PJM Order 2222 Use Case Update

Clarifications and Capacity, Energy, AS Walkthrough

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Use Case Disclaimer

- This Use Case review may reflect proposal items that have been revised or updated since the most recent PJM Draft Proposal presented at the **November 2021 DIRS**
  - Proposal items with updated requirements will be noted verbally or visually
  - There will be examples outlined in PJM Proposal slides not captured in this presentation
  - PJM still welcomes comments and questions on updated proposal items during this presentation for consideration

Use Case Updates: Agenda

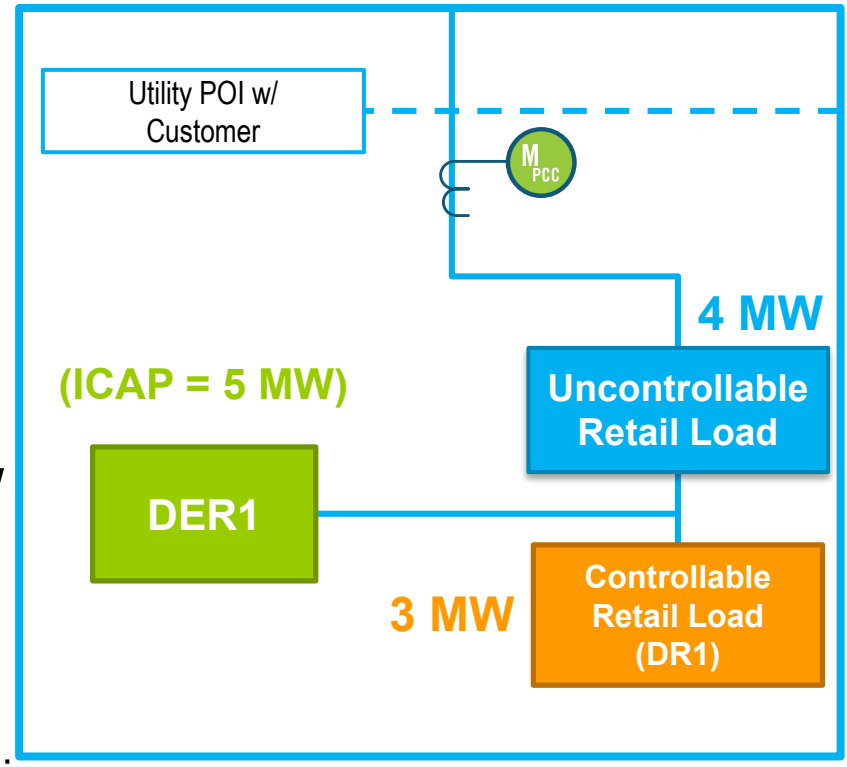
- Provide an update on capacity valuation methodology
- Walk through market participation for Use Cases
  - Capacity
  - Energy
  - Ancillary Services
- Discuss NEM interactions and double counting

For Reference – Use Cases: Outline

	Composition	Configuration	Sites	Use Case Goal
1	Homogeneous	Front of the meter	One	• Demonstrate size requirements and their implications.
2	Heterogeneous	Front of the meter	Multiple	• Demonstrate information exchange on an aggregate basis. • Walkthrough utility review with multiple distribution feeders.
3	Homogeneous	Behind the meter	One	• Demonstrate participation for sites co-located with retail load. • Illustrate rules where aggregates contain both potential for injection and load reduction.
4	Heterogeneous	Behind the meter	One	• Demonstrate participation for sites co-located with retail load. • Illustrate rules where aggregates contain both potential for injection and load reduction. • Highlight rules for multiple technology types where necessary.
5	Homogeneous	Behind the meter	Multiple	• Illustrate an aggregation of **many customer sites with BTM generation** wanting to participate in one or multiple markets.
6	Heterogeneous	Behind the meter	Multiple	• Illustrate an aggregation of **many customer sites, each with mixed technology types**, wanting to participate in one or multiple markets.
7	Homogeneous	Behind the meter	Multiple	• Illustrate an aggregation of **many distinct customer sites with load reduction** wanting to participate in one or multiple markets.

