

How EBCE Procures Electricity

MARCH 9, 2023



Agenda

- **Section 1:** Power Resources Team
- **Section 2:** California Energy Markets Overview
- **Section 3:** Overview of Key Compliance Obligations
- **Section 4:** Building a Clean Energy Portfolio
- **Section 5:** Contract & Project Lifecycle

SECTION 1

Power Resources Team



EBCE's Power Resources Team



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What We Do

Fixed Price Energy Hedges

Portfolio Management

Long-Term Resource Valuation

RECs and Carbon Free

Integrated Resource Planning

Resource Adequacy

Operationalize PPAs

Contract Management

Energy Risk Management

Contract Settlements

Never-Ending Compliance

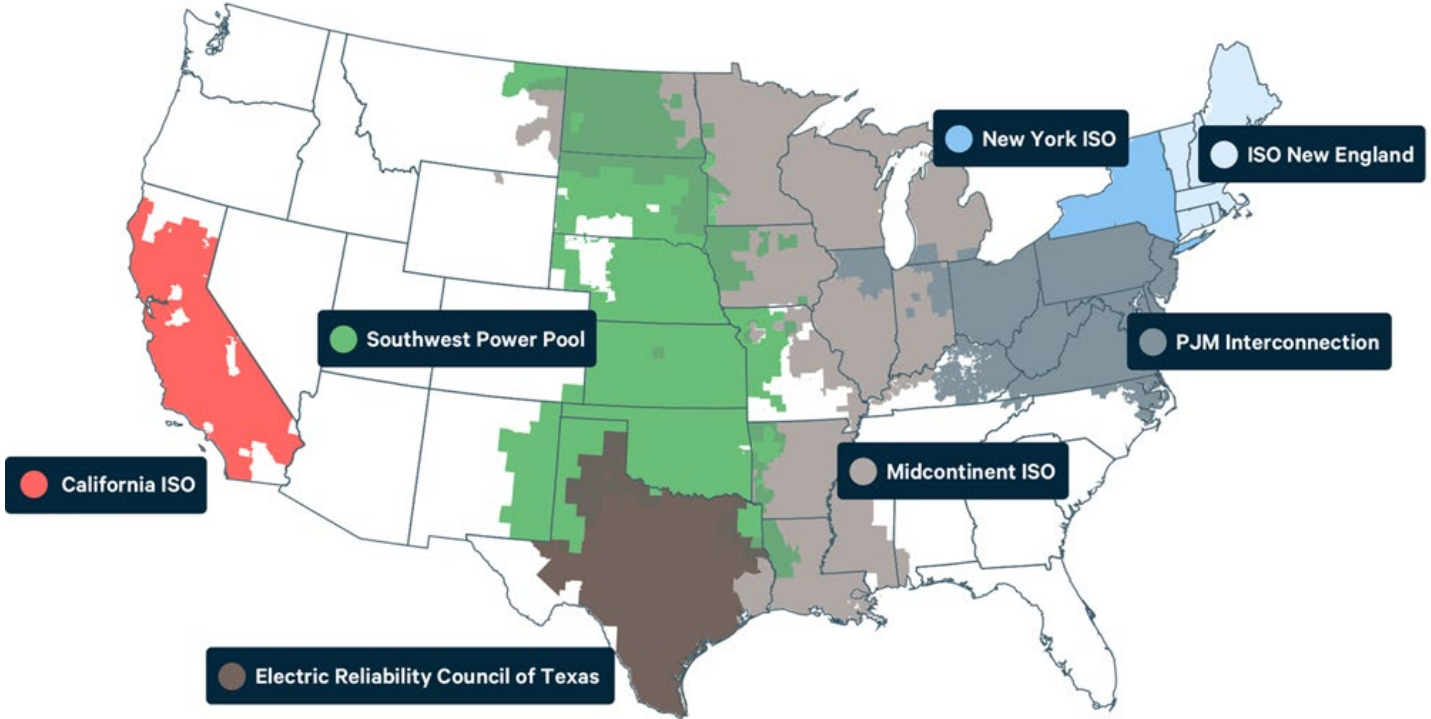
Contract Negotiation

SECTION 2

California Energy Landscape



North American Balancing Authority Areas



Source: Homeland Infrastructure Foundation-Level Data (2019)

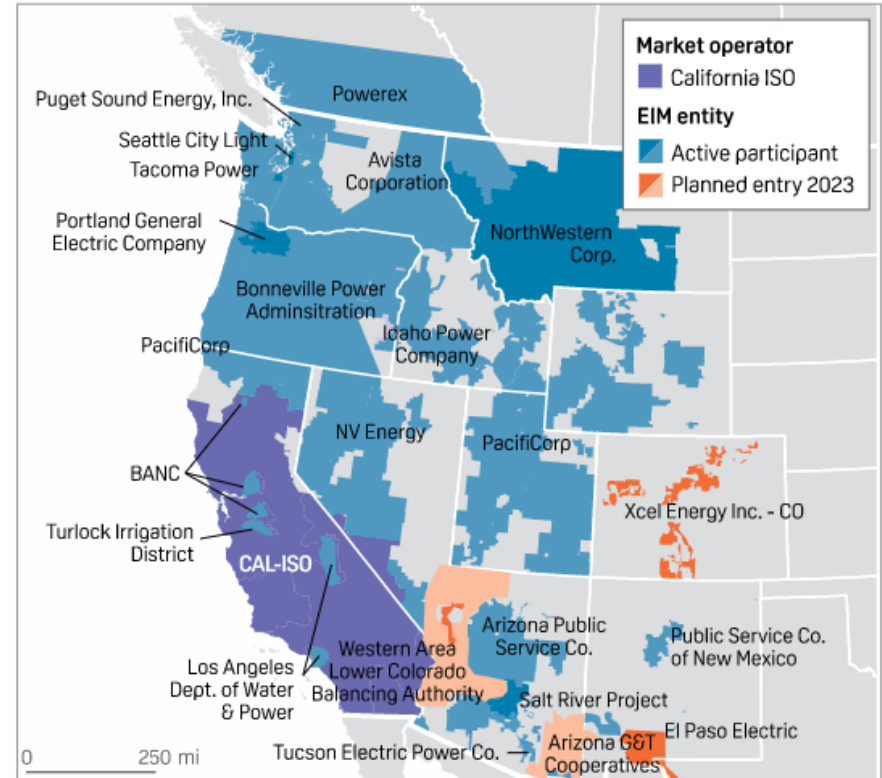
California Balancing Authority Areas

CAISO BAA

- Avg. Peak Load ~47,000 MW
 - 2022 Peak: 52,061 MW (September)
- 26,000 circuit miles of transmission

Role of CAISO

- Competitive Wholesale Power Market
 - Efficiently match supply & demand
- Reliable Operations
- Grid Planning and Development



Source: Cal-ISO, S&P Global Commodity Insights, S&P Global Market Intelligence

CAISO Markets

Day-Ahead Market

- Matching Supply / Demand
- Majority of Transitions
- Market Processes

Real-Time Market

- Matching Supply / Demand
- Incremental Adjustments to Day-Ahead
- 15-Min. and 5 Min. settlements
- Market Processes



SECTION 3:

Overview of key compliance rules



Compliance & Other Obligations

Compliance

- Annual Year-Ahead System/Local/Flexible Resource Adequacy Filing
- Energy Division Resource Adequacy Price Data Request
- Ten-Year Resource Adequacy Data Request
- Historical Load Data (Previous Year)
- Independent Audit of the Annual Power Source Disclosure Report and Power Content Label
- Integrated Resource Plan
- Required Electric System Reliability Procurement 2021-2023
- Required IRP Procurement 2021-2028
- Annual IRP Data Request
- Power Source Disclosure Report
- Renewable Portfolio Standard Compliance Report
- Renewable Portfolio Standard Compliance Report - Supplemental
- Renewables Portfolio Standard Procurement Plan
- Revised Year-Ahead Load Forecast
- Year-Ahead Load Forecast
- Flexible Capacity Needs Assessment and Allocation
- Monthly Load Migration Forecast
- Monthly System/Local/Flexible Resource Adequacy Filing
- Quarterly Revised Load Forecast for Cost Allocation Mechanism
- Retail Sales Report
- Energy Storage Requirement Report
- RPS-PCIA Quarterly Data Report
- RA-PCIA Quarterly Data Report
- Imports/Exports Report
- Imports/Exports Report Verification
- LCFS Annual Fuel Pathway Report
- Registration of Specified Source Facilities
- Renewables Portfolio Standard Reporting & REC Retirement
- Revised August Load Forecast for Local Resource Adequacy Reallocation

Commitments

- R100: 100% RPS tariff
- Bright Choice: RPS % exceeds compliance requirements
- Commitment to 0 emission portfolio by 2030
- Financial prudence
- Managing costs for EBCE customers (~20% low income)

Regulatory Bodies

CAISO

California Independent System Operator

- Manages the flow of electricity on high-voltage power lines, operates a wholesale energy market, and oversees infrastructure planning.

