Emissions Accounting "What is Clean?"

SVCE Study Session
June 14, 2023

SILICON VALLEY CLEAN ENERGY

SVCE & The Market

CAISO is the energy market through which SVCE buys and sells energy.

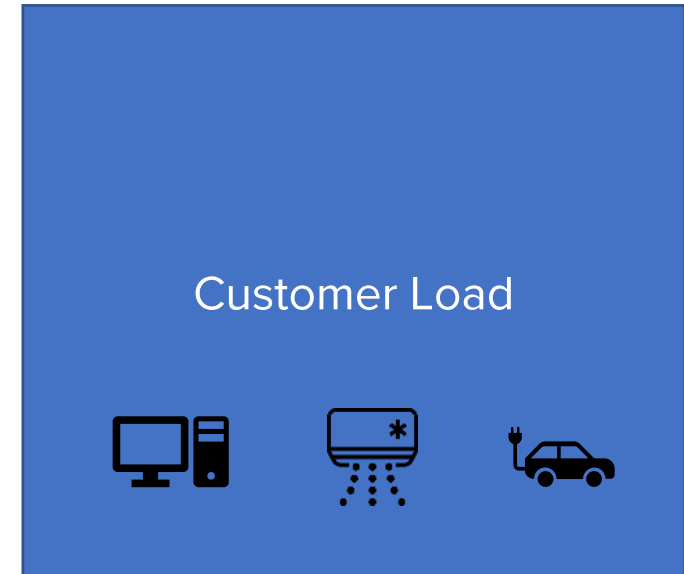**Supply from our resources does not match our customer demand in all hours.**

SVCE (and all other suppliers) bid energy into the market

CAISO selects least cost resource mix to meet demand

SVCE buys energy on behalf of its customers

SVCE Resources

All Other CAISO Resources

CAISO Market

Customer Load

SVCE is both a supplier and source of demand for the CAISO market

Regulatory Mechanisms Today

All current requirements use annual and attributional methodologies.

Legislation	Regulation	Methodology	Challenges/ Issues
AB 1110	Power Content Label	Annual emissions reported on lb CO2/MWh	Allows LSEs with excess energy to "push" dirty power off their PCL resulting in unaccounted for dirty energy
SB 100	IRP	Projected annual portfolio emissions	Forecasted, not actual. CEC still finalizing metrics, tools and pathways for compliance.
SB 350	RPS Plans/ IRP	Percentage of retail sales	Ignores value of non-RPS clean energy.

