Asia-Pacific Energy Regulatory Forum

Federal Energy Regulatory Commission

Flexibility and Market Efficiency

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Disclaimer

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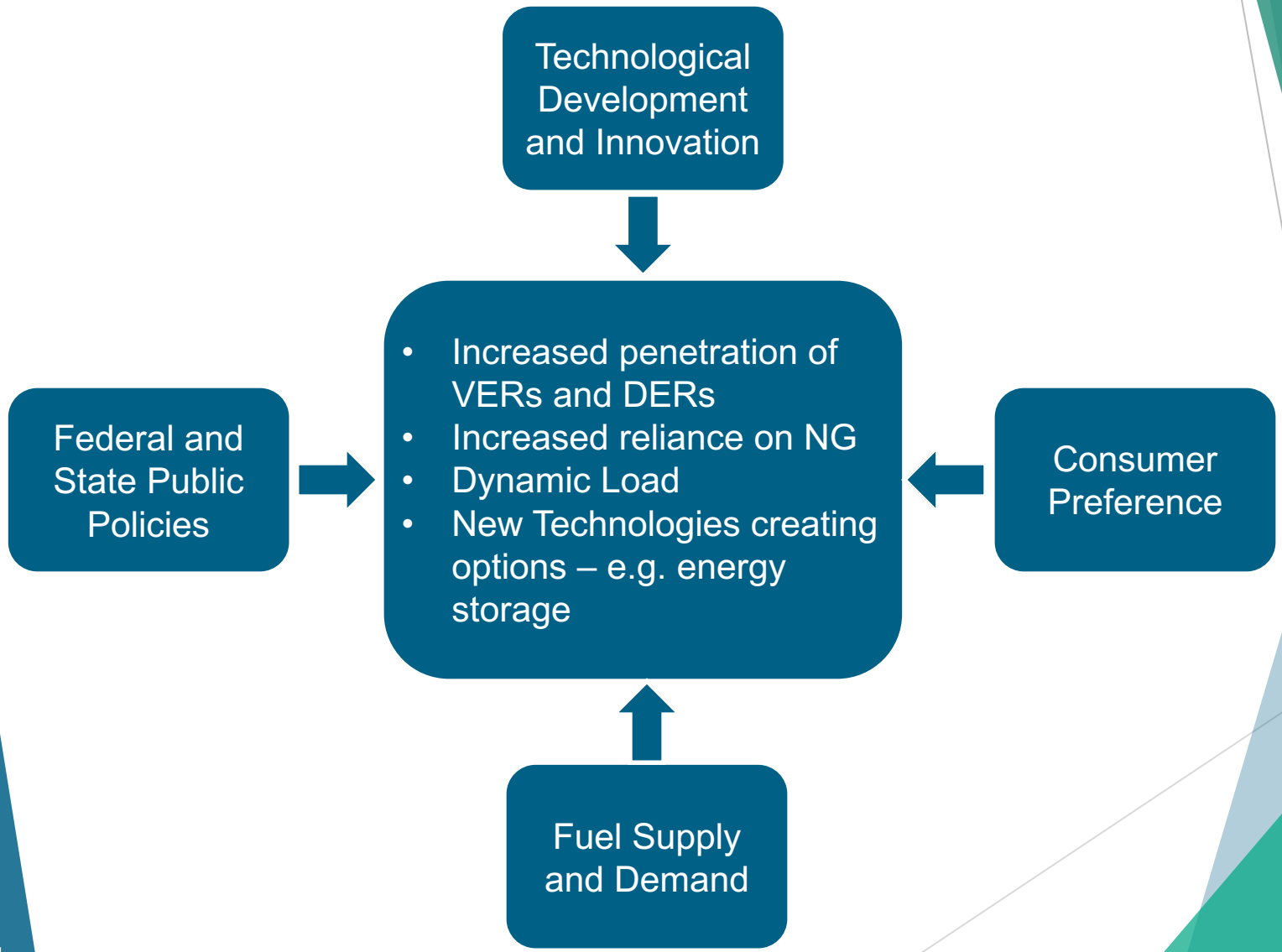
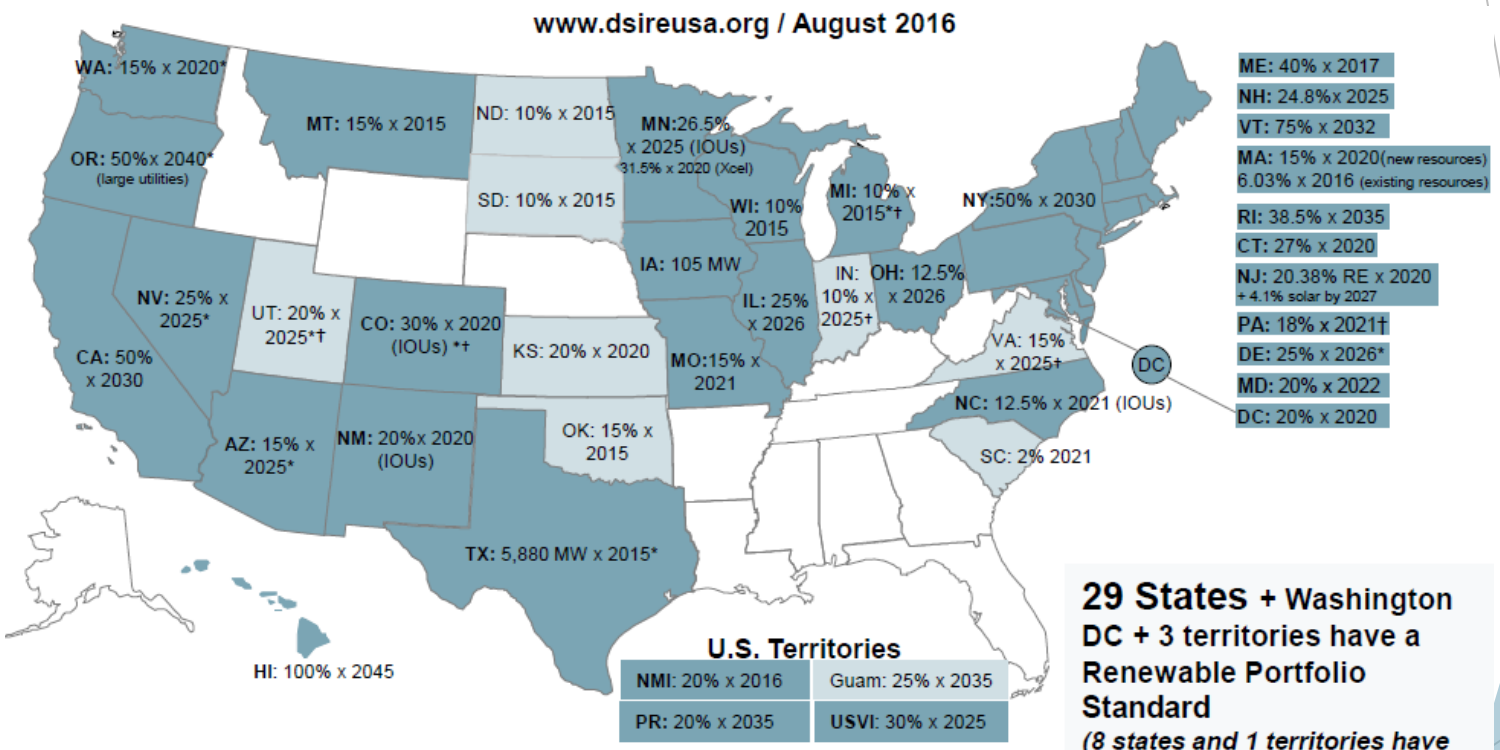
Outline

