DER Energy & Capacity Market Design

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Business Issues Committee

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NEW YORK INDEPENDENT SYSTEM OPERATOR

Agenda

- **DER Energy Market Design**
  - Overview & Purpose
  - Transmission Nodes
  - DER Aggregations: Overview, Rules & Participation
  - Registration
  - Bidding & Dispatch
  - Telemetry, Settlements & Metering
- **DER Capacity Market Design**
  - Installed Capacity Supplier Payment Structure
  - Capacity Suppliers with duration limitations
  - Resources not eligible to be Capacity Suppliers with duration limitations
  - Capacity Market Rules for Aggregations
  - Time Stacking
  - ICAP Mitigation Measures
  - Interconnection for DER
- **Appendix**

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Background - DER

Date	Working Group	Discussion points and links to materials
06-19-18	Market Issues Working Group (MIWG)	DER Market Design: Updates
07-26-18	Market Issues Working Group (MIWG)	DER Market Design Updates: Energy Market Bid to Bill Examples
10-09-18	Market Issues Working Group (MIWG)	DER Market Design Update: Wholesale Obligations for Dual Participation
10-10-18	Market Issues Working Group (MIWG)	DER Market Design Update
11-05-18	Market Issues Working Group (MIWG)	DER Market Design Updates
12-18-18	Market Issues Working Group (MIWG)	DER Overall Energy Market Design Review
02-04-19	Market Issues Working Group (MIWG)	DER Overall Energy Market Design Review Part I
02-06-19	Market Issues Working Group (MIWG)	DER Overall Energy Market Design Review Part II
02-28-19	Market Issues Working Group (MIWG)	DER Energy Market Design Dual Participation
03-18-19	Market Issues Working Group (MIWG)	DER Energy Market Design DR Cost Allocation
03-28-19	Market Issues Working Group (MIWG)	DER Energy Market Design: Settlements & Other Updates

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Background - Capacity

Date	Working Group	Discussion points and links to materials
03-25-19	Installed Capacity Working Group	Expanding Capacity Eligibility
04-08-19	Installed Capacity Working Group	Expanding Capacity Eligibility

Background - MSE

Date	Working Group	Discussion points and links to materials
02-02-17	Posted	Distributed Energy Resources Roadmap for New York's Wholesale Electricity Market
05-23-17	Market Issues Working Group (MIWG)	DER Measurement & Verification, Monitoring & Control, and Meter Data Study
09-29-17	Market Issues Working Group (MIWG)	DER Meter Data Study
10-30-17	Market Issues Working Group (MIWG)	DER Meter Data Study Initial Findings– E-Cubed Policy Associates, LLC (Dr. Paul Sotkiewicz)
12-13-17	Market Issues Working Group (MIWG)	NYISO Meter Data Study Report– E-Cubed Policy Associates, LLC (Dr. Paul Sotkiewicz)
09-11-18	Market Issues Working Group (MIWG)	DER Meter Service Constructs for NYISO Market Participation
10-23-18	Market Issues Working Group (MIWG)	Conceptual Details of MSEs Participation in NYISO Markets
11-30-18	Market Issues Working Group (MIWG)	Meter Services Entity Design Updates
02-15-19	Market Issues Working Group (MIWG)	Metering, LBMP Calculation, and Creditworthiness Tariff Amendments for DER
04-05-19	Market Issues Working Group (MIWG)	Metering and MSE Cost Recovery Tariff Amendments

Overview & Purpose

Purpose of the DER Roadmap Effort

- Develop and enhance participation opportunities for DER in the NYISO-administered wholesale markets by creating:
  - A DER Participation Model; and
- Create a model that supports the **NYISO Market Design Vision** - ***Attract and retain the most efficient resources to meet NY's reliability needs.***

DER Definition for the Market Design

- Distributed Energy Resource ("DER"): (i) a facility comprising two or more Resource types (excluding the Aggregation Resource type) behind a single point of interconnection with an Injection Limit of 20 MW or less; or (ii) a Demand Side Resource; or (iii) a Generator electrically located in the NYCA with an Interconnection Limit of 20 MW or less, that is electrically located in the NYCA.
- DER must be capable of responding in real-time to NYISO dispatch instructions.

Transmission Nodes

Transmission Node Overview

- **The ISO, in coordination with the Transmission Owners, shall establish the set of Transmission Nodes in the New York Control Area**
  - All Transmission Nodes will be identified in ISO Procedures
- **Aggregators will work with Transmission Owners to determine which ISO identified Transmission Node each individual DER/Facility electrically maps to**
  - Only DER/Facilities that map to the same Transmission Node may be aggregated together
- **Aggregators may enroll one or more Aggregations at a Transmission Node**

DER Aggregations: Overview, Rules & Participation

DER Aggregation Approach

- Aggregations grouped at a Transmission node allow NYISO to effectuate dispatch in a manner that both sends correct price signals and effectively relieve transmission constraints on the system
  - This Transmission Node level granularity, instead of Load Zone level, will more effectively relieve transmission constraints thereby resulting in lower overall total production cost

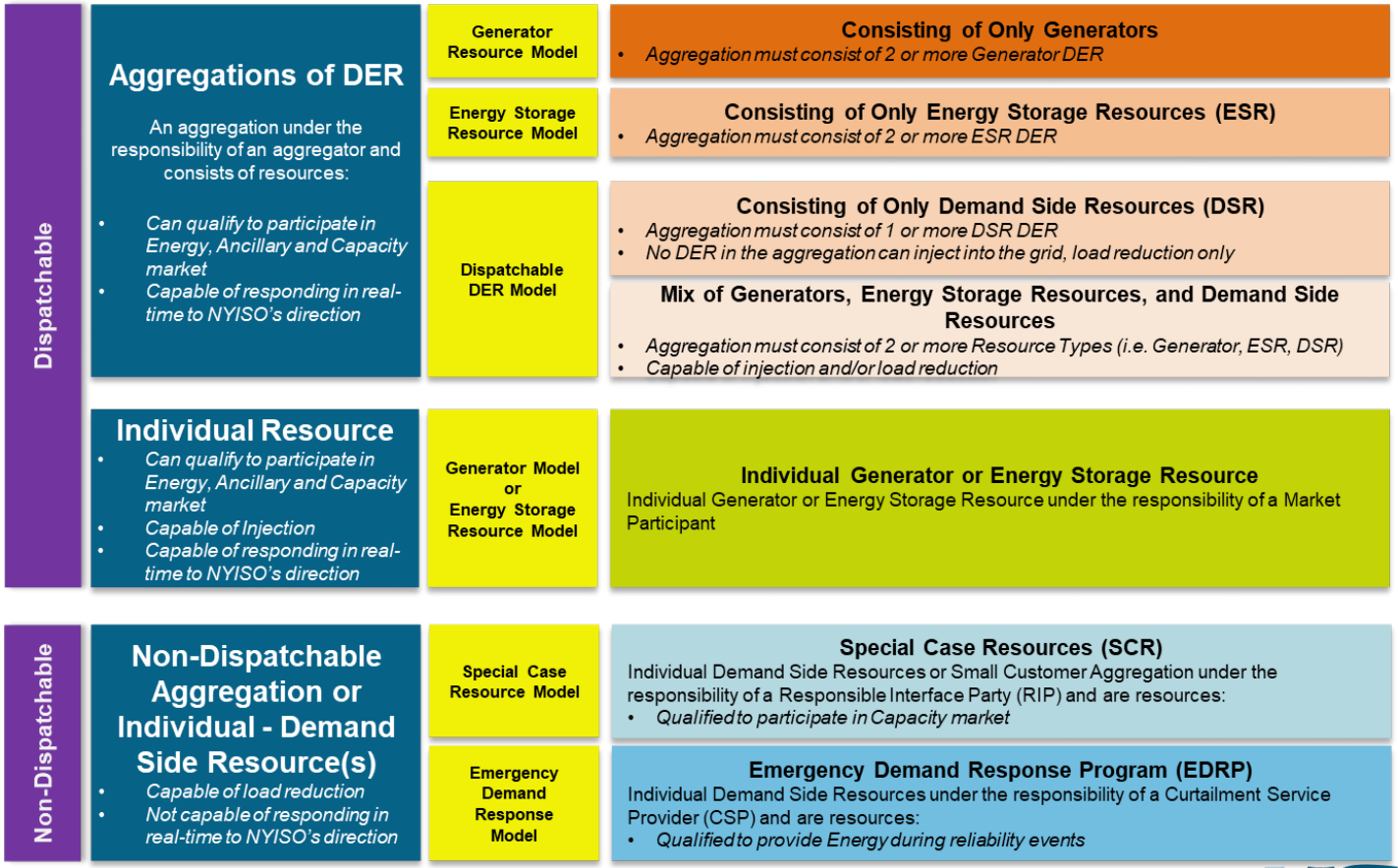
DER Market Participation

- **The DER participation model will only be available to Aggregations**
  - An Aggregation consists of two or more individual resources, except that Demand Side Resources and individual facilities that can reduce load and inject energy (i.e., transition from being Load to Supply without an infeasible operating range), will be permitted to individually use the DER participation model as a single-resource Aggregation
- **Individual facilities in an Aggregation will participate under the market rules for either:**
  - A DER Aggregation (when there are multiple Resource types in the Aggregation), or
  - The specific Resource type (when there is a single Resource type in the Aggregation)
    - For an Aggregation of Intermittent Power Resources, the technology type of each Resource in the Aggregation must be the same (E.g., Resources depending on wind as their fuel)

Basics for all Types of Aggregations

- Resources will be permitted to aggregate to meet minimum requirements and performance obligations for eligible participation models (see slide 15 for more details)
- The Aggregator will be the NYISO Market Participant
- The Aggregation will be a group of one or more resources participating in the NYISO Market, represented by a PTID
  - Bids will represent the offer of the Aggregation
  - Performance will be measured in aggregate
  - Financial settlements will be in aggregate
    - NYISO intends to separately process the injection, withdrawal and load reduction data to ensure accurate settlements

Participation Models Available to DER



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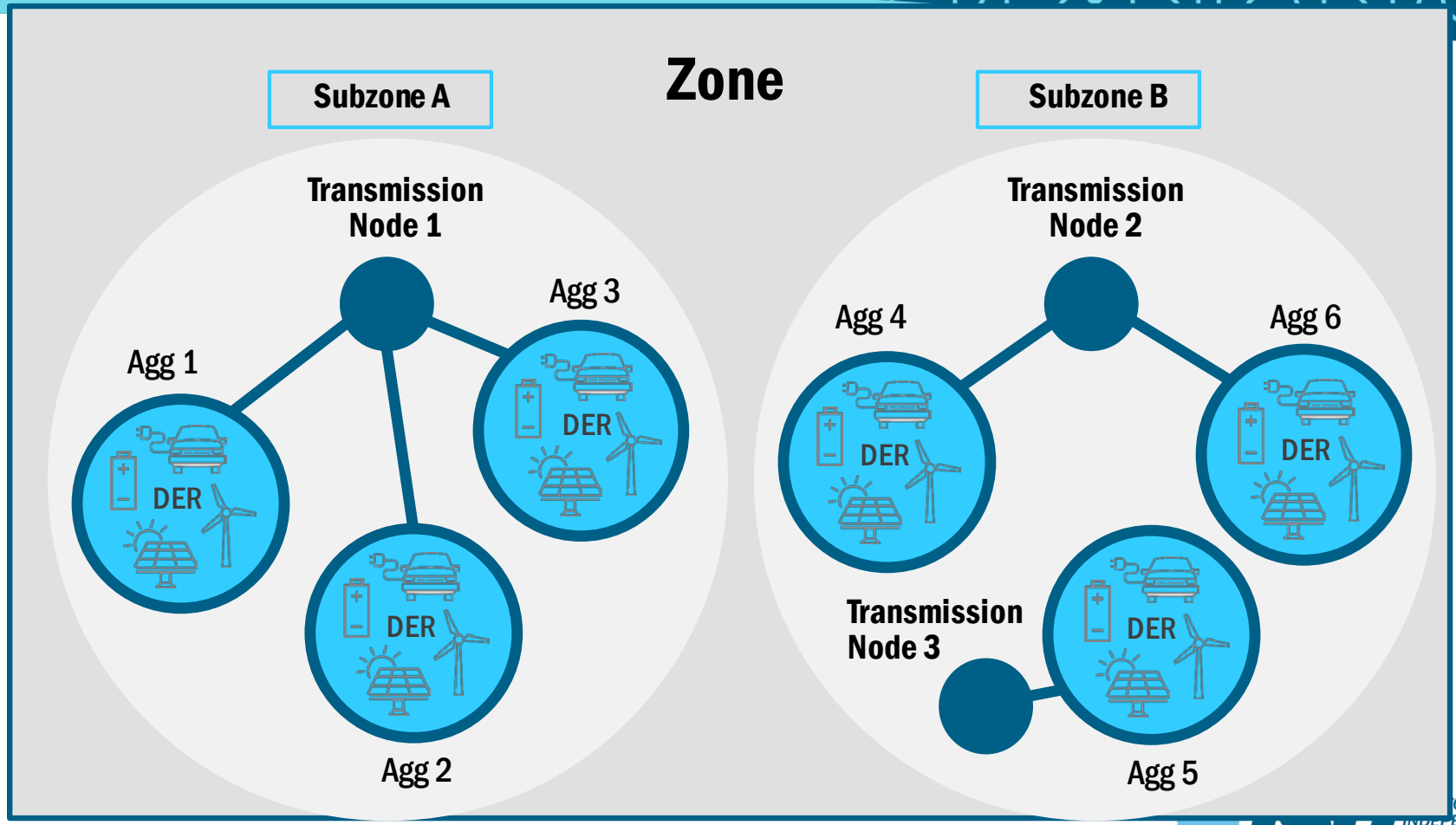


