

Order No. 2222: Meter Reader Working Group Input

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(On behalf of the NEPOOL Meter Reader Working
Group April 2021)

Agenda

- Market Committee Referral Request
- Overview of Scenarios
 - DER without sub-metering
 - DER with sub-metering
- MRWG Response:
 - Meter Requirements
 - Systems Impacted
 - Responsible Parties (ISO-NE, HP AMR, DERA)
 - Timing of Upgrades
 - Costs to Participants
 - Host Participant Assigned Meter Reader Cost Recovery

Terminology/Acronyms

- A DER is proposed to be defined as “any resource located on the distribution system, or any subsystem thereof, or behind a customer meter.”
 - “These resources may include, but are not limited to, electric storage resources, distributed generation, demand response, energy efficiency, thermal storage, and electric vehicles and their supply equipment”
- A Distributed Energy Resource Aggregation (DERA) may consist of one or more Distributed Energy Resources (DERs)
- A DER Aggregator is the market participant responsible for assembling a collection of DERs into a DERA
 - The DER Aggregator is the single point of contact with the ISO-NE and the Host Participant Assigned Meter Reader (HP AMR)
- MRWG – NEPOOL Meter Reader Working Group
 - Subcommittee that reports to the NEPOOL Markets Committee
- RQM - Revenue Quality Metering
- RDP - Retail Delivery Point
- AMI - Advanced Metering Infrastructure
- MV90 – Software system that makes meter data readable for utility billing

MC Referral Request to MRWG

- What would be required to accomplish the proposed reporting for wholesale market settlement of distributed energy resource (DER) aggregations, meter data acquired from either meter reader or third party owned sub-meters of DER devices located within end-use customer facilities.
- What would be required to accomplish the proposed reconstitution of such DER devices' sub-metered consumption or generation to the remaining loads reported for settlement of the Load Assets in which the end-use customers with DERs are associated, such that the DER device's consumption or generation is not also reflected in the reported load of those Load Assets.
- Meter Reader and Host Participant current capabilities and identification of any increased capabilities needed to provide interval meters and daily reads of those meters for any end-use customer who seeks to be a part of a DER aggregation.