FERC

Federal Energy Regulatory Commission

- United States federal agency that regulates the transmission and wholesale sale of electricity and natural gas in interstate commerce.

NERC

North American Electric Reliability Corporation

- Nonprofit corporation created by the electric utility industry to promote the reliability and adequacy of bulk power transmission in the electric utility systems of North America.

CPUC

California Public Utilities Commission

- Regulatory agency that regulates privately owned public utilities in the state of California, including electric power, telecommunications, natural gas and water companies.

CEC

California Energy Commission

- As the state's primary policy and planning agency, the Energy Commission is committed to reducing energy costs and environmental impacts of energy use while ensuring a safe, resilient, and reliable supply of energy.

And more!

- CARB, CSWRCB, DWR, etc

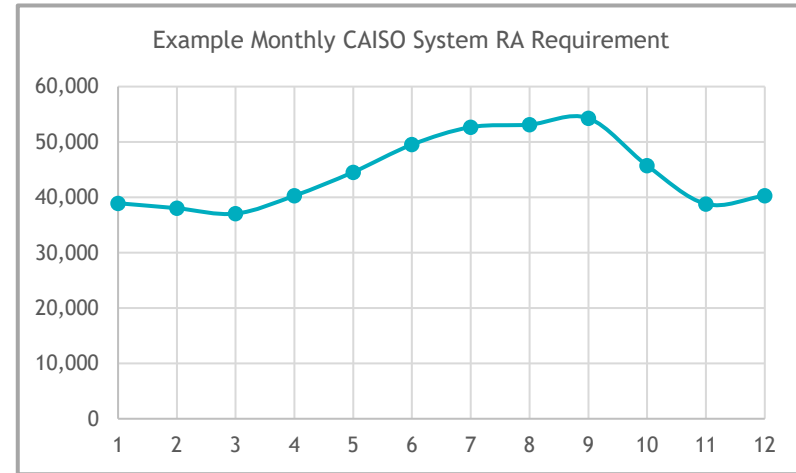
Resource Adequacy

Resource Adequacy (RA):

- A compliance product to ensure there is a *plan* for adequate resources to match customer demand with available generation at any hour of the day in the CAISO
- Resource Adequacy is purchased as available capacity per month

Requirements:

- EBCE is required to procure in each month:
 - Peak customer demand + Planning Reserve Margin (16%)
- Load serving entities (LSEs) must demonstrate compliance to both the CPUC and CAISO, annually and monthly



Resource Adequacy - Types

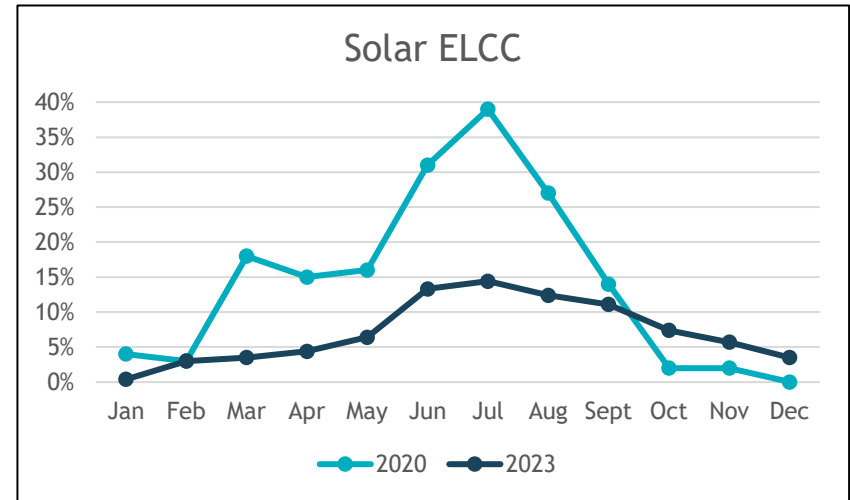
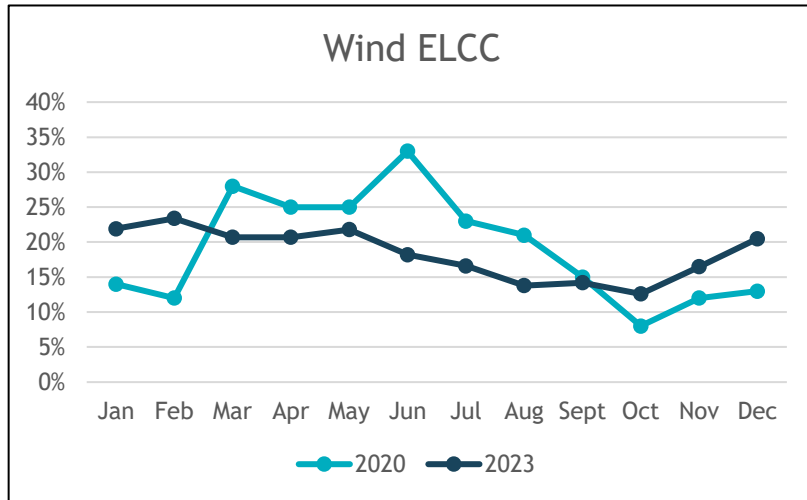
EBCE *currently* has two types of RA requirements: System and Flexible

System	Flexible
<ul style="list-style-type: none">• Interconnected to CAISO• Imports: energy imported from outside the CAISO	<ul style="list-style-type: none">• Determined by resource ability to increase output during hours of “flexible need”• Battery storage resources are flex

***Local RA and Central Procurement Entity (CPE):** EBCE was responsible for a Local RA requirement in 2022 and years prior. Starting in 2023, CPE is responsible for Local RA procurement.

Resource Adequacy - Renewables

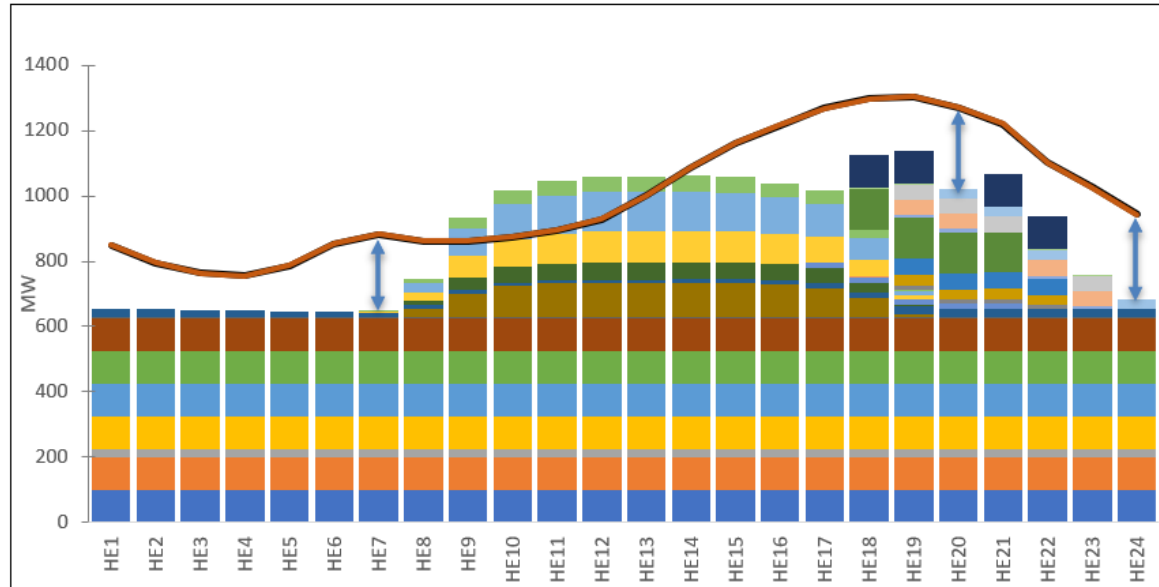
- Effective Load Carrying Capability (ELCC) is used to determine the contribution of **intermittent resources** to system reliability.
- Solar and wind offer diminishing contributions to RA as penetration grows, particularly for solar.
- Dramatic decrease in solar ELCC in summer months is contributing to a more constrained RA market in summer.