Aggregations, Participation Options

Resource Type	As Aggregations of:	As an Individual Energy Storage Resource	As an Individual Energy Limited Resource	As an Individual Gen	As an Individual Intermittent Power Resource
DSR	DER, SCR, EDRP	No	No	No	No
Storage	ESR	Yes	Yes	Yes	No
Wind	IPR (wind only)	No	No	No	Yes
Solar	IPR (solar only)	No	No	No	Yes
GTs	Gen (GTs only)	No	Yes	Yes	No
Other Gens	Gen	No	Yes	Yes	No
Mixed	DER	No	No	No	No

Note: All resources must individually qualify to be eligible to aggregate as an Aggregation of LESR, CLR, ELR
Note: Generators with PURPA contracts, Limited Control Run of River Resources, Behind-the-Meter Net Generation Resources, Municipally-owned Generation, System Resources, and Control Area System Resources are not eligible to aggregate as an Aggregation

Aggregation Services

- **Aggregations may qualify to provide Energy, Capacity and Ancillary Services**
  - Eligibility to provide services in the NYISO-administered markets will be dependent upon the operating and other characteristics of the Aggregation
    - For example, ESR Aggregations will be eligible to provide Spinning Reserve and 30-Minute Reserve whereas
    - A DER Aggregation with an ESR and a Generator will not be eligible to provide Spinning Reserve
  - Minimum offer requirements for all Aggregations will be 100 kW

Aggregation Dispatch

- **Aggregations will not receive unit commitment from the NYISO and will instead be considered as only a dispatch resource when participating in the wholesale market**
  - Aggregation will not have any commitment parameters such as start up cost considered in the market evaluation
  - DER will likely be serving a primary function other than providing Energy and Ancillary Services to the NYISO-administered wholesale markets, and therefore will already be "committed" when used to serve that primary function. It follows, then, that those resources will not require a day-ahead or real-time commitment by the NYISO.
  - In addition, unit commitment requires knowing the off/on status of the resource. Given that an Aggregation is an Aggregation of DER, it is not possible to determine an Aggregation's on/off status

MST 23.7 Update – Monitoring of Aggregations

- **Except for actions that are shown to be consistent with competitive conduct, moving Resources into, out of or between Aggregations, or constituting and dissolving Aggregation(s):**
  - In a manner that avoids or reduces the consequences of mitigation or financial sanctions under the ISO's Tariffs; or
  - That enables a Resource, an Aggregation, an Aggregator, an owner, or a Market Party to avoid complying with a Tariff rule

  Is a violation of the Services Tariff.
- **The NYISO will report violations it identifies to the Market Monitoring Unit for possible referral to FERC's Office of Enforcement**

Registration

Aggregator Registration

- **Aggregators will be required to**
  - Register as a Market Participant
  - Post collateral
    - Aggregators will be required to follow all existing market Collateral requirements for their Aggregations
      - Based on market products qualified and enrolled in

DER/Aggregation Registration

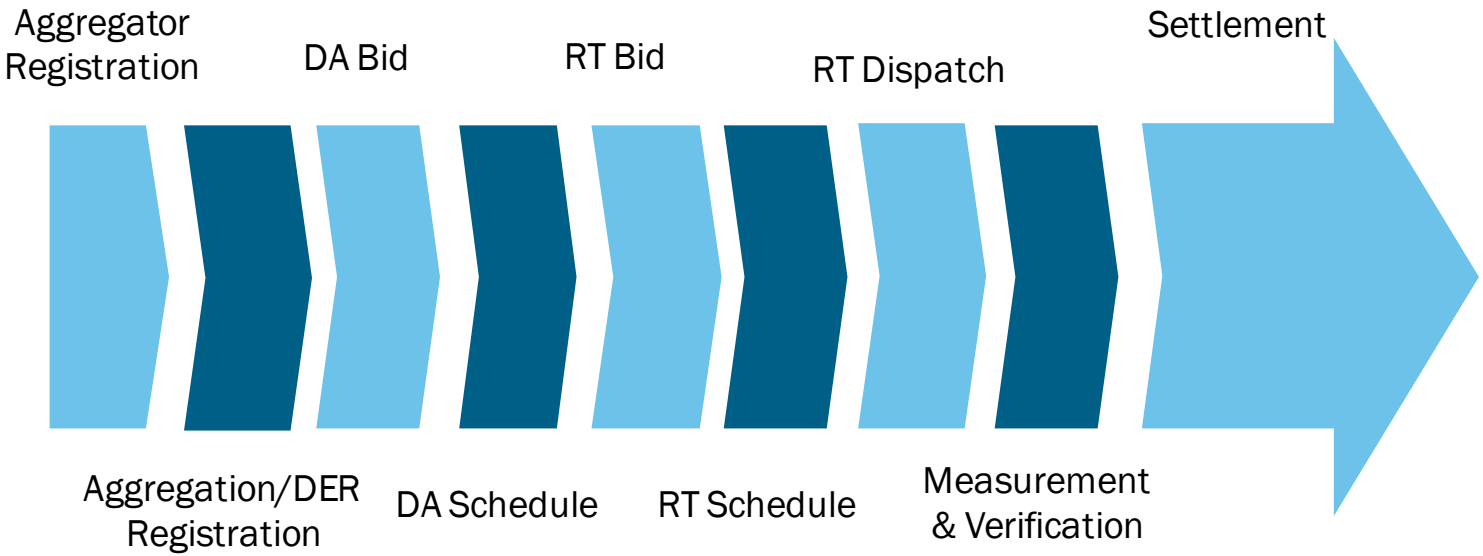
- **Aggregator will be required to register individual DER's parameters/unique operating characteristics, which will be a hybrid of existing Generator, ESR and Demand Response Parameters**
  - Matrix of required information for cumulative Aggregation values will be dependent on the characteristics of each individual DER
  - An aggregator may register any number of Aggregations at a transmission node
  - Transmission nodes will be unique to a single TO's subzone
  - A subzone may have multiple transmission nodes

Bidding & Dispatch

DER Bidding, Approach

- All DER Aggregations, regardless of resource mix, will be bid into the Energy market place and settled as a single entity
- The distinction for the settlements process, as it will pertain to Revenue Metering and Telemetry, will be that the NYISO will account for the following aspects of each DER Aggregation when evaluating performance:
  - Energy Injection from Generation units
  - Demand Reduction provided as Supply from Demand Side Resources
    - To account for FERC Order No. 745
  - Energy Withdrawal from Withdrawal-Eligible Generators

Participation Timeline



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Energy Withdrawals by Aggregations

12/18
MIWG

- **An Aggregation that contains a Withdrawal-Eligible Generator may Bid to withdraw Energy for a market interval**
  - The points in the Aggregation's Bids may reflect the entire operating range of the Aggregation for that interval
  - Example: Aggregation contains 3 – 1MW small generators and 1 ESR with a -2MW to +2MW range
    - Aggregation operating range reflected in the Bid could be -2 to +5

Telemetry, Settlements & Metering

Meter Services Entities

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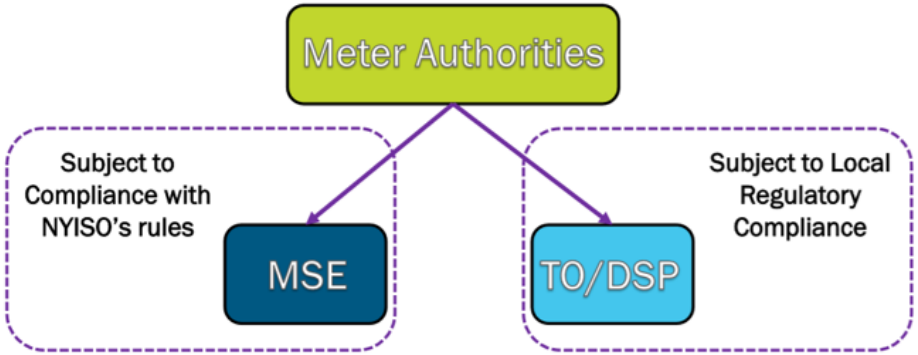
Review



11/30 MIWG

- NYISO is developing a new Meter Services Entity (MSE) construct that will authorize entities to provide meter services to DER Aggregations in the DER and reliability-based (SCR and EDRP) demand response programs
  - New rules will replace the existing MSP/MDSP constructs used for the NYISO's demand response programs
  - DER Aggregators will engage authorized MSEs to provide services for its Aggregations, and will be responsible for any financial compensation paid to the MSE for the services it provides
- MSE rules are included with the tariff revisions to integrate the DER participation model
- The new MSE rules do not impact existing metering constructs used by Member Systems
  - Member Systems are those eight utilities that comprised the membership of the New York Power Pool
- For more information on DER Meter Configurations, please refer to the Appendix

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Aggregation Telemetry

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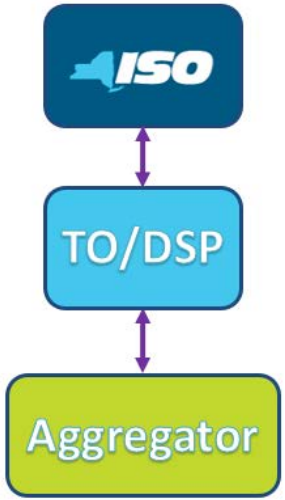
Options for Real-time Telemetry Data Communication Paths

Option 1 – Aggregator communicates only with DSP and DSP provides data to/from NYISO



Option 2 – Aggregator communicates with both DSP and NYISO in parallel

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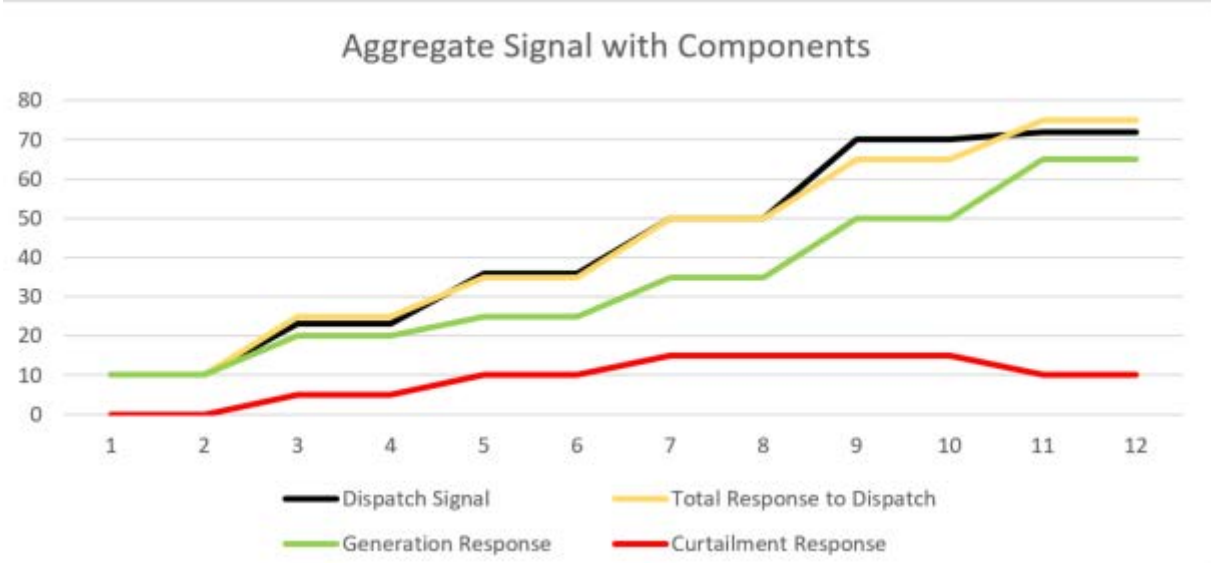
Aggregate Response Signal with Individual Components

6/19
MIWG



- This example contains the NYISO dispatch signal, the aggregate response signal and the sub-component signals for settlements

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Real-Time Telemetry & Settlement Data

- **Similar to Generators participating in the NYISO markets today, the Aggregation will be required to send all telemetry signals for 24 hours of the day, 7 days a week**
  - This will be required regardless of dispatch schedule, for the independent signals for:
    - Aggregation aggregate signal, and;
    - Aggregation aggregate Injection, and;
    - Negative Generation (when an Aggregation eligible to withdraw Energy is dispatched to withdraw), and;
    - Aggregation aggregate Load Reduction
- **The aggregator will need to measure the injection, withdrawal and the load reduction of all DER within the Aggregation, during dispatch**
  - This will be done regardless of utilization of assets for meeting dispatch
  - This applies to both real-time telemetry and settlement data submission

Real-Time Telemetry Requirements for Power System Operations: 6-Second Scan Rate

10/10
MIWG

One of NYISO's responsibilities is maintaining the reliability of the New York Bulk Power System and timely information on market resource performance supports this mission. 6-second telemetry of resources participating in NYISO's market is crucial to effectively maintain the reliability of the grid.

