
PJM EDC COORDINATION WORKSHOP

November 9, 2021

EDC TOPICS OF DISCUSSION

TOPICS OF DISCUSSION: PROFORMA



- Need to identify necessary data for proforma discussion in addition to the current asks:
 - A short description of what is the intent of the proforma agreement.
 - Any new agreements needed that the DER Aggregator(s) will be required to sign with PJM (with a short description of what is the intent of the agreement) outside of the proforma.
 - Any existing agreements that will need to be modified to account for FO2222 or may need a DER Aggregator(s) signature.
 - Any other agreements needed that will support the FO2222 market participation activities between multiple parties.

TOPICS OF DISCUSSION: USE CASES



- **Use Case Discussions (Complete End to End Process Discussion Including Metering, Telemetry, and Settlement)**
 - Use cases requiring discussion:
 - Storage + Generation
 - Hybrid Resources
 - Co-located Resources
 - EV's (Vehicle to Grid)
 - EV's (Load Only)
 - PJM to cover the following attributes for each use case:
 - Coordination between retail / wholesale metering data collection
 - Information needed for all wholesale markets.
 - All potential market participation capabilities
 - Mixed wholesale/retail injection assets (when applicable)
 - Pure wholesale injection assets
 - Detailed settlements mechanics (as outlined in settlements section)
 - Detailed Metering, Telemetry requirements
 - Disconnection equipment requirements (safety requirements)
 - Discussion about energy storage rules and DER aggregations.

TOPICS OF DISCUSSION: ADDITIONAL ITEMS



- **Additional Settlement Items**

- Define the necessary PJM asks for the November 9th and November 22nd Meeting
- Need to ensure that DER aggregations participation remains unchanged for 1 year.
 - The DER under that aggregation needs to participate in the same participation as well for 1 year.
- Current Identified Items
 - Full process map walk through of daily settlements including:
 - Responsibilities of Data Submissions for Settlement.
 - Compliance methods for Settlement Data Submission Requirements
 - Expected submission system for data submissions.
 - Connection of PowerMeter and Inschedule systems.
 - Hour over hour process for injection / consumption changes (what occurs when changes happen within the hour)
 - Inclusion method/process of Muni/Coop Data Submissions (Traditional Definition of EDC or FERC 2222 definition of EDC?)

- **Feedback on Previous EDC Presentations from 10/18/21.**

PREVIOUSLY IDENTIFIED EDC ITEMS

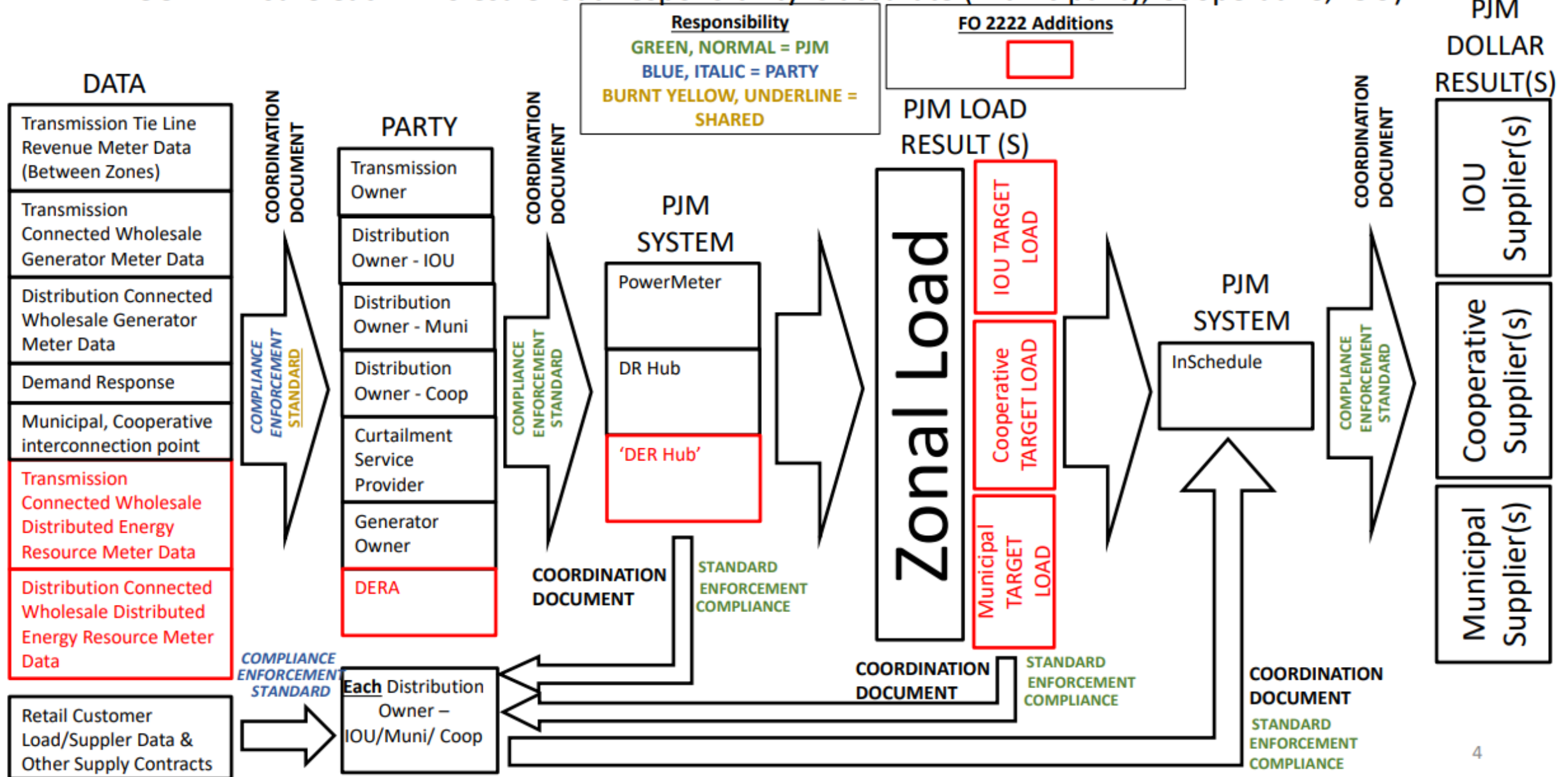
(FROM 10/26/21 MEETING)

