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Distributed Energy Resources in the CAISO Market and Operational Awareness

Delphine Hou
Director, California Regulatory Affairs

June 1, 2022
CAISO participation models are technology neutral and focus on resource capabilities to provide wholesale market services

• Three major categories for distributed energy resource (DER) participation:
  – Generates only
    • Examples include: aggregated or stand-alone distribution-connected generators
  – Reduces load only
    • Examples include: “traditional” load drop, various demand response programs, storage-backed demand response
  – Reduces load and generates
    • Examples include: storage resources, aggregation of distributed energy resources
The CAISO is an early mover to integrate DERs into wholesale markets

• The CAISO has participation models for a variety of services
  1) Stand-alone DERs
     • 500+ new DERs (2.2 GW) since 2005
     • Same requirements as transmission-connected resources
  2) Demand response (2010)
     • Distribution interconnection requirements, CAISO registration process
     • 2.0 GW in CAISO markets
     • Two major models (Proxy Demand Response and Reliability Demand Response Resource) with 7 settlement methodologies to accommodate electric vehicles, behind-the-meter solar/storage, etc.
   • Allows small DERs to participate as a DERA
   • Created when CPUC had a 1 MW cap for net energy metering (NEM) resources, which was later removed
   • DERAs cannot participate in net energy metering program or demand response program
   • Distribution companies get 30 days to review DERA to ensure DERs are not also demand response participants, NEM, in other DERAs, conflict with their tariffs, or create risk
   • Federal Energy Regulatory Commission (FERC) Order 2222 (2020) largely based on CAISO’s DERA
Telemetry enhances accuracy of load forecasting to account for behind-the-meter penetration

- Example shows impact of rapidly moving demand actuals due to movement of ~725 MW of DER generation due to cloud coverage throughout the middle of the day
Situational awareness is critical for CAISO operations

• Behind-the-meter solar has been the most impactful DER for CAISO operations thus far
• In future, DERs will be more heterogeneous, bi-directional, and driven by varying use patterns and customer needs
• Understanding the impact of DERs is critical to situation awareness and reliability
  o This will likely require access to aggregated telemetered response by technology type for both short-term (i.e., within a few minutes or hours) and long-term modeling and forecasting