Distributed Energy Resources (DER) Participation Model Chapter 1

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DER Participation Model
2024
eLearning Module

Presentation Outline

- Chapter 1: Introduction to the DER Participation Model
- Chapter 2: DER Onboarding Overview
- Chapter 3: Energy Market and Ancillary Services Participation
  - Settlements for Energy and Ancillary Service Participation
- Chapter 4: Installed Capacity Market Participation
- Chapter 5: Participation model transitions to and from DER

Chapter 1: Introduction to the DER Participation Model

DER Participation Model

- The NYISO's Distributed Energy Resources (DER) Participation model allows for Market Participants to group individual DER to form a single entity called an Aggregation that can participate in NYISO markets and services
- Facilities can be located on:
  - The New York State Transmission System and/or
  - The Distribution System located in the NYCA
- The Aggregation must satisfy all applicable eligibility and performance requirements necessary to participate in the NYISO-administered markets

DER Participation Model

- Qualifying for wholesale market participation requires that Aggregations:
  - Satisfy all enrollment requirements as per tariff rules
  - Meet a minimum offer size requirement of 100 kW
  - Meet minimum of 0.1 MW for a period of at least one hour for injection, withdrawal, and demand reduction
  - Must be capable of responding in real-time to NYISO dispatch instructions
  - Satisfy all measurement and communication requirements
  - Meet qualifications required for Installed Capacity Market participation

Aggregation

- Aggregation is a Resource that must be comprised of:
  - Two or more individual Generators, Demand Side Resources, or Distributed Energy Resources, (or)
  - One or more individual Demand Side Resources

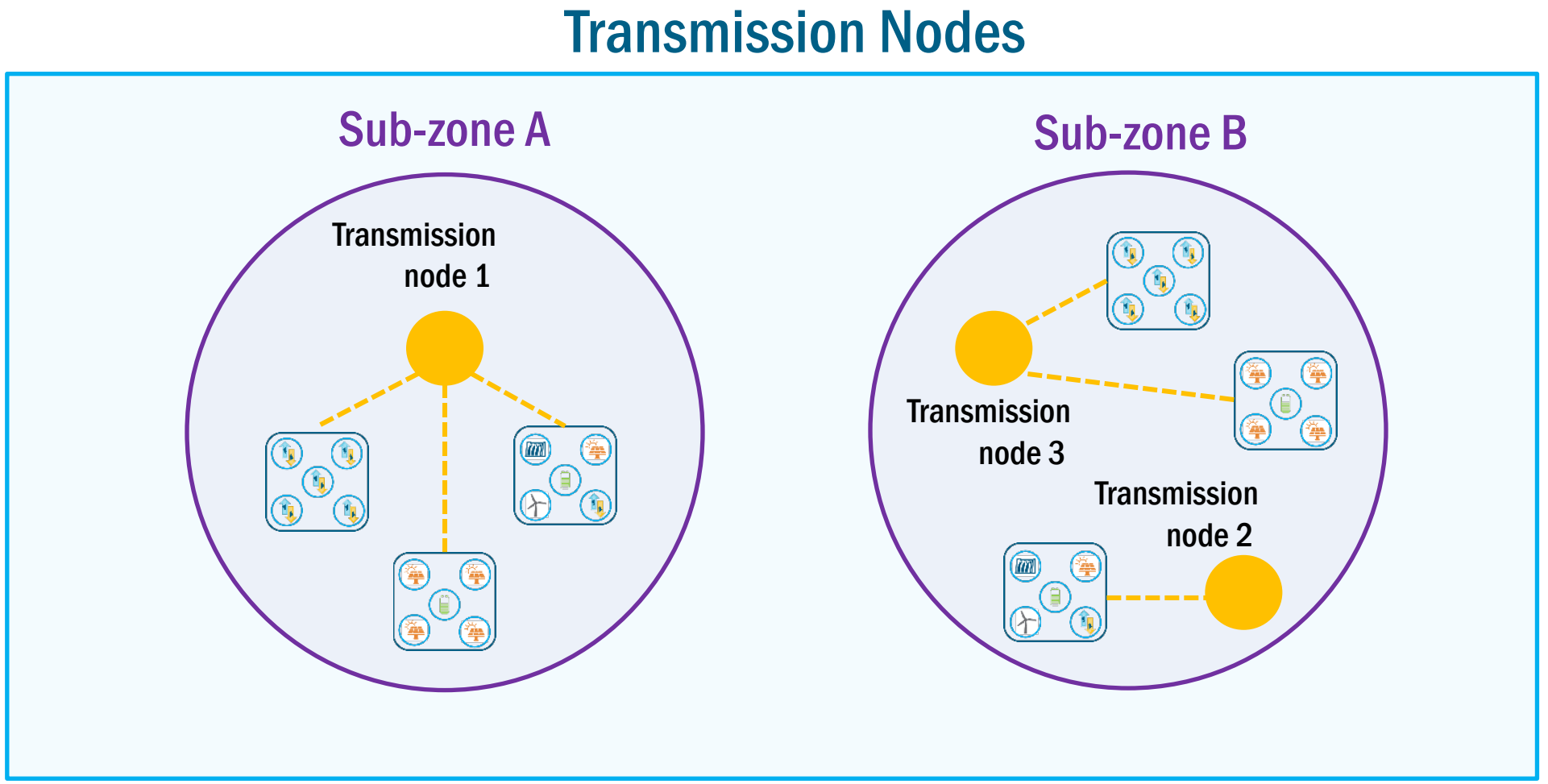
  at separate points of interconnection and that are grouped and dispatched as a single unit by the ISO

- An Aggregation may be comprised of DER interconnected to either the Transmission System or a distribution system in the NYCA
  - Aggregation may include a mix of DER interconnected on the Transmission and distribution systems, but all DER in an Aggregation must electrically map to the same Transmission Node

Transmission Nodes

- A Transmission Node is a point on the NYS Transmission System at which Locational Based Marginal Prices ("LBMP") are calculated for Aggregations
  - Transmission Nodes reflect a collection of designated load buses on which individual DER are located and may participate together in an Aggregation
    - Energy injections, withdrawals and Demand Reductions for an Aggregation are modeled at a single Transmission Node
    - The NYISO DER participation model requires that individual DER be mapped to a Transmission Node
    - Each DER will be assigned to a single Transmission Node
    - An Aggregation may only comprise DER assigned to the same Transmission Node
  - Established by NYISO and Member Systems in coordination
    - Identified and designated from NYCA Load nodes modeled by the NYISO

Transmission Nodes



For more details, refer to Section 5.2 of the Agg Manual

Size Requirement for Aggregations

- Min Size requirement for participation as an Aggregation in Energy, Ancillary Services and Installed Capacity is 100 kW
  - If an Aggregation offers a combination of Energy injections, Energy withdrawals, and/or Demand Reductions, the Aggregation must offer the minimum offer level of 100 kW for each response type
  - Each DER must have a minimum capability of 10 kW
  - Each DER has a maximum individual injection limit of 20MW
  - A Demand Side Resource participating as a DER has no maximum size limitation
    - For example: A Demand Side Resource can have a 50 MW load reduction capability

Distributed Energy Resource (DER)

- A Distributed Energy Resource (DER) may be one of the following categories of facilities electrically located in the New York Control Area ("NYCA"):

  (i) A facility comprising two or more different technology types located behind a single point of interconnection with a maximum Injection Limit of 20 MW,

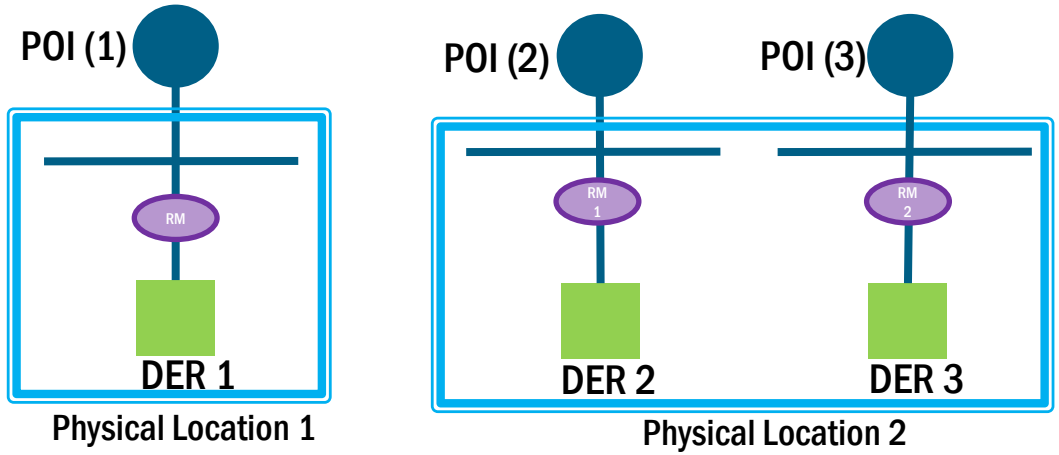
  (ii) A Demand Side Resource, or

  (iii) A Generator with a maximum Injection Limit of 20 MW

- Distributed Energy Resources may be interconnected either to:
  - The New York State Transmission System and/or
  - The Distribution System located in the NYCA

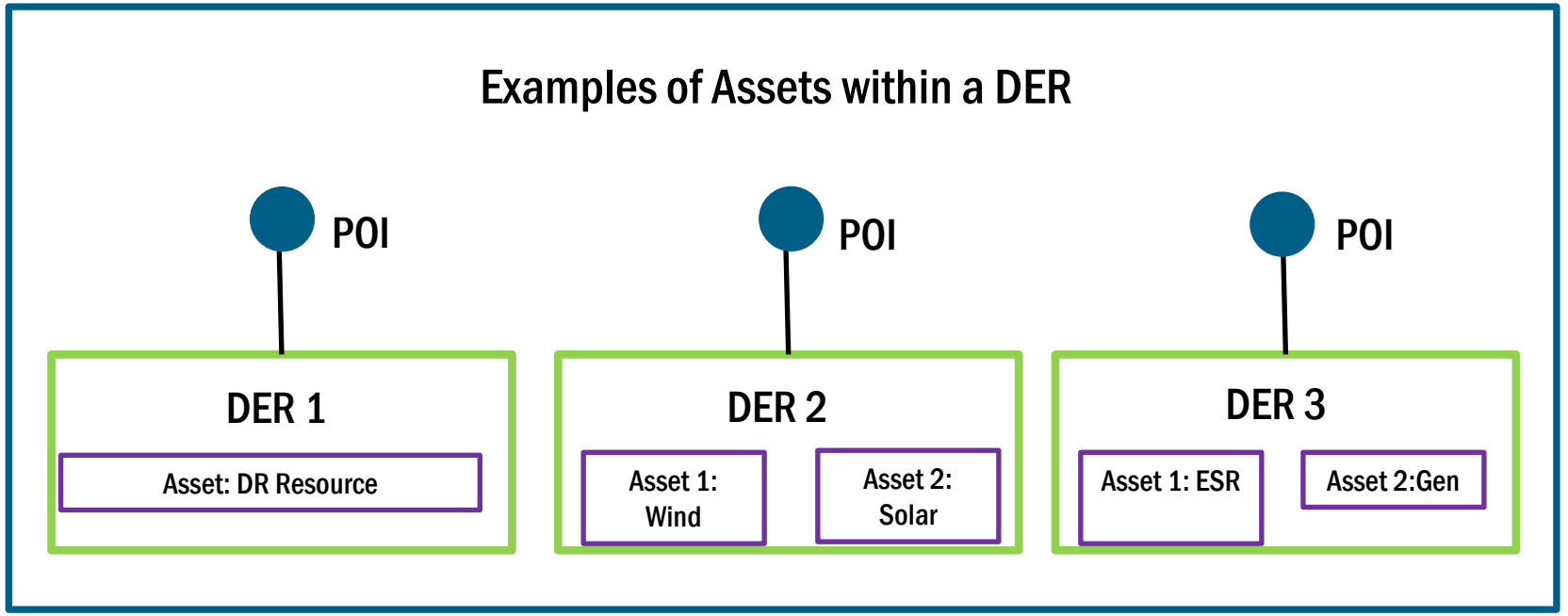
Distributed Energy Resource (DER)

