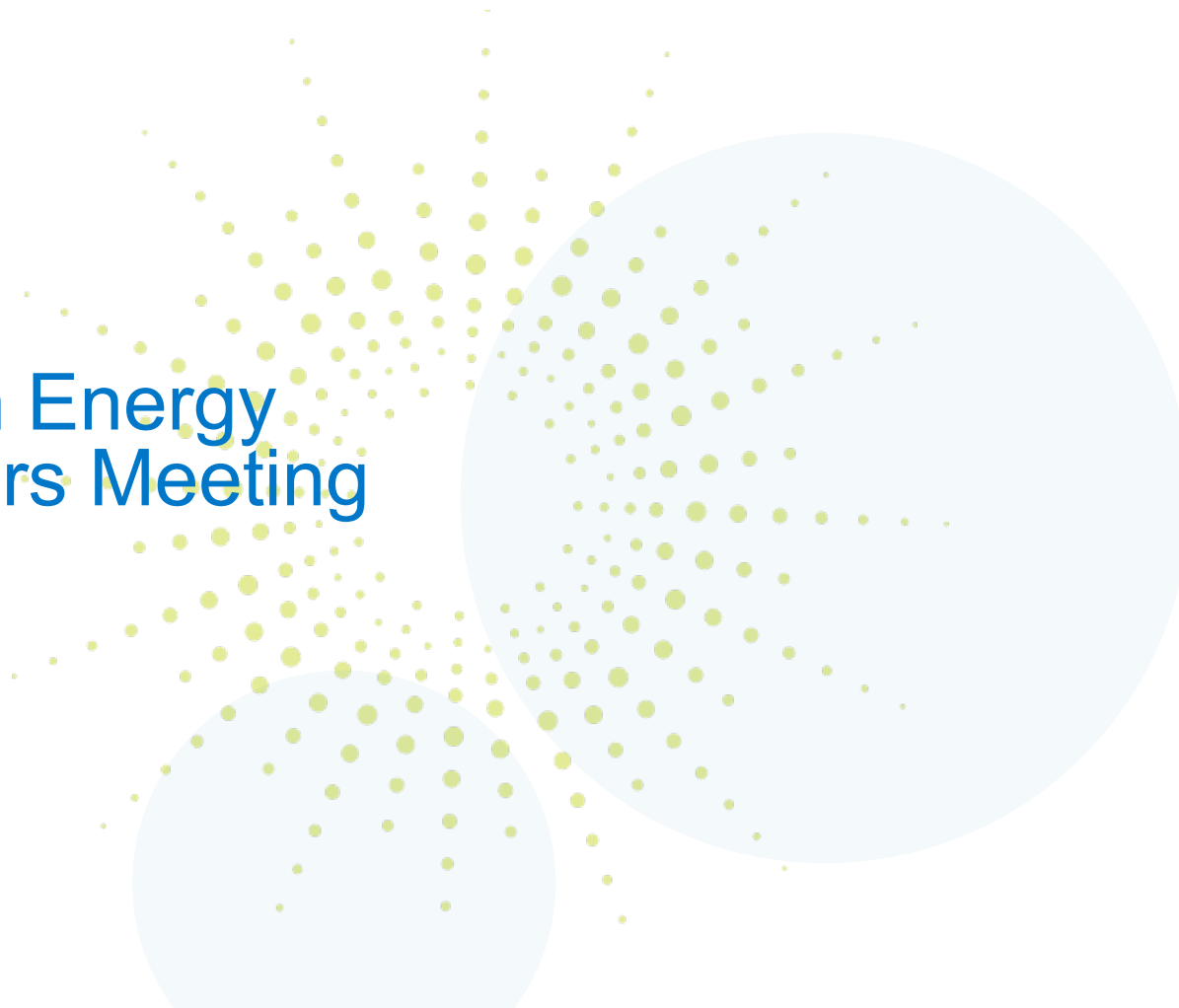




Peninsula Clean Energy Board of Directors Meeting

September 25, 2021



Agenda

- Call to Order / Roll Call
- Public Comment (for items not on the Agenda)
- Action to set the Agenda and Approve Consent Item 1
 - Consent - Public Comment



Approval of a Resolution to Execute Power Purchase and Sale Agreement for Renewable Supply with Chaparral Solar, LLC

Item 2

Board of Directors Retreat

Siobhan Doherty, Director of Power Resources

September 25, 2021

Recommendation

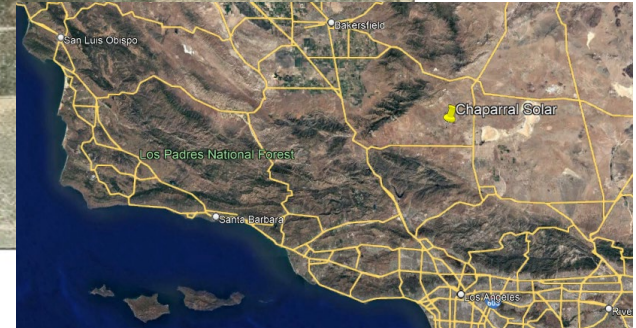
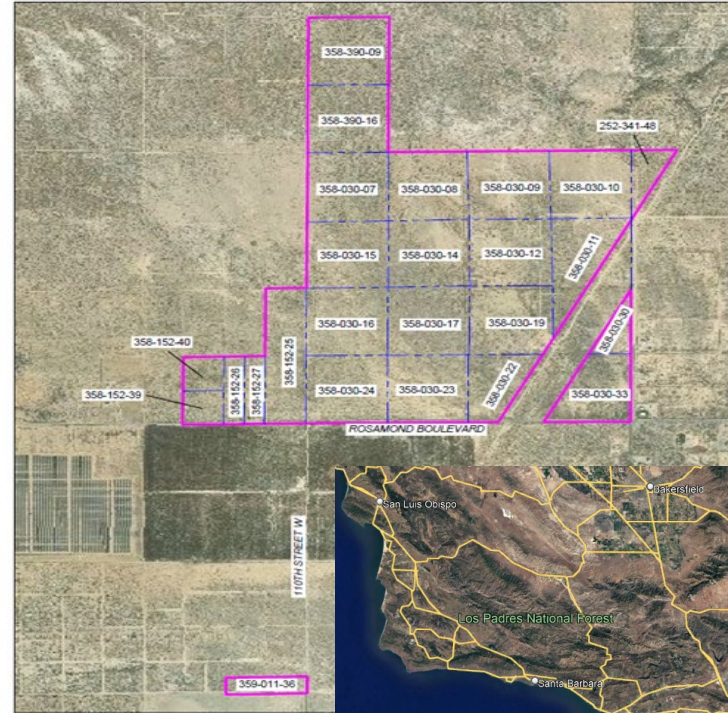
Approve Resolution Delegating Authority to Chief Executive Officer to Execute Power Purchase and Sale Agreement for Renewable Supply with Chaparral Solar, LLC, and any necessary ancillary documents with a Power Delivery Term of 15 years starting at the Delivery Commencement Date on or about December 31, 2023, in an amount not to exceed \$230 million.

Long-term RE + Storage RFP

- Peninsula Clean Energy published an RFP soliciting contract proposals of ≥ 10 years in term length
- Staff received offers for solar + storage, wind, and offers for geothermal from three counterparties
- Procuring Solar + Storage out of this RFP was a high priority to staff, provides flexibility to the portfolio, allowing us to move electricity to higher demand hours in the evening
- This will help to meet Peninsula Clean Energy's goal to provide renewable energy on a 24/7 basis

Chaparral Solar – Project Overview

Developer / Owner	Leeward Renewable Energy
Counterparty	Chaparral Solar, LLC
Location	Rosamond, Kern County, CA
Capacity	Solar: 102 MW Storage: 52 MW / 208 MWh
Term	15 years
Delivery Start	December 31, 2023
Environmental / Permitting	The project received its CUP in April 2021; Kern County was the lead agency for the CEQA process
Labor	Project signed a commitment letter to enter into a 5-craft project labor agreement for construction of the project



Contract Structure

- Pay for the output of the solar generating portion of the project at a fixed-price rate per MWh
- Pay for the use of the storage portion of the project at a fixed-price rate per kW-month
- Both with no escalation
- Contract term: 15 years
- Peninsula Clean Energy is entitled to all product attributes from the facility:
 - Energy
 - Renewable energy
 - Ancillary services
 - Resource adequacy

Labor

- The project has signed a commitment letter to enter into a 5-craft project labor agreement for construction of the project.
- As part of permitting process, Kern County Planning Department staff received letters of support for the project from
 - Kern County Electrical Joint Apprenticeship and Training Committee (JATC),
 - International Brotherhood of Electrical Workers Local Union No. 428, and
 - Ironworkers Local 433.

Environmental Review

- Staff worked with several environmental non-profits to develop a system for evaluating the environmental impact of projects. Staff studied the geospatial footprint of the project to evaluate whether the project is located in a restricted or high conflict area for renewable energy development:
 - Protected areas at the federal, state, regional, local level (e.g. County-designated conservation areas, BLM Areas of Critical Environmental Concern, critical habitat for listed species, national, state, county parks, etc.).
 - Identified and mapped important habitat and habitat linkages, especially for threatened and endangered species (either state or federally listed).
- For this project, the analysis showed that the project was not located in a protected area based on the USGS Protected Areas Database (PAD-US) or in an area not suitable for renewable energy development as identified by the Renewable Energy Transmission Initiative (RETI).

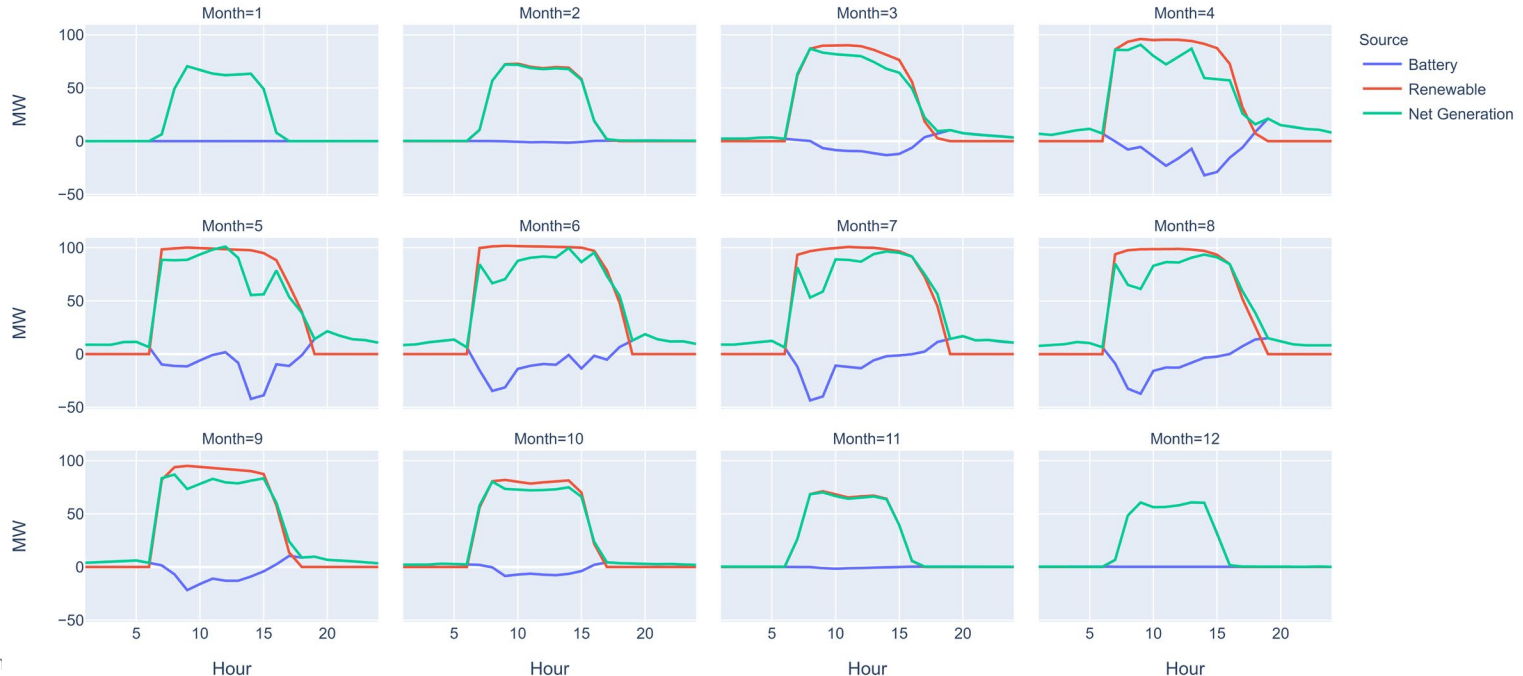
USGS PAD-US: <https://www.usgs.gov/core-science-systems/science-analytics-and-synthesis/gap/science/protected-areas>
RETI: <https://reti.databasin.org/>

Permitting

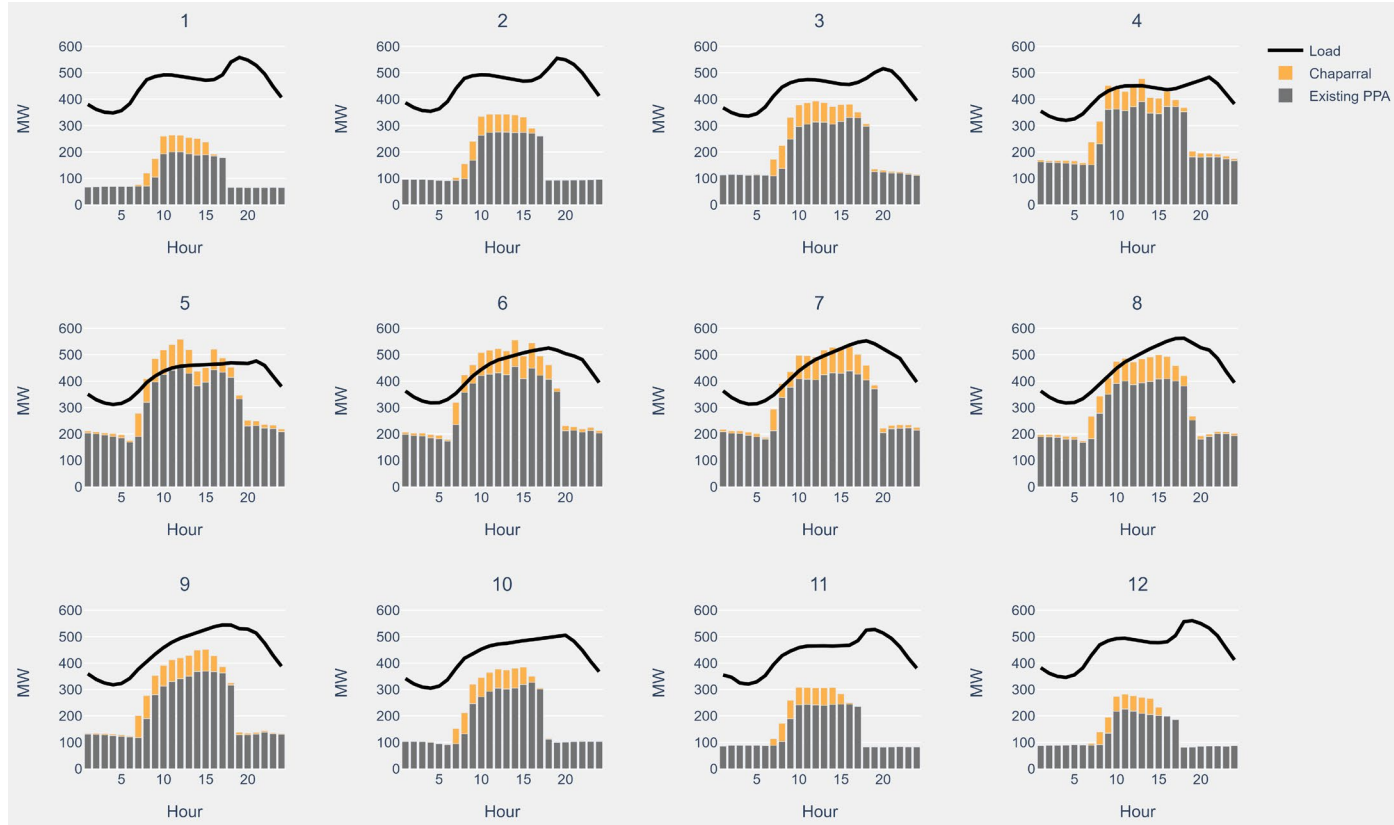
- Kern County was the lead agency for the California Environmental Quality Act (CEQA) process.
- The project's conditional use permit (CUP) application was deemed complete on August 13, 2018.
- The Draft Environmental Impact Report (DEIR) was published in January 2021.
- The project received its CUP in April 2021.
- The project is not subject to a Williamson Act Land Use Contract and is not located within an area designated as Prime Farmland, Farmland of Statewide Importance or Unique Farmland.

Generation Profile

Solar generation peaks in summer months, adding storage could shift generation to evening peak hours



Month-Hour Shape - 2025



Fit with Strategic Plan

- Priority 1: Design a power portfolio that is sourced by 100% carbon free energy by 2025 that aligns supply and consumer demand on a 24x7 basis
- Power Resources Goal 1: Secure sufficient, low-cost, clean sources of electricity that achieve Peninsula Clean Energy's priorities while ensuring reliability and meeting regulatory mandates
 - Objective A Low Cost and Stable Power: Develop and implement power supply strategies to procure low-cost, reliable power.
 - Objective B Clean Power: Design a diverse power portfolio that is 100% carbon-free by 2021; and is 100% carbon-free by 2025 that aligns supply and consumer demand on a 24 x 7 basis.

Recommendation

Approve Resolution Delegating Authority to Chief Executive Officer to Execute Power Purchase and Sale Agreement for Renewable Supply with Chaparral Solar, LLC, and any necessary ancillary documents with a Power Delivery Term of 15 years starting at the Delivery Commencement Date on or about December 31, 2023, in an amount not to exceed \$230 million.

Adopt Findings Pursuant to AB 361 to Continue Fully Teleconferenced Board Meetings Due to Health Risks Posed by In-Person Meetings

Item 2A

Board of Directors Retreat

September 25, 2021

Citizen's Advisory Committee Report to Recommend Amending Peninsula Clean Energy's Goal to be 100% Greenhouse Gas-Free by 2035

Item 3

Board of Directors Retreat

September 25, 2021



First Annual Strategic Plan Update

Item 4

Board of Directors Retreat

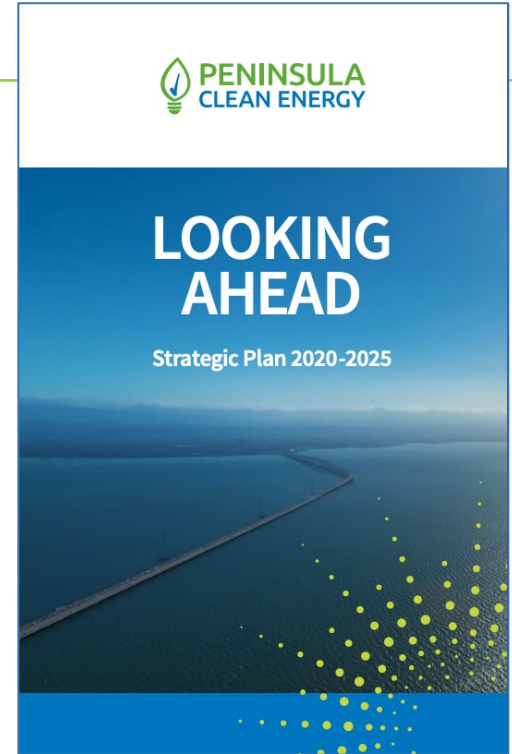
September 25, 2021

Agenda

- Organizational Priorities and Dashboard - Jan
- Power Resources – Siobhan
- Community Energy Programs - Rafael
- Marketing, Outreach and Customer Care - KJ and Leslie
- Public Policy – Jeremy and Marc
- Financial Stewardship - Andy
- Organizational Excellence - Jan
- Q&A

Our priorities

- Design a power portfolio that is sourced by 100% renewable energy by 2025 that aligns supply and consumer demand on a 24x7 basis
- Contribute to *Peninsula Clean Energy member jurisdictions* ~~San Mateo County~~ reaching the state's goal to be 100% greenhouse gas-free by 2045



Organizational Priorities

BOD Dashboard			
Organizational Priorities	2019 Baseline	2020	2025 Target
2025 100% RE 24/7	47.0%	47.0%	100.0%
Overall County GHGs (MT CO2e)	4,100,000	Data available in 2022	TBD



5-Year Strategic Plan Progress Calendar Year 2020

Power Resources Team

Strategic Objectives

Goal: Secure sufficient, low-cost, clean sources of electricity that achieve Peninsula Clean Energy's priorities while ensuring reliability and meeting regulatory mandates

- A. Low-Cost and Stable Power: Develop and implement power supply strategies to procure low-cost, reliable power
- B. Clean Power: Design a diverse power portfolio that is 100% carbon-free by 2021; and is 100% renewable by 2025 on a 24 x 7 basis
- C. Local Power Sources: Create a minimum of 20 MW of new power sources in San Mateo County by 2025
- D. New Power Sources: Continually explore and support innovative sources and solutions for clean energy

Key Performance Indicators

	Power Resources – Measured on CY		
	2019 Baseline	2020	2025 Target
2025 100% RE 24/7	47%	47%	100%
Renewable Content (%)	52%	55.2	100%
Emissions Factor (lbs / MWh)	94	12	0
New Capacity Statewide (%)	0	16.0%	50%
Local Resources (MW)	0	1.175 MW	20

Due to reporting timelines for renewable energy procurement and certain regulatory requirements, these metrics are reported on a calendar year basis.

FY 2021 Key Accomplishments

A. Low Cost and Stable Power

- RFO and hired new scheduling coordinator (SC) and new load forecaster
- Built hourly cost of power model
- Started two analytical and risk analysis pilot projects
- Improved load forecasting model and built in Python

B. Clean Power

- Executed 3 wind PPAs – 245 MW
- Launched RE RFO and shortlisted Projects
- Built 100% renewable energy optimization model
- Submitted 2020 CPUC Integrated Resources Plan
- 100 MW Mustang Solar started operating

C. Local Power Resources

- Executed Sunrun contract and launched residential 1 – 5 MW load modification program
- RFO and hired engineering firm for DER evaluations for 17 county and municipal facilities
- Provided medically vulnerable customers with portable back up batteries – 123 customers reached

D. New Power Sources

- Launched long duration storage RFI and RFO in collaboration with group of CCAs
- In coordination with CC Power, shortlisted long duration storage projects and started negotiations

FY 2021 Challenges

- Pandemic slowed roll out of Power on Peninsula – Homeowner program
- Pandemic slowed scheduling of site evaluations for County and municipal DER sites
- DER Strategy in progress but behind schedule
- RFO analysis took longer than predicted due to confirming information with bidders and more in-depth analysis compared to previous years

FY 2022 Priorities

- Negotiate contracts to achieve lowest cost of power
- Maintain cost of power below budget
- Refine risk policy
- Execute contracts from RFO shortlist
- Refine 100% RE model and develop procurement strategy
- Launch 2021 RFO for renewable energy and storage
- Execute contracts from Long Duration Storage RFO
- In collaboration with CC Power, launch RFO for firm clean resources

5-Year Strategic Plan Progress

Programs Team

Strategic Objectives

Organizational Priority: *Contribute to our region reaching the state's goal to be 100% greenhouse gas-free by 2045*

Community Energy Programs: *Implement robust energy programs that reduce greenhouse gas emissions, align energy supply and demand, and provide benefits to community stakeholder groups*

- A. Signature Programs:** Develop market momentum for electric transportation and initiate the transition to clean energy buildings
- B. Community Benefits:** Deliver tangible benefits throughout our diverse communities
- C. Innovation and Scale:** Leverage leadership, innovation and regulatory action for scaled impact

Key Performance Indicators

Community Energy – Calendar Year

	2019 Baseline	2020	2025 Target (cumulative)	
Overall County GHGs (MT)	4,100,000	TBD	TBD	Pace of reduction s: ~2% annual emissions
Transportation: GHG Reductions (MT)	770	2,400	120,000	
Buildings: GHG Reductions (MT)	1,600	3,800	12,100	
EV Charging ports installed	0	13	6,200	
Electric appliances installed	0	0	2,800	
Funds for Low Income/ Underserved	11%	47%	20%	

Notes:

- 2025 Target is a 6-year sum total of Programs impacts from 2020 – 2025
- No target (yet) set for total County emissions

Program Outcomes

Metric	Outcomes (as of Sept. 7, 2021)
Reach Codes	12 in San Mateo Co , 12 in Santa Clara County adopted <ul style="list-style-type: none">• Half of the 48 adopted state-wide, catalyzed EBCE and San Luis Obispo• Existing building code development & technical assistance
EV Charging	>3,200 ports applied for incentives <ul style="list-style-type: none">• Tech assist: >100 customer projects
Electric Vehicles	Vehicle Incentives: 494 total (incl. over 100 low-inc used) E-Bikes: 276 total <ul style="list-style-type: none">• Consumer preference of EVs increased ~10% since 2020
Water Heaters	Incentives: 48 total
Solar + Storage	Municipal: 16 sites assessed, up to 5.8MW Residential & Medical: 300 sites, 1,112kW PV, 1,884kWh storage
Innovation Pilots	6 in-progress
Leadership & Policy	<ul style="list-style-type: none">• PCE is “go-to” resource on EVs for CPUC, AQMD, and CCAs• Influence: CPUC Transportation Framework, 2022 CA EV Code

2021 Challenges

- **Pandemic:** Slowed programs across the board including: lack of in-person events, and supply constraints and costs impacting product availability and construction
- **EV Ready:** Installations slow due to multiple factors
- **Electrification:** Low awareness, contractors charging high costs, and weak economics with low gas and high electrical rates
- **Staff:** Loss of a staff member slowed electrification

Priorities for CY22

Top Priorities

- Reach Codes: 2022 code cycle, existing building policy development
- EV: Charging installations, managed charging
- Buildings: Implement on-bill finance, next iteration of incentive program
- Solar+storage: Ramp-up storage program and flexible load strategies
- State policy: Tariffed on-bill and transportation funds administration

Additional Priorities

- Hiring Building Electrification Program Manager
- Development of solar PPA for local DER Projects
- Prepare for Los Banos enrollment



5-Year Strategic Plan Progress FY21 (July 2020 – June 2021)

Marketing and Customer Care Teams

Marketing & Customer Care Strategic Objectives

- A. Brand Reputation: Elevate Peninsula Clean Energy's brand reputation as a trusted leader in the community and the industry
- B. Engagement: Educate and engage stakeholders in order to gather input, inspire action, and drive program participation
- C. Customer Care: Ensure high customer retention and satisfaction

Key Performance Indicators

Marketing & Customer Care – Metrics at FY End

	2020 Baseline	FY 2021	2025 Target
Participation Rate	97%	97%	97%
PCE Aided Awareness*	34%	31%	60%
PCE Favorability*	63%	60%	80%
Key Account Engagement	Low	Med/Low	High
Residential & SMB Engagement	Med/Low	Med/Low	High

* The 2020 research sample resulted in a margin of error of +/- 2.0% at 95% confidence. The 2021 research sample was smaller with a wider margin of error of +/- 4.3%, meaning that these figures essentially remain unchanged year over year.

