



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

8/11/2022

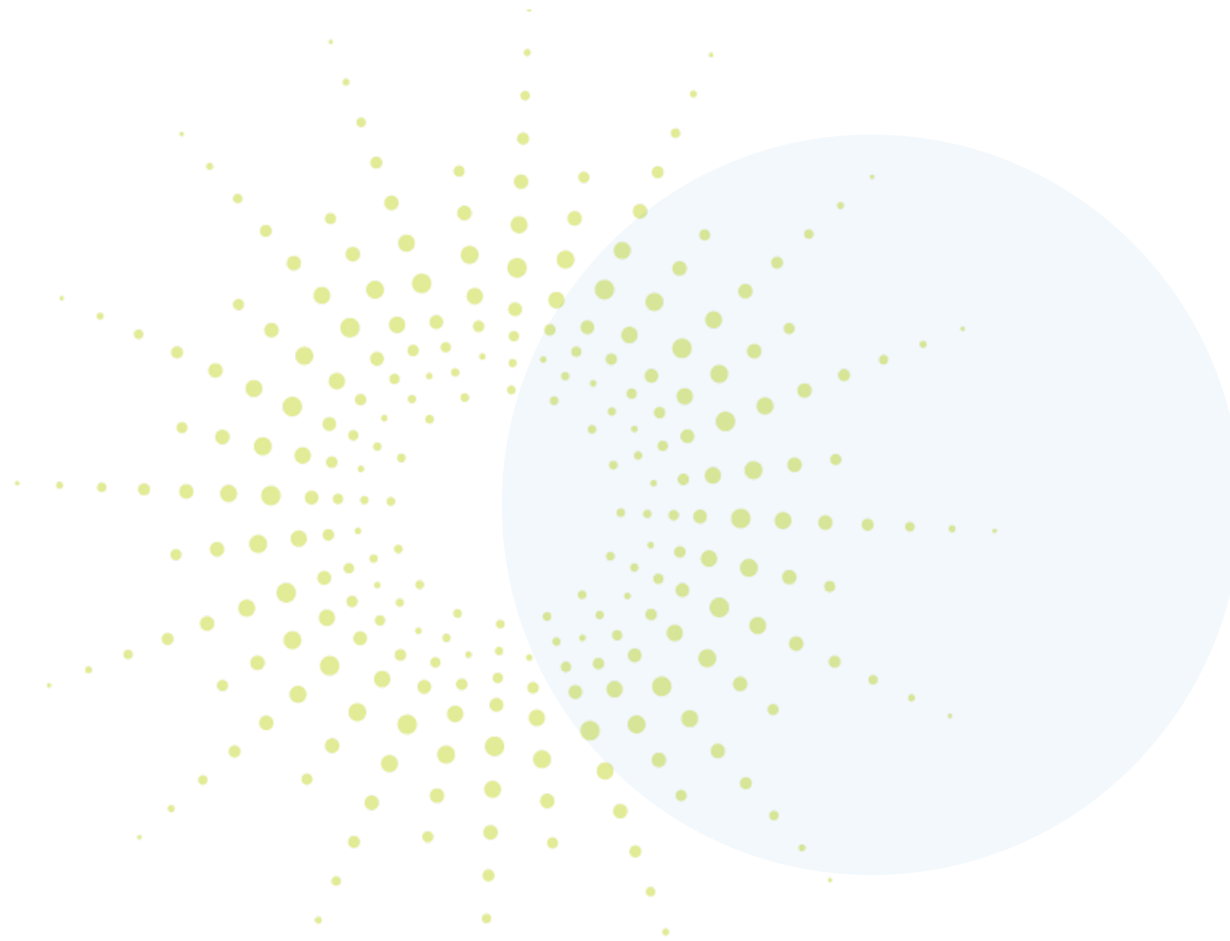


# Agenda

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- Background
- Modelling Approach
- Next Steps
- Integrated Resource Planning

Background



# Our Time-coincident Goal

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## Organizational Priorities:

- By 2025, deliver 100% renewable energy each and every hour of day
- Contribute to our community reaching a goal of 100% greenhouse gas-free by 2035

