Welcome! The Webinar will begin shortly

CITY OF PALO ALTO

Sustainability and Climate Action Plan Ad Hoc Committee

November 30, 2023

cityofpaloalto.org/ClimateAction

Acting Now for a Resilient Future

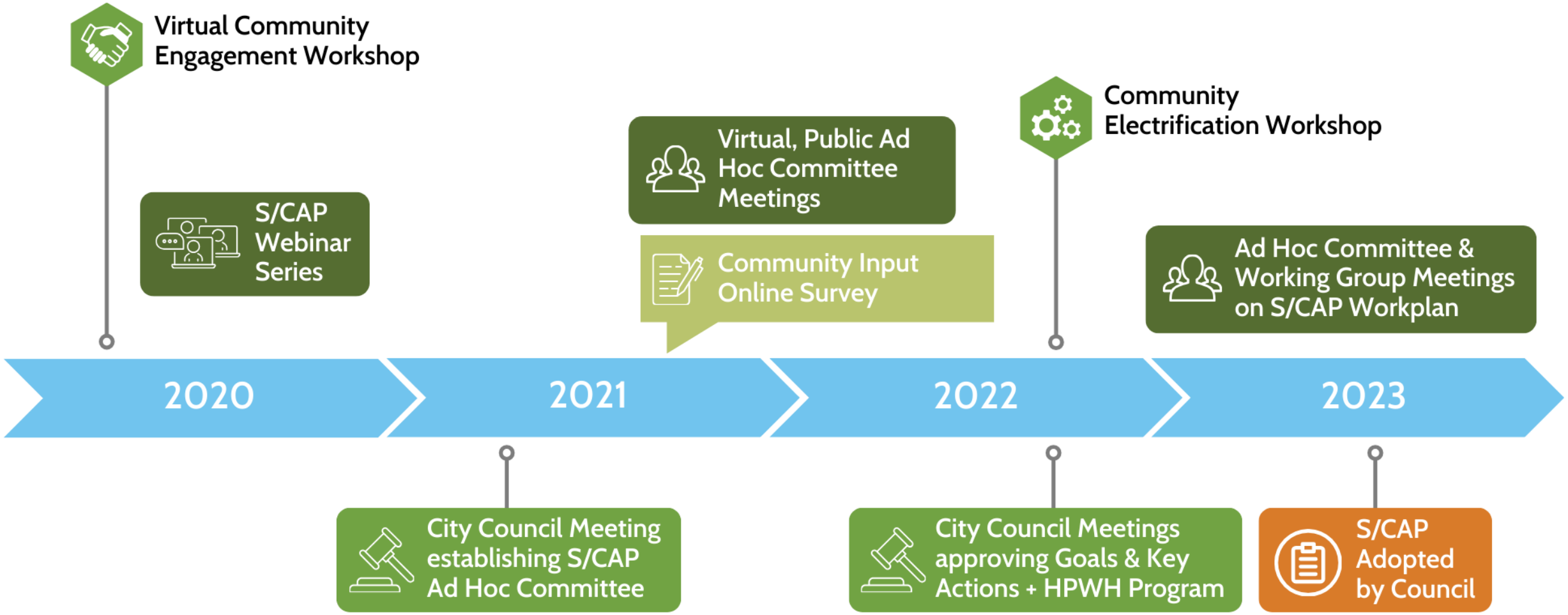
Agenda

- Sustainability and Climate Action Plan (S/CAP) Update
- Grid Modernization
- S/CAP Ad Hoc Committee and Working Group Comments
- 100% Renewable Energy on a 24 / 7 Basis
- S/CAP Ad Hoc Committee and Working Group Comments
- Public Comment and Questions

Sustainability and Climate Action Plan (S/CAP)

CITY OF PALO ALTO

S/CAP Update Community Engagement



S/CAP FOCUS AREAS

CLIMATE ACTION

Reduce overall greenhouse gas emissions 80% below 1990 levels by 2030

ENERGY

ELECTRIFY BUILDINGS

Reduce the use of natural gas in buildings

MOBILITY

INCREASE ACTIVE TRANSPORTATION

Reduce overall vehicle miles travelled

ELECTRIC VEHICLES

SUPPORT EV ADOPTION

Reduce transportation related greenhouse gas emissions

CLIMATE ADAPTATION & SEA LEVEL RISE

PREPARE FOR CLIMATE CHANGE

Reduce impacts of climate change from sea level rise and wildfires

NATURAL ENVIRONMENT

ENHANCE BIODIVERSITY

Restore and enhance resilience of the natural environment

ZERO WASTE

SUPPORT ZERO WASTE

Divert 95% of waste from landfills by 2030, leading to zero waste

WATER

FURTHER WATER CONSERVATION

Decrease water use and improve water systems

Sustainability and Climate Action Plan (S/CAP) Goals

CITY OF PALO ALTO

California's Goal:	Palo Alto's Goal:
48% BELOW 1990 LEVELS BY 2030	80% BELOW 1990 LEVELS BY 2030
Carbon Neutral BY 2045	Carbon Neutral BY 2030


