Electric Storage Participation

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Timeline

- February, 2018: FERC final rule on storage ...
  - Filing due Dec 3, 2018.
  - Implementation due Dec 3, 2019.

Electric Storage Resource Definition

- Electric Storage Resource (ESR) = “a resource capable of receiving electric energy from the grid and storing it for later injection of electric energy back to the grid.”
- Connected at: transmission, distribution, or behind a customer meter.
  - PJM has ESR at both T and D today, none behind a meter that inject.
- Excludes demand response.
- Includes pumped hydro

Over 5,300 MW of Electric Storage Resources currently in PJM

** Data taken from Generation Queue and EIA 860
1. Can sell* energy, **Capacity**, and A/S (incl. Black Start etc.) the resource is technically capable of providing

2. Dispatched and **sets price** as seller and buyer

3. Bid parameters that account for ESR characteristics

4. Min market threshold is 100 kW

5. Stored MWh are billed at LMP as wholesale

* “Eligible to provide…”
• ESRs will be modeled as one continuous resource
• PJM will not make commitment decisions in the ESR model and not manage state of charge
  – Start and no load cost will not be considered
• 3 modes of operation:
  – Continuous, Charge & Discharge
• Parameters
  – Offered in through Markets Gateway
    • Max/Min charge/discharge, etc
    • Ramp considered infinite only in continuous mode

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</table>
Continuous operation mode - ESRs can update their max charge and discharge limits hourly in day-ahead and more frequently in real-time.

** State of charge telemetry will be requested for telemetered resources
Charge & Discharge mode will be available to ESR resources in DA and RT
PJM proposes that status quo, per manual 21, of a minimum of 10 hour duration is maintained in the capacity market.
Questions or Feedback?

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