- A DER must be located at a distinct physical location (street address), with its own utility account number, revenue grade metering and Point of Interconnection (POI) to the NYS Transmission or Distribution system
  - There may be more than one DER at a single physical location, if they have their own
    - Revenue grade meter, as per requirements
    - Separate utility account numbers and/or Point of Interconnection (POI), and
    - Operated independently from other facilities at that physical location



Distributed Energy Resource (DER) - Assets

- A DER could comprise of one or more assets
  - Assets are defined as different technologies located within the same DER facility, associated with a single utility account and net meter
- 'Technology types' refers to any of the following categories of an 'asset'
  - Demand Side Resource
  - Generator
  - Energy Storage Resource
  - Solar
  - Wind, or
  - Landfill Gas



Distributed Energy Resource (DER) - Assets

- Each DER has a 10-kW minimum capability which is applied to Demand Reduction, Injection, and Withdrawal capabilities separately, pursuant to Services Tariff Sections 4.1.10 and 2.5
  - Therefore, an individual DER with a combination of assets capable of Demand Reduction, Injection, and Withdrawal must have the 10-kW minimum capability applied to each of the three response types
- An asset may be a singular generation source (e.g., one wind turbine) or may reflect a composite of several of the same generation sources behind the same meter (e.g., ten identical wind turbines)
- There is no limit on the number of assets comprising an individual DER
  - A DER can only contain one Demand Reduction asset (as there can only be one load associated with a DER)

Distributed Energy Resource (DER) - Assets

- All components of the asset must share the same generating technology and fuel type to enroll as a singular asset with an associated GADS submission record
  - Multiple solar panels that form part of a solar Resource, located behind a single POI and are associated with a single utility account and net meter will be grouped together as one asset for GADS data submission
  - An ESR located behind the same POI and associated with the same utility account and net meter will be considered a separate asset to the solar resource for GADS data submission
- Each conventional generator behind the same POI and associated with a single utility account and net meter must be enrolled as a singular asset with an associated GADS submission record
  - For example: Two generators behind the same POI and associated with a single utility account and net meter will be considered two separate assets for GADS data submission

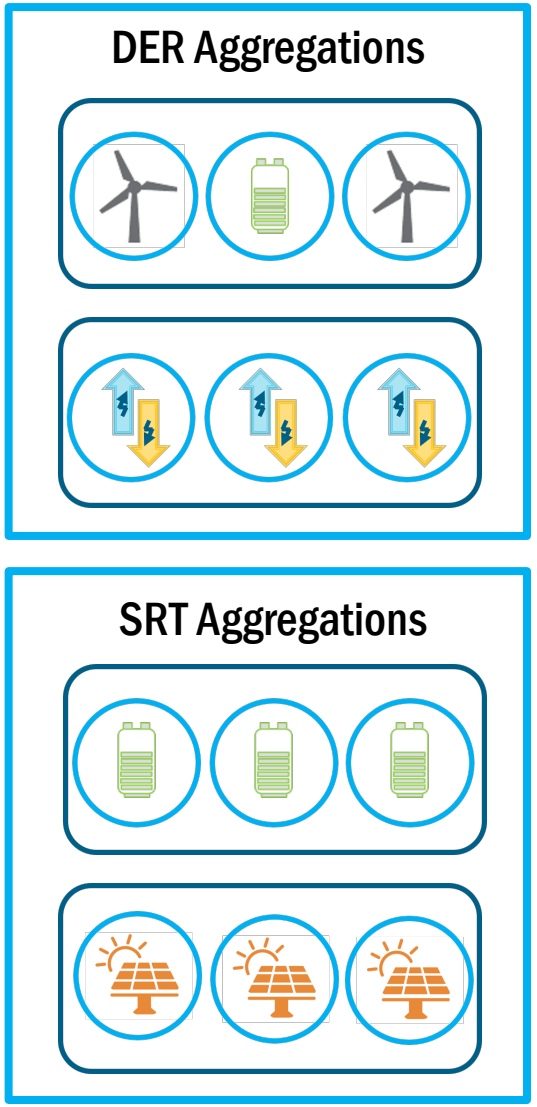
Existing NYISO Classifications for DER

Existing classifications that are eligible for DER to participate in an Aggregation	Existing classifications that are ineligible for DER to participate in an Aggregation*
Generators	Facilities designated as PURPA units
Demand Side Resources	Limited Control Run of River (LCRoR) units
Limited Energy Storage Resources (LESR)	Behind-the-Meter Net Generation (BTM:NG) Resources
Energy Limited Resources (ELR)	Municipally Owned Generators
	System Resources
	Control Area System Resources

* A resource may choose to forego its applicable classification and participate as a “Generator” for the purpose of its participation in an Aggregation

Types of Aggregations

- Individual DER will participate in an Aggregation under the market rules for either:
  - A DER Aggregation (multiple Resource types in the Aggregation OR all Demand Side Resources)
    - Example 1: An Aggregation with 2 IPR and 1 ESR located to the same Transmission Node
    - Example 2: An Aggregation consisting of 3 Demand Side Resources
      - Note: An Aggregation may also be comprised of a single Demand Side Resource
  - The specific Resource type (when there is a Single Resource Type (SRT) in the Aggregation)
    - Example 1: An Aggregation of only ESRs
    - Example 2: An Aggregation of only Solar IPRs



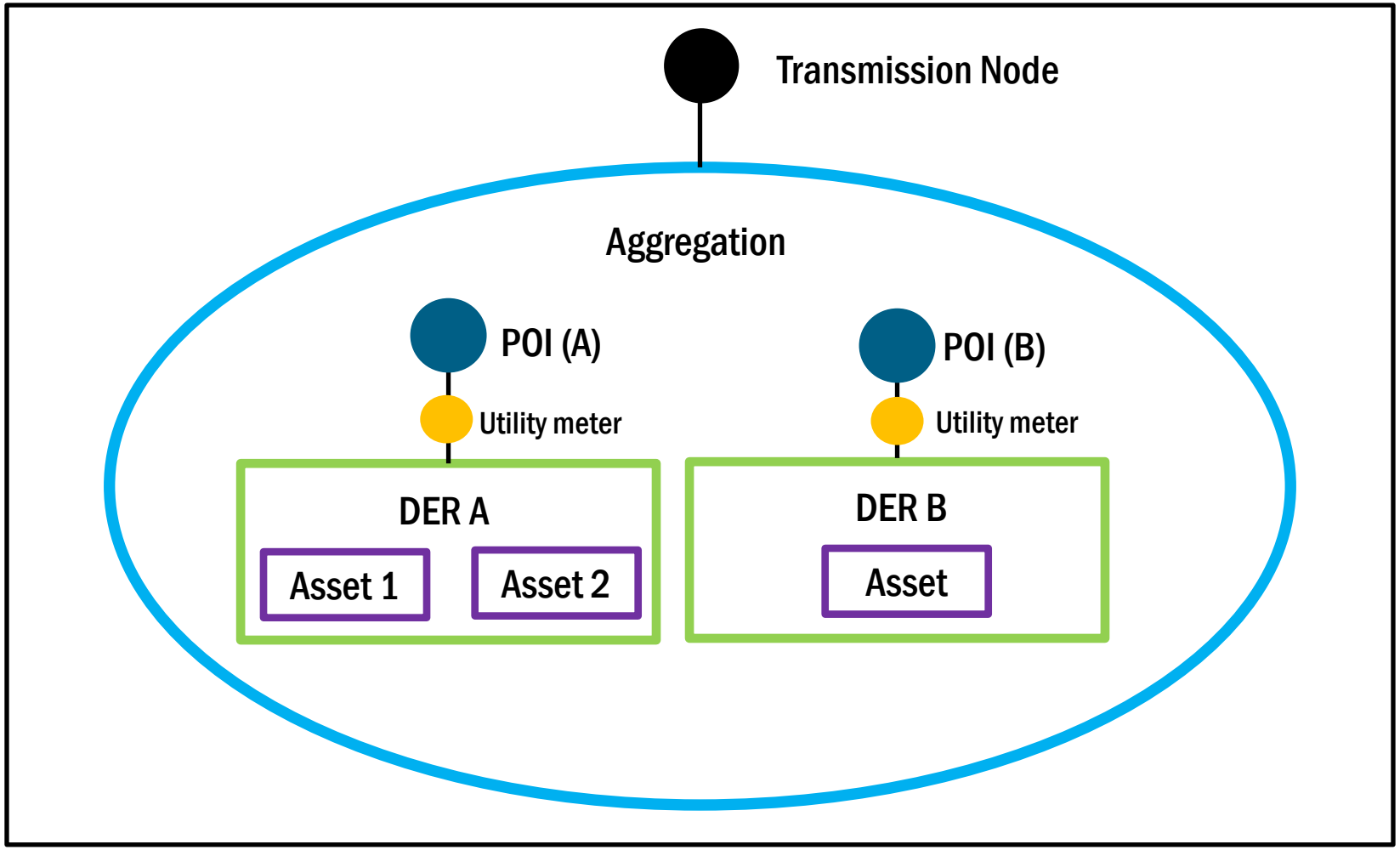
Types of Aggregations

- 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), for it to be considered a SRT Aggregation
  - An Aggregation with wind and solar Intermittent Power Resources will be considered a DER Aggregation
- Single Resource Type (SRT) Aggregations will follow the rules associated with that Resource type for market participation
  - Exceptions are specific to participation as an Aggregation
- Aggregations that are comprised of more than one Resource type, and Aggregations comprised of only Demand Side Resources shall follow the rules associated with DER Aggregations