ENERGY


MOBILITY


ELECTRIC VEHICLES

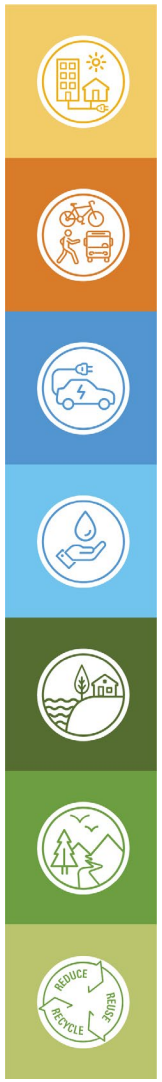

WATER


CLIMATE ADAPTATION & SEA LEVEL RISE


NATURAL ENVIRONMENT

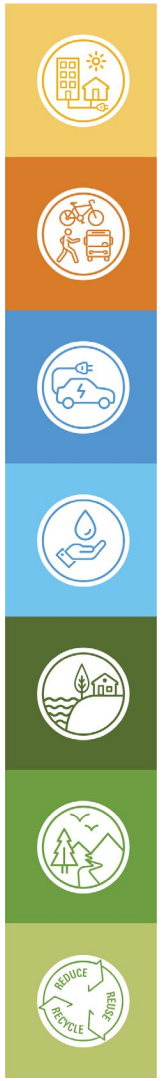
ZERO WASTE

2023-2025 S/CAP Work Plan: Sustainability



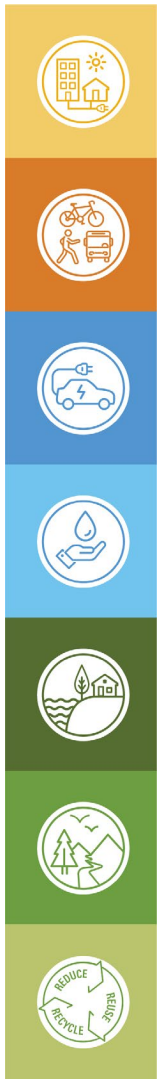
- Reduce water consumption while exploring water supply alternatives
- Develop and adopt a multi-year Sea Level Rise Adaptation Plan
- Minimize wildland fire hazards
- Increase Palo Alto's Tree Canopy and reduce pesticide usage
- Support the Green Stormwater Infrastructure Plan
- Encourage food waste reduction, prevention, and recovery
- Eliminate single-use disposable containers and prioritize domestic processing of recyclable materials

Sustainability Focus Areas Highlights



- Developing a “One Water” portfolio for Palo Alto
- Developing the Sea Level Rise Adaptation Plan
- Various efforts around Foothills fire management planning
- Reviewing potential improvements to the Tree Protection Ordinance
- Launched a new Zero Waste Living outreach campaign

2023-2025 S/CAP Work Plan: Climate Action



P1. Complete grid modernization plan

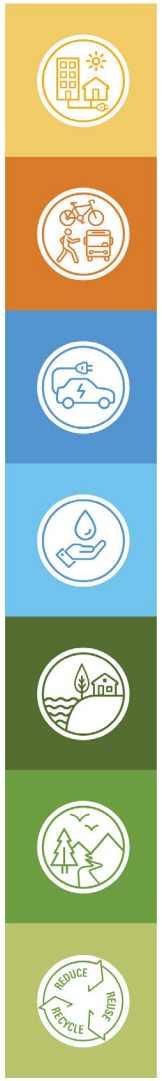
P2. Launch effective programs for emissions reductions with highest impact and lowest cost

P3. Build community awareness and confidence in electrification

P4. Identify an additional 9% in emissions reduction opportunities to achieve the 80x30 goal

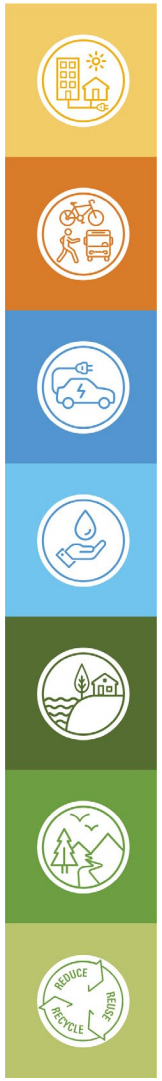
P5. By 2024 identify funding needed and potential funding sources for full scale implementation of highest impact emissions reductions

Single-Family Electrification



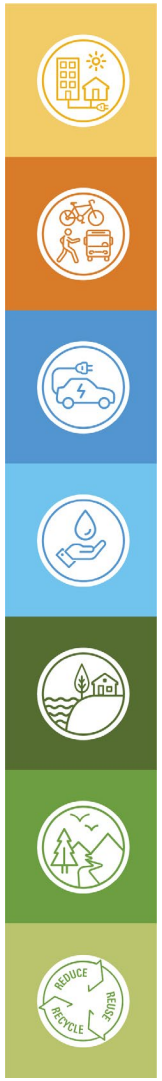
- Full Service Heat Pump Water Heater Pilot Program March 2023 launch
- Higher enrollment rate than any previous CPA energy program – and much more is needed to meet ambitious goals
  - Nearly 200 installations completed or scheduled
    - 20% of annual water heater turnover in Palo Alto.
  - High customer satisfaction in post-installation surveys
  - However, 2/3 of participants drop out before getting an installation
  - To achieve 1000 installs per year need more participants, fewer drop-outs
  - Staff is developing continuous improvement program and working on ideas for program enhancements with stakeholders
- Expansion of program to whole home electrification in development

Multi-Family and Non-Residential Electrification



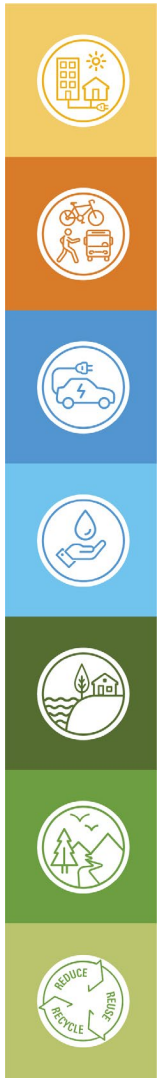
- Multi-family Programs:
  - Pilot program in progress focused on EV charging
    - On track to provide some charger access to over 10% of multi-family units in Palo Alto
  - Exploring expanding programs to building electrification in 2024
    - First focus may be on affordable housing – one pilot completed already
- Non-Residential Program:
  - Pilot program in progress focused on rooftop HVAC
    - Provides rebates and technical assistance
    - 26 assessment reports, 4 projects
  - Designing advanced pilot, tentatively aiming to launch in 2024

S/CAP Funding Study



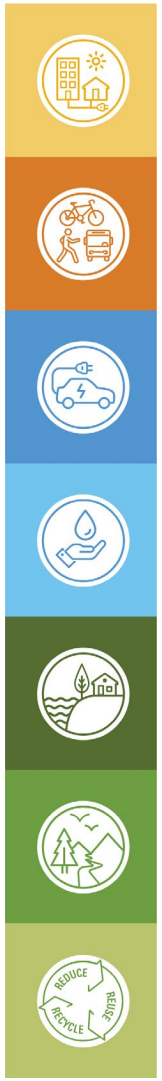
- Goal: Understand what it will cost (net of savings) to achieve the 80x30 emissions goals (primarily vehicle / building electrification)
- Questions to answer:
  - What is the total cost net of benefits?
  - What public or private financing mechanisms are available?
  - What funding streams could be used to repay the financing?