Where SVCE is today

SVCE is on track to meet SB 100/ SB 350 RPS obligations while maintaining 100% carbon free on an annual basis.
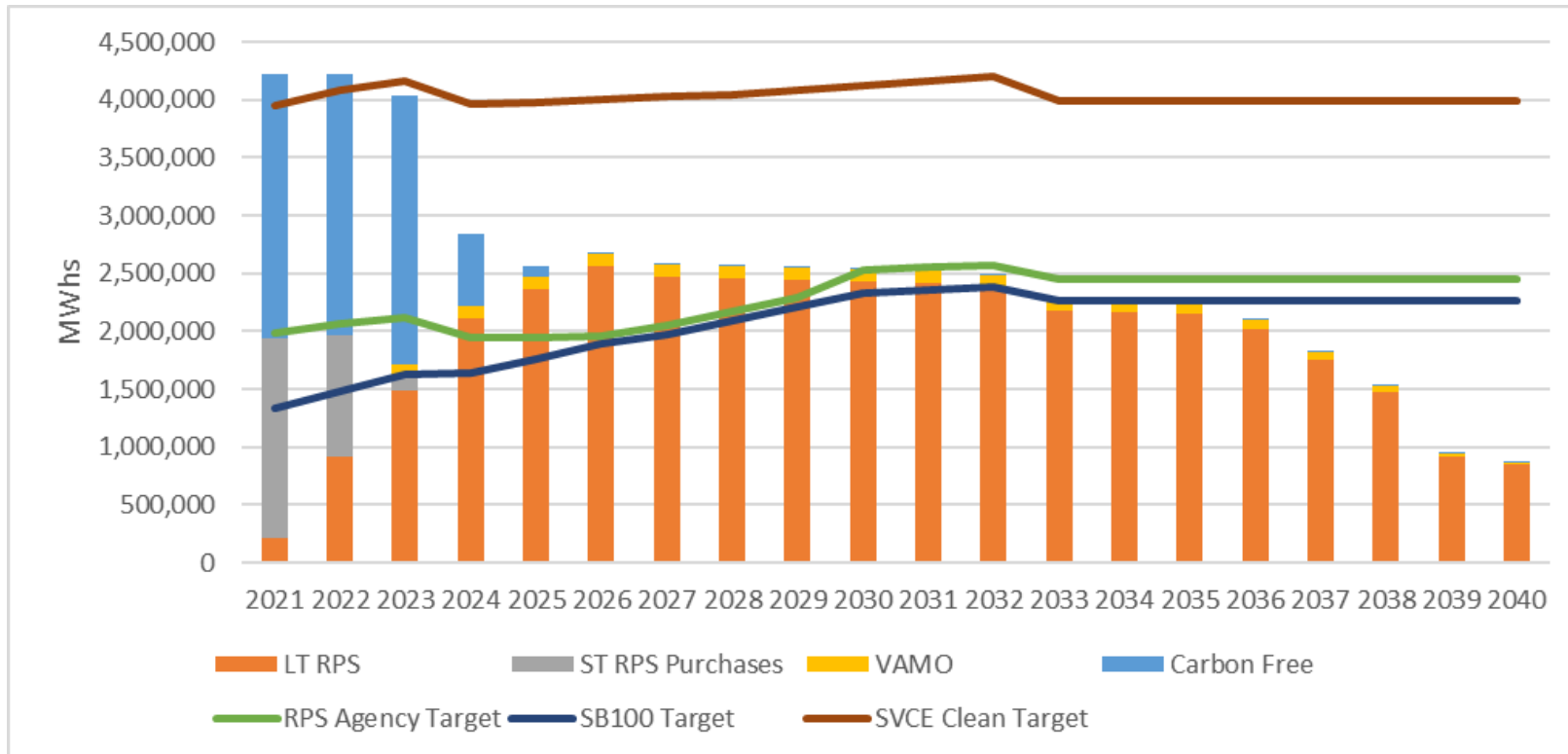
Difference between RPS and load is met with carbon free resources (hydro and nuclear)*

*Diablo Canyon Power Plant operating life is now expected to be extended through at least 2030; allocation of attributes is still being considered by regulators.

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Power Content Label (PCL)

- Standardized accounting for all Load Serving Entities (LSEs)

- Resource Loading Order Issues:
  - Allow LSEs to effectively "remove" gas their sales
  - Can push RPS off LSEs PCL due to loading order
  - AB 1110 altered rules required resource specific emissions

**2022 POWER SOURCE DISCLOSURE ANNUAL REPORT
SCHEDULE 3: POWER CONTENT LABEL DATA
For the Year Ending December 31, 2022
SILICON VALLEY CLEAN ENERGY
GREEN START**

Instructions: No data input is needed on this schedule. Retail suppliers should use these auto-populated calculations to fill out their Power Content Labels.

