start to significantly diverge until after 2050. Shorter-term climate risk may ultimately look the same regardless of the baseline.



SSP Planning Baseline Will Reflect Risk Tolerance

- Connecting SSP baselines to adaptation investments makes them a reflection of our tolerance for climate risk. Planning for the worst-case scenario will make adaptation more expensive, but planning for the best-case scenario could leave the system more vulnerable to climate impacts.
- Energy Division does not have a definitive recommendation for which SSP scenario to use as the basis for the CAVA and for investment purposes at this time. We look forward to hearing stakeholder perspectives on this issue.
- **We do recommend that the IOUs conduct sensitivity analysis in their CAVAs**, which would require risk analysis across **multiple scenarios and climate variables** in order to better understand the range of possible risk outcomes.

Beyond the SSP Baseline…

- There is additional potential to move towards basing CAVA analysis on Global Warming Levels (GWLs) instead of target years to avoid temperature bias in global climate models. For example, instead of assessing changes in precipitation by the year 2070, we would instead report changes in precipitation at global warming levels of 1.5, 2, 3 and 4°C.
- The recommended approach used in the latest IPCC assessment (AR6) suggests for the latest CMIP6 models to develop ensemble averages centered by GWL, not year.
  - See https://www.nature.com/articles/d41586-022-01192-2
- This issue is being explored by SMEs in the Integrated Resource Planning proceeding. Energy Division will continue to coordinate on this issue internally and share more information once its available.

10 Minute Q&A

Looking to the Future

Climate Adaptation for Small and Multi-Jurisdictional Utilities

- The current CAVA requirements are only for the three major IOUs. While SMJU's are respondents to this rulemaking, the Commission has not yet required any specific adaptation planning process for SMJUs.
- If SMJU's were to be asked to provide CAVAs to the Commission, the size of these entities, their capacity to produce such analysis, and the relevance to their operations & services must be considered.
  - Liberty Utilities does not own many generation assets and does not own any transmission lines. They operate under an Energy Services Agreement with NV Energy, are not a part of CAISO, and are not required respondents of the IRP proceeding.
  - Bear Valley is similar. They serve just over 24,000 customers and are only responsible for distribution system assets and own a total of 8.4MW of generation capacity.

Next Steps

- March 28 Pre-hearing conference will discuss issues of scope and schedule.
- Parties are encouraged to meet prior to the PHC to collaboratively discuss potential issues in scope and schedule.
- Parties doing so may file Joint Pre-PHC statements no later than March 24.
- Parties wishing to participate in PHC must identify one speaker no later than March 21.

Update: Climate Resilience at PG&E

Nathan Bengtsson, Lead, Climate Resilience – Phase II Initial Workshop, March 13, 2023

PG&E At-a-Glance

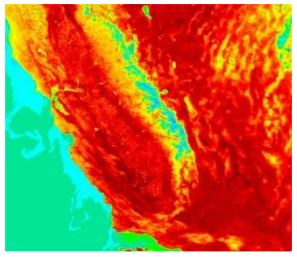
PG&E is focused on providing safe, reliable, affordable and clean energy to nearly 1-in-20 Americans…

24,000 employees	**5.3 million** electric customers	**~90%** GHG-free energy	**126k** Circuit miles of lines
70,000 square mile service area	**4.4 million** gas distribution customers	**7,700** MW of owned electric generation capacity	**49k** Miles of gas pipeline

PG&E Climate Hazards At-a-Glance

…in an operating environment more frequently and severely impacted by climate-driven physical hazards.

Endemic Physical Climate Hazards


Heat


Subsidence


Drought


Precipitation


Sea Level


Wildfire Risk

- Increasing frequency and severity
- Uncertainty

A Timeline of Climate Change Resilience Initiatives at PG&E

2018

- Public Safety Power Shutoffs (PSPS)

2020

Climate Vulnerability Assessment and Community Engagement Plan

- Wildfire Mitigation Plan
- Enhanced Vegetation Management Program

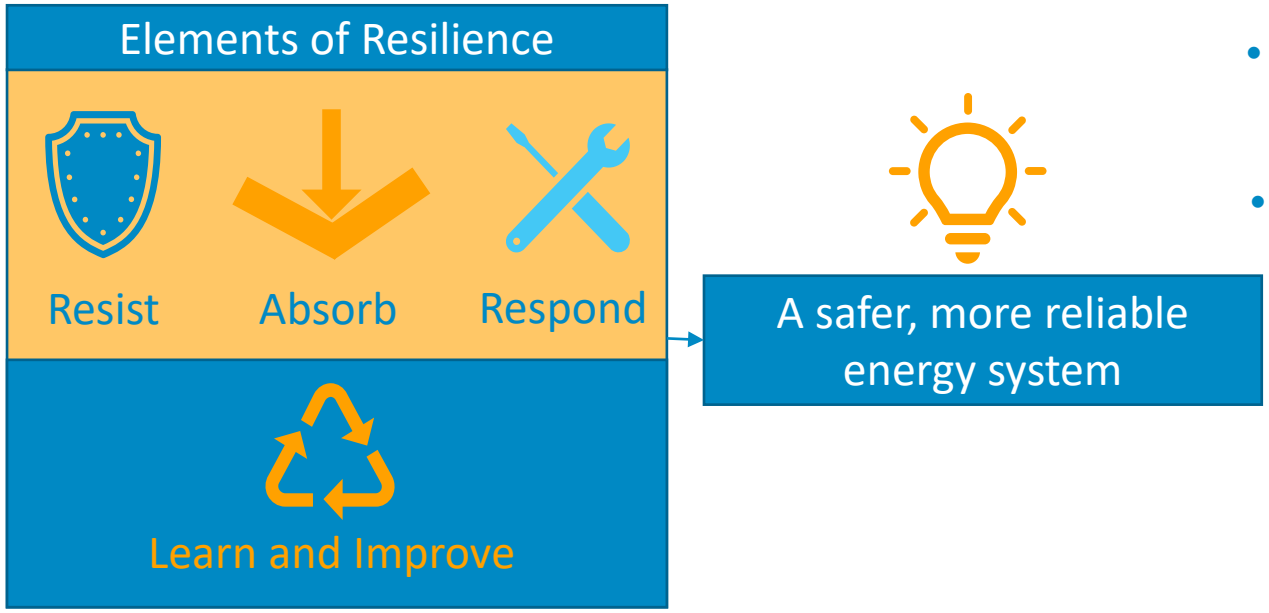
2021

- Enhanced Powerline Safety Settings (EPSS)
- 10k Undergrounding Commitment
- Climate Resilience GRC Chapter Established
- Team Expansion; move to Engineering, Planning & Strategy

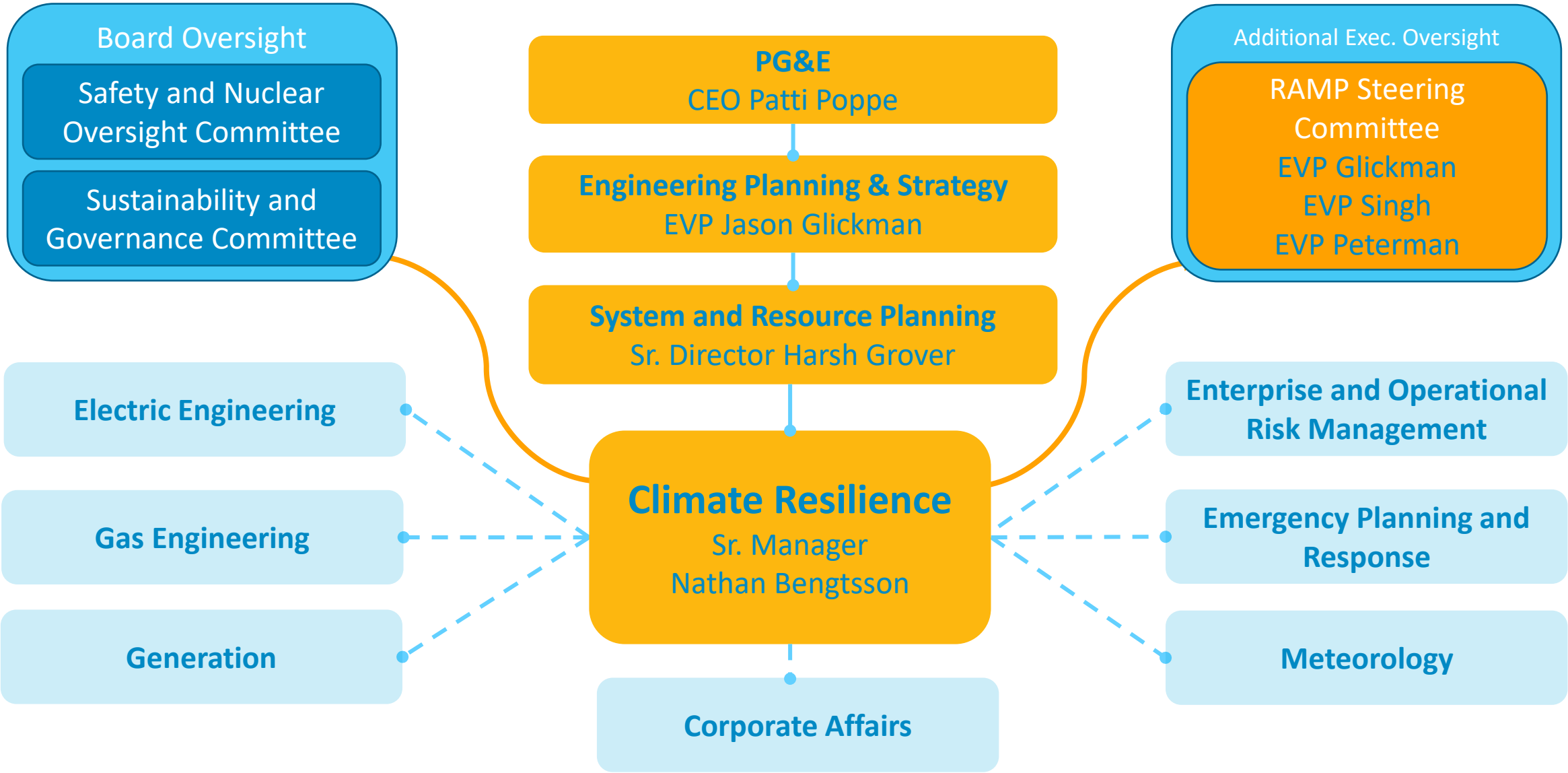
2022

- PG&E Climate Strategy Report
- FEMA BRIC Award for Flood Protection
- EPRI Climate READi
- Climate-Informed Design Guidance Initiative