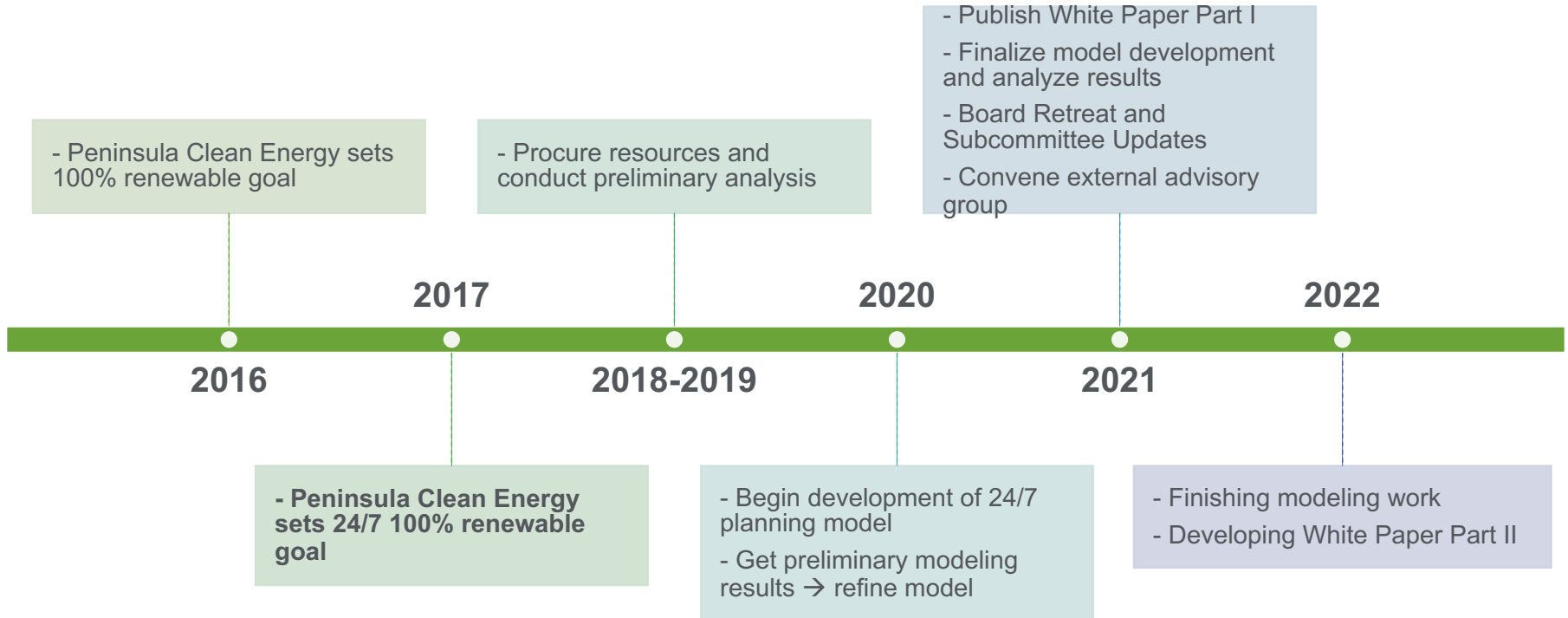
# Renewable v. Carbon-Free

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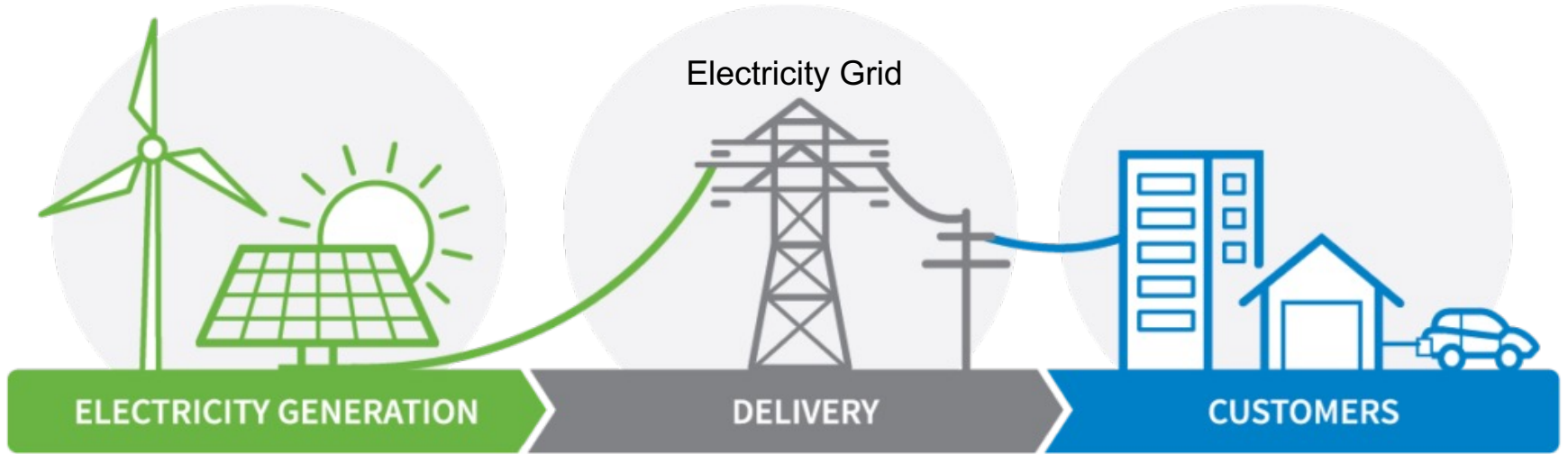
- Renewable: electricity generated from a resource that is naturally replenished as it is used
- Carbon-free: electricity generated without emitting carbon dioxide or other greenhouse gases into the atmosphere