Components of the S/CAP Funding Study



- Funding and Financing Source Study
  - Identify potential funding and financing sources, explore legal / policy issues
- Building Sector Studies
  - Evaluate multi-family & commercial building electrification potential
  - Includes a deep dive on affordable housing electrification
- Electric Vehicle Charging Strategic Plan
  - Evaluate different EV charger strategies for multi-family, commuter, and visitor
  - Evaluate costs and business models
- Funding Model to Explore Potential S/CAP Funding Approaches

Studies Complementing the S/CAP Funding Study

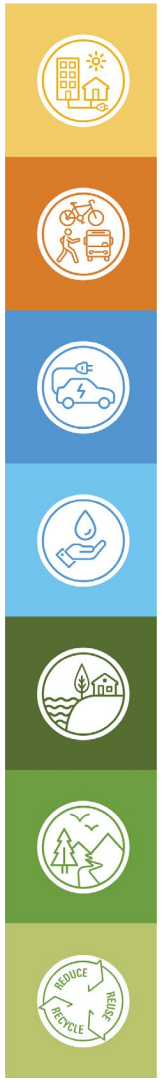


- Electric Cost of Service Study
  - Time of use rates
  - Rate designs that do not inhibit electrification
- Grid Modernization and Reliability & Resiliency Studies
  - Cost of electric distribution system upgrades
- Gas Transition Financial and Infrastructure Study
  - Cost and technical considerations for retiring gas infrastructure
  - Ways to ensure affordable gas bills for those who have not yet electrified

Grid Modernization

CITY OF PALO ALTO

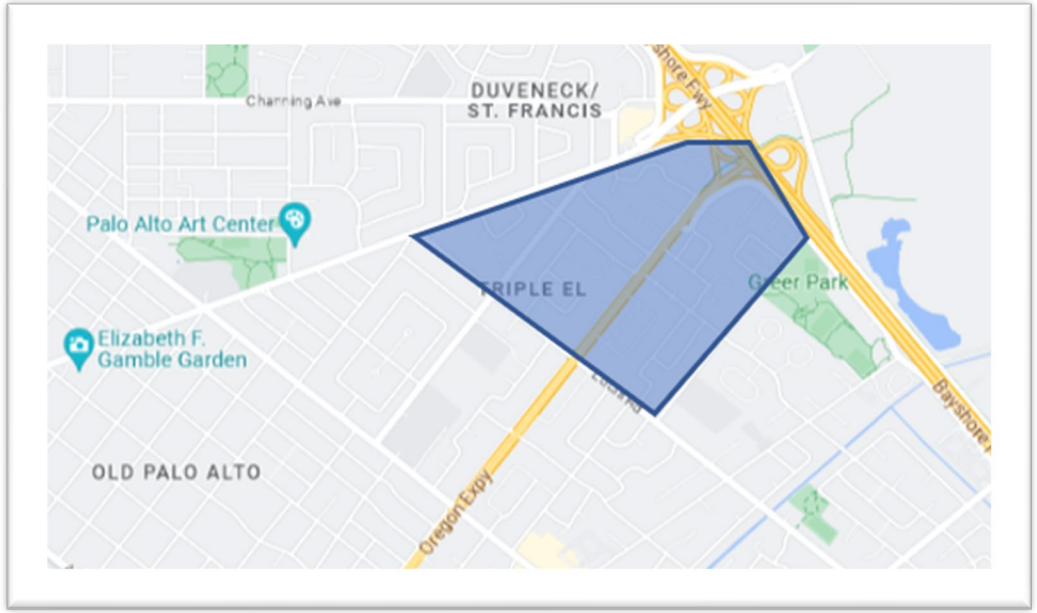
Grid Modernization Project Goals



- Project Goals
  - Preserve and enhance reliability
  - Prepare the system for widespread electrification
- How the project will achieve these goals
  - Replace aging electric infrastructure
  - Add capacity to accommodate electrification
  - Add more connections between parts of the system
  - Modernize system for efficiency and integration of new technologies

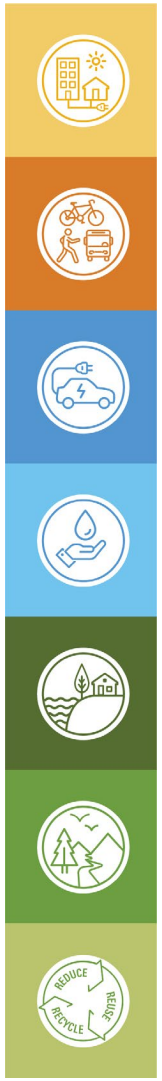
Grid Modernization Project Schedule

- Construction on first project starts early next year
  - 1200 home neighborhood. Boundaries: Louis, Amarillo, 101, Embarcadero



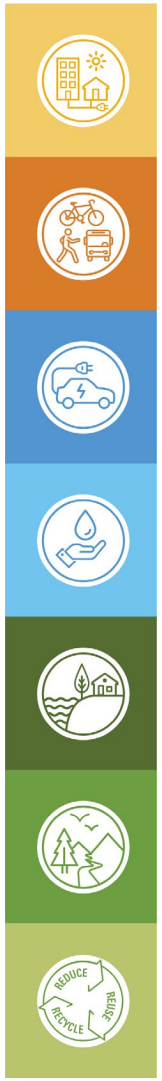
- Upgrade overhead areas (90%-95% of homes) by end of 2027
  - Will create the capacity needed for building/vehicle electrification
- Upgrade more difficult underground areas from 2027 through 2030
- Substation capacity, increased connectivity - 2027 through 2030

Grid Modernization Project Coordination



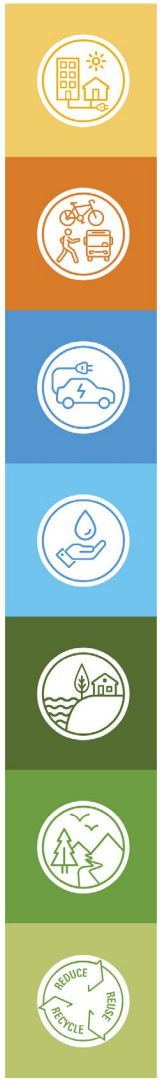
- Coordinated with automated meter infrastructure (AMI) and fiber rollout, particularly in early years
  - Fiber upgrades enable locally-owned internet services in Palo Alto
  - Grid upgrades allow for easier electrification – no transformer issues
  - AMI will provide residents better information about energy use, access to time of day pricing, and better outage response coordination
- AMI rollout will go faster than grid modernization and fiber projects
- AMI data will help optimize grid modernization project