2023 +

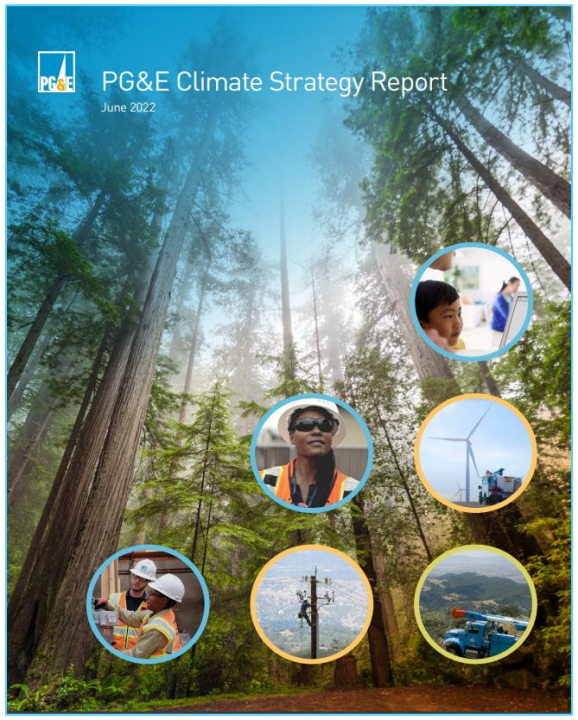


Climate Resilience Functional Organization



Structure of Climate Initiatives at PG&E

Climate Mitigation



[Sustainability Report](#)
[Climate Strategy Report](#)

Climate Adaptation

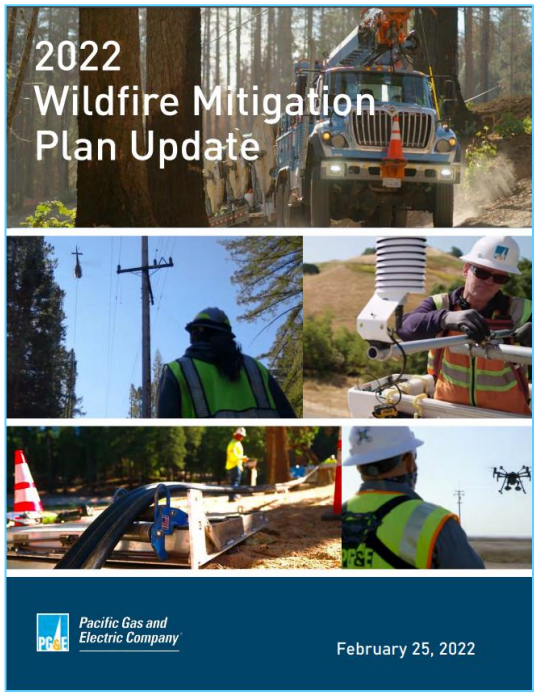
Programmatic, multi-hazard climate adaptation

PG&E's Climate Vulnerability Assessment

(To be filed in May 2024)

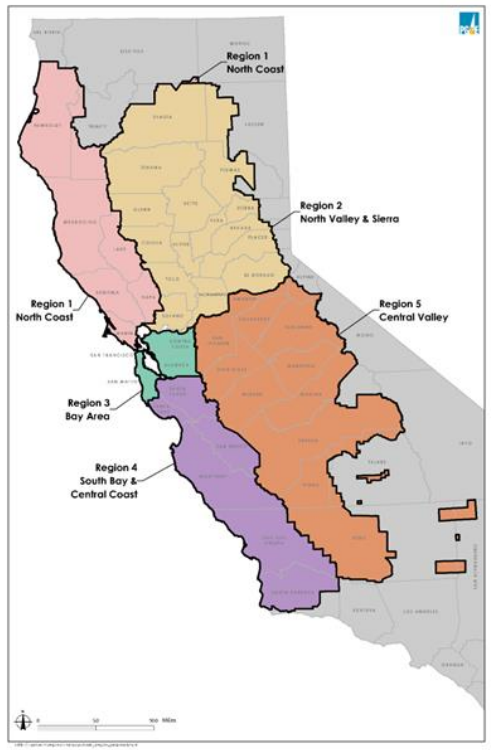
Climate Resilience Team

Wildfire Mitigation

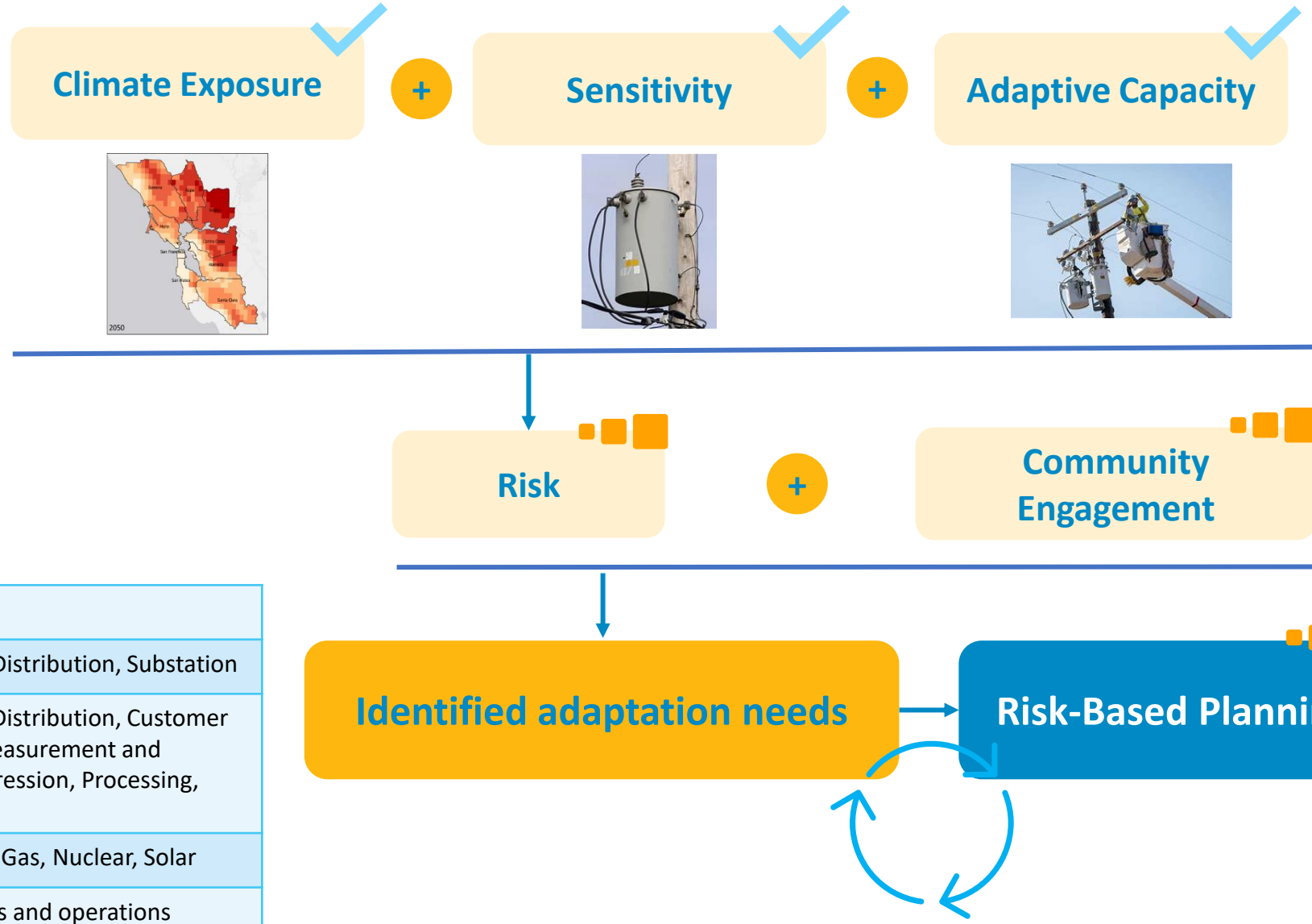


[Wildfire Risk Management](#)

