

FERC ORDER 2222

EDC/TO Coordination Activities for EDC Registration Review and Operational Dispatch and Override Review

**PJM DIRS EDC Coordination Workshop
March 3, 2021**

For Discussion Purposes

ELECTRIC DISTRIBUTION COMPANIES: Roles and Responsibilities

- Electric Distribution Companies support our customers' safe operation of Distributed Energy Resources (DER)
 - EDCs have DER programs currently
 - Wholesale market participation of BHTM or Distribution Connected DERs must recognize distribution system conditions or constraints to avoid adverse conditions
- Electric Distribution Companies maintain responsibility and accountability for ensuring the safe and reliable operation of the distribution system on behalf of our utility workers and customers
- Electric Distribution Companies are different sizes, operate in different state jurisdictions, and service different customer bases
 - EDCs are at different levels in their grid modernization investments
 - Rules need to recognize different starting points for EDCs, as well as their transitions to additional automation in the future

ELECTRIC DISTRIBUTION COMPANIES: Roles and Responsibilities for Override

- The EDC Review Process for evaluating DER Participation in Aggregation to include:
 - Processes to avoid individual DER and DERA dispatch overrides/disconnects where possible
 - Consideration of operational circumstances that require dispatch overrides to maintain the reliability and safety of the distribution system
- Overrides may occur outside of “normal” operating system conditions including:
 - Emergency and Planned system reconfiguration
 - Actions for anticipated or actual significant weather events
 - High/Low Voltage conditions
 - Peak and Minimal System Loading Conditions
 - Other distribution system balancing as needed
- EDCs shall not be liable for damages required due to DER overrides
 - Proper communication channels with PJM and the DERA are needed to minimize DER operational impacts

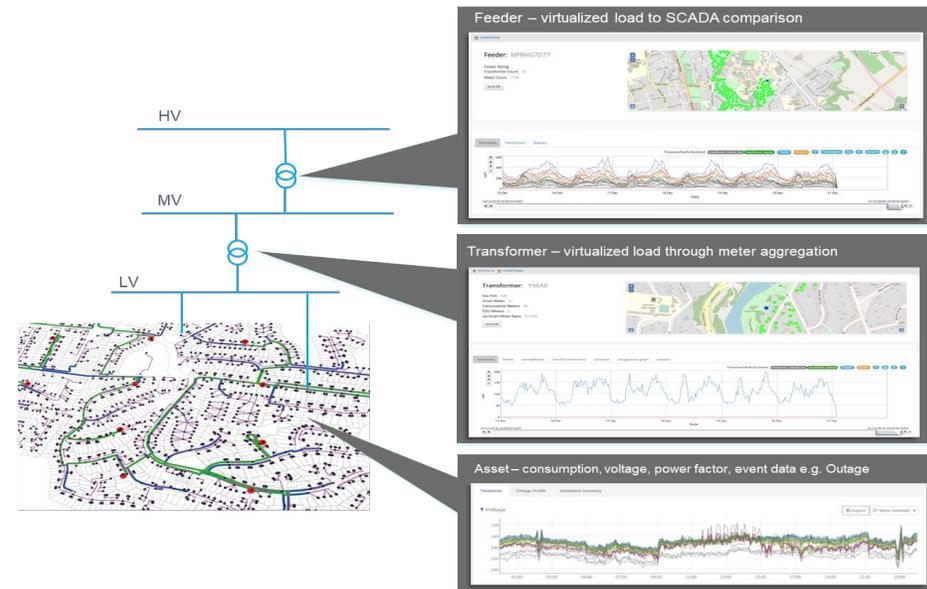
60-Day EDC Registration Review Process:

Scenario Planning for Individual DER + Group (Aggregate) DER

- To remain flexible and adaptable to changing conditions and technology development, scenario analysis, granular forecasting, and options analysis must be available in the process to study as aggregations are created or altered
- Utilities must account for increased uncertainty due to DERs and need to evaluate potential future scenarios
- DERs create more variable supply and demand, thus EDCs are beginning to utilize time series power-flow analysis to understand the impact of DERs
- As aggregations are formulated or adjusted, additional studies will need to be performed during the 60-Day EDC Registration Review Process to ensure system capacity and capability
 - steady-state
 - short-circuit
 - stability

Individual Study Process- Consider aggregate existing generation and queue ahead projects when performing impact study with the addition of the generating project.