Use Case 4: Capacity Participation Options

- **Site Max Load = 7 MW (Controllable (DR) + Uncontrollable)**
- **DER1 = 5 MW ICAP, PLC = 5 MW**



Continuous DER Capacity Evaluation

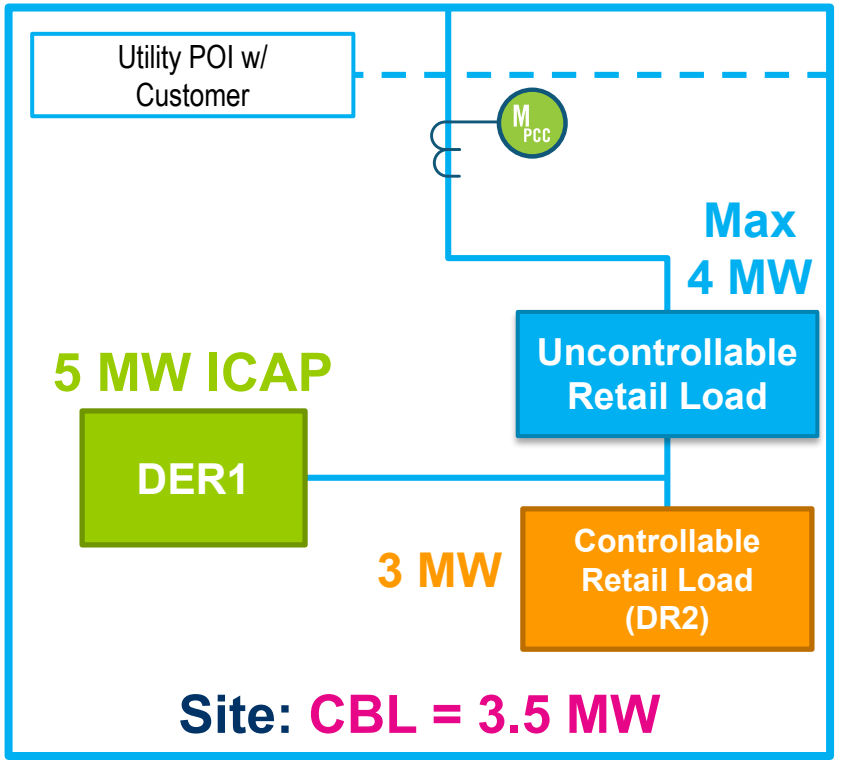
- Two part calculation- accounting for load reductions and Injection MWs
  - DR: 5 MW PLC – resource eligible for 5MW capacity with 5MW of load reduction available (3MW of DR1, 2MW from DER1)
  - Injection: (DER1 ICAP – Max Load) = 5MW – 7MW= 0MW
    - This site would not have any capacity value for injections
    - Ongoing analysis if load reduction should be accounted for in analysis
    - (DER1 ICAP – Max Uncontrollable Load) = 5MW – 4MW = 1MW
    - Looking across other initiatives within PJM (BTMG, co-sited load)

Use Case 4: Energy Participation Options

- Continuous DER Energy Participation

- DER Aggregations will be compensated in energy settlements for injections, plus any reductions that are calculated based on existing Economic Load Response Customer Baseline methodology (CBL)

- Example: CBL = 3.5MW, DR2 reduces 3 MW, DER1 operates to 5 MW
  - Site meter sees net injection of 1 MW
  - Energy credit = 1 MW injection + 3.5 MW CBL reduction = **4.5 MW**