Grid Modernization Project Funding



- Funding for these projects has already been identified
- Grid modernization is projected to be $230 to $300 million
  - Estimated 50% to 60% of this cost is related to replacement of aging infrastructure needed even without electrification
- Requires debt issuance, projected rate increase of about 10% over seven years to pay ongoing debt service
  - Already integrated into approved Electric FY 2024 Financial Plan
- Fiber to the Premises funding identified
- Will continue to apply for grants for both projects

Reliability and Resiliency Strategic Plan



- Proposed plan to be discussed at December 6, 2023 UAC hearing
- Strategies in the proposed plan:
  - Strategy 1: Replace and modernize electric distribution infrastructure
  - Strategy 2: Implement operational practices to improve reliability and manage outages effectively
  - Strategy 3: Ease adoption of flexible technologies and efficient strategies
  - Strategy 4: Quantify the benefits of flexible technologies and efficient strategies to the utility and community
  - Strategy 5: Evaluate resource needs for demand reduction / resiliency programs
  - Strategy 6: Implement any Strategy 5 programs chosen by the community

S/CAP Ad Hoc Committee and Working Group

PENINSULA CLEAN ENERGY

Peninsula Clean Energy: 100% Renewable on a 24/7 Basis

Mehdi Shahriari, Manager of Planning and Analytics

Agenda

- Introduction and Background
- Results
- Recent Challenges
- Summary

Introduction and Background

Introduction

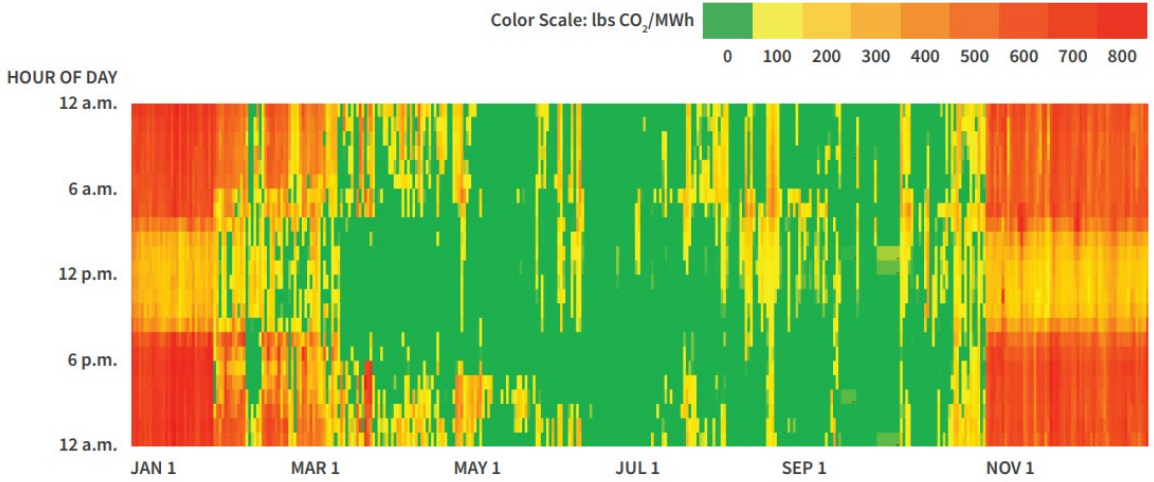
- Peninsula Clean Energy is a Community Choice Aggregator that provides electricity to customers in County of San Mateo and City of Los Banos.

- Organizational Priority:
  - Deliver 100% Renewable Energy Annually by 2025 and on a 99% Time-coincident Basis by 2027

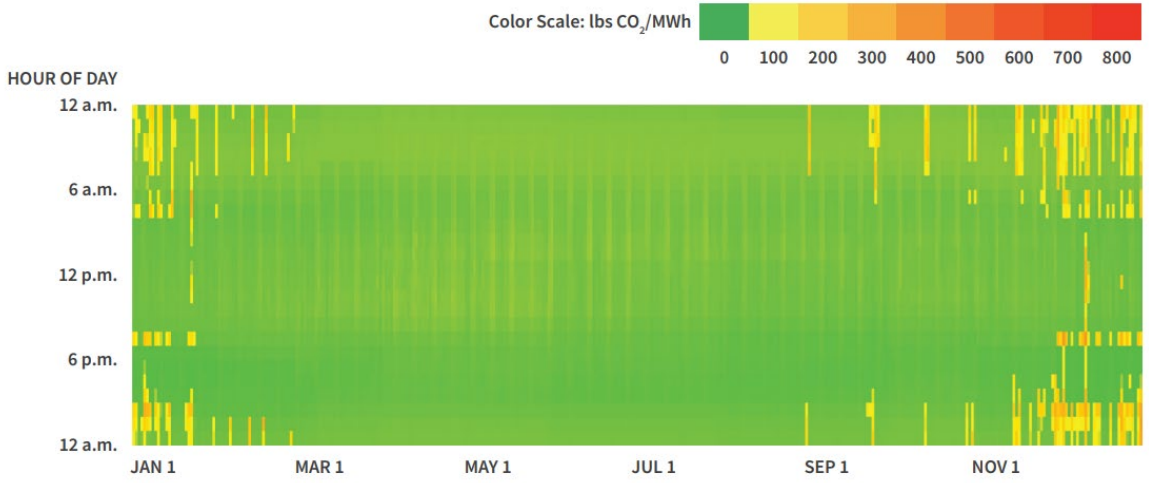
Hourly Matching Concept Review

Our goal is to match our electricity supply to customer load on an hourly basis

2021 Peninsula Clean Energy 24/7 Emissions Footprint



Peninsula Clean Energy 24/7 Emissions Footprint
(Hourly 99% Goal)