	Adjusted Net Procured (MWh)	Percent of Total Retail Sales
Renewable Procurements	1,618,503	44.9%
Biomass & Biowaste	51,509	1.4%
Geothermal	889,027	24.7%
Eligible Hydroelectric	11,373	0.3%
Solar	542,353	15.0%
Wind	124,240	3.4%
Coal	-	0.0%
Large Hydroelectric	1,111,912	30.8%
Natural gas	-	0.0%
Nuclear	875,506	24.3%
Other	-	0.0%
Unspecified Power	-	0.0%
Total	3,605,920	100.0%

Total Retail Sales (MWh)	3,605,920

GHG Emissions Intensity (converted to lbs CO_2e/MWh)	72

Percentage of Retail Sales Covered by Retired Unbundled RECs	0.9%

Coso Geothermal
(clean, reliable energy + capacity)

Clean Energy Choices

GreenStart

SVCE's standard product

- **100% Clean annually**
- **RPS: 45-55% now**
- **Rate discount to PG&E**

Opt Out ✕

Return to PG&E

- **Annual Clean level will vary**
- **Minimum state RPS**

GreenPrime

SVCE's opt-up product

- **100% Clean annually**
- **100% RPS**
- **Green-e certified**
- **Rate premium over GreenStart**

Custom products available for large commercial customers, such as GreenPrime Direct 24x7 and EcoInvest

Clean Product Challenges

1. Tight market for RPS products ---> cost to procure two to three times higher than 2022

2. Green-e certified RPS products even harder to find

3. PG&E allocations of carbon-free resources uncertain

4. Small emissions associated with some renewables, make messaging a challenge

5. PCL accounting rules not reflective of actual energy portfolio mix

Clean Standard Pathways

While regulatory structures will continue to change, **SVCE** can shape its own clean trajectory going forward.

- **Annual**
  - **Renewable Portfolio Standards**
  - **Power Content Label**
- **Hourly**
  - **24x7 –** *Portfolio level supply and demand matching*
  - **Carbon Free Energy (CFE) Score –** *Portfolio + grid emissions accounting*
  - **Clean System Power –** *Portfolio + grid emissions forecasting*

As standardized hourly accounting mechanisms are developed and adopted the state may also move to an hourly framework.

24x7

There is increasing interest from the private sector and LSEs in pursuing "24x7" clean. In its strictest sense, this requires supply and demand matching each hour, without regard to the system at that time.

