Western Regional Energy Landscape

Adam Schultz
Manager, Regional Coordination

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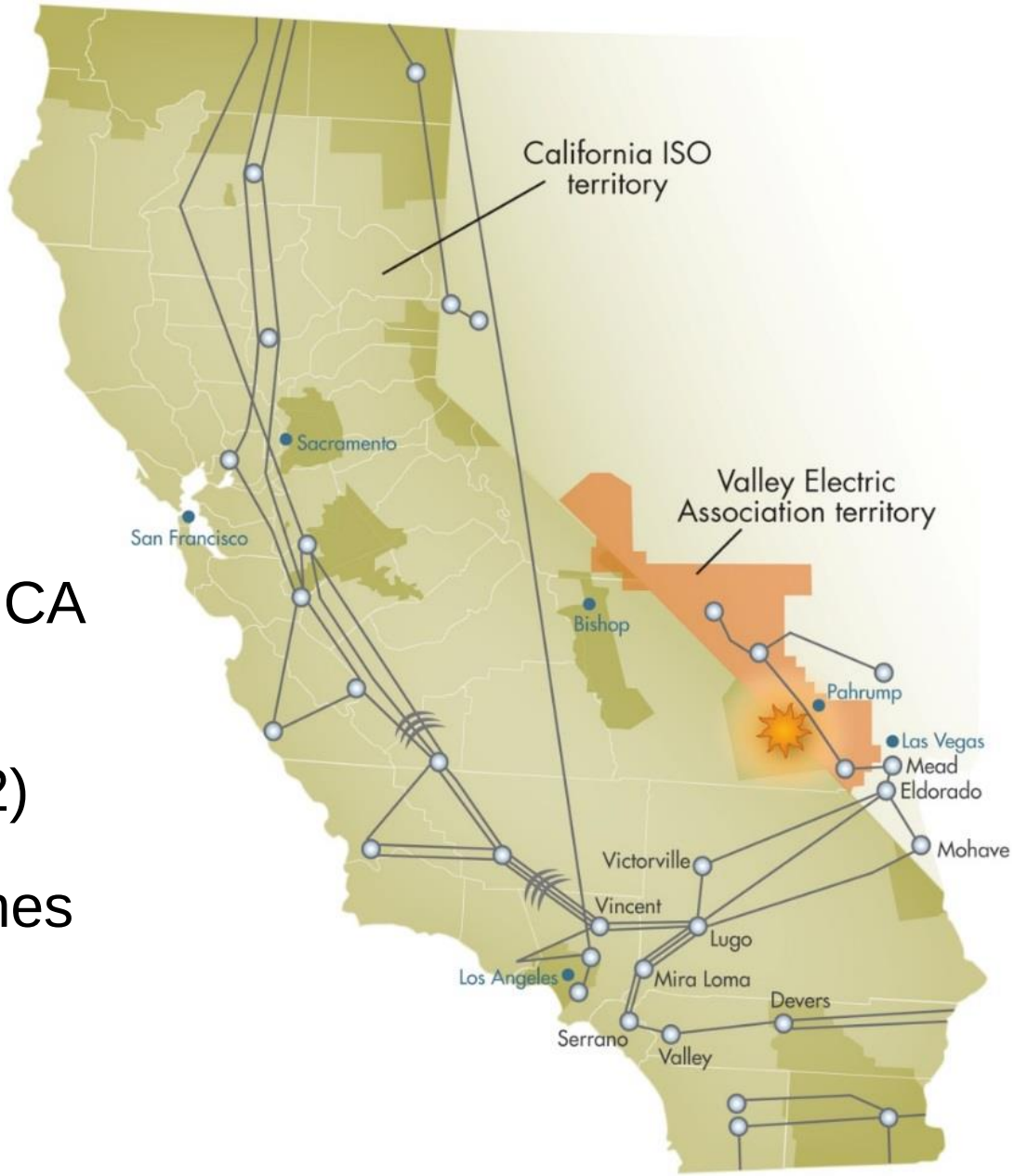
Some facts about CAISO