- Real-time telemetry updated every 6 seconds provides essential two-way communication of operational data between market resources and NYISO
- NYISO relies on real-time telemetry for situational awareness necessary to balance supply and demand within the New York Control Area (NYCA), and to identify and respond to normal and abnormal conditions

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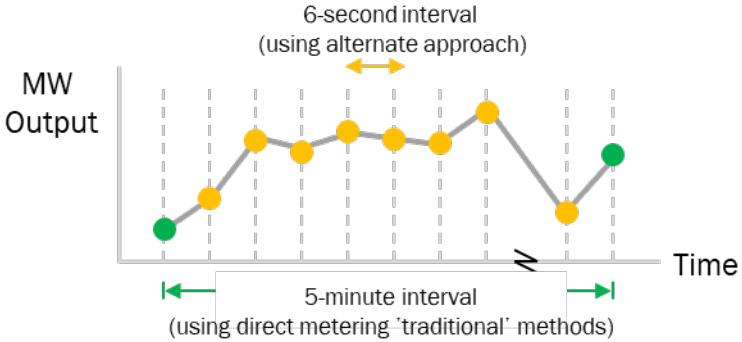
Alternative Telemetry Requirements

- **Operational Requirements:**
  - For each DER within an Aggregation, the Aggregation is expected to have MW output data for that DER on a 6-second basis to generate its aggregate MW output values for telemetry to the NYISO
  - Limited to individual assets of 100kW or less
  - Resource 6-second MW output values comprise:
    - Measurements through direct metering ('traditional') methods (e.g., CT/PT) from the resource with periodicity of 5 minutes or faster, and
    - Calculated values through an alternate approach to augment direct metered values as needed to produce operational data on a 6-second basis



- **Reporting Requirements:**
  - All data used to develop alternative telemetry is subject to the same data retention requirements as traditionally metered resources *i.e.,* 6 years
  - NYISO reserves the right to preapprove methods prior to implementation, or audit and disapprove alternative telemetry schemes if found noncompliant with NYISO's telemetry requirements

Energy Balancing

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Energy Balancing with Generation

- **Aggregators will be allowed to balance individual DER response within the Aggregation to achieve Aggregation dispatch**
- **Example:**
  - Aggregation contains one 5 MW ESR and one 4 MW generator
  - Aggregation bids in and is scheduled to charge 1 MW
  - The ESR charges at 5 MW while running its generator at 4 MW
    - Aggregation response = -5 MW of ESR + 4 MW of injection = - 1 MW
    - The Aggregation would be invoiced for 1 MW of Energy withdrawals from the wholesale market

Application of FERC Order No. 745 Net Benefits Test

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Methodology

- The Order No. 745 Net Benefits Test implementation methodology described in the July and December 2018 presentations described the NYISO's proposal to terminate the application of the Day-Ahead Market offer floor because the FERC Order No. 745 Monthly Net Benefit Test (NBT) does not need to be applied to bids submitted in the Day-Ahead Market because bids are re-evaluated in real-time to determine the real-time schedules
- As part of the NYISO's existing two settlement system, the determination of final dispatch only occurs in real-time
- The NYISO believes that this decision supports the following:
  1. Works with the existing settlements system
  2. Keeps payment evaluation for Energy between Generators and Aggregations otherwise (NBT) equivalent
  3. Appropriately addresses the impacts of the Billing Unit Effect of dispatching demand response

Time of Application of Order 745

- **The NYISO will apply its NBT as an after-the-fact evaluation**
  - NYISO will continue to calculate a monthly NBT value applicable to Demand Side Resources participating in the DER participation model
  - NYISO will perform an evaluation of LBMPs and telemetry data during the settlements process
  - Application of the NBT during the settlements process instead of as an Offer Floor will allow aggregators to bid in Demand Side Resources in the energy markets at any dollar value
    - If the clearing price for energy is equal to or greater than the monthly NBT value, Demand Side Resources would be eligible for payment
    - If the clearing price for energy is less than the monthly NBT value, Demand Side Resources would not be paid (notwithstanding its contribution to the Aggregation's response to the dispatch signal for performance)
      - Demand Side Resource performance will be included in the evaluation of whether an Aggregation meets its basepoint signal, regardless of whether those resources are eligible for payment.

BPCG & DAMAP Eligibility

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DAMAP/BPCG Eligibility

- Aggregations will be eligible for DA BPCG payments
- In real-time, Aggregations will be eligible for DAMAP and BPCG only when operating OOM or as part of an SRE
- Aggregations comprised entirely of Energy Storage Resources that Self-Manages its Energy Level and Bids as ISO-Committed Flexible will also be eligible for real-time BPCG
  - DAMAP and BPCG for Aggregations will be determined using the same formulas as currently used for Generators and/or Energy Storage Resources

DAMAP Eligibility, DER Aggregations

- **DER Aggregations will not have a "Day-Ahead Margin" to protect**
  - DER and ESR Aggregations will have intertemporal energy constraints that limit their injecting/withdrawing capabilities For these reasons, the NYISO's DAMAP eligibility for DER Aggregations will follow the same recommendation as that for ESRs[1]
  - Eligible only when dispatched OOM for reliability reasons

1. ESR Market Design Updates (MIWG, September 21st, 2018)

Dual Participation

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Dual Participation

- **The NYISO's proposed market design will allow resources that provide Wholesale Market services to also provide services to another entity (*e.g.,* the utility or a host facility)**
  - The NYISO believes that providing resources with the flexibility to meet wholesale and distribution system needs will deliver the maximum benefit to New York electricity consumers
  - Resources participating in the wholesale markets will continue to be obligated to follow all applicable NYISO market rules and utilize good utility practices
  - Rules on resources entering and leaving the markets are discussed on slide 95
- **Dual participation concept applies to all resources, not just DER Aggregations**
  - Effective May 1, 2020, Generators and Demand Side Resources electrically located in the NYCA may simultaneously participate in the ISO-administered wholesale markets and in programs or markets operated to meet the needs of distribution systems located in the NYCA.

Requirements

- **Dual participating resources will be required to:**
  - Comply with all NYISO market rules for the services offered to the wholesale market
    - Non-compliance may result in financial penalties
  - Appropriately offer into the wholesale markets to reflect any non-wholesale (e.g., retail) obligations
    - Resources will be required to follow NYISO dispatch instructions at all times;
    - Resources will submit offers to NYISO when providing non-wholesale service
      - Based on resource type and market product enrollment, the offer may denote "Self" or "ISO"-Committed mode
    - Resources will receive payments for Energy or Ancillary Services scheduled through these offers
- **For further detail, please refer to Appendix slides on Dual Participation**

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DER Settlements for Regulation & Reserves

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Settlements Approach

- Settlements will need to account for the following aspects of each DER Aggregation when evaluating performance:
  - Energy Injection from Generation units
  - Demand Reduction provided as Supply from Demand Side Resources
    - To account for the FERC Order No. 745
  - Energy Withdrawal from Withdrawal-Eligible Generators
- This will be implemented by separating the Telemetry signals and the Revenue Meter files into distinct data sets for Settlements processing
- For more information on Settlements for DER, please refer to the Appendix

Cost Allocation Methodology

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DER Aggregation Settlements and Application of Net Benefits Test Threshold

- **Day-Ahead DER Aggregation offers receiving a Day-Ahead Market schedule will be compensated at the DAM LBMP**
  - This includes offers/schedules that the Aggregator intends to meet in real-time using Injections and/or Demand Reductions
- **NYISO will apply Net Benefits Test Threshold against the Real-Time Market LBMPs**
  - Performance will be compensated based on LBMPs for the market in which the DER Aggregation was scheduled
    - DAM or RT

Demand Reduction Cost Allocation Methodology

- **The NYISO will calculate the cost of demand response as compensable real-time Demand Reduction times the RT LBMP**
  - Compensable Demand Reductions are the lesser of Actual DR or the RT Schedule (after subtracting injections)(cannot be less than zero), when the RT LBMP passes the NBT.
- **Costs of demand response will continue to be allocated to the Loads that benefit from Demand Reductions, consistent with existing settlement structure submitted in compliance with Order No. 745**
- **Actual Demand Reductions occur in real-time**
  - FERC Order No. 745 is premised on the idea that the effects of demand response (i.e., the billing unit effect) appear only where actual demand reductions occur
  - The Cost Allocation methodology is more reflective of the financial value of the product delivered in real-time
  - This aligns the Cost Allocation with both the value of dispatching at or above the Monthly NBT Threshold and the costs Loads pay in real-time
- **For more information on Cost Allocation methodology, please refer to the Appendix**

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Energy Baselines and Real-Time Response for Demand Reduction in an Aggregation

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Use of Baselines for Demand Reduction within an Aggregation

- As a reminder, the DER market design intends to allow an Aggregation to provide offers for energy, operating reserves, regulation service or combination of such if capable and qualified to do so
- As a result a Demand Reduction resource within an Aggregation may be contributing to an aggregated dispatch instruction of the Aggregation for energy, reserves and/or regulation service
  - Calculation methodologies for a Demand Reduction resource need to account for the ability to provide (1) energy and reserves, and (2) regulation

- For more information, please refer to Appendix

DER Capacity Market Design

Installed Capacity Supplier Payment Structure

ICAP Suppliers

- **A resource must not have any daily duration limitations to qualify as a Capacity Supplier**
  - Have a minimum injection capability of 1 MW for traditional resources, 0.1 MW for ESR or DER resources
  - Receive 100% capacity payment
  - Subject to most existing qualification requirements
- **A resource that has a daily duration limitation may qualify as a Resource with an Energy Duration Limitation**
  - Have a minimum injection capability of 1 MW for traditional resources, 0.1 MW for ESR or DER resources
  - Receive capacity payment as applicable for resource's duration

ICAP Supplier Payment Structure

- **The NYISO's proposed capacity values for duration limited resources**
  - These rules will be effective for the 2021-2022 Capability Year

	Incremental Penetration of resources with duration limitations	
Durations (hours)	Less than 1000 MW	At and Above 1000 MW
2	45%	37.5%
4	90%	75%
6	100%	90%
8	100%	100%

ICAP Supplier Payment Structure (cont.)

- **The NYISO proposed capacity values are based on the GE Capacity Value Study as well as the other studies that have been conducted**
  - Every year, the NYISO will post the MW tally of new resources with duration limitations to identify if we have hit the transition point
    - Once past the transition point (=> 1000 MW), the 'At and Above 1000 MW' numbers will be used until new values are established
    - More information on the MW count in Appendix

Capacity Value Study

- **The NYISO will review the Capacity Values in 2022-2023, with results from the future study implemented in the 2025-2026 Capability Year**
  - Going forward, the NYISO is proposing to review the Capacity Values every 4 years with a 205 filing
    - Results of the Capacity Value Study will be submitted with the 205 filing, including any potential changes to the durations, capacity values, and Peak Load Windows
    - The duration of the Peak Load Window (used for B/S/N obligation, derating factor calculation, etc.) will be tied to the lowest duration eligible for 100% capacity payment
  - The Capacity Value Study will be reoccurring starting two years before the Demand Curve Reset process begins (every 4 years) (*e.g.*, 2022, 2026, etc.)