AGENDA

- Summary of EDC Recommendations
- Pnode Mapping
- Registration
- Metering and Telemetry
- Planning
- Implementation Timeline

High Level – Revenue Data Movement - ENERGY

- GOAL: Ensure each wholesale load responsibility is accurate (Municipality, Cooperative, IOU)



Issues/Solutioning

- Issues
 - Enforcement of data accuracy and deadlines
 - Development of data standards
 - Limiting unnecessary data movement for purposes of financial settlements
 - Control of data
 - Determining distribution owner load responsibilities
 - Transparency, etc.
 - Before Inschedule
 - Establishment of accountability for accurate financial settlements under PJM OA, OATT and RA (Governing Documents)
 - Memorialization of settlements operations responsibilities
- Expected Solutions
 - Creation of a data compliance paradigm that sets explicit expectations to properly and transparently account for load obligations of all Distribution Owner retail and wholesale LSEs
 - Recall presentation on 6/14/2021 that put together mathematical solutions

SUMMARY: EDC RECOMMENDATIONS

- **Operations Coordination Model**

- The EDC shall be the designator of the Dispatch Agent role.

- **Single Pnode Model Requirement**

- EDCs support PJM's proposal to allow energy market participation of a DERA up to a single Pnode.
- EDCs propose EDC/TO provides PJM with Enode mapping of individual DERs participating in PJM wholesale markets as part of a DERA for PJM to then assign the appropriate Pnode to the DERA.

- **Data Sharing**

- Order 2222 implementation must respect state jurisdictional boundaries and requirements, including, but not limited to, those for data sharing, cyber security, Dx/Tx modeling for planning and operational separation.

- **BTM Metering + Telemetry**

- Order 2222 compliance must comport with EDC/state/RERRA requirements for metering & telemetry to allow for accurate and timely wholesale and retail billing and settlements.
- We agree with PJM's recommendation of one DER Aggregator per POI or retail premise meter.