Update: PG&E's Climate Vulnerability Assessment

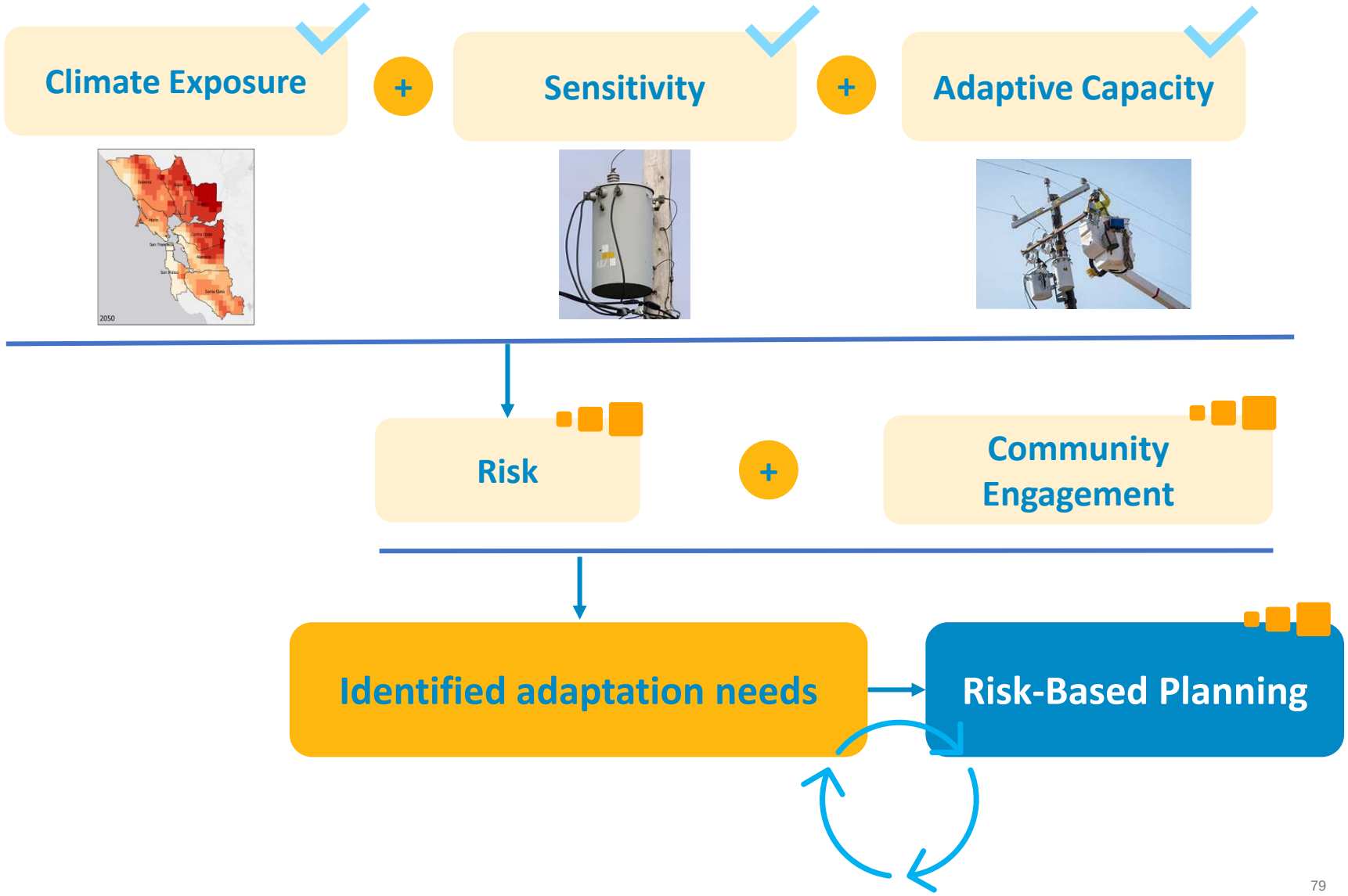


Functional Area	Asset Families
Electric Engineering	Transmission, Distribution, Substation
Gas Engineering	Transmission, Distribution, Customer Connected, Measurement and Control, Compression, Processing, Storage
Generation	Hydro, Natural Gas, Nuclear, Solar
CRESS, IT, other operations	Critical facilities and operations



CVA Insights

1. The CVA is foundational to understanding how to systematically address physical climate risk.
2. Future CVA's should seek to extend foundational analysis.
3. CVA requirements regarding data sources should be structured to accommodate rapid advances in climate science.
4. Clear planning guidance (e.g. RCP 8.5) provides a useful baseline for CVA analysis; and the complexity of climate hazard analysis recommends flexibility in study design.



Update: CVA Community Engagement Plan

Regional Approach & Scope

- Engagement across 5 Regions
- Engagement is based on lived experience
  - Impacts of climate hazards and energy outages
  - Community resilience needs (preparedness, response and recovery)
  - Barriers to engagement (linguistic, geographic, digital, etc)

Community-Based Organization (CBO) Partners

- Organizations that work with disadvantaged, vulnerable communities (DVCs) and climate-vulnerable communities
- Engagement as capacity building
- Fair compensation

Chinese Newcomers Service Center, San Francisco

Update: CVA Community Engagement Plan

Integration of CVA and CEP Results are designed into Engagement Plan.

Methodology

- Research Interviews
- Community Surveys
- Advisory Groups
- Adaptive Capacity Index
- Continued Engagement

Results

- Impacts of climate hazards and energy outages
- Community resilience needs
- Barriers to engagement

Outcomes

- CVA Community Resilience Chapter
- Equity Framework to prioritize adaptation recommendations
- Beyond the CVA

Community Engagement Insights

Lessons Learned and Topics for Phase II

- Clarity on content of engagement
- Inclusion of climate-vulnerable populations in "DVC" umbrella
- Guidance for using community "adaptive capacity" in prioritization
- Timely post-engagement surveys allow for feedback implementation

Chinese Newcomers Service Center, San Francisco

Stone Soup Fresno, Fresno

"I was wary that this would be a rubber-stamped process, but [CBO] members and facilitators stayed honest and created a powerful process."

"I appreciate the intentionality and slow, deliberate pace of the [CEP Process]-I felt that our organization and capacities were always centered and respected, and we were met where we were."

"I felt supported through this process."

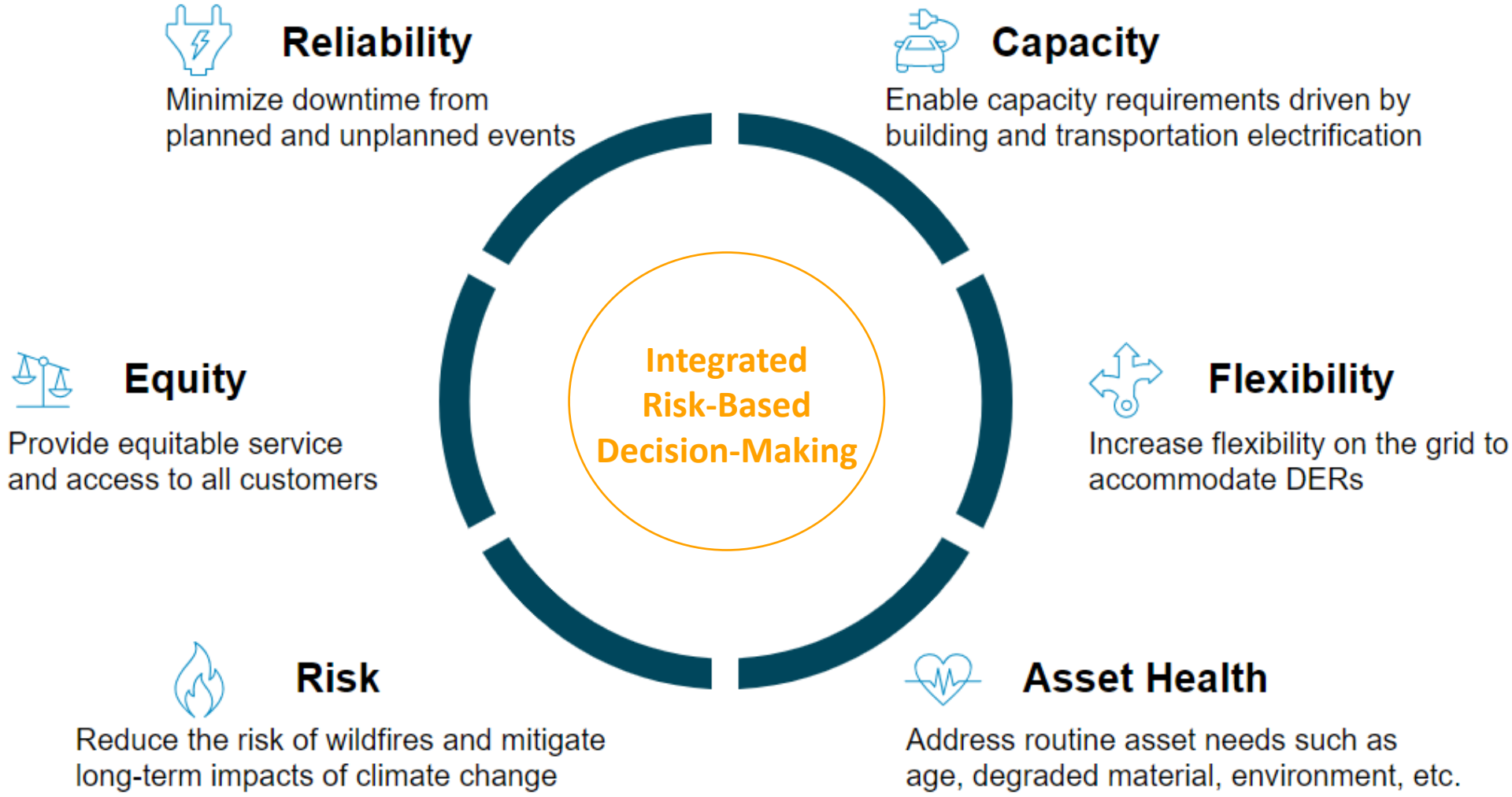
Little Manila Rising, South Stockton

Meta Learning #1

Climate Vulnerability Assessment is the *beginning* of climate resilience

Meta Learning #2

Climate Resilience must be considered in context of grid priorities



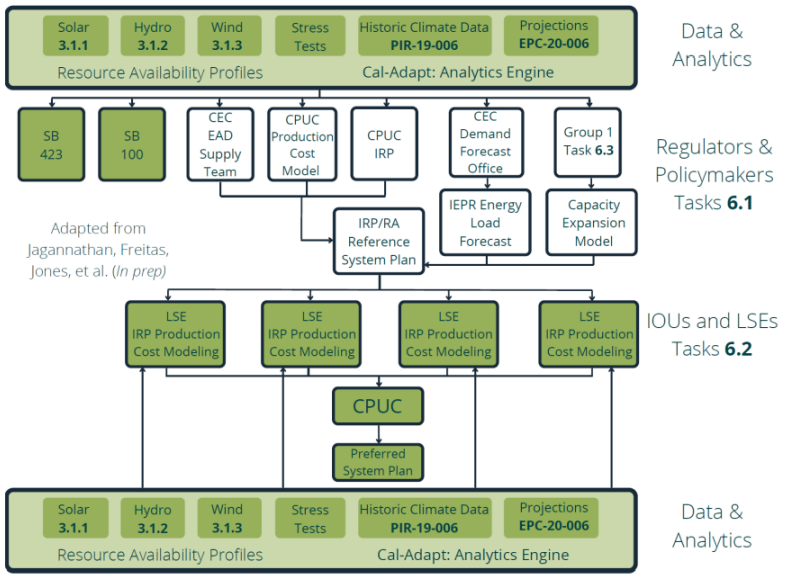
Meta Learning #3

Energy-sector climate resilience can be accelerated via a coordinated and consistent policy framework

Related CPUC Proceedings
Risk-based Decision-Making (RBDF) OIR
Microgrid/Value of Resilience OIR
Integrated Resource Plan (IRP) Proceeding
Risk Assessment Mitigation Phase Filing
General Rate Case Filing

EPC-21-037

External Connections



Summary of Insights

Meta Insights

1. Climate Vulnerability Assessment is an initial step in building climate resilience.
2. Climate resilience must be considered in the context of other important goals.
3. Energy-sector climate resilience can be accelerated via a coordinated and consistent policy framework.