Overview of Scenarios

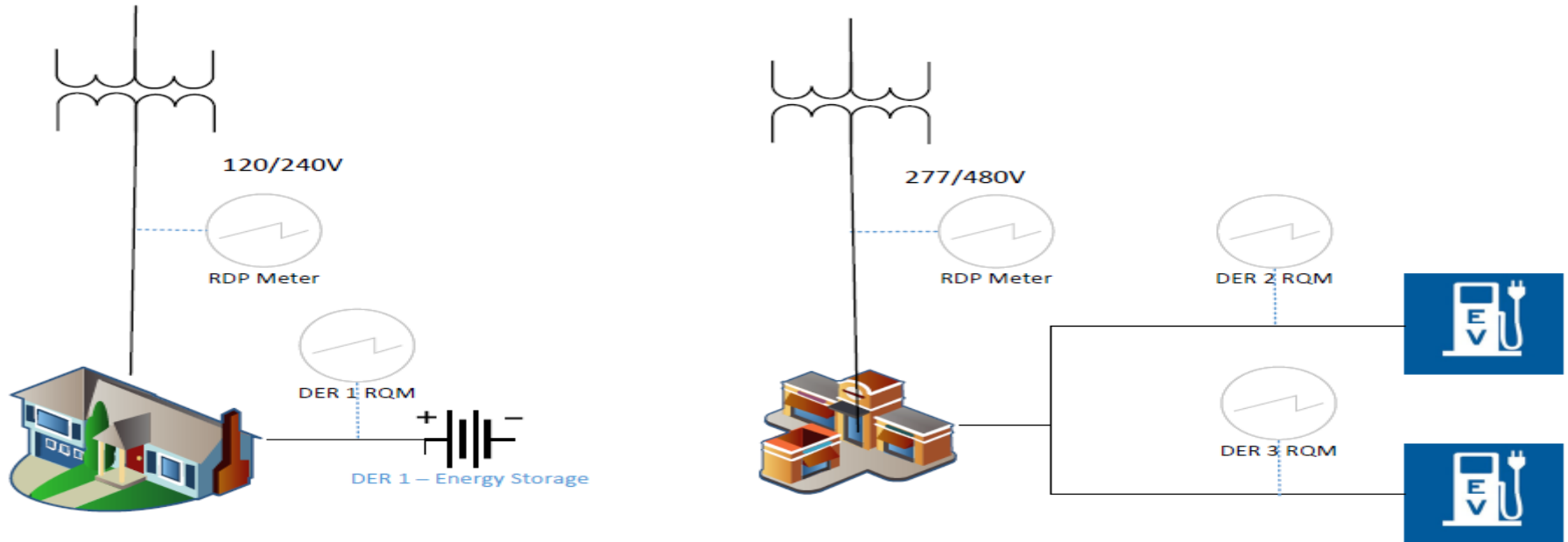
DER Aggregation – No Sub-Metering



- DER Aggregation may consist of DER 1, DER 2, and DER 3 in entirety where the Net Load or Net Generation is measured at the Retail Delivery Point (RDP). The DERA would obtain both a Load Asset and a Generator Asset ID such that load and generation are both settled at the applicable LMP. In all intervals, DERA reported data represents the sum of DER 1, DER 2, and DER 3 RDPs.
- Alternatively, the DERA is established just to monetize net generation, so all load is reported as part of another Load Asset but Net Generation reflected by any of the 3 the RQM meters is reported for the DERA.
- In both cases, Revenue Quality Metering with telecommunications capability would be required to separately meter the hourly positive (generation) and negative (load) energy flow at the RDP. (5-minute reporting, if applicable)

Overview of Scenarios

DER Aggregation – With Sub-Metering



- DER Aggregation may consist of DER 1, DER 2, and DER 3 devices only. The DERA would obtain both a Load Asset and a Generator Asset ID such that load and generation will both be settled at the applicable LMP. In all intervals, the DERA interval data represents the sum of DER 1, DER 2, and DER 3 data. The individual DER interval data for both load and generation must be reconstituted back to each RDP meter.
- Alternatively, the DERA establishes just a Generator Asset ID to monetize energy supply from devices. The device load would be reported as part of the Load Asset the RDP is associated with. DER generation must be reconstituted back to each RDP meter.
- In the first case, Revenue Quality Metering with telecommunications capability would be required to separately meter the hourly positive (generation) and negative (load) energy flow at each DER. RQM/telecommunications would also be required to capture the generation in the second scenario. (5-minute reporting, if applicable)
- In both scenarios, hourly interval data would be required at the RDP meter in order to perform reconstitution.

MRWG Response Topic 1

Q1. What would be required to accomplish the proposed reporting for wholesale market settlement of distributed energy resource (DER) aggregations, meter data acquired from either meter reader or third party owned sub-meters of DER devices located within end-use customer facilities?

Requirements: DER Aggregation - No Sub Metering

- Revenue Quality Metering & Telecommunication Capability for each DER at the Retail Delivery Point (RDP)
 - Upgrade MV90 Systems to handle potentially unlimited number of DER data points
 - Means to identify and aggregate DER devices to the DERA Registered Generator Asset ID
 - Upgrade Meter Data Management Systems to accommodate hourly interval data/register readings
 - Upgrade HP AMR Settlement Systems to handle hourly data associated with new DER load and generator Asset IDs
 - Upgrade to support additional reconciliation of load and generation data processing requirements

Requirements: DER Aggregation - With Sub Metering

- Revenue Quality Metering & Telecommunication Capability for each DER located behind the Retail Delivery Point (RDP)
 - Upgrade MV90 Systems to handle the aggregation potentially unlimited number of DER data points
 - Means to identify and aggregate DER devices to the DERA Registered Generator Asset ID
 - Upgrade Meter Data Management Systems to accommodate hourly interval data/register readings
 - Upgrade HP AMR Settlement Systems to handle hourly data associated with new DER load and generator Asset IDs
 - Upgrade to support additional reconciliation of load and generation data processing requirements
 - AMI metering at the RDP
 - Infrastructure to support AMI meters and data collection systems

MRWG Response Topic 2

Q2. What would be required to accomplish the proposed reconstitution of such DER devices' sub-metered consumption or generation to the remaining loads reported for settlement of the Load Assets in which the end-use customers with DERs are associated, such that the DER device's consumption or generation is not also reflected in the reported load of those Load Assets?