Highlights of Progress

- Brand Reputation
 - Well-positioned as leaders/experts, good news coverage in Tier1 media
 - Several collaborations with other CCAs
 - Residents who are aware of Peninsula Clean Energy view the agency favorably and recognize leadership on environmental issues
- Engagement/Program Participation:
 - Good, early start on Los Banos community outreach
 - All-Electric Awards; Switch is On campaign
 - 10 outreach grantees for CY21 with more emphasis on low-income, diverse groups
 - Schools engagement (youth, faculty, admin)
 - Robust engagement with RICAPS
 - CAC working groups
- Storytelling:
 - Expanded reach via Nextdoor and switch to GovDelivery (Granicus email tool)
 - Improved messaging and evolution of website and branding
 - Collateral for leg/reg audiences, Los Banos
 - Community benefits reports for 21 jurisdictions
 - Community presence through virtual local events
- Customer Care:
 - SMB bill credit; CARE/FERA bill credit (FY20)
 - Market research
 - Increased strategic accounts engagement with first C&I customer workshop held 3/19

Challenges

- No Improvement in Awareness
 - More than two-thirds of residents do not recognize Peninsula Clean Energy from a list of electricity providers
 - Some disconnects between our messaging and audience perceptions
- Strategic Accounts Engagement
 - Businesses are still very much in flux with pandemic-restricted operations and have been less inclined to schedule one-on-one check-in meetings the past several months

Priorities for FY22

Top Priorities

- Community Engagement in Los Banos ahead of enrollment
- Updated Agency Description and “All-Electric Life” Concept
- EV Campaign
- Outreach Grantees and Schools programs
- Program launch/promotional support (incl. Power On Peninsula, HPWH, Used EV Rebates, DAC-GT, Home Upgrade Program, OBF, Managed Charging Pilot)
- Utility API launch for strategic accounts



5-Year Strategic Plan Progress FY21 (July 2020 – June 2021)

Public Policy Team

Strategic Objectives

Department Goal: Strongly advocate for public policies that advance Peninsula Clean Energy's Organizational Priorities

- A. Regulatory: Educate and engage policymakers to develop policies that support Peninsula Clean Energy's organizational priorities
- B. Legislative: Engage state legislators to pass legislation that advances Peninsula Clean Energy's organizational priorities
- C. Growth of Community Energy and CCAs: Take a leadership position in supporting the growth of community energy and CCAs (Community Choice Aggregators) of community energy

Key Performance Indicators

	Public Policy – Calendar Year		
	2020 Baseline	2021	2025 Target
PCIA Containment	Low	Low	High
Legislative Impact	Medium	Medium	High
Regulatory Impact	High	High	High
Coalition Building	Low	Medium	High
Fostering CCA Growth	Medium	Medium	High

July 2020 – June 2021 Key Accomplishments

PCIA Containment

- Unwinding and forward removal of PCIA Cap & Trigger which created increased rate uncertainty
- Negotiating creation of "Master Data Requests" for future ERRA cases to improve transparency and intervention
- Increasing Joint CCA participation in PCIA-related cases and standardizing agreement structures for future cycles

Legislative Impact

- Established a good relationship with Senator Becker
- Cultivating relationships with representatives for Los Banos and broader central valley

Coalition Building

- Continued outreach with Environmental Justice and Ratepayer Advocates to build trust and understanding

Regulatory Impact

- Continued thought leadership through individual, joint, and CalCCA casework, including cases relating to:
 - Accelerate achievement of the State's climate goals while ensuring reliability and affordability (IRP/RA)
 - Support of PCE's programmatic objectives (Electrification, DAC-GT/CS, SGIP, DER planning)
 - Adjustment of PG&E's PCIA and generation rates (ERRA, PCIA OIR, General Rate Case Phase 1 & 2)
- Focused on evolving relationship with CPUC Commissioners and staff and other State agencies to be more collaborative, data-focused, and coordinated

Fostering CCA Growth

- Supporting smooth inclusion of Los Banos
- Maintaining "open door" with CCA peers to advise and guide as appropriate

Challenges

- Impacts of COVID have reduced opportunities for demonstrating thought leadership through speaking at industry events
- Despite incremental changes, PCIA rates remain difficult to forecast and a very significant portion of our customers generation-side rates
- While CCAs have quickly growing credibility across a range of regulatory areas, there remains a strong focus by statewide decision-makers on continuing to prove excellence and institutional capability by CCAs.

CY 2022 Priorities

PCIA Containment

- Continue efforts to mitigate PCIA rate impacts, increase transparency and increase ability to forecast changes
- Explore all opportunities to accelerate unwinding of PCIA

Legislative Impact

- Deepen relationships with local elected representatives
- Demonstrate through leadership through proactive engagement in policy that aligns with our agency's goals

Coalition Building

- Broaden our relationships with other key stakeholders
- Explore productive opportunities for partnerships

Regulatory Impact

- Continued excellence in casework, thought leadership and technical proficiency
- Proactively engage in policy venues to create opportunities for future agency-wide success
- Cultivate further our relationship with CPUC to be more collaborative and coordinated
- Explore more opportunities with other State and Federal agencies to amplify our agency's success

Fostering CCA Growth

- Continue supporting a smooth inclusion of Los Banos
- Continue supporting other CCAs where appropriate
- Continue increasing the awareness of CCA statewide



5-Year Strategic Plan Progress Full Year ending June 30, 2021

Financial Stewardship

Strategic Objectives

Goal: Employ sound fiscal strategies to promote long-term organizational sustainability

- A. **Fiscal Health**: Strengthen and maintain Peninsula Clean Energy's fiscal health
- B. **Financial Controls and Management**: Implement financial controls and policies that meet or exceed best practices for leading not-for-profit organizations
- C. **Financial Sustainability**: Practice strategies to ensure long-term financial sustainability

Key Performance Indicators

Financial Stewardship – Metrics at FY End

	2020 Baseline	2021	2025 Target
Days Cash On Hand (Unrestricted)	238	257	231
Credit Rating (Fitch/Moodys)	BBB+/Baa2	No change	“A” Level
Change in Net Position (\$000s)	\$48,900	-\$8,216	Positive
Investment Performance	TBD	2.0%	TBD
Average Cost of Energy (\$/MWh)	\$61.92	\$62.90	\$62.73

Note: Days Cash on Hand based on revised Reserve Policy adopted 02/25/2021

Highlights of Progress

- Days Cash on Hand
 - Ended June 30, 2021 at 257
 - Current forecast for
 - FY25 is 211 vs. Target of 231
 - FY24 forecast of 204 (lowest point based on current 5-year forecast)
- Average Cost of Energy
 - \$62.90 for full year
 - Q1 was \$77.28
 - Substantial unexpected costs in Q1 related to extended heat waves and smoke periods in July-September quarter
 - Higher usage and lower production
 - Other 3 quarters combined was \$58.01
 - Current forecast for FY25 is \$59.46 - below 5-year target of \$62.73
- Change in Net Position
 - Negative (\$8.2 million) vs. Budget of Negative (\$8.5 million)
 - Current forecast for
 - FY25 is \$26.1 million
 - 5-year outlook is Negative (\$9.2 million)
 - Highly dependent on PG&E and PCIA rates
- Credit Rating
 - Current
 - Moody's – Baa2
 - Fitch – BBB+
 - No change since last report

Challenges

- PCIA rate increases and forecasting uncertainty
 - Substantial increases in PCIA that started on January 1, 2021 will have significant impact on revenues over the next few years
 - Current forecast indicates that reserves can be maintained above policy levels, but will need to be monitored
- Net Position in past Fiscal Year (2020-2021) impacted by significant, unexpected energy costs in Q1
 - FY21 was already expected to be less favorable than prior years due to revenue reductions from PCIA changes and PG&E Generation Rate decreases
 - Hedging policy designed to protect against price spikes for load that matches forecast load
 - Does not protect against:
 - Extended periods of higher load than forecasted levels
 - Distribution outages or smoke events that reduce production below expected levels



5-Year Strategic Plan Progress FY21 Results

Organizational Excellence

Strategic Objectives

- A. **Culture and People**: Foster a workplace culture that attracts and develops exceptional talent and values all people
- B. **Innovation**: Foster a culture of innovation to yield solutions that accelerate our mission
- C. **Data and Technology**: Increase capabilities and efficient use of data and technology to support organizational decision making and program execution
- D. **External Vendor Partners**: Implement vendor policies that embrace diversity and inclusion and that optimize engagement results
- E. **Governance**: Follow best practices for governance and succession to engage and develop qualified, diverse Board members

Key Performance Indicators

Organizational Excellence – Metrics at FY End

	2020 Baseline	FY21	2025 Target
Governance	High	High	High
Staff Satisfaction	High	High	High
Innovation Impact	High	High	High
Organizational Policies	High	High	High
Technology and Systems	Medium	Medium-High	High

Highlights

Culture and People

- Staff committee formed to recommend future WFH, remote work, and return to office policies
- Made 6 hires since start of COVID/WFH
- Conducted staff satisfaction survey

Innovation

- Developing white paper on 24/7 renewables

Technology and Systems

- Extensive use of PowerPath for energy programs
- Implementing “Data Connect” for large customers
- Data Warehouse Project almost complete

External Vendor Partners

- Providing PCE policies as models for CC Power labor and environmental policies
- Launching comprehensive DEAI effort; consultant selection complete

Governance

- Developed and posted full set of videos on website for board / alternate / CAC member training
- Successfully integrated Los Banos as new PCE board member
- Improving utilization of CAC expertise through CAC working groups and agenda action items
- Providing more concise board presentations
- Updated Policies 16 and 18

Challenges

- Work from home since March 2020; continuing until at least January 2022

FY 22 Priorities

Culture and People

- Finalize new policies for WFH, remote work, and in-person work
- Continue team-building and social opportunities

Innovation

- Complete and publish 24/7 renewables white paper in fall 2021

Technology and Systems

- Complete Data Warehouse Project and implement throughout organization
- Continue project(s) related to file storage, organization and retention – work and policies

External Vendor Partners

- Conduct DEAI work with consultant over next 6-9 months
- Update and implement Inclusive and Sustainable Workforce and Ethical Vendor Policies

Governance

- Review “lessons learned” from Los Banos expansion
- Develop succession processes for key board and staff



Peninsula Clean Energy's Strategic Priorities

Item 5

Board of Directors Retreat

September 25, 2021

Strategic Plan



ACHIEVING
OUR MISSION

ORGANIZATIONAL PRIORITIES:

By 2025, deliver 100% renewable* energy each and every hour of the day.

Contribute to San Mateo County reaching the state's goal to be 100% greenhouse gas-free by 2045.

August 2021 - IPCC report – Summary for Policymakers

“It is unequivocal that human influence has warmed the atmosphere, ocean and land.”

“Evidence of observed changes in extremes such as heatwaves, heavy precipitation, droughts, and tropical cyclones, and, in particular, their attribution to human influence, has strengthened since AR5.”

“From a physical science perspective, limiting human-induced global warming to a specific level requires limiting cumulative CO₂ emissions, reaching at least net zero CO₂ emissions, along with strong reductions in other greenhouse gas emissions.”

Approach to Delivering 24/7 Renewable Energy by 2025

Item 5A

Board of Directors Retreat

September 25, 2021

Presentation outline

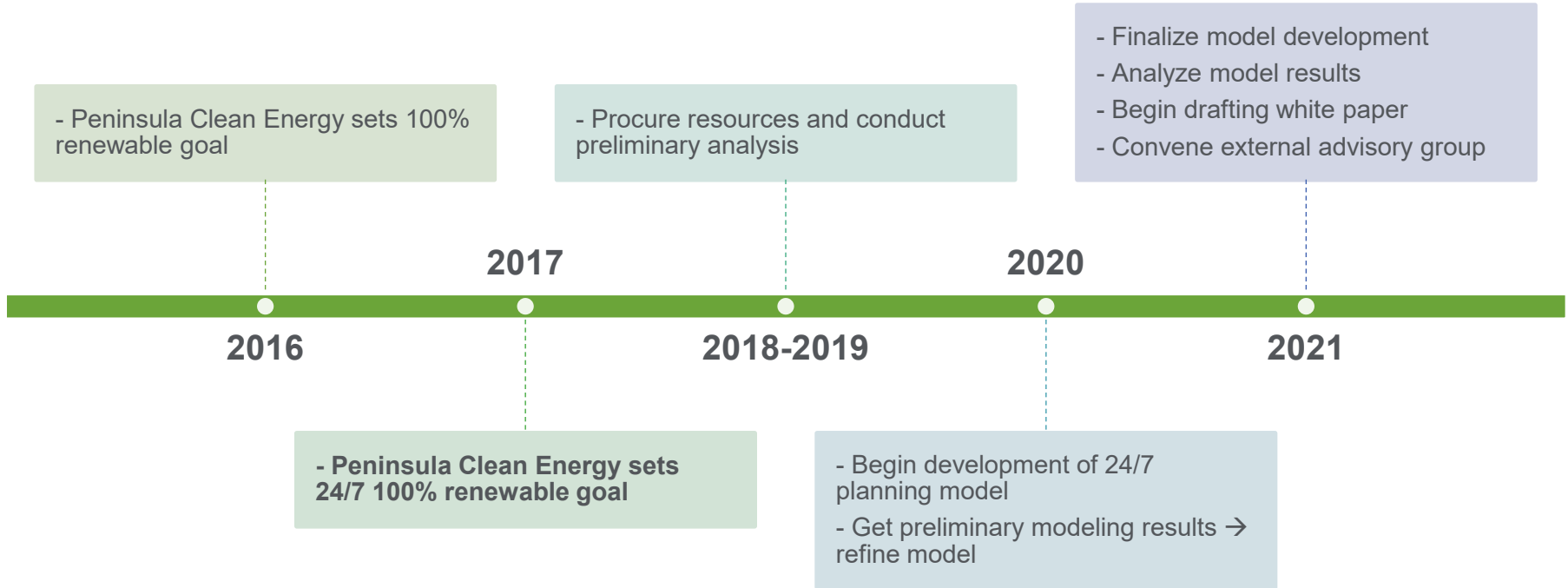
Each section will include time for presentation and Q&A

1. Our 24/7 goal in context
2. Why is 24/7 renewable energy important?
3. Overview of renewable energy procurement
4. Overview of 24/7 strategies
5. Defining and phasing our goal
6. Approach to modeling our goal
7. Challenges to meeting our goal
8. Next Steps

Our 24/7 Goal in Context



Progress to Date



Why do we have this goal? (1)

- Peninsula Clean Energy currently delivers 100% GHG-free electricity to all customers
 - We have built a financially strong organization at the same time as providing cleaner energy at a 5% savings compared to PG&E
 - We have demonstrated that consumers can save money and reduce GHG emissions at the same time – **cleaner+greener is NOT more expensive**
- We match this electricity delivery to consumer load on an annual basis
 - There are hours when we input more clean energy into the grid than our customers use
 - There are hours when we produce less clean energy than our customers use, and thus rely on system power (natural gas plants) which produce GHG emissions
 - On an annual basis, these net out

Why do we have this goal? (2)

- If we match our electricity supply to consumer load on an hourly basis
 - We will not be relying on system power (natural gas plants) and can maximally reduce GHG emissions from our electricity supply
- Peninsula Clean Energy wants to take the lead to show it's possible to do this in a cost-effective way
 - GHG emissions will be much further reduced
 - Even cleaner+greener can be cost-effective
- Peninsula Clean Energy can provide the model for others to follow and accelerate further reductions of GHG emissions in the electricity supply

Why do we have this goal? (3)

- Earlier action in reducing GHG emissions is better, as it reduces the build-up of GHG emissions over time.
- *Today's discussion will not discuss costs – we will update the board in the future about costs as we have more modeling results.*

Since setting our goal, many have followed

Corporations

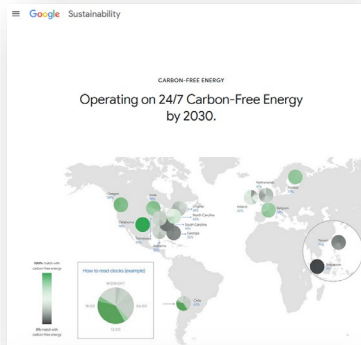
Municipalities

NGOs

Markets

Federal Government

United Nations

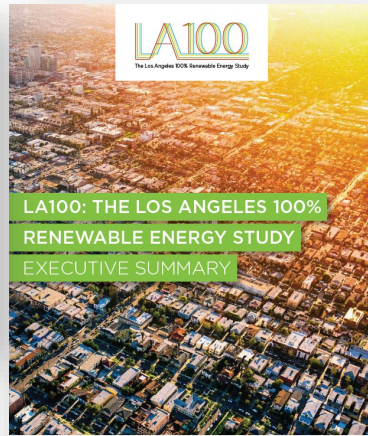


Microsoft Announces New 100/100/0 Commitment By 2030

JULY 14, 2021 BY HARUN ASAD
Share This Article: [in](#) [t](#) [f](#) [f](#)



Microsoft has announced that by 2030 the company will have 100% of its electricity consumption, 100% of the time, matched by zero carbon energy purchases. The move



History made as Des Moines adopts 24/7 carbon-free energy resolution, becoming first in nation

posted on Monday, January 11, 2021 in [Energy News](#)

DES MOINES – Tonight, the Des Moines City Council voted (unanimously) to adopt an ambitious city-wide [clean energy resolution](#). The resolution's passage makes Des Moines the first city in Iowa to commit to 100%, 24/7 clean energy and adds the city to the list of more than [170 nationwide](#) that have enacted 100% clean energy goals.

M-RETS graphic titled "Data-driven Renewable Energy Markets". It features a blue background with green circular icons containing lightning bolts. The text "Hourly generation data access is an important first step in a multi-faceted process to establish data-driven renewable energy markets." is at the bottom.

RMI graphic titled "Clean Power by the Hour". It features the RMI logo and the text "Assessing the Costs and Emissions Impacts of Hourly Carbon-Free Energy Procurement Strategies". Below the title is a blue banner with the text "Report / July 2021".

Capitol Report graphic titled "Biden pledges to buy 24/7 carbon-free electricity pushed by Clean Air Task Force, Google and others". It includes the text "Last Updated: March 31, 2021 at 8:03 p.m. ET" and "First Published: March 30, 2021 at 6:03 p.m. ET". The author is "By Rachel Koning Beals". The bottom of the graphic shows a blue background with white lines representing power lines.

United Nations UN Energy graphic titled "Coalition for 24/7 Carbon-Free Energy". It features the United Nations logo and the UN Energy logo. Below the title is a navigation bar with links: Home, About, Submission Guidelines, Online Registration, Compact Registry, Compact Previews, Resources, HLDE 2021, UN Energy. The main text describes the coalition and its goals.

How does our goal compare to others'?

Who	Goal	Target
Peninsula Clean Energy	24/7 renewable*	2025
Google	24/7 carbon-free	2030
SMUD (Sacramento)	24/7 carbon-free	2030
Microsoft	24/7 carbon-free	2030
LADWP (Los Angeles)	24/7 carbon-free	2035
Des Moines, IA	24/7 carbon-free	2035

- Our goal has the most ambitious timeline, and is the only to commit to 100% renewables
- Demonstrate by example a pathway to decarbonization
- No other CCAs are pursuing a goal like this

Renewable v. Carbon-Free

- Renewable: electricity generated from a resource that is naturally replenished as it is used
- Carbon-free: electricity generated without emitting carbon dioxide or other greenhouse gases into the atmosphere

Supply Resource	Renewable	Carbon-free	Baseload
Solar PV	X	X	
Wind (onshore and offshore)	X	X	
Geothermal	X	Certain types	X
Small Hydro (<30MW)	X	X	
Biogas	X		X
Wave / Tidal	X	X	
Biomass	X		X
Large Hydro		X	
Nuclear		X	X

Baseload Resources

- Baseload resources can reliably provide power every hour of the day, regardless of weather, and will likely play an important role in meeting our 24/7 goal
- Renewable baseload resources have a minimal amount of carbon emissions.
- Discuss the role of these resources in our portfolio

Baseload Resource	Carbon Emissions (lbs/MWh)*
Geothermal (Geysers)	79
Biogas / Landfill Gas (Ox Mountain)	6

For Comparison	Carbon Emissions (lbs/MWh)*
CA System Mix [Grid Mix]	944

*Emissions factors per the CEC's Power Source Disclosure Program

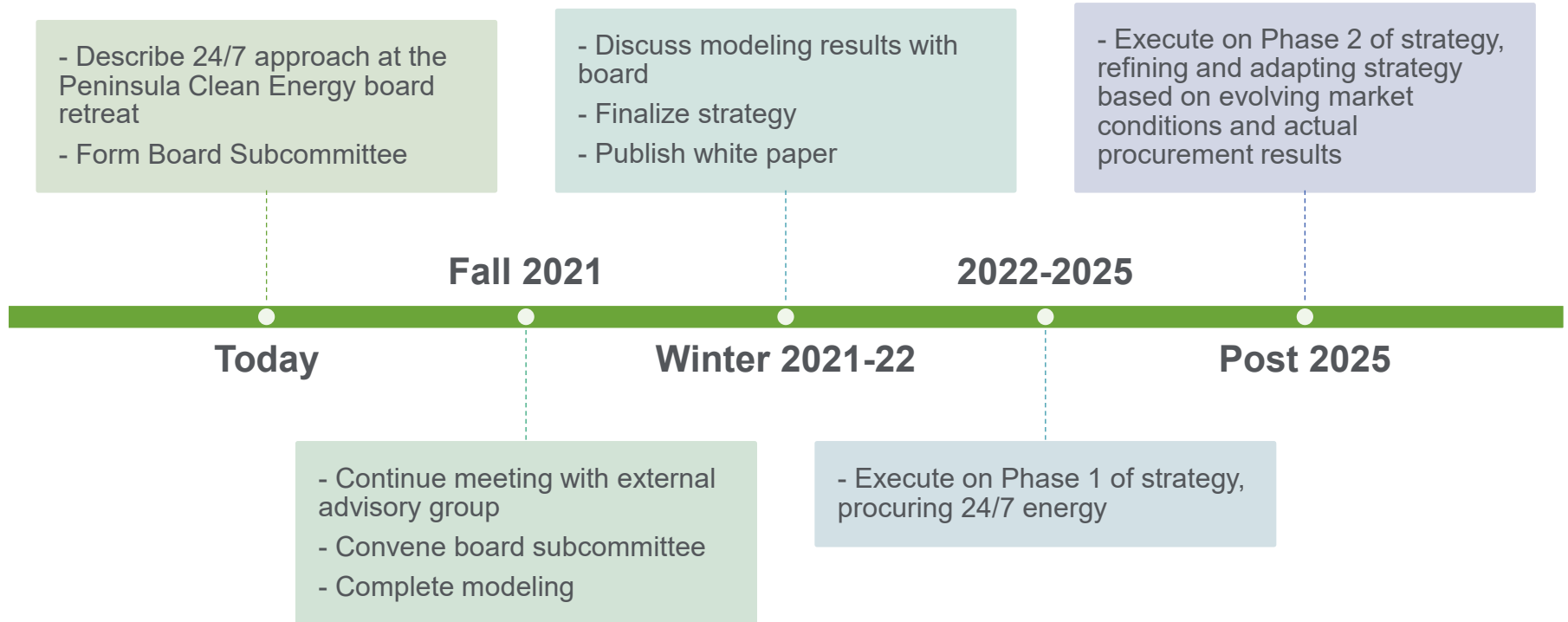
Renewable v. Carbon-Free

Peninsula
Clean Energy
will focus on
these
renewable
resources for
our 24/7 goal

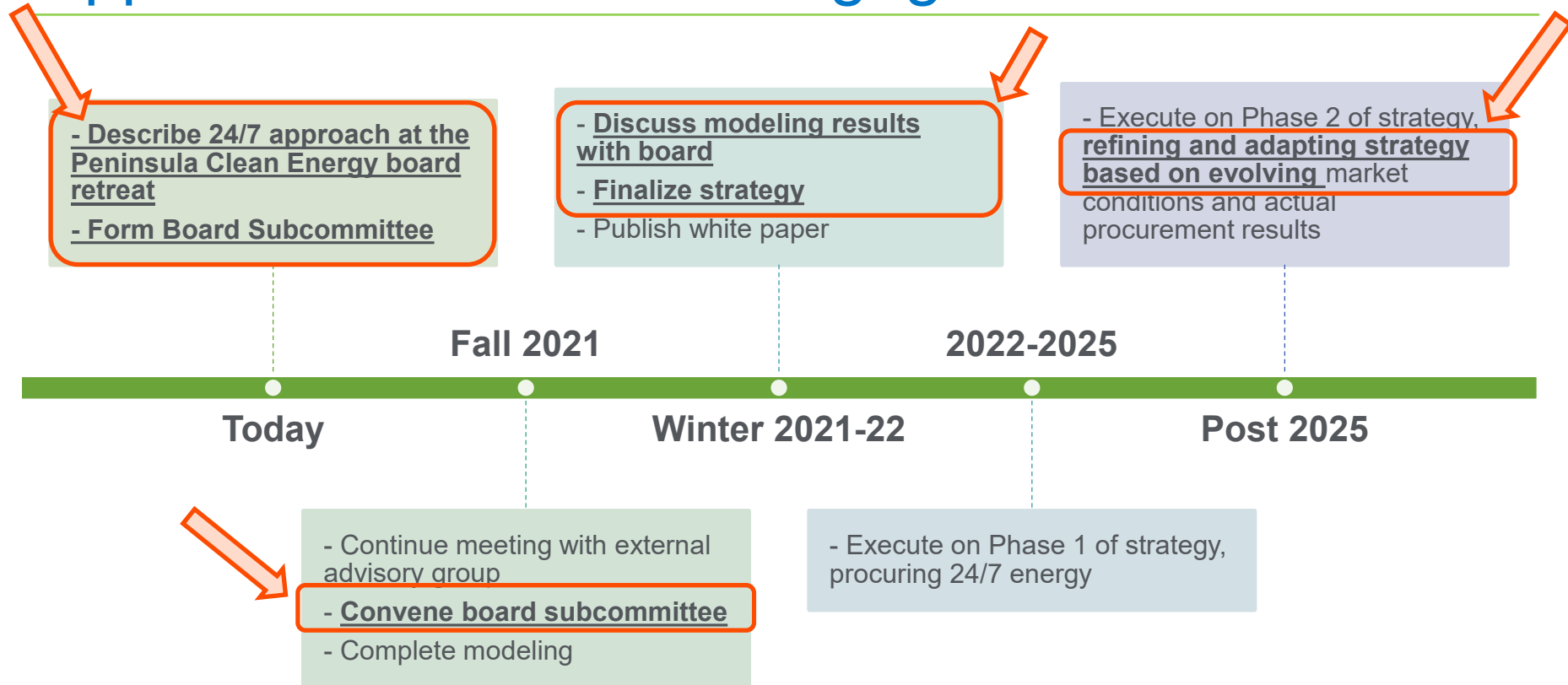
Supply Resource	Renewable	Carbon-free	Baseload
Solar PV	X	X	
Wind (onshore and offshore)	X	X	
Geothermal	X	Certain types	X
Small Hydro (<30MW)	X	X	
Biogas	X		X
Wave / Tidal	X	X	
Biomass	X		X
Large Hydro		X	
Nuclear		X	X

In order to meet our 24/7 goal, we need to be able to “schedule” each resource so we know how much is being generated and delivered to our customers each hour. We are unable to schedule large hydro and nuclear so that we know how much is being delivered to our customers in a particular hour.

