DER Stakeholder Feedback on ISO-NE Compliance with Order No. 2222

Advanced Energy Economy, Advanced Energy Management Alliance

June 2021 Markets Committee Meeting

About Advanced Energy Economy (AEE)

- AEE is a national association of businesses that are making the energy we use secure, clean, and affordable.
- AEE is the only industry association in the United States that represents the full range of advanced energy technologies and services, both grid-scale and distributed. Advanced energy includes energy efficiency, demand response, energy storage, wind, solar, hydro, nuclear, electric vehicles, and more.
- AEE also supports the work of the Advanced Energy Buyers Group (”AEBG”), a coalition of large buyers of advanced energy technologies to meet sustainability goals.
- AEE pursues policy transformation in the states and in wholesale power markets that expand market opportunities for advanced energy technologies and lay the foundation for a 100 percent clean advanced energy future.

Advanced Energy Management Alliance

Empowering consumers through distributed energy resources, including demand response and advanced energy management

We are providers and consumers united to overcome barriers to nationwide use of distributed energy resources . We advocate for and educate on policies that empower and compensate consumers to have cost-effective, efficient, resilient, reliable, and environmentally-sustainable choices.

*The views expressed here reflect the collective positions of AEMA and do not necessarily reflect those of any one of its member companies.

Agenda

- Overview of Order 2222 and expected use cases
- Key barriers to participation by various use cases
- Recommended Improvements to ISO-NE’s proposal

Overview of Perspective on O.2222

DERs are an important part of New England’s energy future

- Distributed solar and storage are already growing quickly in New England and will continue to do so; ISO-NE projects more than 10 GW of PV by 2030*
- Recent studies demonstrate the importance of electrification and flexible load—whether the loads associated with electrification are optimized in wholesale markets will significantly impact the cost and reliability of the future grid:
  - **Massachusetts Energy Pathways:** The “All Options” base case calls for significant electrification, with electricity increasing from 19% of final energy in 2020 to 68% in 2050; relies on significant increases in flexible load across water heating, heating, cooling, and light duty vehicles (ranging from 15-50% of these loads being flexible by 2050)**
  - **The Brattle Group:** Decarbonization pathway calls for electrification of 90% of LDVs, 80% of all other on-road transportation, and 95% of fossil fuel demand in residential buildings by 2050***
  - **E3 and EFI:** Looks at two scenarios, High Fuels and High Electrification, both of which rely heavily on electrification to meet 2050 goals****

*https://www.iso-ne.com/static-assets/documents/2021/03/final_2021_pv_forecast.pdf
**https://www.mass.gov/doc/energy-pathways-for-deep-decarbonization-report/download at 2, 102
***https://brattlefiles.blob.core.windows.net/files/17233_achieving_80_percent_ghg_reduction_in_new_england_by_20150_september_2019.pdf
****https://www.ethree.com/wp-content/uploads/2020/11/E3-EFI_Report-New-England-Reliability-Under-Deep-Decarbonization_Full-Report_November_2020.pdf

Goals and opportunity of Order No. 2222

- Viable participation models that enable DERs to participate in wholesale markets to their full potential will:
  - Make the job of maintaining reliability easier by increasing visibility and dispatchability of DERs
  - Deploy and use economically efficient levels of DERs
  - Avoid reliance (and payment) to other resources to supply system needs that DERs can provide cost-effectively
  - Reduce usage of other (emitting/less efficient) resources
  - Substantially augment load flexibility that will help to manage an increasingly variable resource mix
- Order No. 2222 gives us the opportunity to make the most of the region's investment in DERs

Likely near-term use cases

- Frequently Dispatched DERs, e.g., Electric Buses, Battery storage
- Residential Demand Response and Energy Efficiency, e.g., Smart Thermostats and Water Heaters
- Residential Behind-the-Meter (BTM) Resources, e.g., Solar, Solar + Storage, Storage, and EV Charging
- Front-of-the-Meter (FTM) Distribution-Connected Resources

This is a non-exhaustive list intended to illuminate considerations to accommodate a range of DERs. Additional details in appendix.

Illustrative Use Case: Electric Busses

- A growing number of school districts are replacing fossil fuel school buses with electric models which are rarely used at night or during the summer
- During these times, these resources can become a flexible resource that can provide many grid services
- There are currently **480,000** school buses serving more than **25 million** students
- Other examples of frequently dispatched DERs include residential EVSE, energy storage, and workplace charging

Additional details on this and other use cases included in appendix.