- Established in **1998**.
- Based in Folsom, CA.
  - 650 employees
- Serving **30** million people and **80%** of CA and part of Nevada.
- **52,061** MW peak demand (Sept. 2022)
- **25,685** circuit-miles of transmission lines
- **27,000** market transactions per day



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CAISO Core Functions

Within CAISO balancing authority area:

- Maintains reliability on the grid
  - Balances supply and demand
  - Manages the flow of energy
  - Maintains operating reserves
- Oversees the transmission planning process
- Operates the wholesale electric market

For much of the western interconnection:

- Operates the Western Energy Imbalance Market (WEIM)
- Serves as Reliability Coordinator (RC West)

Today's electric grid is mostly operated by independent system operators (ISO/RTOs)

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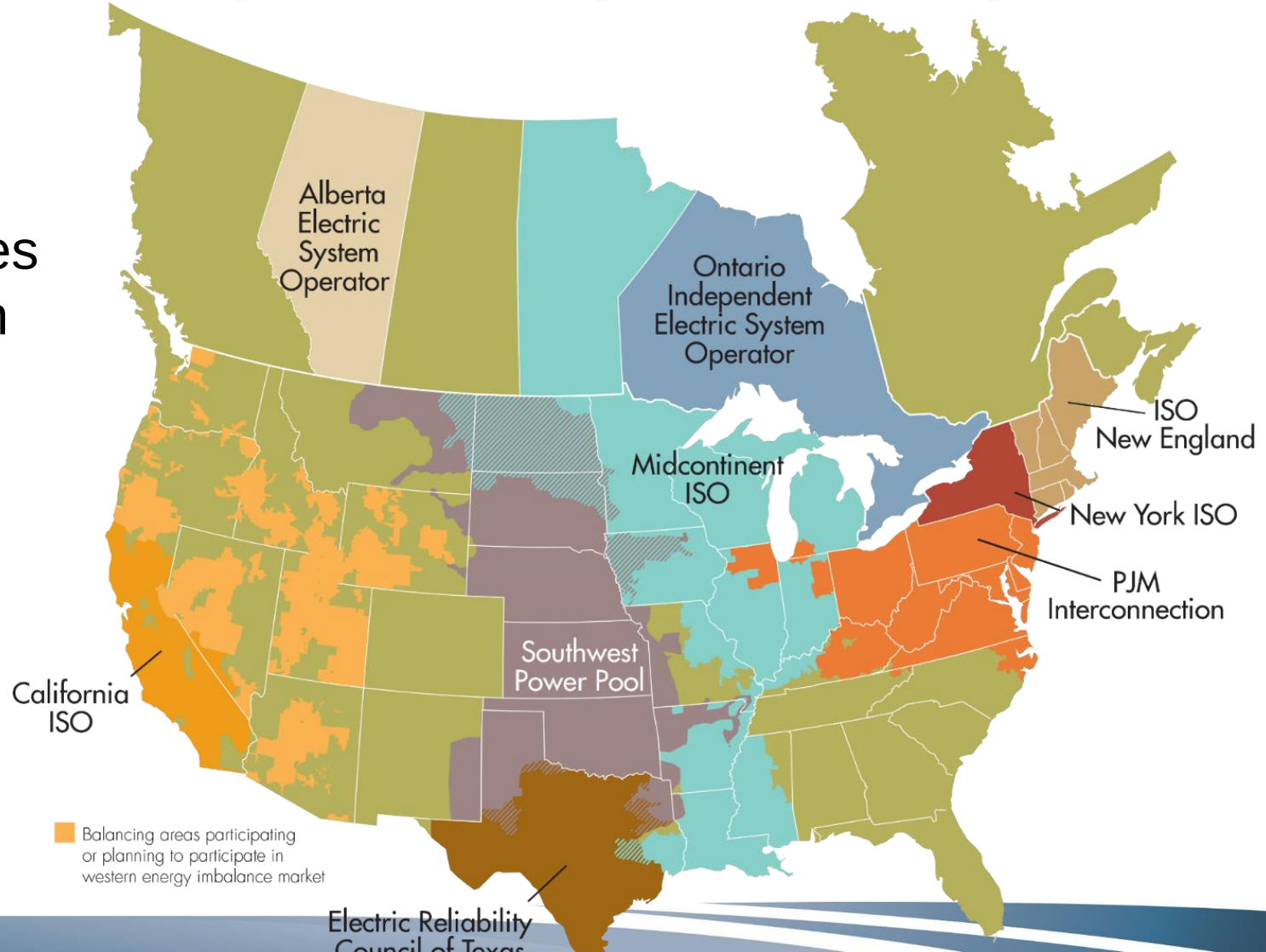
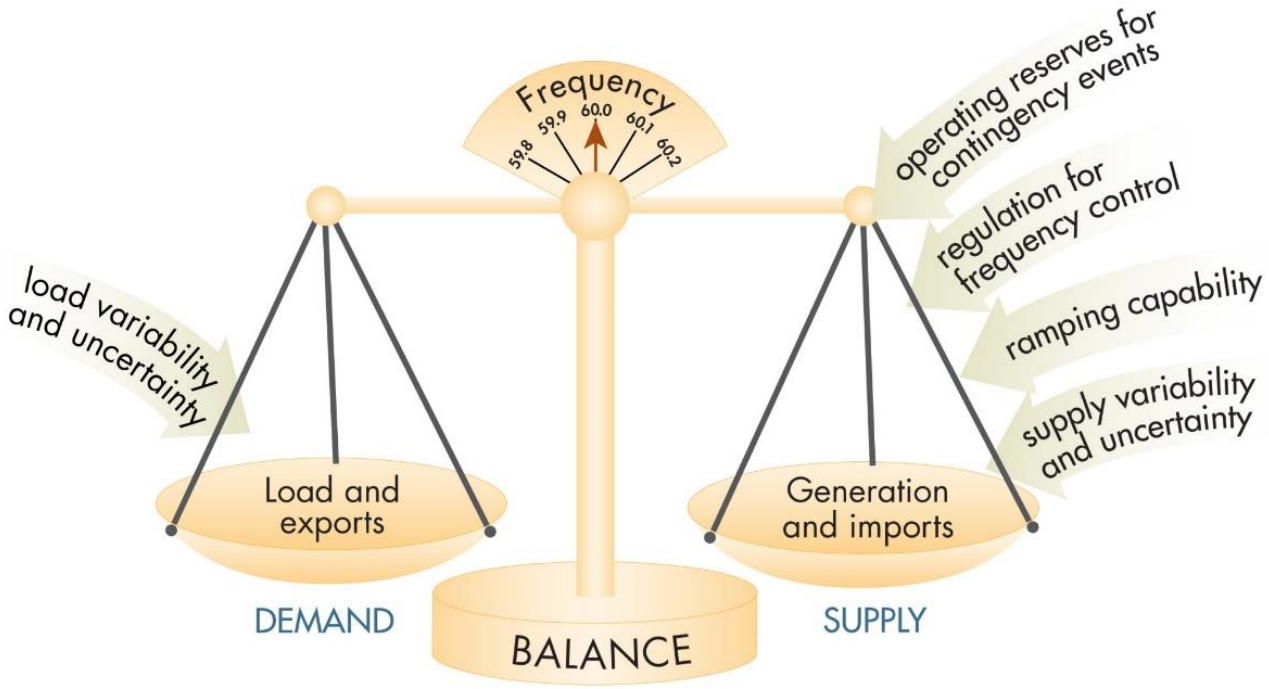
- One of 38 balancing authorities in the western interconnection
- CAISO is the only ISO/RTO operating within the WECC
- Remaining areas of WECC operate in bilateral markets



To keep the system reliable, an ISO must match supply and demand instantaneously all day every day.

Independent grid operators take a pulse of the grid every few seconds before automatic dispatch systems adjust flows to follow fluctuating conditions such as weather changes and sudden supply shortfalls or surpluses.