Next Steps



Opportunities for Board Engagement



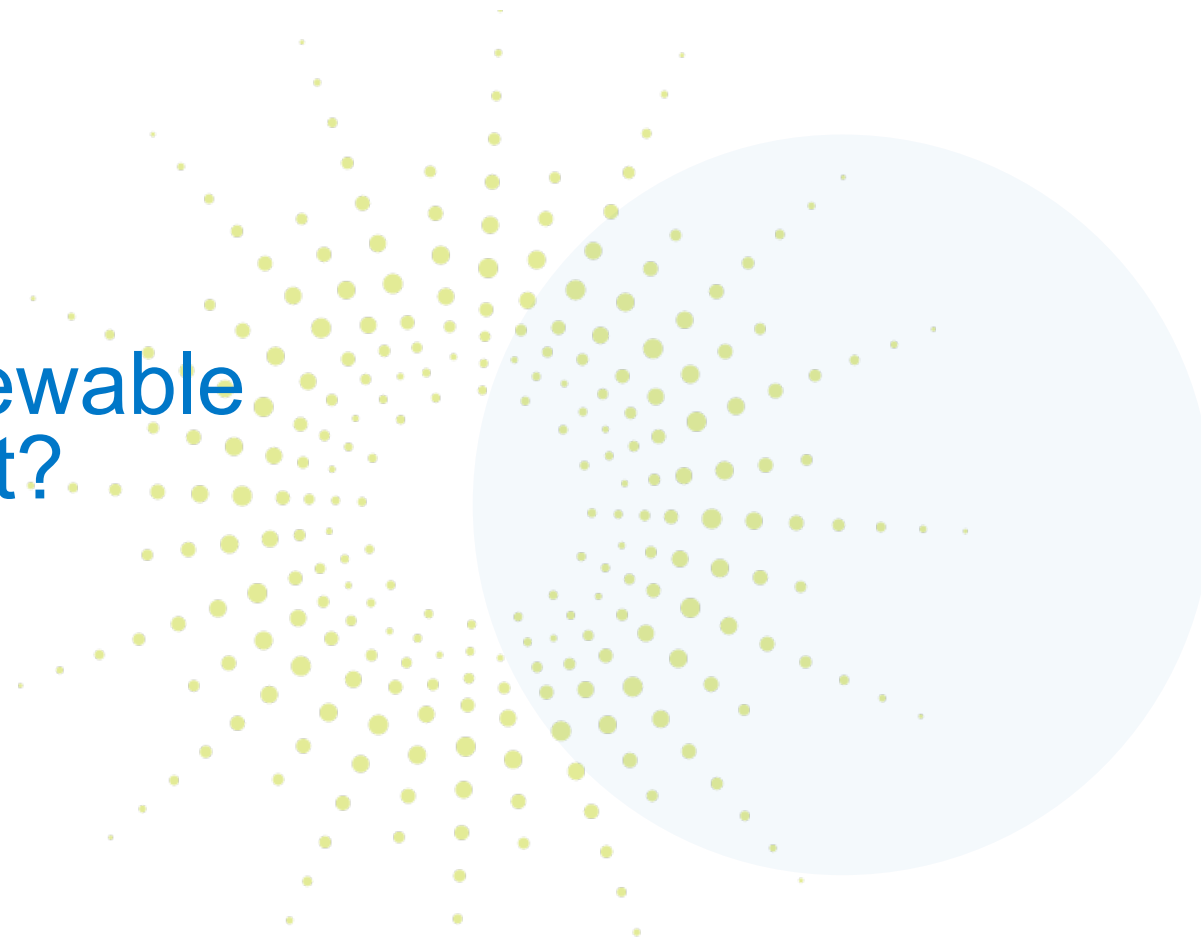
External Advisory Group

- Peninsula Clean Energy staff has formed an external advisory group with technical staff from these groups to review and advise
 - Google
 - LBL
 - MRETs
 - Stanford
 - RMI
 - Others
- Met in August and plan to meet every other month during development of white paper

Questions?



Why is 24/7 renewable
energy important?



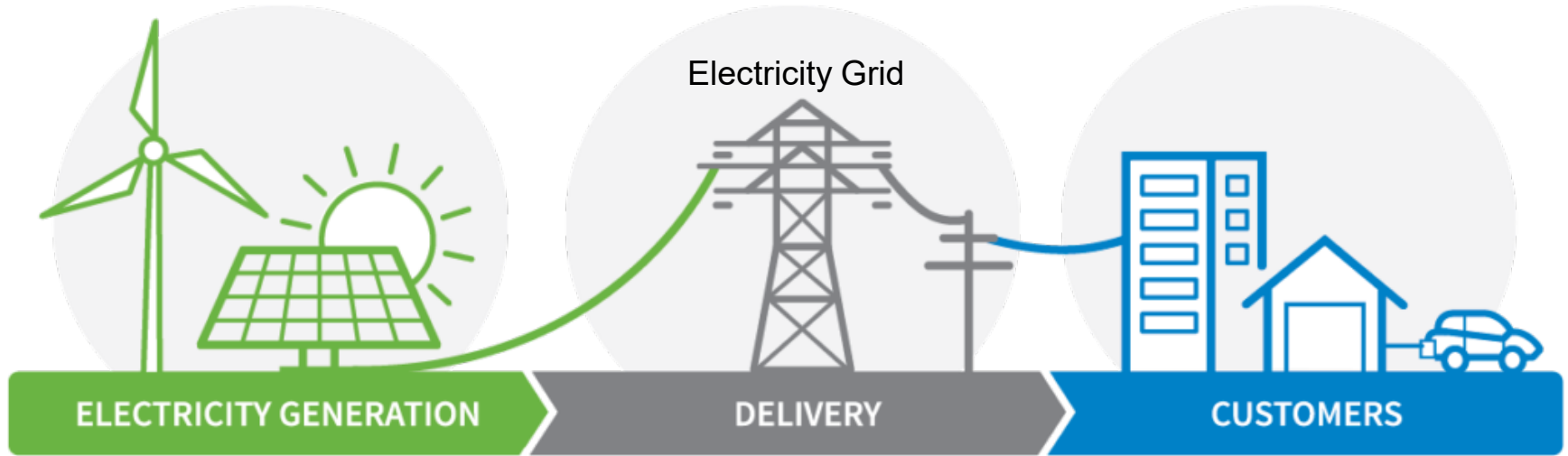
Why is 24/7 renewable energy important?

Reduce emissions in every hour, especially during evenings and overnight

Allow retirement of fossil fuel plants

Create a blueprint for sustainable, scalable renewable energy

How it works: Peninsula Clean Energy and the Electricity Grid



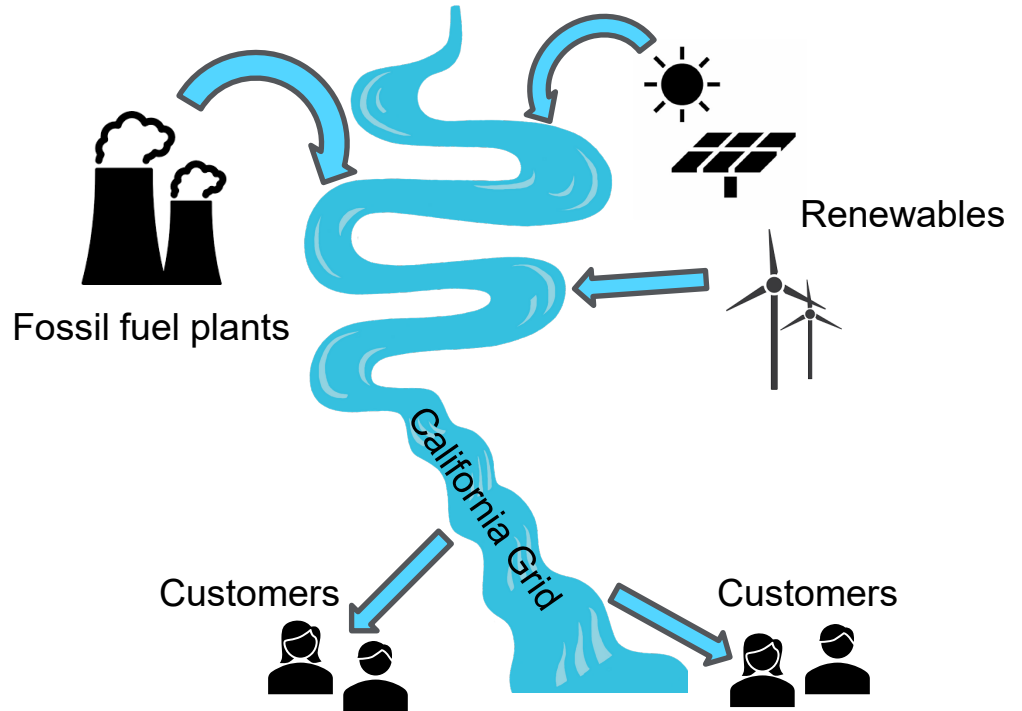
Peninsula Clean Energy
delivers energy supply to
the California electricity grid

The electricity grid
transmits and
distributes electricity
throughout California

Our customers
receive the energy
from the grid

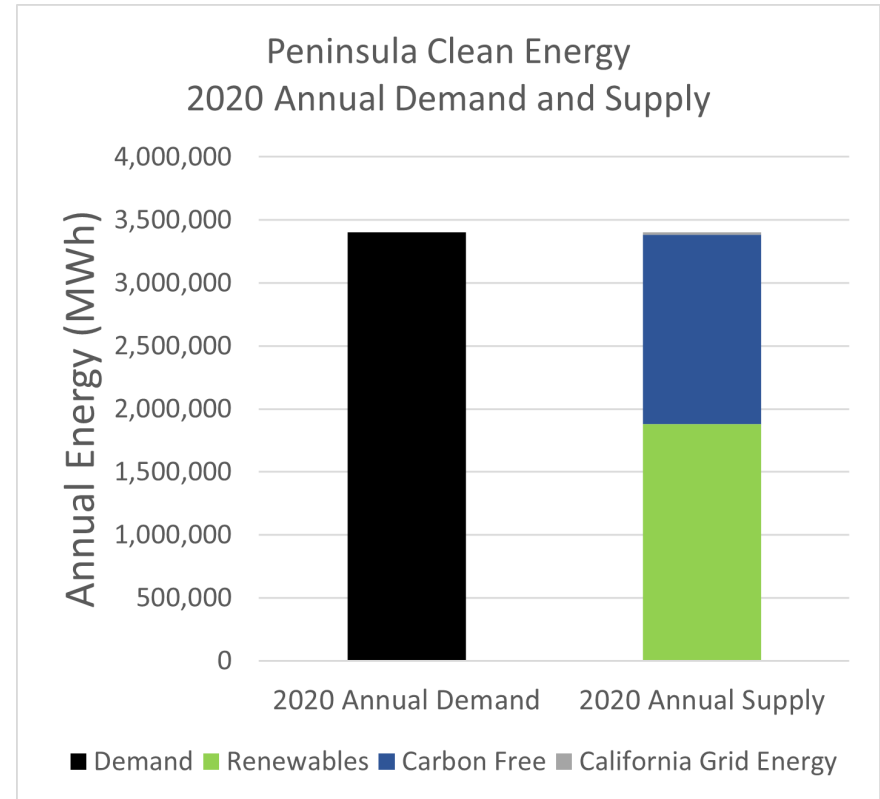
Imagine the Electricity Grid as a River of Water

- Once electricity is put onto the grid, it's impossible to track where each electron goes.
- We try to match our total supply to our customers' total demand.
- The timescale matters:
 - Annual Matching
 - 24/7 Matching



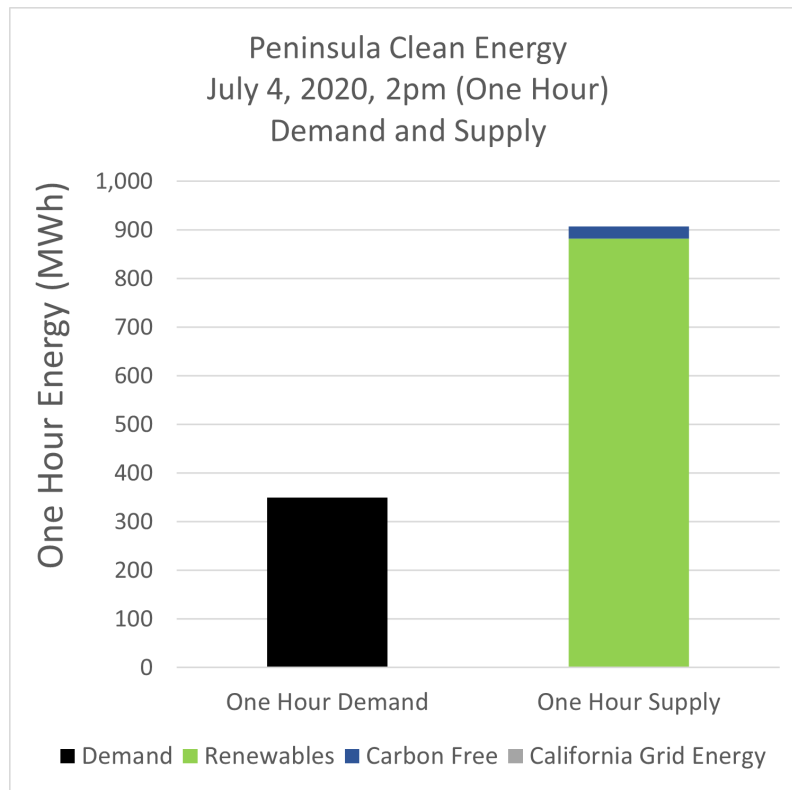
Peninsula Clean Energy is currently 100% Carbon Free on a total annual basis

- We currently purchase enough renewable and carbon-free supplies to meet customer demand in the same year
- This annual framework:
 - Is the current industry standard
 - Does not show whether supply and demand matched on an hourly basis



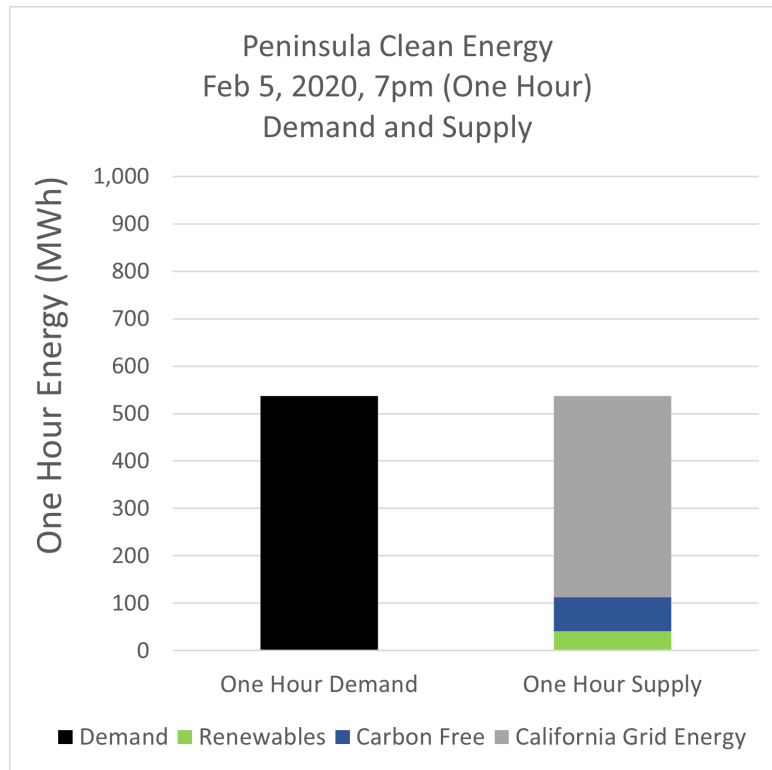
Currently, in a single hour, our demand and supply may not match

- In this hour in 2020, we supplied more energy to the grid than our customers needed

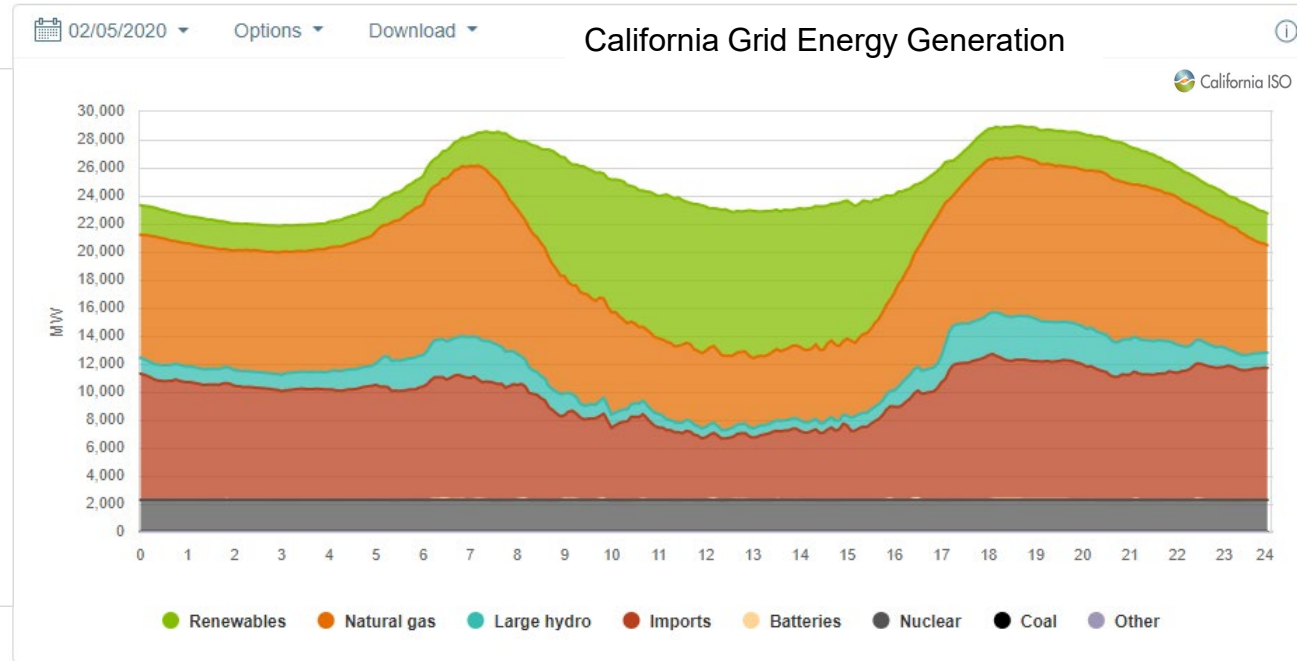
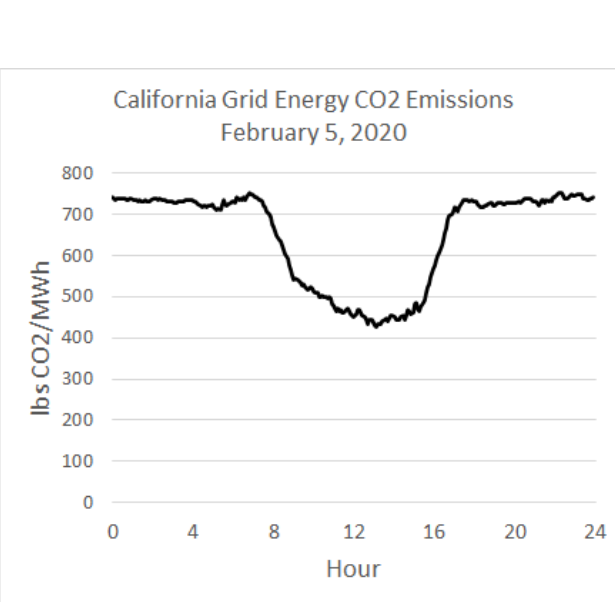


Currently, in some hours, we don't supply as much as our customers need

- In this hour in 2020, our contracted supplies were less than our customers' demand
- To make up the difference, we have to deliver California grid energy to our customers
- California Grid Energy has emissions

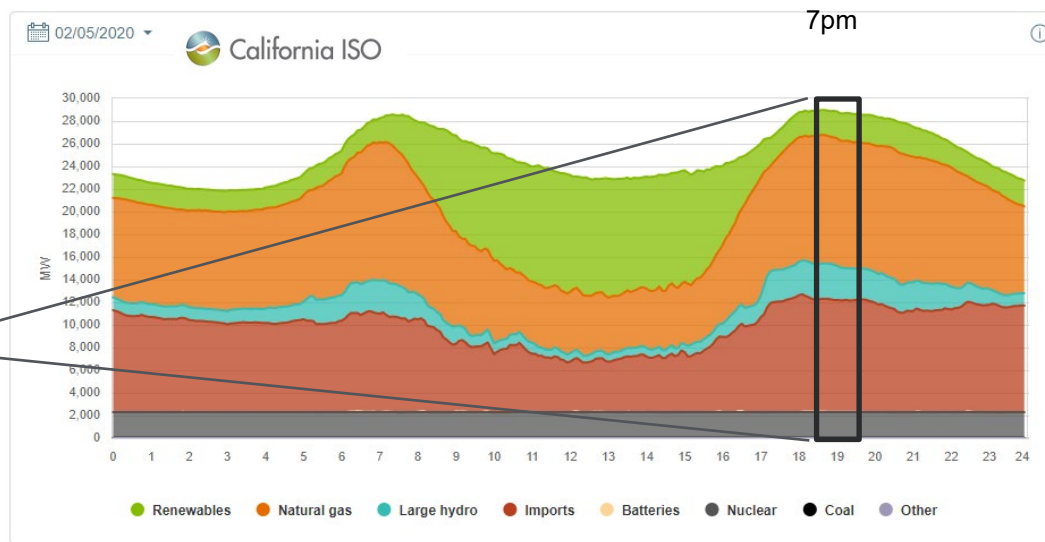
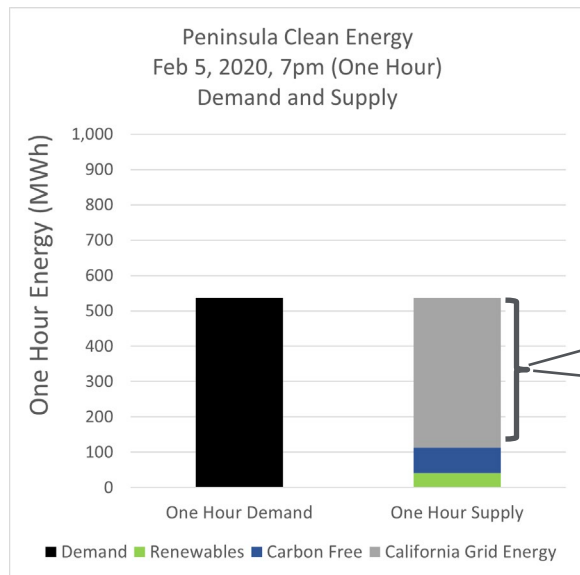