- **Cyber Security**

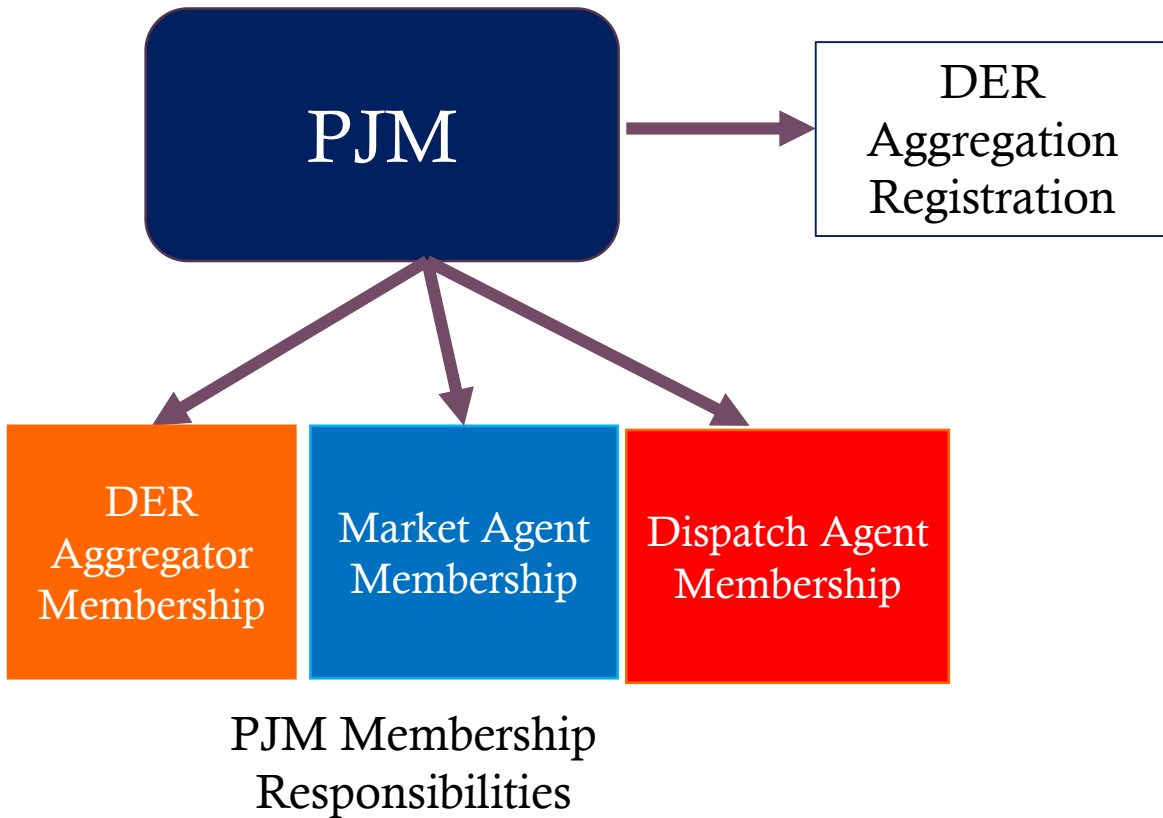
- Cyber Security will be critical, and EDCs will need to implement appropriate requirements at the distribution level consistent with individual state cyber security obligations

PNODE MAPPING

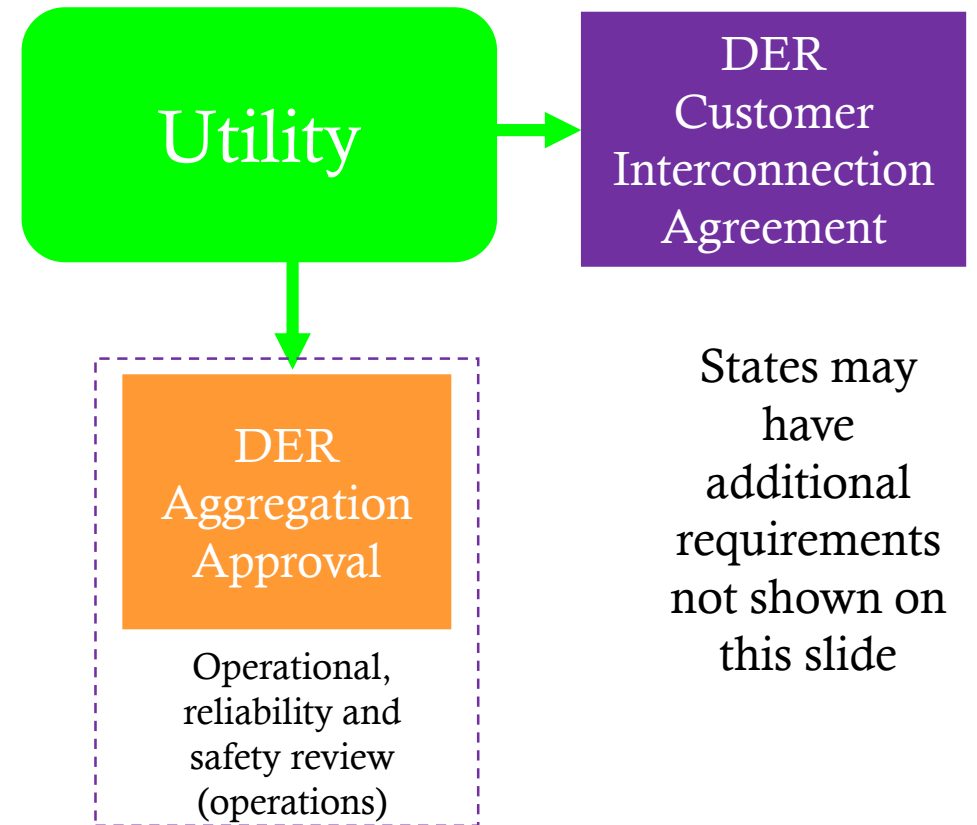
- **Joint EDC / TO mapping**
 - Provide DER mapping to transmission Enode levels currently modeled under normal system configurations.
 - Data provided shall be handled respecting current EDC/TO consumer privacy and FERC Code of Conduct policies.
- **PJM mapping**
 - PJM to map DER assets from the Enode provided by the TSO to its respective Pnode.
- **Abnormal Distribution Configurations**
 - EDCs may need to isolate or reduce output for DERs during abnormal distribution system configurations not studied via interconnection process. Such abnormal configurations would preclude the individual DER from participating through the DERA in the wholesale markets.