Requirements: DER Aggregation - No Sub Metering

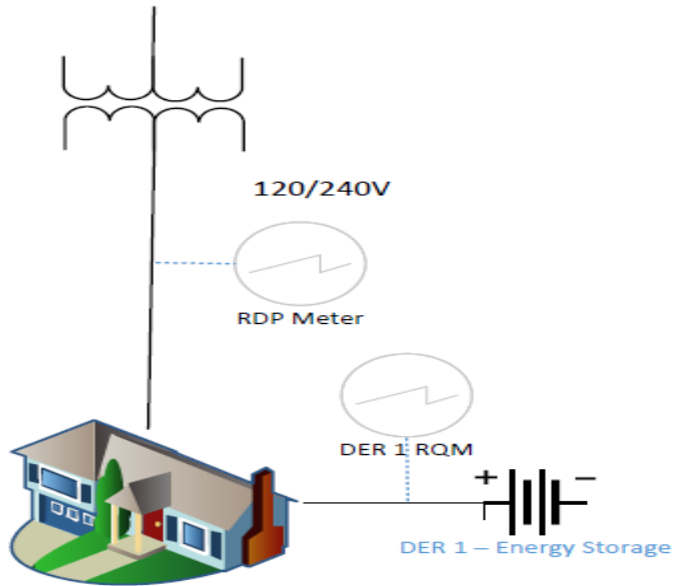
- Revenue Quality Metering & Telecommunication Capability for each DER at the Retail Delivery Point (RDP)
 - Reconstitution would not be required in this scenario as the RDP meter would be used for both generation and load reporting

Requirements: DER Aggregation - With Sub Metering

- Revenue Quality Metering & Telecommunication Capability for each DER located behind the Retail Delivery Point (RDP)
 - Modification to the MV90, AMI and MDM Systems to handle computations that would modify the interval meter readings recorded at the RDP
 - The number of DER devices behind each RDP would complicate the computations as the net impact for all devices would need to be reflected at the RDP metering
 - Adjusted readings at the RDP would be needed for each interval as follows:
 - Grossed up generation behind the RDP
 - Reduced for load recorded on the DER RQM located behind the RDP meter
 - Adjusted RDP interval readings needed to calculate annual Peak Load and individual customer peak load contribution values
 - Adjusted RDP meter values needed to reconcile Meter Domain load Settlement calculations