California Grid Energy

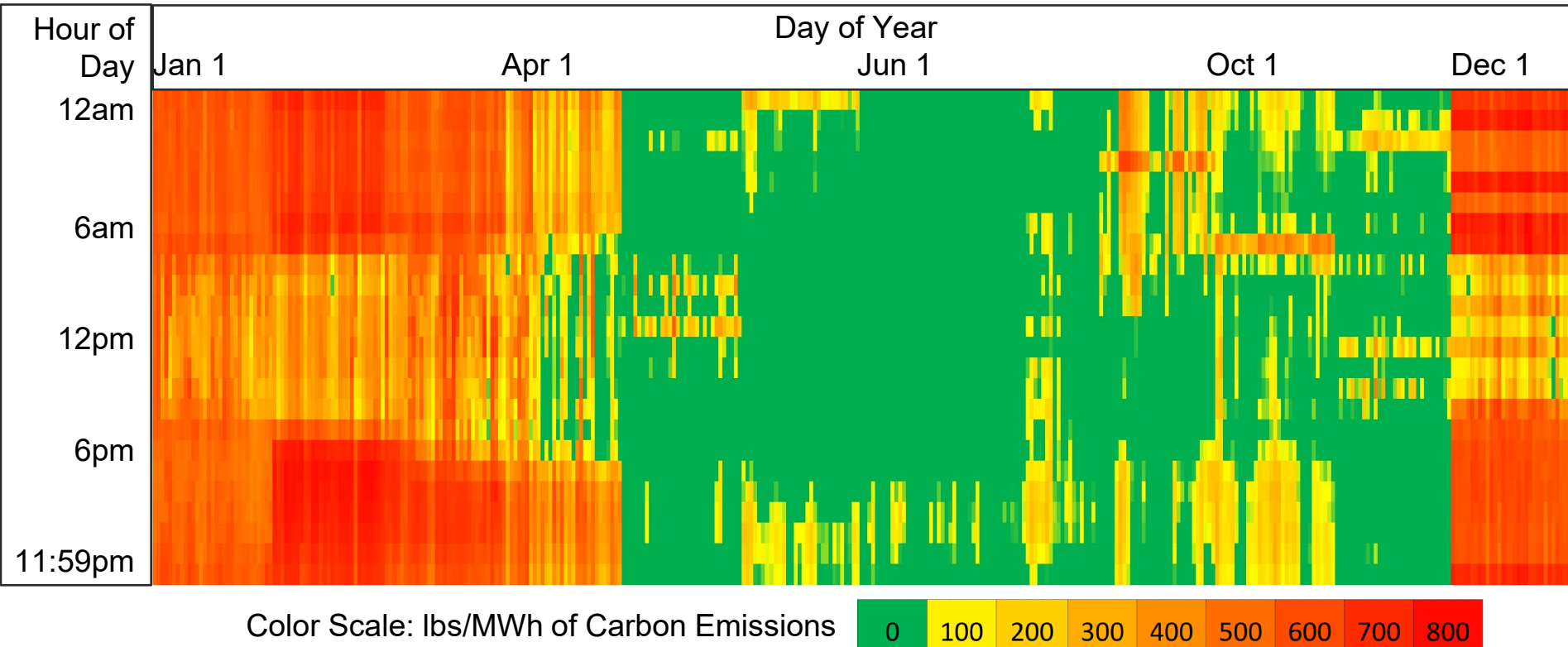


24/7 Approach: Understanding Emissions Footprint

- In this hour (2/5/2020 at 7pm), we delivered our customers California Grid Energy
- A large portion of the California Grid Energy in this hour was supplied by methane gas
- If we reduce our reliance on the grid in this hour, we can reduce grid emissions



2020 Peninsula Clean Energy 24/7 Emissions Footprint due to use of California grid energy



Annual accounting vs 24/7 accounting

- The two frameworks result in different calculated emissions footprints
- The 24/7 accounting approach is needed to understand how to reduce emissions from the California grid during every hour of the year

- Reflects our use of California grid energy
- Does not credit oversupply

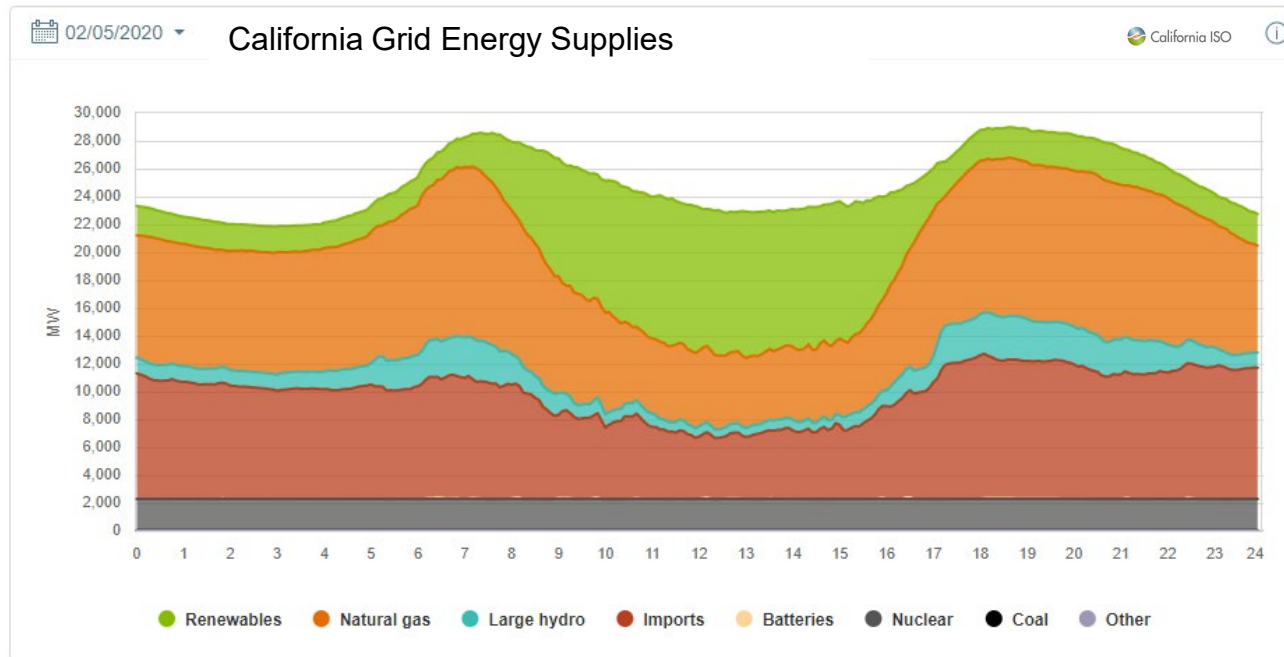


	2020 24/7 Emissions Footprint	2020 Annual Emissions Footprint
Average	187 lbs/MWh	12 lbs/MWh
Minimum	0 lbs/MWh	N/A
Maximum	826 lbs/MWh	N/A



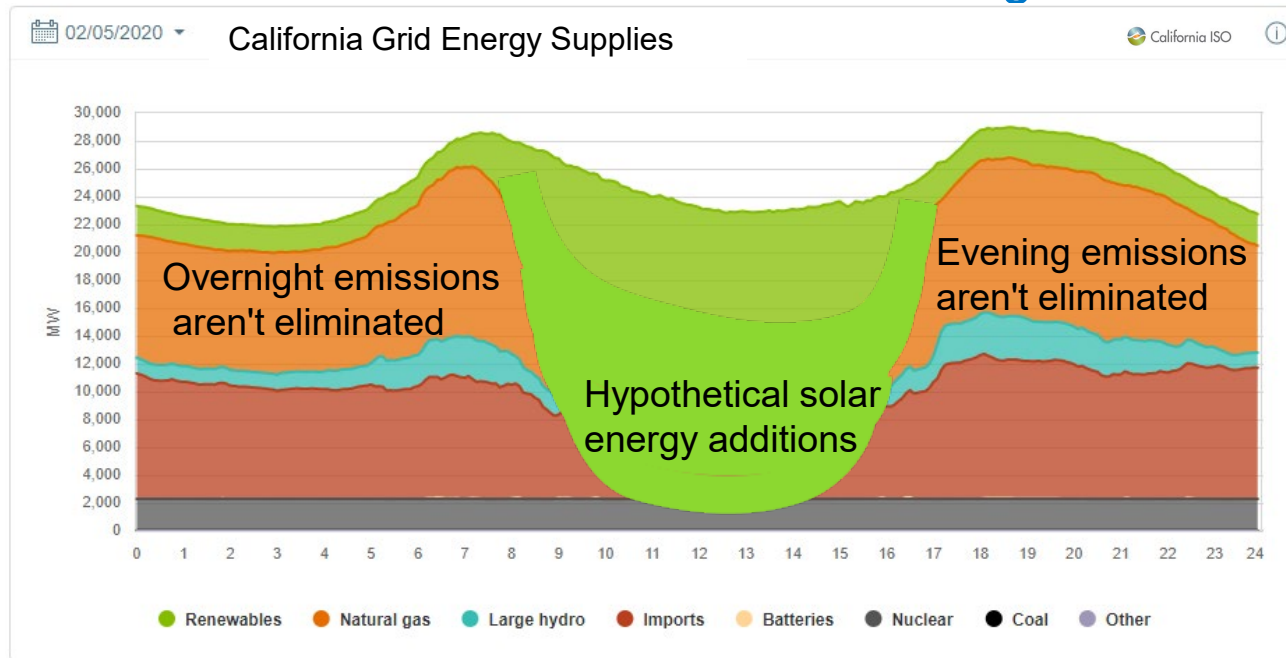
- Current reporting standard
- Gives credit for oversupply in some hours

The California Grid Energy, Today



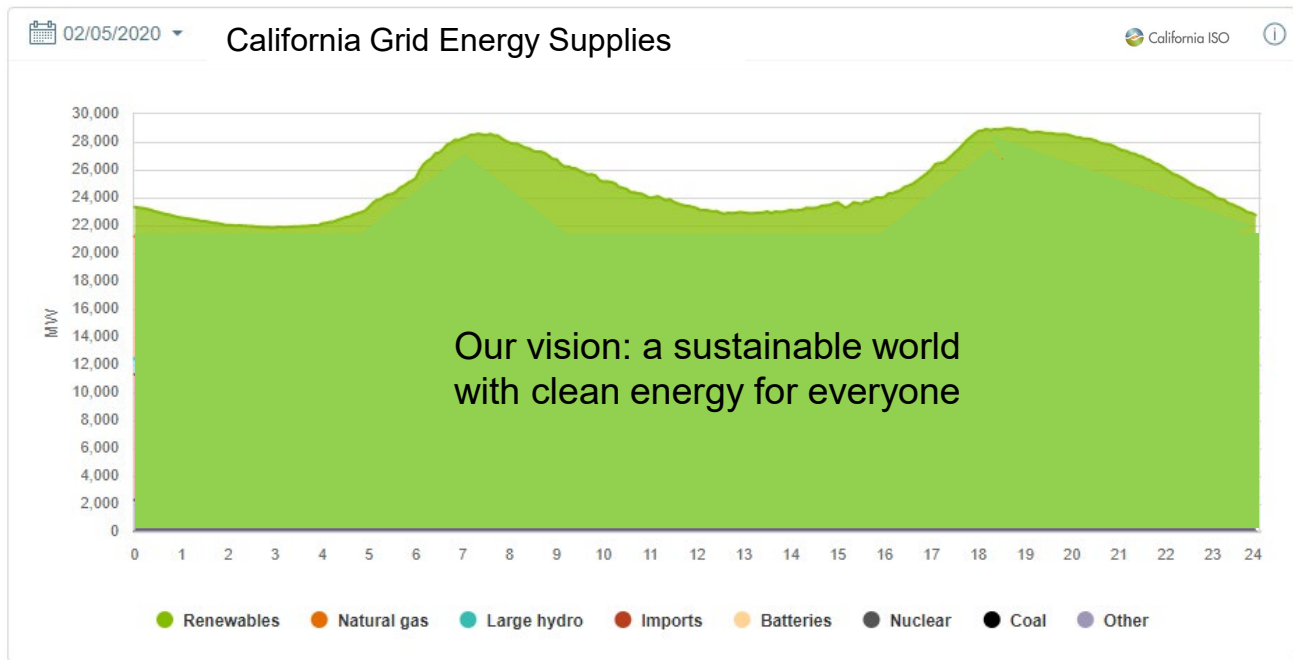
Imagine if more communities pursue total annual renewable goals...

- Adding only low-cost solar energy to the grid leads to issues and can't eliminate carbon emissions in the overnight hours



Imagine if more communities pursue 24/7 renewable goals...

- Our 24/7 renewable portfolio will be a model for others to follow



Annual Procurement vs. 24/7 Procurement

	Annual Procurement Existing approach
What	Purchase enough clean supplies to meet electricity demand <u>in the same year</u>
Benefits	Increases "low-hanging-fruit" renewable supplies on the grid, such as low-cost solar
Challenges	Methane gas generation needed when the sun sets and the wind doesn't blow Will create issues on the grid as more communities implement it

Annual Procurement vs. 24/7 Procurement

	Annual Procurement Existing approach	24/7 Procurement Our goal for 2025 and beyond
What	Purchase enough clean supplies to meet electricity demand <u><i>in the same year</i></u>	Purchase renewable supplies to meet electricity demand <u><i>in the same hour</i></u>
Benefits	Increases "low-hanging-fruit" renewable supplies on the grid, such as low-cost solar	Add renewable supply to the grid in a scalable, sustainable way Facilitate retirement of fossil fuel generation
Challenges	Methane gas generation needed when the sun sets and the wind doesn't blow Will create issues on the grid as more communities implement it	Has not been done before Requires creativity and innovation

The importance of 24/7 renewable energy

- If more communities pursue renewable goals, using an annual accounting approach and the lowest cost (solar) resources, the electricity grid would have more and more issues
 - There would be too much supply when the sun shines
 - There wouldn't be enough supply when the sun set
- California needs a 24/7 renewable energy strategy to achieve its decarbonization goals
- With our 24/7 goal, Peninsula Clean Energy will do our part and lead the way in achieving scalable renewable electricity supply
- We will create a blueprint for other communities to follow

Questions?

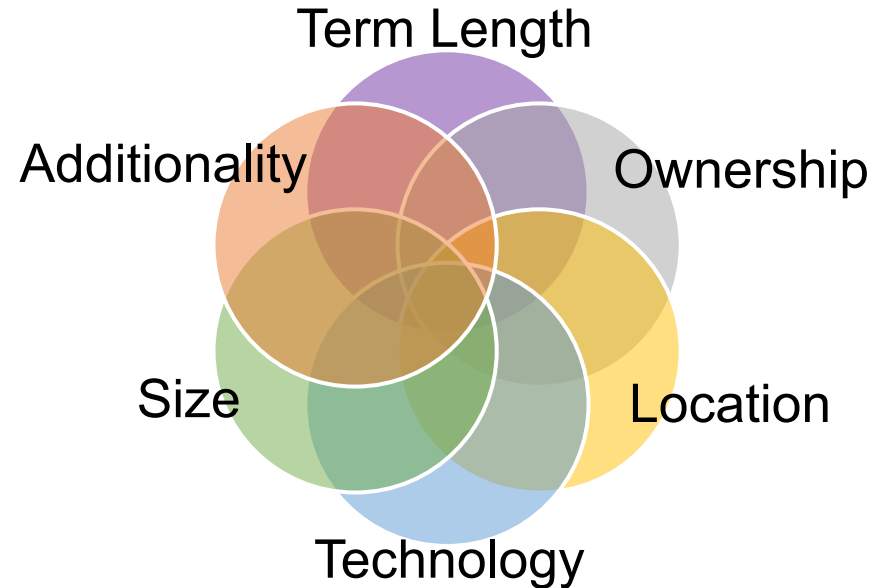


Overview of Renewable Energy Procurement



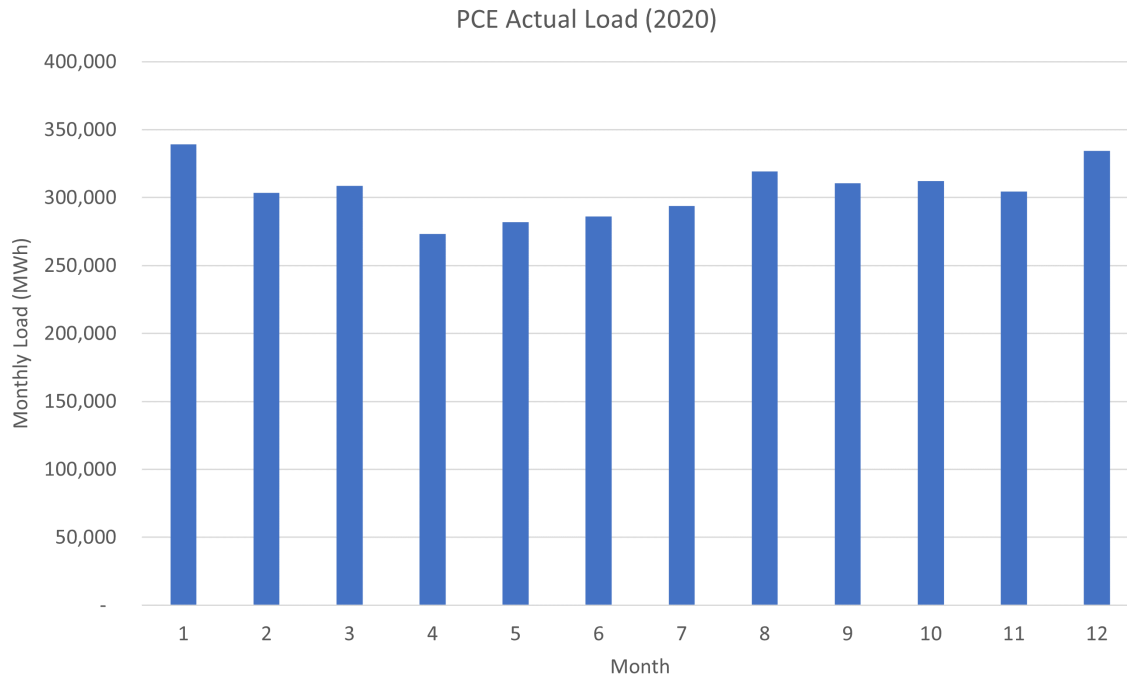
Strategic Integrated Resource Plan: Procurement Strategy

- We use a portfolio risk management approach in our power purchasing program
- We seek low-cost supply as well as diversity in contract attributes
- We also seek diversity in timing of market purchases to cost average over time, including remaining cognizant of the value of open market positions.

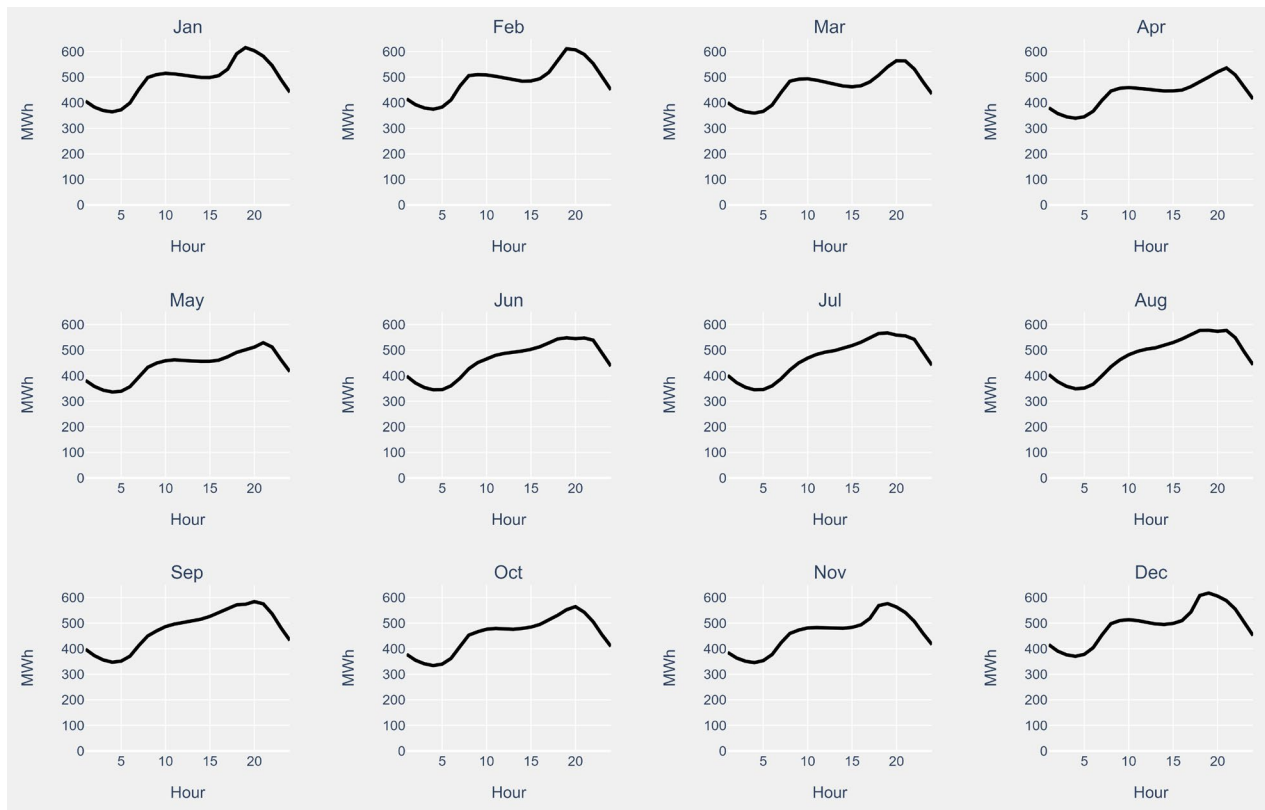


Our Load

- Our monthly load is higher during winter months



Month-Hour Load Shapes (2025)



Renewable Resource

- The primary resources we will use to serve our customer demand are:
 - Wind
 - Solar
 - Geothermal
 - Small Hydro

Wind Resource

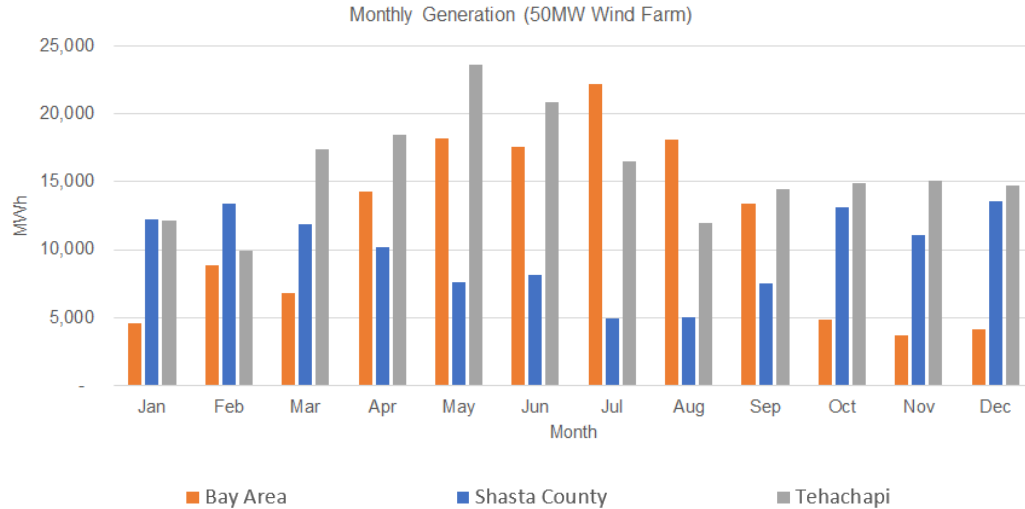
- Limited new wind in CA; good sites already developed, permitting restrictions; existing sites are being repowered
 - Challenges include environmental concerns such as aesthetics and special-status species
- Opportunity to procure from out of state projects
- Off-shore development may be available in the next decade



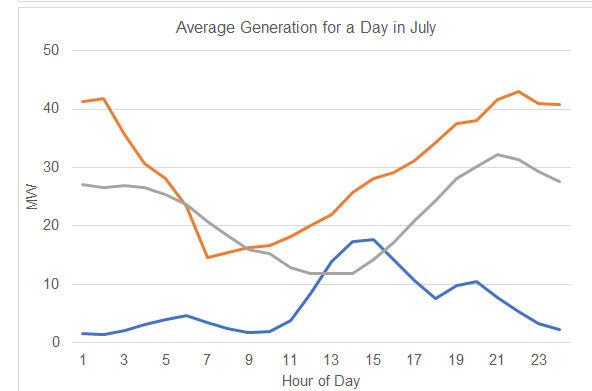
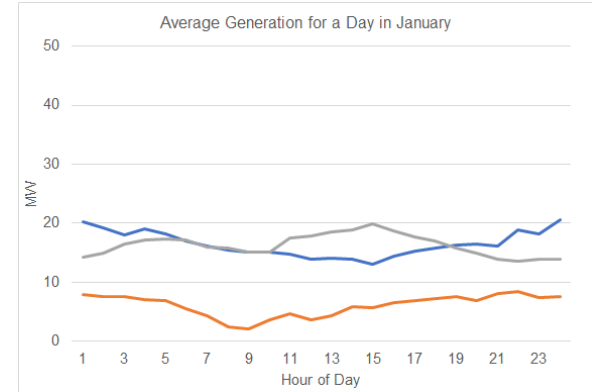
Location of wind farms in California