Vulnerability Analysis Insights

1. The CVA is foundational to understanding how to systematically address physical climate risk.
2. Future CVA's should seek to extend baseline analysis.
3. CVA requirements regarding data sources should be structured to accommodate rapid advances in climate science.
4. Clear planning guidance (e.g. RCP 8.5) provides a useful baseline for CVA analysis; and the complexity of climate hazard analysis recommends flexibility in study design.

Community Engagement Insights

1. Clarity on content of engagement
2. Inclusion of climate-vulnerable populations in "DVC"
3. Guidance for using community "adaptive capacity" in prioritization
4. Timely post-engagement surveys allow for feedback implementation

Climate Adaptation OIR – Phase II

March 13, 2023

Max Beller

Climate Adaptation Advisor

Climate Adaptation Team

- **Brian D’Agostino -** Vice President, Wildfire & Climate Science
- **Sandeep Aujla -** Director, Fire Science & Climate Adaptation
- **Mark Mezta –** Manager, Climate Adaptation
- **Robyn Brookshire –** Senior Community Resilience Advisor
- **Max Beller –** Climate Adaptation Project Advisor
- **Brianna Haugen –** Climate Adaptation & Resilience Specialist

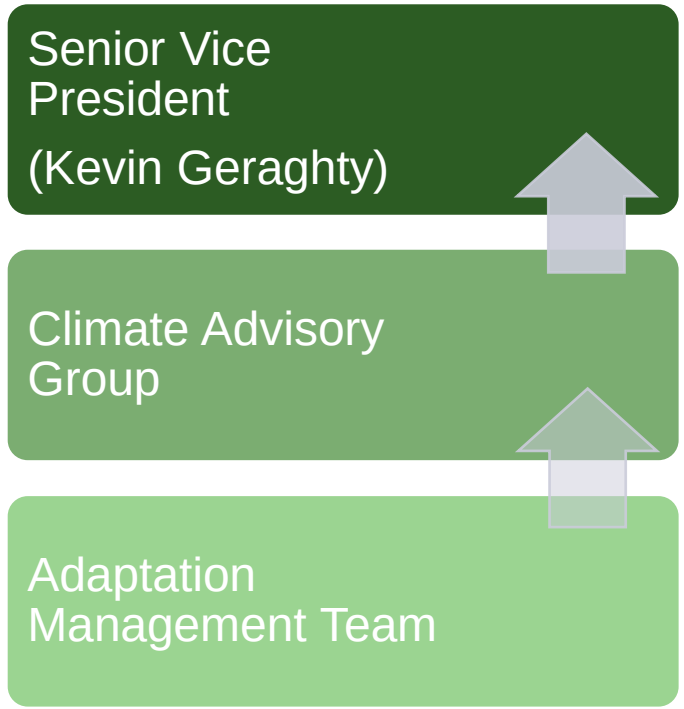
Climate Advisory Group & Adaptation Management Team

Cross-departmental team to help identify & address system-level vulnerabilities to climate change impacts & pathways to mitigate known climate-related risks

Guiding Principles

1. Compliance with the Climate Adaptation OIR
2. Climate & equity are core considerations
3. Build comprehensive approach to climate change related risk
4. Apply a breadth of knowledge to address this challenge

Governance Structure



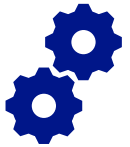
CAG & AMT – Accomplishment Highlights

Facilitated data access and workshops to determine sensitivity scores

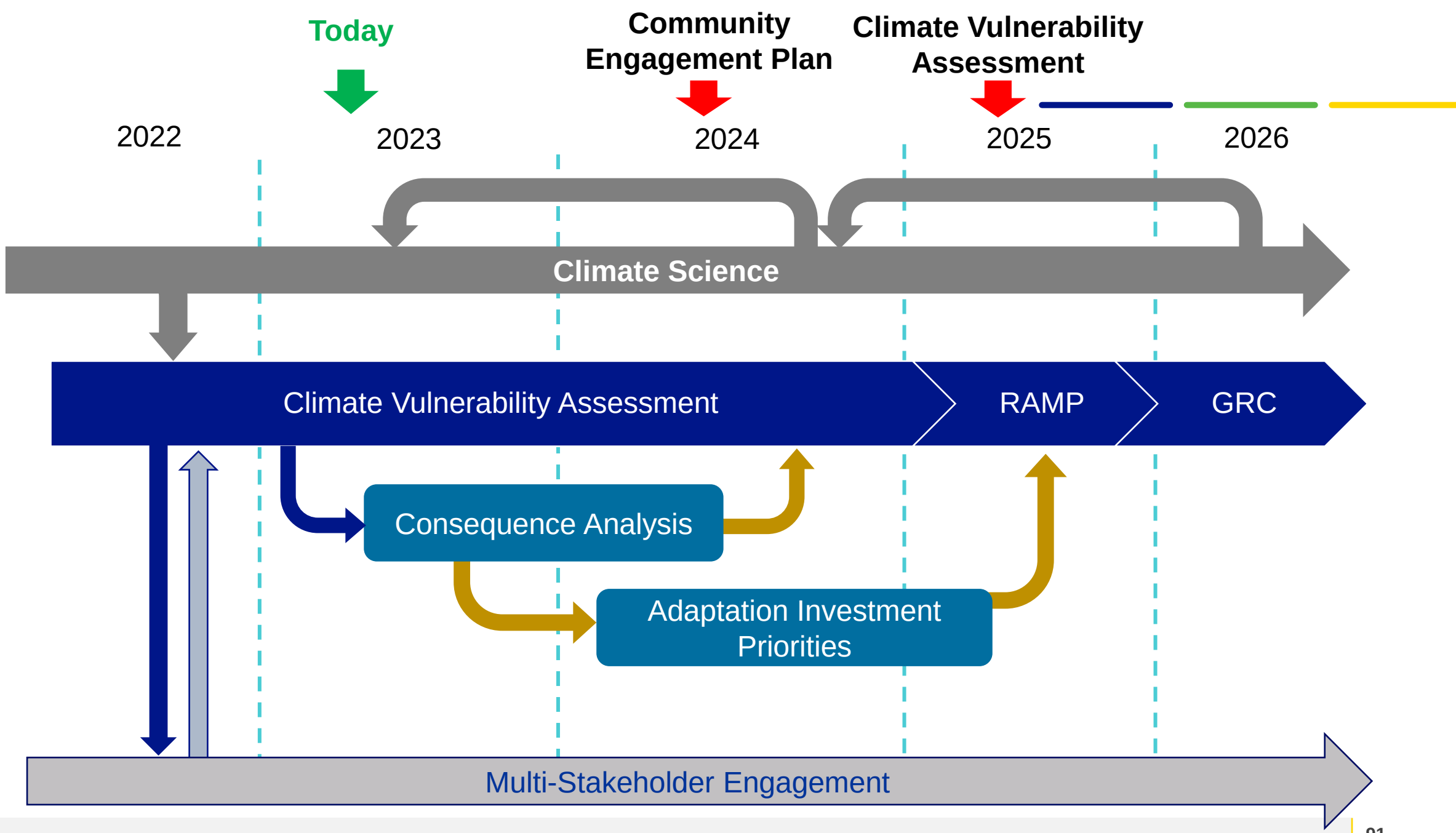
Community Engagement Framework Co-Development & Review

Synergies within outreach materials, events, and messages

Build internal alignment and cross-functional collaboration



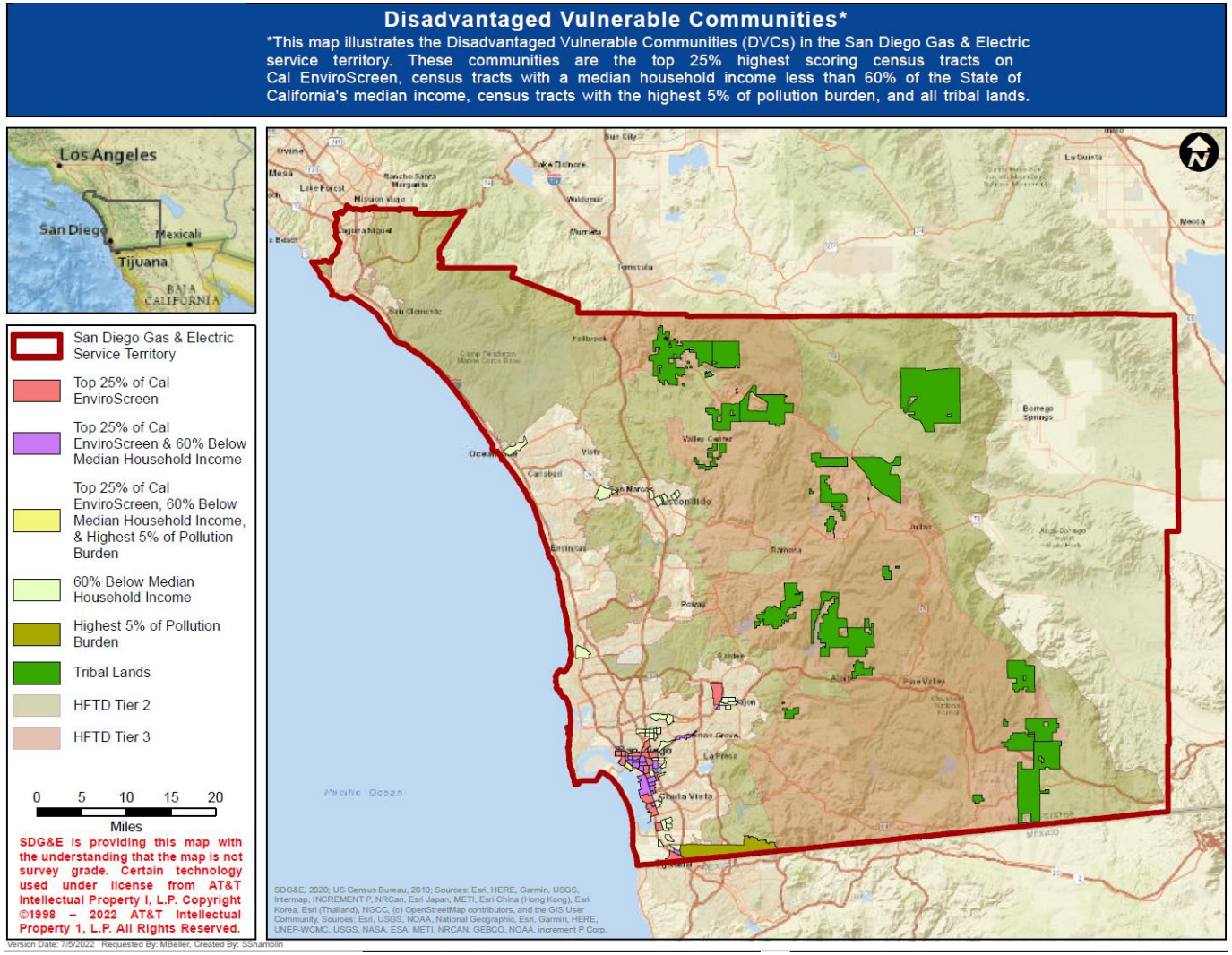
Integration of climate exposure data into visualization tools