Capacity Suppliers with duration limitations

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Qualifications

- **Qualifications for Capacity Suppliers with duration limitations**
  - Resources must be electrically located within the NYCA
  - Have a minimum injection capability of 1 MW for all resources, excluding ESR and DER where the minimum injection capability is 0.1 MW
  - Resources will be allowed to derate and/or time stack to aggregate to meet a certain duration requirement
  - Performance-based generators (Wind, Solar, RoR Hydro) will not be eligible for a duration limitation

DMNC Test

- **Like all Capacity Suppliers, Capacity Suppliers with duration limitations must conduct a DMNC test, as applicable for the resource type**
  - Specifics of DMNC tests are included in Appendix
  - Duration limited resources must perform their DMNC test during the Peak Load Window

Peak Load Window

- **Capacity Suppliers with duration limitations must be available during a predefined Peak Load Window**
  - The Peak Load Window for Winter and Summer Capability Periods are different
    - The 6 hour window is applicable for incremental penetration of resources with duration limitations less than 1000 MW
      - Winter: HB 16 – 21
      - Summer: HB 13 – 18
    - The 8 hour window is always applicable to resources that elect an 8-hour duration limitation, and will be applicable to all duration limited resources for incremental penetration of resources with duration limitations equal to or greater than 1000 MW
      - Winter: HB 14 – 21
      - Summer: HB 12 – 19

Bid/Schedule/Notify

- **Capacity Suppliers with duration limitations are required to Bid/Schedule/Notify during the Peak Load Window**
  - The Bid/Schedule/Notify requirements differ based on the participation model of the resource
  - More detail on the Bid/Schedule/Notify requirements included in Appendix

Derating Factor

- **The ICAP to UCAP translation will not change**
  - UCAP = ICAP * (1 - derating factor)
- **Derating factors for availability-based resources will be derived from GADS or the UOL calculation, as applicable to the resource type**
  - The derating factor for traditional resources will continue to be based on the GADS/EFORd methodology
  - The derating factor calculation for resources using the UOL availability calculation will be based on the resource type (ESRs and DER)
    - Activity that occurs outside of the required bidding obligation will not affect the derating factor (including failed starts and outages)
    - More detail in Appendix

ICAP

- **ICAP calculation will still apply to all resources as current practice, but the payment for all resources will be based on an Adjusted ICAP**
  - ICAP = min(CRIS, DMNC)
    - ICAP value used consistent with current practices (i.e. Bid/Schedule/Notify, etc.)
  - Adjusted ICAP = min(CRIS, DMNC) * Duration Adjustment Factor
    - Applies to all Capacity Suppliers where the payment corresponds to the Duration Adjustment Factor for that duration
    - The derating factor is applied to the Adjusted ICAP for the system wide ICAP to UCAP translation
  - UCAP for market = Adjusted ICAP * (1 – derating factor)

Resources not eligible to be Capacity Suppliers with duration limitations

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SCR Program

- **The SCR program will remain at a 4 hour duration requirement for participation in the Capacity Market**
  - SCRs will only be eligible to participate as Capacity Suppliers with duration limitations of 4 hours
  - SCRs will receive the payment percent that is applicable to resources that have duration limitations of 4 hours
  - All other SCR program rules, including the current notification times and testing requirements, will remain the same

Performance-based generators

- **Performance-based generators (Wind, Solar, RoR Hydro) will continue to be Installed Capacity Suppliers if qualified**
  - The NYISO is not proposing to change the performance measurement windows for Intermittent Power Resources as part of this market design effort
    - The performance measurement for Intermittent Power Resources will be considered as part of the Tailored Availability Metric effort to allow for additional review and analysis considering that they are a separable category from duration limited resources
  - The NYISO is not proposing to change the performance measurement windows for RoR Hydro resources

Capacity Market rules for Aggregations

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Aggregations – Obligations

- **Obligations of Aggregations**
  - Bid/Schedule/Notify obligations will be based on the characteristics of the Aggregation
  - The NYISO will require the DER to perform a DMNC test once every Capability Period for the Aggregation as a whole
    - More detail in Appendix
  - The method for calculating the derating factor for a DER will be based on the characteristics of the DER by treating the DER as a single resource
    - Derating factors for DER will be measured on the availability or performance of the Aggregation as a whole, as appropriate for that participation model

Aggregations – Resources Changing Aggregations

- **Resources that switch Aggregations but remain within the same participation model can switch on a monthly basis**
  - Existing resources will carry their previous DMNC with them
- **Resources that switch between participation models or wholesale/retail participation must do so at the beginning of the Capability Year**
  - Existing wholesale market participants must notify the NYISO of this change prior to August 1st of the year preceding the Capability Year
  - Resources that switch between participation models will carry their previous DMNC with them

Time Stacking

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Time Stacking - Qualifications

- **Time Stacking - the ability to stack/sequentially align DER to meet minimum duration requirements for capacity payments**
  - Individual DER must be separately registered and must be able to run for a minimum of 1 hour per day to participate in time stacking
    - Individual DER will only be allowed to participate in hour increments and be truncated down to the hour duration before time stacking
  - A time stacked DER will be rated for the amount of power it can sustain over the run time requirement
    - This can be the Capacity Supplier requirement or any Capacity Supplier with duration limitations requirement
  - DER participating in the homogeneous intermittent model cannot time stack

Time Stacking (cont.)

- Individual DER can time stack to meet the 8 hour duration requirement, and/or can aggregate to increase their capacity
- The NYISO will require the time-stacked Aggregation to perform a DMNC test once every Capability Period
  - More detail in the Appendix

ICAP Mitigation Measures

ICAP Mitigation Measures

- **The NYISO has not identified the need for any additional market mitigation measures specifically for the DER participation model at this time**
  - Aggregations will be subject to the mitigation measures that pertain to ICAP offering behavior
    - Pivotal Supplier "must offer"
  - DER Injections will be subject to the mitigation measures that pertain to market entrance/exit
    - Buyer Side Mitigation
    - Physical Withholding

Interconnection for DER

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Interconnection for DER

- **Interconnection (ERIS) and CRIS Requirements will Focus on the Facility (not the asset or aggregation)**
  - A multi-technology DER facility may submit one IR in the Small Generator Interconnection Procedures for both ERIS and CRIS
- **NYISO proposes to redefine what may be included in one Interconnection Request (IR) (*i.e.*, a single queue position in the interconnection queue)**
  - Revisions to both the Material Modifications and Permissible Modifications sections to account for DER
    - Material Modifications (requiring a new Interconnection Request)
    - Permissible Modifications (not material, but may require IA amendments)
    - Details included in Appendix

CRIS for DER

- NYISO proposes to award CRIS at the "facility" level
  - CRIS will only be applicable to injection capability of resources (not withdrawal or load reduction portion)
  - Details on maximum allowable CRIS included in Appendix
- For a Developer requesting CRIS only (*e.g.*, new facility not subject to the NYISO SGIP or existing facility already evaluated in a NYISO, SIR or utility interconnection process), no IR is required for the facility
- In order to obtain CRIS, if more than 2 MW, must execute a Facilities Study Agreement for the next open Class Year Study to be evaluated for deliverability

CRIS for DER (cont.)

- If a facility moves between aggregations, NYISO proposes that the CRIS awarded to the facility stays with the facility and moves with it to the new aggregation
- For a multi-asset facility, if an asset within that facility moves to another facility, NYISO proposes that the original facility retains the full amount of CRIS

Feedback?

- Email additional feedback to: DER_Feedback@nyiso.com

Don’t forget the underscore

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Appendix

DER/Facility Meter Configurations

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Metering Configurations

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- The following examples will build up from the individual DER/Facility level to the Aggregation as a whole

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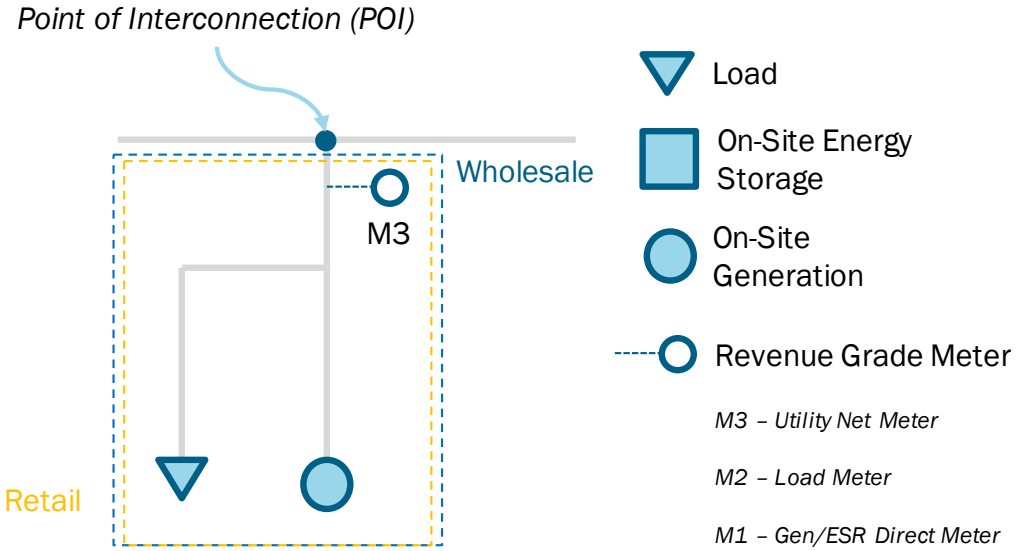
1 - Net-Metered, no ESR

- A net-metered facility/DER without ESR may participate as an injection, demand reduction or both type resource



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2A – Facility/DER with no injection, ESR does not inject

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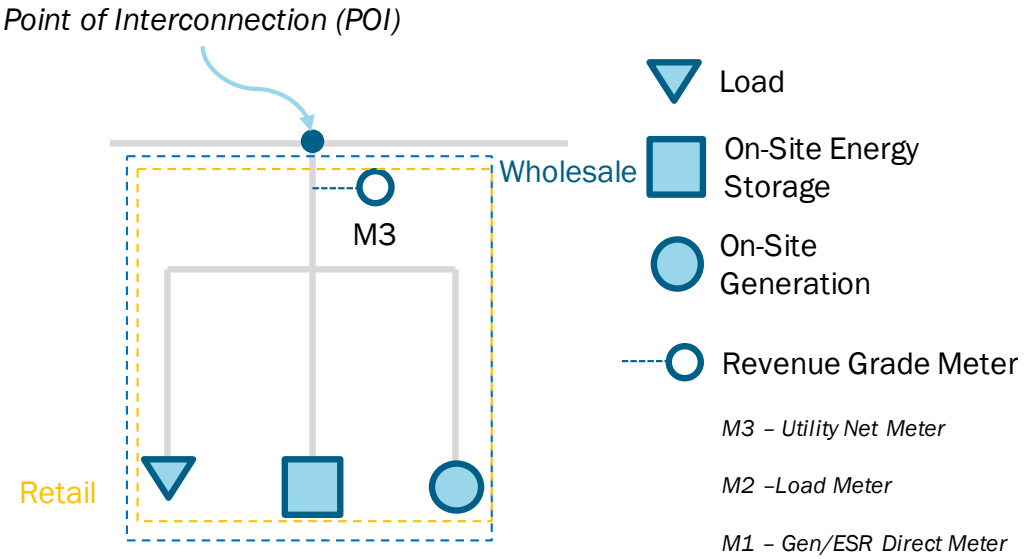
- If facility/DER has an ESR asset which does not inject into the grid, it will be considered a load-reduction asset and be net-metered



2B – Injecting Facility/DER , with Load and Wholesale ESR

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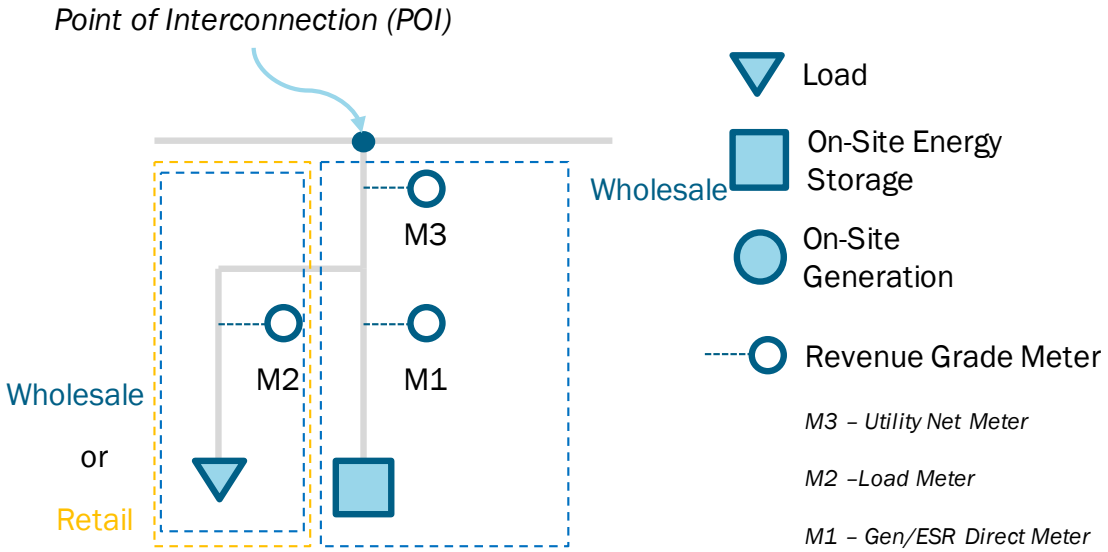
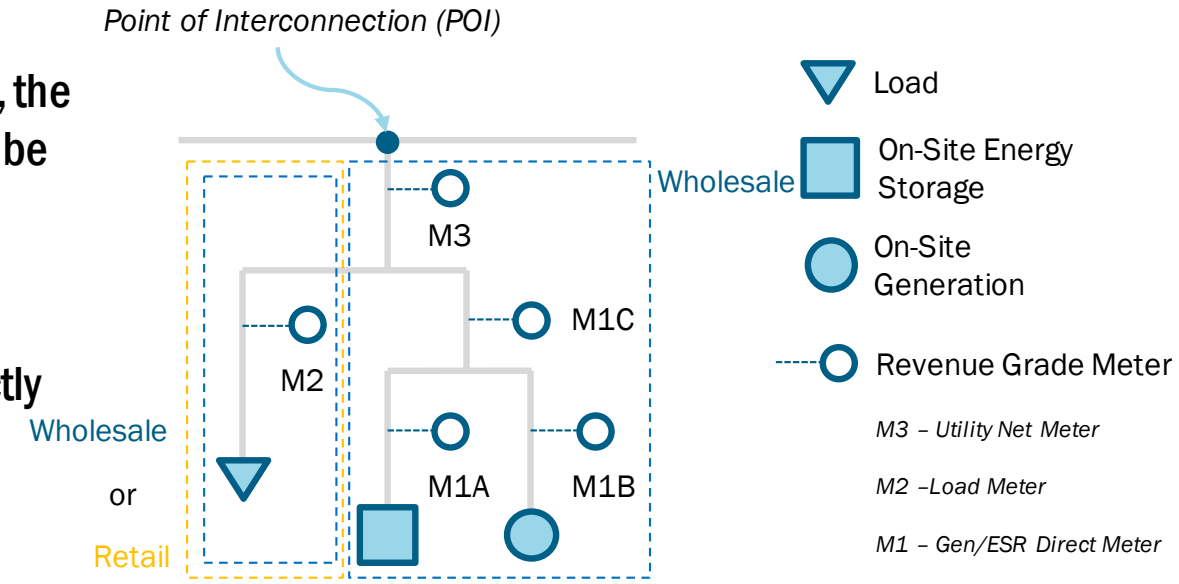
- A facility/DER with ESR will require both the ESR and the load to be metered separately
- The Load and ESR could participate as separate DER within the Aggregation
- Full load at M2 must either be directly metered or calculated by the Meter Authority reported to NYISO for LSE billing purposes