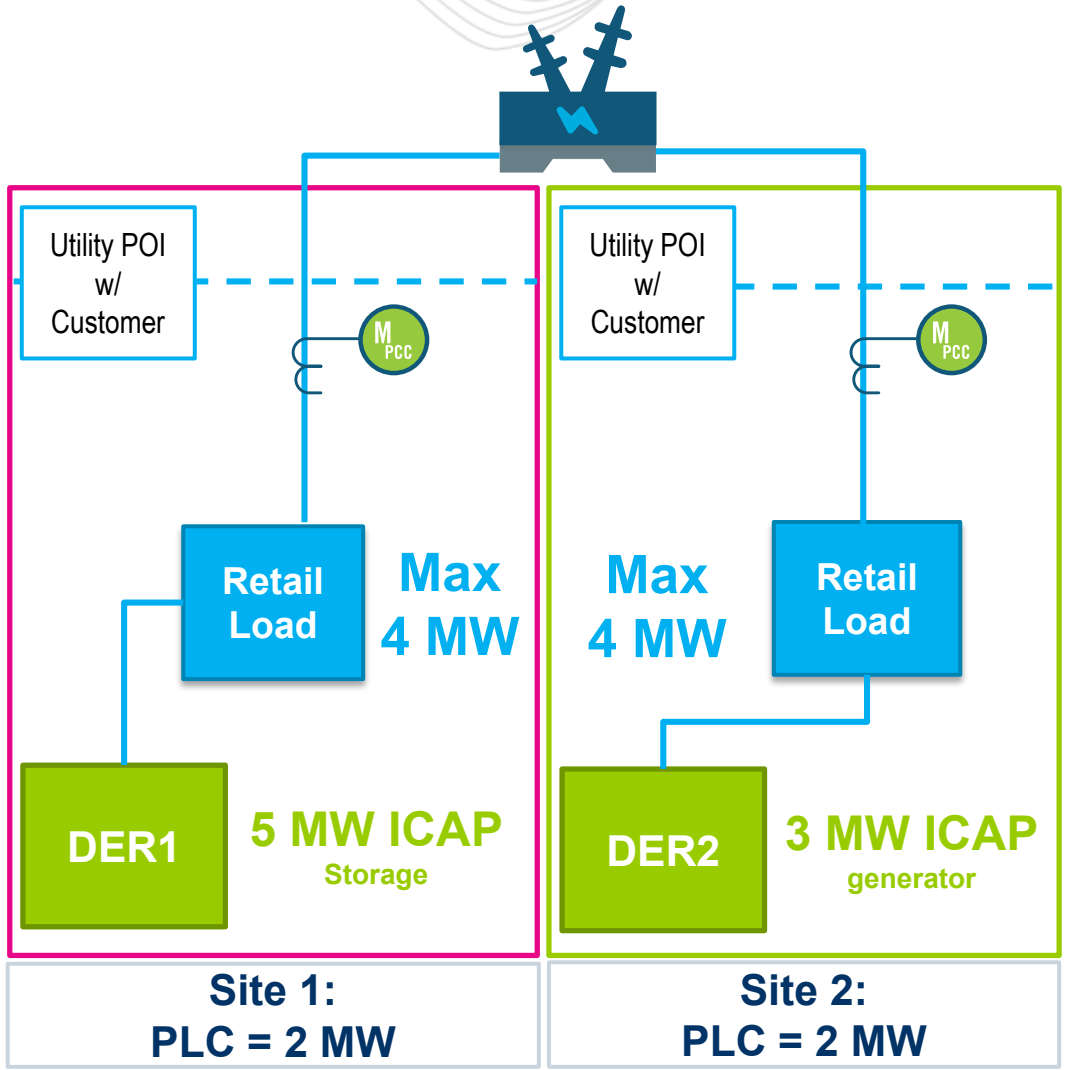


Use Case 6: Capacity Participation Options

- Site 1: Max Load = 4 MW, DER1 = 5MW ICAP, storage, PLC =2MW
- Site 2: Max Load = 4 MW, DER2 = 3MW ICAP, generator, PLC=2MW