Barriers that O.2222 Must Overcome to Enable DERAs to Participate

Key Barriers

Current market rules	Technology/Use Case	Participation Model
Viable Participation Model	C&I Load Curtailment/Infrequently Dispatched DG	Existing Active DRR Program
Good foundation, but market will soon outpace ISO models	Behind-the-meter solar, residential storage, and EE	Passive DR Options; as these devices proliferate and become more capable, existing ISO-NE models will be strained
Good foundation but challenges remain	Front of the Meter Distributed Solar + Storage.	Existing four options presented in April 2020 webinar properly integrate these DERs, with exception of reserves accounting for collocated resources; interconnection remains a challenge, as does the inability to aggregate.
Signifiant barriers to ISO-NE participation	Behind-the-meter technologies that frequently dispatch (e.g. storage/ electric buses) and/or provide retail-level use cases (e.g. a Non-Wires Solution to a distribution utility).	Active DR Baseline rules and prohibition on real-time energy market participation for DR challenge the ability of these resources to participate; we expect these use cases to proliferate in New England.
Signifiant barriers to ISO-NE participation	Residential and Small Commercial “dispatchable” use cases (e.g. electric vehicle charging).	Current ISO-NE metering and telemetry requirements coupled with lack of Advanced Metering Infrastructure (AMI) renders participation nearly impossible.

Initial Recommendations to Improve ISO-NE Proposal

DER stakeholders support many elements of ISO-NE’s O.2222 compliance proposal, but changes are necessary

- The overall structure of the SODERA and DDERA participation models is sound, and while we are still reviewing the details of the proposal and may have additional feedback, we find the general approach to the following issues to be logical and appropriate:
  - Size requirements
  - Locational requirements
  - Operational coordination
- However, without changes to other parts of the proposal, DERs will continue to face barriers to entry that will prevent them from taking advantage of these new participation models and preclude them from market participation.

Recommendation #1: Submetering must be a viable participation option

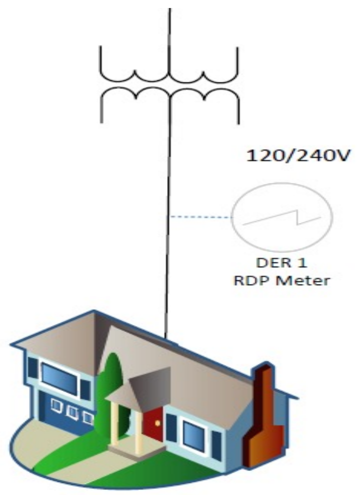
- Submetering uses device-level metering (behind the Retail Delivery Point) to separate out DER performance from the rest of the facility load
  - Submetering is used in ISO-NE today for passive DR, including BTM solar and solar+storage
  - This is critical for many current and likely future DER use cases, e.g., BTM storage, EVSE, hot water heaters, smart thermostats, etc.
- Submetering is necessary to comply with FERC's directive to "allow distributed energy resource aggregators to register distributed energy resource aggregations under one or more participation models *that accommodate the physical and operational characteristics* of the distributed energy resource aggregations" (P8)
  - Without submetering, many DERs will face significant barriers to entry and be precluded from offering all the services they are technically capable of providing
- Submetering is allowed in CAISO's DERP model and NYISO's DER model (both with FERC approval), and has been proposed in PJM's straw proposal under Order No. 2222

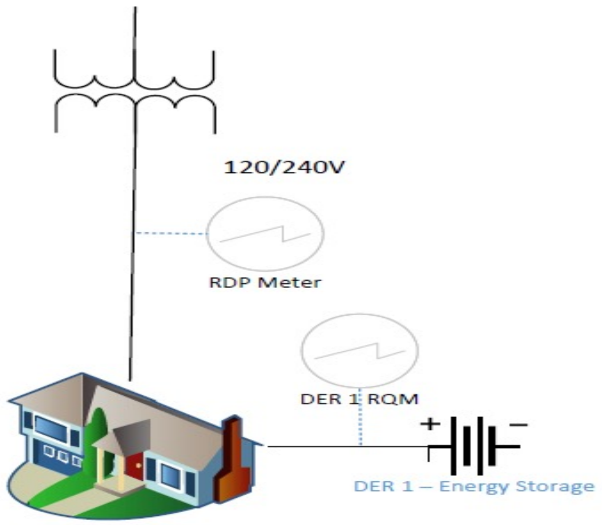
ISO-NE's proposal technically allows submetering, but faces major barriers to implementation