DER– Demand Reduction Resources

- Demand Side Resources can participate as a DER as one of the following types, depending on how they facilitate their load reduction:
  - Decreasing the electricity the facility consumes from the grid (Interruptible loads) – Response Type C
  - Using a qualified Local Generator to supply part of the resource's load – Response Type G
    - Non-controllable generation cannot be the Local Generator (e.g., solar and other IPRs)
  - Using both load curtailment and a Local Generator – Response Type B
  - Using curtailment and/or Behind-the-meter generation with additional capability of injection onto the grid – Response Type I (only for DER Aggregations)

Summary: Granularity of an Aggregation



NYISO Market Participation

Energy Market

Aggregations can participate in the Day-Ahead and Real-Time Energy Markets

Ancillary Services

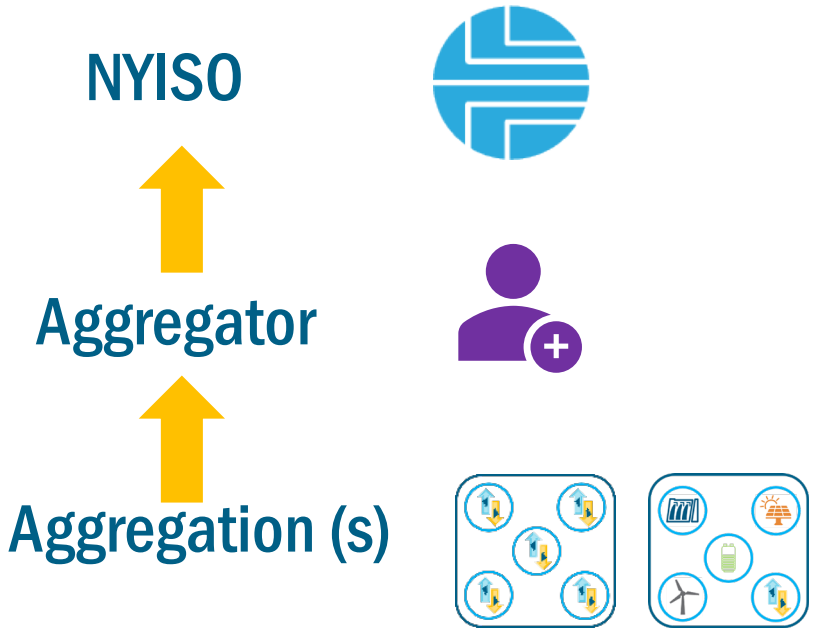
Aggregations can qualify to provide Regulation Service and/or Operating Reserves

Installed Capacity Market

Aggregations can qualify to provide UCAP and participate in the Installed Capacity Market

Entities: Aggregator

- The entity that registers as a NYISO Customer
- Responsible for enrollment of Aggregations, facility enrollment, bidding, scheduling, submitting meter data and settlements corresponding to participation in NYISO markets
- May enroll more than one Aggregation



Entities: Meter Authority

- Meter Authority: Entity responsible for calibration, maintenance, operation, and reporting of metered data from an electric revenue meter used in the wholesale electricity markets administered by the NYISO
- Could be a Member System, Meter Services Entity, or municipal electric utility
  - Member System: The eight Transmission Owners that comprised the membership of the New York Power Pool, that own, operate and maintain the NY Transmission System
  - Meter Service Entity (MSE): Entity authorized by NYISO to provide metering and meter data services, only for DER Aggregations (Single Resource Type (SRT) Aggregations NOT included)
    - MSE must register as NYISO customer or Guest to participate
    - If qualified, Aggregator can function as its own MSE

Entities: Distribution Utility

- For the purposes of the DER participation model, the term ‘distribution utility’ means the electric utility that owns and operates a distribution system in the NYCA
- Includes:
  - Municipalities,
  - Member Systems, and
  - Electric cooperatives connecting the NYS Transmission System to retail customers

Additional References

- Tariff:
  - Market Administration and Control Area Services Tariff
- Manuals:
  - Aggregation Manual
  - Installed Capacity Manual
  - Control Center Requirements Manual
  - Ancillary Services Manual
- User's Guides:
  - Aggregation System User's Guide
  - Market Participant User's Guide
- Market Training materials:
  - DER Onboarding Educational Suite
  - Aggregation System Training e-learning module

New York ISO

Distributed Energy Resources (DER) Participation Model Chapter 2

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DER Participation Model

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Chapter 2: DER Onboarding

DER Onboarding

- The onboarding process consists of a series of steps to be taken by an Aggregator, in collaboration with multiple NYISO departments in order to get the Aggregation ready for participation in qualified NYISO markets and services
- DER Onboarding processes include:
  - Interconnection Process for DER
  - Metering requirements
  - NYISO Customer and NYISO Aggregator Registration
  - Enrollment in the Agg system
    - Energy and ancillary market participation
    - Installed Capacity market participation
  - Testing and validation prior to start of participation in NYISO markets
    - End-to-end Communication testing

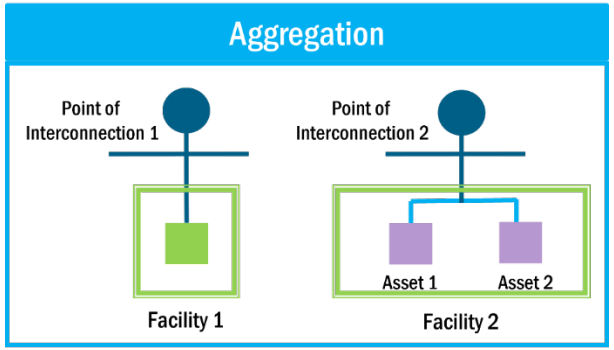
DER Onboarding

- **Market Training DER onboarding suite**
  - Designed to help guide new Aggregators through the Onboarding process
  - Instructions for new Aggregators and existing customers who wish to participate in the NYISO markets using the DER participation model

Topic	Resource Mode
Introduction to Onboarding	eLearning Module
1. Interconnection	Fact Sheet (PDF)
2. NYISO's Customer Registration & Aggregator Registration	eLearning Module
3. Credit Requirements	Fact Sheet (PDF)
4. DER Information Community Portal (DERIC)	FAQ (PDF)
5. Communications Testing & Operations Modeling	Fact Sheet (PDF)
6. Market Mitigation & Analysis: Energy Market Reference Levels	Info Graphic (PDF)
7. Outage Scheduling	Info Graphic (PDF)
8. Metering Configuration	Fact Sheet (PDF)
9. Metering for Settlements	Fact Sheet (PDF)
10. Installed Capacity (ICAP) Enrollment for Participation	Info Graphic (PDF)
11. DER Settlements	Quick Reference Sheet (PDF)
12. Resource Appendix: NYISO Onboarding of New Resources DER Participation	Appendix (PDF)

Interconnection for DER

- All non-Demand Side Resource DER must have a fully executed Interconnection agreement (or an unexecuted Interconnection agreement filed with FERC) either through:
  - NYISO's Interconnection process, OR
  - An applicable non-NYISO Interconnection process (*e.g.*, Transmission Owner or SIR interconnection process)
- For NYISO market participation, the NYISO requires that the Interconnection studies be completed and approved prior to the enrollment of the DER in the NYISO's Aggregation System
- The enrollment process draws on the information provided by the Interconnection study process for validation of DER physical and operating characteristics
- Interconnection for DER is conducted at the facility level, not at the asset level (within a facility), or at the Aggregation level (composed of multiple facilities)



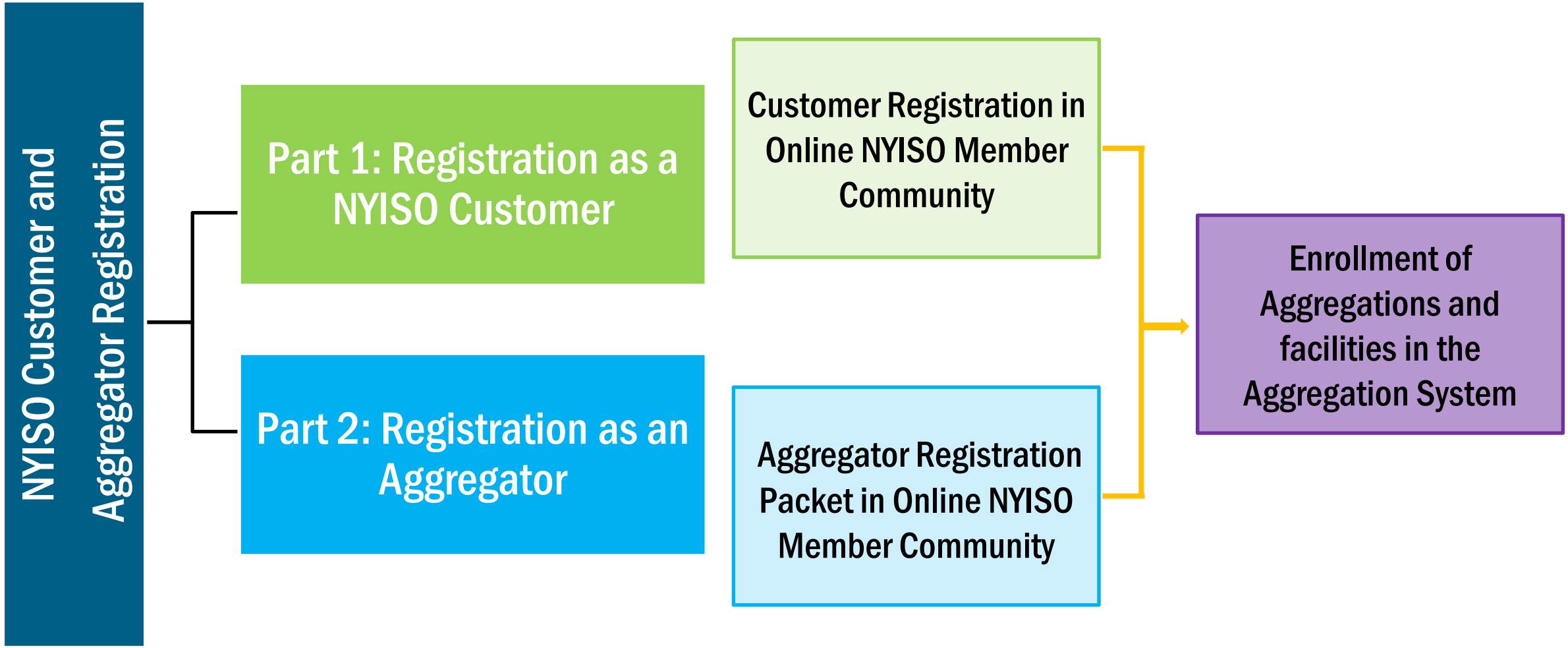
Interconnection for DER, cont.