Continuous DER Capacity Evaluation

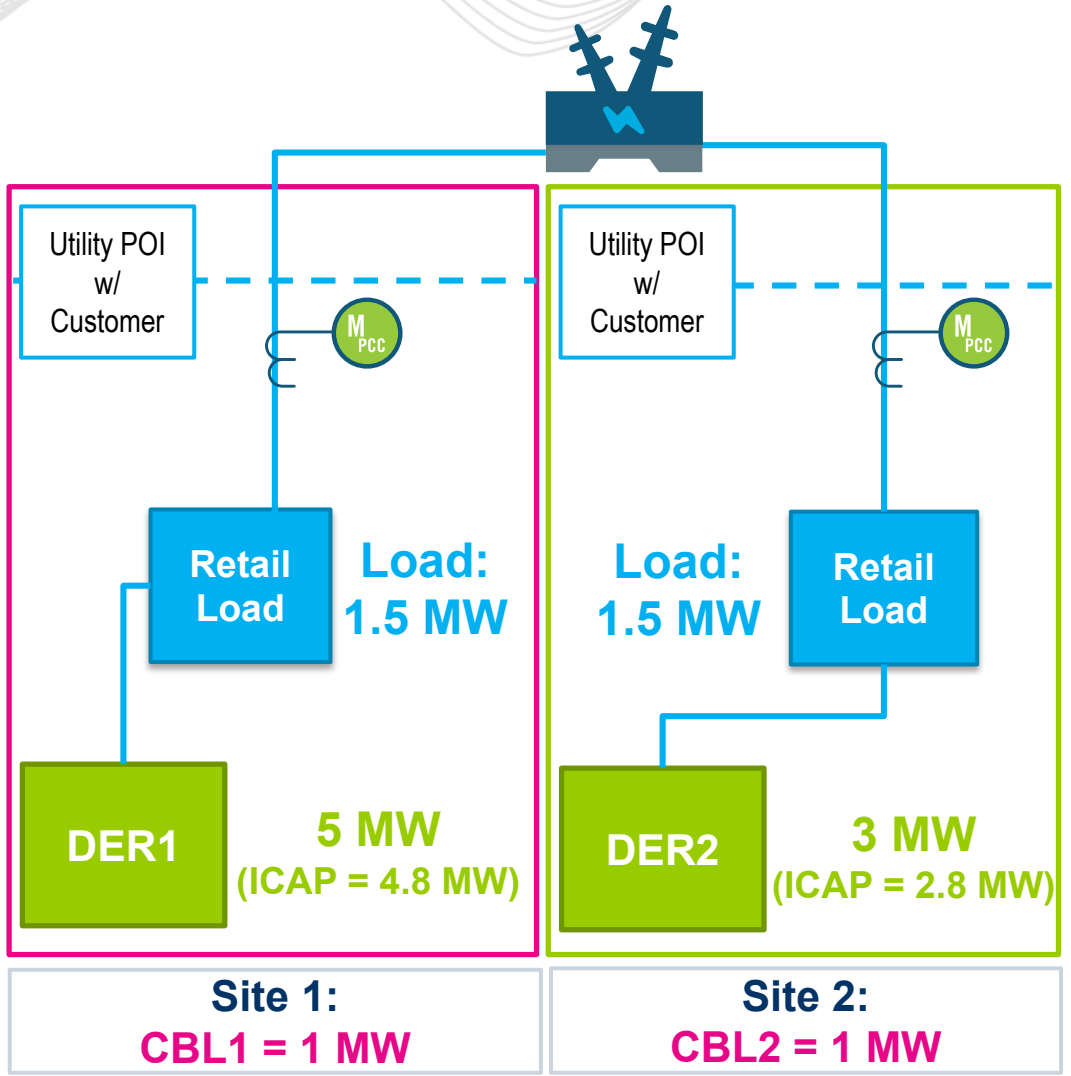
- **Site 1:** DR: 2 MW PLC = 2 MW capability
  - Injection: (5 MW ICAP – 4 MW) = 1MW capability
  - **Site 1 = 3MW capability**
- **Site 2:** DR: 2 MW PLC = 2 MW capability
  - Injection: (3 MW ICAP – 4 MW) = 0MW capability
  - **Site 1 = 2MW capability**
- DER Aggregation = Site 1 + Site 2
- **Up to 5MW capability** can be offered into PJM capacity market