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

# Progress to Date



# How it works: Peninsula Clean Energy and the Electricity Grid



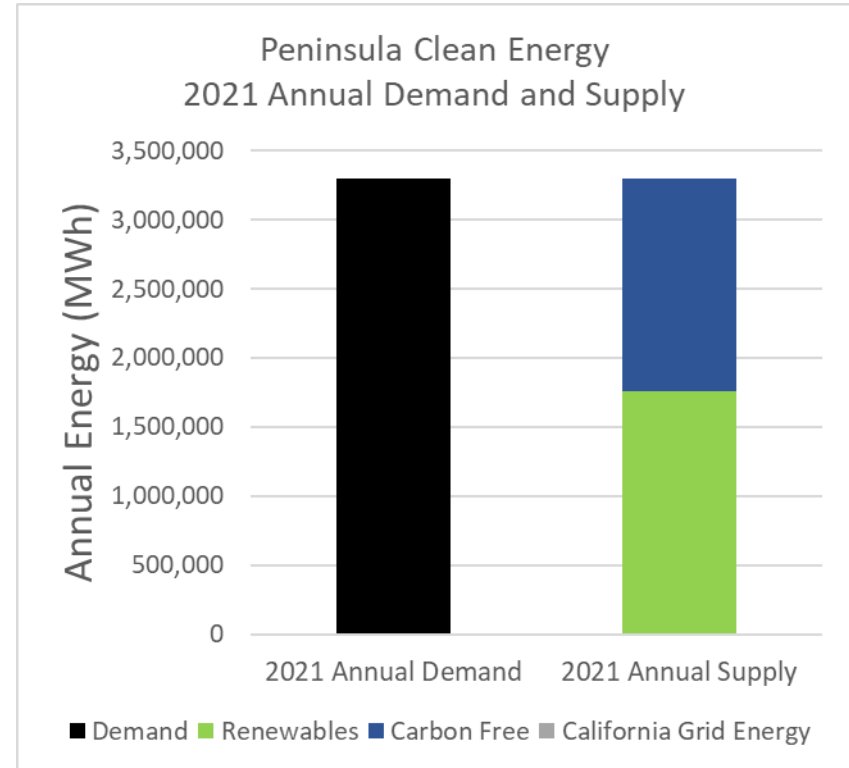
**Peninsula Clean Energy**  
delivers energy supply to  
the California electricity grid

**The electricity grid**  
transmits and  
distributes electricity  
throughout California

**Our customers**  
receive the energy  
from the grid

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

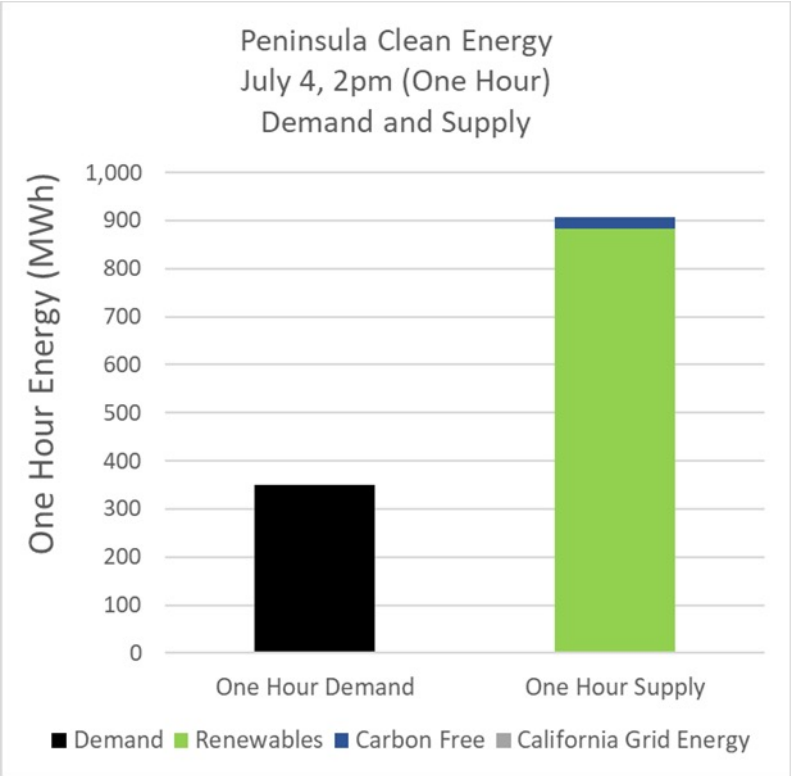
- We currently purchase enough renewable and carbon-free supplies to meet customer demand in the same year
- This annual framework:
  - Is the current industry standard
  - Does not show whether supply and demand matched on an hourly basis