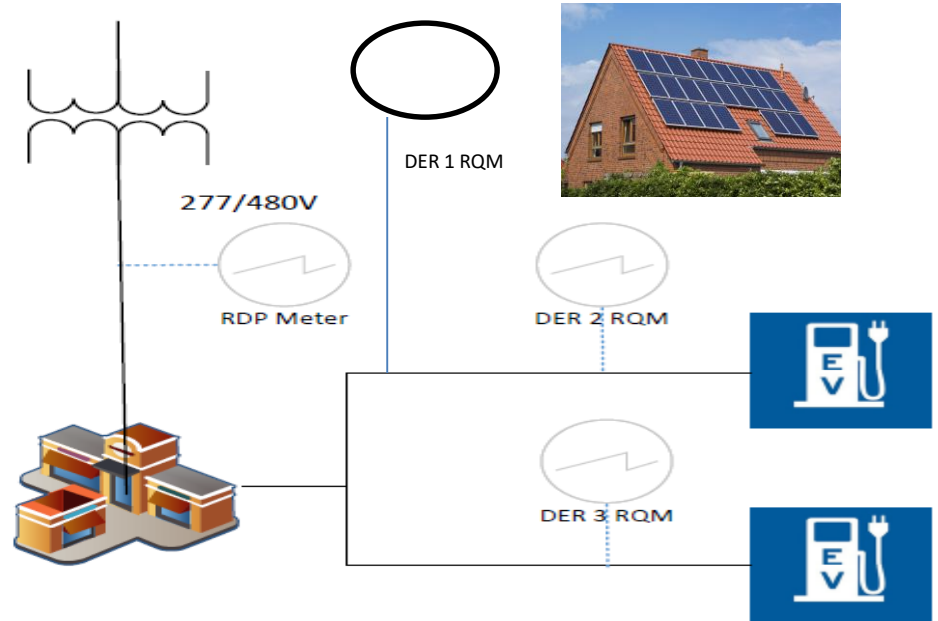
Reconstitution Example

DER Aggregation – With Sub-Metering



Example 1 DERA Load & Gen Asset

Hour 1:00	Hour 11:00
RDP Meter readings 20 kWh	RDP Meter Reading 25 kWh
DER1 Load 2 kWh	DER 1 Generating 3 kWh
Reconstituted ISO-NE Reported Values:	
RDP Asset 20 -2 = 18 kWh	RDP Asset 25 + 3 = 28 kWh
DERA Load Asset = 2 kWh	DERA Load Asset = 0 kWh
DERA Generator Asset = 0 kWh	DERA Generator Asset = 3 kWh

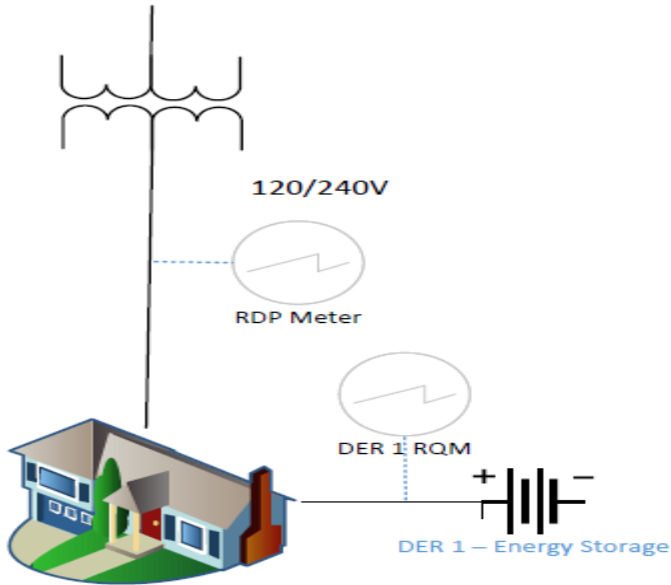


Example 2 DERA Load & Gen Asset

Hour 1:00	Hour 18:00
RDP Meter readings 10 kWh	RDP Meter Reading 35 kWh
DER1 Load 2 kWh	DER 1 Generating 3 kWh
DER 2 Generating 4 kWh	DER 2 Generating 1 kWh
DER 3 Load 3 kWh	DER 3 Generating 2 kWh
Reconstituted ISO-NE Reported Values:	
RDP Asset 10 -5(L) +4(G) =9 kWh	RDP 35 + 6 = 41 kWh
DERA Load Asset = 5 kWh	DERA Load Asset = 0 kWh
DERA Generator Asset = 4 kWh	DERA Generator Asset = 6 kWh