Source: California Energy Commission

Wind generation varies by season and location

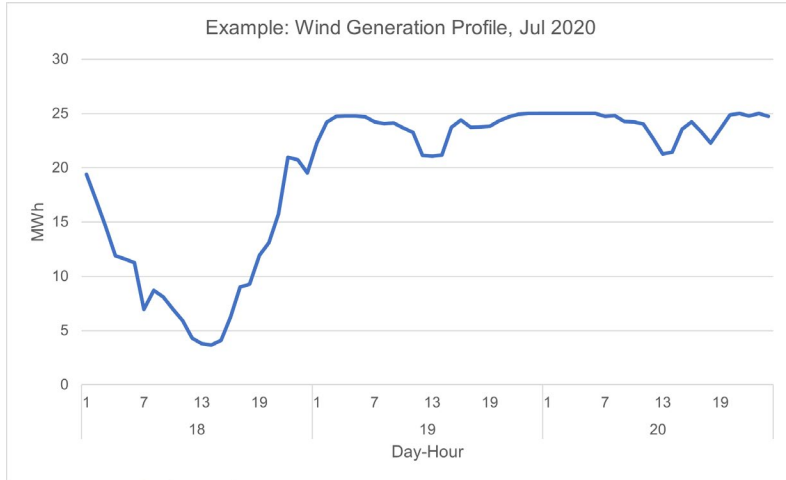


Location	Capacity Factor
Shasta County	27%
Bay Area	31%
Tehachapi	43%

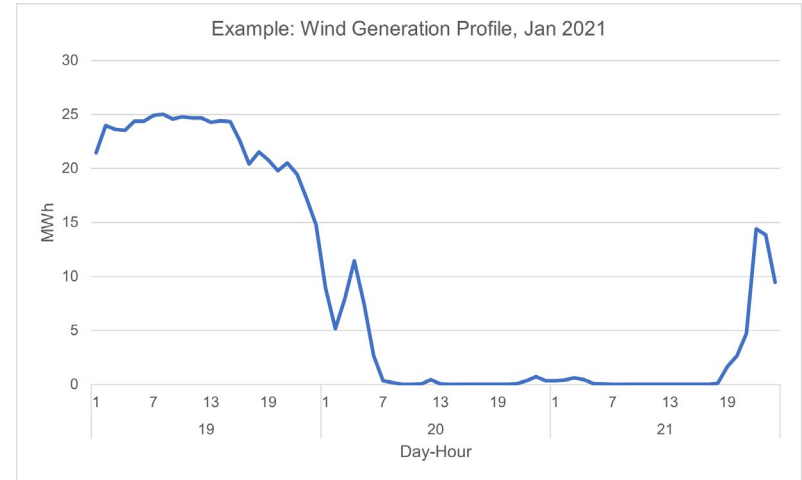


Wind generation varies by day and hour

Wind generation could be very different day to day

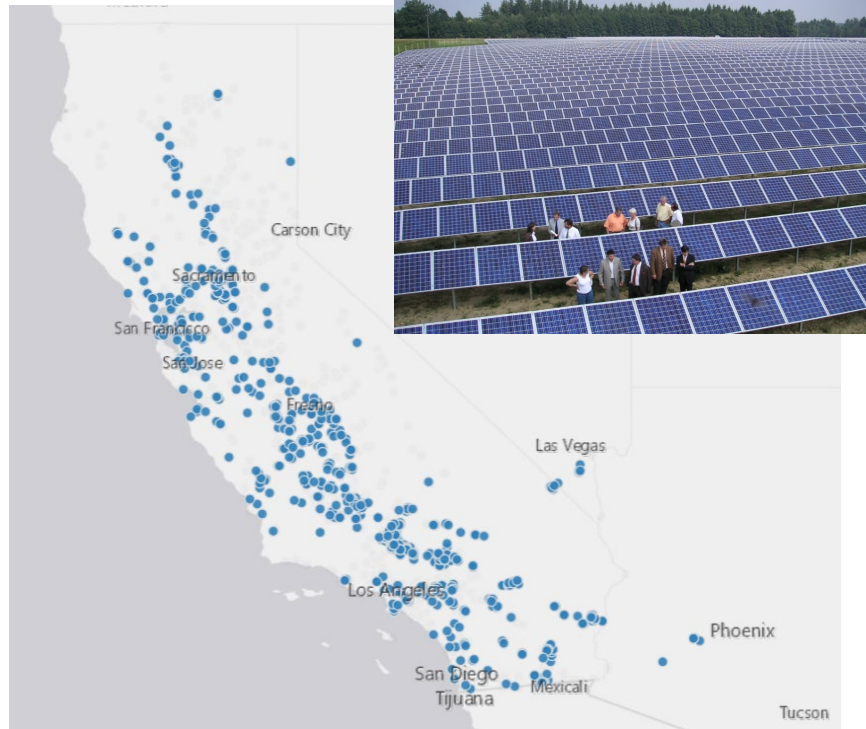


Wind could stop blowing for multiple days resulting in zero generation from a windfarm



Solar Resource

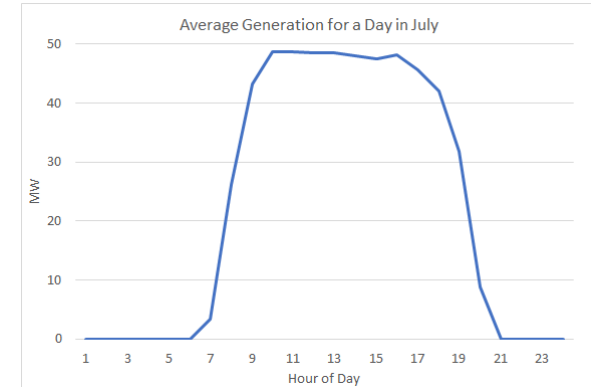
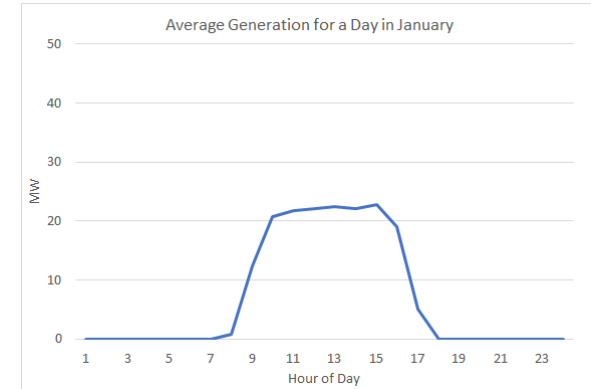
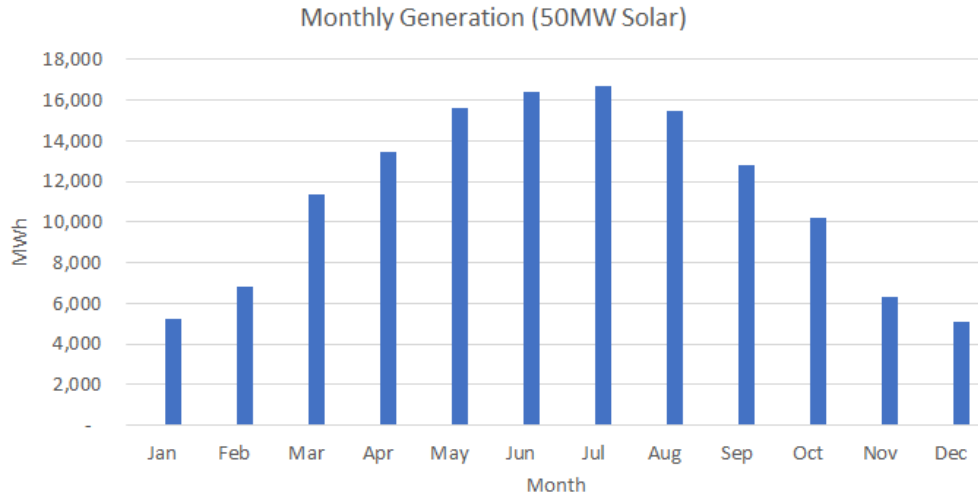
- Generally the cheapest resource in CA with the most abundant land area for development
- Availability impacted by seasonal solar availability, cloud cover, and wildfire smoke



Location of utility solar installations in California

Source: California Energy Commission

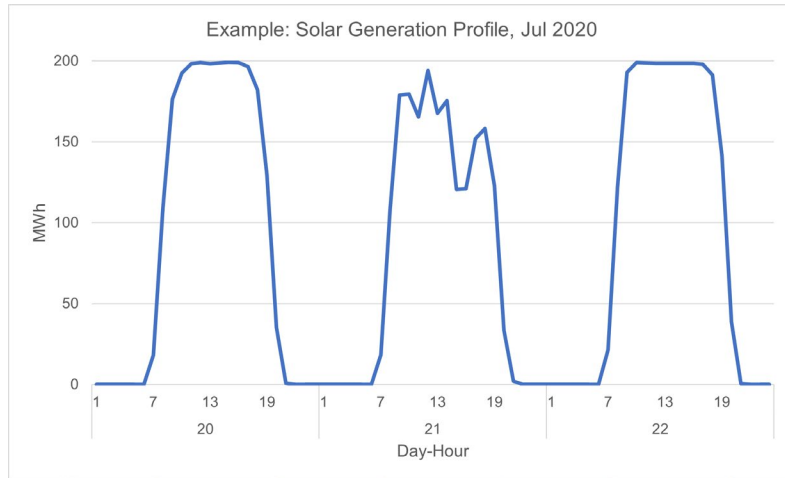
Solar generation varies by season



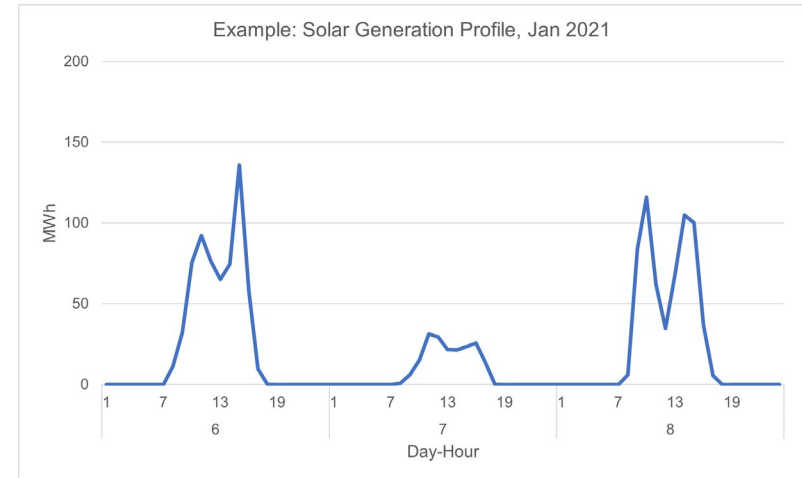
Solar Profile (Hourly)

Solar generation is more predictable than wind but can still vary day to day

A cloudy day could reduce solar generation



Solar generation is generally lower in winter compared to summer and we can expect larger number of cloudy/rainy days



Geothermal Resource

- Geothermal provides renewable baseload power
- Limited locations where available
- Tends to be higher priced than other renewable generation sources

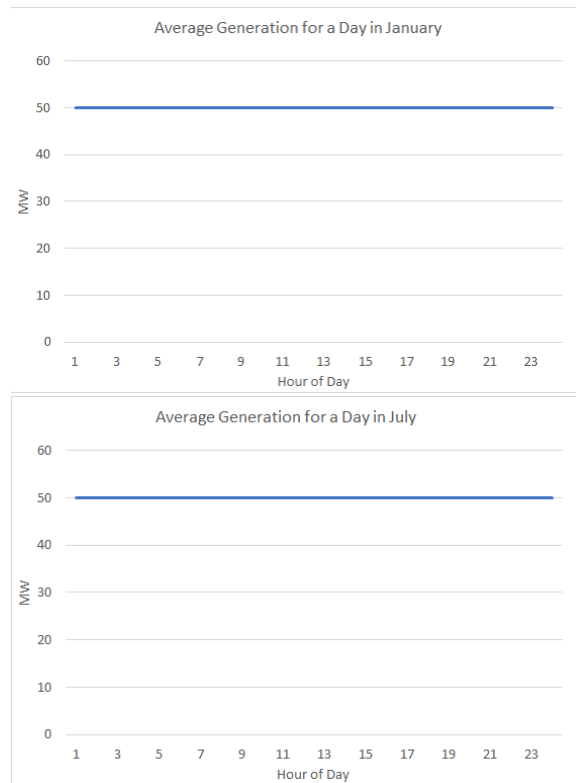
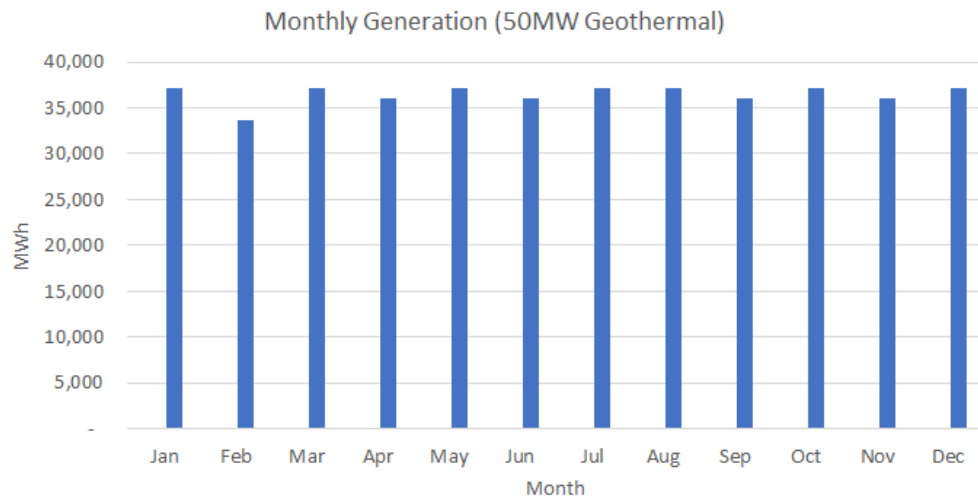


Location of geothermal generators in California

Source: California Energy Commission

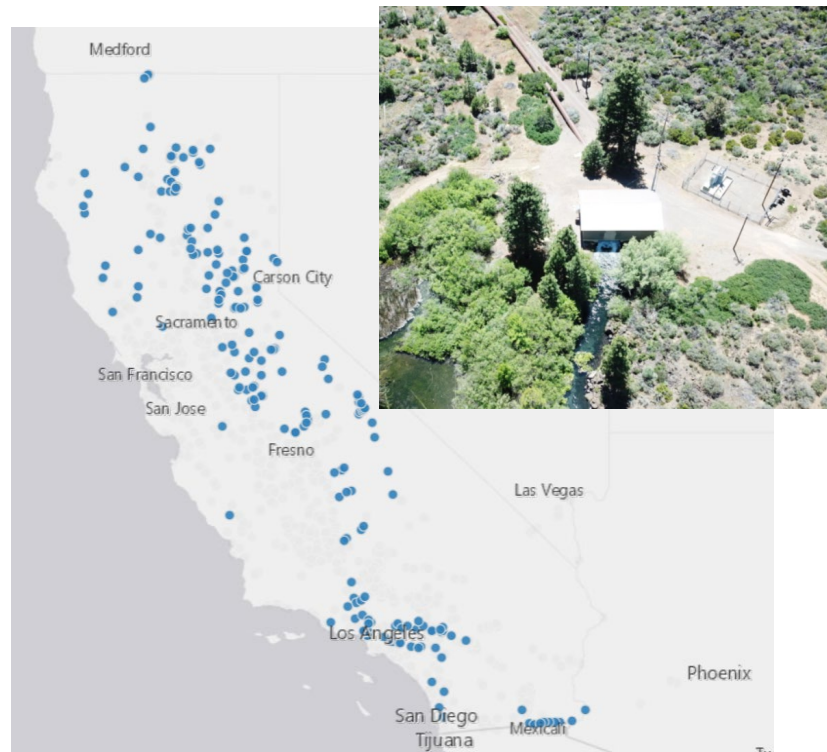
Photo: McCabe Project - Calpine Corporation & Geysers Power Company, LLC.

Geothermal Profile



Small Hydro Resource

- In California, "small hydro" is considered renewable if <30MW
- Large hydroelectric dams considered carbon-free but non-renewable
- Annual and seasonal availability affected by droughts, rainfall
- Limited opportunity for new small hydro in CA

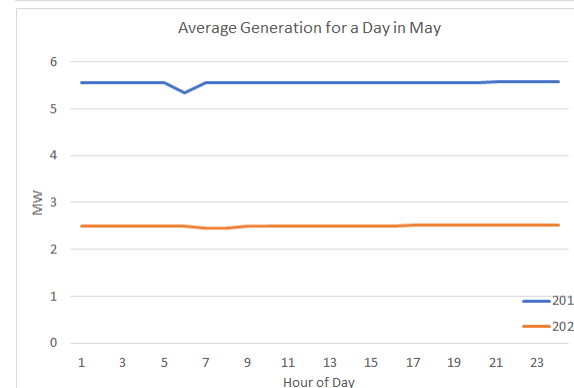
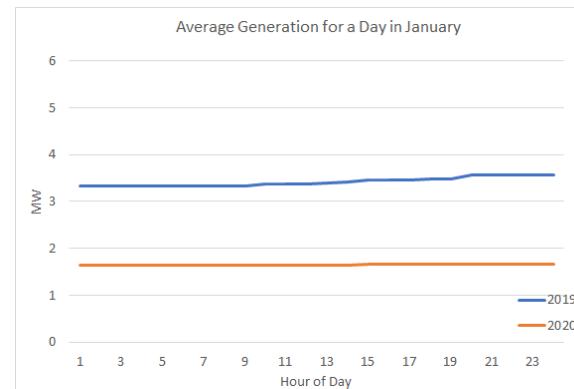
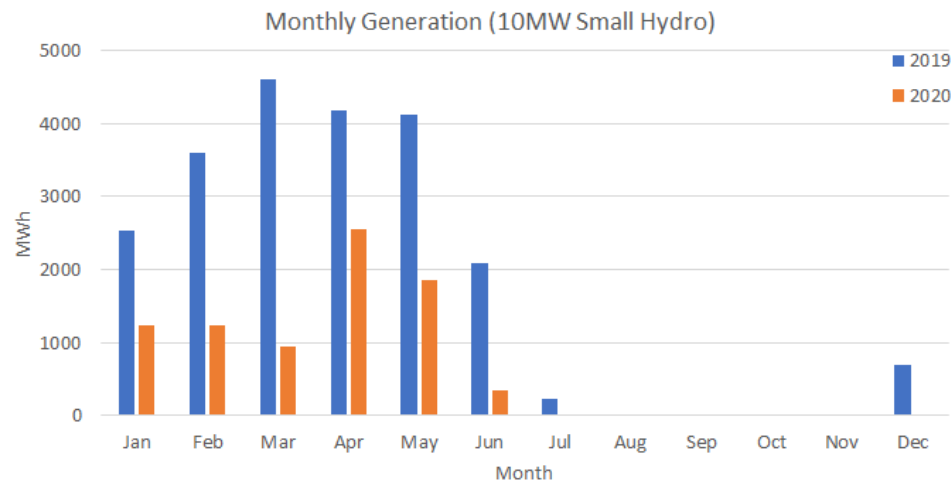


Location of small hydroelectric generators in California

Source: California Energy Commission

Photo: Bidwell Ditch hydroelectric project

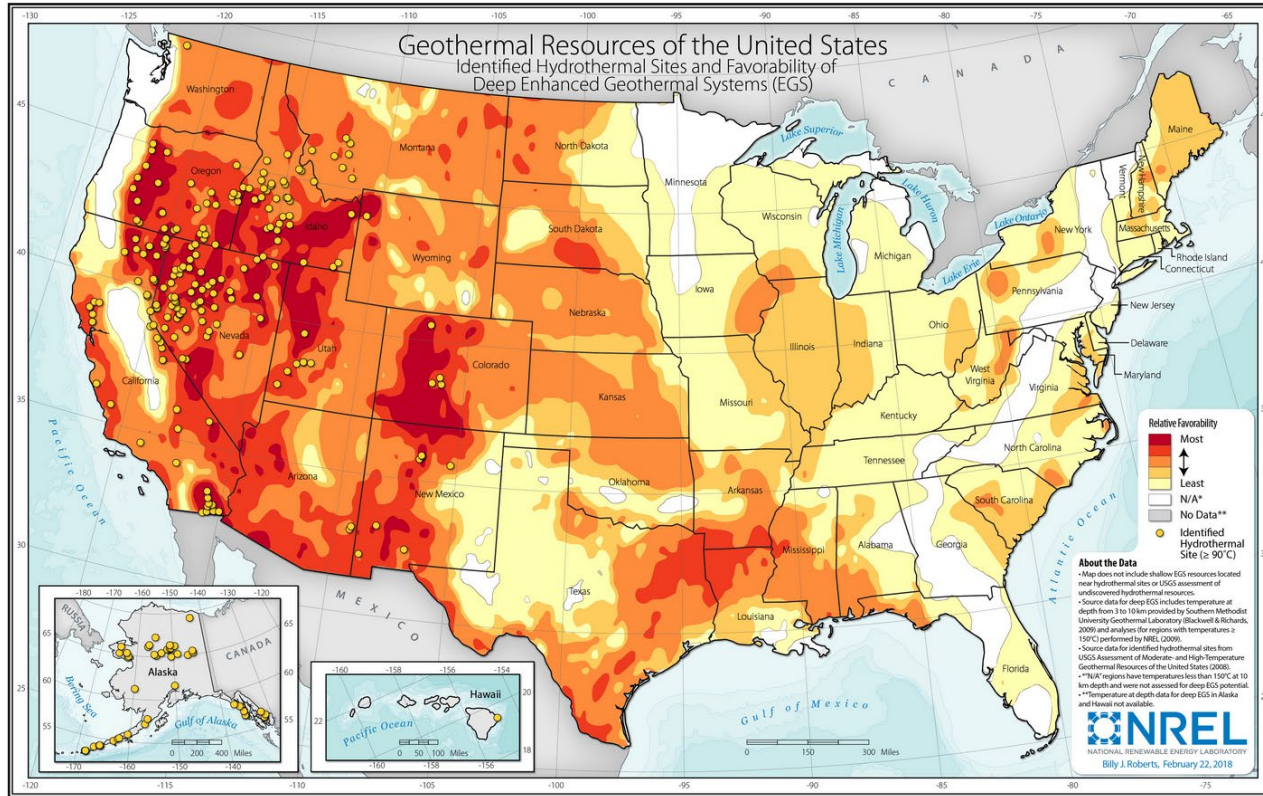
Small Hydro Profile



Resource Location

- Prioritize in-state resources
- Wind and geothermal capacity in state are limited in capacity
- For these resources, may need to procure from projects out of state that can deliver to California

Geothermal Resources



Wind Resources

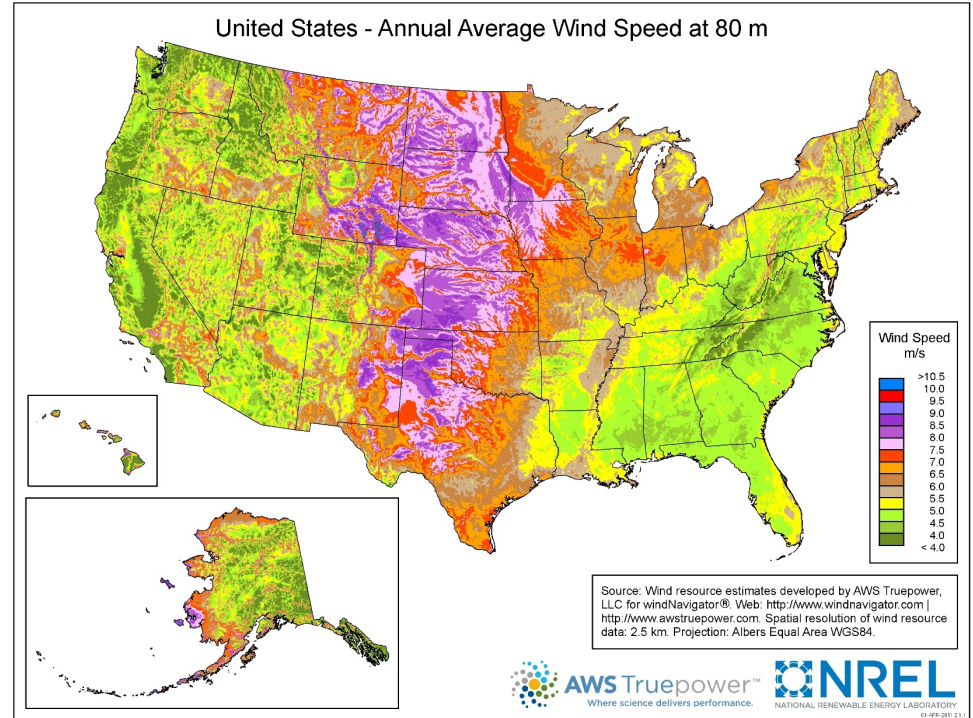
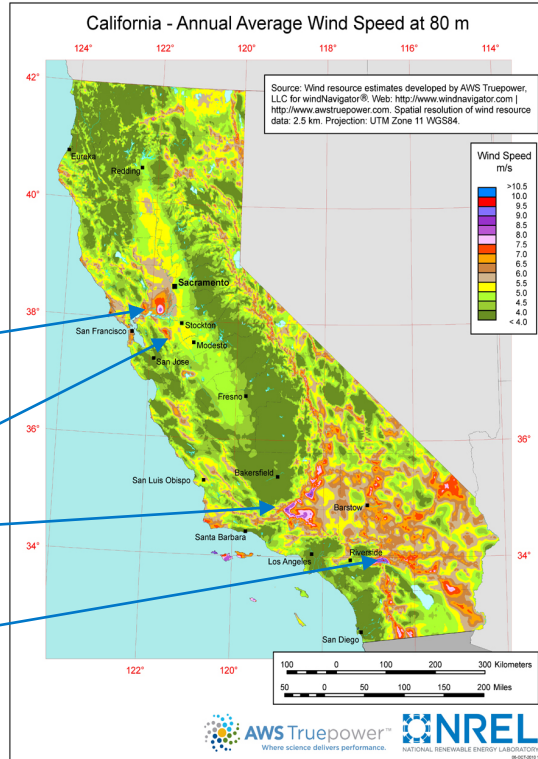
Major wind development areas:

Solano

Altamont

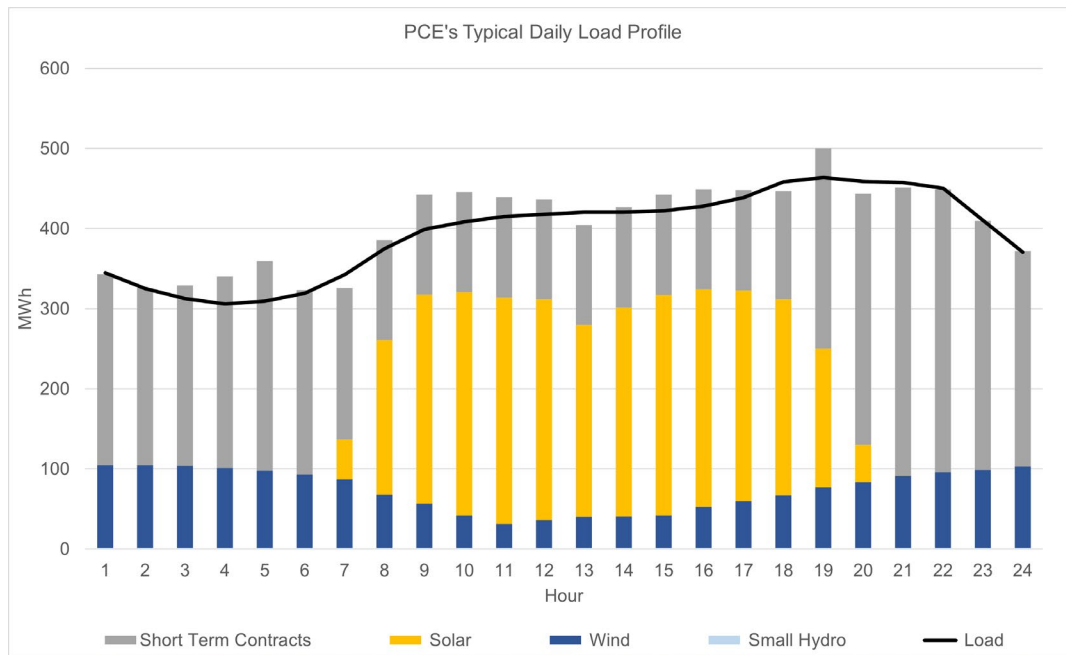
Tehachapi

San Geronio

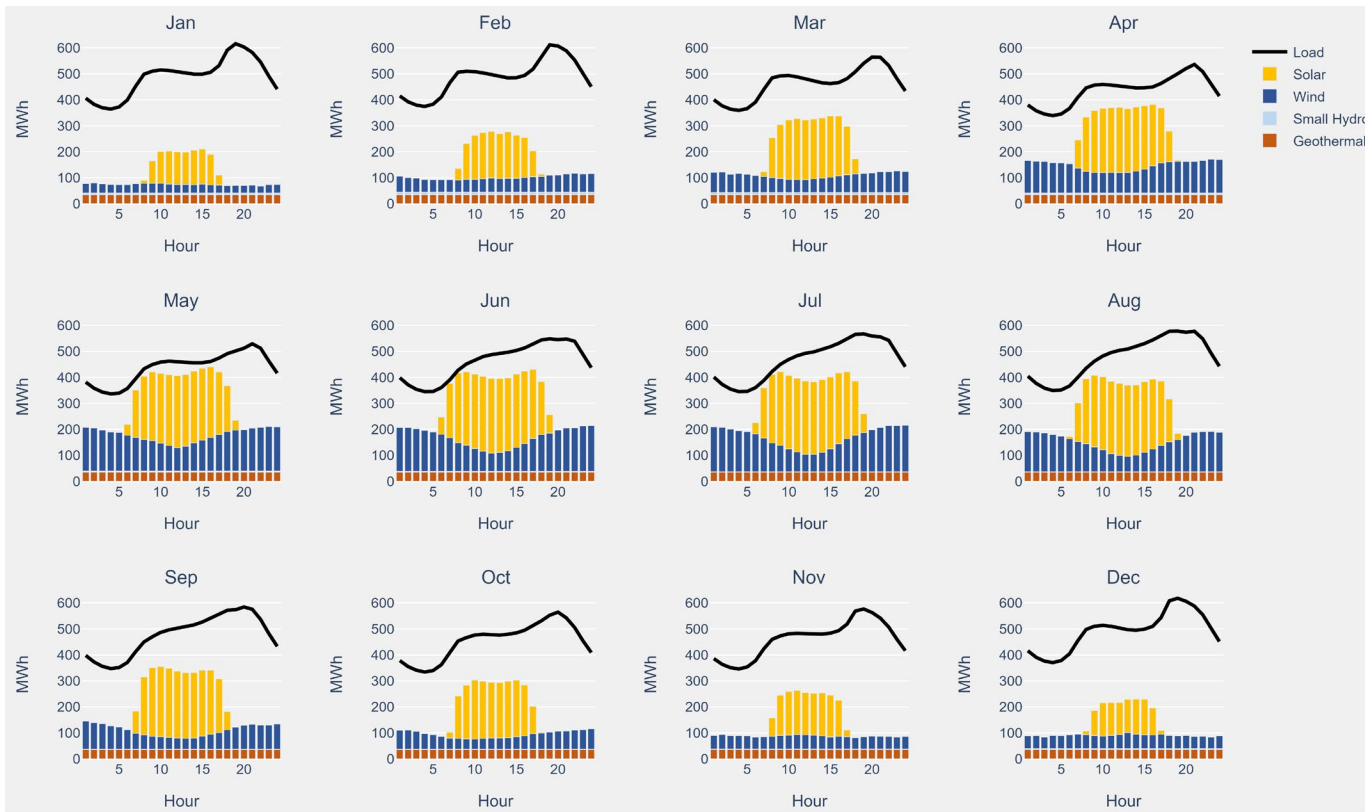


2021 Load and Contracts

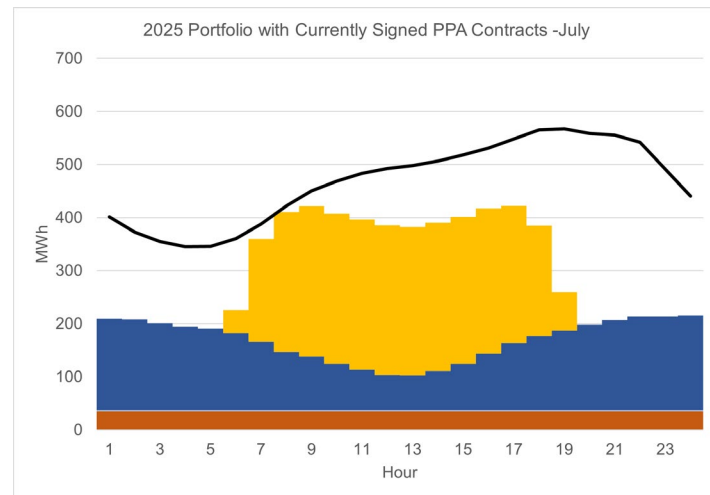
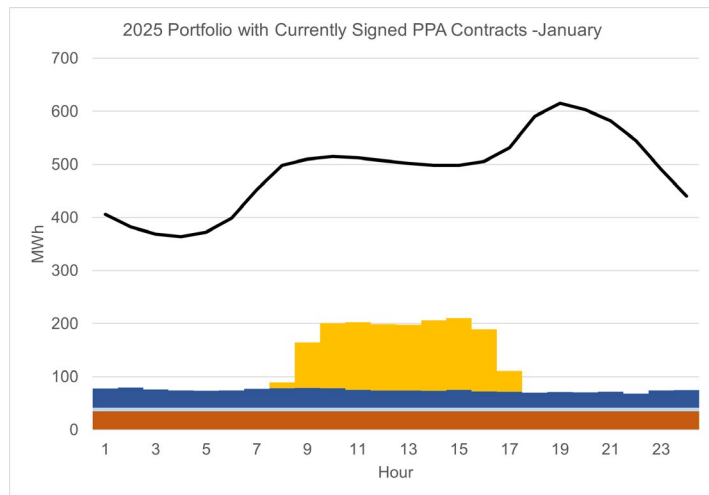
- On a typical day, we cover our load with long term PPAs (wind, solar, small hydro) and short term contracts



Current Portfolio: Month-Hour Shape in 2025



Current Portfolio: Month-Hour Shape in 2025

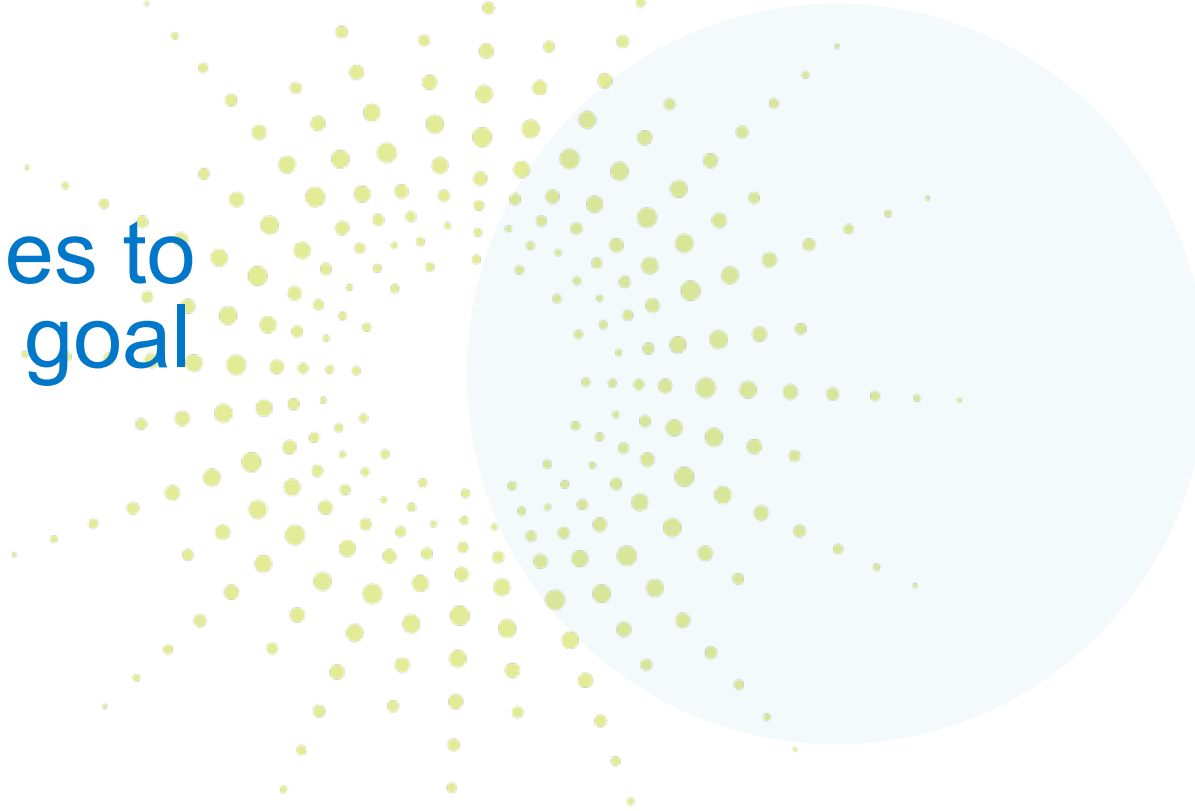


■ Solar ■ Wind ■ Small Hydro ■ Geothermal — Load

Questions?



Potential strategies to
achieve our 24/7 goal



Three main strategies for 24/7 matching

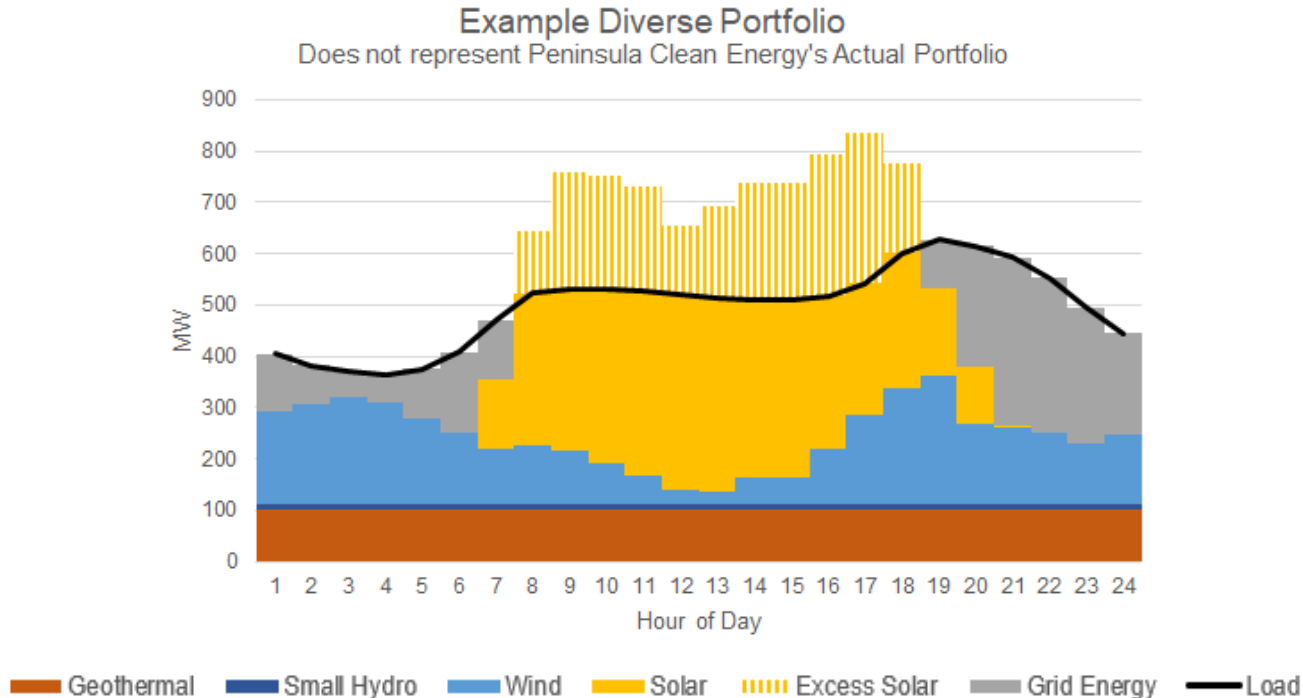
- There are several strategies, all of which must work together to match generation and load on an hourly basis
 1. Diversify our supply portfolio
 2. Use energy storage to shift excess renewables
 3. Shape and shift load to match renewable supply

Note:

- The following slides illustrate hypothetical examples of these strategies, but do not represent our actual strategy
- We will present specific strategies at a future date when we have final modeling results

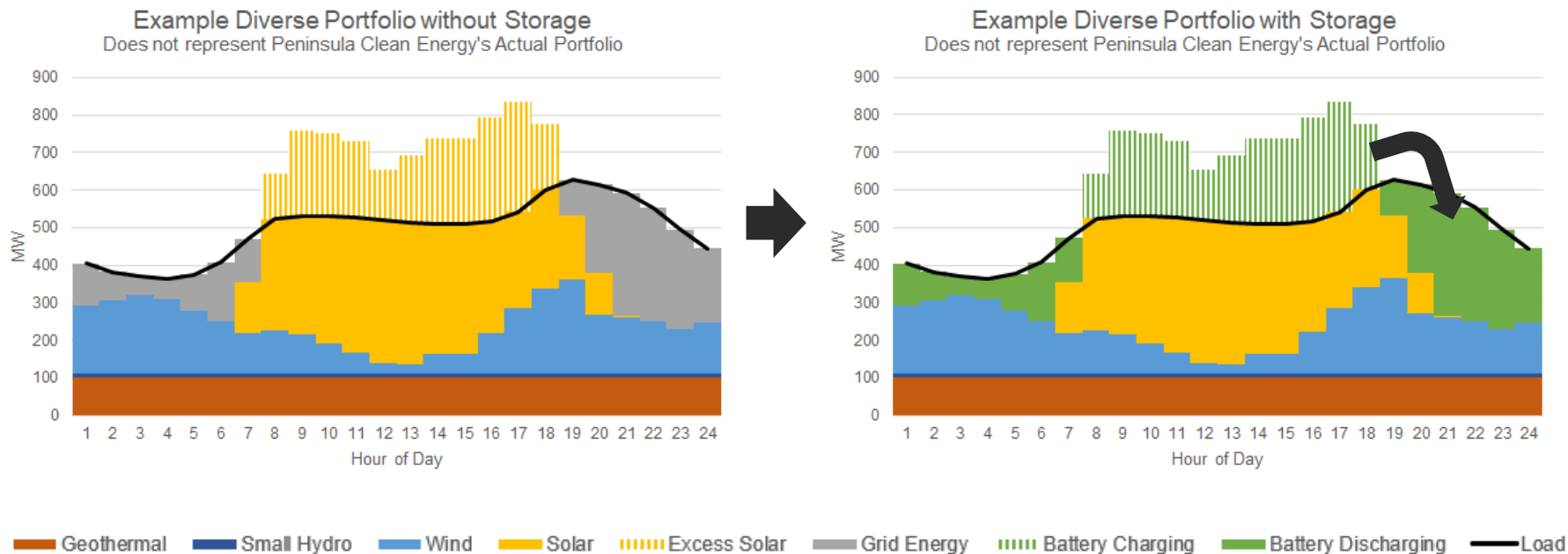
1. Procure a diverse portfolio of renewables

NOTE: These charts are illustrative in nature and do not represent a specific energy portfolio that Peninsula Clean Energy is considering



2. Use energy storage to shift excess supplies

NOTE: These charts are illustrative in nature and do not represent a specific energy portfolio that Peninsula Clean Energy is considering

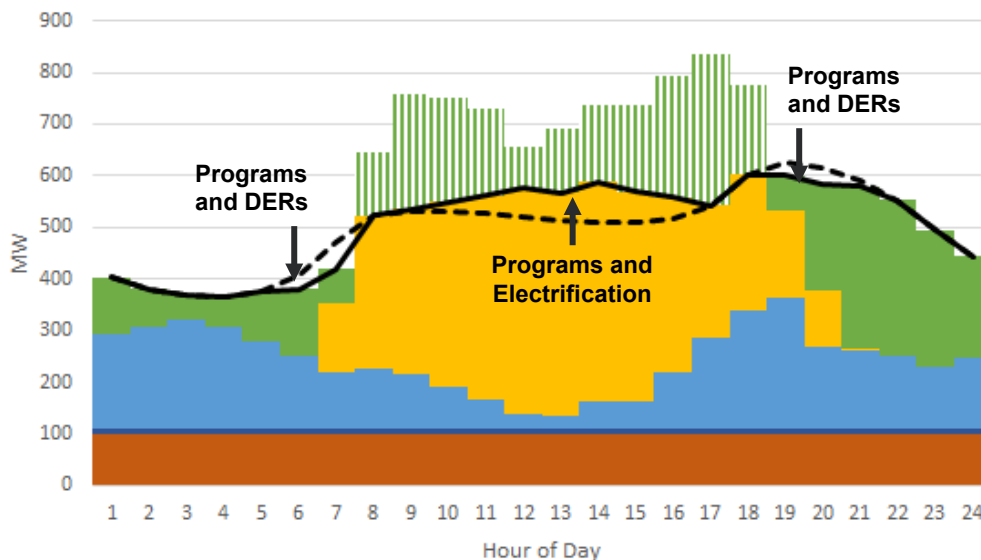


3. Shape and shift load to match renewable supply

NOTE: These charts are illustrative in nature and do not represent a specific energy portfolio that Peninsula Clean Energy is considering

Shape and shift Load to match renewable availability

Does not represent Peninsula Clean Energy's Actual Portfolio



Geothermal Small Hydro Wind Solar Battery Charging Battery Discharging Load (Shaped and Shifted) Load (Original)

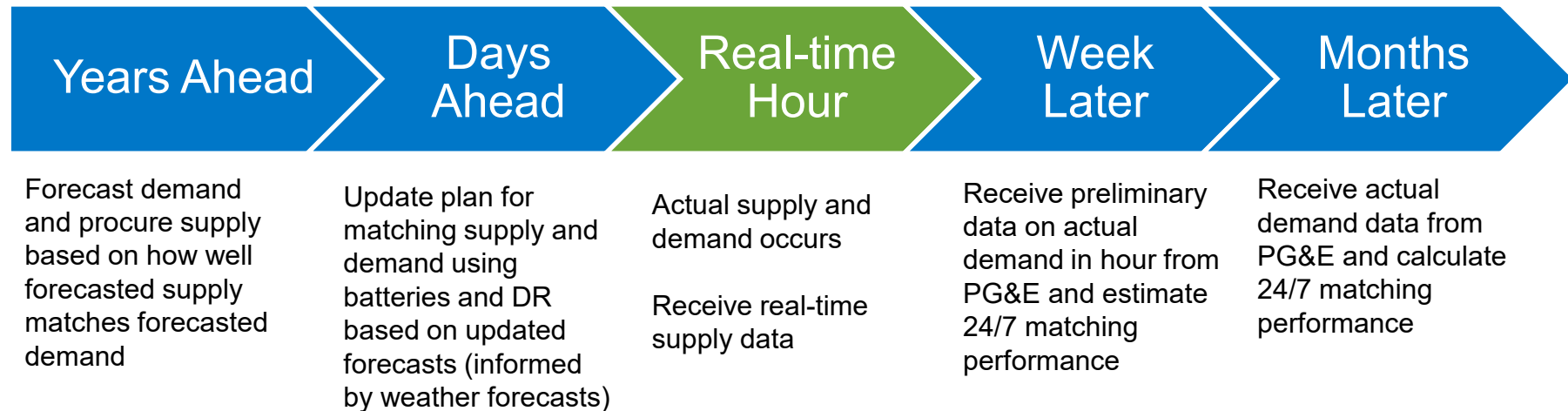
Questions?



Phasing our 24/7 Goal

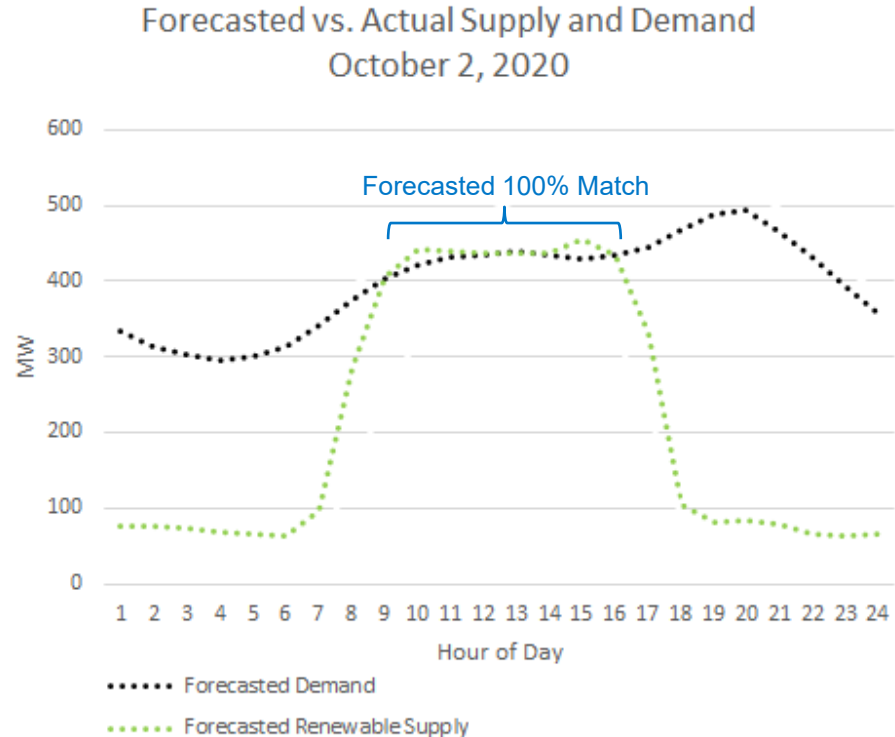


Delivering 24/7 renewable energy in each hour is a multi-year process



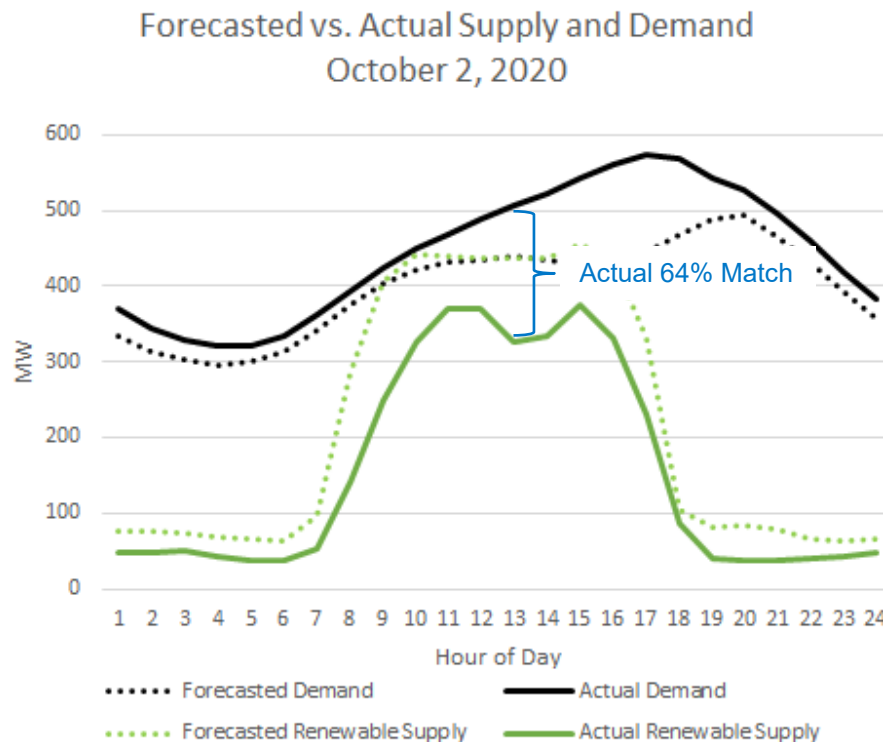
Actual load and supply never matches the forecast

- When procuring energy, we plan using forecasts of supply and demand



Actual load and supply never matches the forecast

- When procuring energy, we plan using forecasts of supply and demand
- Actual, real-time generation and load will differ from the forecasts



Phasing our 24/7 Goal

Phase 1 (by 2025)

- Procure 24/7 renewable energy from proven technologies based on:
 - Forecasted hourly load
 - Forecasted hourly generation

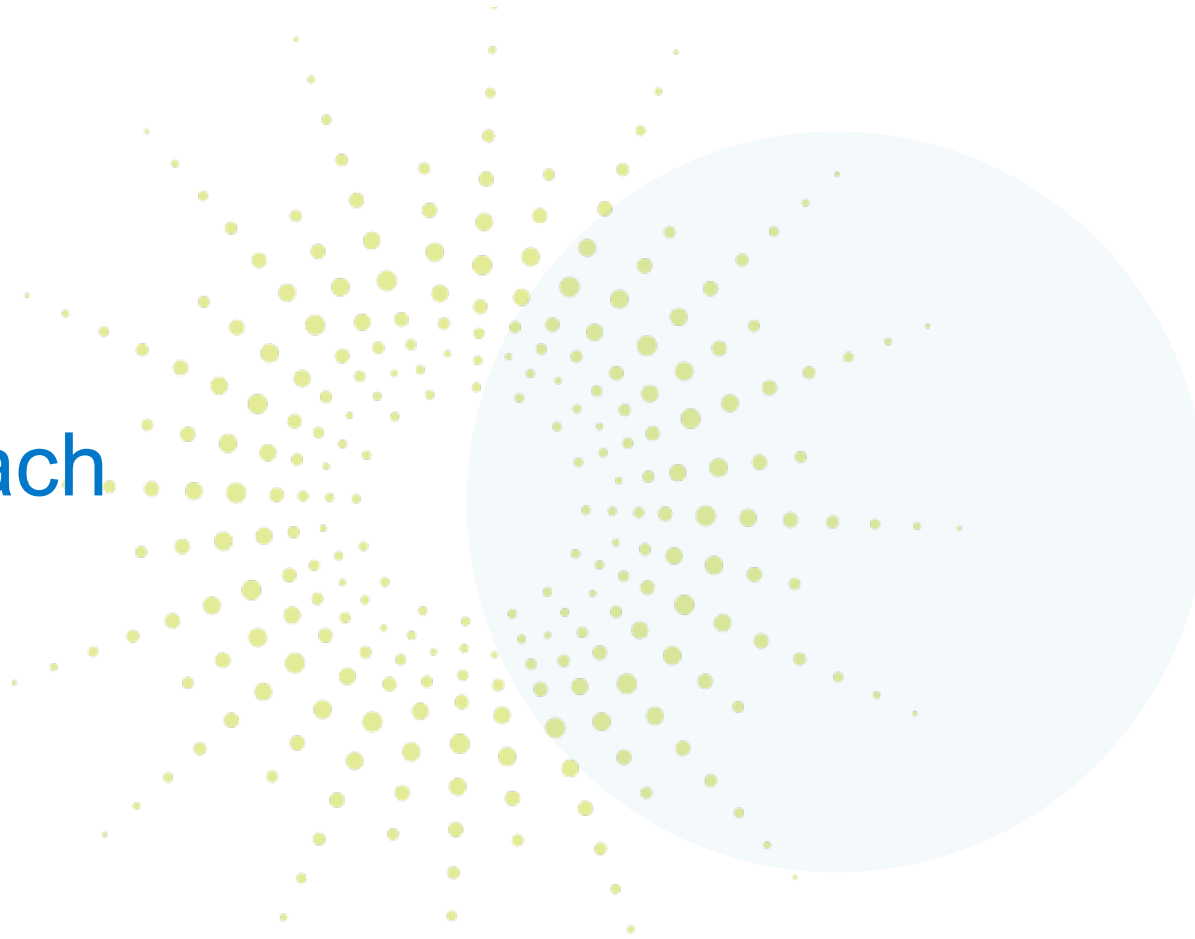
Phase 2 (beyond 2025)

- Continue to evaluate the cost/benefit of *delivering* 24/7 renewable energy in closer to real-time through:
 - Improving data pipelines from PG&E/CAISO
 - Integrating emerging technologies
 - Scaling demand-side resources

Questions?