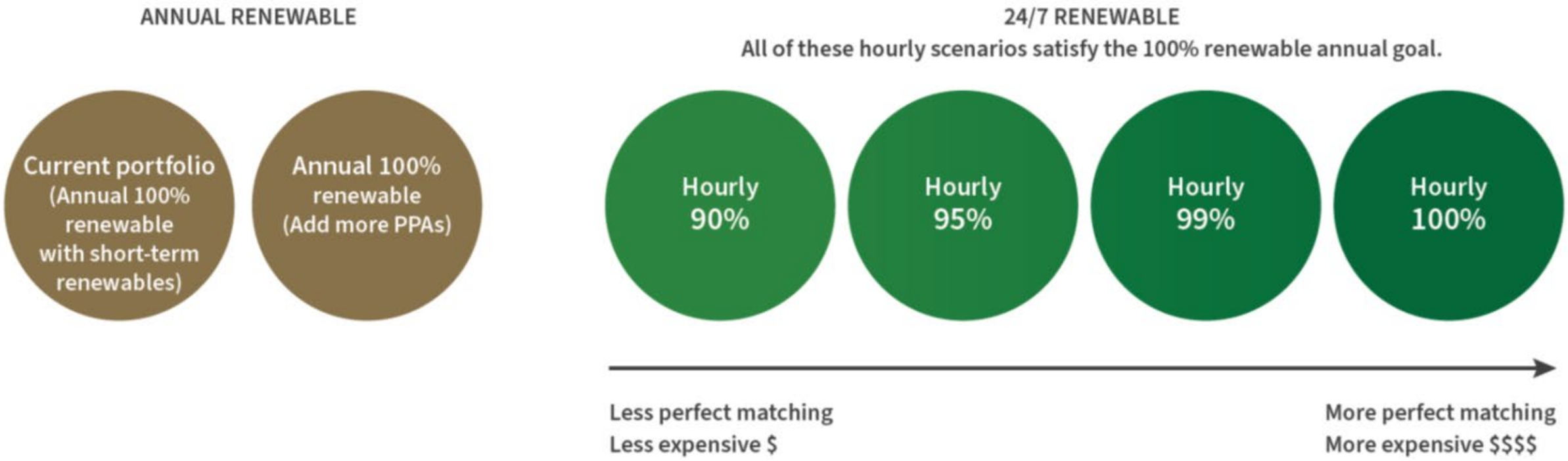
Why Does the 24/7 Strategy Matter?

- Nearly eliminates PCE's emission footprint
- Facilitates displacement of grid-level fossil fuel generation
- Improves grid reliability by bringing on new clean & storage resource capacities
- Establishes PCE as a leader in sustainability and innovation

In general, the 24/7 strategy promotes a mechanism in the power industry to combat climate change, which could lead to larger benefits such as preventing sea level rise, wildfire, extreme weather events and reduce health impacts to society.