- A DER ‘s ERIS and CRIS values will be determined through the Interconnection Process
  - ERIS: Allows for Energy market participation to enable the wholesale grid to receive electric energy from the resource
    - DERs, except for Demand Side Resources, must obtain ERIS either through NYISO’s Interconnection process or obtain an ERIS equivalent value (seasonal Max Net Value) through one of the non-NYISO Interconnection processes
  - CRIS: Allows for Installed Capacity Market participation to enable resource to offer capacity as a supplier
    - DERs, except for Demand Side Resources, larger than 2 MW must obtain CRIS through deliverability studies even if the DER participated in a Non-NYISO interconnection process
- For more information about the NYISO and non-NYISO Interconnection processes, please refer to the DER Interconnection factsheet of the DER Onboarding education suite

Overview of NYISO's Registration Process

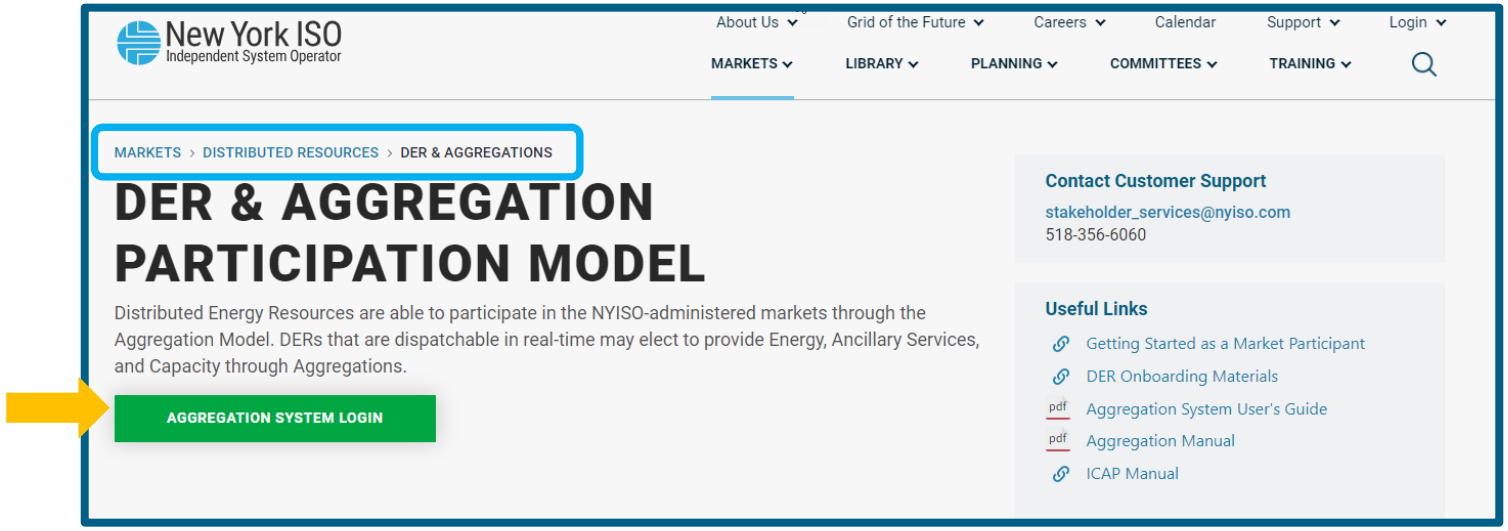
- The NYISO's registration process for a new applicant entity/organization that wishes to participate In NYISO's Energy, Capacity and/or Ancillary Services, as an Aggregator consists of two main parts:
  - NYISO Customer Registration Process
  - Aggregator Registration process
  - An entity/organization that is already a NYISO customer, and would like to participate in the NYISO markets as an Aggregator, and enroll Aggregations needs to only go through the Aggregator Registration Process
- Once this two-part Registration process is complete, the Aggregator will be able to enroll Aggregations and facilities for participation in the NYISO's Agg System interface

Two Part Process of Registration



Aggregation and Facility Enrollment

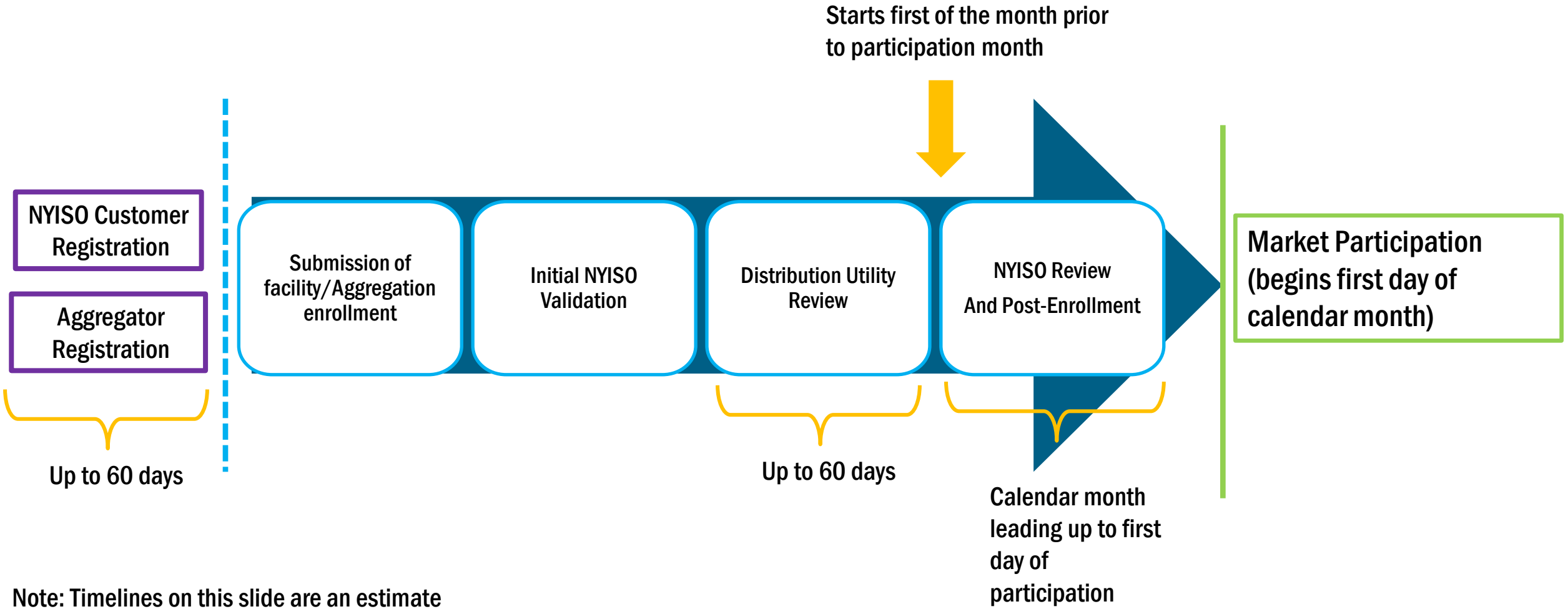
- NYISO's Aggregation System:
  - Online interface for Enrollment of Aggregations and facilities for participation in NYISO's Energy, Ancillary Services and Installed Capacity markets and management of enrollment of Aggregations
  - Designated personnel from the Aggregator organization will have access to the Aggregation System
  - Aggregation enrollments may be submitted on a monthly basis
- Aggregators are responsible for submitting applicable documentation to support the enrollment data for each Aggregation and facility as directed
  - Complete list of applicable documents provided in the Agg System User's Guide



Functionalities of the Agg System

- Enrollment for Energy and Ancillary Services Participation
- Enrollment for Installed Capacity Market Participation
- Management of Enrollments
  - Modification of facility/Aggregation level attributes
  - Separating Facilities/Aggregations
  - Transition of existing resources to the DER Participation Model
    - Special Case Resources (SCRs)
    - Stand-alone Generators

Overview of Enrollment Process in Agg System



Note: Timelines on this slide are an estimate

Enrollment and Participation Timeline

- New DER and Aggregations
  - Energy market and Ancillary Services participation: 1st month after NYISO Review and successful enrollment
  - Installed Capacity Market Participation: 1 month after Energy market participation onwards
    - DMNC tests must be submitted and validated prior to participation start
- Existing resources transitioning into the DER participation model
  - Energy and Ancillary Services market participation: 1st month after NYISO Review and successful enrollment
  - Installed Capacity Market Participation: Can start 1st month after NYISO Review and successful enrollment
    - If DMNC/provisional DMNC is submitted and validated during the month of NYISO Review

Enrollment Process in Aggregation System

- The Aggregation System Training e-learning module provides a comprehensive look at the steps required to complete the Enrollment process for DER and Aggregations in the NYISO's Aggregation System
- Here are the topics that are included in this e-learning training which complements this training suite on the DER Participation model:
  - Introduction to the Agg System
  - Enrollment of new Aggregations and facilities
    - Submission of facilities and Aggregation Enrollment
    - Initial NYISO Validation
    - Distribution Utility Review
    - NYISO Review
    - Post Enrollment Setup for Participation
  - Enrollment tasks for Installed Capacity Market Participation
  - Management of Enrollments

Metering Requirements

- Metering Requirements for Aggregations:
  - Hourly Revenue Quality metering
  - Real-Time six second telemetry
- Aggregators of DER must obtain wholesale metering and/or meter data services from a Meter Authority (MA)
  - Could be a Member System, Municipal Electric Utility or MSE
    - DER Aggregations may obtain wholesale metering and/or meter data from:
      - An authorized Meter Services Entity
      - Municipal electric utility
      - Member System
    - Single Resource Type (SRT) Aggregations may only obtain wholesale metering and/or meter data from:
      - Applicable municipal electric utility
      - Member System
  - The Aggregator is responsible for the Aggregated meter data provided to the NYISO on behalf of their Meter Authority

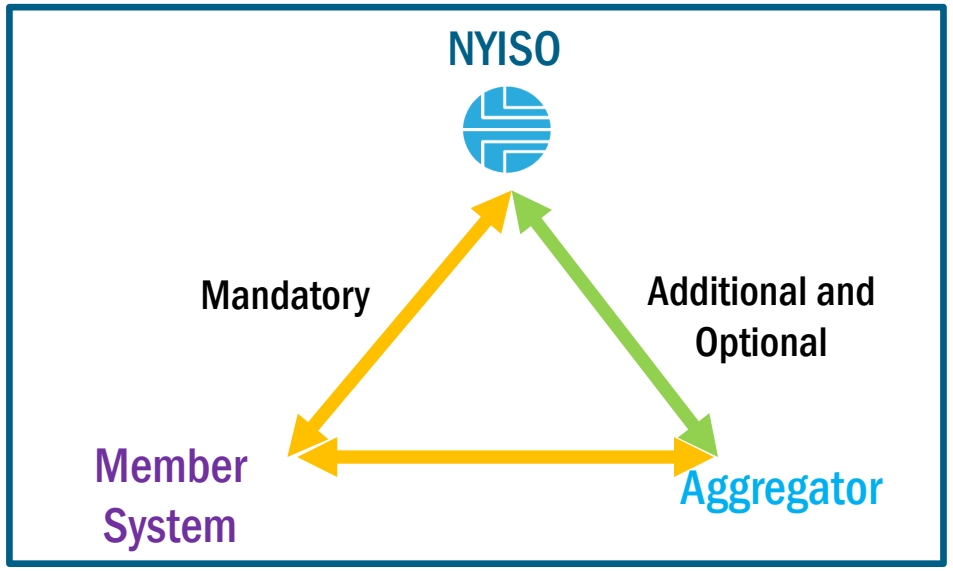
See Metering for Settlements fact sheet for specifications