Today
Community Engagement Plan
Climate Vulnerability Assessment
2022
2023
2024
2025
2026
Climate Science
Climate Vulnerability Assessment
RAMP
GRC
Consequence Analysis
Adaptation Investment Priorities
Multi-Stakeholder Engagement

Community Engagement Plan

To be filed May 15, 2024

Disadvantaged Vulnerable Communities



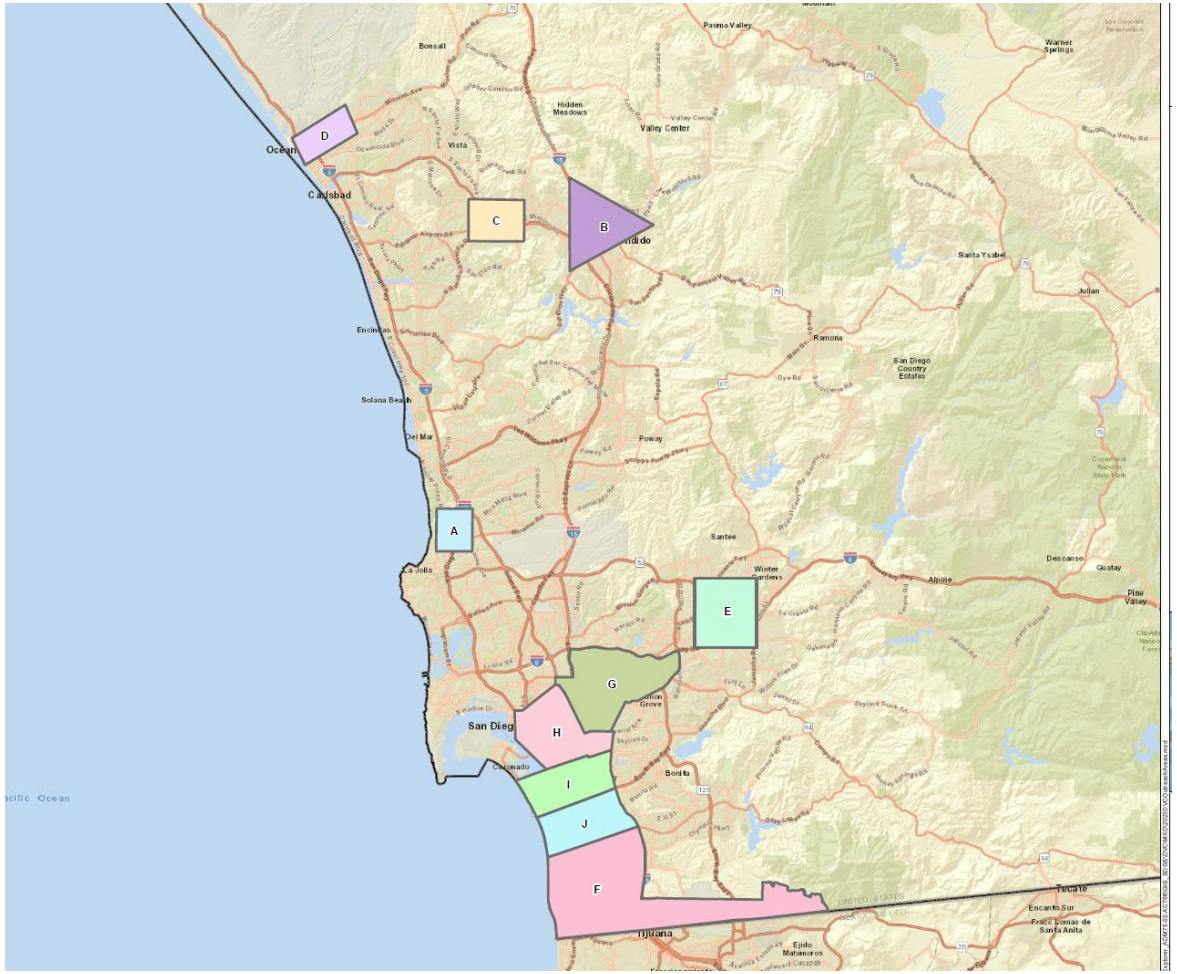
Disadvantaged Vulnerable Communities (DVCs)

- Top 25% of census tracts according to CalEnviroScreen (CES)
- All Tribal lands
- Census tracts with median household income below 60% state median
- Top 5% Pollution Burden census tracts on CES

DVC Zones

- Pending community partner review, SDG&E is planning on aggregating collections of DVCs to guide outreach strategies & CBO partnerships

- Tribal Nations will each have their own outreach program developed in conjunction with Tribal government



Community Engagement Framework - **Draft**

Provide SDG&E detailed recommendations & strategies for consideration to implement effective & equitable community engagement

Key Objectives of Community Engagement Recommendations

1. Ensure Equity-First Approach at the Forefront of Engagement Measures
2. Increase Knowledge of SDG&E's Climate Adaptation Efforts
3. Develop Network of Engaged, Diverse, Community Partners
4. Increase SDG&E Staff Capacity to Collaborate with Community Partners

This framework is currently being reviewed both internally by SDG&E & CBOs with which SDG&E & SDRCC engaged in the development process

Source: Community Engagement Framework Draft, SDRCC, 2022

Community Engagement Framework - Draft

Ensure equity-first approach at the forefront of engagement measures	Establish and maintain equity-first Community Climate Coalition (EC3)
Increase knowledge of SDG&E's climate adaptation efforts	Enhance outreach & project information materials
Develop network of engaged, diverse, community partners	Develop & deploy communication pathways
Increase SDG&E staff capacity to collaborate with community partners	Workshops & supporting a two-way learning environment

Lessons Learned

Best Practices

- Partnering with established organizations serving DVC populations
- Practitioners attending engagement events to learn from communities
- Constant iteration & flexibility through surveys & effectiveness assessments
- Aligning outreach asks with other internal groups & proceedings

Feedback

- DVC definitions miss areas that perhaps should be considered as such
- Increased utility engagement requirements across OIRs stretches CBO bandwidth
- DVC involvement in Climate Adaptation Vulnerability Assessment (CAVA) process is unclear & perhaps too broad

Opportunities

- Explore expansion of DVC definition to include climate exposure data or allow IOUs to consider non-DVC communities
  - CARB Climate Vulnerability Metric
- Prudence about where community engagement is required or further defining how cross-functional regulations & groups should collectively approach engagement
- Specify community involvement in CAVA further or narrow scope to vulnerability analysis & adaptation investment prioritization

Vulnerability Assessment

To be filed May 15, 2025

Vulnerability

Vulnerability
The potential of assets, operations or systems to be affected by projected hazards

=

Exposure
The degree to which assets, operations, or systems could face climate hazards, based on their physical locations and projected hazards

X

Sensitivity
The degree to which assets, operations, or systems could be affected by exposures

Initial Draft Vulnerability Scoring Process

1. Exposure scores assign a rating from 1 - 3 to all raw exposure data; ratings were selected to align with different thresholds associated with each hazard
2. Preliminary sensitivity scores were determined for each substation sub-asset & each hazard with insights from SDG&E asset health indices
3. Sensitivity & exposure scores are multiplied to produce a vulnerability score for each sub-asset for the substation
4. This number is then multiplied by the number of each substation's sub-assets
5. These scores are summed by hazard to produce a vulnerability score for each hazard
6. To capture relative risk & ensure that no one hazard was weighted more heavily than others, substations scores within each hazard are normalized on a scale of 0 - 1
7. All hazard scores are summed to produce an overall vulnerability score for each substation, with 4 being the highest possible vulnerability score

Example Substation				
SLR	HFTD	FEMA Floodplain	Temperature	Total
0.43	0	0.17	0.62	1.22

=

Temperature

Minimum	Maximum	Score
80	104	1
104	110	2
110	130	3

×

Sub-Asset	Heat	Flooding	SLR/Coastal Flooding	Wildfire	Precipitation
Example Asset	3	2	3	2	2

Lessons Learned

Best Practices

- Create consistent touchpoints for education and engagement with both leaders and practitioners from around the utility
- Focus on frameworks and implementation practices rather than data which can and will change frequently
- Consider assets upstream of DVCs as if they are in DVCs