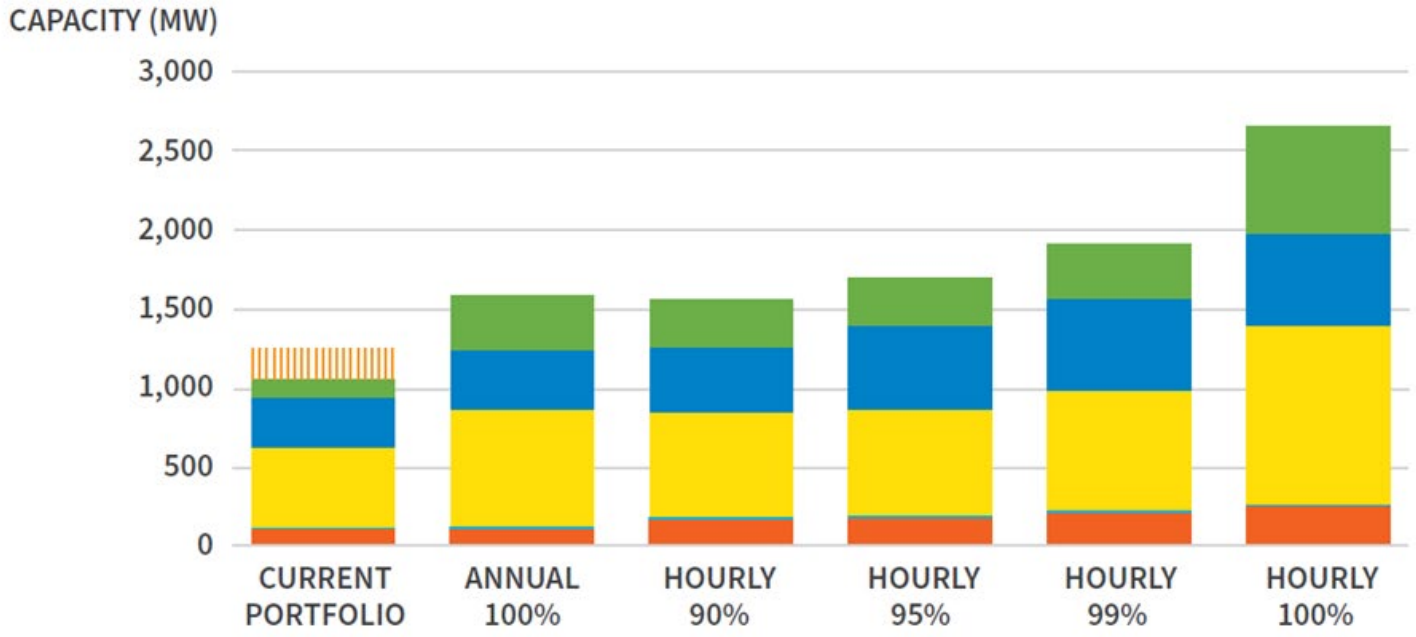
Results

Renewable Goal Scenarios



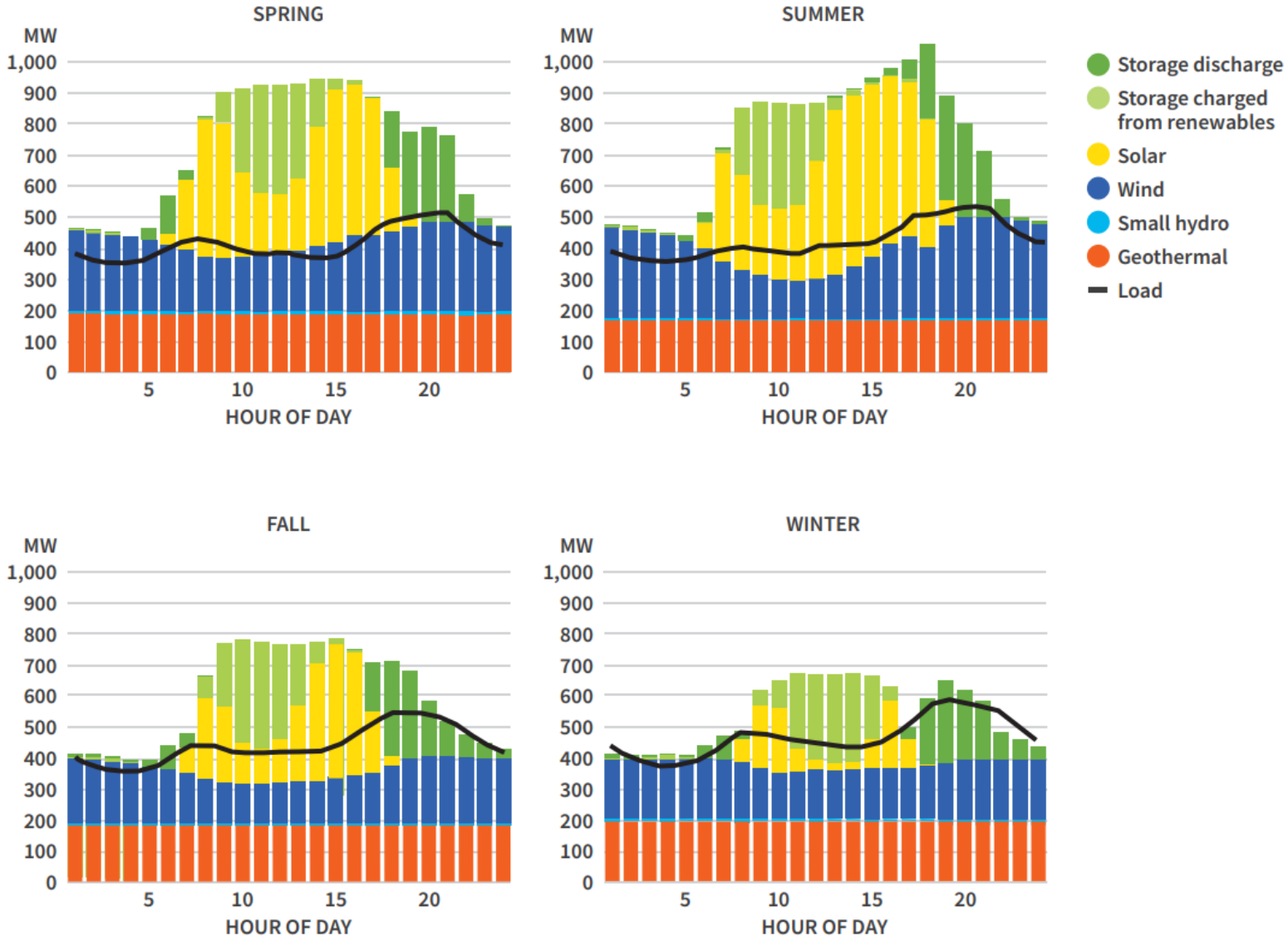
New Capacity Required to Add to our Portfolio

- New capacity required to be added to our portfolio generally increases as time-coincident target increases.
- More firm and flexible resources are needed at higher time-coincident targets.



	CURRENT PORTFOLIO	ANNUAL 100%	HOURLY 90%	HOURLY 95%	HOURLY 99%	HOURLY 100%
Short-term renewables capacity	196	–	–	–	–	–
Storage	116	350	306	311	351	681
Onshore wind	320	378	408	530	586	586
Solar	502	743	660	671	751	1,127
Small hydro	12	16	16	16	16	12
Geothermal	84	84	149	149	187	227
TOTAL	1,230	1,571	1,539	1,677	1,891	2,634

Seasonal Supply Stack (Hourly 99% Scenario)



Cost of Time-Coincident Procurement

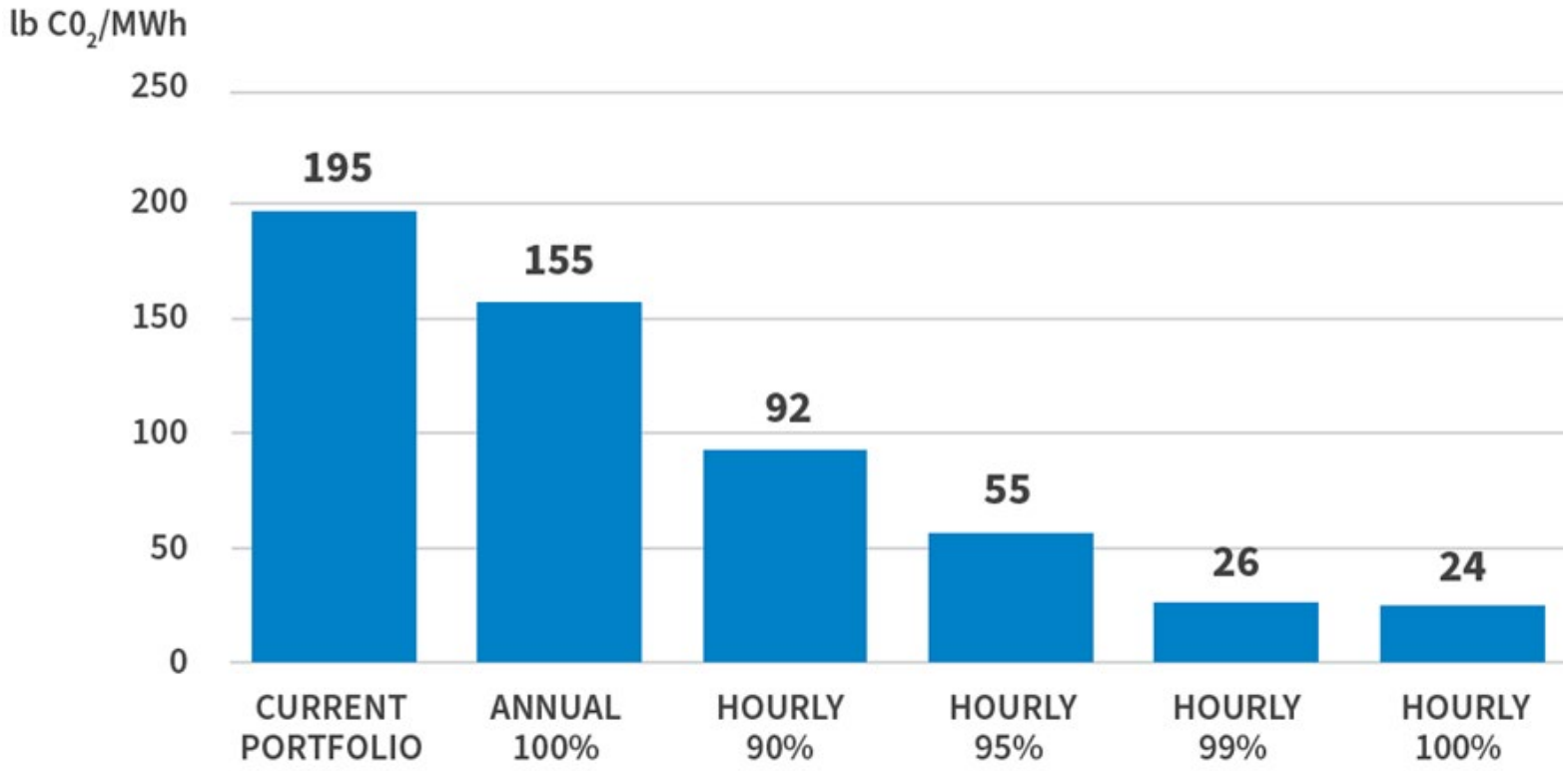
- Time-coincident renewable energy procurement up to 99% can be achieved with only 2% cost increase relative to Current Portfolio (based on early-mid 2022 market conditions)
- Based on current market conditions, however, achieving time-coincident renewable energy is infeasible within these cost ranges