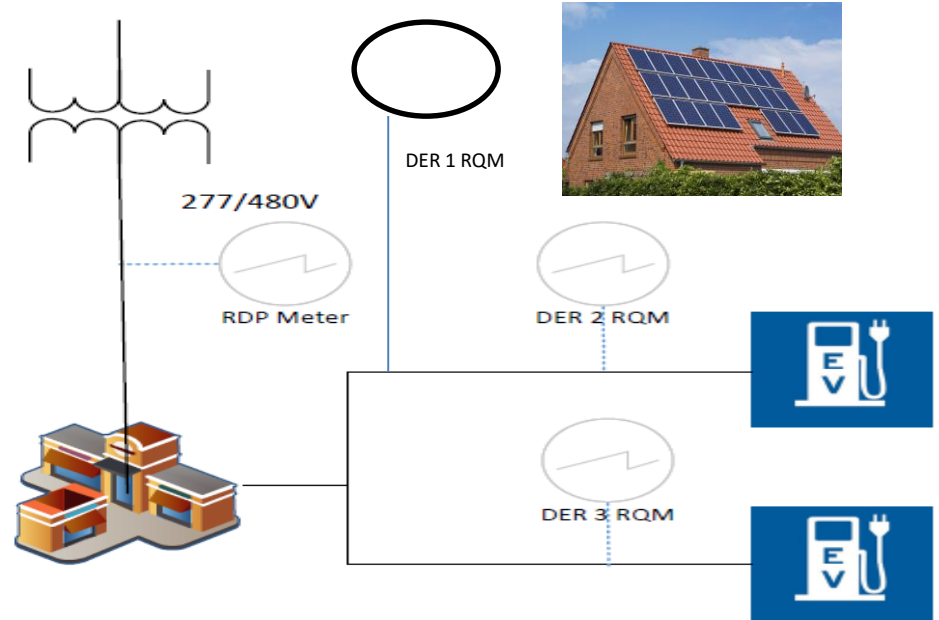
Reconstitution Example

DER Aggregation – With Sub-Metering



Example 1 DERA Gen Asset

Hour 1:00	Hour 11:00
RDP Meter readings 20 kWh	RDP Meter Reading 25 kWh
DER1 Generating 0 kWh	DER 1 Generating 3 kWh
DER1 Load N/A	DER1 Load N/A
Reconstituted ISO-NE Reported Values:	
RDP Supply Asset 20 kWh	RDP Supply Asset 25+3 = 28 kWh
DERA Generator Asset = 0 kWh	DERA Generator Asset = 3 kWh



Example 2 DERA Gen Asset

Hour 1:00	Hour 18:00
RDP Meter readings 10 kWh	RDP Meter Reading 35 kWh
DER1 Generating 0 kWh	DER 1 Generating 3 kWh
DER 2 Generating 4 kWh	DER 2 Generating 1 kWh
DER 3 Generating 0 kWh	DER 3 Generating 2 kWh
DER Load N/A	DER Load N/A
Reconstituted ISO-NE Reported Values:	
RDP Supply Asset = 14 kWh	RDP 35 + 6 = 41 kWh
DERA Generator Asset = 4 kWh	DERA Generator Asset = 6 kWh

Retail Customer billed based on RDP Meter Reading for Delivery and Reconstituted RDP readings for Supply