- Account for outages
- Coordinating supplies and transmission capability
- Secure the power system from harm
- Modeling that improves visibility into full system



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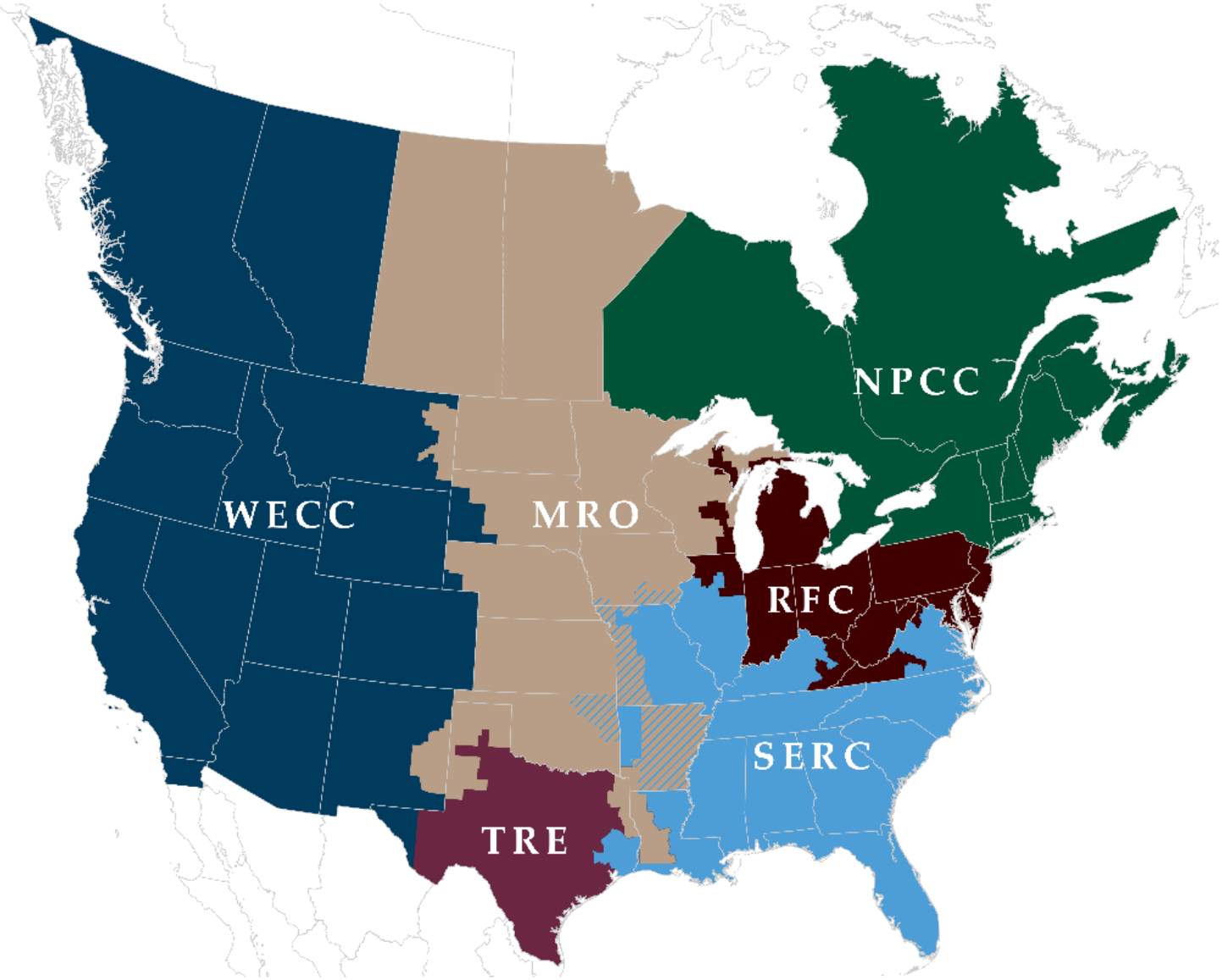
The Western Interconnection

- Six Regional Entities have responsibility delegated by NERC for assuring reliability of the bulk power system within their respective footprints.
- WECC – the Western Electricity Coordinating Council – is the Regional Entity responsible for the Western Interconnection.