RA Reform and Slice of Day

- Intent of RA Reform: Minimize customer cost, meet hourly reliability needs, be adaptable to a changing grid.
- Full implementation starts with compliance year 2025.
- Under Slice of Day, RA obligations based on EBCE's hourly share of CAISO load for the “worst day” of each month.

Example:



RA - Reliability Procurement Mandates

- Three CPUC procurement orders
- Incremental capacity to be procured from resources such as solar, wind, storage, hybrid, geothermal, demand response.

	Near-Term Reliability	Mid-Term Reliability	Supplemental Mid-Term Reliability
Compliance Term	2021-2023	2023-26	2026-27
Total Procurement (MW NQC)	3,300	11,500	4,000
EBCE Requirement (MW)	99.6	418	136
Penalty	none	Cost of New Entry	Cost of New Entry

Compliance with Renewable Portfolio Standard

What is Renewable Portfolio Standard (RPS)?

- Key program for building more renewable energy facilities
- Sets increasing renewable energy purchase requirements for CA Load-Serving Entities
- Must be procured from RPS-eligible facilities
- Targets verified on multi-year period rather than annually

CP#	CP4				CP5			CP6		
Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
RPS %	36%	39%	41%	44%	47%	49%	52%	55%	57%	60%

Renewable Energy Credits and Portfolio Content Category Classifications

Renewable Energy Credits (RECs):

- Represent clean energy attributes of renewable electricity
- Each REC is equivalent one MWh of renewable electricity generated
- Limitations to the amount that each group can count towards RPS requirements
- Classified into three distinct categories Portfolio Content Categories (PCC)

PCC 1	Energy and REC are from same source and delivered into a California Balancing Authority (CBA) without any substitution
PCC 2	Substitute Energy not from the same source as REC
PCC 3	Electricity Products Not Qualified as PCC 1 or PCC 2, Including Unbundled RECs

RPS Compliance vs Power Content Reporting

RPS Compliance

- Multi-year compliance periods with annual reporting requirements
- Minimum required percent of electricity from designated renewable energy resources

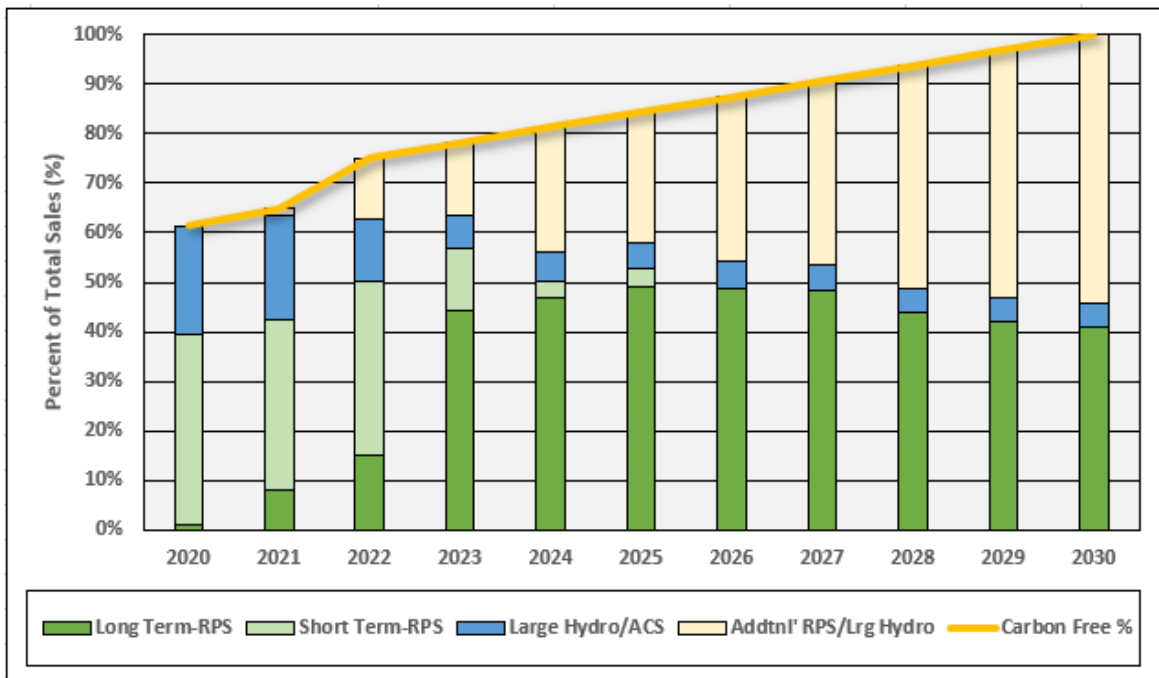
VS.

Power Content

- Annual requirement, for 1 calendar year of purchases
- Detailed breakdown on sources of energy used to provide electricity
- Resembles a nutrition label

Long-Term Renewable Procurement

- The chart below is renewables plus large hydro as a percent of sales through 2030
- Shows long- and short-term renewables, large hydro contracted to date with the additional Carbon-free or renewable purchases needed to reach annual goals



Emissions Reporting

- EBCE reports annual emissions through the Power Source Disclosure Report
 - Emissions Factor is calculated as lbs CO₂e/MWh for power purchased from emitting sources, or unspecified power
 - Annual emissions for purchased power is shared with customers every year on the Power Content Label