ISO-NE has proposed two options for a facility to participate:

- **At the Retail Delivery Point,** with the entire facility enrolled
  - Requires full-facility participation with all load at the facility participating as the DER asset, which does not accommodate DERs that need to be separated out from facility load
- **At the asset level,** with load reconstitution
  - <u>Allows submetering</u>, but implementation of the metering approach is outside of ISO-NE control and FERC jurisdiction
  - The Meter Reader Working Group has indicated that submetering (especially with reconstitution) is not implementable by meter readers in the near-term

Example: Residential home with battery storage





Without submetering:

- Aggregator is responsible for bidding all changes in household load, despite controlling only the battery
- Aggregator cannot bid in a single device BTM
- Without residential AMI meters, does not allow for residential BTM resource participation
- Fails to accommodate many DER use cases / business models

With submetering:

- Aggregator is responsible for bidding changes in battery activity
- Residential customers can participate without AMI
- Accommodates current and likely future business models

Given the importance of submetering, changes are needed

- A pending clarification request at FERC may reduce the need for reconstitution, although metering challenges exist with or without reconstitution
- To enable submetering, alternative approaches will likely need to be considered
  - This could include 3rd-party metering and/or ISO-NE taking on some relevant responsibilities
  - Parallel metering has been suggested as a potential approach to separate out DER performance, but is unworkable for many use cases, including any residential DER, and therefore does not resolve the barrier to submetering
    - Parallel metering requires installation of duplicative revenue-quality metering which is costly and impractical for most DERs
    - Any consideration of parallel metering should be accompanied by a detailed cost comparison to alternatives

Recommendation #2: Allow DR subject to O. 745 to participate in a DERA in same manner as it does a DRR

- We believe ISO is moving in the right direction on this issue and applaud the commitment to allow DR subject to O.745 to participate in a DERA; we look forward to reviewing the details of ISO's proposal next month.
- In order to fully enable participation by all types of behind-the-meter price responsive load, some tweaks are needed to the DR model:
  - Baseline approach must work for frequently dispatched loads (explained on subsequent slides)
  - DR must have the option to offer into real-time energy market
- ISO-NE model also does not accommodate passive DR and EE, which are included in the definition of DERs in FERC Order No. 2222

Reform the DERA DR model to incorporate the NYISO DER Baseline approach

Technology & Use Case to enable	Recommended Solution
Behind-the-meter technologies that frequently dispatch and/or provide retail-level use cases (e.g., electric school buses)	Update the DERA DR Model to allow a baseline option similar to what FERC approved in the NYISO DER filing This allows for metering at the facility level while only enrolling a subset of the facility as supply in the market.

Reform the DERA DR model to incorporate the NYISO DER Baseline approach

- **<u>Proposal</u>**: Similar to FERC-approved NYISO DER baseline approach (see Appendix B), add back any "performance" to the customer baseline, which addresses baseline erosion and enables dual participation use cases (e.g. utility programs such as Daily Dispatch, DCM, etc.).
- This approach encourages DERs to reflect their retail-level use cases in the wholesale energy market, giving ISO-NE visibility and optimization capabilities
- Settlement happens at the Retail Delivery Point meter so no reconstitution is necessary, but DER Aggregator can enroll just a portion of the facility/the DER in the market
- Baseline includes last 10 days, regardless of whether there is dispatch, and includes addback for any "event" performance if the DER clears the energy market. DERA DR receives full LMP unless below Net Benefits.

Recommendation #3: Avoid undue burden to DERs in capacity qualification and Overlapping Impact Test

- **ISO's original proposal:**
  - Show of Interest (SOI) requirements and Overlapping Impact Test (OIT) for DERAs would be similar to what applies to new generators
    - Concern: detailed info on specific DERs that make up DERA would be needed during capacity qualification process if generation model used for SOI and OIT; it's not realistic or necessary for aggregators to identify specific DERs 3+ years in advance.
- **ISO-NE has indicated that it may change its proposal** such that it would base new capacity qualification process and OIT for DERAs on the DR model
  - We support this change and look forward to further discussions
  - We would like to understand if OIT will apply at the DERA level; would appreciate if this could be addressed at the appropriate technical committee

Recommendation #4: Metering & telemetry requirements should reflect actionable needs