The Western Electric Transmission Grid

- 136,000 miles of transmission lines
- Long, high-voltage lines connect distant population centers
- Electricity generally flows south and west in a doughnut pattern

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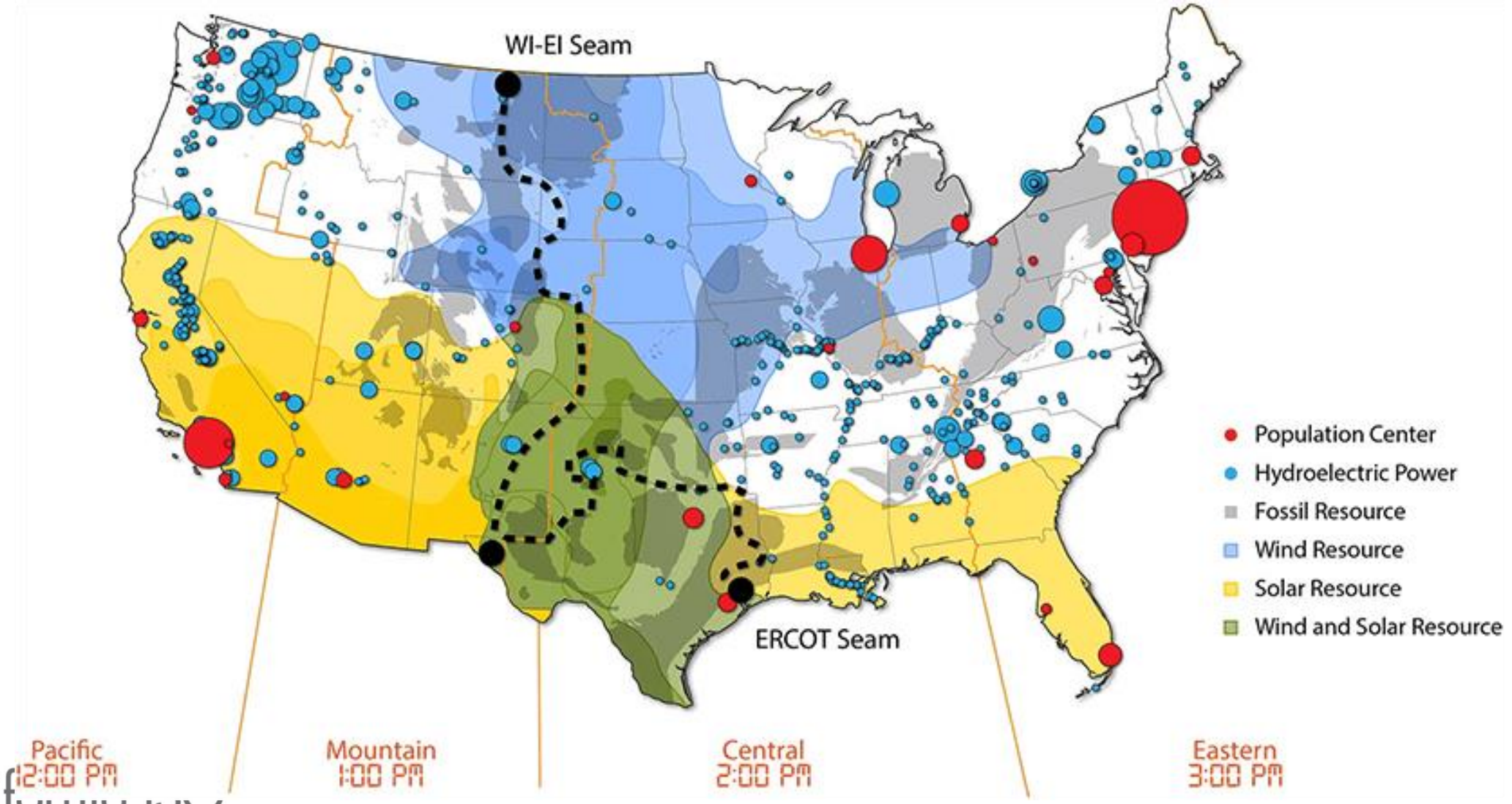
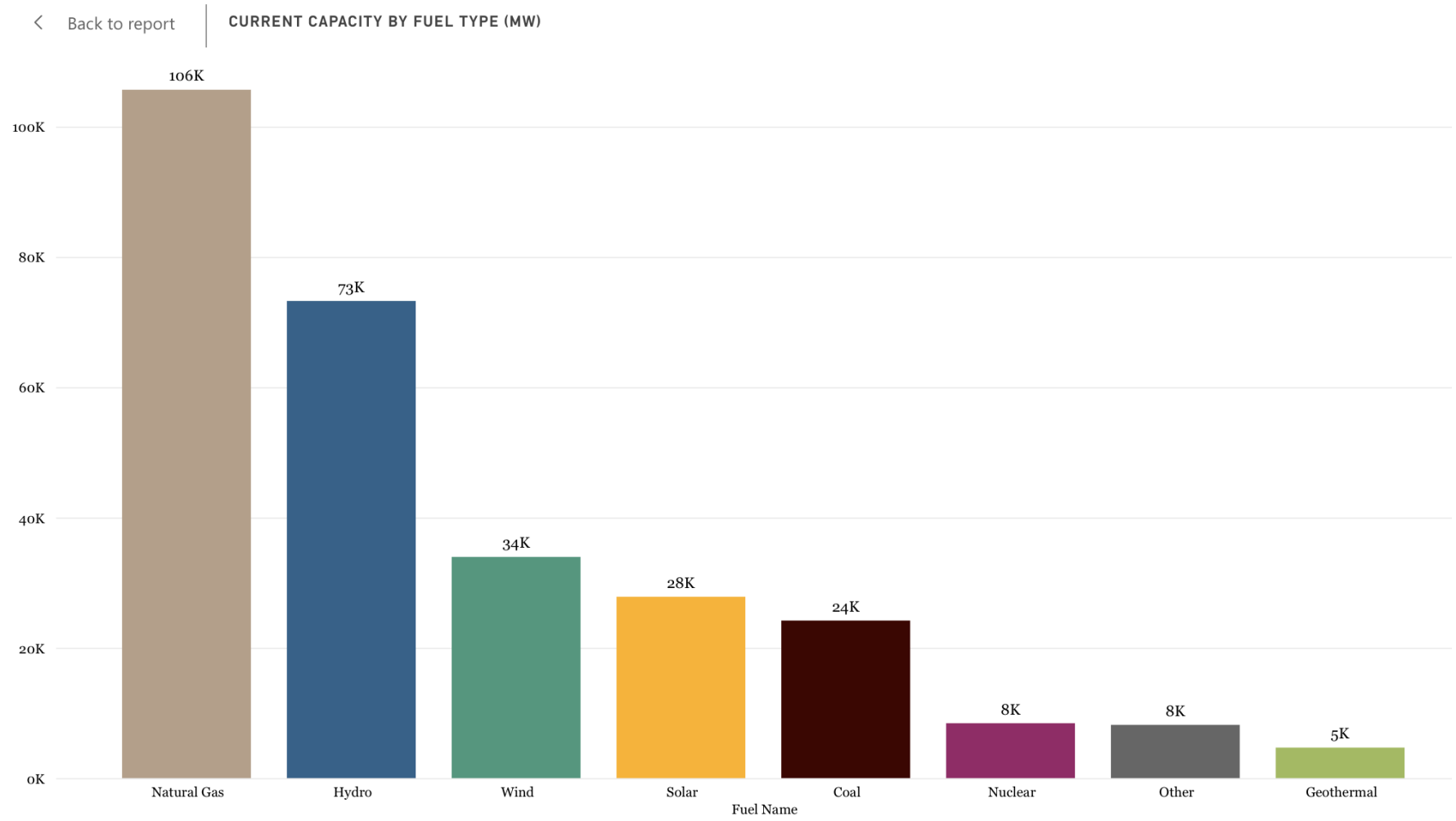
NREL: Interconnection Seams Study