3 – Multiple generating assets with ESR

7/26
MIWG

- If facility/DER has an ESR asset in addition to other generating assets, the ESR & other generating assets may be "group" or separately metered
  - M1C, or;
  - Both M1A & M1B
- Full load at M2 must either be directly metered or calculated by the Meter Authority reported to NYISO for LSE billing purposes



Metering Configurations Overview

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- Only facilities/DER with wholesale ESR assets which are looking to inject, are required to utilize separate metering configurations
- If assets are separately metered with approved metering devices at the same location, they will be regarded as separate and distinct Facilities/DER
  - Regardless of physical location

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Dual Participation

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Dual Participation – MST 4.1.9.6

- Effective May 1, 2020, Generators and Demand Side Resources electrically located in the NYCA may simultaneously participate in the ISO-administered wholesale markets and in programs or markets operated to meet the needs of distribution systems located in the NYCA.
- Generators and Demand Side Resources engaged in dual participation must meet all applicable rules and obligations set forth in the ISO's OATT and Services Tariff.
- Generators and Demand Side Resources operating to meet an obligation outside of the ISO-administered wholesale markets must be dispatched by the ISO for the applicable market intervals.
- The ISO and Transmission Owners shall coordinate scheduling and dispatch for all Generators and Demand Side Resources engaged in Dual Participation in accordance with ISO Procedures.

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Dual Participation Obligations

- **Outages on the Distribution system must be accommodated through Aggregator's Bid/Schedule/Notify procedures**
  - As part of the Aggregator/TO communication procedures, the Aggregator will be responsible for reflecting distribution system outages in its Wholesale Market Bids
  - The Aggregator is responsible for updating bids or derating the Aggregation to properly represent an Aggregations ability to perform as a result of any outages
- **Resources participating in the Capacity Market must elect any changes to their participation by August 1st of the year prior to the Capability Year in which that change will be effective**

Dual Participation Obligations (cont.)

- **Resources with load reductions at the time of NYCA and Locality Peak will be added back to the actual metered load for determining ICAP Requirements**
  - Similar to the add-back done currently for SCR load reductions
- **Resources that switch from a retail load modifier to NYISO wholesale market participation must do so at the beginning of the Capability Year**
  - Resources must notify the NYISO of this change prior to August 1st of the year preceding the Capability Year
- **Resources that exit the NYISO wholesale market to be a retail load modifier must notify the NYISO of its intended operation**
  - If notified prior to August 1st of the year preceding the Capability Year, then the resource's transition to a retail load modifier will be reflected in the requirements for the Transmission District
  - If not notified prior to August 1st of the year preceding the Capability Year, then the resource's transition to a retail load modifier will not be reflected in the Transmission District Requirements

NYISO-DSP Coordination

- **All Aggregators, including Aggregators with dual participating Resources, will need to comply with the NYISO-DSP-Aggregator operational coordination framework to ensure that NYISO and DSP have accurate information on the operational status and availability of the Aggregations and individual DER within the Aggregation**
  - NYISO's operational decisions will primarily be at the Aggregation-level; DSP may need individual DER-level information to assess DER's impact on specific distribution feeders and on the distribution system
- **Meter authorities will be required to properly account for all Load at M2* for LSE's wholesale market reporting & billing if direct metering is used for the individual DER**
  - *Permissible metering configurations were presented on February 6th
    - https://www.nyiso.com/icapwg?meetingDate=2019-02-06
- **Meter authorities will be required to report the host load of facilities, net of wholesale participation**

Market Exit Obligations and Revenue Streams & BSM

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Market Exit Obligations

- **Resources may leave the market at any time but will still be required to fulfill any:**
  - Capacity Market obligations
    - Forward position in Capacity Market: must resolve its position prior to obligation month
    - Allocated Sales in Capacity Market: DA Market bidding obligation still exists
  - Generator Deactivation Notifications
    - Injection based Resources are required to notify the NYISO a year in advance of leaving the Wholesale Market
- **Market exit does not exclude resources from penalties or sanctions imposed resulting from action in NYISO markets**

Revenue Streams and BSM

- **Resources will present any contracts or documents as a result of an information request by the NYISO MMA as part of the BSM process**
  - This is an existing requirement
  - Additional information was presented on February 15th to the ICAPWG/MIWG
    - https://www.nyiso.com/icapwg?meetingDate=2019-02-15

DER Settlements Approach for Regulation & Reserves

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Persistent Undergeneration

- Persistent Undergeneration charges (Services Tariff 15.3A) will be evaluated based on total Supply provided in response to dispatch
- Actual Energy Injections + Actual Energy Withdrawals + actual Demand Reductions = total response

Compensable Overgeneration

- Compensable Overgeneration will be evaluated based on total response to dispatch
- Actual Energy Injections + Actual Energy Withdrawals + actual Demand Reductions = total response

Energy Withdrawals by Withdrawal-Eligible Generators in DER Aggregations

- DER Aggregations containing at least one Withdrawal-Eligible Generator may submit Bids to withdraw Energy
- Aggregations will be subject to Persistent Over-Withdrawal Charges pursuant to Services Tariff Sec. 15.3A.1.2
  - This will be applied in the same manner as Persistent Over-Withdrawal Charges for ESR

Order 745 Cost Allocation

- The costs of demand response will be allocated in accordance with the methodology developed in compliance with FERC Order No. 745

- All make whole payments (DAMAP/BPCG) to DER Aggregations will be treated as uplift and *not* follow the FERC Order No. 745 Cost Allocation methodology

Energy Bilaterals

- Energy bilaterals can only be satisfied by Aggregations entirely populated by Injection type resources
- Demand Reduction assets will not be a party of an Energy Bilateral as a provider of Energy (source)
- Allowing Demand Side Resources to be a source would leave the impacted LSE either short on supply or double paying for the MW quantity of that bilateral, dependent on how the reduction quantity of MW is accounted for in the forecast
  - NYISO is not proposing to change methodology or software for Energy Bilaterals
  - Demand Reduction resources would still be eligible to be a party to Capacity Bilaterals according to existing tariff rules

DAMAP/BPCG Eligibility

- The proposal for DAMAP & BPCG eligibility has not changed since the December presentation
- DER Aggregations will be eligible for DAMAP and BPCG only when operating OOM or as part of an SRE
  - DAMAP and BPCG for DER Aggregations will be determined using the same formulas as currently used for generators

Regulation Capacity

- **Regulation Capacity payments will be based on the Regulation Capacity scheduled**
  - Monthly NBT Threshold does not apply to Regulation Capacity payments
  - This is not an Energy payment
  - Monthly NBT Threshold pertains to economic Energy and not Regulation Capacity

Regulation Service

- **Aggregations containing Demand Side Resources providing Regulation Service will be eligible for Energy payments if the real-time LBMPs for a given interval meet or exceed the applicable Monthly NBT Threshold**
  - Regulation Service performance for DER Aggregations will be determined using the same formulas as currently used for generators

RRAC & RRAP

- **The proposal for RRAC & RRAP eligibility is that an Aggregation should be revenue neutral in relation to the RTD basepoint regardless of NBT when dispatched for Regulation:**
  - RRAC and RRAP will be evaluated for both payments and charges based on total response
  - Actual Energy Injections + Actual Energy Withdrawals + actual Demand Reductions = total response

Operating Reserves

- Operating Reserves payments will be based on the Operating Reserves scheduled
  - NBT Threshold does not apply to Operating Reserve payments
- The Demand Reduction component of Aggregations containing Demand Side Resources whose Operating Reserves have been converted to Energy will be eligible for Energy payments if the real-time LBMPs for a given interval meet or exceed the NBT Threshold for that month

Cost Allocation Methodology

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DER Aggregation Settlements and Application of Net Benefits Test

- **Day-Ahead DER Aggregation offers receiving a Day-Ahead Market schedule will be compensated at the DAM LBMP**
  - This includes offers/schedules that the Aggregator intends to meet in real-time using Injections and/or Demand Reductions
- **NYISO will apply Net Benefits Test against the Real-Time Market LBMPs**
  - Performance will be compensated based on LBMPs for the market in which the DER Aggregation was scheduled
    - DAM or RT

Demand Reduction Cost Allocation Methodology

- **The NYISO will calculate the cost of demand response as compensable real-time Demand Reduction times the RT LBMP**
  - Compensable Demand Reductions are the lesser of Actual DR or the RT Schedule (after subtracting injections)(cannot be less than zero), when the RT LBMP passes the NBT.
- **Costs of demand response will continue to be allocated to the Loads that benefit from Demand Reductions, consistent with existing settlement structure submitted in compliance with Order No. 745**
- **Actual Demand Reductions occur in real-time**
  - FERC Order No. 745 is premised on the idea that the effects of demand response (i.e., the billing unit effect) appear only where actual demand reductions occur
  - The Cost Allocation methodology is more reflective of the financial value of the product delivered in real-time
  - This aligns the Cost Allocation with both the value of dispatching at or above the Monthly NBT Threshold and the costs Loads pay in real-time

Demand Reductions Cost Allocation (con't)

- **The NYISO believes this approach allows for the greatest flexibility for Aggregators to select resources to meet its schedule**
  - The NYISO will not require Aggregators to identify the resources that will be used to satisfy the DAM or RT offer and;
  - Once the revenue grade meter data files are submitted, the NYISO will separately settle Injections and Demand Reductions

Demand Reduction Cost Allocation (con't)

- **The Load benefitting from Demand Reductions will pay the Real-Time cost of those Demand Reductions**
  - This occurs even in those circumstances when the DER Aggregation is compensated at the Day-Ahead LBMP
  - Any differences between money collected from Loads and the money paid to Suppliers (i.e., residuals) will be allocated pursuant to the existing rules
- **The NYISO does not believe this cost allocation proposal will result in a significant amount of residuals**
  - An Aggregation with a Day-Ahead schedule will only contribute to residuals when the Aggregation meets its schedule (in whole or in part) with Demand Reductions and the Real-Time LBMP is greater than or equal to the Monthly Net Benefit Threshold

Energy Baselines and Real-Time Response for Demand Reduction in an Aggregation

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Proposed Energy Baseline Methodology for Demand Reduction within an Aggregation

4/26 MIWG

- To minimize the data exchange between the NYISO and the aggregator, the energy baseline will be calculated by the aggregator to support real-time operation and settlement purposes, and will not be reported to the NYISO in real-time
  - The energy baseline of each resource will be used by the aggregator to determine the energy response by each resource providing Demand Reduction within a Aggregation
  - Only the Demand Reduction response of the Aggregation as a whole is communicated to the NYISO in real-time via telemetry
- The NYISO intends to include the calculation methodology to determine the energy baselines to be used by the aggregator in its Tariffs, similar to EDRP, DADRP and SCR
- The aggregator will be required to retain these calculation results and make them available to NYISO upon request

Proposed Energy Baseline Methodology for Demand Reduction within an Aggregation, cont'd

4/26 MIWG

- The NYISO is proposing that the aggregator use an adjusted 5-minute ECBL for calculating the Demand Reduction of a resource when the Aggregation is providing energy
- This proposal is akin to the DADRP ECBL methodology with a few key differences:
  - Calculation of the baseline will be at a 5-minute time granularity instead of hourly
    - Hourly ECBL was intended for DADRP, which is an hourly granular market (i.e., day-ahead)
    - Dispatchable DER are intended to be dispatched in real-time for energy and ancillary services, making a 5-minute granular baseline more applicable when capturing load variability and resource capability

Proposed Energy Baseline Methodology for Demand Reduction within an Aggregation, cont'd

4/26 MIWG

- **Other key differences to the DADRP methodology include:**
  - The 5-minute ECBL will have an in-day adjustment applied on the resource's unadjusted 5-minute ECBL during the entire dispatch period of the Aggregation based on the resource's load during the three 5-minute intervals, starting 60 minutes prior to operating hour and ending 45 minutes prior to operating hour of the Aggregation
    - To better determine the real-time capability of a resource, NYISO is proposing a baseline adjustment to be calculated during the Operating Day for the purposes of real-time telemetry
    - The in-day adjustment will be capped at ±20%
    - DNV GL has concluded with similar finding that real-time adjustments perform better when the look-back window proximity is closer and its duration is shorter compared to the dispatch time, and when the adjustment is calculated throughout the Operating Day[1]
  - The in-day adjustment is to be recalculated when there is sufficient post dispatch load data available that is not affected by a wholesale market instruction to reduce load