Feedback

- Transitioning from the current decision's Representative Concentration Pathway (RCP) guidelines to the new Share Socioeconomic Pathway (SSP) framework in Couple Model Intercomparison Phase (CMIP6) models from the Intergovernmental Panel on Climate Change (IPCC) is not defined
- Factoring DVC insights and climate vulnerability into investment decisions
  - DVC data and information will be relatively qualitative and scoring DVC investments is a challenge
  - More difficult to invest based on uncertain projections due to rate pressures and GO95 stipulations

Opportunities

- Phase II should include how IOUs should consider SSPs instead of RCPs in planning and vulnerability assessment processes
- Add clarity between "local known conditions" in GO95 and climate projections and associated uncertainties

Thank you

Max Beller
mbeller@sdge.com

CLIMATE ADAPTATION OIR WORKSHOP

CPUC Adaptation Order Instituting Rulemaking Decision (Adaptation OIR)

March 13, 2023

SoCalGas™

Agenda

- Climate Advisory Group
- The Natural Gas System
- Vulnerability Assessment Methodology
- Community Engagement Plan

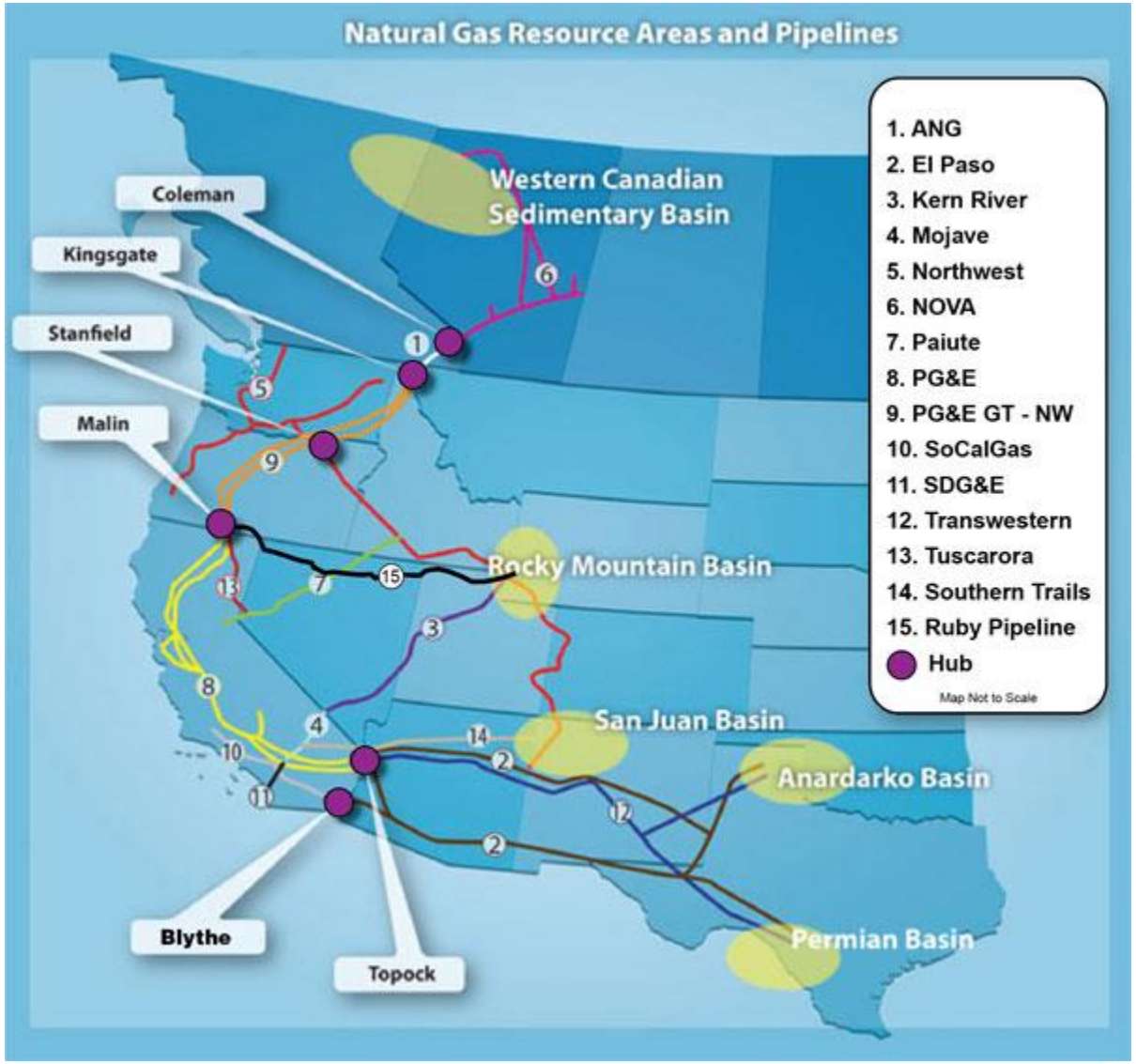
SoCalGas

Climate Advisory Group Meetings

- SoCalGas held its 1st Climate Advisory Group Meeting on February 17, 2022 and 2nd Climate Advisory Group Meeting on November 16, 2022.
- Internal stakeholders from Operations, Storage, Transmission, Distribution, Regulatory, Public Policy, Public Affairs, Community Relations, and Customer Strategy & Engagement were present.
- Background on the Climate Adaptation OIR was presented, and current and future action items were discussed.

End of the Western U.S. Natural Gas Pipeline System

1. >95% of natural gas used in Southern California is produced outside of the state
2. Southern California is the end-point of western gas flow
3. Natural gas storage supports local and regional reliability and helps moderate price shocks



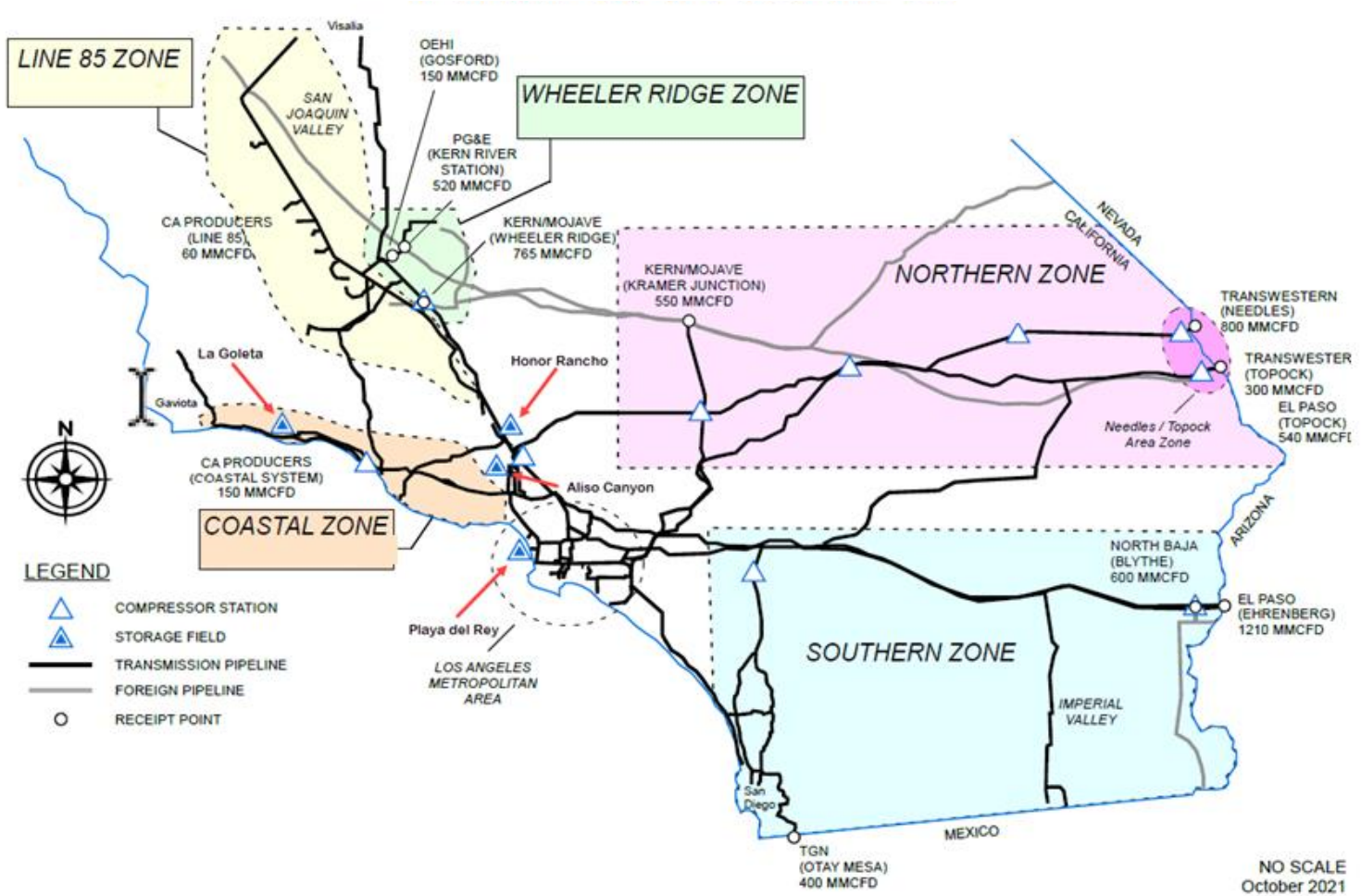
https://www.energy.ca.gov/media/4503 *This schematic is illustrative and represents a high-level overview of the pipeline systems.*

SoCalGas

SoCalGas and SDG&E System Overview

- SoCalGas and SDG&E own and operate an integrated gas transmission system consisting of pipeline and storage facilities
- Designed to transport supply from the fringes of the service territory to primary loads centers in Los Angeles and San Diego

SoCalGas Receipt Points, Transmission Zones, and Storage Fields



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Vulnerability Assessments Methodology Key Steps

What changes in weather and climate can we expect?

Examine: Warmer temperatures, sea level rise and coastal flooding, changes in precipitation and riverine flooding, wildfires, and cascading hazards

How will these changes affect SoCalGas/SDG&E?

Examine: how gas infrastructure may be impacted, how operations may be affected, and how gas service may be disrupted

In turn, how will these changes impact communities?