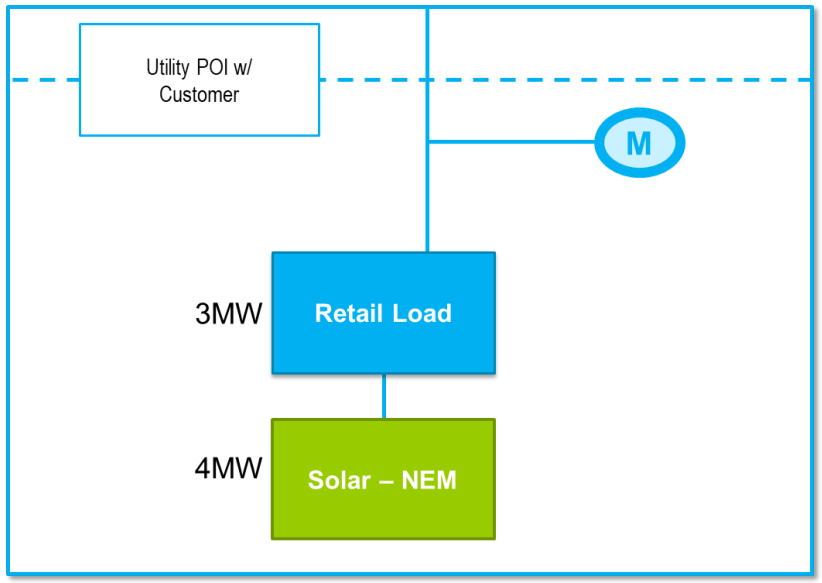
Use Case 5: Energy Participation Options

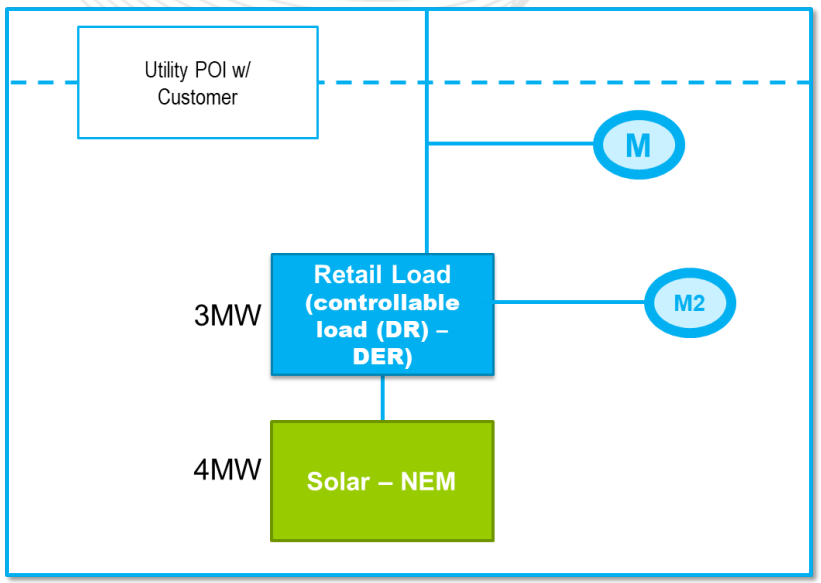
- Continuous DER Energy Participation
- DER Aggregations will be compensated in energy settlements for injections and reductions, based on site CBL