Metering Requirements

- Revenue Quality Metering:
  - DER must have a Revenue Grade Meter at the Point of Interconnection to NYS Transmission or Distribution system
  - Revenue quality data required by the NYISO includes the following three channels:
    - Energy Injections,
    - Energy Withdrawals (when the Aggregation contains at least one Withdrawal-Eligible Generator), and
    - Demand Reductions
  - Revenue Grade Metering infrastructure for individual DER within Aggregations should be based on the guiding examples provided in the Revenue Metering Requirements Manual

Telemetry Communication Requirements

- Telemetry requirements for end-to-end communication:
  - Six second telemetry basepoints from the NYISO to the aggregation
  - Real time aggregated operational data from each aggregation to the NYISO
- Acceptable configurations for two-way communications
  - Mandatory: Aggregators communicate with the NYISO through their respective Member System
    - Aggregators must coordinate with their respective Member Systems to establish the technical requirements for telemetry communication between them
  - Additional and Optional: Direct communication between the Aggregator's control center and NYISO
    - Aggregator must submit Infrastructure and Technology Plan as part of Aggregator Registration packet



End to End Communications Testing

- The Aggregator should work with NYISO groups to schedule and coordinate final end-to-end testing of all applicable Aggregations after the Aggregation enrollment data has been submitted and approved by the applicable Distribution Utility
- Successful completion of communications testing is required for Aggregation enrollment in the Agg system and must be completed before the Aggregation begins participation
    - Testing duration depends on the volume of Aggregations and complexity
- Please refer to the DER Communications Testing and Ops Modeling Fact Sheet in the DER Onboarding suite for further information

Additional References

- Tariff:
  - Market Administration and Control Area Services Tariff
- Manuals:
  - Aggregation Manual
  - Installed Capacity Manual
  - Control Center Requirements Manual
  - Revenue Metering Requirements Manual
  - Accounting and Billing Manual
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  - Market Participants User's Guide
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Distributed Energy Resources (DER) Participation Model Chapter 3

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Chapter 3: Energy Market and Ancillary Services Participation

Participation in Energy & Ancillary Services

- Participation Requirements
- Registration and Bid Parameters
- Scheduling: Day-Ahead and Real-Time Energy Markets
- Scheduling: Ancillary Services products
- Operational Coordination
- Financial Settlements

Participation Requirements

- Qualifying for wholesale Energy market and Ancillary Services participation requires that Aggregations:
  - Satisfy all enrollment requirements as per tariff rules
  - Meet a minimum offer size requirement of 100 kW
  - Meet injection and withdrawal rate of at least 0.1 MW for a period of at least one hour
  - Must be capable of responding in real-time to NYISO dispatch instructions
  - Satisfy all measurement and communication requirements

Energy Market Participation

- Bidding and Scheduling for the Energy market is done at the Aggregation level
- All bidding obligations apply to the Aggregator and Aggregation, not to the individual DER comprising the Aggregation
- Aggregations will be scheduled according to their bids and capabilities, consistent with the treatment of other Resources in the NYISO markets
- Aggregations will be eligible to set prices for the services for which they are scheduled and subsequently dispatched

Energy Market Participation

- Aggregations are dispatch-only, and will be treated as always available to run
- The NYISO will not require the submission of commitment parameters, nor will it evaluate those commitment parameters
- Aggregators must be able to operate a given Aggregation such that it can meet 5-minute Base Point Signals from the NYISO in Real Time
- Dispatch capability depends on the type of Aggregation, and the NYISO will treat each Aggregation consistent with its 'type'
  - Examples:
    - Single Resource Type Aggregations consisting of only solar resources
    - DER Aggregations consisting of multiple resource types
    - DER Aggregations consisting of Demand Reduction resources

Registration and Bid Parameters

Registration Parameters for Aggregations

- Aggregators provide physical and operational information during enrollment of individual DER and Aggregations in the NYISO's Aggregation System
- Upon successful enrollment of the Aggregation, Aggregation parameters will be automatically transferred to the MIS and other internal NYISO systems required for energy market bidding and scheduling
- MIS bidding authorization flags are based on the services that the Aggregation is qualified to provide, and derived from its enrollment information in the Aggregation System
- The list of required Enrollment parameters for an Aggregation is based on the type of Aggregation and facilities that are part of the Aggregation
  - The complete list of Aggregation attributes is available in Attachment A to the Aggregation System User's Guide

Registration Parameters – Single Resource Type (SRT) Aggregations

New York ISO

- Aggregators will be required to provide the following parameters:

Parameter	Definition	Unit of Measure
Physical Upper Operating Limit (UOL)	Physical maximum MW level at which the Aggregation is willing to operate	MW
Physical Lower Operating Limit (LOL)	Minimum MW level at which the Aggregation is willing to operate	MW
Response Rate(s)	Represents how quickly the Aggregation can respond to dispatch instructions from the NYISO to inject onto the grid. Includes Normal and Emergency Response Rates	MW/min.
Physical Upper Storage Limit	Maximum amount of Energy an Aggregation is physically capable of storing – Only for ESR Aggregations and LESR Aggregations	MWh
Physical Lower Storage Limit	Minimum amount of Energy an Aggregation is physically capable of storing – Only for ESR Aggregations and LESR Aggregations	MWh
Roundtrip Efficiency	Ratio of Energy injections to Energy withdrawals for an Aggregation – Only for ESR Aggregations and LESR Aggregations	%

Registration Parameters – DER Aggregations

- Aggregators will be required to provide the following parameters:

Parameter	Definition	Unit of Measure
Physical Upper Operating Limit (UOL)	Physical maximum MW level at which the Aggregation is willing to operate	MW
Physical Lower Operating Limit (LOL)	Minimum MW level at which the Aggregation is willing to operate Can be a negative value for Aggregations that contain withdrawal eligible generators	MW
Response Rate(s)	Represents how quickly the Aggregation can respond to dispatch instructions from the NYISO to inject onto the grid. Includes Normal and Emergency Response Rates	MW/min.

Bid Parameters – Single Resource Type (SRT) Aggregations

- Aggregations will submit the following bid parameters with economic offers:

Parameter	Definition	Unit of Measure
Normal Upper Operating Limit (UOLN)	Maximum level at which the Aggregation is willing to operate	MW
Emergency Upper Operating Limit (UOLE)	Maximum level at which the Aggregation is willing to operate, at the request of the ISO during extraordinary conditions. It needs to be equal to or greater than the Normal UOL	MW
Lower Operating Limit (LOL)	Minimum MW level at which the Aggregation is willing to operate; Can be a negative value for Aggregations containing at least one Withdrawal-Eligible Generator	MW
Upper Storage Limit	Maximum amount of Energy an Aggregation is physically capable of storing – Only for ESR Aggregations and LESR Aggregations	MWh
Lower Storage Limit	Minimum amount of Energy an Aggregation is physically capable of storing – Only for ESR Aggregations and LESR Aggregations	MWh
ESR Outage Type	Reporting mechanism for Aggregation outage that identifies type of outage experienced, if applicable – Only for ESR Aggregations	Normal (N) Planned Outage (P) Forced Outage (F)

Bid Parameters – Single Resource Type (SRT) Aggregations

Parameter	Definition	Unit of Measure
Incremental Bid Curve	Series of 11 monotonically increasing steps that indicate the quantities of Energy for a given price that an Aggregation is willing to supply	$/MW
Market Choice	Identifies which market, Day Ahead or Real Time, the bid parameters apply to	DAM RT
Beginning Energy Level	Total amount of Energy stored by the Resource at the beginning of a market interval – Only for ESR Aggregations	MWh
Unit Operation Modes	Parameters that indicate whether the Aggregation is to be evaluated based on economic parameters and whether its output will be a fixed value	ISO-Committed Flexible ISO-Committed Fixed Self-Committed Flexible Self-Committed Fixed
Energy Level Management Modes	Parameter that indicates how Energy Level Constraints will be managed – Only for ESR Aggregations	ISO-Managed Self-Managed
Opportunity Cost	Economic parameter to be utilized by NYISO's Market Monitoring and Mitigation Analysis (MMA) team in Reference Levels	$/MW

Bid Parameters – DER Aggregations

- Aggregations will submit the following bid parameters with economic offers:

Parameter	Definition	Unit of Measure
Normal Upper Operating Limit (UOLN)	Maximum level at which the Aggregation is willing to operate	MW
Emergency Upper Operating Limit (UOLE)	Maximum level at which the Aggregation is willing to operate, at the request of the NYISO during extraordinary conditions. It needs to be equal to or greater than the Normal UOL	MW
Lower Operating Limit (LOL)	Minimum MW level at which the Aggregation is willing to operate; Can be a negative value for Aggregations that contain ESR facilities	MW
Incremental Bid Curve	Series of 11 monotonically increasing steps that indicate the quantities of Energy for a given price that an Aggregation is willing to supply	$/MW
Market Choice	Identifies which market, Day Ahead or Real Time, the bid parameters apply to	DAM RT
Unit Operation Modes	Parameters that indicate whether the Aggregation is to be evaluated based on economic parameters and whether its output will be a fixed value	ISO-Committed Flexible ISO-Committed Fixed Self-Committed Flexible Self-Committed Fixed
Opportunity Cost	Economic parameter to be utilized by NYISO's Market Monitoring and Mitigation Analysis (MMA) team in Reference Levels	$/MW

Bidding- Unit Operating Modes

- Bid modes are specific to Aggregation type
- Aggregators must select a bid mode for each Bid into the Energy Marketplace

Aggregation Type	Bid Mode(s) Available
DER	Self-Committed-Fixed/Flexible
ESR	ISO-Committed-Flexible Self-Committed-Fixed/Flexible
LESR	ISO-Committed Flexible Self-Committed Fixed/Flexible
Generator	Self-Committed Fixed/Flexible
Wind	Self-Committed Fixed/Flexible
Solar	Self-Committed Fixed/Flexible
Landfill Gas	Self-Committed Fixed/Flexible