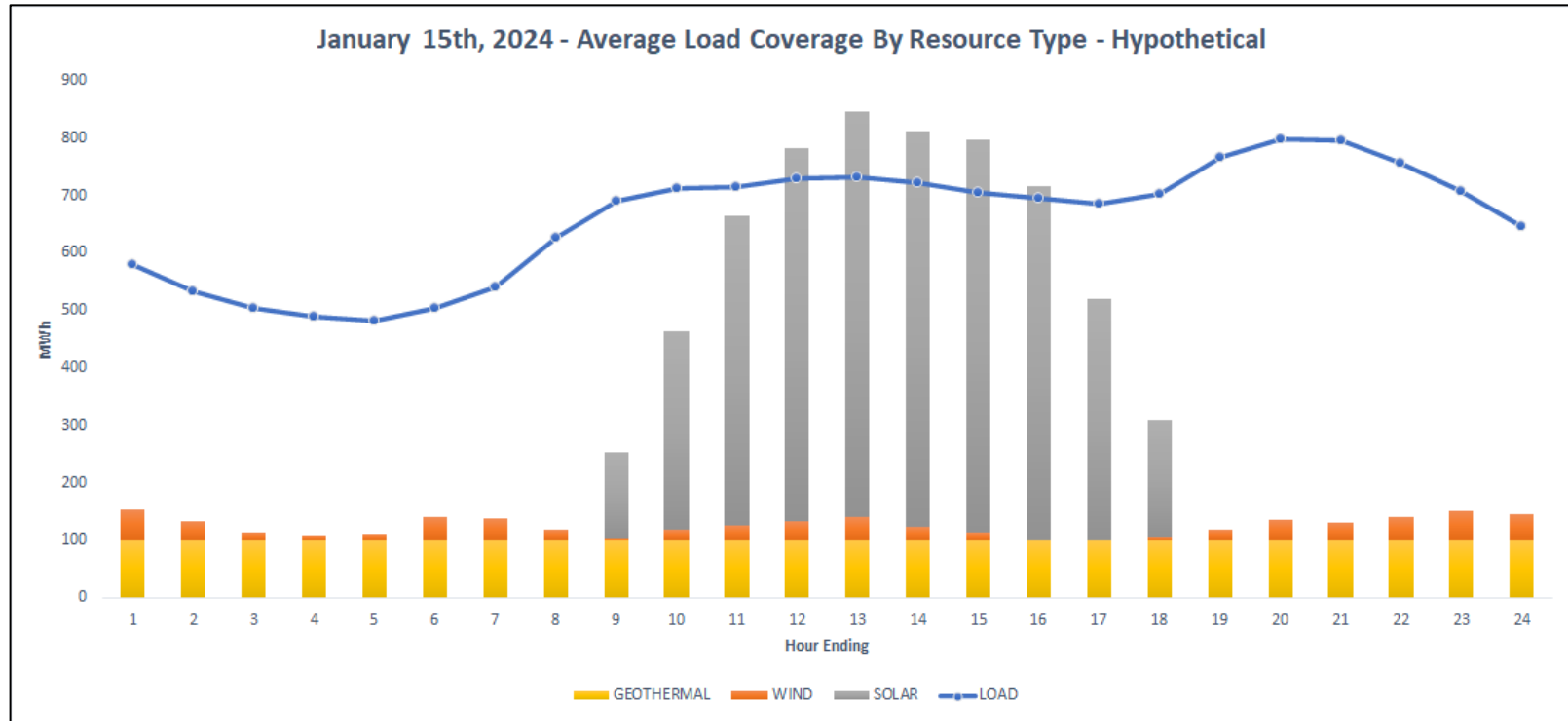
2021 POWER CONTENT LABEL								
East Bay Community Energy								
ebce.org/documents-and-resources								
Greenhouse Gas Emissions Intensity (lbs CO ₂ e/MWh)				Energy Resources	Renewable 100	Brilliant 100	Bright Choice	2021 CA Power Mix
Renewable 100	Brilliant 100	Bright Choice	2021 CA Utility Average	Eligible Renewable ¹	100.0%	35.8%	42.3%	33.6%
0	0	564	456	Biomass & Biowaste	0.0%	0.0%	0.5%	2.3%
				Geothermal	0.0%	0.0%	0.0%	4.8%
				Eligible Hydroelectric	0.0%	0.0%	0.2%	1.0%
				Solar	50.0%	17.9%	19.0%	14.2%
				Wind	50.0%	17.9%	22.6%	11.4%
				Coal	0.0%	0.0%	0.0%	3.0%
				Large Hydroelectric	0.0%	64.2%	15.9%	9.2%
				Natural Gas	0.0%	0.0%	0.0%	37.9%
				Nuclear	0.0%	0.0%	1.7%	9.3%
				Other	0.0%	0.0%	0.1%	0.2%
				Unspecified Power ²	0.0%	0.0%	40.0%	6.8%
				TOTAL	100.0%	100.0%	100.0%	100.0%
				Percentage of Retail Sales Covered by Retired Unbundled RECs ³ :		0%	0%	0%
<p>¹The eligible renewable percentage above does not reflect RPS compliance, which is determined using a different methodology.</p> <p>²Unspecified power is electricity that has been purchased through open market transactions and is not traceable to a specific generation source.</p> <p>³Renewable energy credits (RECs) are tracking instruments issued for renewable generation. Unbundled renewable energy credits (RECs) represent renewable generation that was not delivered to serve retail sales. Unbundled RECs are not reflected in the power mix or GHG emissions intensities above.</p>								
For specific information about this electricity portfolio, contact:					East Bay Community Energy 1-833-699-EBCE (3223)			
For general information about the Power Content Label, visit:					http://www.energy.ca.gov/pcl/			
For additional questions, please contact the California Energy Commission at:					Toll-free in California: 844-454-2906 Outside California: 916-653-0237			

SECTION 4:

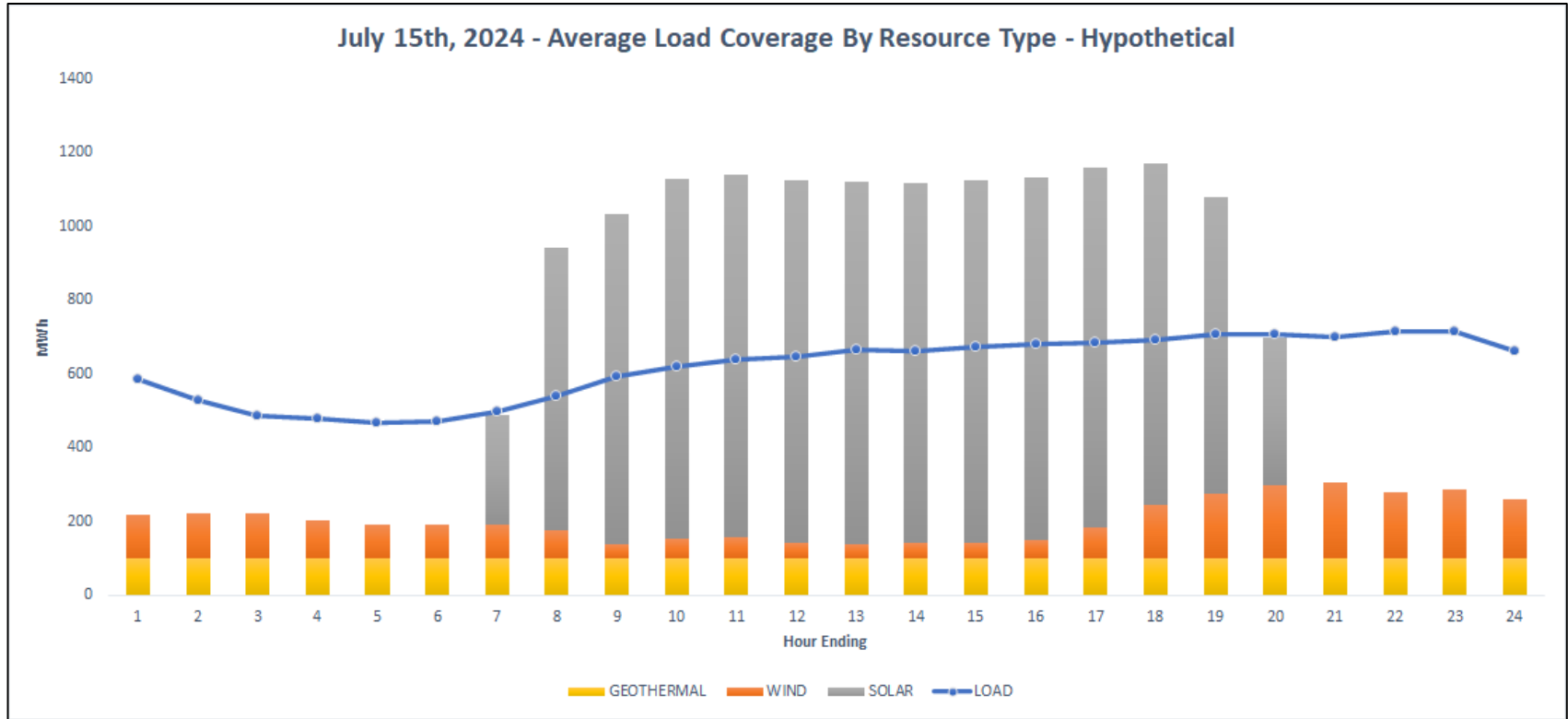
How do we build a
clean energy
portfolio?



Hypothetical Future January

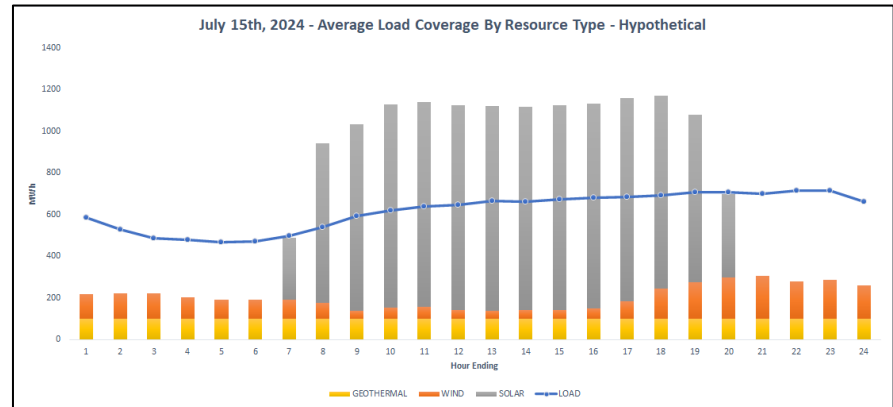
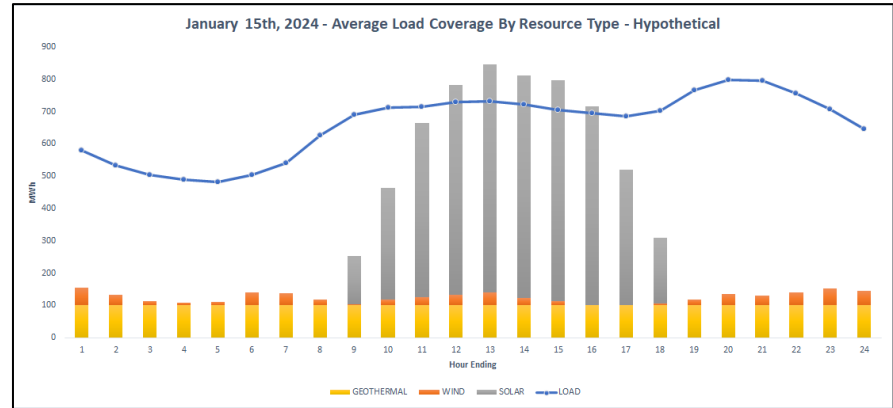