- Changing Market Environment
- Need for Flexibility
- Options to Increase Flexibility
- Importance of Market Reforms
- Wholesale Market Reforms
  - FERC Reforms
    - Demand Response
    - Integration of VERs
    - Ancillary Services
    - Price Formation
    - Removing Barriers to Participation of Energy Storage
  - RTO/ISO Reforms: CAISO
- Retail Market Reforms

Changing Market Environment

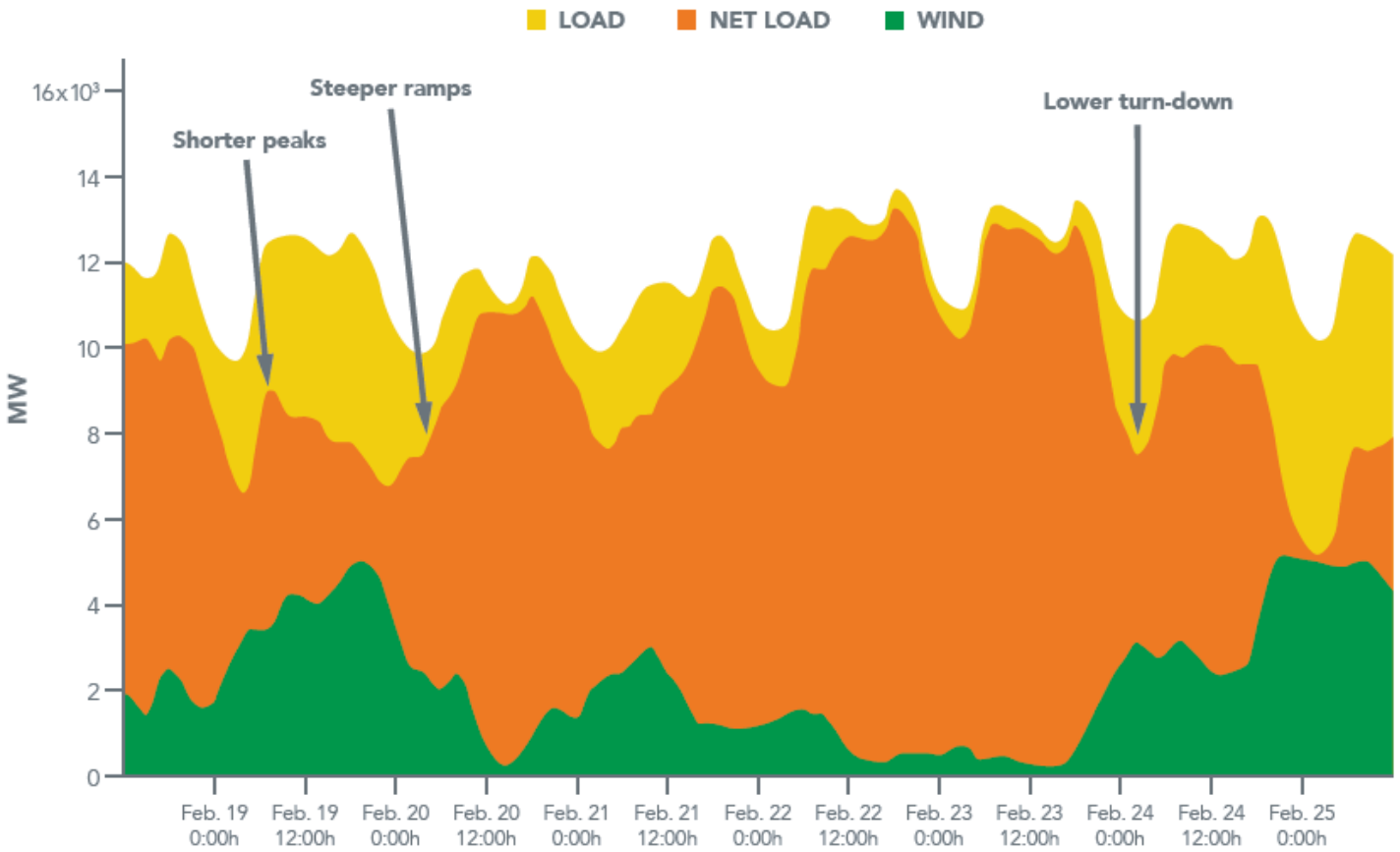


Renewable Portfolio Standards



Need for Flexibility

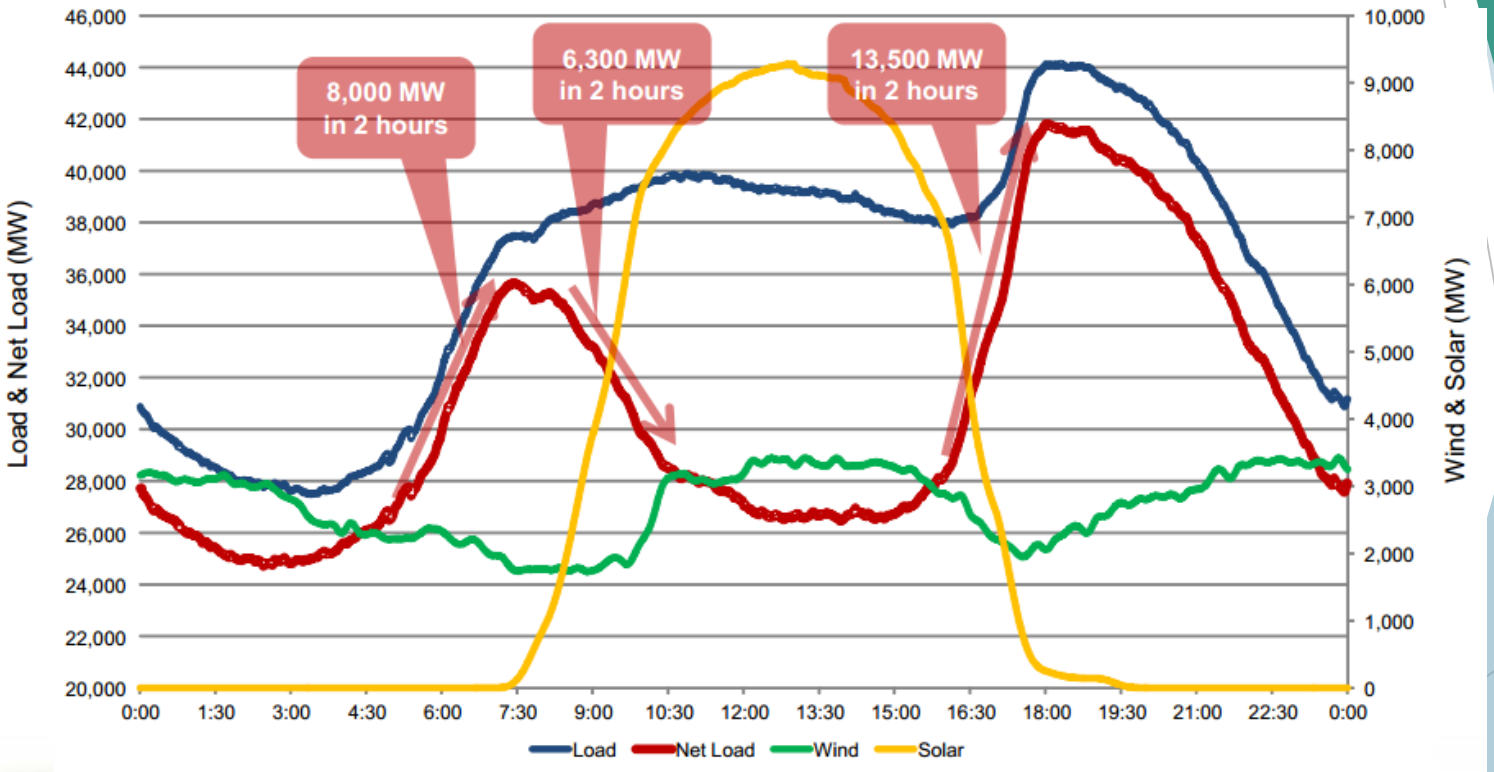
The ability of a power system to respond to change in demand and supply