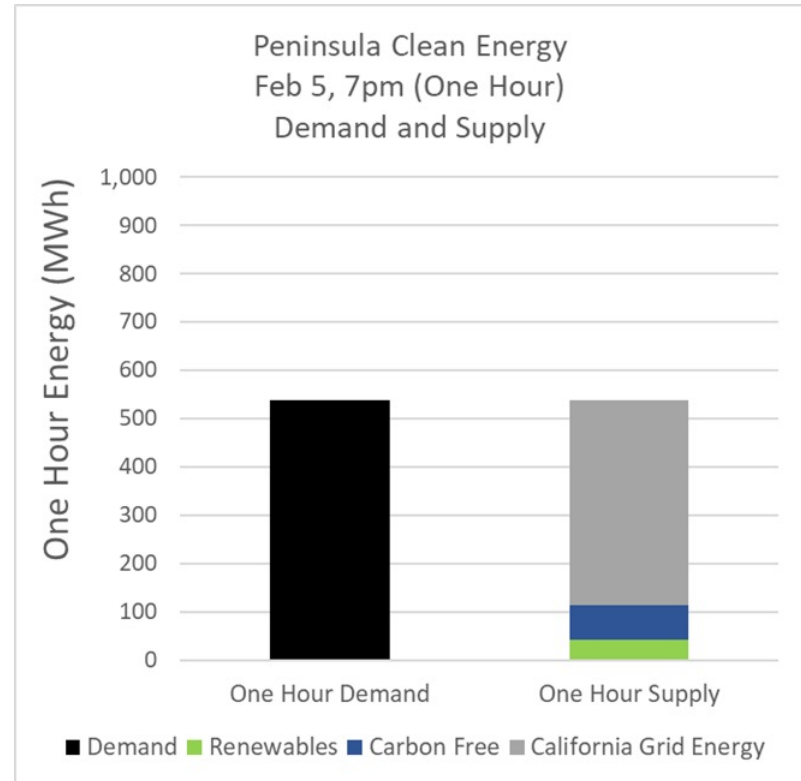
# Currently, in a single hour, our demand and supply may not match