Group Study Process- Consider aggregate existing generation and queue ahead projects. We would study all projects in the group and perform one group study, as needed.



Examples of Real Time Override Scenarios and Implications of System Constraints

- Changes in system conditions may result in naturally occurring system disruptions not associated with dispatch overrides
- Situational operational circumstances may require dispatch override to maintain the reliability and safety of the distribution system

Below are examples of potential situations where EDC involvement is necessary:

- Planned outages or abnormal switching impacting DER
 - EDCs can review and inform PJM and the aggregator during the day ahead reviews
- Unplanned or emergency outages impacting DERs
 - DERs out of power and dispatch orders can't be executed
- Unplanned grid constraints such as emergency switching
 - DERs are in service but the dispatch orders can't be executed
- Privacy and cyber security situations emerge

APPENDIX

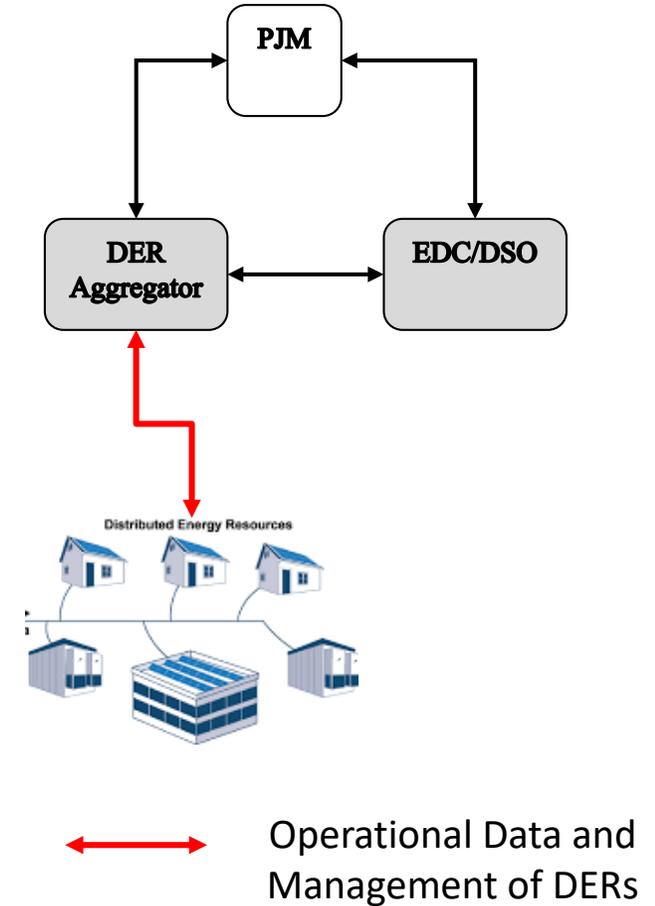
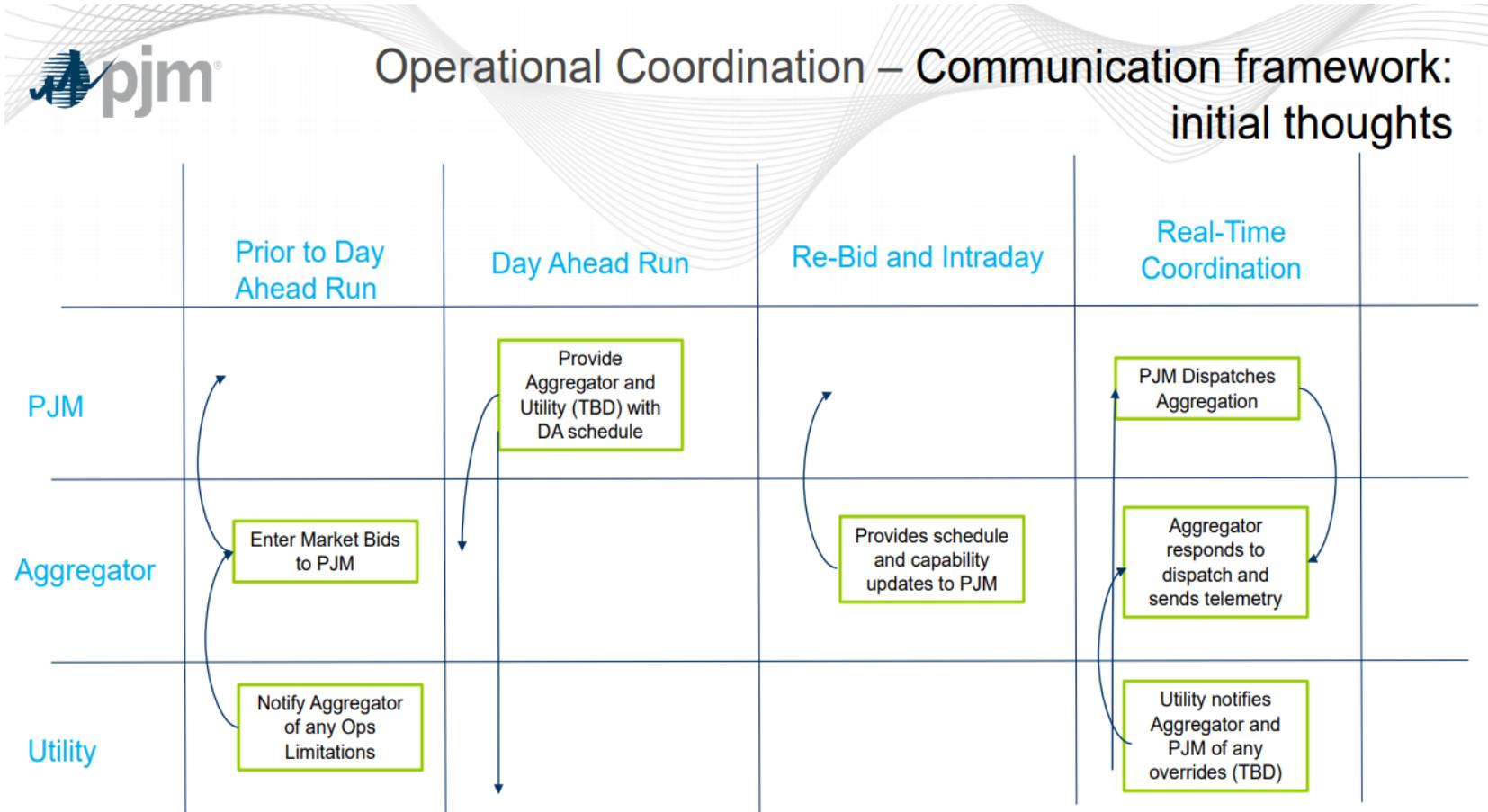
February 11 EDC/TO DIRS Presentation