Modeling Approach



Objective

Identify the least-cost portfolio of renewable generation and storage resources that can meet our load in every hour of 2025, considering factors such as available resources and associated costs

Portfolio Planning Tool

- **Modeling need**
 - Existing models not well suited for our context
 - Needed flexibility to answer questions
- **Our approach**
 - Internally built a portfolio planning model based on the "Switch 2.0" model, an open-source, peer-reviewed power system planning model
 - Modeling and preliminary results started in 2020 → continued refinement of model and assumptions

Inputs and outputs



Scenarios

Goal Definition / Phasing

- Different 24/7 goal percentages (ex: 95% vs 99% vs 100%)
- Role of emerging technologies

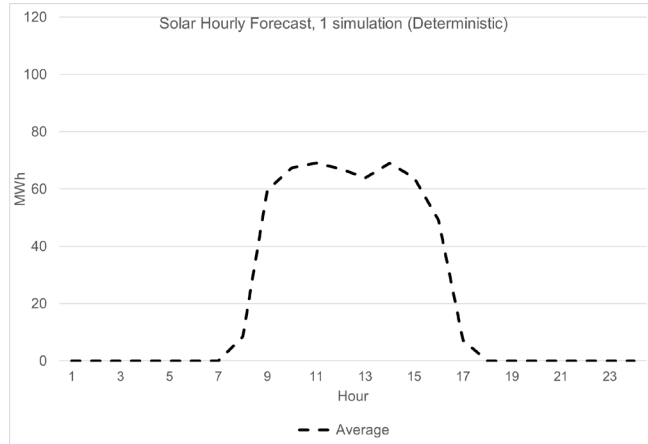
Sensitivity Analysis

- Availability of generation resources
- Different load forecasts
- Different resource costs

Modeling Uncertainty

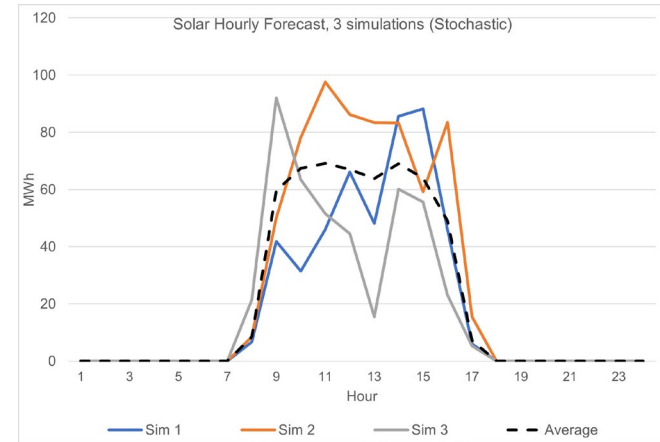
- Our portfolio planning model can only simulate in a deterministic manner, without considering uncertainty around forecasts (1 simulation)
- To model impact of uncertainty in our forecasts, we need a stochastic model where we can look at multiple simulations

Example of Stochastic Analysis



Deterministic approach looks at 1 simulation without uncertainty.

Stochastic approach captures the uncertainty around renewable generation by looking at multiple simulations.



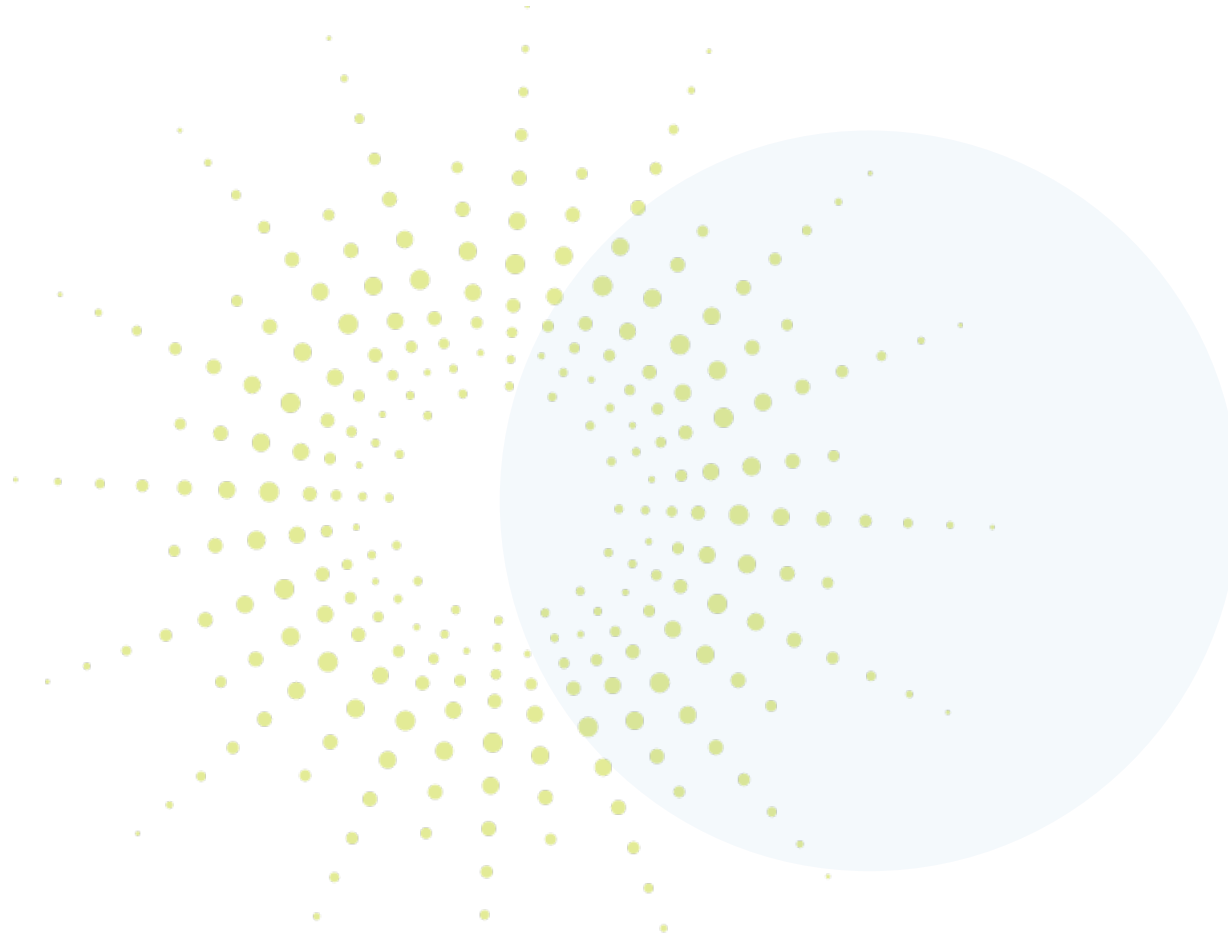
Our Approach to Modeling Uncertainty

- To understand the uncertainties around our forecasts, we will use the output from our portfolio planning model as an input to a separate commercial software that can perform stochastic analysis
 - To capture the uncertainty around our forecasts
 - Help us to better understand the risks associated with Peninsula Clean Energy's portfolio and find ways to manage and minimize risks

Questions?



Challenges



Resource Challenges

- Seasonal mismatch between our load (peaks in winter) and solar generation (peaks in summer)
- Limited capacity for new baseload resources such as geothermal
- Limited capacity for wind resources (especially in-state)
- Because of timeline, many innovative technologies and approaches will not be available by 2025
- Limited information to model the role of demand-side resources
- Lack of access to real-time load data from PG&E

External Policy Challenges

- Difficult to communicate the differences between the annual approach and a 24/7 approach
- The current industry standard is to use an annual approach
- There's no official tracking system or accounting framework to communicate the value of a 24/7 approach

Product Challenges

- How do we transition ECOplus (currently annual 50% renewable) and ECO100 (currently annual 100% renewable) to a 24/7 renewable product?

Questions?



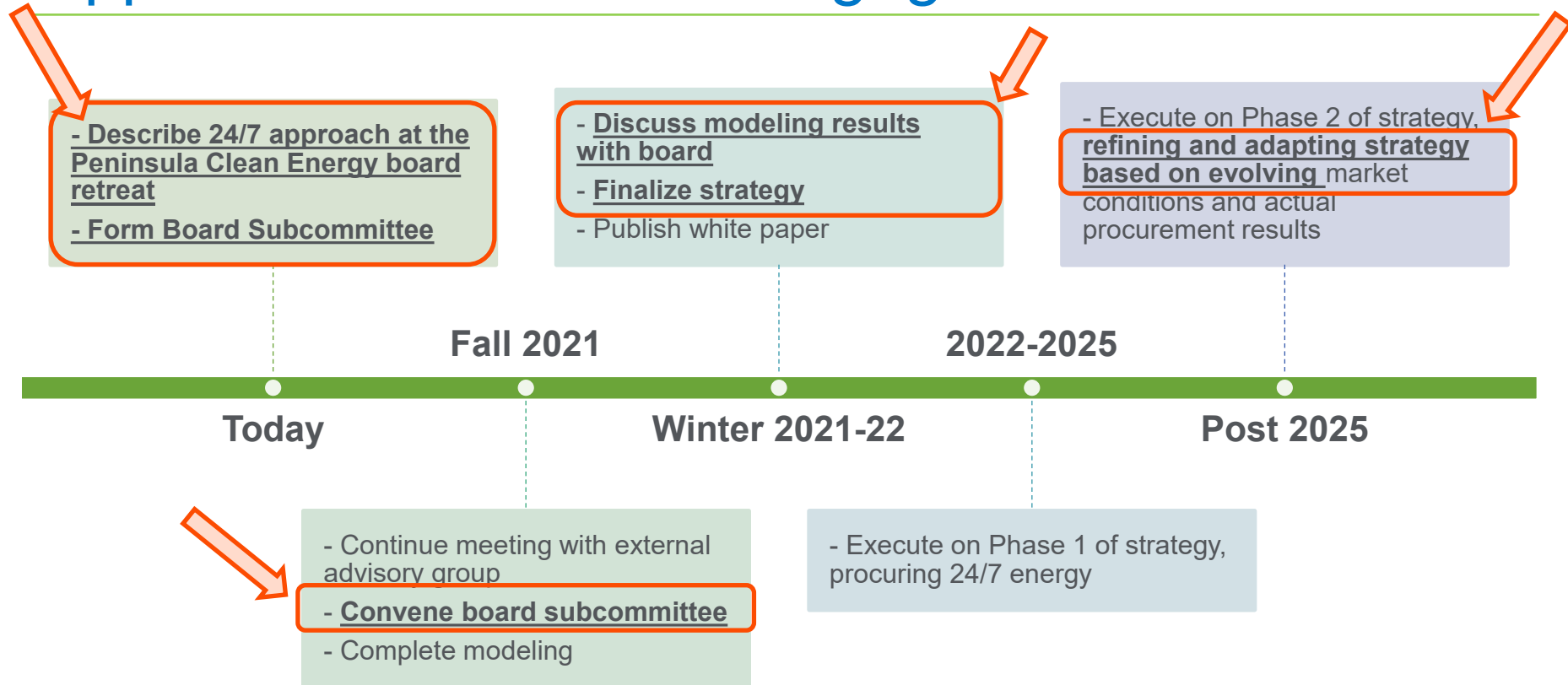
Next Steps and Timeline

A decorative background featuring a large, light blue circle on the right side. To the left of the circle is a dense cluster of small, yellow dots of varying sizes, some of which overlap the blue circle. The dots are arranged in a way that suggests a starburst or a cluster of particles.

Next Steps



Opportunities for Board Engagement



Board Subcommittee

- We'd like to convene a subcommittee of Board members interested in a more technical dive into 24/7 strategy
- If interested, you can let us know now, or reach out to Nelly or Jan
- The first meeting will likely be in October depending on member schedules

Thank you!

A sustainable world with
clean energy for everyone.



2045 Decarbonization & PCE Programs



Our Decarbonization Goal



ACHIEVING
OUR MISSION

ORGANIZATIONAL PRIORITIES:

By 2025, deliver 100% renewable*
energy each and every hour of the day.

Contribute to San Mateo County
reaching the state's goal to be
100% greenhouse gas-free by 2045.

Discussion at the End

1. Should PCE place greater emphasis on: a) rapid, economical GHG reduction, b) underserved communities, or c) innovation
2. Are there key actions PCE should consider to accelerate decarbonization?

Agenda

- Success Highlights
- Emissions Profile
- Impact & Additionality
- Programs Overview, Budget & Costs
- 2045 Framework
- GHG Reduction Projection
- Discussion Questions

Success Highlights #1

1. Reach Codes: 12 agencies in SM County

- Project accounts for half codes in CA
- Major innovation in building and EV code
- 90,000 MT CO₂ over 10 years (equivalent to 10M gallons of gas)



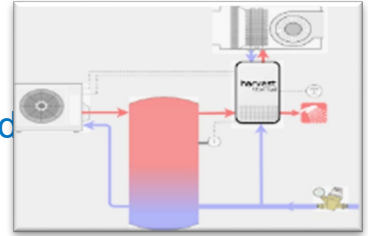
2. EV Charging: 3,500 ports in progress

- Attracted additional \$12 million from state
- Major innovation in charger deployment strategy (3-4x ports/\$)
- 500,000 MT CO₂ over 10 years (equivalent to 58M gallons of gas)



3. Technology: Advanced building system (Harvest Thermal)

- Major innovation with combined space & water heating, “grid aware” load
- Lower cost of electrification 20% and operating costs 25%+
- 70-90% reduction in home emissions



Success Highlights – Underserved Communities

1. Electric Vehicles: 109 vehicles

- \$1.2 million in savings over 10 years
- 5,700 MT CO2 over 10 years



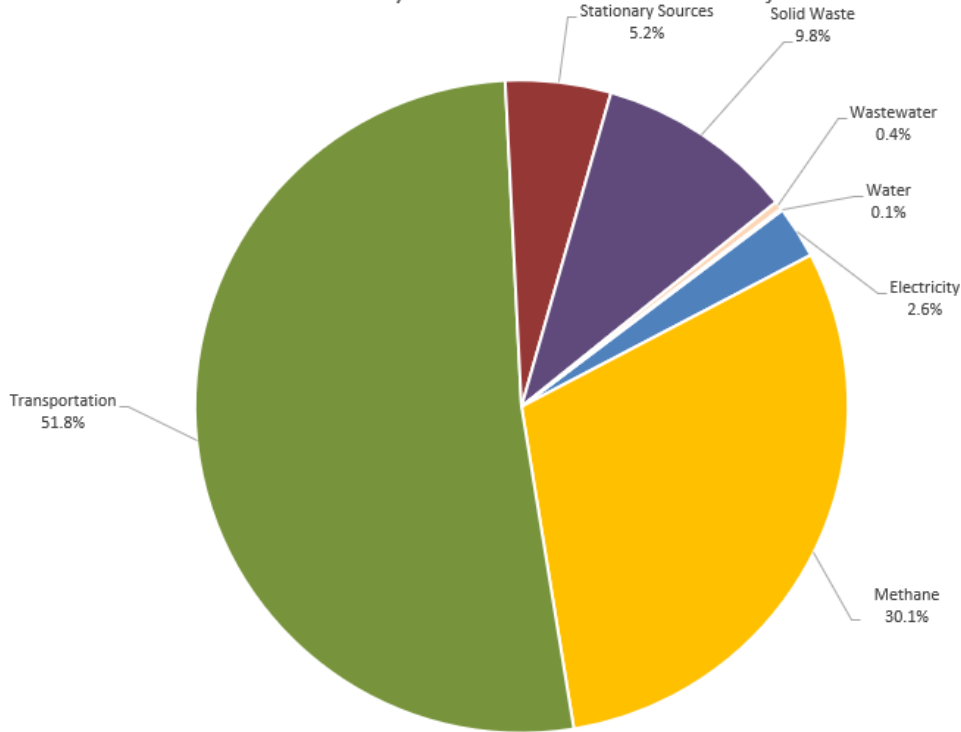
2. E-Bikes: 276 E-Bike rebates provided

- Ultra low-cost transportation option
- *"I love it!!! Hardly use my car anymore. So grateful... whole family uses this bike."*
- Est. 1,200 MT CO2 over 10 years



San Mateo County Emissions

San Mateo County-Wide GHG Emissions - 2021 Projection

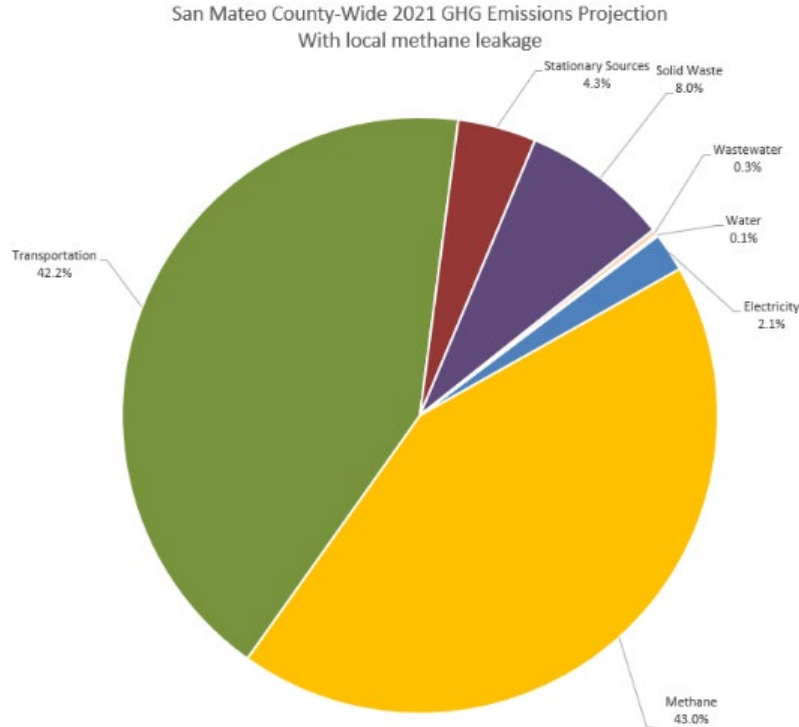


2021

- PCE electricity: 100% GHG-free
- Est. 3.9 Million MT CO₂e

- Emissions projection based on 2019 with 2021 PCE electricity emissions factor
- Electricity emissions include Direct Access and non-PCE accounts on annualized emissions basis
- Leakage emissions are not accounted for
- Air travel and embedded carbon of products not included

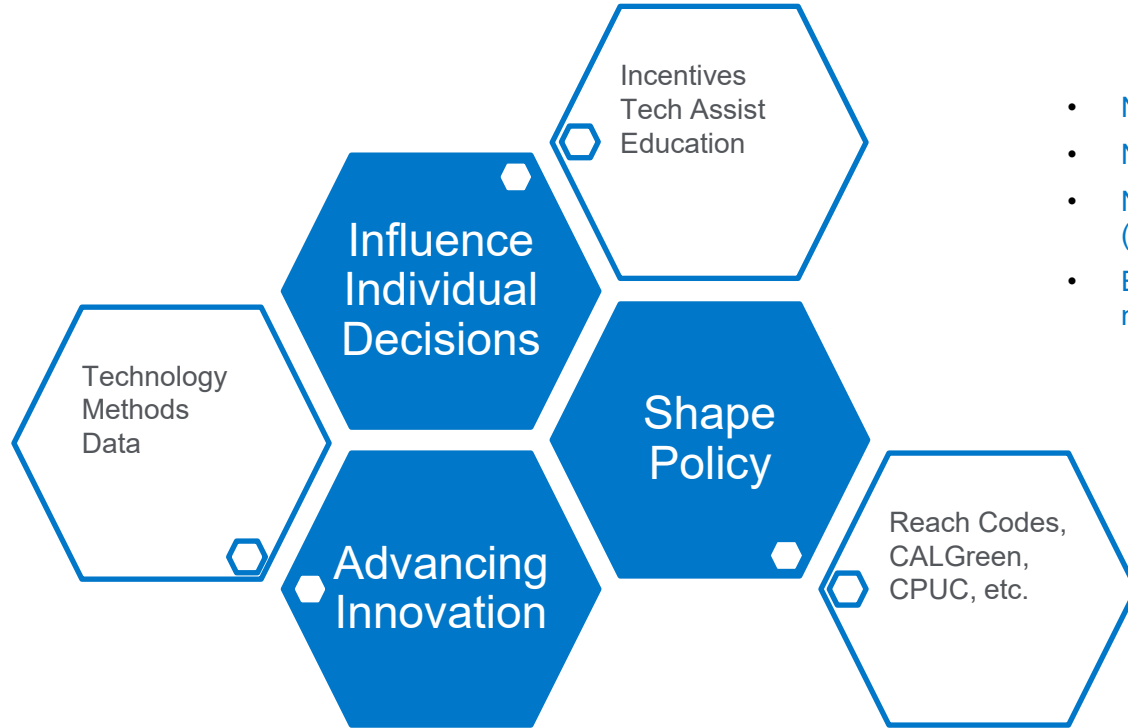
Updated Emissions (DRAFT)



- Methane leakage +75% impact
- Conservative estimate – 20-year global warming potential (GWP20)
- Near term impact is higher