REGISTRATION: ROLES & RESPONSIBILITIES

FERC Jurisdiction



State/RERRA Jurisdiction



Draft

ROLES & RESPONSIBILITIES - PJM

- DER Aggregator Membership (which could be the utility)
- Market Agent Membership (which could be the utility)
- Dispatch Agent Membership (which could be the utility)
- DER Aggregation Registration
- PJM Processes
- Regulated by FERC
- Designed to address PJM's requirements for the DER Aggregator, Market Agent and Dispatch agent to participate in designated roles in the wholesale markets

REGISTRATION: ROLES & RESPONSIBILITIES – EDC

- Interconnection Agreement – Utility responsibility, regulated by State/RERRA
 - Interconnection Agreements need to be reevaluated after receiving the DER/DERA Registration for potential modifications.
- DER Aggregation Approval* – Utility responsibility, consistent with obligation to provide safe, adequate and proper service. EDC/Host Utilities may have additional requirements for:
 - DER Aggregators
 - DER Dispatch Agents
 - DER Market Agents

*Note - Potential for States/RERRAs to also establish obligations in this area.

DER AGGREGATION APPROVAL BY EDC

- The following points are required but may not be exhaustive:
 - Individual DER customers must have a valid Interconnection Agreement with the EDC prior to requesting inclusion in a DER Aggregation registration.
 - The 60-day clock does not begin until all data needed by the EDCs for the review has been received by the EDC
 - If during the EDC's review of the Aggregation, significant data changes or gaps are identified, the 60-day clock will reset
 - The EDCs and Aggregator may agree to a longer review period
 - A DER Aggregation must be affirmatively approved prior to operation.
 - If a reliability or safety issue is identified, the Aggregation will not be approved, and the PJM registration is denied. The EDCs will work with the DER Aggregator to resolve the issues for the Aggregation to become enabled.
 - If the Aggregation is approved, EDCs recommend it remain in place, unchanged, for a period of one year, with the exception of individual DER customers leaving the aggregation.

METERING + TELEMETRY + SETTLEMENT

- **Customer Participation**
 - State/RERRA will determine retail tariff program(s) interaction with wholesale market participation.
 - Injections and related retail credits will need to be coordinated in accordance to EDC's tariff programs.
- **Metering Data Coordination**
 - State regulators/RERRA will have jurisdiction over DER metering / submetering requirements.
 - It is the understanding of the EDC's that PJM expects meter information to be submitted to PowerMeter for each DER/DERA.
 - EDC/TO will require a mechanism to receive individual DER meter data from the DER Aggregators in a timely manner to allow for accurate wholesale and retail settlements.
 - As proposed, DER participants can use POI meters for wholesale meters for injections (similar to PJM DR currently) and gain access to utility meter data and pulses for pulse counters but could change depending on the customer system configurations.
 - EDC will require access to all metering and telemetry data for DERA/DER.
- **Physical Customer Modifications Over Time**
 - DER system metering / telemetry configurations can be reevaluated during EDC's interconnection processes or annual PJM DER registration reviews.
 - State/RERRA programs that require special retail rates for load or injections will require additional DER submetering.
- **TO zonal aggregated load and generation reporting**
 - Need to discuss the methods of data submission (i.e Inschedule, Powermeter, ...)
 - Need to separate municipalities and cooperatives from EDC/TO due to the complexities added by wholesale BTM assets.