MRWG Response Topic 3

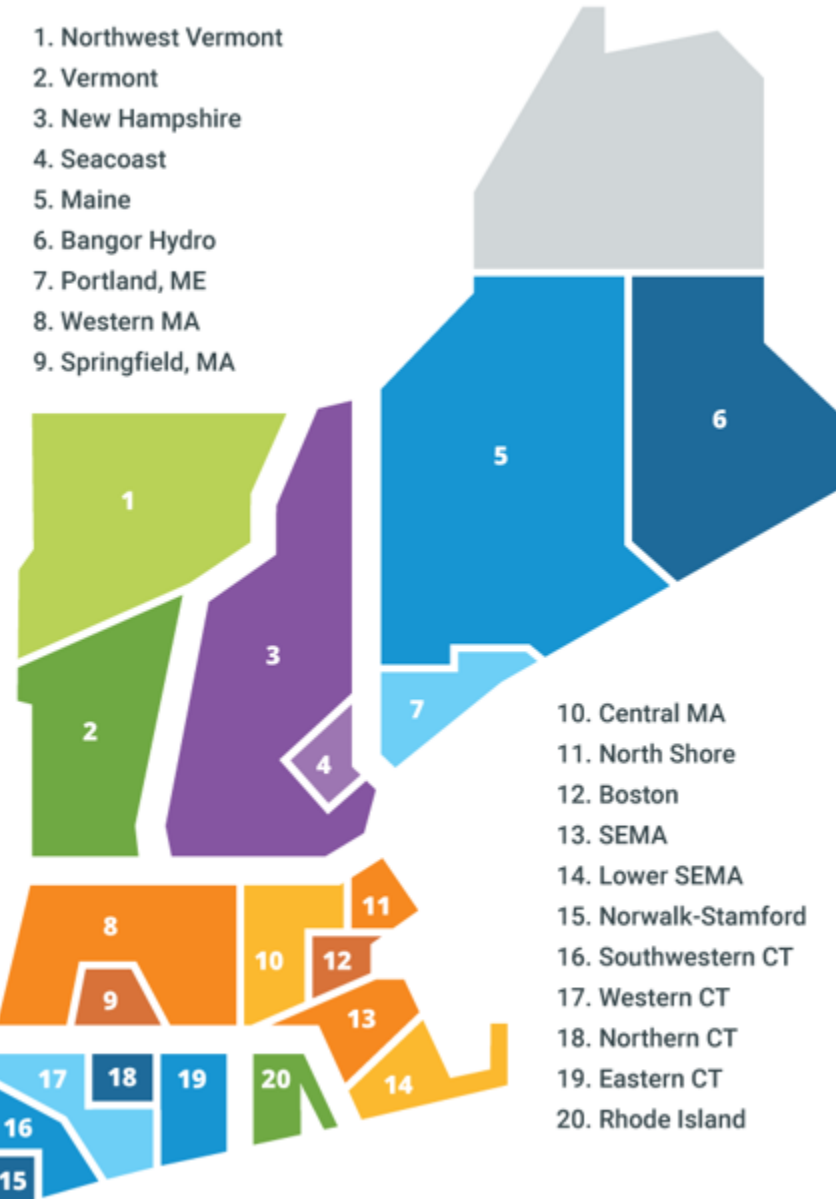
Q3. Meter Reader and Host Participant current capabilities and identification of any increased capabilities needed to provide interval meters and daily reads of those meters for any end-use customer who seeks to be a part of a DER aggregation.

Requirements: DER Aggregation – For Both No Sub Metering or With Sub Metering

- Revenue Quality Metering (MV90) & Telecommunication Capability for each DER recorded at the Retail Delivery Point (RDP) or for each Device located behind the RDP for all DERA reported as a Generator Asset ID
- AMI metering with data collection infrastructure which would enable the HP AMR to obtain hourly readings in a manner which would allow the readings to be used to report consumption on the Load Asset ID
 - Majority of HP AMR rely on load profiles for Load Asset ID reporting purposes today
 - AMI Metering and the associated data collection infrastructure would be necessary to obtain AMI meter readings for participants in any DERA program for Load Asset reporting
 - A Meter Data Management System (MDM) would be required to obtain and format the AMI meter readings
 - The AMI hourly readings would need to perform calculations from the MV90 meter readings to reconstitute the loads based on the sub metered DERA generation behind the RDP meter
 - Settlement System upgrades would be required to utilize hourly interval data from the MDM for customers participating in DER
 - New business processes would need to be developed to modify readings at the RDP for sub metered DER
 - RQM, AMI and Telecommunications Considerations
 - Cost of RQM and a dedicated telecommunications system for the HP AMR to obtain interval readings
 - Cost of AMI meters, installation and collection devices in each region to support interval data collection
 - Remote locations in New England experience frequent interruptions with telecommunications equipment
 - Increase storage capabilities to maintain and retain larger quantities of data

MRWG Response–Aggregation Zone Issues

1. Northwest Vermont
2. Vermont
3. New Hampshire
4. Seacoast
5. Maine
6. Bangor Hydro
7. Portland, ME
8. Western MA
9. Springfield, MA



10. Central MA
11. North Shore
12. Boston
13. SEMA
14. Lower SEMA
15. Norwalk-Stamford
16. Southwestern CT
17. Western CT
18. Northern CT
19. Eastern CT
20. Rhode Island

- **New England Aggregation Zones identified to not match HP AMR Metering Domain**
- **How/Who will ensure new DER Aggregations for Load and Generator Assets include only DER resources that are within the aggregation zone?**