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

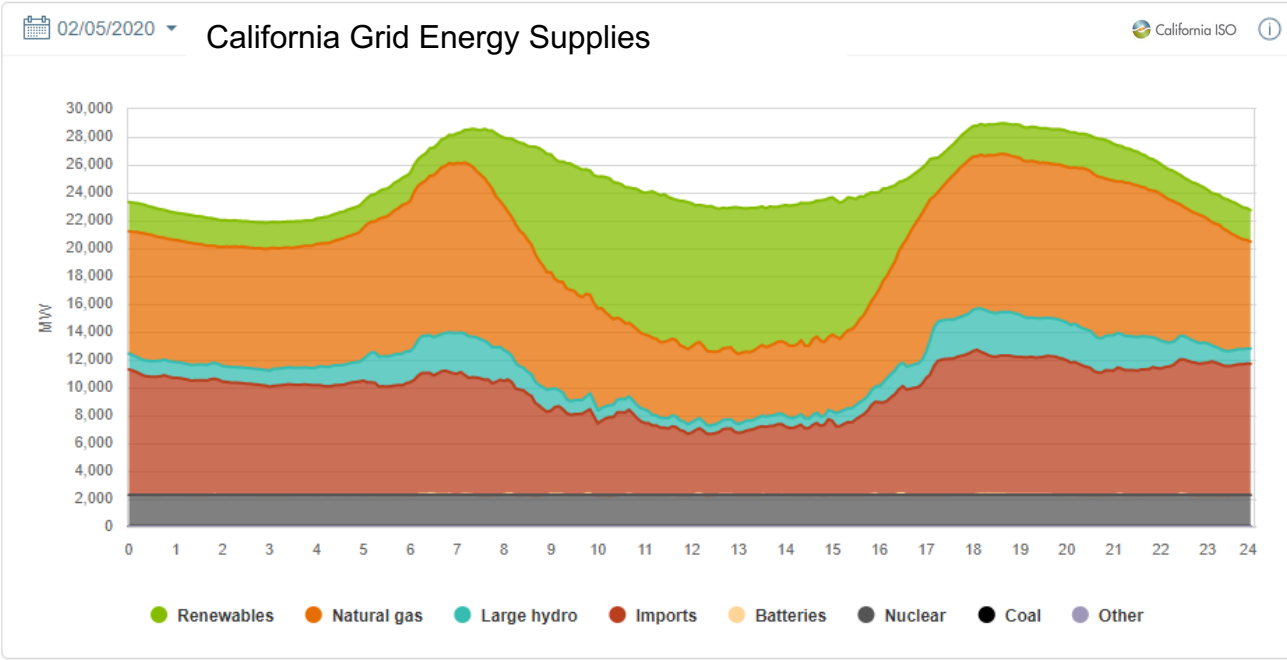


# Currently, in some hours, we don't supply as much as our customers need

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

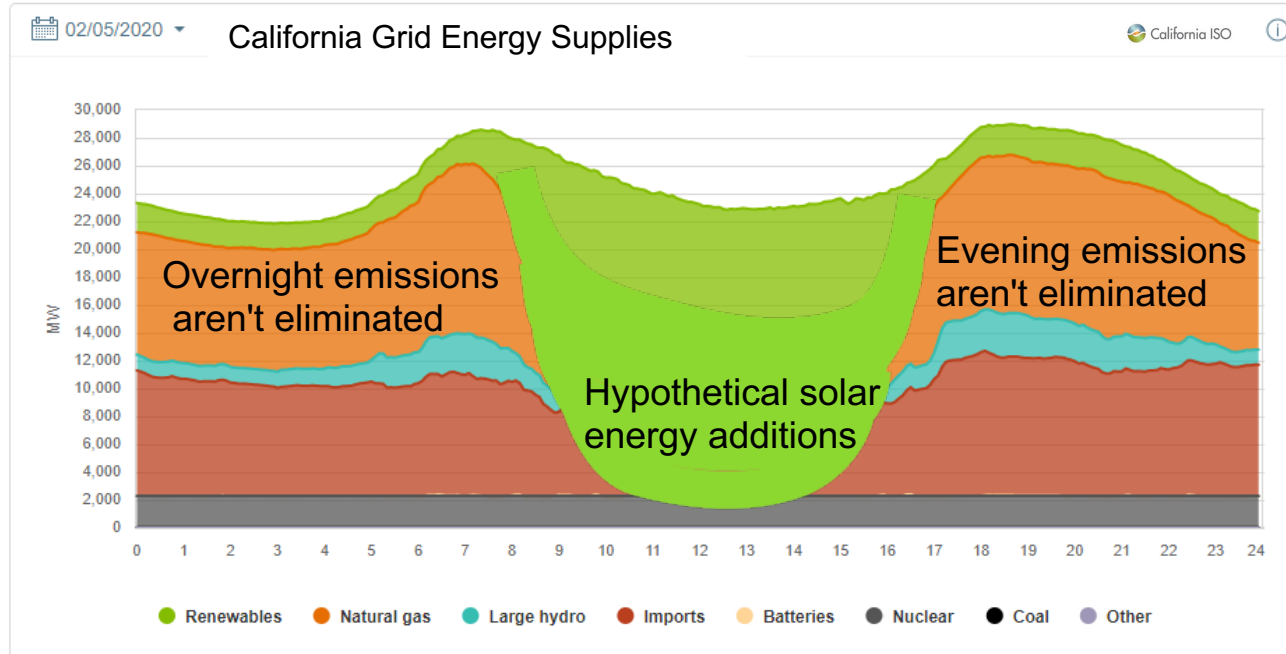


# The California Grid Energy, Today



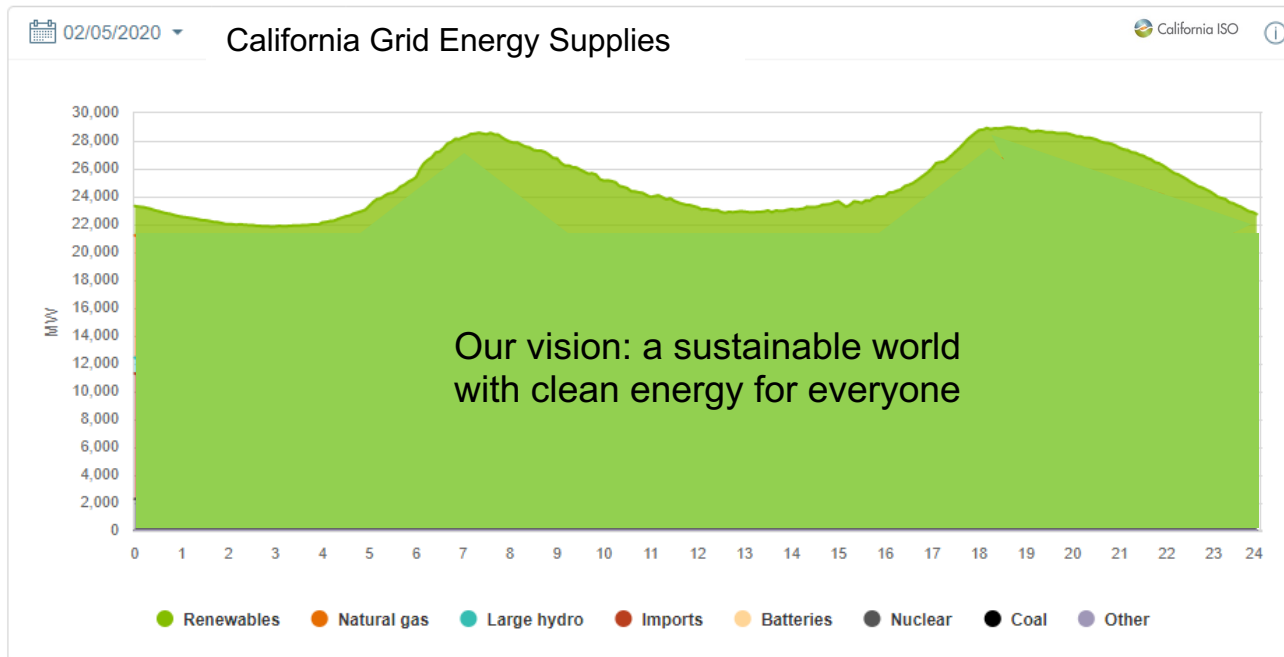
# Imagine if more communities pursue total annual renewable goals...