Electric Distribution Company Realities: Operating a Dynamic Distribution Grid

Visibility and management ability at the individual DER level is important to meet agreed regulatory requirements of providing customers with safe, secure, reliable and affordable electrical service while respecting their privacy

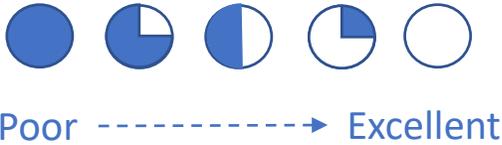
- Why?
 - The distribution systems is dynamic with multi-directional power flow, voltage deviations, swings in load, and new requirements for protection settings
- How?
 - Automation - using sophisticated software, communications, and control architecture to provide customers with reliable service.
 - Aggregation and DER management must be embedded into the automation algorithms for EDCs to be successful in the future.
 - Less Standards Settings

PJM Proposed Communication and Management Model



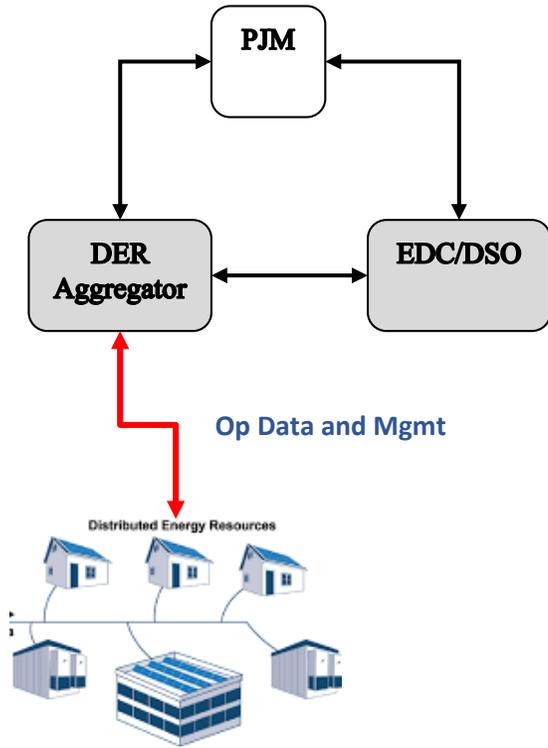
Reliability and Situational Challenges with Proposed PJM Communication and Management Model