Source: National Renewable Energy Laboratory

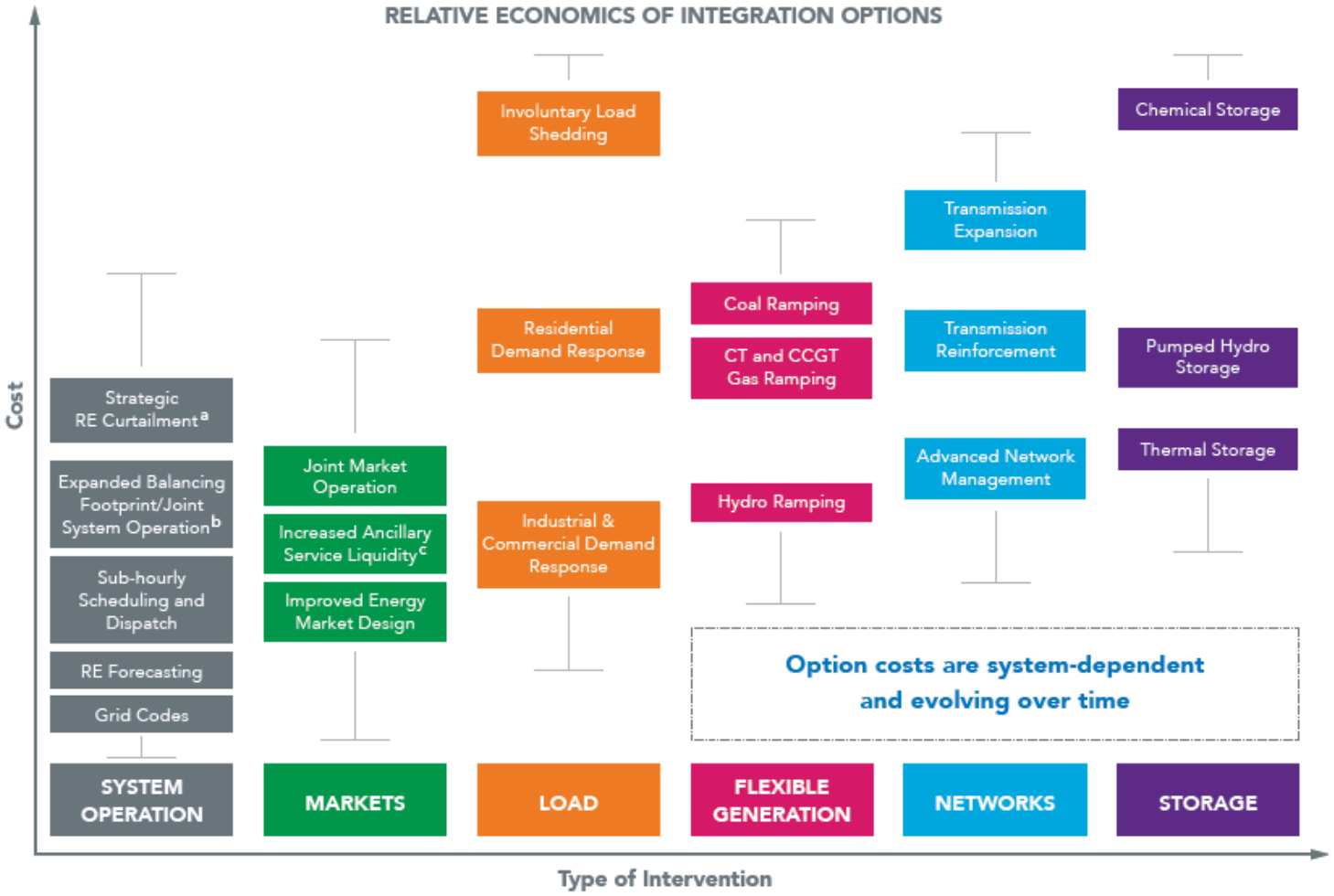
Need for Flexibility: CAISO

January 2020



Source: California Independent System Operator (CAISO)

Options to Increase Flexibility



Source: National Renewable Energy Laboratory

Importance of Market Reforms

Market reforms enable the transition to a 21st century power grid that is efficient, reliable, and sustainable

- Provide accurate price signals and recognize the value resources provide to the grid including flexibility
- Support high penetration of VERs
- Reduce vulnerabilities and improve service reliability
- Promote efficiency and transparency
- Remove barriers to participation of new technologies – e.g. energy storage
- Enable DERs to provide grid services
- Reduce system costs and save ratepayers money
- Enable customer participation and business model innovation