- Metering and telemetry come at significant cost; as a principle, metering and telemetry should be tailored to provide needed, actionable information
- For DDERAs, telemetry requirements jump significantly from resources providing 30-minute reserves (every 5 minutes) to resources providing 10-minute reserves (every 10 seconds).
- We suggest that telemetry requirements for DERAs be no more granular than those required for Demand Response Assets (DRAs):
  - 5 minute telemetry required for DRAs that aren't providing TMSR or TMNSR (10 minute spinning or non-synchronized reserves)
  - 1 minute telemetry required for DRAs providing TMSR or TMNSR

Recommendation #5: Implementation should be expedited to the extent possible

- The proposed filing date of 2/2/22 followed by an implementation phase could delay DERA's access to markets.
  - Show of Interest for FCA 17 (opening April 2022) will occur after the Feb. 2022 filing date, but before ISO's DERA participation model is implemented. The FCA17 Capacity Commitment Period will presumably start after the implementation phase.
- Near-term changes and/or waivers to FCM participation rules would alleviate delays:
  - We recommend giving DERs the option to enter into FCA 17 (and subsequent FCAs) qualified as DERAs.
  - Alternatively, we recommend:
    - Allowing resources to change their resource classification to a DERA at a later date.
    - Temporarily waiving the requirement for DERs on dual-use feeders to have an ISO queue position.
- In general, we support any opportunities to ensure smooth and expeditious implementation to remove barriers to DER participation.
  - We look forward to learning more about ISO-NE's initial thinking about implementation.

Contact

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Appendix A: DERA Use Cases
Frequently Dispatched DERs, e.g., Electric School Buses

- ✓ A growing number of school districts are replacing fossil fuel school buses with electric models which are rarely used at night or during the summer
- ✓ During these times, these resources can become a flexible resource that can provide many grid services
- ✓ There are currently **480,000** school buses serving more than **25 million** students
- ✓ Other examples of frequently dispatched DERs include residential EVSE, energy storage, and workplace charging

Appendix A: DERA Use Cases
Opportunity and Barriers: Frequently Dispatched DERs

Potential Retail Services:

- Transportation/Electric Vehicle Charging
- Demand Response
- Peak Load Shaving
- Non-Wires Solutions Via Distribution Utility

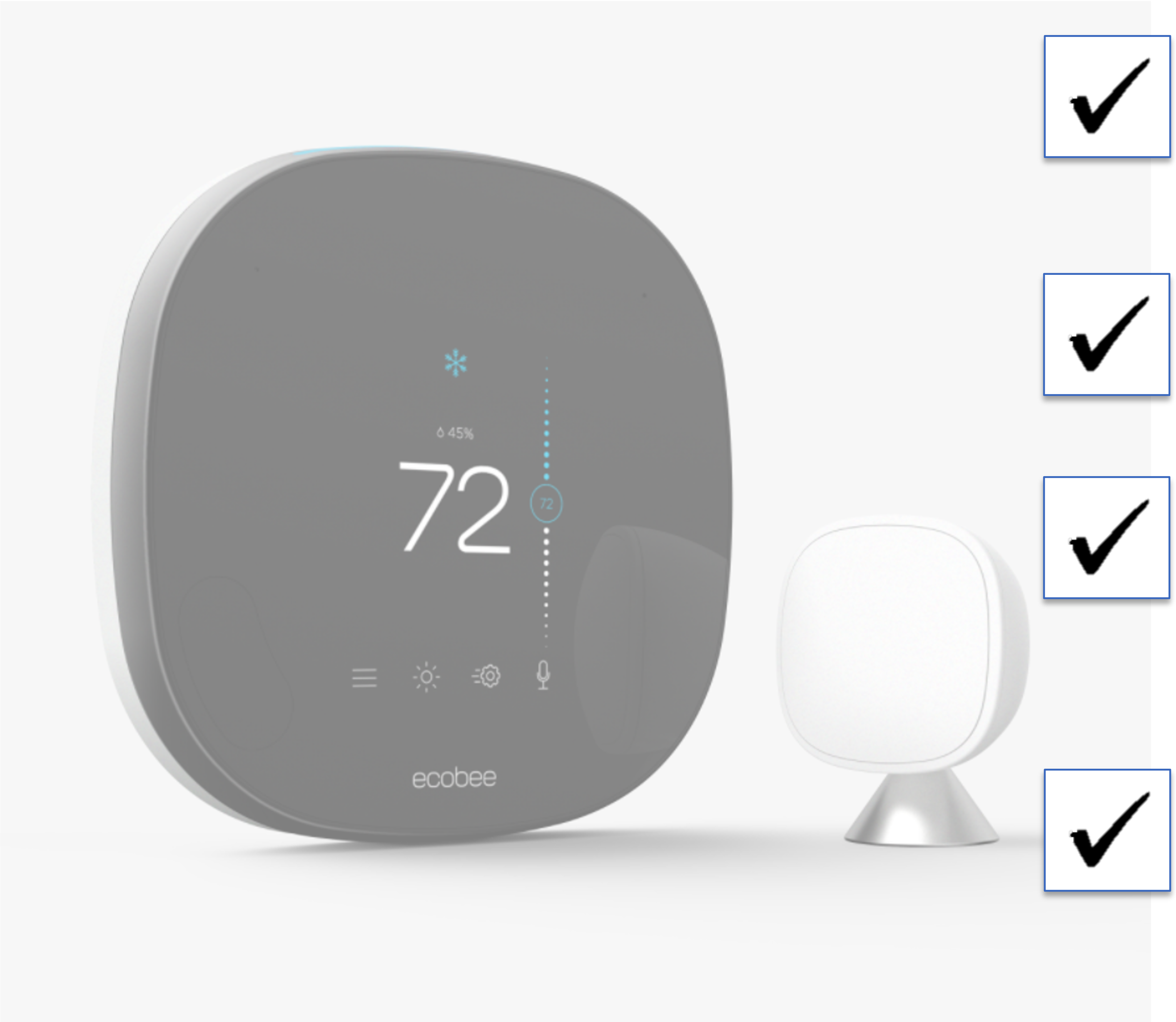
Potential Wholesale Services:

- Energy
- Capacity
- Ancillary Services

To enable wholesale market participation, grid operators will need to:

- Develop a continuous participation model that gives these resources credit for their full capacity value
- Allow these DERs to update energy offers in real-time to account for retail uses
- Allow submetering and/or create properly designed “baselines” to avoid baseline erosion due to frequent dispatch and give these resource fair compensation

Appendix A: DERA Use Cases
Residential Demand Response (DR) and Energy Efficiency



- ✓ Order 2222 allows residential customers and their homes to play a part in the power grid also
- ✓ Residential devices such as smart thermostats and water heaters control the largest loads in homes
- ✓ Enabling wholesale market participation for smart thermostats alone has the potential to contribute **40 GW** of load reductions through residential customers
- ✓ While DR aggregation models already exist, these resources will have more options to offer more services as part of a DER aggregations under O.2222

Appendix A: DERA Use Cases
Opportunity and Barriers: Residential DR and EE

Potential Retail Services:

- Enhanced Home Comfort and Cost Savings
- Energy Efficiency and Demand Response
- Peak Load Shaving and Load Smoothing

Potential Wholesale Services:

- Energy
- Capacity
- Ancillary Services

To avoid data access barriers and open up wholesale markets to these resources, grid operators should:

- Allow direct metering (or "submetering") of residential DR resources
- Ensure that metering and telemetry requirements are based on data quality needs that provide the RTO/ISO with necessary, actionable information tailored to the services being provided
- Put procedures in place to avoid charging customers twice for the same energy if residential DERs are dispatched to both increase and reduce load

Appendix A: DERA Use Cases
Behind-the-Meter Solar + Storage, Storage, EV Charging

- ✔ DER aggregators will be seeking to bid customer-sited resources such as batteries, rooftop solar panels, smart loads (e.g., EV chargers), and microgrid resources into wholesale markets
- ✔ There is widespread interest in a transition to an electrified economy from consumers, states, and policymakers
- ✔ These DERs provide grid operators with reliability benefits and delivers cost savings to consumers while improving local resiliency and help meet state climate goals

Appendix A: DERA Use Cases
Opportunity and Barriers: BTM Solar, Storage, EVSE

Potential Retail Services:

- Customer Bill Management
- Peak Load Shaving
- On-Site Backup Generation
- Renewable Energy Credits (RECs)
- Resiliency Services

Potential Wholesale Services:

- Energy
- Capacity
- Ancillary Services
- Demand Response and Reverse Demand Response

To open up wholesale markets to these DERs, grid operators should:

- Create a participation option for smaller DERs that allows for sub-metering
- Limit the data and telemetry required for these small, sub-metered resources to what is actionable given the market services the resource is providing
- Ensure flexibility so that providers have the ability to design and bid in different configurations (e.g., different hybrid solar+storage resources)

Appendix A: DERA Use Cases
Front-of-the-Meter (FTM) Distribution-Connected Resources,

- ✓ Deployment of FTM distribution-connected resources has surged in recent years
- ✓ States, municipalities, and local governments are interested in larger DERs (such as community solar or microgrids, that may include multiple generation technologies).
- ✓ However, bulk power grid operators and distribution utilities have struggled to take full advantage of these unique resources.