[1] ISO New England, Inc., Oct. 31, 2014 Filing, Docket No. ER15-257-000, Testimony of Henry Yoshimura at 49

Example Unadjusted 5-minute ECBL Calculation

4/26 MIWG

- Calculation of Unadjusted 5-minute 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

Example Unadjusted 5-minute ECBL Calculation

4/26 MIWG

- **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
February 20	1.2 MW
February 16	1.2 MW
March 1	1.1 MW
February 28	1.0 MW
February 27	1.0 MW

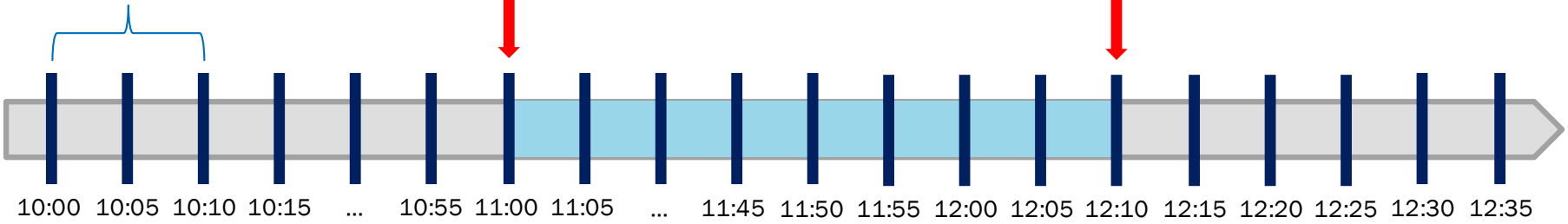
Example Timeline when Applying the In-Day Adjustment

4/26
MIWG

$Adj_{10:00,10:05,10:10}$ = (Average of Actual Metered Load Data) – (Average of Unadjusted 5-minute ECBL) for 5-min time intervals: 10:00, 10:05, 10:10

Start of Aggregation Dispatch

End of Aggregation Dispatch



Adjusted 5-minute $ECBL_{11:00}$ = Unadjusted 5-minute $ECBL_{11:00}$ + $Adj_{10:00,10:05,10:10}$

Adjusted 5-minute $ECBL_{11:05}$ = Unadjusted 5-minute $ECBL_{11:05}$ + $Adj_{10:00,10:05,10:10}$

and so on during dispatch period …

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Review of NYISO Ancillary Service Baseline for DSASP

4/26
MIWG

- Today the real-time response of a Demand Side Ancillary Service Program (DSASP) resource is calculated by taking its baseload prior to a dispatch event minus its actual metered load
- DSASP resources can provide 10-minute or 30-minute operating reserves and regulation service
- The baseload value is carried throughout the entire duration of the dispatch
- NYISO proposes to use the same methodology from DSASP to determine the response of a Demand Reduction resource contributing to a regulation dispatch of an Aggregation
  - The methodology used in DSASP adequately captures the response information needed by the NYISO for a resource providing regulation movement

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Response Calculation Methodology of Curtailment Resources within a Aggregation

4/26 MIWG

- **The NYISO proposes to use the aforementioned baselines to prescribe how an aggregator is to calculate the Demand Reduction response of a resource such that it can be incorporated into the Aggregation's total Demand Reduction response:**
  - When an Aggregation is dispatched for energy and reserves, the aggregator is to calculate any Demand Reduction response by taking the difference (MW) of (1) its Adjusted 5-minute ECBL and (2) its current 6-second resource load,
  - When an Aggregation is dispatched for regulation, the aggregator is to calculate any Demand Reduction response by taking the difference (MW) of (1) its baseload prior to start of dispatch for regulation service and (2) its current 6-second resource load, akin to the methodology used for existing DSASP resources
    - If the Aggregation was dispatched for energy only prior to being dispatched for regulation, the aggregator is to use a Demand Reduction resource's 6-second resource load during the time interval prior to dispatch plus its calculated response for the same time interval to calculate its "baseload prior to start of dispatch for ancillary regulation"

Response Calculation Methodology of Demand Reduction Resources within an Aggregation – Energy Only Example

4/26 MIWG

	10:59:42	10:59:48	10:59:54	11:00:00	11:00:06	11:00:06
Agg Scheduled for Energy	Y	Y	Y	N	N	N
Agg Scheduled for Regulation	N	N	N	N	N	N
Resource Load	1.00	1.05	1.05	1.60	1.70	1.75
Unadjusted 5-min ECBL	2.00	2.00	2.00	1.50	1.50	1.50
In-Day Adjustment	-0.30	-0.30	-0.30	0.25	0.25	0.25
Adjusted 5-min ECBL	1.70	1.70	1.70	1.75	1.75	1.75
Demand Reduction Response	0.70	**0.65**	0.65	0	0	0

Demand Reduction Response at 10:59:48

= Unadjusted 5-minute ECBL @ 10:59:48 + In-Day Adjustment @ 10:59:48 – Resource Load @ 10:59:48

= 2.00 MW + (-0.30 MW) – 1.05 MW

= 0.65 MW

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Response Calculation Methodology of Demand Reduction Resources within an Aggregation – Regulation Only Example

4/26 MIWG

	10:59:42	10:59:48	10:59:54	11:00:00	11:00:06	11:00:06
Agg Scheduled for Energy	N	N	N	N	N	N
Agg Scheduled for Regulation	N	N	N	Y	Y	Y
Resource Load	1.75	1.85	1.70	1.60	1.70	1.55
Baseload Prior Regulation Dispatch				1.70	1.70	1.70
Unadjusted 5-min ECBL	2.00	2.00	2.00	1.50	1.50	1.50
In-Day Adjustment	-0.30	-0.30	-0.30	0.25	0.25	0.25
Adjusted 5-min ECBL	1.70	1.70	1.70	1.75	1.75	1.75
Demand Reduction Response	0	0	0	**0.10**	0	-0.15

Demand Reduction Response at 11:00:00

= Baseload Prior to Regulation Dispatch – Resource Load @ 11:00:00

= (Resource Load @ 10:59:54 + Demand Reduction Response @ 10:59:54) - Resource Load @ 11:00:00

= (1.70 MW + 0 MW) – 1.60 MW

= 0.10 MW

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Response Calculation Methodology of Demand Reduction Resources within an Aggregation – Energy and Regulation

4/26 MIWG

Example

	10:59:42	10:59:48	10:59:54	11:00:00	11:00:06	11:00:06
Agg Scheduled for Energy	Y	Y	Y	Y	Y	Y
Agg Scheduled for Regulation	N	N	N	Y	Y	Y
Resource Load	1.00	1.05	1.05	1.60	1.70	1.55
Baseload Prior Regulation Dispatch				1.70	1.70	1.70
Unadjusted 5-min ECBL	2.00	2.00	2.00	1.50	1.50	1.50
In-Day Adjustment	-0.30	-0.30	-0.30	0.25	0.25	0.25
Adjusted 5-min ECBL	1.70	1.70	1.70	1.75	1.75	1.75
Demand Reduction Response	0.70	**0.65**	0.65	0.10	0	-0.15

Demand Reduction Response at 10:59:48

= Unadjusted 5-minute ECBL @ 10:59:48 + In-Day Adjustment @ 10:59:48 – Resource Load @ 10:59:48

= 2.00 MW + (-0.30 MW) – 1.05 MW

= 0.65 MW

Response Calculation Methodology of Demand Reduction Resources within an Aggregation – Energy and Regulation Example, cont'd

4/26 MIWG

	10:59:42	10:59:48	10:59:54	11:00:00	11:00:06	11:00:06
Agg Scheduled for Energy	Y	Y	Y	Y	Y	Y
Agg Scheduled for Regulation	N	N	N	Y	Y	Y
Resource Load	1.00	1.05	1.05	1.60	1.70	1.55
Baseload Prior Regulation Dispatch				1.70	1.70	1.70
Unadjusted 5-min ECBL	2.00	2.00	2.00	1.50	1.50	1.50
In-Day Adjustment	-0.30	-0.30	-0.30	0.25	0.25	0.25
Adjusted 5-min ECBL	1.70	1.70	1.70	1.75	1.75	1.75
Demand Reduction Response	0.70	0.65	0.65	**0.10**	0	-0.15

Demand Reduction Response at 11:00:00

= Baseload Prior to Regulation Dispatch – Resource Load @ 11:00:00

= (Resource Load @ 10:59:54 + Demand Reduction Response @ 10:59:54) - Resource Load @ 11:00:00

= (1.05 MW + 0.65 MW) – 1.60 MW

= 0.10 MW

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Counting MWs

Counting MWs

- **Every year, the NYISO will post the MW count of incremental Resources with Energy Duration Limitations so that all Market Participants are aware which set of capacity values will be used in the following Capability Year**
  - The incremental MW count will be posted by July 15th to provide time for resources to elect their durations by August 1st
  - This timing also supports the IRM study process
- **The MW count will start for incremental penetration of duration limited resources above the existing MW in service as of January 1st, 2019**
- **Once the MW penetration threshold has been met, the effective date of new capacity values will be May 1st of the following Capability Year**
  - These values will continue to be effective notwithstanding the future MW count of incremental penetration of Resources with Energy Duration Limitations

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Counting MWs (cont.)

- **The objective of the MW Count is to capture the resources with duration limitations that are eligible for capacity and are incremental to the As Found 2019 System**
- **The incremental MW count will include the following resources as of July 1:**
  - CRIS of additional Resources with Duration Limitations above the existing fleet in service by July Gen Status – CRIS of Resources with Duration Limitations Retired by July Gen Status + Demand Response (SCR and Capacity DR in DER Aggregations) July MW Sold – Existing SCRs (1309.1 MW)
  - Existing resources are reflected in the studies that form the basis of the values included in this market design

Counting MWs (cont.)

Resources included in MW count	Resources included that do not impact MW count	Resources not included in MW count
CRIS of additional Resources that went into service after January 1, 2019 and have participated with an Energy Duration Limitation of 6 hours and less *This includes CRIS of units with an Offer Floor	SCR MW participating in the ISO Markets prior to January 1, 2019 that switch to the DER Participation Model	Existing CRIS of Resources in service and participating in the ISO Markets prior to January 1, 2019
CRIS of Resources with Duration Limitations Retired by July Gen Status		Resources participating with an Energy Duration Limitation longer than 6 hours **For purposes of counting toward the 1000 MW level. The NYISO is open to tracking additional information for future studies
Demand Response (SCR and Capacity DR in DER Aggregations) July MW Sold		
Existing SCRs (1309.1 MW)		

Capacity Value Study

Capacity Value Study

- **The NYISO is proposing to review the Capacity Values every 4 years**
  - Periodic reevaluation is required to ensure that the capacity value of resources more accurately reflects the actual system changes over time and sends the right investment signals to the developers

DMNC Tests

Capacity Suppliers – DMNC

- **For Capacity Suppliers that are not duration limited, DMNC tests will continue to be determined by the technology type of the resource**
  - Traditional resources (nuclear, fuel-based)
    - Will keep the existing 1 or 4 hour maximum capability test, as applicable to technology type
  - Nameplate resources (e.g., Intermittent Power Resources) requirements will not change
  - No other changes will be made to DMNC testing requirements
    - e.g. testing windows, data submission, audit, temperature correction, etc.
    - Operational data can be submitted in place of DMNC test

Capacity Suppliers with duration limitations – DMNC

- **DMNC tests will be determined by the technology type of the resource**
  - Traditional resources (nuclear, fuel-based)
    - Will keep the existing 1 or 4 hour maximum capability test, as applicable to technology type
  - Storage
    - Full duration test at registration
      - This one-time test is required to validate that the resource can perform for the duration
    - Each Capability Period – paper audit with certifications (i.e. information on degradation) with duration test at maximum output (1 hour test for electrochemical storage, 4 hour test for other storage)

Capacity Suppliers with duration limitations – DMNC (cont.)

