



How California Benefits from Demand Response

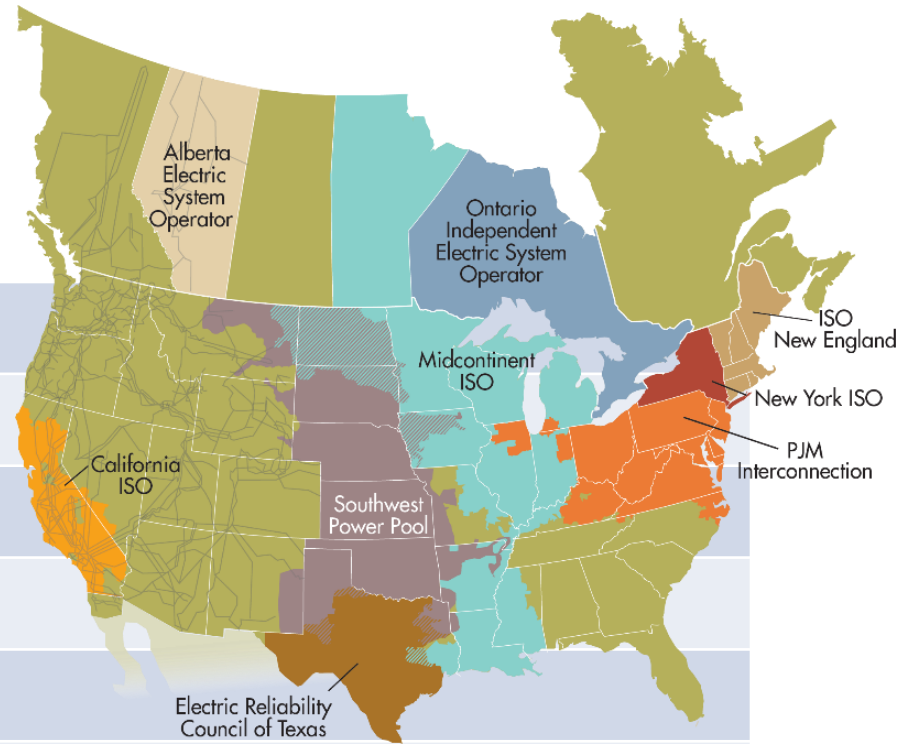
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March 6, 2024 ISO NE Consumer Liaison Group (CLG) meeting

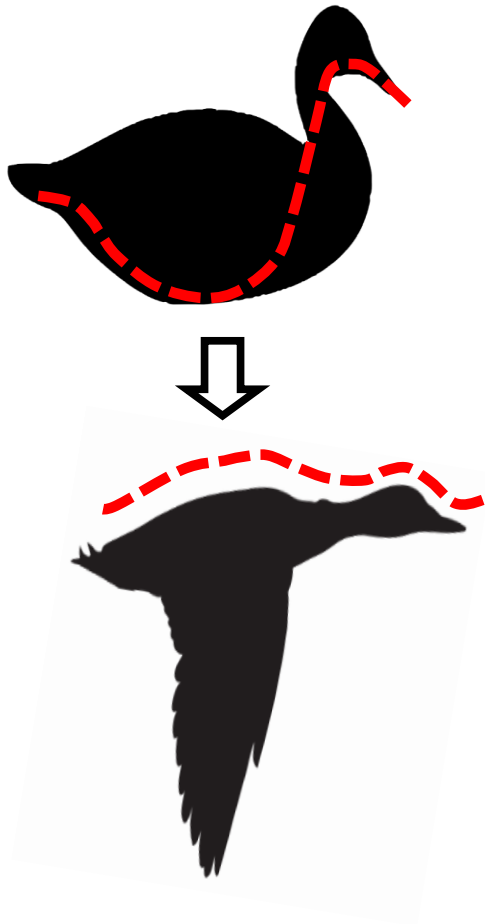
CAISO manages the high-voltage electric grid and wholesale energy market for California and a portion of Nevada

Set on 9/6/22 during Summer 2022 Heat Wave Event



CAISO Statistics	
52,061 MW	Record peak demand
75,747 MW	Power plant capacity
32 million	People Served
One of 9	ISO/RTOs in North America
One of 39	Balancing Authorities in the Western Interconnection
10	States in which Western Energy Imbalance Market operates
42 BAs/TOPs	Receiving reliability coordinator services from CAISO's RC West

Demand Flexibility can create a more favorable load shape and operationally sustainable grid – getting the duck to fly



Respond consistent with grid conditions
(reduce/consume)

- Consume more
 - Mitigate over-generation
 - Minimize renewable curtailment
- Reduce net peak demand
 - Smooth steep ramps
 - Lower cost to serve during high demand
- Balance with intermittent and variable energy resources
 - Manage variability

Industry wide collaboration incentivizes demand flexibility to achieve a cost-effective, low carbon grid