Hypothetical Future July



Step 1: Needs Assessment

- Demand forecast
 - Peak vs average monthly loads
- Quantity Compliance Requirements
 - RPS
 - RA
- Other EBCE-goals
- Market Dynamics
 - Open position
 - Market price exposure
- Risk Management
 - Hedge strategies
 - Finance-ability of transactions



Step 2: Prioritization & Valuation

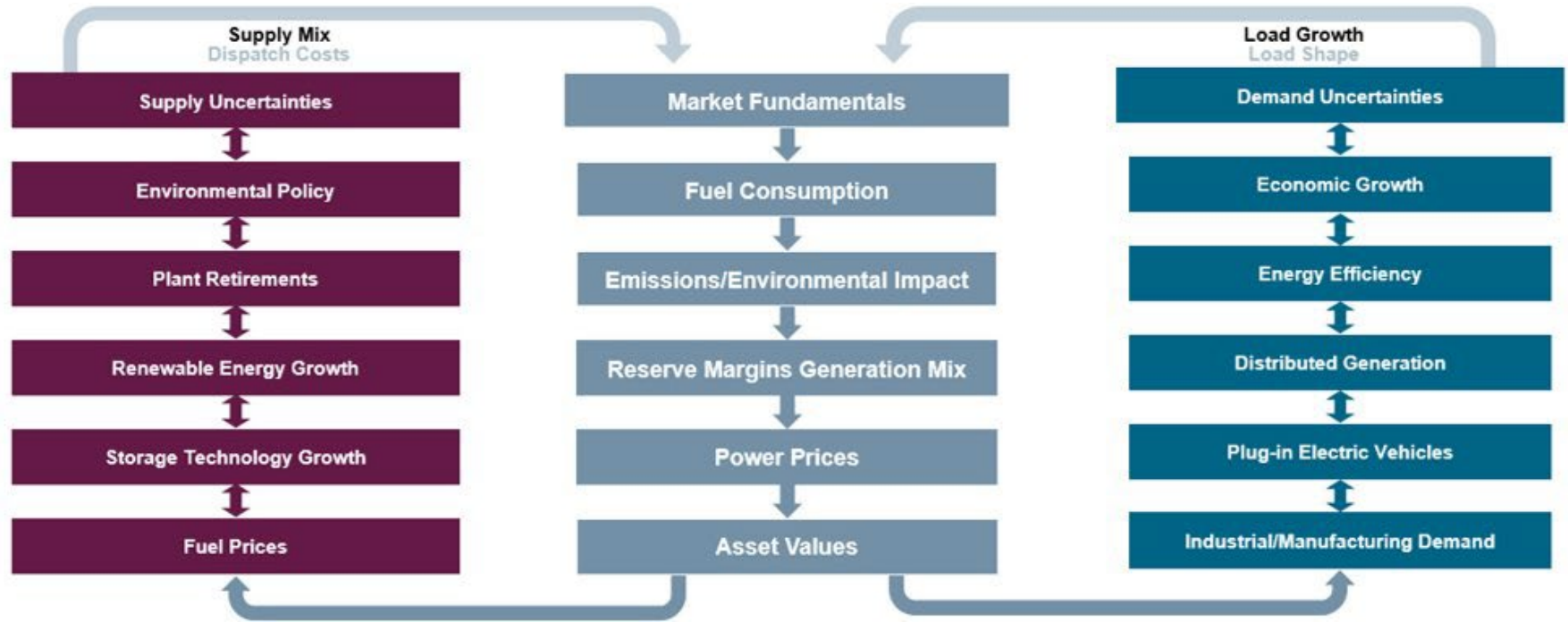
Prioritization

- Compliance Requirements
 - RPS
 - RA
- Market Dynamics
 - Open position
 - Market price exposure
- Risk Management
 - Hedge strategies
 - Finance-ability of transactions
- Other EBCE goals

Valuation

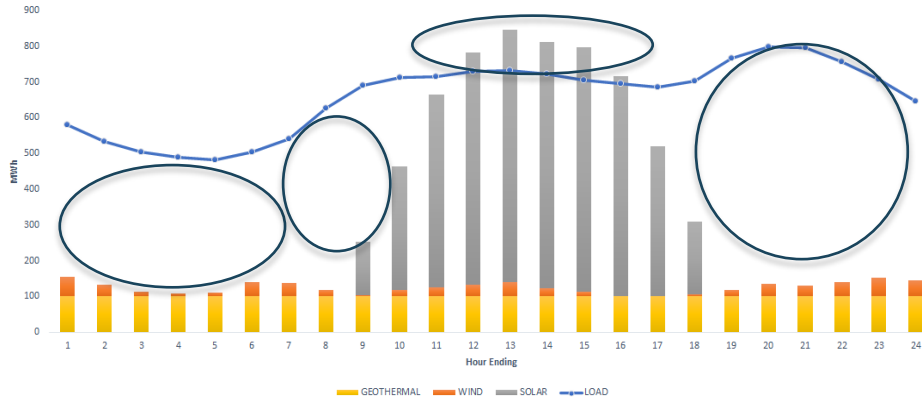
- Quantitative Inputs
 - Forward Curve Development (Energy, RA, RPS)
 - Estimated Value of Location
 - Others
- Qualitative Inputs
 - Open position risk (+ or -)
 - Credit terms & seller creditworthiness
 - Counterparty concentration
 - Project risk/ability to construct in a timely manner
 - Environmental considerations