CONTENT OF THIS SLIDE IS INTENDED FOR DISCUSSION PURPOSES ONLY. THE CONTENT CONSTITUTES PRELIMINARY VIEWS RECOGNIZING FERC ORDER 2222.

PLANNING

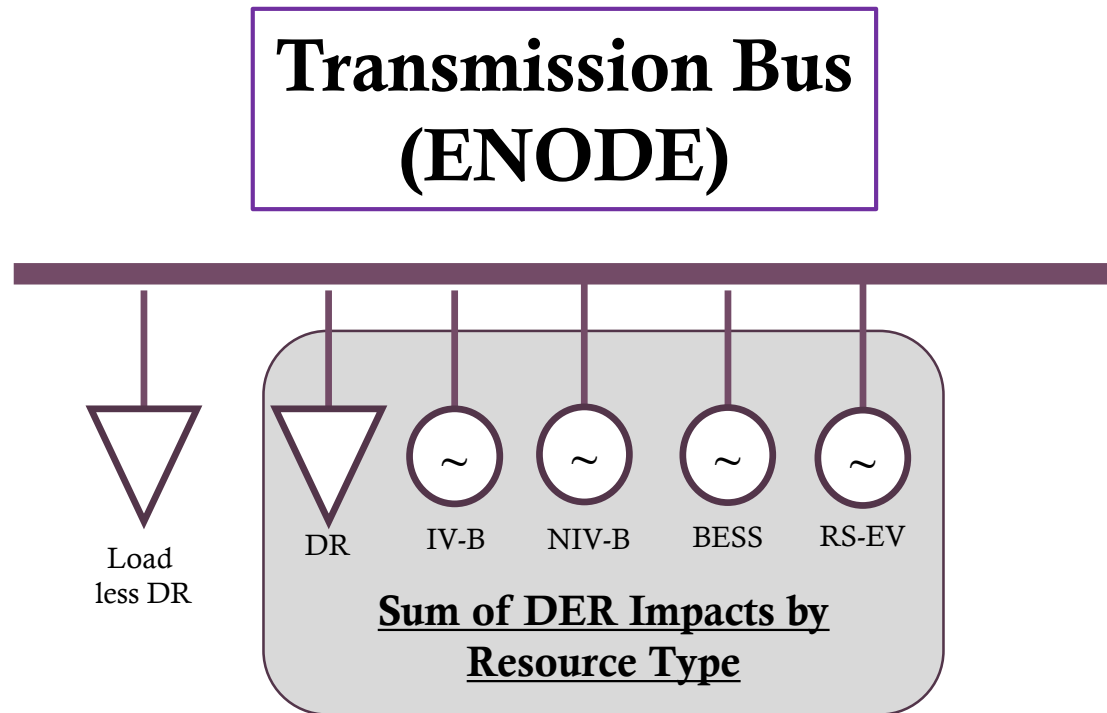
Discussion Item

- Proposed strawman slides for planning are relatively vague on requirements surrounding planning model data granularity, processes data exchange, and model maintenance requirements associated changes for FERC 2222.

Recommendations

- Data exchange limited to only information necessary to perform associated studies.
- EDC Modeling Information Provided to Transmission Owner
 - TO provides PJM with sum of DER impacts by resource type at each Enode.
 - EDCs agree with PJM's resource types as shown below:
 - Inverter-based Resources (IV-B), Non-Inverter based Resources (NIV-B), Battery Energy Storage System (BESS), Relocatable Storage – Electric Vehicles (RS-EV), Demand Response (DR)
- PJM or TO will not release any non-transmission asset information, maps, models or modeling data unless provided authorization from EDC/DO.

PLANNING



- DERA component data is provided in the form of a consolidated model for each resource type
- Multiple DER resource types summed to a singular transmission bus point based upon affiliated DERA
- Routine updates provided by EDC to TO and incorporated into annual RTEP models utilizing existing RTEP processes

IMPLEMENTATION TIMELINE

- Implementation timeline must reflect possibility of need for state/RERRA approvals prior to certain TO/EDC efforts.
 - IAs may need to be amended. Tariffs may need to be written and approved. Rules and regulations may need to be written. Cost Recovery may need to be approved.
- EDCs should have flexibility in the implementation timeline and the functionality.
- Need to have clear definition of what constitutes “implementation.”
 - What is PJM anticipated implementation start date?
 - What is the acceptable minimum functionality that is needed?
 - Will implementation include some form of piloting of functionality?