



DER Aggregation – Settlements Review

DIRS

December 21, 2021

Settlements

Metering
Configuration &
Requirements

- Data submissions for settlements will follow existing PJM PowerMeter and InSchedule requirements

Settlement
Requirements

- Uphold Order 745 for DR Settlements

Double Counting
Services

- Double counting will not be permitted in PJM Markets
- Determination of double counting due to retail activity will be determined by the EDC

- Existing Metering Requirements located in Manual 14D
 - Section 4.2.2: Metering Plan
 - Section 4.2.3: Metering for Individual Generators
 - “...a Generation Owner can negotiate data transmission to and from PJM through the local utility or transmission facilities owner. This allows the Generation Owner the flexibility to use already proven and acceptable methods of data transfer to **minimize initial startup costs and procedures, while meeting all of the current requirements** for providing data to PJM.”
 - “...can be supplemented with the use of the Internet-based PJM Tools such as inSchedule and Data Viewer, further expanding the data transfer capabilities between the customer and PJM without a direct connection to PJM.”

- Real-time (RT) revenue data is required to be submitted into PowerMeter either on a 5 minute or hourly basis in accordance with Manual 28, sections 1A and 3
 - [Current PowerMeter and InSchedule deadlines](#) – PowerMeter is next business day

- MW data true up
 - Generator RT MWh use the One-Month-Lag Meter Correction process via PowerMeter
 - LSE RT load MWh use the Two-Month-Lag Load Reconciliation process via InSchedule (needed because generator metering updated)
 - ***Demand Responders currently have no formal process for MW data true up***

- Distributed Energy Resource Aggregates (DERA) will be settled at the aggregation level in PJM Markets; however meter data will need to be submitted at the individual Distributed Energy Resource (DER) level
- This will allow PJM the ability to properly settle MWh for different types of DERs where accurate wholesale/retail settlements need to occur

- PJM will settle Demand Response resources participating in a DERA (homogeneous or heterogeneous) following FERC Order 745 requirements.
- Demand Response resources that wish to participate in a DERA will have the following additional requirements
 - Submit metered data through DR Hub following the PowerMeter deadline (1 business day after the Operating Day)
 - Mapped at a pricing node (instead of the zonal residual aggregate)

- DERAs which clear day-ahead will be settled in the day-ahead spot market at the applicable cleared DA LMP.
- If any demand response resources are in a DERA, the actual real-time load reduction will be used to carve out the DR activity
 - For any demand response MWs, the day-ahead load of the associated LSE will be adjusted
 - Demand Response MWs will be settled following demand response business rules (OATT Attachment K – Appendix Section 3.3A).

- Whenever a Demand Response resource clears day-ahead, PJM applies a negative load bid in day-ahead to the LSE associated with the registration.
- This negative load bid will be referred to as the negative DEC bid throughout this presentation.

- For any DERA which contains demand response (whether a heterogeneous or homogeneous DERA), PJM will be applying a negative DEC to the LSE for any cleared day-ahead bids.
- Since many LSEs can be affected by demand response resources at the same pricing point, PJM will need to know the percentage of response each resource will be responsible for in the day-ahead market.
- This is the same process PJM currently uses for DR Dispatch Groups which clear day-ahead.

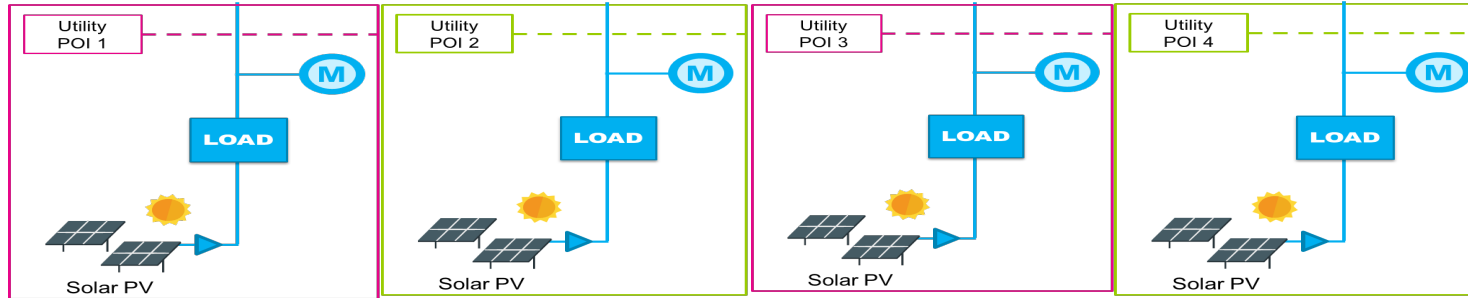
- Since PJM is requiring metered data for demand responders following the PowerMeter deadline (next business day), PJM will require no additional data from the aggregators for the purpose of calculating the negative DEC.
 - PJM will apply the actual relief to the day-ahead market as a negative DEC associated to each impacted LSE

- DERAs which clear day-ahead will be settled for any deviations from day-ahead commitments in the balancing spot market
- DERAs which are dispatched in real-time will be settled in the balancing spot market
- Any balancing demand response in a DERA will have reductions settled as real-time economic load response

- Since DERAs will be modeled as no-commitment units, DERAs that clear Day-ahead or are Dispatched by PJM in real-time will not be eligible to receive Operating Reserve Make-whole Credits, unless they are manually dispatched by PJM
- DERA resources are eligible to incur Operating Reserve Deviation Charges.