Appendix A: DERA Use Cases
Opportunity and Barriers: FTM Resources

Potential Retail Services:

- Peak Load Shaving
- Net Metering
- Renewable Energy Credits (RECs)
- Resiliency Services

Potential Wholesale Services:

- Energy
- Capacity
- Ancillary Services

To open up wholesale markets to these DERs, grid operators should:

- Avoid maximum size requirements that exclude FTM eligibility in DERAs and ensure that FTM resources are eligible to provide same the same products and services at the same rates as non-aggregated FTM DERs.
- Work with stakeholders to provide an opportunity for these resources to participate in the market with state-jurisdictional interconnection agreements (even when connected to a dual–use feeder). The translation of these rules into RTO-specific processes and models will be critical to their success.

Appendix B: Baseline/Metering Solution
FERC-Approved NYISO DER Baseline Approach

- NY-ISO model establishes a resource’s performance baseline using the RDP meter by adding event performance back to the metered load, thereby not eroding the DER’s baseline.
  - For frequently dispatched DER (e.g., BTM storage discharged daily) this model allows participation both in retail-level daily dispatch programs and maintains the resource's ability to earn capacity revenue.
- Advantages:
  - No reconstitution necessary for wholesale market energy settlements. All the metering is done at the facility level and energy compensation is entirely at the retail level making double counting energy settlement not an issue.
  - DER earns retail incentives (e.g., Daily Dispatch, Clean Peak, SMART, etc.), while also capturing revenue from wholesale market capacity participation.
  - Harmonizes retail and wholesale use cases. Capacity market performance metric otherwise eroded due to frequent dispatching for retail program.
  - DER behind facility RDP meter provides retail demand charge management.

Appendix B: Baseline/Metering Solution
FERC-Approved NYISO DER Baseline Approach

Settlement happens at the Retail Delivery Point meter, but DER Aggregator can enroll just a portion of the facility/the DER in the market.

Baseline only includes last 10 days, regardless of whether there is dispatch, and includes addback for any "event" performance if the DER clears the energy market. DER receives full LMP, unless below Net Benefits

Example Unadjusted 5- minute ECBL Calculation

- Calculation of Unadjusted 5-minute *Economic Customer Baseline Load* (ECBL) for 11:05 interval on March 2, 2018 (weekday)

Day	Load at 11:05 interval
March 1	1.1 MW
February 28	1.0 MW
February 27	1.0 MW
February 26	3.1 MW
February 23 Dispatch Day	2.8 MW + 0.5 MW (add-back) = 3.3 MW
February 22	2.4 MW
February 21	2.5 MW
February 20	1.2 MW
February 19 Dispatch Day	1.3 MW + 0.5 MW (add-back) = 1.8 MW
February 16	1.2 MW

FERC Approved Tariff Language:
https://nyisoviewer.etariff.biz/ViewerDocLibrary//Filing/Filing1485/Attachments/Att%20XIV%20OATT%20marked%20eff%209998.pdf

NEW YORK INDEPENDENT SYSTEM OPERATOR

Appendix B: Baseline/Metering Solution FERC-Approved NYISO DER Baseline Approach

- This approach encourages DERs to reflect their retail-level use cases in the wholesale energy market, giving NYISO visibility and optimization capabilities

Example Unadjusted 5-minute ECBL Calculation

- **Calculation of Unadjusted 5-minute ECBL for 11:05 on March 2, 2018 (weekday)**
  - Sorted highest to lowest
  - Unadjusted 5-minute ECBL = average of 5th and 6th values from descending list
  - Unadjusted 5-minute ECBL @ 11:05 March 2, 2018 = average (1.8, 1.2) = **1.5 MW**

Day	Load at 11:05 interval
February 23 Dispatch Day	2.8 MW + 0.5 MW (add-back) = 3.3 MW
February 26	3.1 MW
February 21	2.5 MW
February 22	2.4 MW
February 19 Dispatch Day	1.3 MW + 0.5 MW (add-back) = 1.8 MW
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