Examine: Potential safety threats and consequences of service disruption

What actions should SoCalGas/SDG&E take to address these issues?

Examine: Feasible solutions to mitigate the impact of hazards on the Disadvantaged Vulnerability Communities that SoCalGas and SDG&E serves

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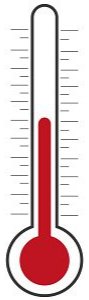
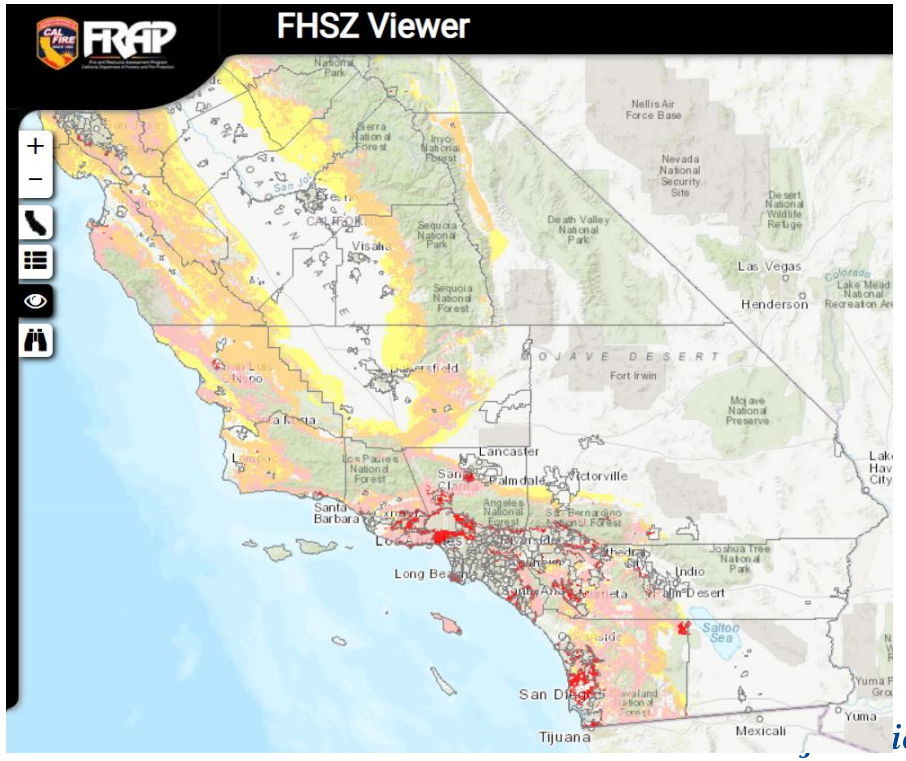
Extreme Temperature Approach



- Assess how **demand for gas** might fluctuate with future temperature changes
- Estimate how increases in ambient temperatures could **increase the energy needed to cool compressor stations**
- Analyze extreme heat **impacts on control equipment and other materials**
- Assess **outdoor worker heat exposure**

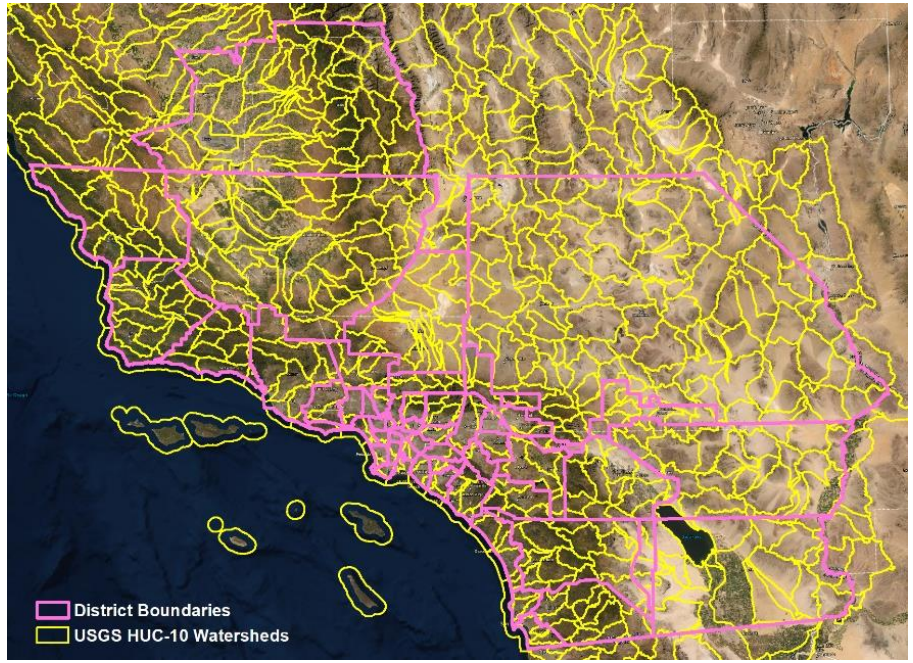
Wildfire Approach

- Assess **physical damage** and associated **impacts on communities**
- Supplemental analysis based on **past instances** of fire threat



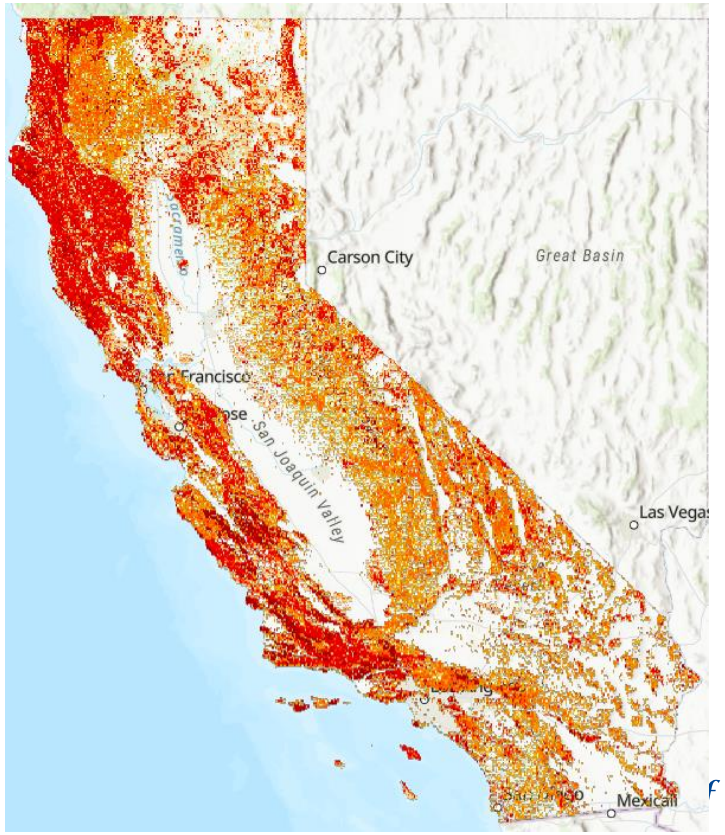
Precipitation Changes & Inland Flooding Approach

- **Watershed-level analysis** of climate impacts
- Supplemental analysis based on **past instances** of flood threat



Precipitation Changes & Deep-Seated Landslide Approach

- Supplemental analysis based on **past instances** of landslide threat
- Assess areas susceptible to **debris flows**



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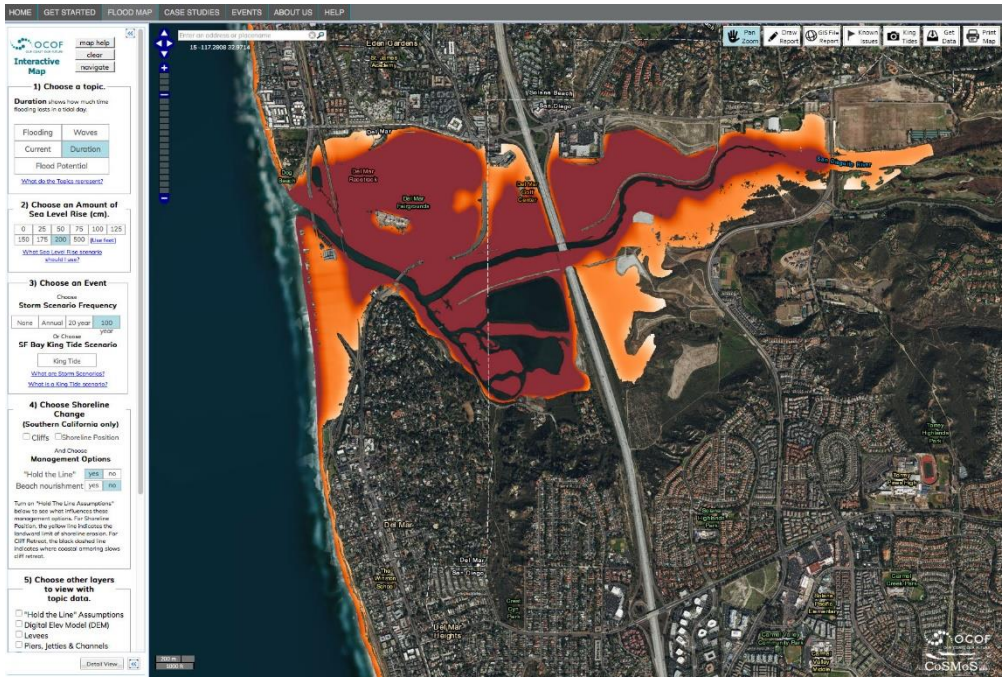
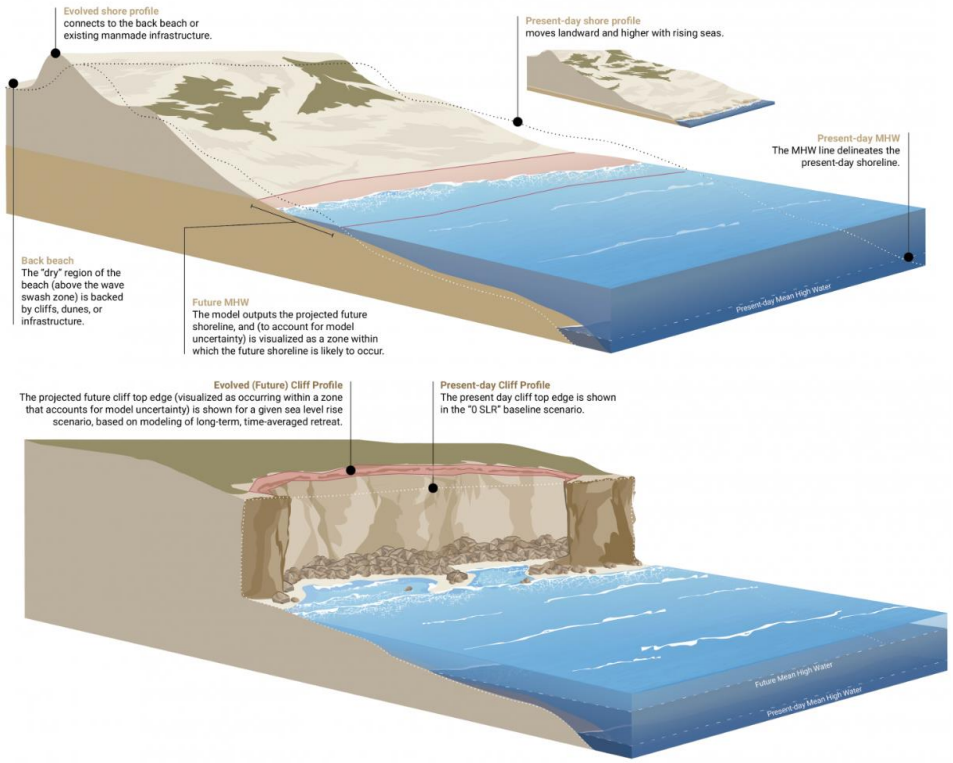
Sea Level Rise and Coastal Flooding Approach