- **DMNC tests will be determined by the technology type of the resource**
  - DER
    - Each Capability Period – full duration test at maximum output.
      - Since the DER can have frequent changes (e.g., load of the customer changes, participate through time stacking, or change their enrollments on a monthly basis) DER will be required to do a full-duration test each Capability Period to demonstrate that the resource can perform for the duration
  - ELR
    - Full duration test at registration
      - This one-time test is required to validate that the resource can perform for the duration
    - Must provide information supporting its ELR status each Capability Year
    - Each Capability Period – paper audit (i.e. information regarding ELR status) with duration test based on technology type (e.g. Pumped Storage is 4 hour test)
- **Duration limited resources must perform their DMNC test during the Peak Load Window**

Bid, Schedule, Notify

Capacity Suppliers

- **Bid/Schedule/Notify obligations for traditional resources will not change for Capacity Suppliers**
  - 24 hour Bid/Schedule/Notify requirement will remain in effect
  - DER Aggregations that are not duration limited would have the 24 hour Bid/Schedule/Notify requirement
- **Bid/Schedule/Notify obligations for performance-based resources will not change**
  - Intermittents (Wind, Solar) have no current obligation to Bid/Schedule/Notify
  - RoR will maintain the 24 hour Bid/Schedule/Notify requirement

Capacity Suppliers with duration limitations

- **Capacity Suppliers with duration limitations are required to Bid/Schedule/Notify during the Peak Load Window**
  - ESRs with duration limitations must B/S/N in the DAM for the entirety of Peak Load Window as ISO-Managed
  - DER and ELRs with duration limitations must B/S/N in the DAM for the number of hours that correspond to their duration requirement
  - For ESRs, DER, and ELRs:
    - These hours must be consecutive and within the Peak Load Window
    - NYISO Operations has the right to move the resource's DAM schedule as well as specify the exact hours that resources should bid into on an as needed basis
      - Operations can specify the bidding window up to 4 hours (1 am) before the close of the DAM
        - » This proposed timeline is consistent with the existing DARU timeline
      - Hours do not have to be within the Peak Load Window
      - Responding to hours outside of the Peak Load Window would be on a best effort basis and will not impact the derating factors

Derating Factor

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Capacity Suppliers – Derating Factors

- **UCAP is calculated as ICAP times quantity 1 minus the derating factor**
  - UCAP = ICAP * (1 – derating factor)
- **The derating factor calculation for availability-based, GADS/EFORd, resources will remain unchanged**
  - Resources include nuclear, conventional combustion generators large hydro generation, Control Area System Resources (HQ), and UDRs/EDRs
  - Derating factors are calculated based on actual outages over an 18-month rolling average when the resource is scheduled for dispatch
- **The derating factor for performance-based Capacity Suppliers (Wind, Solar, RoR Hydro) will be calculated based on the resource's performance during peak hours**
  - This is the same as the existing calculation

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Capacity Suppliers with duration limitations – Derating Factor

- **The ICAP to UCAP translation will not change**
  - UCAP = ICAP * (1 - derating factor)
- **Availability-based derating factors will be derived from GADS or the UOL calculation, as applicable to the resource type**
  - The derating factor for traditional resources will continue to be based on the GADS/EFORd methodology
  - The derating factor calculation for resources using the UOL availability calculation (ESRs and DER) will be based on the resource type
    - More detail on the following slides
    - Activity that occurs outside of the required bidding obligation will not affect the derating factor (including failed starts and outages)

Derating Factor – ESRs

- **The derating factor calculation for ESRs that are duration limited is measured over the entire Bid/Schedule/Notify window**
  - ESRs will be measured in real time over the entire Peak Load Window

Derating Factor – DER

- **The derating factor calculation for DER that are duration limited is measured over the hours that the resource is expected to be available**
  - The resource is expected to be able to operate for the number of hours that correspond to its duration requirement (i.e. 2, 4, 6 or 8)
  - The window that measures the availability of the resource will be adjusted based on the DER's DAM schedule

Capacity Market rules for Aggregations

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Aggregations – DMNC

- **The NYISO will require the DER to perform a DMNC test once every Capability Period for the Aggregation as a whole**
  - Aggregations that obtain a DER new to the market must provide a new DMNC test for the Aggregation as a whole if the Aggregation wants to sell that DER in the Capacity Market
  - The aggregator will provide a resource-specific breakdown of the Aggregation's DMNC
  - An Aggregation can only change its duration at the beginning of the Capability Year
    - The Aggregation must notify the NYISO of this change prior to August 1st of the year preceding the Capability Year
  - Operating data can be submitted in lieu of a DMNC test

Aggregations – DMNC (cont.)

- **DER do not need to perform a new DMNC test again within the same Capability Period if:**
  - The capacity of the Aggregation does not increase
  - The aggregator obtains an existing DER that already performed DMNC (but new to the Aggregation)
  - The aggregator does not intend to sell the increased capacity
  - A DER leaves an Aggregation
    - If a DER leaves an Aggregation and does not join a new Aggregation, it can either participate on its own (if it is >= 0.1 MW) or leave the NYISO markets
      - A DER that leaves the NYISO markets can return at a later date if it meets all of the appropriate qualifications
      - A DER is considered to be a new DER after it has been out of the NYISO markets for 18 months

Aggregations – Bid/Schedule/Notify

- **Bid/Schedule/Notify obligations for a DER will be based on the characteristics of the Aggregation**
  - Homogenous aggregations will have the same obligation as that resource type
    - i.e. an Aggregation of Energy Storage Resources will Bid/Schedule/Notify as ISO-Managed Energy Level in the DAM
    - Exception is that an Aggregation of Load Curtailment resources will participate as part of the Dispatchable DER Model
  - Heterogeneous Aggregations will use the Dispatchable DER Model's Bid/Schedule/Notify obligation

Aggregations – Derating Factor

- **The method for calculating the derating factor for a DER will be based on the characteristics of the DER by treating the DER as a single resource**
  - The derating factor for homogenous Aggregations will be calculated using the method pertaining to that resource type
    - i.e. an Aggregation of all Solar resources (using the Solar Participation Model) will use the derating factor calculation for Solar resources
  - The derating factor for heterogeneous Aggregations will be calculated using the method for the Dispatchable DER Model
- **Derating factors for DER will be measured on the availability or performance of the Aggregation as a whole, as appropriate for that participation model**
  - The NYISO will not have visibility into the availability of the individual DER that comprise an Aggregation (excluding GADS)

Aggregations – Resources Changing Aggregations

- **Resources that switch from NYISO wholesale market participation to a retail load modifier**
  - If notified prior to August 1st of the year preceding the Capability Year, then the resource's transition to a retail load modifier will be reflected in the requirements for the Transmission District
  - If not notified prior to August 1st of the year preceding the Capability Year, then the resource's transition to a retail load modifier will not be reflected in the Transmission District Requirements
- **Resources with load reductions at the time of NYCA and Locality Peak will be added back to the actual metered load for determining ICAP Requirements**
  - Similar to the add-back done currently for SCR load reductions
- **New resources entering the market into an existing Aggregation will affect the Aggregation's derating factor going forward**
  - The derating factor for the months prior to the resource entering the market will be based on the NYISO class average of that resource type
- **For resources that swap Aggregations, the resource derating factor will be determined based on the participation models that the resource is moving to/from**
  - Homogeneous Aggregations have derating factors that are resource-type specific, whereas heterogeneous Aggregations are all Aggregations that use the UOL calculation

Time Stacking

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Time Stacking – DMNC

- **The NYISO will require the time-stacked Aggregation to perform a DMNC test once every Capability Period**
  - The DER will be required to test these DER sequentially during the DMNC window to demonstrate that the DER can be distributed throughout the window
    - Prior to time stacking, each DER will have met all of the qualifications of a Capacity Supplier, excluding the duration requirement
    - The DER are stacked based on their ICAP
  - DMNC of the Aggregation is the minimum sustained output over the duration period
    - Time-stacked Aggregations will only be allowed to switch durations at the beginning of a Capability Year, and consequently perform a new DMNC test
  - Aggregations that obtain a DER new to the market must provide a new DMNC test for the Aggregation as a whole if the Aggregation wants to sell that DER in the Capacity Market

Time Stacking – DMNC (cont.)

- **The NYISO will require the time-stacked Aggregation to perform a DMNC test once every Capability Period**
  - The aggregator will provide a resource-specific breakdown of the time-stacked Aggregation's DMNC
  - Operating data can be submitted in lieu of a DMNC test
- **Aggregators do not need to perform a new DMNC within the same Capability Period if:**
  - The capacity of the Aggregation does not increase
  - The aggregator does not intend to use the new capacity
  - A DER leaves an Aggregation
  - If the duration of a time-stacked Aggregation decreases

Time Stacking – Non-ESR Example 1

- **Time Stacking - the ability to stack/sequentially align DER to meet minimum duration requirements for capacity payments**
  - The following slide includes an example of three non-ESR DERs that participate in time stacking (cannot derate capacity):
    - 3 MW DER with 2 hour capability and 3 MW CRIS
    - 3 MW DER with 2 hour capability and 3 MW CRIS
    - 5 MW DER with 4 hour capability and 5 MW CRIS
  - This Aggregation can elect to be either:
    - An 8 MW DER with a 4 hour capability
    - An 11 MW DER with a 2 hour capability, with 5 MW and 2 hours left over (tall stack)
    - A 3 MW DER with an 8 hour capability, with 2 MW for 4 hours remaining (long stack)

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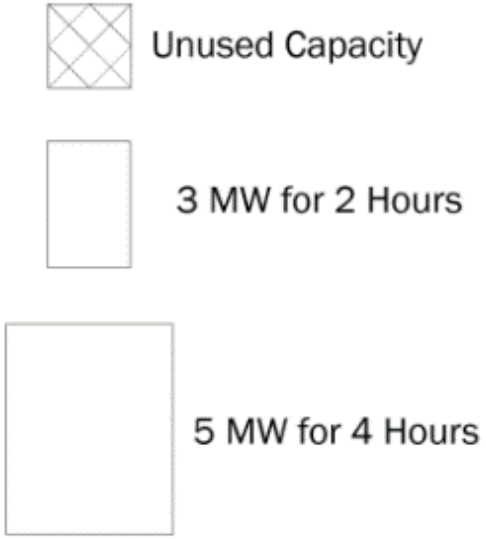
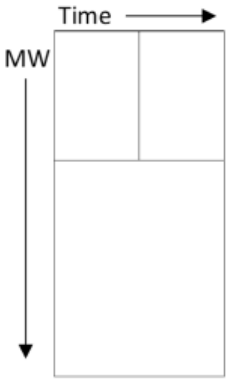
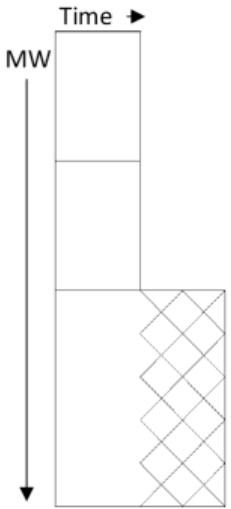
Time Stacking – Non-ESR Example 1 (cont.)



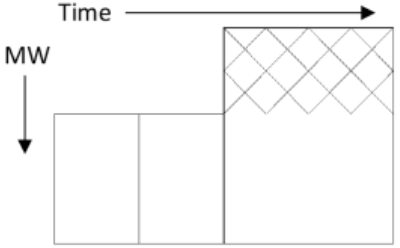
8 MW for 4 Hours



11 MW for 2 Hours



3 MW for 8 Hours



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ICAP Mitigation Measures

Supply Side Mitigation

- **Physical Withholding – presently all ICAP Suppliers are subject to the Physical Withholding rules relating to the audit of removal of capacity from Mitigated Capacity Zones**
  - DER Injection resources will be subject to this rule
  - DER Demand Reduction resources will not
- **Pivotal Supplier must offer – Aggregations that include DER, like all other ICAP Suppliers, are subject to the Pivotal Supplier must offer rule**
  - Aggregations must identify Affiliated Entities (defined in MST Section 23.2.1). See final paragraph of MST Section 5.12.1
  - Unlike other ICAP Suppliers, DER Aggregations and individual DER will not be able to request a Going Forward Cost
    - DER will be able to participate through an aggregation; therefore, an aggregation will not be a true representation of the avoidable costs

Buyer Side Mitigation

- The NYISO is not proposing any changes to the existing Buyer Side Mitigation rules except if necessary to make clear that DER injection resources and not DER demand reductions will be subject to the BSM Rules
- Proposed new generators, UDRs, and Additional CRIS are examined in a two-part test to determine whether an Offer Floor is applicable
- The NYISO proposes that the Competitive Entry, Renewable, and Self Supply exemptions would be available to DER injection resources
  - However, because the proposed Renewable and Self Supply Exemption tariff provisions are pending before the Commission (since April 2016)* the NYISO does not know with certainty whether modifications to tariff provisions ultimately accepted will be needed to make clear that DER injection resources will be eligible. The NYISO proposes that it will commit in the DER Section 205 filing that it will work with stakeholders promptly after issuance of a Renewable and Self Supply order to develop tariff modifications if any are needed so that DER injection resources can request these exemptions

*Tariff provisions to establish a Renewable Exemption and a Self Supply Exemption are pending before the Commission in DocketNo. ER16-1404- 000.