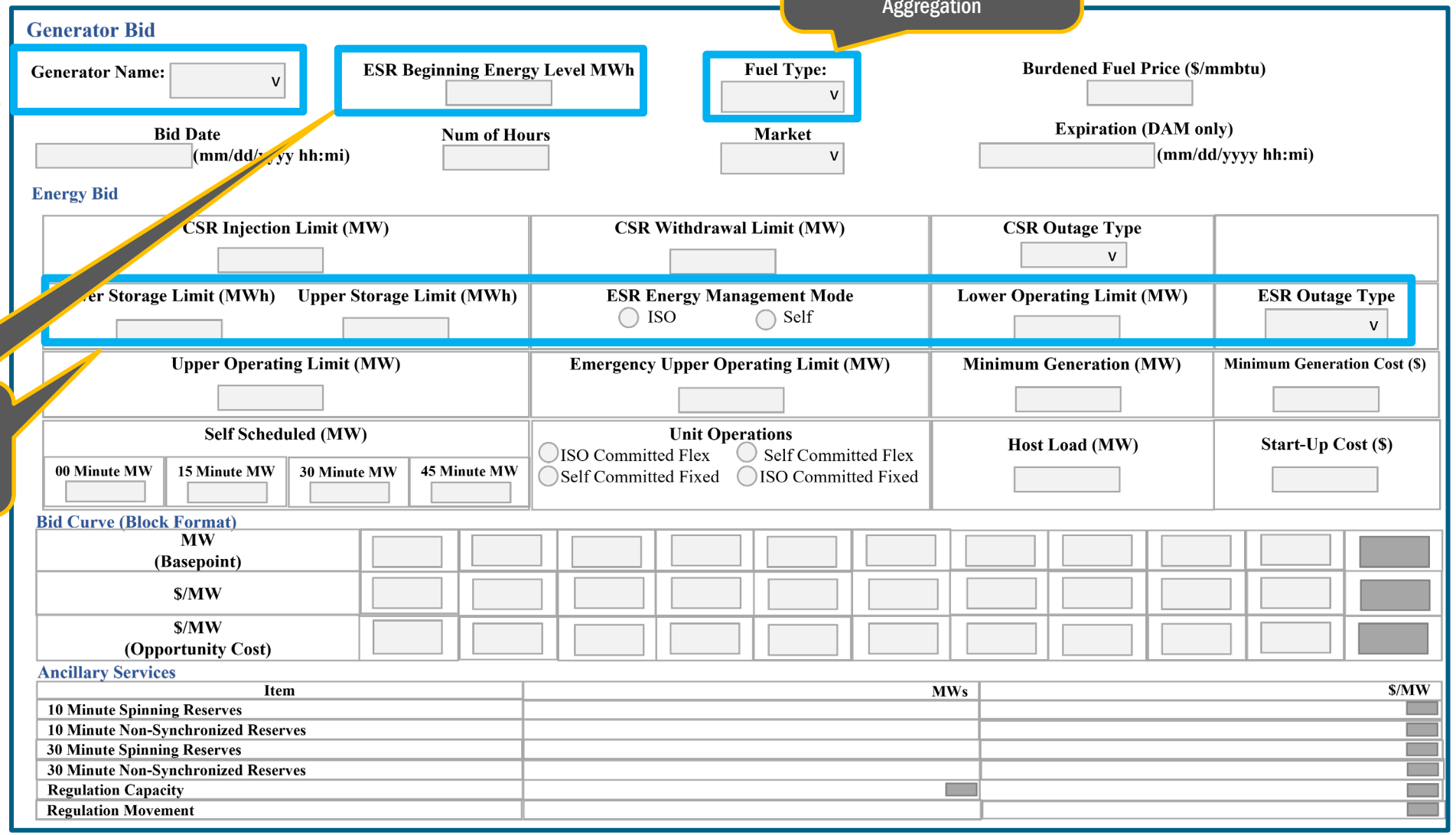
Bidding for Aggregation

Mock-Up
Generator Bid Screen

If selected, applicable DER's cost-based template will set reference level for the Aggregation

Select the Aggregation name, same as what was used for enrollment in the Agg System

Fields specific only for ESR SRT Aggregations



Reference Levels for Aggregations – Energy and/or Ancillary Services

- Reference levels for Aggregations for Energy and Ancillary Services: Cost-based Reference
  - Determined using average marginal costs for DER within the Aggregation
- NYISO Reference level teams will pre-develop an estimate of the cost of every type of resource (DER) that can participate in an Aggregation
  - Cost data templates contain cost data similar to information submitted by suppliers and have the reference level for each type of DER
- Upon enrollment, NYISO will assign the Aggregation the cost-data templates for all DER that are part of the Aggregation
- For every market hour, if the fuel type is selected on the Gen Bid page, the applicable DER's cost-data template will be used to set the reference level for the Aggregation
  - Indicated by choosing the DER's fuel type in the gen bid page for the market hour
  - Aggregation should make sure that the chosen DER is available for the applicable market hour that the bid is entered for
    - For example: Solar resource should not be selected for HB 00 (12 am at night)

Reference Levels for Aggregations – Energy and/or Ancillary Services

- If a fuel type is not selected, the Aggregation's Energy reference level will be set using the default template
- Aggregators can request a consultation with the NYISO, for the development of unique reference levels for the Aggregation
  - If believed that the generic cost data template does not provide a reasonable representation of the Aggregation's cost
- NYISO may request additional data from the Aggregator to support development of Aggregation specific reference levels

Bidding for Aggregations

- For Aggregations that contain at least one Withdrawal-Eligible Generator such as a battery:
  - Another resource in the Aggregation can be used to self-supply some or all of the energy for charging the battery
    - If so, each point of the Aggregation's Bid curve must reflect the net of Energy injections and Energy withdrawals
- For Fixed Bids:
  - When Aggregation's Bid reflects a net injection: Aggregator shall Bid to supply Energy only for the net MWs it intends to inject onto the grid
  - When Aggregation's Bid reflects a net withdrawal: Aggregator shall Bid to withdraw Energy only for the net MWs it intends to withdraw from the grid (refer to example on slide 19)
- For Flexible Bids:
  - An Aggregation may offer an incremental bid curve that reflects the total capabilities of the Aggregation, including the range of withdrawal and injection (refer to example on slide 20)

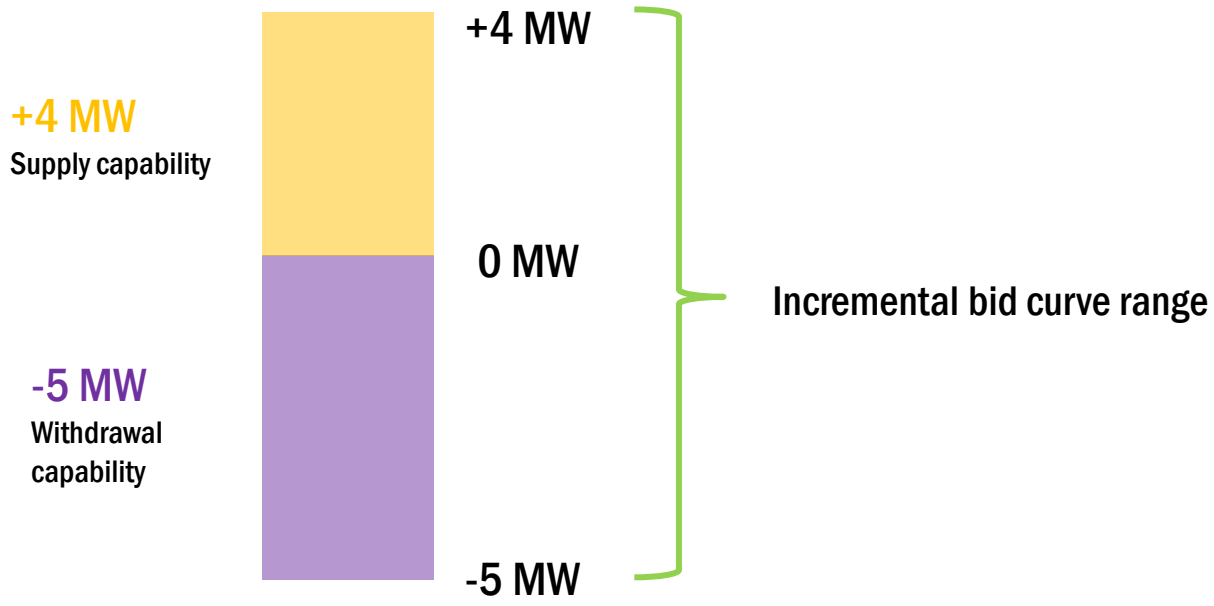
Aggregation Fixed Bid Example

- Aggregator aims to recharge a Withdrawal Eligible Generator in an Aggregation by 5 MW
- Aggregation is capable of supplying 4 MW during the interval
- Aggregator's net offer should be 1 MW of withdrawal that cannot be self-supplied during the interval

(5 MW total withdrawal required) – (4 MW total supply self-supplied) = 1 MW required from the market

Aggregation Flexible Bid Example

- Aggregation offering flexibly may offer an incremental bid curve that reflects the total capabilities of the Aggregation, including the range of withdrawal and injection



Dual Participation

- Dual participation is permitted in the NYISO's DER participation model and in programs or markets operated to meet the needs of the distribution systems located in the NYCA, pursuant to Market Services Tariff Section 4.1.11
  - Aggregators must identify such DER, and notify the NYISO upon enrollment
  - The Aggregation's offers in the various NYISO markets must be made such that the Aggregation is scheduled and dispatched by the NYISO for time intervals that it operates to meet non-wholesale commitments
    - NYISO and the applicable TO will coordinate scheduling and dispatch

Scheduling
Day-Ahead and Real-Time Markets

Scheduling of Energy in the Day-Ahead and Real-Time Markets

- Aggregator Bids are considered along with other suppliers' Day-Ahead market offers via SCUC evaluation
  - DAM optimization produces a schedule that is financially binding for a full 24-hour period
- Real-Time Dispatch MWs will be calculated for next binding market interval using Real-Time Telemetry and dispatched according to ISO Procedures
  - Dispatch instructions for Aggregations will be issued via the applicable Transmission Owner
  - Dispatch instructions for Aggregations communicating with the NYISO and Transmission Owner in parallel shall be issued by the NYISO to the Aggregation and Transmission Owner simultaneously

Scheduling of Energy in the Day-Ahead and Real-Time Markets

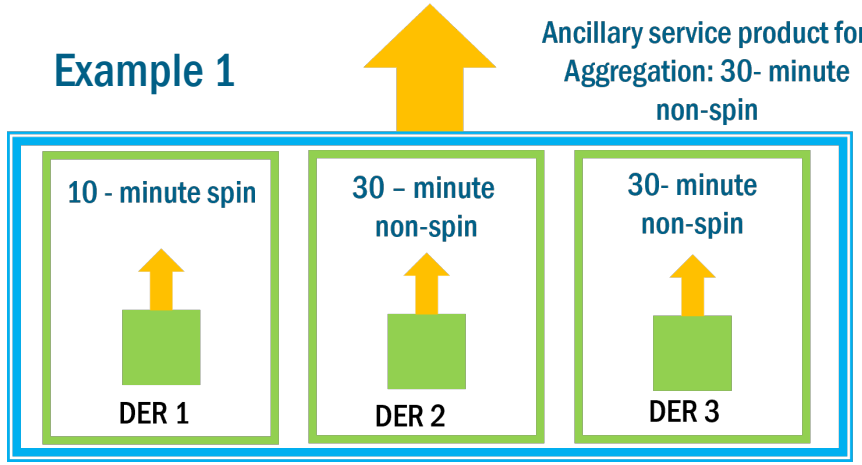
- NYISO Operations may fully or partially derate an individual Resource and/or an Aggregation if the ISO or applicable Distribution Utility determines that one or a group of DER presents significant risk(s) to the safe and reliable operation of the Transmission System or distribution system
  - The DER or group of DER will not be permitted to resume operation until the ISO, distribution utility, and Aggregator are able to resolve the identified concerns
  - If an individual DER and/or group of DER is derated, the ISO shall notify the applicable Aggregator as soon as practicable of the derate and reason for derate
  - Additional detail related to notification and timing of derates is included in the NYISO's Aggregation Manual