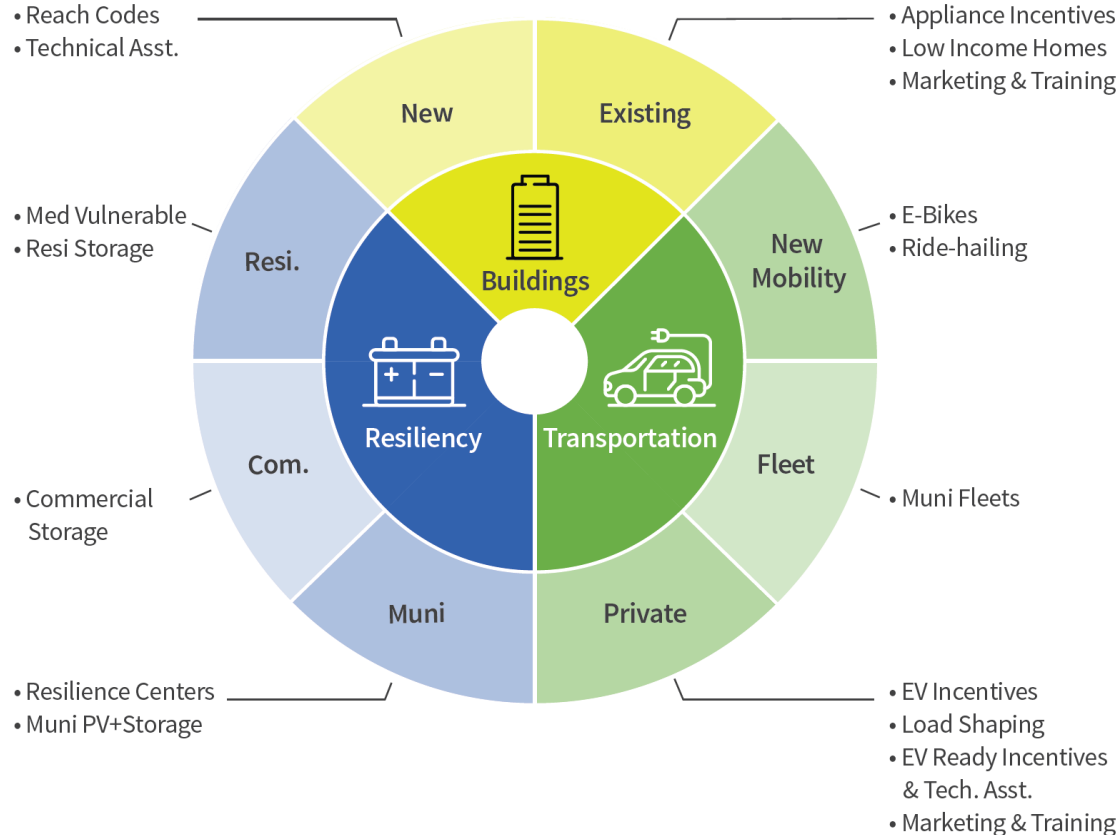
DNV analysis based on existing research

Impacts & Additionality



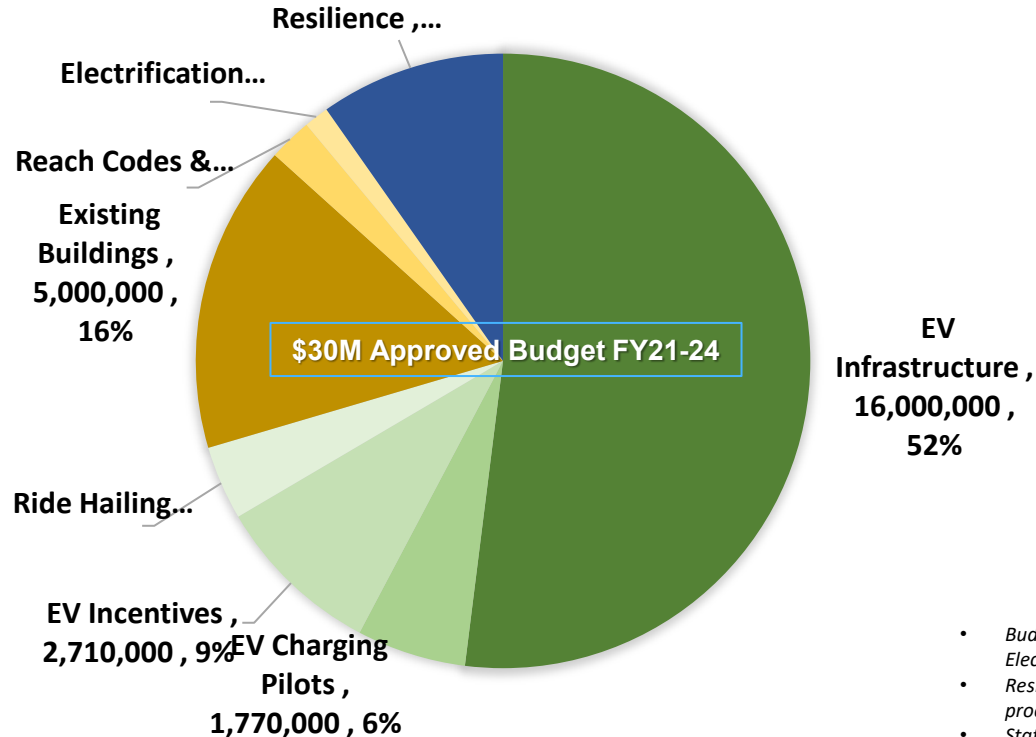
- Not all impacts are measurable
- Not all actions are additional
- No program stands alone, all partner (state, etc.)
- Early action paves way for state and national action

Programs Portfolio



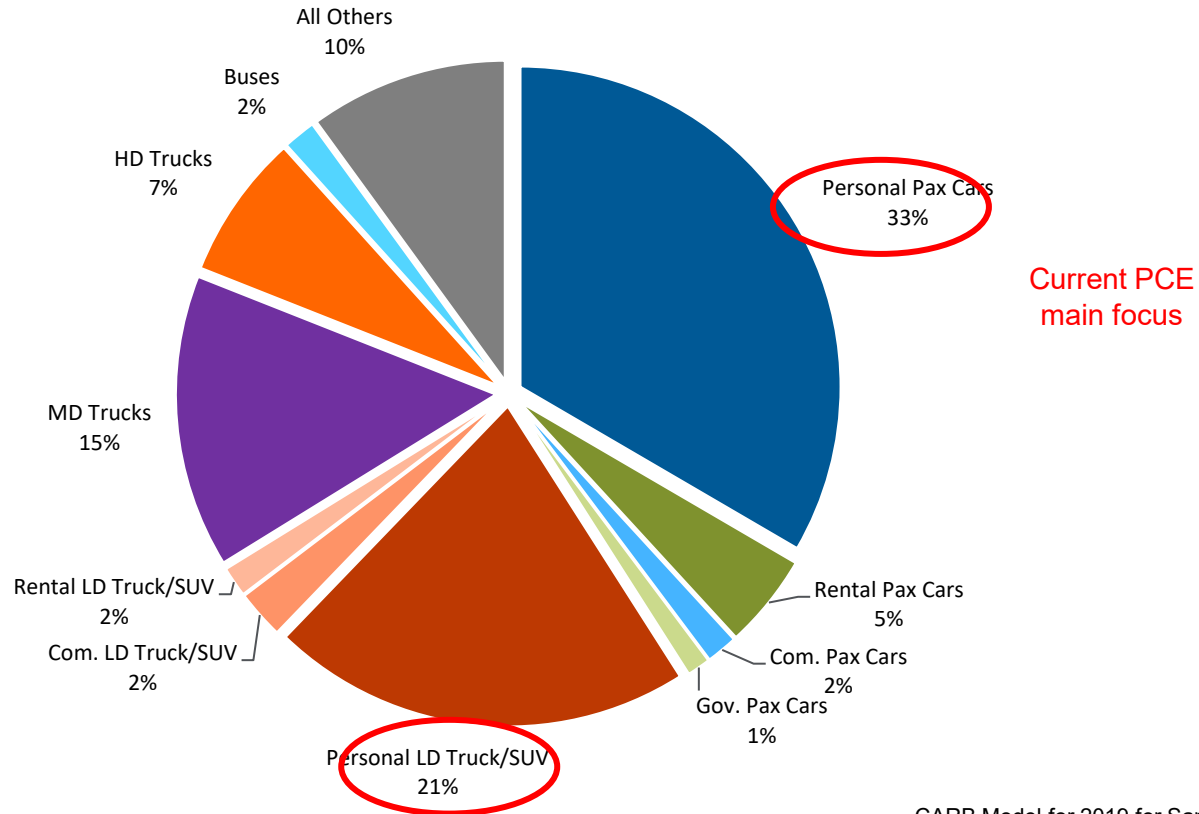
Approved Programs Budget FY21-24

FY21-24 FORECASTED BUDGET

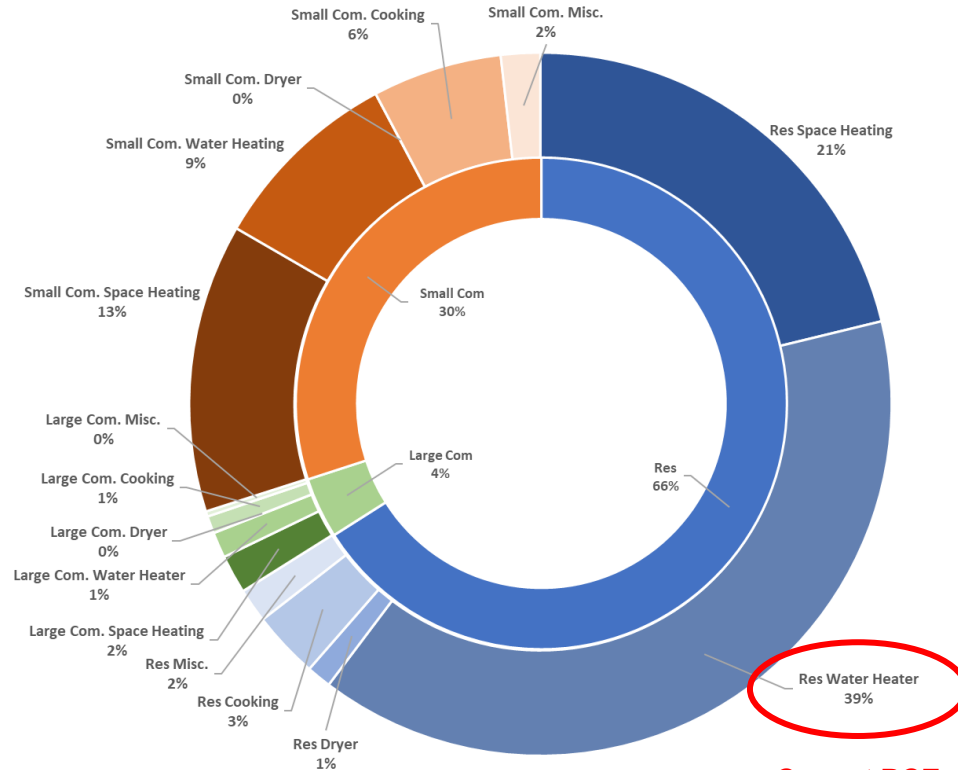


- Budget excludes marketing expenses except Electrification Awareness
- Resilience expenses excludes distributed procurement by Power Resources
- Staff costs are not included

Programs Focus - Transportation



Programs Focus - Buildings

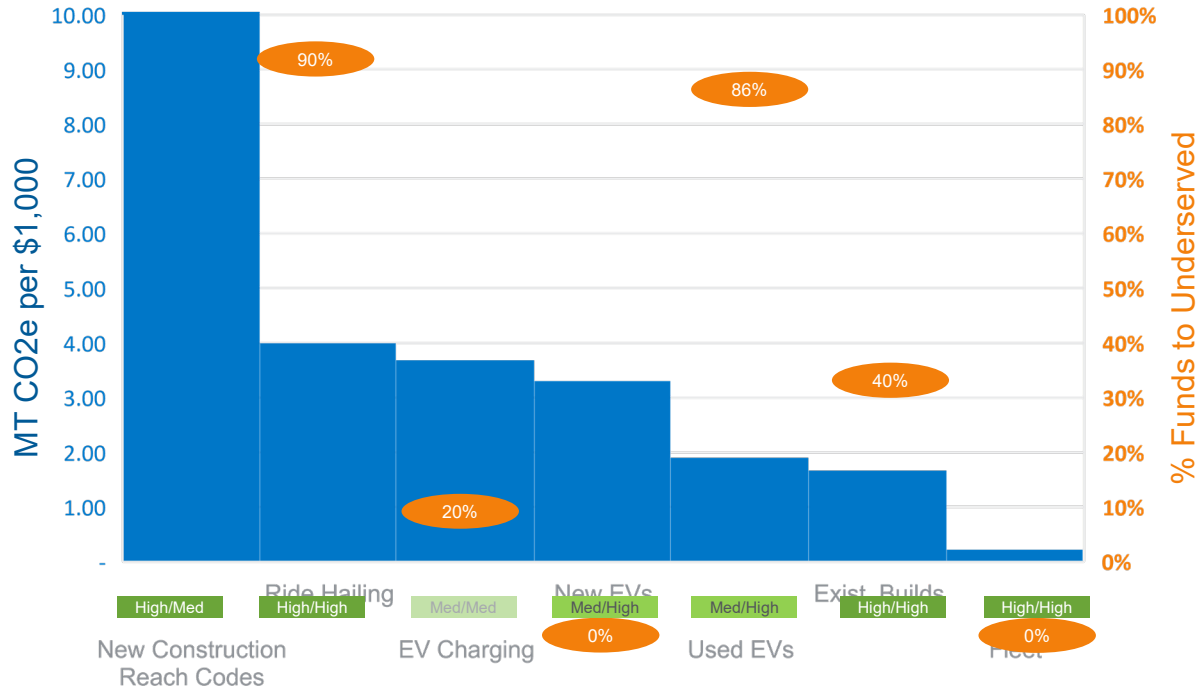


Sources: 2018 PG&E Gas data
2019 California Residential Appliance Saturation Survey
2006 California Commercial End-Use Study

Current PCE
main focus

Cost of GHG Reductions By Program

Program in Approved Budget - Key Metrics



Legend

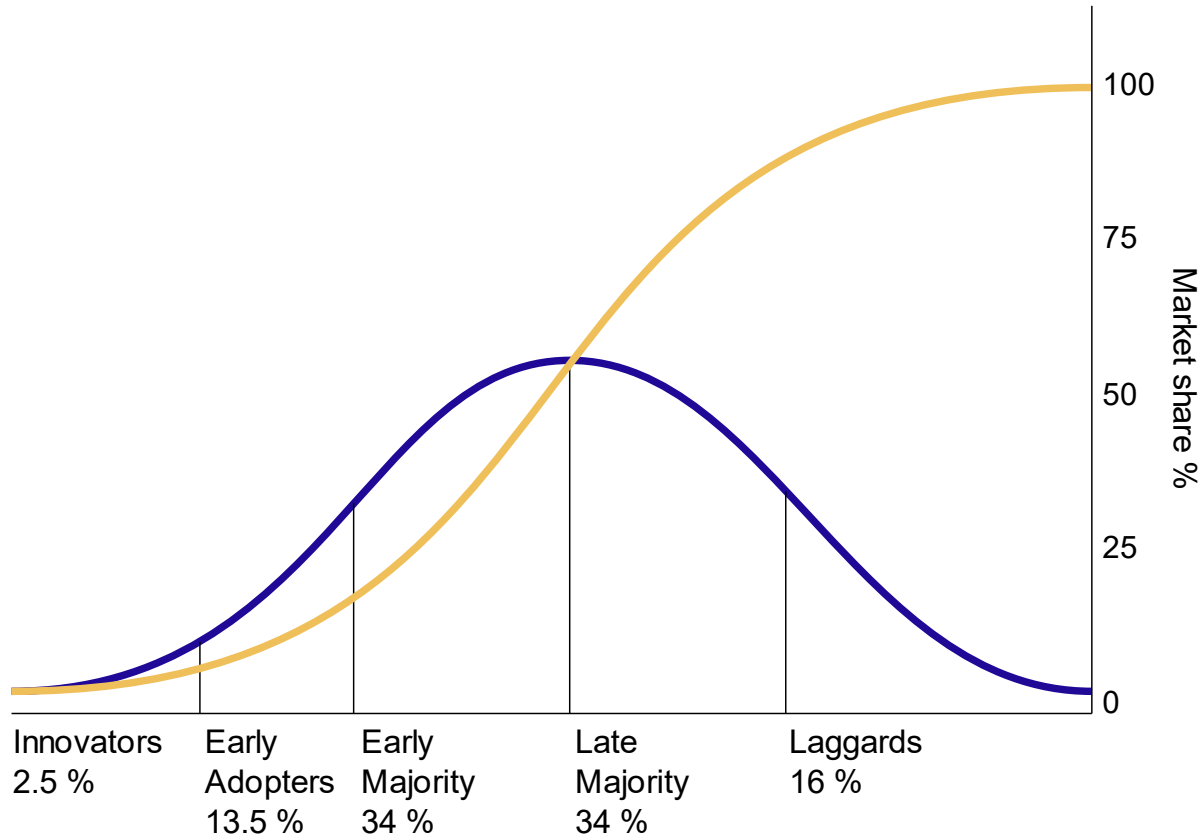
CO2e per \$1,000 (10-yr projection)

% funds to low-income/underserved

Additionality/immediacy

- Estimates only include directly attributable GHG reductions however, many programs “stack” with other state programs. Relative attribution is not considered.
- Effect of reach codes and EV charging is not immediate
- GHG estimates based on annual average of 10-year projection
- EVs and charging assume pre-pandemic commute patterns
- Existing buildings includes fugitive emissions and on-bill finance as additive
- Pilots, e-bikes and climate action plan support are not shown

Market Transformation – Considerations

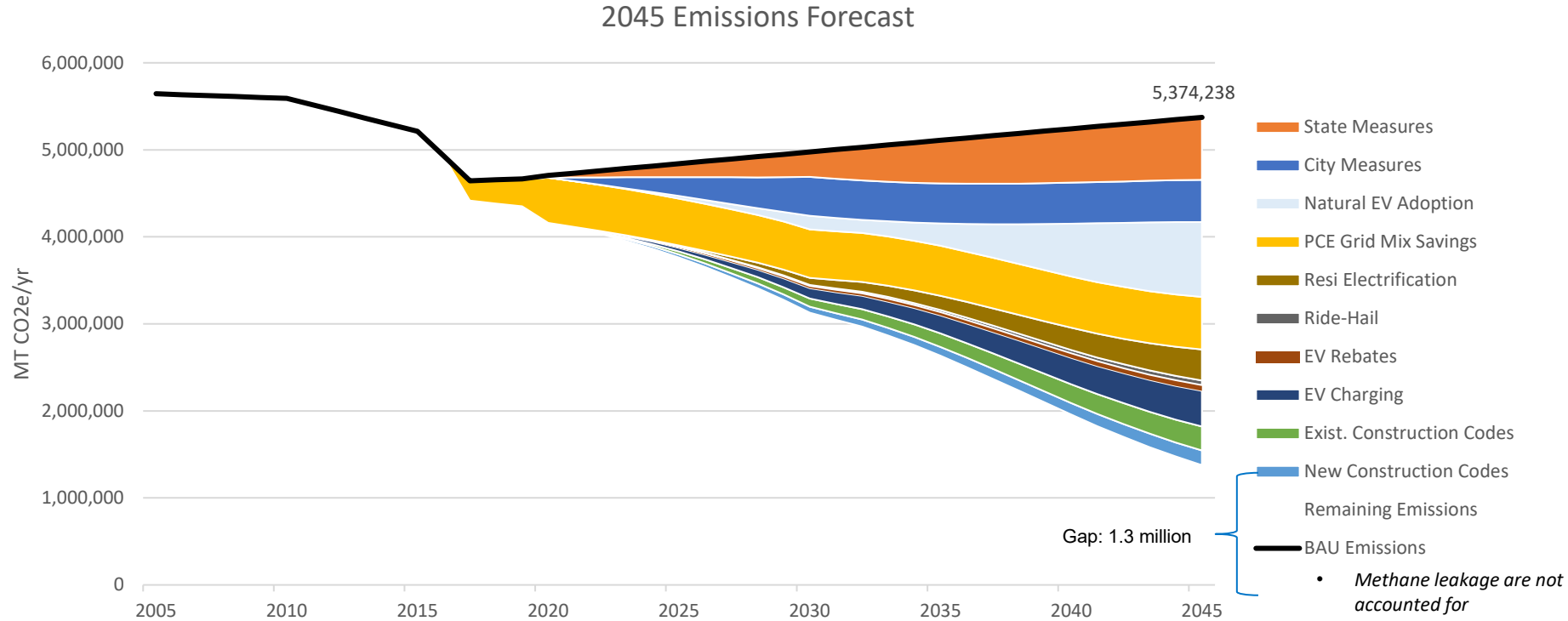


- Needs change over time as market matures
- Initial emphasis is to build momentum
- Some segments will develop market momentum (EVs) but policy support is key
- Over time increase emphasis on low-income and target barriers
- Areas that are more difficult are typically more “additional” (ex: multi-family EV charging)

2045 Framework

	2020 To 2025	To 2030	To 2035	To 2040	To 2045
	Market Intro	Early Momentum	Scaling	Late Adopter	Transformed Mkt
Transport	EV incentives	Low-income EV incentives	Low-income EV incentives	Gas car buy-backs & early retirement	Incentives phase out
	Multi-family charger incentives	Multi-family charger incentives	Multi-family charger incentives	Multi-family charger incentives	
	Education	Education			
Buildings	New construction	Low-income incentives	Low-income incentives	State-wide reqts	Incentives phase out
	Incentives	Initial existing building local reqts.	Broad existing building local reqts.	Low-income incentives	
	Contractor training	On-bill finance		Early replacement program	
	Education	Education	Tariffed on-bill finance with large capital fund		

2045 GHG Reductions (DRAFT)



2045 Emissions Reductions by Measure

	Emissions MT	Units	Cumulative Budget Required
<i>Business As Usual</i>	5,347,238	-	-
Natural EV Adoption	861,568	-	-
State Measures	719,144	-	-
PCE Grid Power	604,540	-	-
City Measures	483,681	-	-
EV Charging	410,586	53,678 ports: 57% of Multifamily+	\$160 million
Resi. Elec. Incentive	354,642	154,684 water heaters: 48%	\$155 million
Exist. Constr. Codes	275,553	24% of all buildings	\$1 million + \$1.2 billion in financing or non-PCE funds for residential
New Constr. Codes	167,554	16% of all buildings	\$1 million
EV Rebates (low-inc)	66,780	21,623: 48% low-income	\$26 million
Ride-Hailing	53,790	420	\$2 million
<i>Gap</i>	1,376,398	<i>Incl: stationary sources, heavy duty vehicles, off-road equipment, landfills, direct access, and remaining buildings (60%)</i>	
<i>PCE Reductions Total</i>	1,933,445	<i>36% of business as usual emissions</i>	

Gap Detail

Emissions Source	Emissions Remaining in 2045 (MT CO ₂ e)
Building methane (60% remaining)	550,000
On-Road Vehicles – Diesel trucks (100%)	250,000
On-Road Vehicles - Gasoline (3%)	50,000
Off-Road Equipment (20%)	77,000
Stationary Source Fuels - Industrial	240,000
Landfills (15%)	100,000
Total	~1.3 million

Air travel, maritime and embedded carbon of products not included

Programs Budget

Program Area	2025	2035	2045	Cumulative (through 2045)
EV Charging	\$5 million	\$7.2 million	\$8.7 million	\$160 million
Resi. Elec. Incentive	\$4 million	\$7.2 million	\$8.7 million	\$155 million
Exist. Constr. Codes	\$100,000	--	--	\$1 million
New Constr. Codes	--	--	--	--
EV Rebates (low-inc)	\$.5 million	\$1.2 million	\$1.5 million	\$26 million
Ride-Hailing	\$.5 million	--	--	\$2 million
DER, Innovation, other	\$2.6 million	\$2.75 million	\$2.75 million	\$66 million
<i>Programs Budget (2021 constant dollars)</i>	<i>\$12.7 million</i>	<i>\$15.5 million</i>	<i>\$18.9 million</i>	<i>\$410 million</i>

Innovation: Focal Areas & Current Projects

Focal Areas	Current
EV charging cost & access	Low-power pilot (complete) Curbside charging (feasibility phase complete)
Building decarbonization	Harvest Thermal space & water heating On-bill finance
Aligning renewable supply & demand	Form Energy long-duration storage Sunrun load-modification
Distributed Generation & Resilience	CCA-in-the-middle PPA program structure

Current approved investment: \$1.975 M 6.6% of approved budget

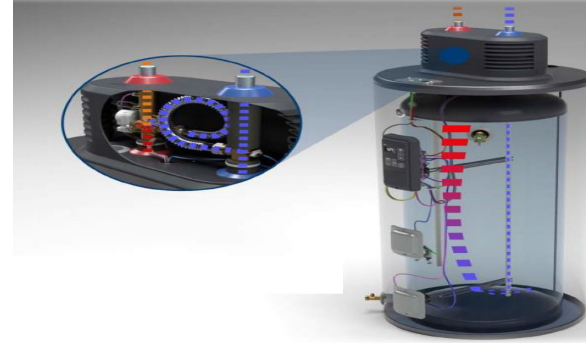
Innovation: Future



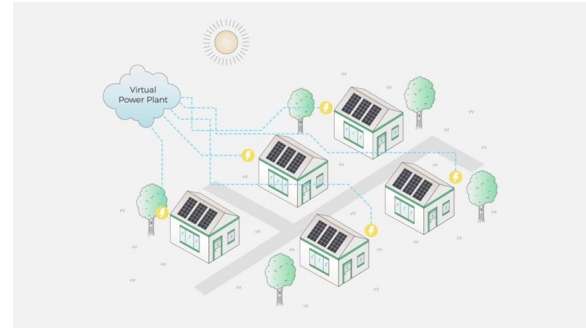
Bidirectional power



Managed charging



Water heaters



Virtual power plants

Critical Challenges

1. Building public awareness and motivating adoption
2. Making it easy to take action
3. Accessing the capital to enable action

Discussion Questions

Discussion 1

Program investments involve trade-offs. Investments in innovation typically provide limited short-term value but may deliver significant impact in the future. Investments in underserved communities typically require higher investment for greenhouse gas reductions but may deliver more community benefit. Current PCE budget mix is approximately: 7% innovation, 20% underserved, and 73% “main” GHG and distributed resources program.

Should PCE place greater emphasis on:

- Rapid, economical GHGs reduction
- Supporting low-income/underserved communities
- Innovation
- The balance is about right

Discussion 2

Climate impacts are developing at a faster pace than anticipated but a significant gap exists to meet 2045 decarbonization. Gov. Newsom has directed state agencies to explore a 2035 target for decarbonization. The CAC adopted a resolution requesting PCE explore a 2035 target.

Are there key actions PCE should consider to accelerate decarbonization?

1. Facilitate policy support such as existing building codes requiring phase out of methane gas appliances
2. Develop large scale finance such as a bond or enhanced private capital
3. Execute massive marketing effort for electrification
4. Other