Option	Reliability	Coordination	Governance	Readiness (Technology)
A				

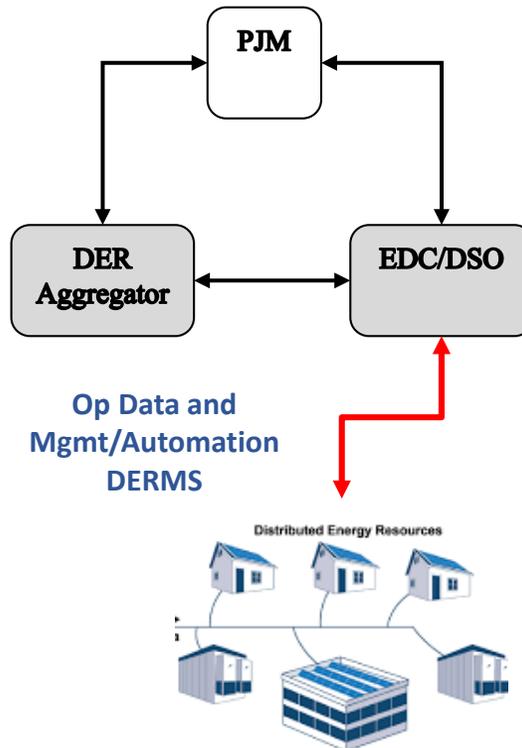


VARIABILITY: EDC Communication and Management Models

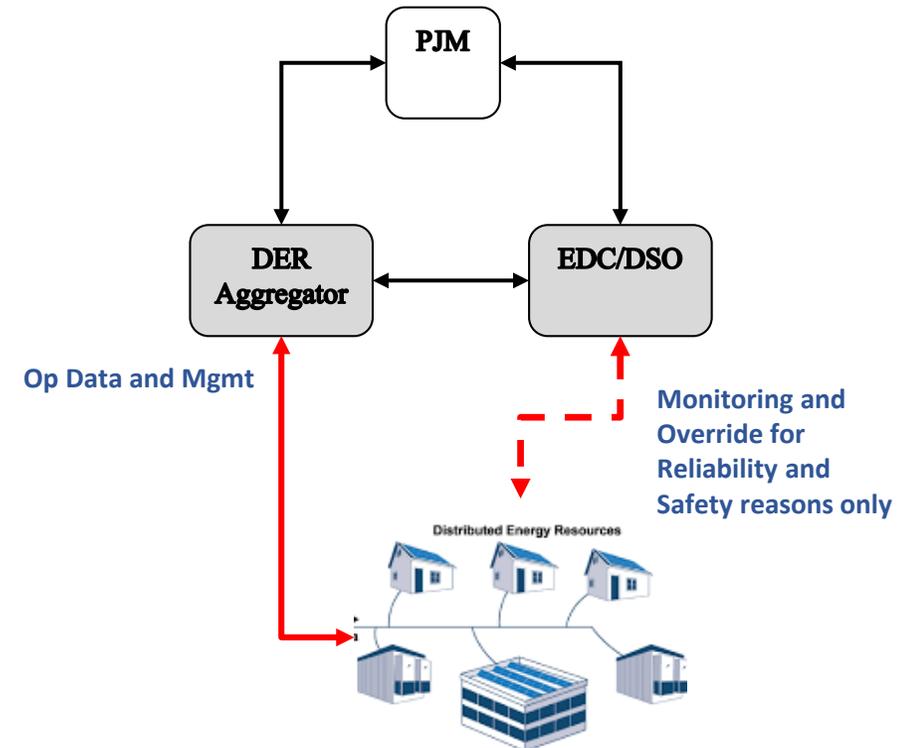
Option A



Option B



Option A/B



Model under discussion

PPLs Proposed Model