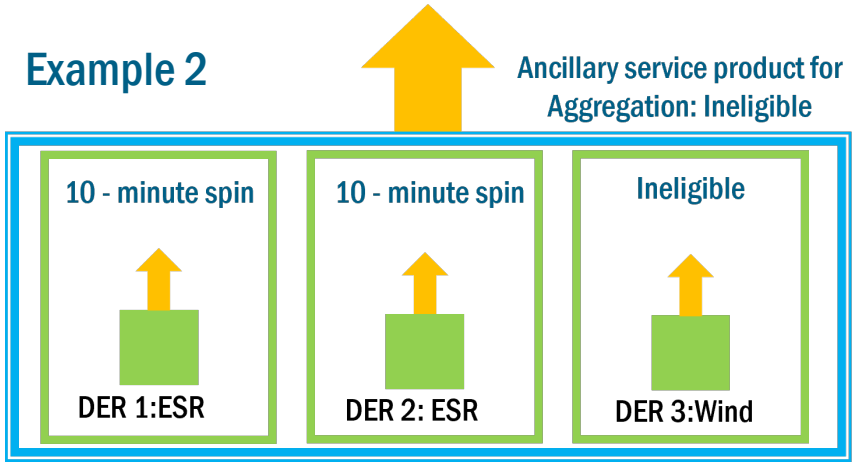
Scheduling of Market-Based Ancillary Services

- Market Based Ancillary Service participation:
  - Regulation
  - Operating Reserves
    - Spinning Reserve
    - 10-minute Non-Synchronized Reserve
    - 30-Minute Reserve
- Aggregations can enroll to begin providing Regulation and/or Operating reserves any time after beginning Energy Market participation
  - Must adhere to prerequisites and verification testing as documented in the Ancillary Services Manual
- Aggregations with one or more ESRs are eligible to provide Operating Reserves and Regulation while withdrawing
- Aggregations with one or more LESRs are eligible to provide Regulation
- Aggregations will only be scheduled to provide Operating Reserves that can be sustained for at least one hour if the Operating Reserves are converted to Energy

Scheduling of Market-Based Ancillary Services

- Aggregations can offer Ancillary Services based on the individual technical capabilities of the DER within the Aggregation
  - Example 1: If the Aggregation has 3 DER, and 1 can offer 10-minute spin and the other two 30-minute non-synchronous, then the aggregation can only offer 30-minute non-Synchronous Reserves as the ancillary service product
  - Example 2: If the Aggregation is made up of 2 ESRs and 1 wind resource, then that Aggregation cannot offer ancillary services, as wind resources cannot offer ancillary services





Operational Coordination

Outage Reporting

- On an ongoing basis, the Aggregator must submit planned and forced outage and derate notifications to the NYISO
- The Aggregator is responsible for submitting outage information, both planned and unplanned, for all Aggregations in its portfolio
- Individual DER outages need not be reported to the NYISO
- Aggregator must modify Energy bids based on outage information on the gen Bid page in the MIS
- Grid Operations Coordination Portal (GOCP)
  - Portal that allows Aggregators and TOs to submit, modify, and review Aggregation outage requests
  - Allows NYISO operators to review, modify, and approve or decline Aggregation outage requests to maintain grid reliability

For more information on GOCP, please see the GOCP Market Training Materials for TOs, GOs, and DSOs

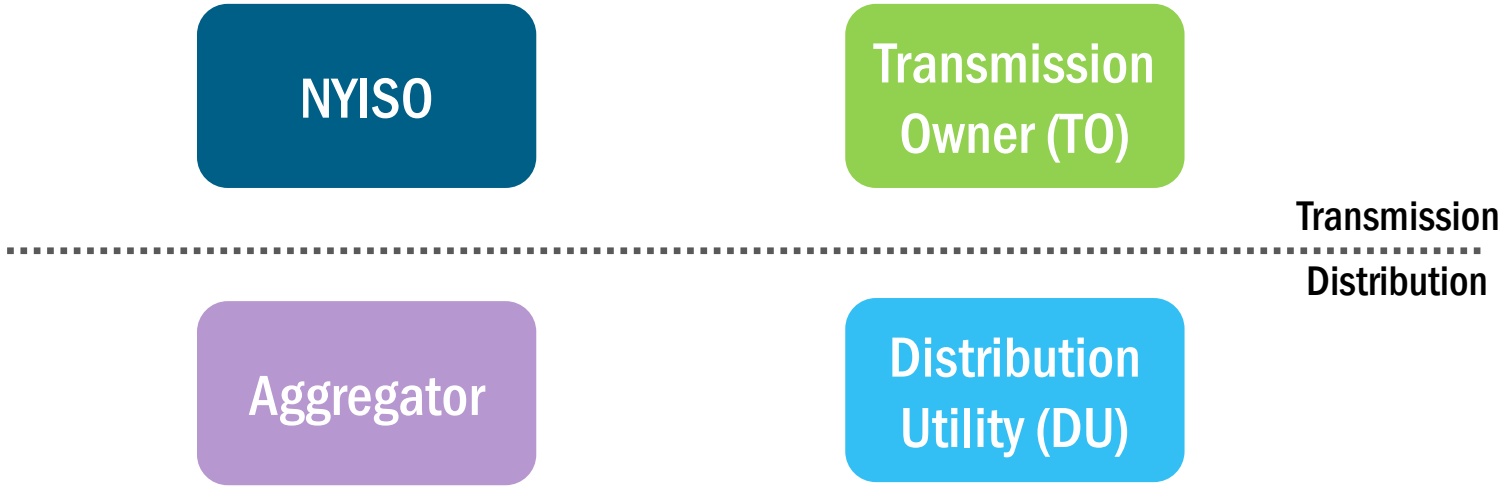
Supplemental Resource Evaluation for Aggregations (Supplemental Resource Availability (SRA))

- The Supplemental Resource Availability (SRA), process is a type of Supplemental Resource Evaluation (SRE) that is adapted for the dispatch-only nature of Aggregations
  - Is used to make Aggregation capability (above the Day-Ahead schedule) available for NYISO, TO or DU operators to address reliability issues
- SRA requests may be made after DAM close and before RT dispatch interval
- SRA process enables NYISO operators to reserve available dispatch range of Aggregations
  - Aggregations must have bid in place for specified interval
- NYISO will evaluate SRA requests following similar procedures for evaluating an SRE request from the TO or DU
- The applicable TOs will notify the DU of Aggregations that are reserved through the SRA process
- If DU identifies a reliability need, request for SRA is submitted via applicable TO
- SRAs can be requested through the NYISO's Grid Operations Coordination Portal (GOCP)

For more details, please refer to the GOCP e-learning modules on NYISO's Online Learning page

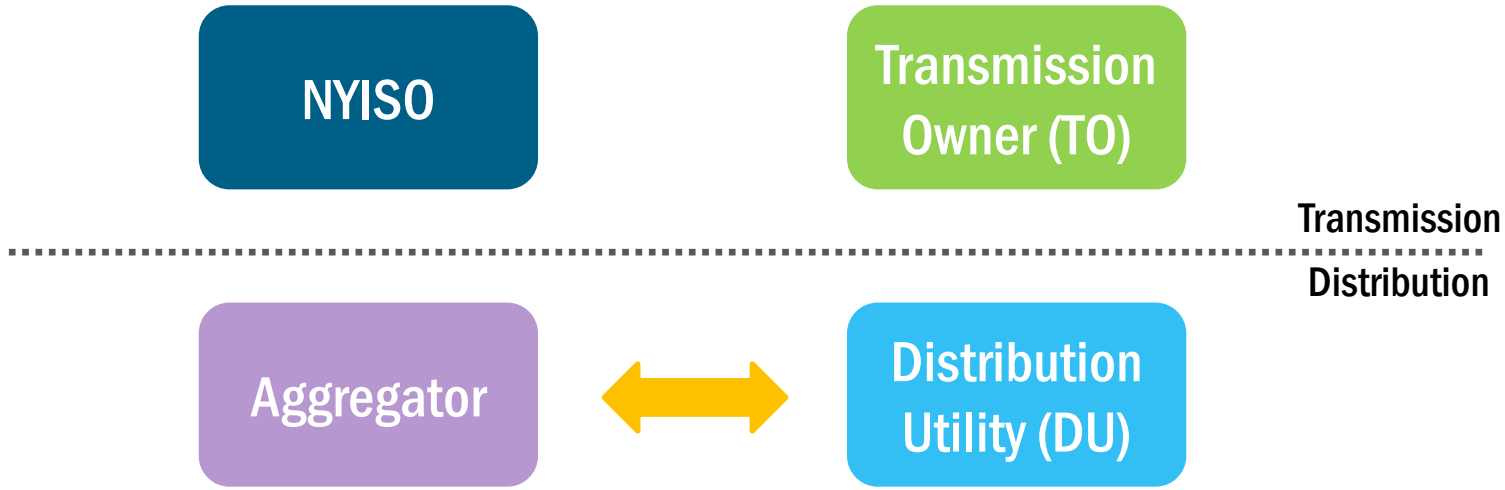
Communication Roles and Responsibilities

- DER/Aggregators, DU, and TO must be available for RT operation verbal communication 24/7 to maintain distribution and transmission system safety and reliability