FERC: Demand Response

- Demand Response (DR) occurs when electricity customers change consumption patterns in response to the grid needs
- When aggregated over enough customers, DR becomes a major resource that can be used to manage the grid's variability in the short-term and avoid overbuilding the system in the long-term by cutting down peak demand
- Demand Response *Order 745*
  - Issued in 2011 and upheld by the Supreme Court in Jan. 2016
  - Requires grid operators to pay DR resources that provide a net benefit to the system the locational marginal price (LMP) that it pays generators in energy markets
  - Gave electricity markets access to a new cost-effective resource and contributed to the development of DR in capacity and ancillary service markets

FERC: Integration of VERs

- Integration of Variable Energy Resources (VERs) *Order 764* (2012)
  - Allows for more efficient integration of VERs
    - Requires transmission providers to offer customers the option of scheduling transmission service on a more frequent intra-hour basis, in intervals of at least 15 minutes
    - Requires new interconnection customers with VERs facilities to provide meteorological and operational data to transmission providers to allow for more accurate power production forecasting

FERC: Ancillary Services

- Frequency Regulation Compensation *Order 755* (2011)
  - Requires compensation of frequency regulation based on actual service provided (capacity and performance payment)
- Third Party Provision of Ancillary Services; Accounting and Financial Reporting for New Electric Storage Technologies *Order 784* (2013)
- Sale of Primary Frequency Response at Market-Based Rates *Order 819* (2015)
- Notice of Inquiry on Provision and Compensation of Primary Frequency Response (February 2016)
- Reactive Power Requirements for Non-Synchronous Generation *Order 827* (June 2016)

FERC: Price Formation

In 2014, FERC initiated a proceeding to explore opportunities for improving price formation in energy and ancillary services markets

- Settlement Intervals and Shortage Pricing *Order 825* (June 2016)
  - Requires RTOs/ISOs to: (1) align settlement and dispatch intervals; and (2) trigger shortage pricing for any dispatch interval during which a shortage of energy or operating reserves occurs
- Notice of Proposed Rulemaking on Offer Caps (January 2016)
  - Propose to cap each resource's incremental energy offer at the higher of $1,000/MWh or the resource's verified cost-based offer
- Order Directing RTO/ISO Reports (November 2015)
  - Pricing of fast-start resources
  - Commitments to manage multiple contingencies
  - Look-ahead modeling
  - Uplift allocation
  - Transparency

FERC: Removing Barriers to Participation of Energy Storage

- Request for Information on barriers to participation of energy storage in FERC energy, capacity, and ancillary services markets (April 2016)
  - Data requests from RTOs/ISOs and request for public comments
  - Information requested includes:
    - Eligibility of electric storage resources to participate in RTO/ISO markets
    - Technical qualification and performance requirements for market participation
    - Bid parameters for different types of resources
    - Opportunities for distribution-level and aggregated electric storage resources to participate in the markets
    - Treatment of electric storage resources when receiving electricity for later injection to the grid

RTO/ISO Reforms: CAISO

- Western Energy Imbalance Market (EIM)
  - Launched in November 2014
  - EIM Entities: CAISO, PacifiCorp, NV Energy. Puget Sound Energy and Arizona Public Service to join in October 2016
  - Benefits
    - More efficient dispatch
    - Reduced renewable energy curtailment
    - Reduced need for flexibility reserves
- Flexible Resource Adequacy Criteria and Must Offer Obligation (FRAC-MOO)
  - Requirement to procure flexible resource capacity
- Flexible Ramping Product
- Distributed Energy Resource Provider (DERP), June 2016
  - Extends market participation to distributed energy resources <0.5 MW – current minimum threshold – by allowing distribution system level aggregation

Retail Market Reforms

- California Public Utilities Commission
  - Energy Storage
  - Distribution Resources Plans (DRP)
  - Integrated Distributed Energy Resources (IDER)
  - Energy Storage and Distributed Energy Resources (ESDER) – joint effort with CAISO
- New York Public Service Commission: Reforming the Energy Vision (REV)
  - Distribution System Platform (DSP) Provider
  - Ratemaking Reforms to support DSP Provider model
    - Market-Based Earnings (MBEs)
    - Incremental Ratemaking Reforms
    - Rate design Reforms