WECC: Current Capacity by Fuel Type (MW)



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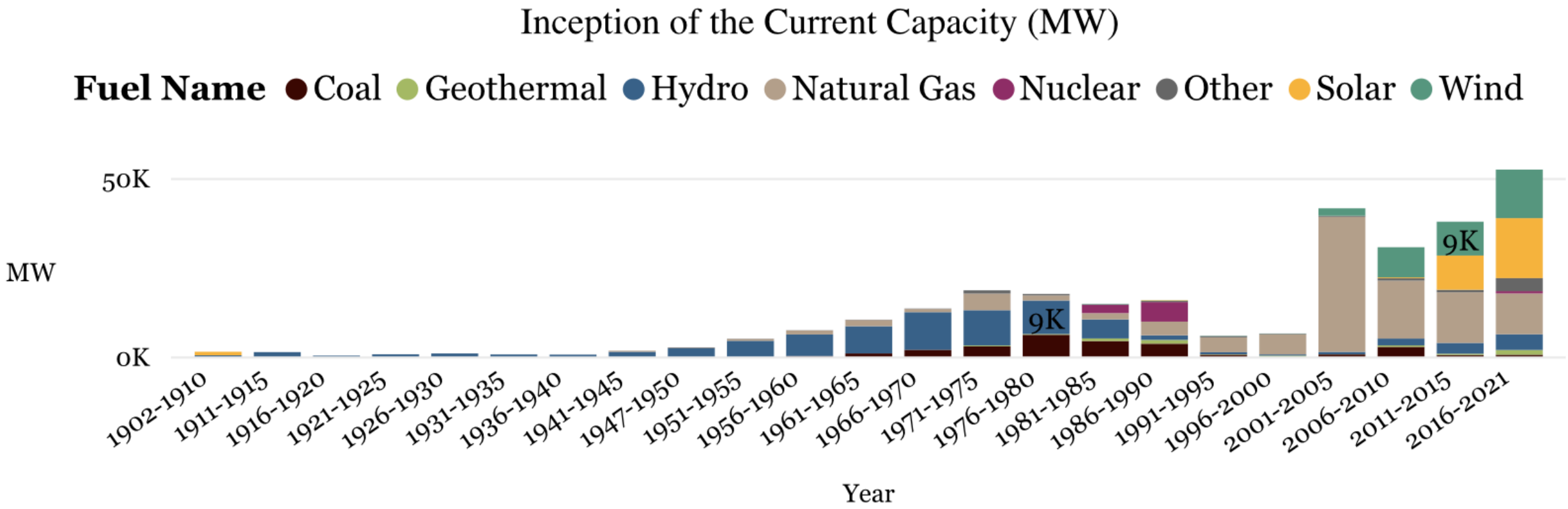
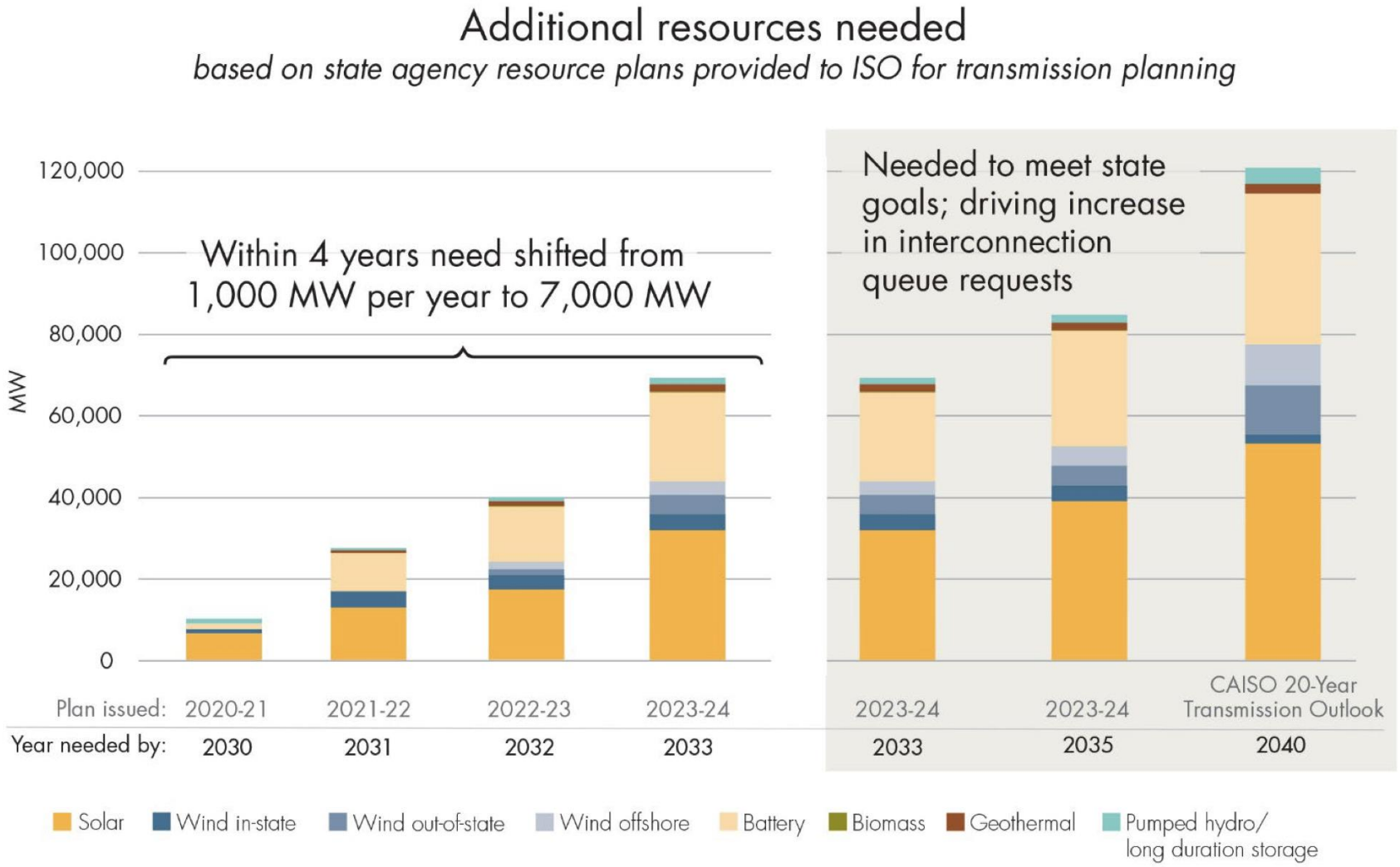
WECC: Inception of Current Capacity by Year Installed



California's Climate Change Goals Driving Unprecedented Need for New Renewable Resources

The resource portfolios provided by the CPUC for transmission planning reflect the acceleration in new resource requirements



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FERC Order No. 2222: Distributed Energy Resources

- FERC Order No. 2222 requires that all RTOs/ISOs allow for Distributed Energy Resources (DERs) that can provide at least 100 kW to participate in all markets
- FERC rule allows several distributed resources to aggregate their capacity to achieve the 100 kW threshold in order to bid into the markets
- CAISO already allowed for DER participation prior to this Order, but has needed to make some adjustments to ensure compliance – for example: reducing the minimum size from 500 kW to 100 kW
- Outside of an RTO/ISO, this FERC Order does not have any direct effect but individual utilities could still develop tariffs to accept output from aggregated DERs

Thank you!

Adam Schultz
Manager, Regional Coordination
aschultz@caiso.com