Key Market Drivers

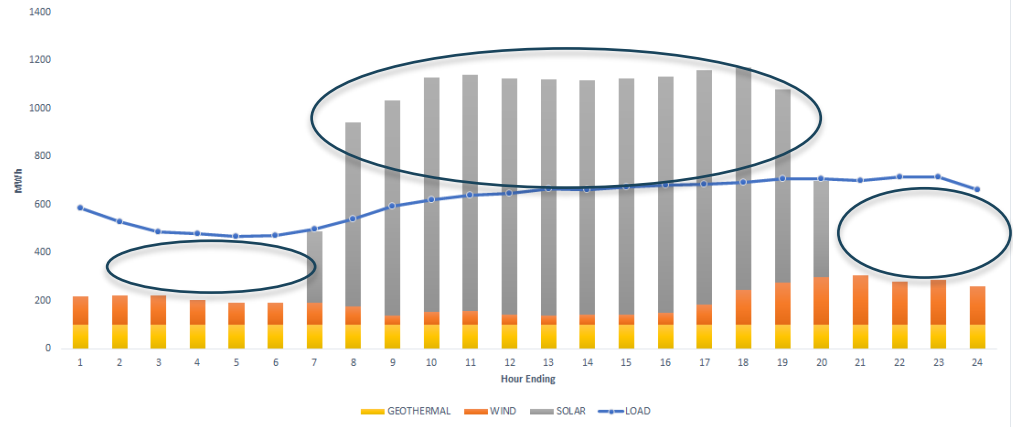


Step 3: Define Eligible Products

January 15th, 2024 - Average Load Coverage By Resource Type - Hypothetical

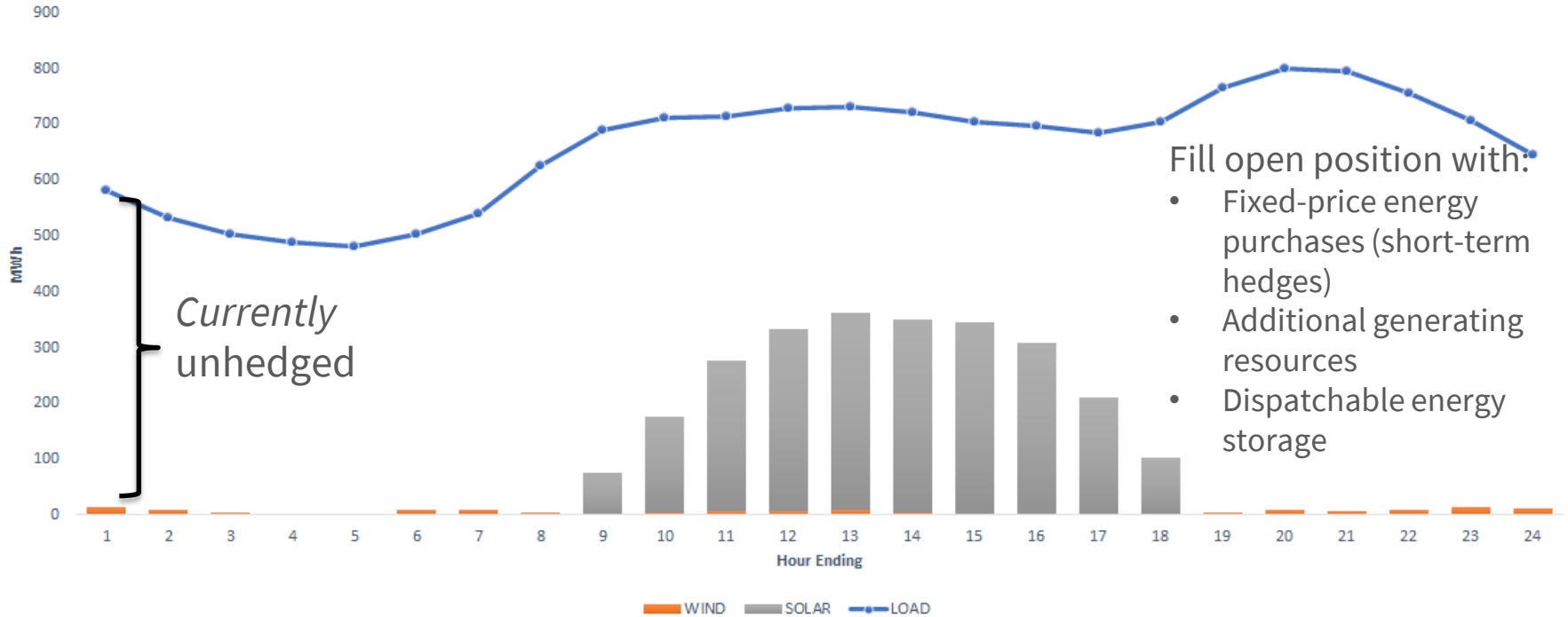


July 15th, 2024 - Average Load Coverage By Resource Type - Hypothetical



Example: “un-hedged” January, 2024

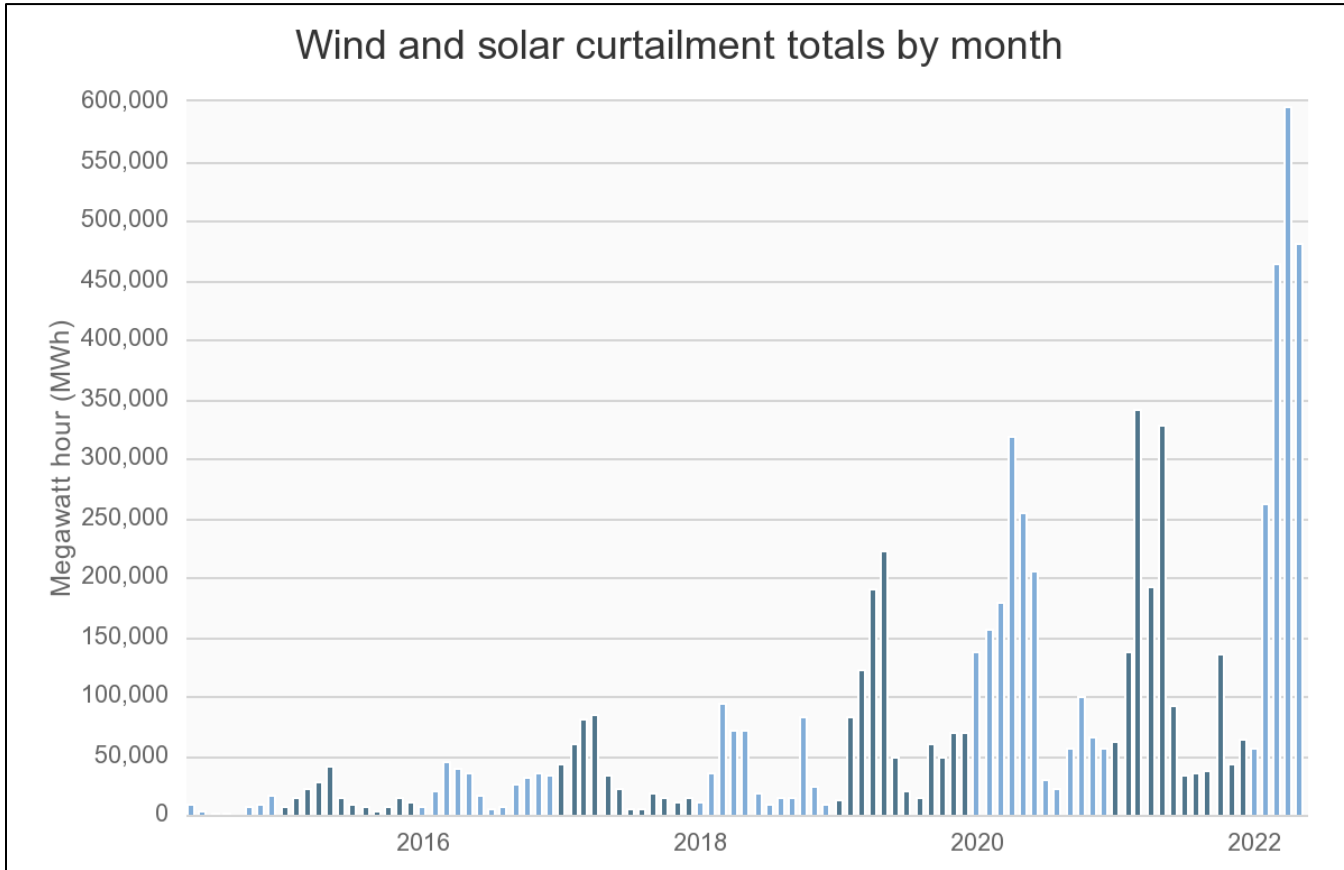
January 15th, 2024 - Average Load Coverage By Resource Type



Fill open position with:

- Fixed-price energy purchases (short-term hedges)
- Additional generating resources
- Dispatchable energy storage