BSM of DER Resources

- All DER injection resources will be evaluated as independent, individual Examined Facilities Only revenue streams and costs associated with the individual facility will be evaluated
- If non-exempt, an Offer Floor will be applied upon entry to the CRIS accepted
- The “Category III” Examined Facility provisions proposed for reinsertion would be effective

Revenues associated with other energy products

- **Existing rules will apply:**
  - Revenue streams other than the NYISO Markets might include, but are not limited to:
    - Sale of generation byproduct
    - Sale of environmental attributes
    - Services to another entity for energy products
- **Revenue streams are considered on a case by case basis and can be excluded if there is insufficient support**

Revenues from Contracts: Existing rules will apply

- **Revenues earned by providing energy services to another entity (e.g., the utility or a host facility) will be accounted for**
  - If, for example, the revenues to be received under a contract are not in the range of the market, the NYISO may substitute the forecast market price
- **Revenues associated with energy or other energy products received under a contract that is entered into in a nondiscriminatory, arms length and competitive manner, as determined by the NYISO, may be included at the contract specified amount**
  - If the contract process was not non-discriminatory, arms length and competitive, the NYISO may either reject the revenues or revise them to the market price

Unit Net CONE: Existing rules will apply

- **Unit Net CONE can include**
  - Federal tax credits *E.g.*, Investment Tax Credit, Production Tax Credit
  - PILOT agreements
  - Accelerated depreciation

Interconnection for DER

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Some DERs Will Not be Subject to NYISO Interconnection Procedures

- **NYISO's interconnection procedures govern the interconnection of the facility if:**
  - Developer intends to make wholesale sales and
  - Developer proposes to interconnect to (i) transmission or (ii) distribution facilities on which there is already a generator making wholesale sales *(i.e.*, "FERC-jurisdictional distribution")
- **NY Standardized Interconnection Requirements (SIR) govern the interconnection of the facility if:**
  - Developer is interconnecting to portions of the distribution system other than "FERC-jurisdictional distribution" and the resource is less than or equal to 5 MW
- **Utility interconnection procedures govern the interconnection of resources if the interconnection is not subject to the NYISO or SIR processes**
  - Interconnection Service for SIR or Utility-level interconnection is based on the applicable interconnection agreement
  - Facilities that proceed through the SIR or utility interconnection processes must have an interconnection agreement that allows wholesale sales

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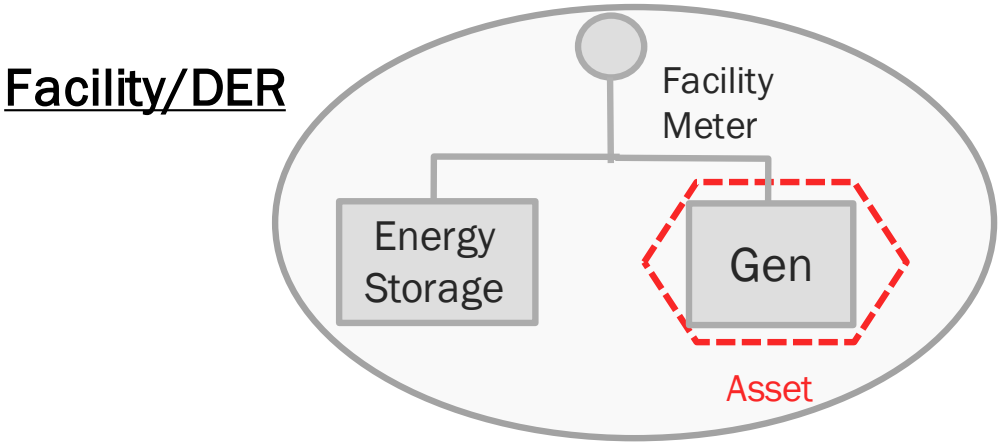
Proposed Revisions to Small Generator Interconnection Procedures

- NYISO proposes to expand the concept of "facility" to include all assets behind a single facility meter



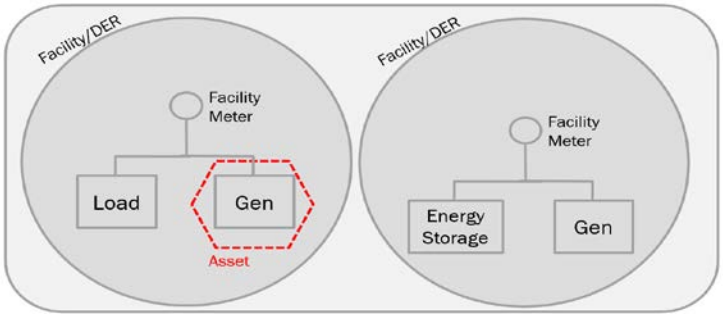
- NYISO proposes to redefine what may be included in one Interconnection Request (IR) (*i.e.*, a single queue position in the interconnection queue)
  - To allow multiple assets behind a single facility meter and POI in the same IR, even if different technologies

Proposed Revisions to Small Generator Interconnection Procedures

- **Proposal will require the following information in the IR for DER Developers requesting ERIS, in addition to information already requested:**
  - Description of the composition of assets within the Distributed Energy Resource, including load reduction assets
    - If one of the assets in the facility is a load reduction asset, that should be specified in the IR, but will not be evaluated in the interconnection studies (*i.e.*, is for information only)
  - Maximum Injection Capability of entire the Distributed Energy Resource over 1 hour
  - Technical details for the DER facility and each asset within the DER facility

Proposed Revisions to Small Generator Interconnection Procedures

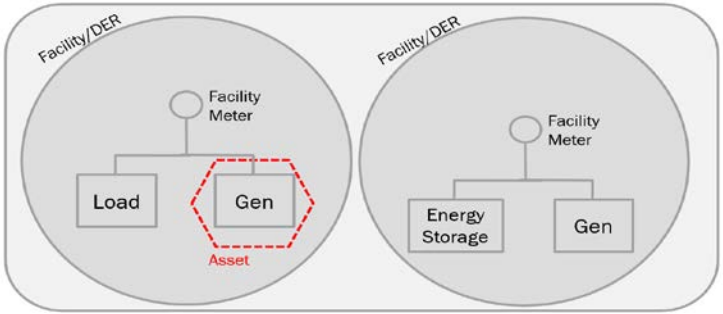
- **Proposal revisions regarding modifications to DERs:**
  - Permissible Modifications (not material, but may require IA amendments)
    - Facilities can switch between different aggregations
    - Assets within a facility switching to another facility are not material modifications **to the original facility**,
    - Eliminating an asset or switching asset to load curtailment



  - For a duration limited facility, a change to the selected duration for capacity market participation would not be a material modification, but capacity sales would be limited by CRIS

Proposed Revisions to Small Generator Interconnection Procedures

- **Material Modifications (requiring a new Interconnection Request)**
  - Adding a new asset to a facility
  - Changing technology of an asset within a facility
    - For example, if a DER facility is comprised of a battery and a solar asset and decides to replace the solar asset with a traditional generator, that modification would be material
  - Assets within a facility switching to another facility may be a material increase to the new facility if the increase is beyond the permissible *de minimis*



Process for DERs to Obtain CRIS

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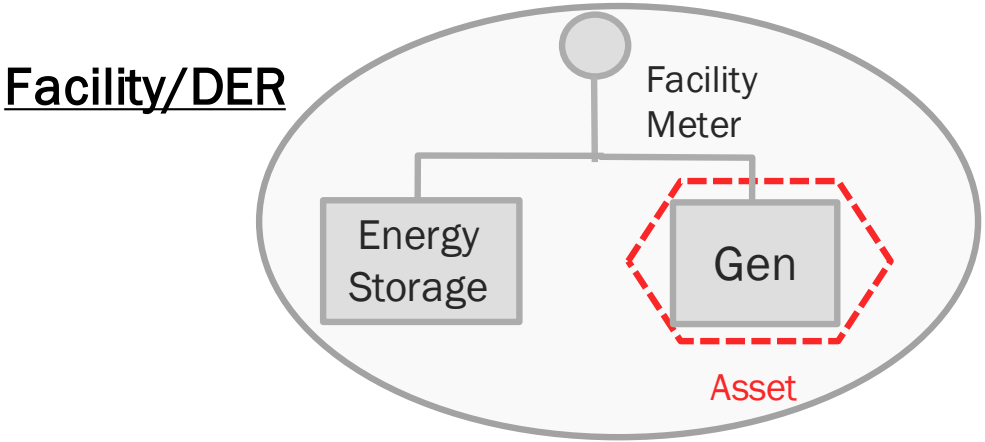
Proposed Revisions to Small Generator Interconnection Procedures

- NYISO proposes to award CRIS at the "facility" level



- CRIS is not awarded to individual assets within a facility
- Each facility within an aggregation must separately request and obtain CRIS

Proposed Maximum CRIS

- CRIS will only be applicable to injection capability of resources (not withdrawal or load reduction portion)
- For a Developer requesting CRIS only (*e.g.*, new facility not subject to the NYISO SGIP or existing facility already evaluated in a NYISO, SIR or utility interconnection process), no IR is required for the facility
  - In other words, the facility does not have to go through the SGIP (unless making a material modification to an existing facility)
- In order to obtain CRIS, if more than 2 MW, must execute a Facilities Study Agreement for the next open Class Year Study to be evaluated for deliverability

Proposed Maximum CRIS

- **For DER facilities, NYISO proposes that CRIS request cannot exceed the minimum of the following:**
  - Expected maximum injection capability (in MW hours) for the Developer-selected duration for capacity market participation (*e.g.*, 2, 4, 6 or 8 hour);
  - Nameplate capacity (for DERs, the collective nameplate of assets included in the DER facility); or
  - The the sum of facility's requested and existing ERIS, as applicable
- **DER Developer must include the following information in the IR and Facilities Study Agreement data forms (for the NYISO to determine the maximum permissible CRIS request):**
  - Selected duration (*e.g.*, 2, 4, 6 or 8 hours) for the entire facility, as applicable; and
  - Expected maximum output of the entire facility for its selected duration

CRIS Impacts to Asset and Facility Modifications

- If a facility moves between aggregations, NYISO proposes that the CRIS awarded to the facility stays with the facility and moves with it to the new aggregation
- For a multi-asset facility, if an asset within that facility moves to another facility, NYISO proposes that the original facility retains the full amount of CRIS
  - The asset moving to a new facility would have no CRIS
  - For the facility to which the asset moved to increase its CRIS more than 2 MW to account for the new asset, it must request CRIS through a Class Year Deliverability Study
  - The original facility may not transfer CRIS to the new facility (*i.e.*, same location CRIS transfer rules will not apply to this scenario)

Deliverability Methodology

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Deliverability Methodology for DERs

- **The Deliverability Study uses derated generator capacity incorporating availability – UCAP Deration Factor (UCDF)**
  - Based on the UCAP of each resource (or Net UCAP, for BTM:NG Resources)
    - UCAP = ICAP * (1 - Derating Factor)
  - The UCDF is applied to the requested CRIS level
    - CRIS requested by a Developer represents ICAP, and that ICAP is derated for the deliverability analysis by applying the UCDF
    - At the conclusion of the deliverability analysis, the NYISO reconverts the deliverable MW and reports them in terms of MW of ICAP (using the same derating factor utilized at the beginning of the deliverability analysis)
  - Derating Factor
    - For non-intermittent resources (including ESRs), derating factor is based on the average from historic ICAP to UCAP translations on a Capacity Region basis
    - For intermittent resources, derating factor is based on resource type

Deliverability Methodology for DERs

- **Proposed DER Deliverability methodology:**
  - For DERs evaluated in the Deliverability Study, the following ICAP to UCAP translation will still apply:
    - UCAP = ICAP (*i.e.,* CRIS) * (1 - Derating Factor)
  - UCAP for DERs will be based upon their maximum ICAP possible, for Developer-selected duration, reduced by the applicable derating factor

Deliverability Methodology for Duration Limited DERs

- **Duration Limited DERs**
  - Duration limited DER, like other DERs, will be studied in the Deliverability Study at their UCAP (*i.e.*, based upon their maximum ICAP possible, for Developer-selected duration, reduced by the applicable derating factor)
  - See example on the following slide of Derating Factor and UCAP used for Duration Limited Resource in Deliverability Study

Example of Derating Factor and UCAP used for Duration Limited Resource in Deliverability Study

Example of battery with the following parameters: 80 MWh, 40 MW injection capability, and ERIS of 40 MW

Capacity Supplier Type	Maximum CRIS (MW)	Duration Category (hours)	Derating Factor %	UCAP for Deliverability (MW)
Capacity	10	8	5%	9.5
Duration Limited	13.3	6	5%	12.6
Duration Limited	20	4	5%	19
Duration Limited	40	2	5%	38

Max CRIS request is the expected max output for the developer-selected duration, and UCAP will be that value reduced by derating factor

Deliverability Methodology for Multiple Technology DERs

- **NYISO proposes that a multi-technology DER facility may submit one IR in the Small Generator Interconnection Procedures for both ERIS and CRIS**
  - CRIS request, however, may be subject to a deliverability evaluation in a Class Year Study if the entire DER facility is larger than 2 MW
  - If not subject to the NYISO's Interconnection Procedures, a multi-technology facility can submit a single CRIS request if the assets within the facility are behind a single facility meter
    - Can request CRIS in a single IR, if also requesting ERIS; or
    - Can request CRIS by requesting and executing a Facilities Study Agreement for the next Open Class Year Study (and providing the required technical data and deposit)

Deliverability Methodology for Multiple Technology DERs

- **Proposed deliverability methodology for evaluating a CRIS request for a multi-technology facility:**
  - NYISO proposes to use a blended UCAP
    - For example, a 4 hour DER with 10 MW of solar and 5 MW/20 MWH of batteries:
      - Could be studied up to 15 MW of CRIS
      - Corresponding maximum UCAP evaluated in the Deliverability Study would be 9.5 MW:

        (10 MW solar * (1-50% Derating Factor for solar) +
        (5 MW battery * (1-10% Derating Factor for batteries)
  - If the facility includes a load reduction asset, the amount of load reduction will not impact the blended UCAP

The Mission of the New York Independent System Operator, in collaboration with its stakeholders, is to serve the public interest and provide benefits to consumers by:

- Maintaining and enhancing regional reliability
- Operating open, fair and competitive wholesale electricity markets
- Planning the power system for the future
- Providing factual information to policymakers, stakeholders and investors in the power system

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