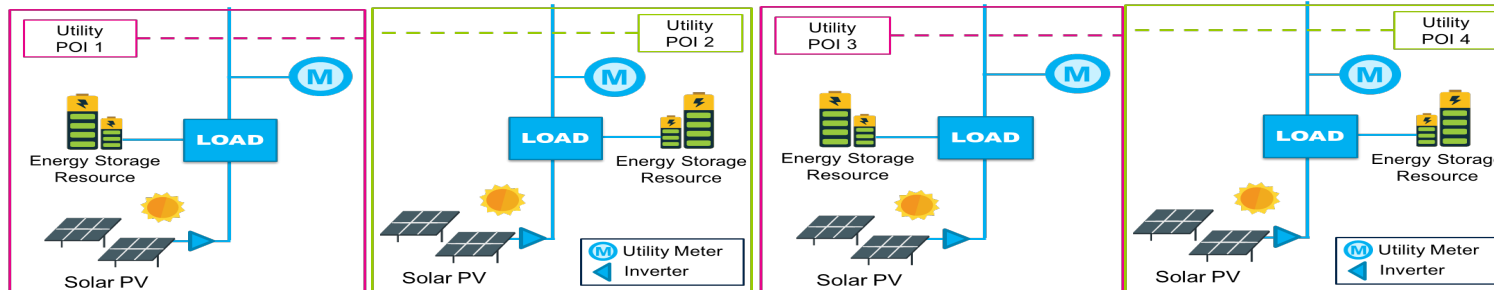
- **Double Counting Services:** limit the participation of resources in RTO/ISO markets through a distributed energy resource aggregation (DERA) that are receiving compensation for the same services as part of another program.
 - Double Counting not permitted in PJM markets; resources cannot be compensated for the same MWs/services in retail and wholesale

- NEM Use Case 1: Solar resource(s) participating in NEM programs



Determination needed by EDC if Solar resource can participate in PJM Markets without double counting

- NEM Use Case 2: Solar resource(s) participating in NEM programs with co-located ESR



Determination of solar participation (use case 1) and if ESR can participate in PJM Markets and necessary metering

- **Retail Net-Energy Metering (NEM)** : DER Resources modeled at a location with a NEM rate and wanted to participate in wholesale markets through a DERA.
 - Participation in wholesale market will need to be approved by EDC after evaluation of resource(s) participation in NEM program and the associated revenue for that participation
 - The will be implemented in the Utility Review process, and will be on a utility-by-utility bases to capture different utility NEM requirements
 - Example: an “all in” NEM rate that already compensates for capacity and ancillary services will not be able to participate in PJM Markets without double counting. NEM rates that are “energy only” may allow resource(s) to participate in PJM Markets.

- **Wholesale / Retail Market Coordination:** An example of this scenario would be Flagging for normal DR activity while Peak-shaving for Capacity. Any such activity would need to be monitored and flagged.
 - For situations such as the example above, resources would be scheduled for retail, and they would not be paid for wholesale.
- **Wholesale service (such as front of the meter generation) and distribution service being run at the same time:** In this scenario, a resource is dispatched by PJM for distribution level services, therefore, they are self-scheduled for energy in the PJM Market. An example of such would be a battery that is running on-peak.
 - If the resource is dispatched, it must reflect this in their wholesale market offer.

Settlements Example - Heterogeneous DERA

DERA

Day-ahead Cleared 10 MW

Generator Aggregate

6 MW Metered Load

DR Resource 1
1.75 MW Metered Load

DR Resource 2
1.3 MW Metered Load

DR Resource 3
2.25 MW Metered Load

Total Metered Load = 11.3 MW

DA LMP
\$100

RT LMP
\$150

Net Benefits Threshold
\$25

Resource	Calculation (RT Metered Load/Total RT Metered Load) * DA Cleared MW	Adj. Day-Ahead Position
Generator Aggregate	$(6/11.3) \times 10$	5.309
DR Resource 1	$(1.75/11.3) \times 10$	1.549
DR Resource 2	$(1.3/11.3) \times 10$	1.150
DR Resource 3	$(2.25/11.3) \times 10$	1.991
Total		10

Resource	DA Spot Market Ch. (Adj. DA Position * DA LMP *-1)	Bal MW (RT Load – Adj. DA Position)	Bal Spot Market Ch. (Bal MW * RT LMP * -1)
Generator Aggregate	\$(530.90)	0.69	\$(103.50)

Resource	DA Load Response Cr. (Adj. DA Position * DA LMP)	Balancing MW (RT Load – Adj. DA Position)	Bal Demand Response Cr. (Bal MW * RT LMP)
DR Resource 1	\$154.90	0.201	\$30.15
DR Resource 2	\$115.00	0.15	\$22.5
DR Resource 3	\$199.10	0.259	\$38.85

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Proposed Settlement Requirements for DER Aggregation



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