- 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

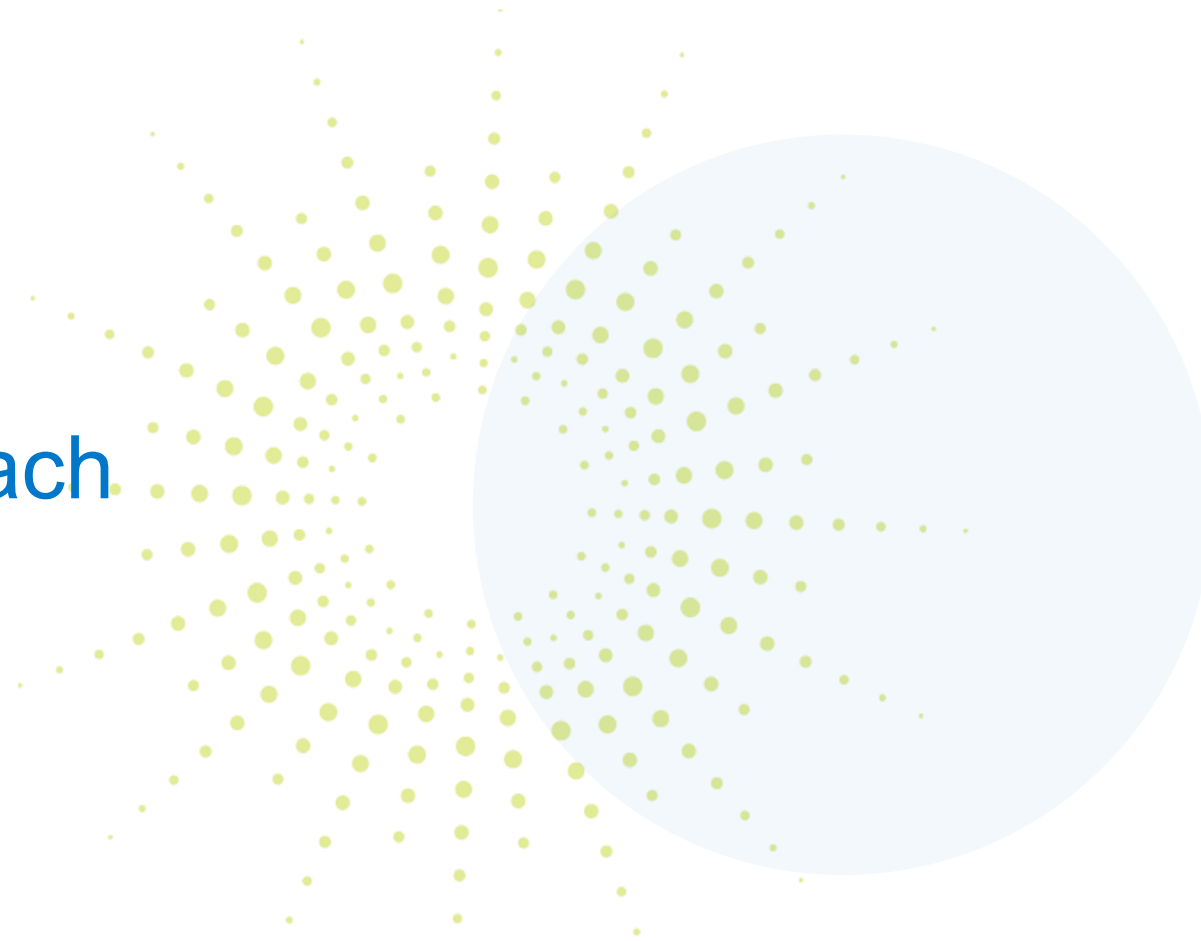


# The importance of 24/7 renewable energy

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- If more communities pursue renewable goals, **using an annual framework** 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