- Supplemental analysis based on **flood depths**
- Look at **Tsunami Hazard Areas**



Sea Level Rise and Coastal Erosion Approach

- Assess **shoreline erosion** and **cliff retreat erosion**
- Supplemental analysis based on **erosion extents**



Synthesizing Findings

- Risk scoring will produce a list of priority assets for each hazard and time period
- Synthesize findings from the hazard-specific analyses. Include comparison of which types of hazards present the greatest risk
- Integrate DVC input from surveys and other outreach qualitatively

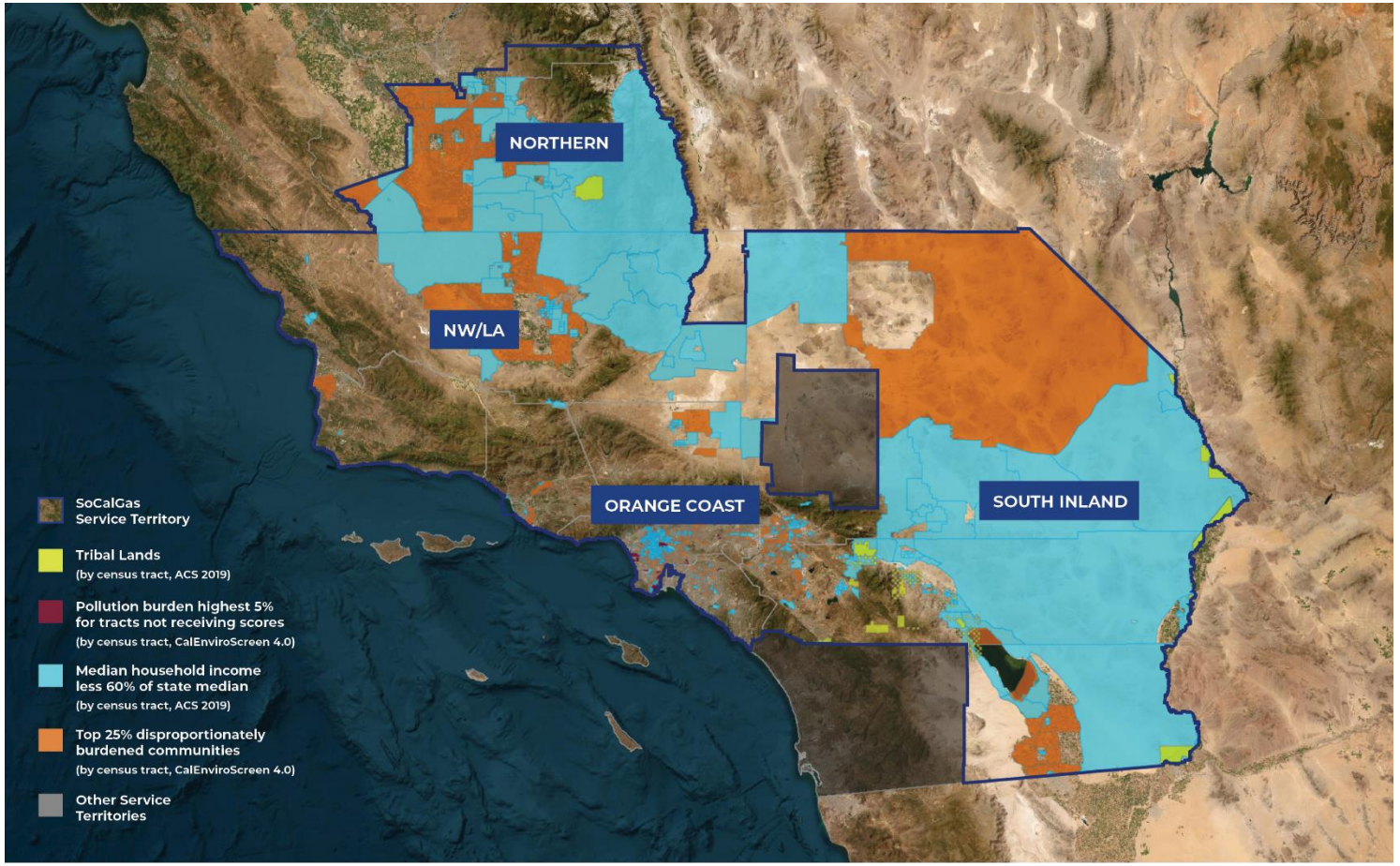
Community Engagement - Completed to Date | March 2023

- OIR Requirements
  - DVC Maps
  - Climate Adaptation Webpage
  - CBO Survey (deployed & analyzed data)
  - DVC Engagement Training (10/25, 11/10)
  - CEP Outline Draft
- External Communications
  - Developed Program Materials (website content, one-pager, brochure, etc.)
  - Material Translations
  - Program Messaging
  - Social Media Strategy
- Comment and Stakeholder Management Systems
  - Zoho CRM Database
  - Zoho App
- CBO Engagement
  - CBO list development
  - Identified Potential CBO Partners for Regional Advisory Board
  - CBO Compensation Strategy (MOU)
  - Regional Advisory Board Initiation
- DVC Engagement
  - Community Analytics Report
  - DVC Data – City Specific
- Other Engagement Strategies
  - Outreach and engagement planning
  - Local Government Engagement Strategy & Stakeholder List
  - Tribal Engagement Strategy and Subconsultant Engagement

Program Structure

» Upcoming Milestones

- Establishment of CBO-led Regional Advisory Boards
- Regional Advisory Board workshops
- Grassroots and on-the-ground community outreach
- DVC open houses
- CEP finalization and socialization with CBOs/DVCs
- Tribal engagement
- Local government engagement
- External Communications/Videos
- Surveying



2023 Timeline: Q1 & Q2

- Q1: January – March 2023
  - Establish Regional Advisory Boards
  - Initiate local government engagement
  - Finalize Tribal engagement strategy
  - Advice Letter
- Q2: April – June 2023
  - Establish/finalize Regional Advisory Boards
  - Complete first CBO/Regional Advisory Board workshops
  - Obtain feedback on VA methodology
  - Begin internal socialization of CEP outline
  - Initial DVC outreach begins
  - Continued Tribal, local government, and CBO engagement

2023 Timeline: Q3 & Q4

- Q3: July – September 2023
  - Complete second CBO/ Regional Advisory Board workshops
  - Ongoing DVC outreach
  - DVC workshops planning in coordination with Regional Advisory Board
  - Development of CEP document
  - Continued Tribal, local government, and CBO engagement
- Q4: October – December 2023
  - Final CBO/ Regional Advisory Board workshops – feedback on CEP
  - DVC workshops with CBO/ Regional Advisory Board
  - Complete Tribal, local government, and CBO engagement
  - Comment organization for filing
  - CEP finalization, incorporating feedback from DVCs and CBOs
  - File CEP

Key Takeaways

- CEP and VA Timeline
  - A more coordinated timeline between the CEP and VA could improve community engagement and communication effort.
- CBO Engagement
  - Should not be asking CBOs to submit proposals for this work. The onus is on SoCalGas to clearly outline the expectations and requirements for CBOs, along with a compensation structure for their efforts. This makes the process simpler for the CBOs, who are often already overburdened.
- Data Gathering
  - Follow up with CBOs and DVCs soon after touch-points (RAB meetings, workshops, open houses) with any surveys or questions for accurate data.
  - Collect demographic information in surveys.

Next Steps

- Climate Adaptation Vulnerability Assessment Memorandum Account – CAVAMA
- Climate OIR Equity Initiative Monthly Meetings
- CPUC Advice Letter Due March 31, 2023
- Cadence of Meetings
  - 3rd Climate Advisory Meeting in Q2 2023
  - Vulnerability Assessment Teams
  - Community Engagement Teams
- SDG&E Climate Advisory Group; Coordination with PG&E and SCE

THANK YOU!

Michelle Lee (née LaPena)

A Tribal Perspective

Next Steps

- March 28 Pre-hearing conference will discuss issues of scope and schedule.
- Parties are encouraged to meet prior to the PHC to collaboratively discuss potential issues in scope and schedule.
- Parties doing so may file Joint Pre-PHC statements no later than March 24.
- Parties wishing to participate in PHC must identify one speaker no later than March 21.

For more Information:

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Adam Banasiak adam.banasiak@cpuc.ca.gov

https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/climate-change

Thank you for attending!