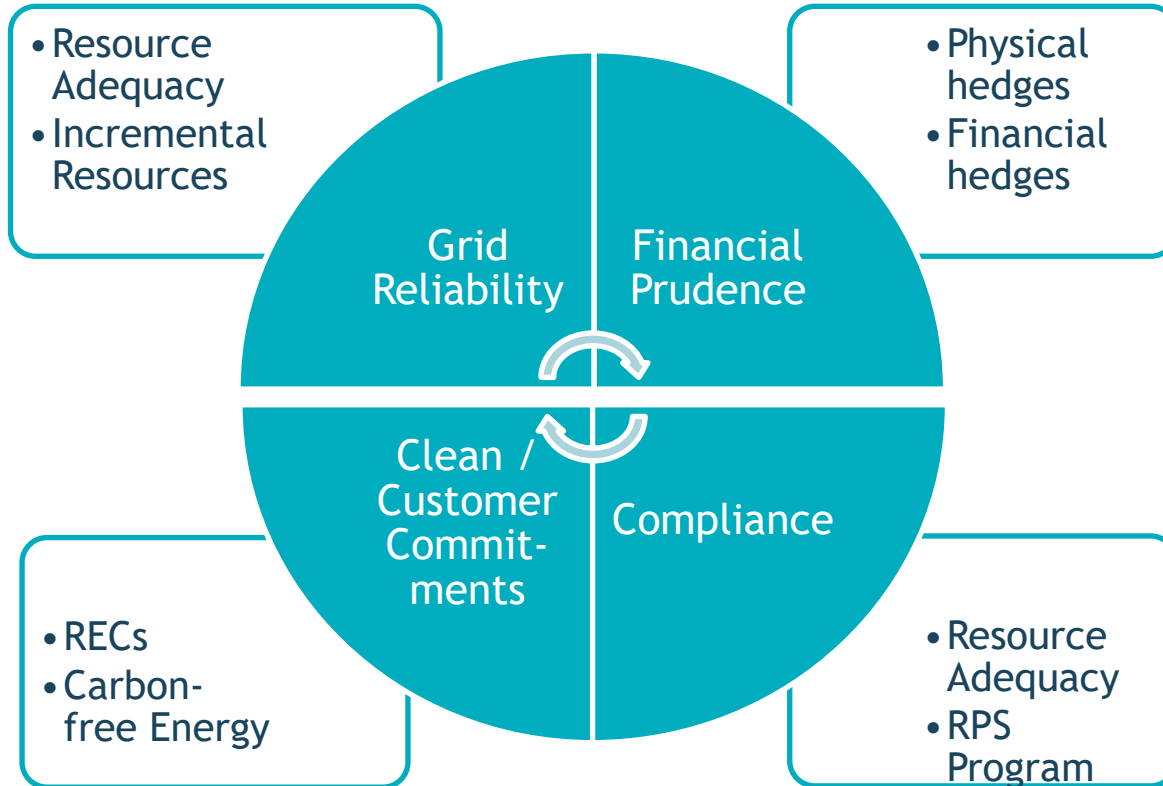
CAISO Wide Curtailment



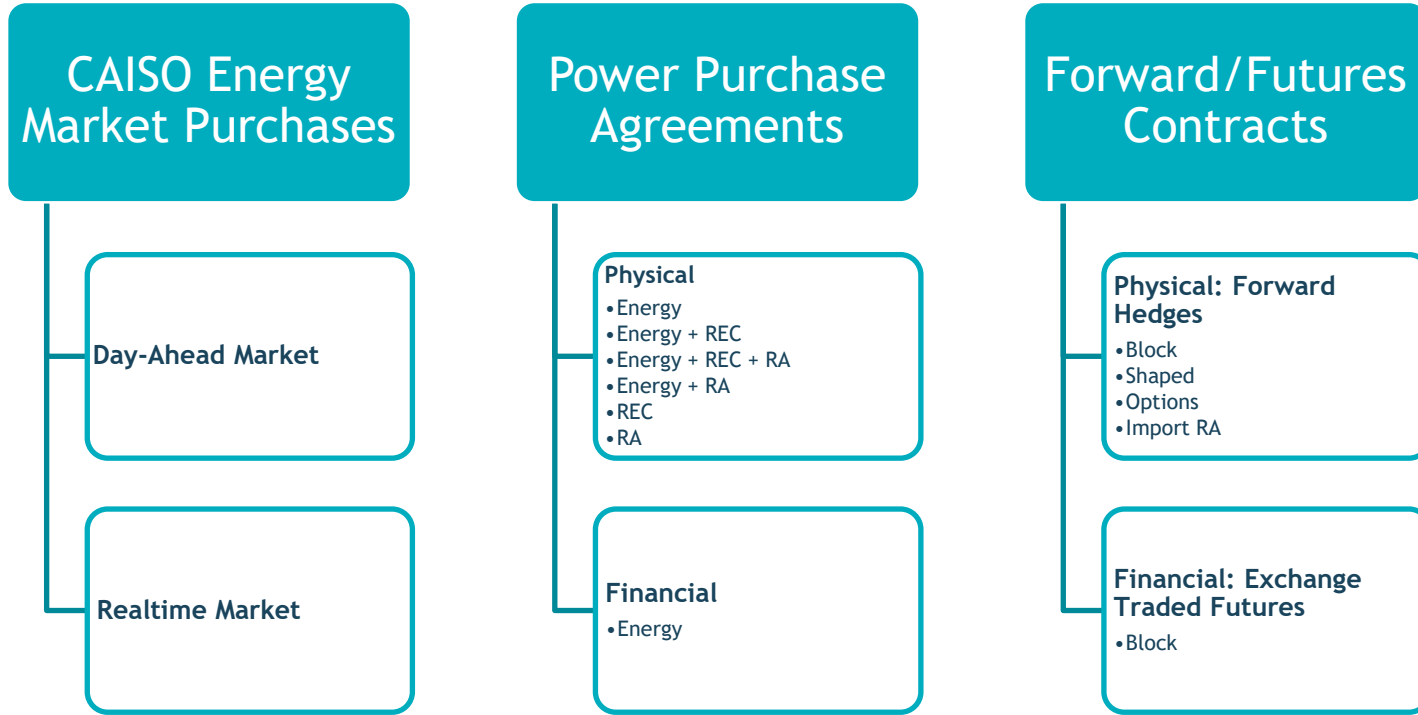
Step 4: Go-to-Market

- Identify Product
- Develop Timeline
- Market/Seller Outreach
- Evaluate Offers
- Negotiate
- Calculate final, proposed notional values
- Execute Agreements

EBCE Priorities



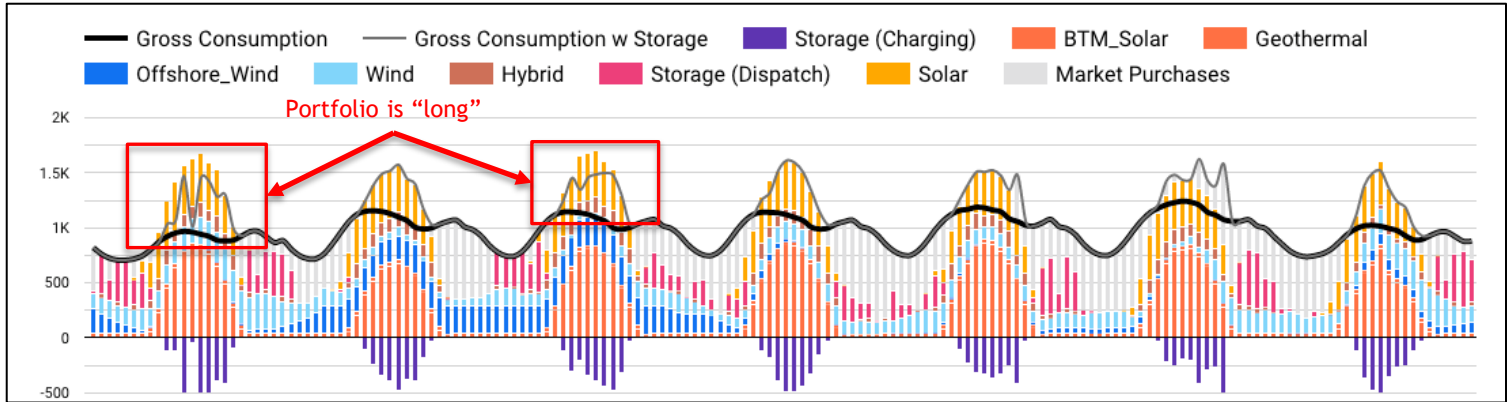
Roles of Different Hedge Products



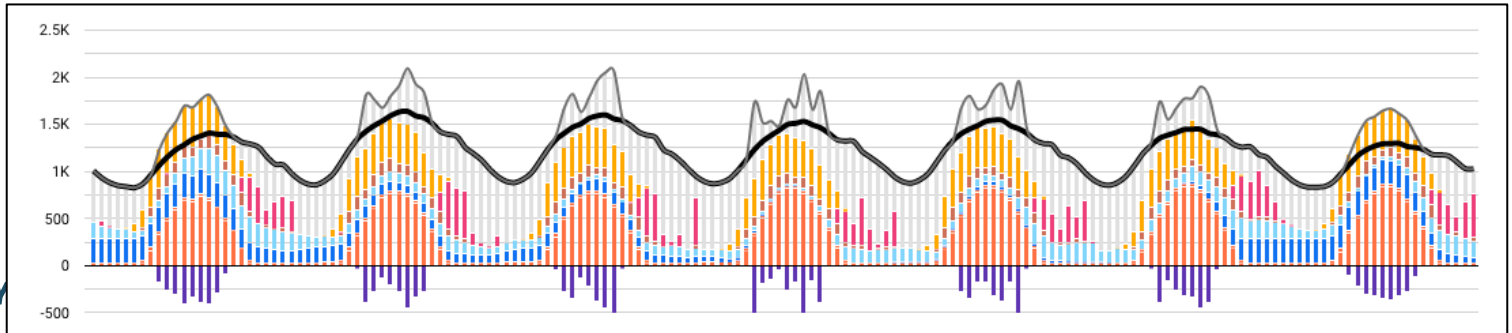
Example Portfolio - Market Exposure

Modeling exhibits a preference for portfolios that, on average, limit EBCE's sales of excess electricity into the market. This leads to periods of market reliance in "high load" months to limit exposure to low / negative prices in "lower load" months