# Modeling Approach



# Resources for 24/7 Goal

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- **Renewable resources:**
  - **Solar** (*photovoltaic / concentrating\**)
  - **Wind** (*onshore / offshore*)
  - **Geothermal\***
  - **Small hydro\***
  - *Ocean wave\**
  - *Tidal current\**
- **Storage: only charging from renewables**

Key:

*Emerging/less-mature tech (unlikely available by 2025)*

\* Limited capacity available



# Objective

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

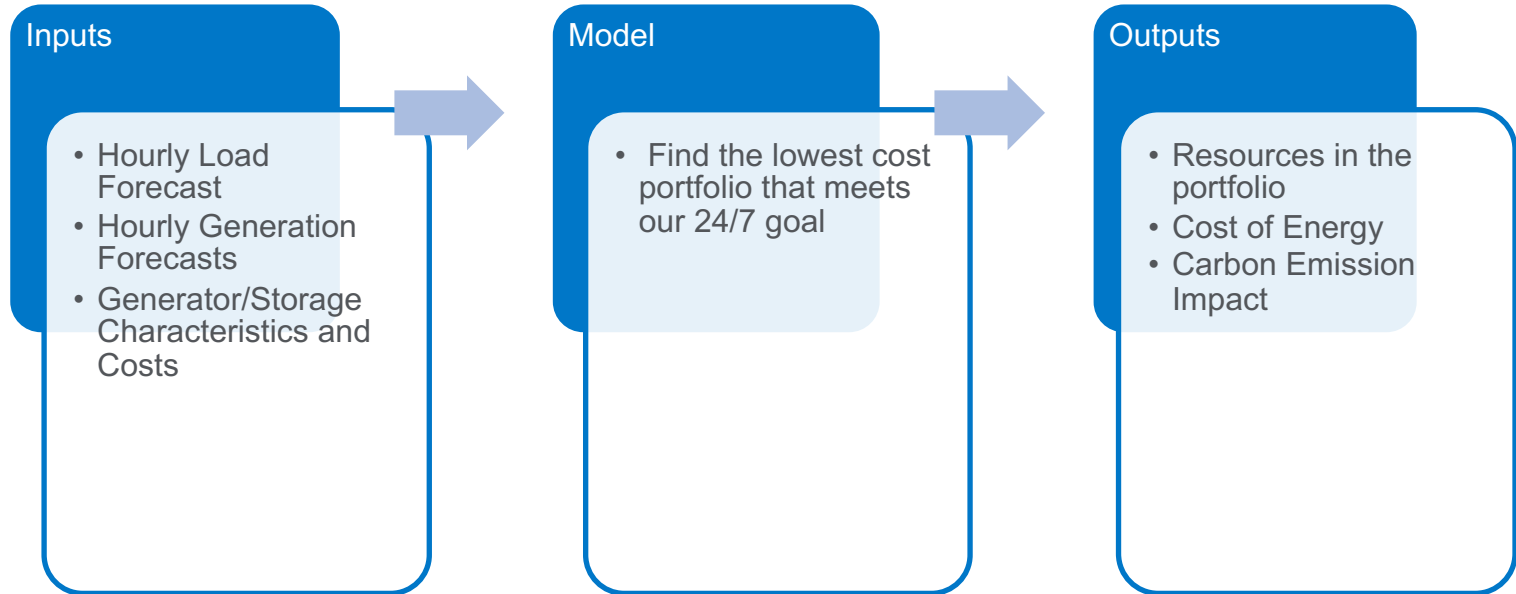
# Portfolio Planning Tool

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- **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 started in 2020 → continued refinement of model and assumptions since then