Wholesale	Retail	Legal/Regulatory
Technology agnostic market participation models that allow large, small, and aggregate resources to participate	Grid informed time-variant and dynamic rates (TOU, RTP)	Electrification goals and mandates designed to create a sustainable and efficient grid
Market structures that reward flexibility and minimize uncertainty	Critical peak and critical consumption pricing periods	Grid harmonized building codes and appliance standards
Regional markets that leverage diversity and generate operational efficiencies	Load management programs that reward favorably shifting and shaping energy use	Retail markets, structures that create resiliency, grid-informed price signals, and low-friction energy exchange

CPUC Decision 14-03-026 – March 27, 2014

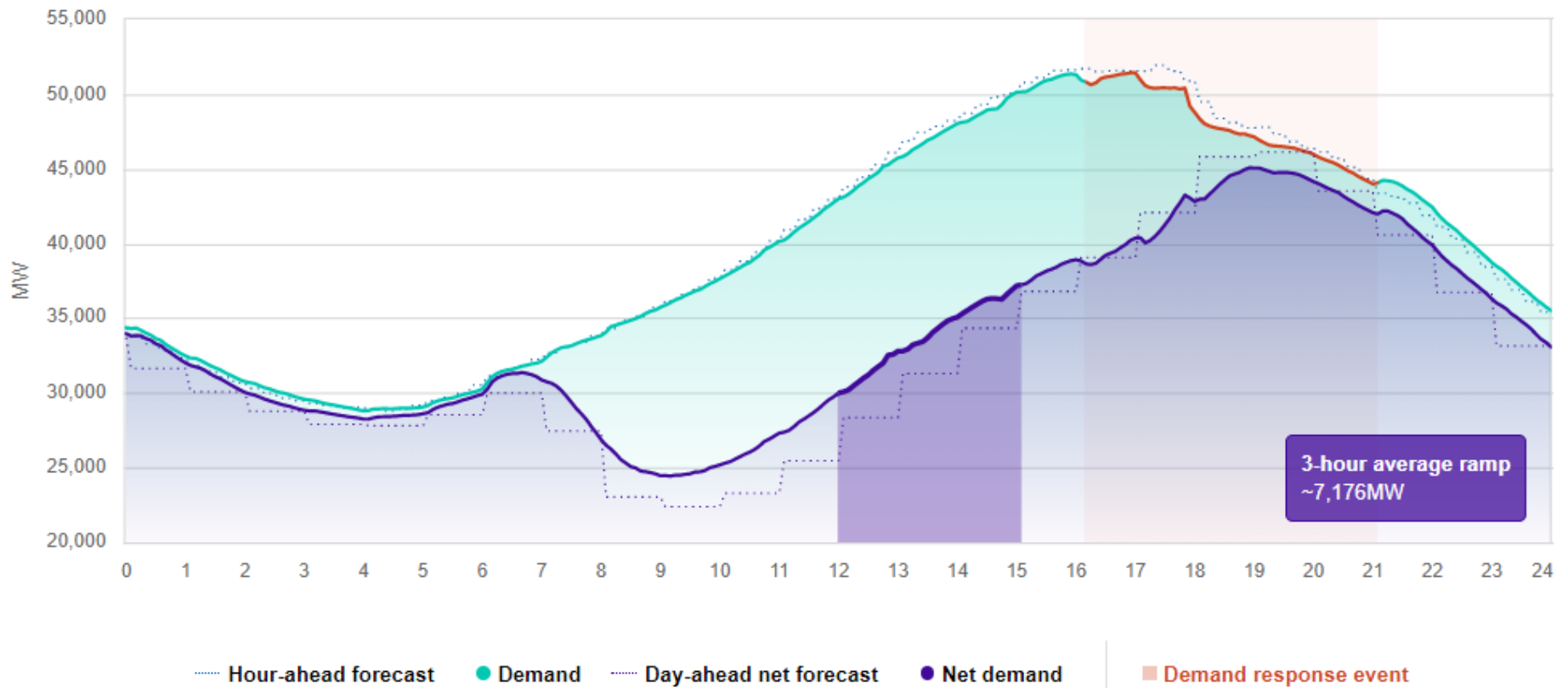
-Beginning of Market Integrated Demand Response

- Order enhanced the role of DR in meeting the state's resource planning needs and operational requirements by bifurcating the state's DR programs:
 - 1. Load-Modifying Resources**
 - 2. Supply-Side Resources**
- Supply-side resources are competitively bid and integrated into CAISO's energy markets
 - Receive an RA credit/capacity payment for each month it is available "to be called upon"; penalized if the resource does not show up

CAISO Supply-Side Demand Response Programs

Program	Services Provided	Market Dispatch	Description
Proxy Demand Response (PDR)	Energy, spin, non-spin, residual unit commitment	Economic day-ahead and real-time	Bids into the CAISO markets as supply; counts towards RA
Reliability Demand Response Resource (RDRR)	Energy	Economic day-ahead, reliability real-time	Bids into the CAISO markets as supply; used for reliability purposes and triggered by emergency conditions; counts towards RA