Sample week
- April 2030



Sample week
- July 2030



Risk Management

Development

Performance

Volume

Profile

Basis

Credit

Balancing

Price

Length of
Contract

Change in
Law

Compliance

Force
Majeure

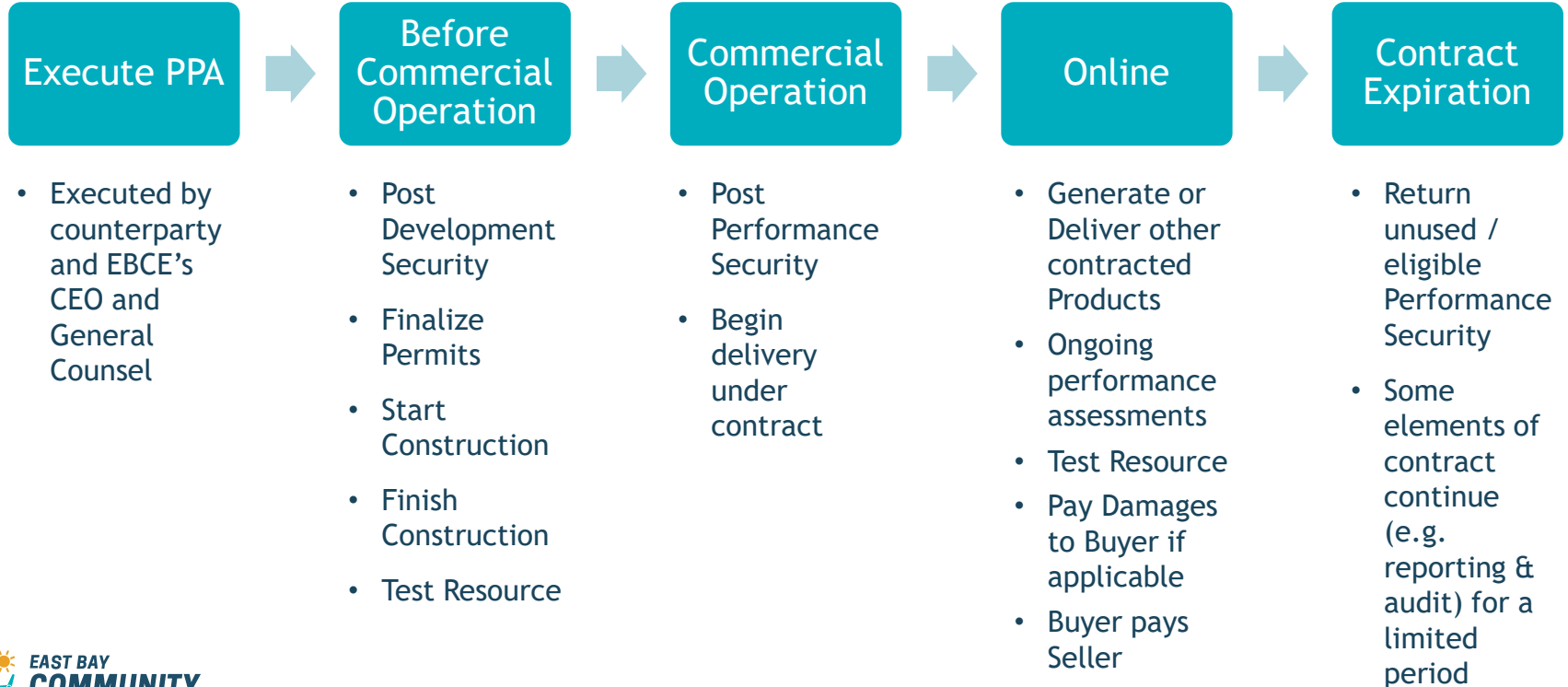
SECTION 5:

Contract & Project Lifecycle



Long-Term Contract Lifecycle

After contract negotiation & EBCE Board approval...



Common Challenges in Long-Term Offtake

Before Project is Online:

- Finalizing permits
- Interconnection
- Securing all materials to begin construction
 - Anti-circumvention
 - Supply Chain disruption
 - Delays at ports
- Construction “surprises”

During Delivery Term:

- Generation/weather impact on performance
- Curtailment of Energy
- Outages (Planned or Forced)
- Equipment failures (“lemons”)

Financial Performance:

- Resource location is “congested”
- Changes to CAISO model make resource location less valuable
- Event based changes to energy value (gas, weather, build-out)

Summary: EBCE's Current Long-Term Portfolio

Developer	Project	Tech	Size (MW)	Online Date	Term (Years)
Clearway	Golden Fields	Solar	112	Dec. '20	15
Greenbacker	SHWEC	Wind	58	July '21	20
Pattern	Tecolote	Wind	100	Dec. '21	10
Convergent	Henrietta D	Battery Storage	10, 4-hr	Dec. '21	15
Idemitsu	Tulare Solar	Solar	56	April '22	15
Clearway	Daggett 3	Solar + Storage	50 (12.5, 4-hr)	Aug. '23	15
EDP Renewable	Scarlet	Solar + Storage	100 (30, 4-hr)	Dec. '23	20
Intersect Power	Oberon	Solar + Storage	125 (125 RA only)	Dec. '23	15
LS Power	Tumbleweed	Battery Storage	50, 4-hr	June '24	15
Nextera	Kola	Battery Storage	125, 4-hr	April '25	20
Fervo Energy	FEC Nevada 1	Geothermal	40	June '26	15

Questions & Discussion

Acronym Key

Acronym Definition

ACS	Asset-Controlling Supply
CAISO	California Independent System Operator
CEC	California Energy Commission
CPUC	California Public Utilities Commission
DR	Demand Response
ERRA	Energy Resource Recovery Account
IOU	Investor-Owned Utility
IRP	Integrated Resource Plan
LSE	Load-Serving Entity
NCPA	Northern California Power Agency
NQC	Net Qualifying Capacity
PCIA	Power Charge Indifference Adjustment
PCL	Power Content Label
PPA	Power Purchase Agreement
PDR	Proxy Demand Response
RA	Resource Adequacy
REC	Renewable Energy Credit
RPS	Renewable Portfolio Standard
SQMD	Settlement Quality Meter Data
ADS	Automated Dispatch Signal
APN	Aggregated Pricing Node
COB	California-Oregon Border
CRR	Congestion Revenue Rights
CS	Community Solar
CUP	Conditional Use Permit
DA	Direct Access
DAC	Disadvantaged Community
DLAP	Default Load Aggregation Point
DLC	Departing Load Charges
DRAM	Demand Response Auction Mechanism
EFC	Effective Flexible Capacity
ELCC	Effective Load Carrying Capacity

Acronym Definition

EPE	Electric Power Entity
FTR	Firm Transmission Rights
GEP	Guaranteed Energy Production
GT	Green Tariff
HLH	High Load Hour
ICE	Intercontinentals Exchange
IEPR	Integrated Energy Policy Report
IST	Inter-SC Trades (Inter-Scheduling Coordinator Trades)
LCOE	Levelized Cost of Electricity
LHL	Low Load Hour
LMP	Locational Marginal Price
LSE	Load Serving Entity
Mid-C	Mid-Columbia (located at Washington-Oregon border)
MRTU	Market Redesign and Technology Upgrade
NERC	North America Electric Reliability Corporation
NOB	Nevada-Oregon Border
NP	CAISO Zone (standing for Northern Path)
OCEI	Oakland Clean Energy Initiative
OTCGH	OTC Global Holdings
Pnode	Pricing node
POU	Public-Owned Utility
PSDR	Power Source Disclosure Report
PTO	Participating Transmission Owner
RTO	Regional Transmission Organizations
SC	Scheduling Coordinator
SP	CAISO Zone (standing for Southern Path)
TO	Transmission Owner
UIE	Uninstructed Imbalance Energy
WAPA	Western Area Power Administration
WECC	Western Electricity Coordinating Council
WREGIS	Western Renewable Energy Generation Information System