Scenario	Difference in Expected Cost of Energy relative to Current Portfolio (%)
Current Portfolio	0%
Annual 100%	-1%
Hourly 90%	0%
Hourly 95%	1%
Hourly 99%	2%
Hourly 100%	12%

Emissions Reductions: Hourly Carbon Footprint

- Increasing our time-coincident target will reduce PCE's hourly carbon footprint

* The hourly carbon footprint accounts for our use of grid energy in some hours, and does not give us "credit" for supplying excess energy in other hours



Results are specific to Peninsula Clean Energy

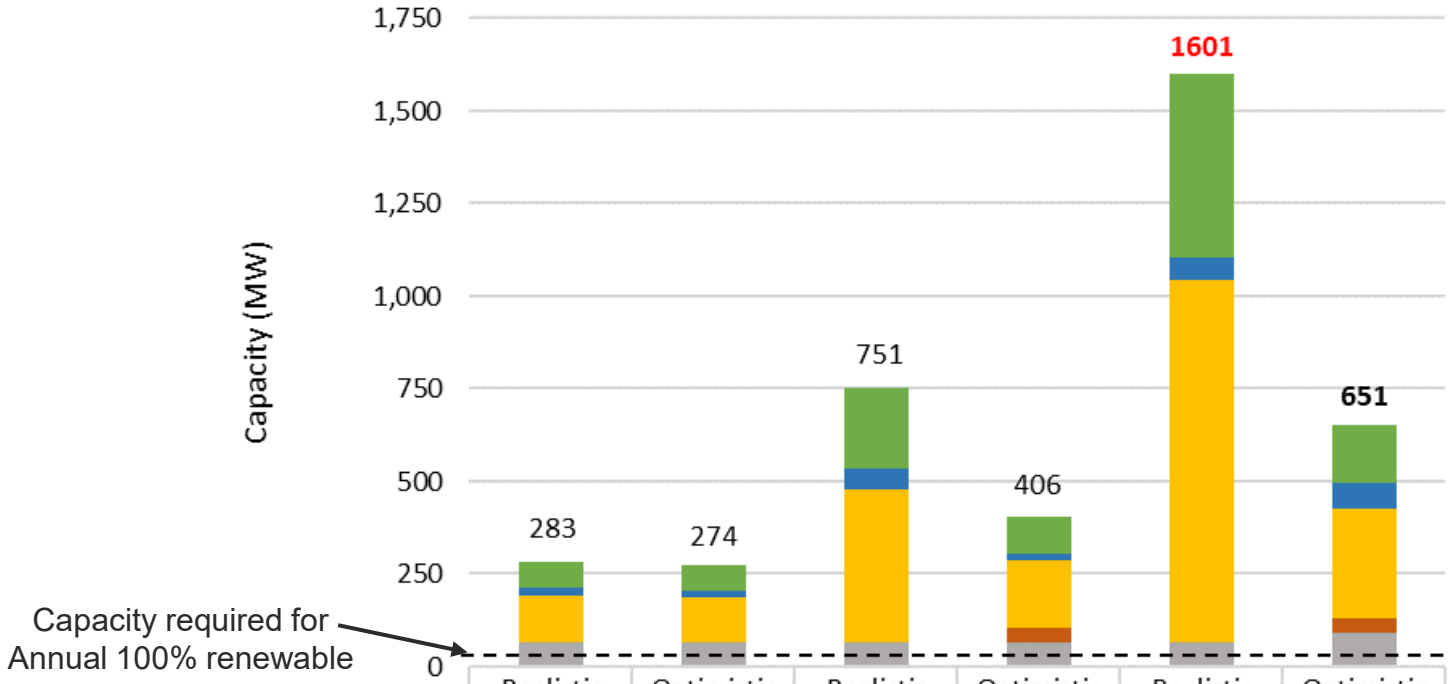
Recent Challenges

Refining PCE's 24/7 Strategy

- Since June, PCE has worked on several analysis with focus on:
  - Resource Availability: What resources would be available in 2027?
  - Market Uncertainty: What are the forecasted future price ranges for energy, RA, and REC?
  - Reselling Excess Products: Can we sell our excess products? What are the best ways to sell the excess products?
  - Cost and Risk: What's the best way to evaluate the cost and risk impact for different time-coincident percentages?