24x7 Matching
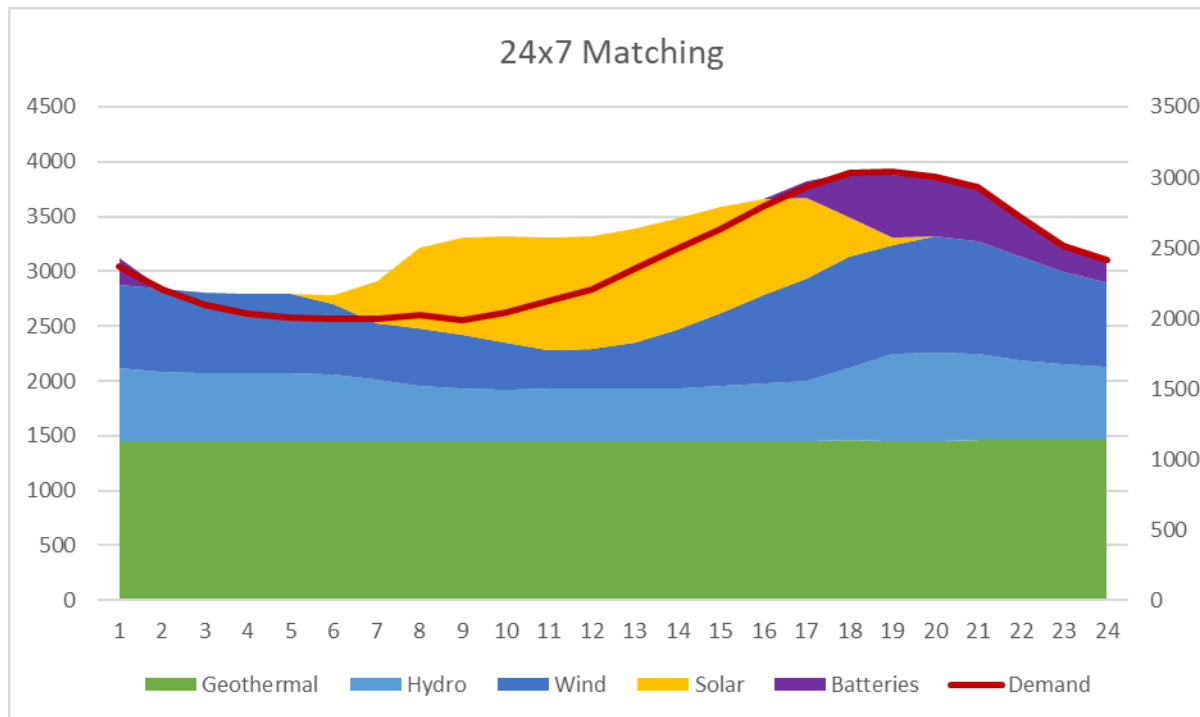
Illustrative Example

- Hard to optimize portfolio perfectly – especially across full year – likely resulting in overbuild in many hours

- Actual resource dispatch is hard to predict
  - Battery dispatch by CAISO unlikely to fit portfolio need

- SB 1158 (Becker) will require LSEs to report their 24x7 progress; but does not set any specific requirement

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Google CFE – A Goldilocks Solution?

Google's CFE methodology benefits from considering the grid's cleanliness at the time the clean portfolio is dispatching. In doing so it encourages an entity to buy resources which help fill the dirtiest system hours, helping reduce total system emissions more efficiently.

Entity's Carbon Free Supply

Entity's net load (e.g. system energy utilization)

System Emissions Score

$$\frac{MWhgen + [(MWhload - MWhgen) * Forecasted\ Hourly\ Grid\ CFE\ Score]}{MWhload}$$

Example: entity has **90 MW** of renewables online in an hour with **100 MW** of demand; system is **65% clean in the hour:**

$$\frac{90 + [(100-90) * .65]}{100} = 90\% \text{ CFE}$$

Next Steps for SVCE

SVCE staff is currently working to develop a pathways study to understand the portfolio implications of several clean energy targets.

Likely Scenarios:
- BAU: 100% carbon free with state-wide RPS goals and requirements met
- CFE analysis (exact score(s) TBD)
- 24x7 analysis (expected share of hours TBD)

With Consideration For:
- Cost
- Financial Risk
- Regulatory Risk
- Portfolio Management Best Practices

Target delivery of initial draft paper Q4 2023

Back up slides

Agenda

Objectives of Workshop: Participants have improved understanding of Clean metrics and accounting methodologies

Item	Time
Introduction	5 minutes
Level Setting on Clean Energy Metrics	15 minutes
Discussion	40 minutes

Resource Attributes for a Cleaner Grid

To Achieve a 24x7 grid – or anything close to it – we need an increasing amount of clean, firm and dispatchable resources.

Resource	Clean	Firm	Dispatchable	Energy Source	Affordable
Solar/Wind	✔️	❌	❌	✔️	$
Storage	— Depends on Source Energy	—	✔️	❌ net loss ~15%	$
Fossil	❌	✔️	✔️	✔️	$$
Geothermal	— May be emitting	✔️	— Potentially	✔️	$$
Biomass	— Emitting but often considered neutral	✔️	— Potentially	✔️	$$
Hydrogen	— Depends on Source Energy	✔️	✔️	?	$ $ $

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How to Measure Clean?

Attributional (commonly used)	Examples	Notes
Definition: Emission accounting associated with purchased energy	• Calculating annual renewable energy as share of total retail load (%) • Calculating Average Annual Emissions by CO_2 output (lbs) • Calculating hourly emissions from portfolio	• Requires "clean tags" to be tracked; current widely-used systems set up for annual, not hourly accounting • Often does not consider system cleanliness/ build optimization
Consequential (uncommon)	**Examples**	
Definition: Estimated change in system emissions from purchased energy	• Estimated system emissions reduction due to adding geothermal contract	• Requires estimated counter factual • May have higher emissions impact per $ spent • May consider marginal or average system impact