- **Current Load Asset enrollment process –Electronic Data Interchange (EDI) Systems**
- **Competitive Electricity Provider (CEP) - State License to serve load**
- **CEP applies for a Load Asset ID in the Metering Domain**
 - Enrolling CEP sends EDI Enrolment to Distribution Company
 - EDI validates an account is active in metering domain
 - Does not validate aggregation zone within the metering domain
 - Major system updates would be required to include new zone validations
- **Current “Settlement Only Generator” Registration Process – One ID per Generator**
 - Registration form includes: Metering Domain State, City and ZIP Code, and P-Node provided to ISO-NE
 - ISO-NE assigns new Generator Asset ID
- **Modeled Generators Registration Process – One ID per Generator**
 - Generators >5MW go through multi-month process and provide similar information to ISO-NE: Metering Domain, State, City, Zip Code
 - New P-Node established by ISO-NE
- **DER Aggregation**
 - One Generator Asset ID for many DER resources
 - How will ISO-NE ensure that all aggregated resources are in the same Aggregation Zone
 - What information will be required to identify each DER by Zone?

MRWG Response–Interval Metering

- Timing for reporting Generation, Tie Line and Loads to Asset Owners and ISO-NE
 - Daily and Month-End Settlement/Resettlement Deadlines pursuant to Market Rules & Manuals
 - Generation and Tie Line data provided to Asset Owners by 8:00 a.m. each business day for the Settlement Day
 - All Settlement data for Load, Generation and Tie Lines reported to ISO-NE 37 hours after the Settlement Day
 - ISO-NE publishes an annual Metering & Resettlement Deadlines Calendar
- Meter Readers currently all report hourly interval data to ISO-NE for Load, Tie Line and Generation
 - Reporting 5-Minute interval data would require extensive system upgrades & impact performance and time required to provide data to ISO-NE to settle the Wholesale Energy Markets
 - MV-90, Settlement, AMI, MDM
 - Data Storage capabilities would increase
 - Impact time required to retrieve 5 minute data from meters – MV90 & AMI meters
 - Impact run time for system to perform load settlement calculations
 - Uploads to ISO-NE will take longer
 - Carving out DERA Asset for 5 minute treatment would create issues and impact systems and system performance
 - Need to create new logic to identify which assets were being settled on 5 minute data versus hourly data would be difficult as Load Settlement Systems reconcile all Load Assets on an hourly basis

MRWG Response—Additional Considerations

Additional Factors to Consider and Systems Impacted by DER Requirements

- Cost of additional metering and telecommunications systems
 - DER/DERA bears costs of incremental meter & telecommunications
 - Wiring of DER behind the RDP metering – electrical inspections, interconnection issues
 - SCADA Requirements needed for Operations to ensure safety and reliability of the Grid
- Cost of HP AMR System Upgrades to support FERC Order 2222 reporting requirements
 - State Regulators must be included in any discussions regarding cost recovery
- HP AMR Billing Systems
 - Modifications needed to support FERC Order 2222
 - RDP Register readings need to be modified to match the wholesale quantities to report Supplier Load Asset ID values
 - Customer invoiced quantities based on DER adjusted values for RNS, LNS, Energy and Peak Load Contribution
 - Billing Systems modified to invoice T&D charges based on different quantities than Supply charges
 - Customer confusion
- EDI system modifications
 - Ensure reconstituted RDP meter readings are sent to suppliers
 - Additional validations required to identify Aggregation Zone for DERA eligibility
- Administrative Burden
 - Additional time needed for HP AMR to obtain and perform the calculations necessary to report aggregated DER and reconstitution
 - How to handle DER Aggregation and reaggregation if an end-use customer switches DER Aggregator after a period of time
- Time and effort necessary to register new Load and Generators Assets in each Metering Zone
- State licensing requirements for Competitive Electricity Providers (DERA) and Utility Billing & Metering Agreements would need to be negotiated for each DERA.
- Need to consider how to prevent a DER from participating in State retail programs (Net Energy Billing and Distribution Generation) as well as in the ISO-NE Wholesale Energy Markets such that these resources are not double dipping (acting as load reducers and being paid for generation)

Time and Cost estimates cannot be provided by the MRWG at this time. Each HP AMR would need to work within their respective operating company to fully understand the FERC Order 2222 Requirements and how those requirements will impact their various meter, billing and settlement systems.

Questions/Comments