Resources Availability: Additional Capacity Needed by 2027

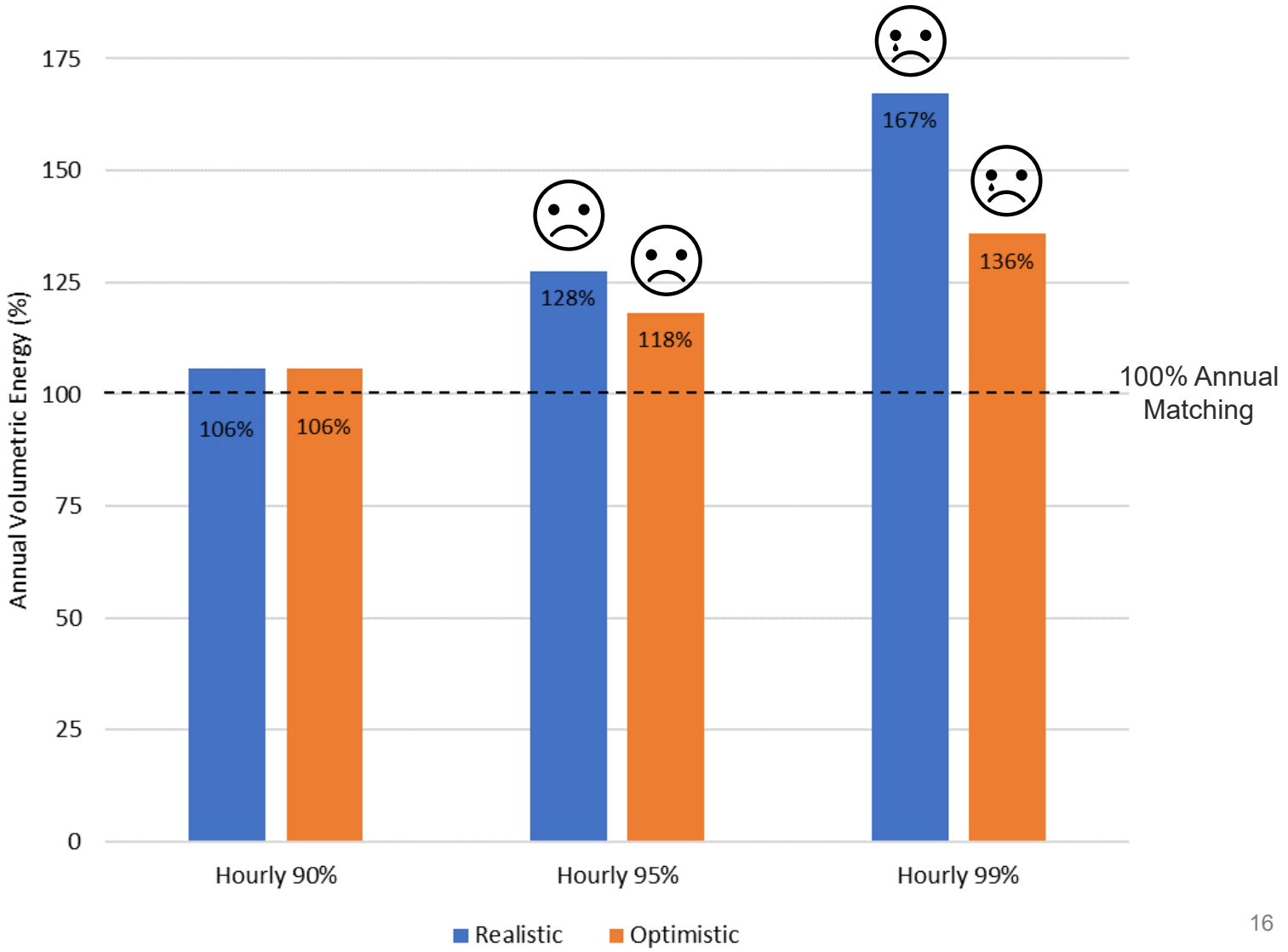
- Under the **Realistic** scenario, PCE will need to procure significant amount of additional capacity to achieve higher time-coincident targets
- Under the **Optimistic** scenario, a more desirable set of available resources significantly reduces over-procurement. This scenario is unlikely for 2027.



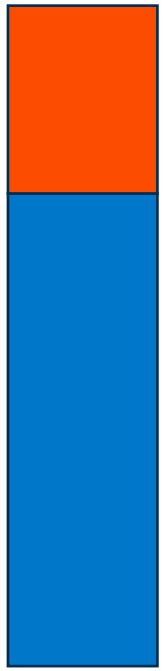
	Realistic	Optimistic	Realistic	Optimistic	Realistic	Optimistic
	Hourly 90%		Hourly 95%		Hourly 99%	
Total	283	274	751	406	1601	651
Storage	72	69	216	100	499	156
Onshore Wind	20	20	58	20	58	68
Solar PV	126	119	412	180	979	294
Geothermal	0	1	0	41	0	41
Shaped	65	65	65	65	65	91

Over-Procurement in 2027

- Higher time-coincident targets result in more over-procurement, especially under the **Realistic** scenario.



Why is Over-Procurement Risky?



Excess Supplies (Over-Procurement)

Supplies matched to load

Try to Re-Sell

High market prices → $50M in Revenue

Mid market prices “neutral” → $30M in Revenue

Low market prices or low market demand → $10M in Revenue

PCE's Current 24/7 Goal is Challenged

CHALLENGE: Lack of Desirable Resources Available in 2027

- Limited supply of wind, geothermal, shaped-product, long-duration storage
- Record-high prices

Significant Over-procurement at High Prices

RISK: Inability to sell excess products or selling excess at low market prices

Other Challenges & Risks

- Delays in project development and commercial operation
- Disconnect between real-time operations and the planning target
- Maintaining the 24/7 goal after the target year and challenges with finding perfect replacements

Summary

General Conclusions

- Time-coincident renewable procurement strategy could be cost-effective under certain market conditions and would reduce PCE's hourly carbon footprint
  - Meeting the 99% time-coincident target in 2027 is going to be extremely challenging.
  - Continuing to procure heavily in the current market with lack of best-fit resources will significantly increase PCE's exposure to future market with excessive over-procurement, potentially resulting in high cost to PCE and its customers.

Thank you!

A sustainable world with clean energy for everyone.

S/CAP Ad Hoc Committee and Working Group

Public Comment and Questions

SUSTAINABILITY & CLIMATE ACTION PLAN

Thank You!

Please submit questions or comments to

sustainability@cityofpaloalto.org

Acting Now for a Resilient Future

CITY OF PALO ALTO