# Inputs and outputs

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# Scenarios

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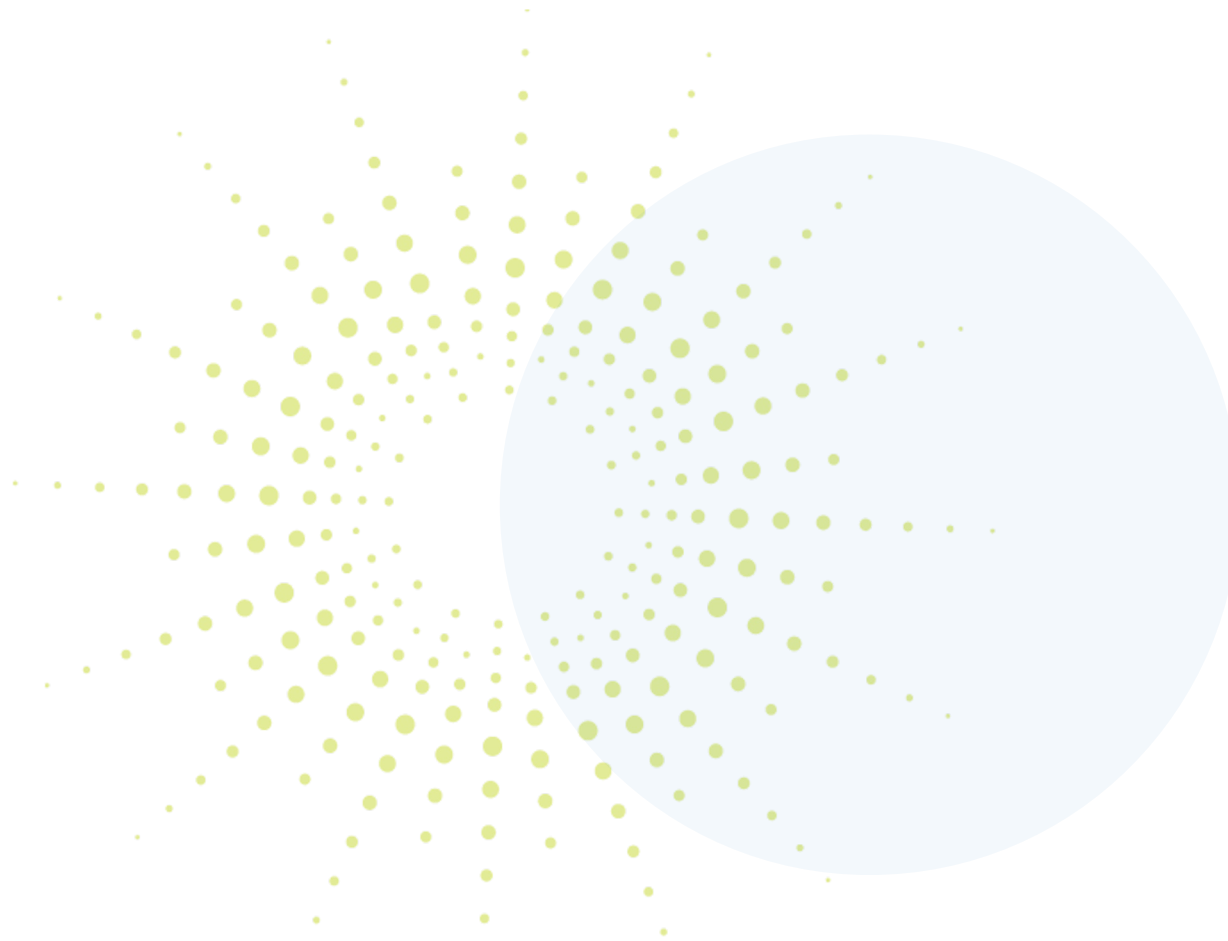
- Existing Portfolio
- Annual Renewable Target
- Hourly Renewable Target (90%, 95%, 99%, and 100%)

# Decision Metrics

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- We use different metrics to make our final decision:
  - Cost
    - Affordability
    - Risk
  - Impacts on Emissions
  - Impacts on California Electricity Grid
  - Reliability / Real-time performance

# Next Steps



# Next steps

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- Share our modeling results and our proposed strategy with the Board Subcommittee and at the September Board Retreat
- Complete drafting of the White Paper Part II
- Execute contracts in negotiation
- Issue future RFOs

# Integrated Resources Planning





# What is Integrated Resources Planning?

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- Integrated Resources Planning is a long-term planning process to align supply and demand
- For California electric load serving entities, like Peninsula Clean Energy, we participate in a state-wide Integrated Resources Planning process led by the California Public Utilities Commission. This process occurs every 2 to 3 years, and is currently underway.
- In addition to the state-wide planning process, Peninsula Clean Energy also performs individual Integrated Resources Planning, such as for our 24x7 goal.

# Looking ahead to Peninsula Clean Energy's 2022 IRP

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- Integrated Resources Planning Goals:
  - Meet or exceed our state-mandated emissions targets in compliance with all IRP requirements
  - Meet or exceed our reliability requirements
  - Provide affordable, clean electricity to our customers
  - Provide time-coincident renewable energy to meet customer electricity demands in all hours
- Schedule:
  - Review proposed 2022 IRP with Board of Directors (Sept/Oct 2022)
  - 2022 IRP submission deadline to CPUC: November 1, 2022

# Highlights of Peninsula Clean Energy's Planned Procurement

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- To meet our customer's energy demand, we contract with renewable resources (wind, solar, geothermal, and small hydro) and storage
- We give preference to projects with environmental benefits and that avoid environmental impacts
- We use competitive solicitations to find the most cost-effective resources