September 6, 2022: No outages (thanks to conservation and demand response)



Emergency Load Reduction Program (ELRP)

ELRP Background

- The California Public Utilities Commission (CPUC) is a regulatory agency that oversees investor-owned utilities (IOUs) in California
 - The CPUC ensures its jurisdictional load serving entities procure sufficient resources, including demand response and energy efficiency.
- The CPUC approved the creation of the Emergency Load Reduction Program (ELRP) as a pilot program for 2021-2025 as a result of the 2020 outages.
- **ELRP is an out of market emergency demand response program intended to incentivize load reduction not already participating in other programs. It is administered by the 3 IOUs.**
- ELRP was implemented summer 2021 and refinements were made for summers 2022 and 2023

ELRP Structure

- Out of wholesale market (on distribution side)
- Pilot 2021-2025
- Can be called May-October, any day, 4-9pm
- Activated by the IOUs based on CAISO grid conditions
- Metered and compensated by IOUs at a rate of \$2000/MWh; no market settlement
- No penalty for nonperformance
- About 300 MW registered in 2023

ELRP Structure

Who can participate in ELRP?

- Non-residential customers and aggregators
- Exporting DERs (non-residential)
- Virtual Power Plants (VPP)
- Vehicle-Grid-Integration (VGI) aggregators
- Residential customers

- CAISO Proxy Demand Response (PDR) resources
 - *Only if* incremental to CAISO dispatch

ELRP Structure (subgroups with min dispatch guarantee)

Group	Description	Notes
A.1	Non-residential customers	
A.2	Non-residential aggregators	Guaranteed 10hr dispatch
A.3	Exporting DERs	
A.4	Virtual Power Plants (VPP)	Guaranteed 20hr dispatch
A.5	Vehicle-Grid-Integration (VGI)	Guaranteed 30hr dispatch
A.6	Residential ELRP	
B.1	PDR: Third-party providers	Only compensated for load drop beyond CAISO dispatch
B.2	PDR: IOU Capacity Bidding Programs (CBP)	Only compensated for load drop beyond CAISO dispatch

Demand-Side Grid Support (DSGS)

DSGS Background

- The California Energy Commission (CEC) is a state agency that advances state energy policy and planning
- In 2022, state legislation created the DSGS program to compensate eligible customers for upfront capacity commitments and per-unit reductions in energy load during extreme events
- Like ELRP, DSGS is an out of market emergency demand response program intended to incentivize load reduction not already participating in other programs
- The CEC implemented DSGS in summer 2022 and refinements were made for summer 2023
- DSGS targets publicly-owned utilities, not under the jurisdiction of the CPUC, customers with backup generation, and water agencies

DSGS Structure

- Out of wholesale market
- Can be called May-October, any time
- Activated by utilities based on CAISO grid conditions or CAISO market prices for some participation options
- Metered and compensated by CEC at a rate of \$2000/MWh; some participation eligible for standby payments; no market settlement
- No penalty for nonperformance
- About 200 MW registered in 2023

DSGS Structure

Who can participate in DSGS?

- Non-residential customers and aggregators
- Residential customers
- Water agencies
- Virtual Power Plants (VPP)
- Behind the meter battery storage

- CAISO Proxy Demand Response (PDR) resources
 - *Only if* incremental to resource adequacy shown to the CAISO

ELRP/DSGS Out of Market Emergency Alert Triggers

Emergency Alerts: Trigger Events for ELRP and DSGS demand response

Emergency Levels	Demand Response Operational Actions	Business Rules
Flex Alert/Day-ahead EEA Watch	ELRP Residential - Day Ahead activation	A Flex Alert is a call to consumers to voluntarily conserve electricity when the ISO anticipates energy supply may not meet high electricity demand. Can be multi-day events, but generally for specific hours (i.e. 1600 – 2100, not for 24 hour period)
EEA Watch (Day-ahead or Day-of)	ELRP Non-residential, non-backup generation (BUG) DSGS, non BUGs <u>Note:</u> some DSGS options trigger based on high CAISO day-ahead market prices RDRR – enabled in market or forced dispatch	Generally issued day ahead by 1500 for the next day for specific hours (forecasted deficiencies) <u>Note:</u> The ISO generally issues Flex Alert and EEA Watch notices in the day-ahead timeframe, but may issue Flex Alert and EEA Watch notices earlier or day-of depending on system conditions
EEA 1	RDRR – forced dispatch if not market dispatched	Issued day-of for specific hours (future hours with forecasted deficiencies). Real-time analysis shows all resources are in use or committed for use, and energy deficiencies are expected. Consumers are encouraged to conserve energy
EEA 2	ELRP and DSGS BUGs	Issued day-of for specific hours – CAISO requests emergency energy from all resources and has activated emergency energy programs. Consumers are urged to conserve energy to help preserve grid reliability

Questions?



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