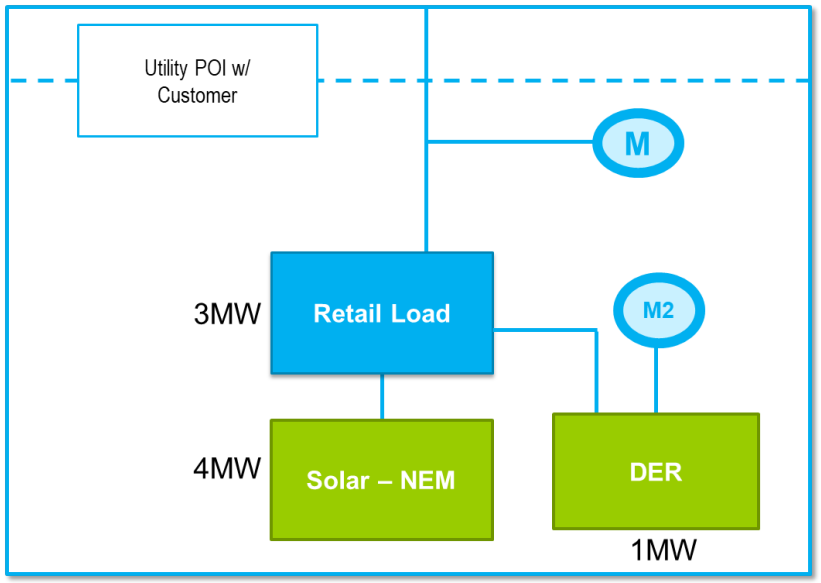
- Example: CBL1 and CBL2 are 1 MW each, load is 1.5 MW, DER1 operates to 5 MW and DER2 operates to 3 MW
  - Site 1 meter sees net injection of 3.5 MW, Site 2 meter sees net injection of 1.5 MW
  - Energy credit = Site 1 + Site 2 = (3.5 MW + 1.5 MW) injection + (1 MW + 1 MW) CBL reduction = **7 MW**



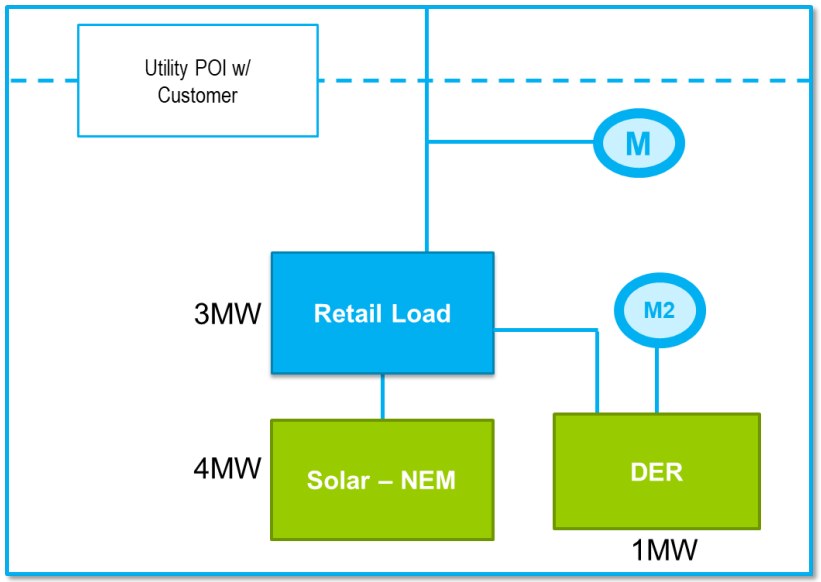
Net Energy Metering







Net Energy Metering customers are eligible to participate in A/S Only using the DERA model, assuming metering and performance requirements can be met. NEM customers that have a PLC are only eligible to offer capacity as a Demand Resource (DR).



Ancillary Service Participation

Regulation

- DER eligible to be submetered for regulation (M2)
- Offer up to qualified / tested capability

Reserves

- Eligible up to the MW capability of DER for reserve offers
- MWs provided would be validated at the POI (M) (ex. 1MW assignment would need to show a 1MW response at M during a spin event)

Use Cases: Potential Next Steps

- Receive feedback
- Complete market participation review for Use Cases
- Address feedback
- Continue to iterate with stakeholders, adding additional detail throughout implementation process

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