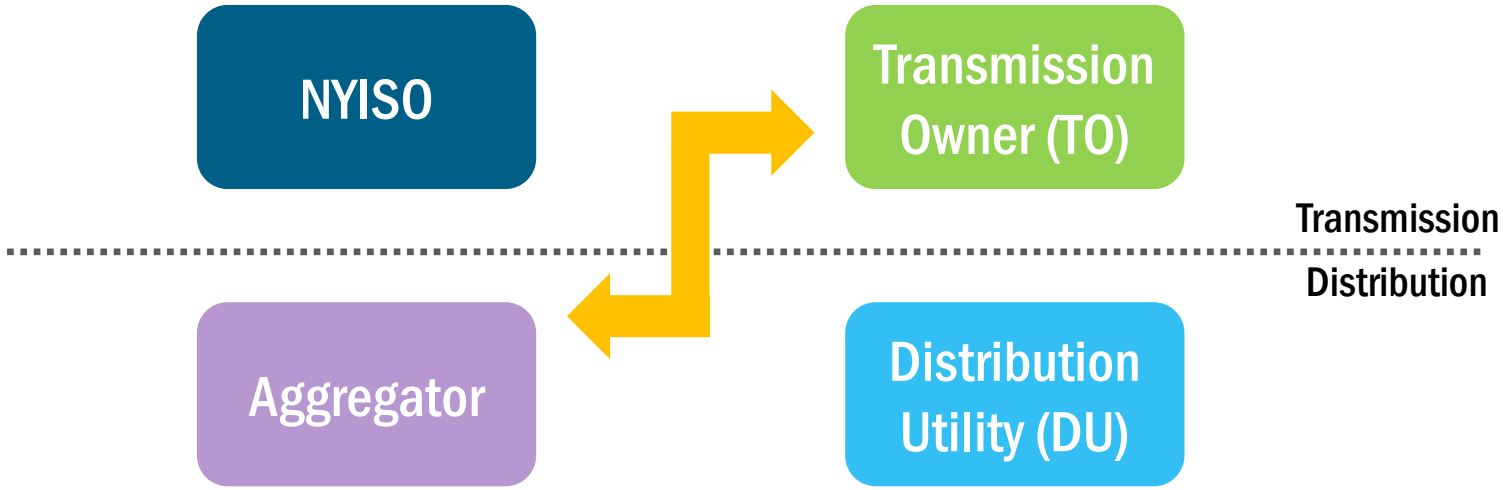
Communication Roles and Responsibilities

- Between DU and DER/Aggregator
  - DU notifies DER/Aggregator of planned and unplanned distribution system changes
  - Aggregator shares Day Ahead Schedule with DU
  - DU review of DER/Aggregator Day Ahead Schedules
    - Note: DU review is not required for schedule adjustments in RT
  - DU directs DER/Aggregator to curtail or disconnect individual DERs when needed for reliability and safety



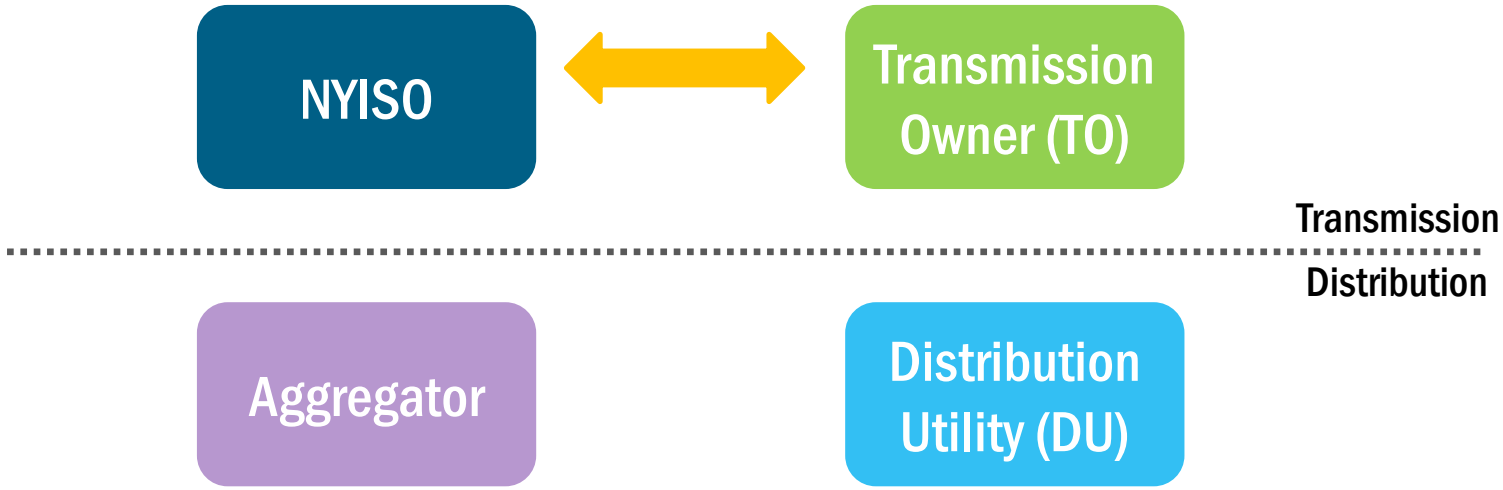
Communication Roles and Responsibilities

- Between the TO and the Aggregator
  - TO reports emerging transmission system issues (actual or anticipated) to the Aggregator as soon as practicable
  - TO may request OOM for Aggregation in NYISO's GOCP if DER/Aggregation creates Transmission issues
  - The TO coordinates with NYISO on any SRA requests for Reliability issues on the Transmission system
  - TO communicates with Aggregator during NYISO audit of Aggregation



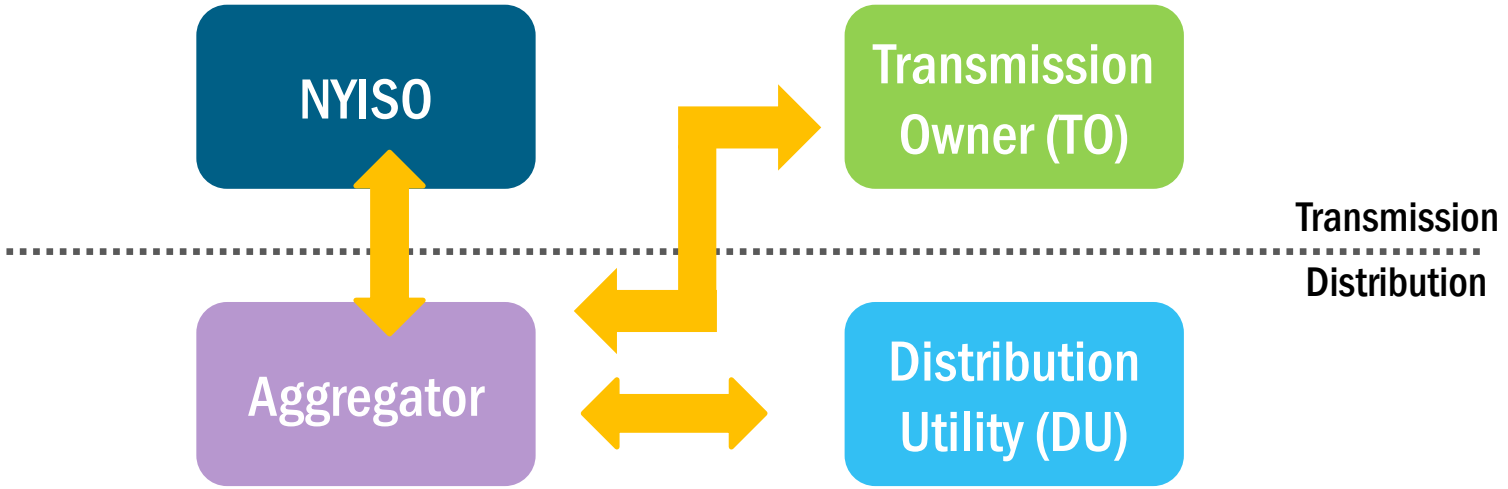
Communication Roles and Responsibilities (cont'd)

- Between TO and the NYISO
  - NYISO to issue Day-Ahead Operating Plan (DAOP) for Aggregation schedules
  - Notify each other as necessary to indicate Supplemental Resource Availability (SRA)
  - TO notifies NYISO if TO has curtailed Aggregation
  - TO communicates with Aggregator during NYISO audit of Aggregation



Communication Roles and Responsibilities (cont'd)

- Between Aggregator and NYISO
  - Aggregator receives operating schedules, and schedule adjustments/updates from NYISO
  - Aggregator responsible for submitting bids into NYISO's MIS
  - NOTE: When Aggregation communicates to NYISO and TO in parallel, the Telemetry to and from Aggregation must be sent simultaneously



Scheduling & Dispatch Timeline

Aggregator submit and update DAM bids through NYISO's MIS

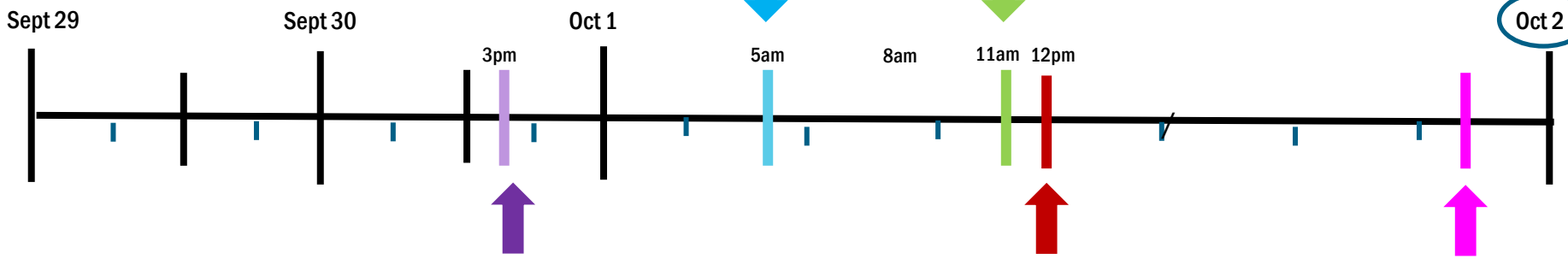
Up to 14 Days Prior and Until 5:00am Day Before Dispatch (Day Ahead Market Close)

- NYISO provides Aggregators with DA Schedules for its Aggregation(s)
- NYISO provides each TO with DAOP

By 11:00am on the Day Before Dispatch DAM Schedules & LBMPs Posted

Dispatch Day

Aggregation's Meter Authority sends NYISO revenue meter data for each hour of the Dispatch Day



Day After Dispatch

Until 3:00pm Two Days before Dispatch

DU and/or TO notify DER/Aggregator of planned distribution and/or transmission system maintenance

By 12:00pm on the Day Before Dispatch

- Aggregator communicates schedules of individual DERs it intends to dispatch to meet its DAM schedule
- DU to use this information to verify Aggregator's dispatch plan reflects applicable distribution system conditions

After 12:00pm and No Later than 10:00pm on the Day Before Dispatch

- DU may review Aggregator's submitted dispatch plan
- If the Distribution Utility requires the Aggregator to modify its dispatch plan, the Aggregator may need to notify the NYISO of a de-rate and submit RTM Bids that account for the changed condition

Financial Settlements – Energy and Ancillary Services

Energy and Ancillary Services Financial Settlements

- Aggregation performance and settlement are administered at the Aggregation-level
  - NYISO does not settle Energy injections, withdrawals, or Demand Reductions of the individual DER comprising an Aggregation
  - Note: The revenue quality meters are on the DER
    - Aggregation settlement data is the sum of the revenue meters for each response type (injection, withdrawal, Demand Reduction)
- Three-channel revenue quality metering (RQM) data required by NYISO for settlement from all individual DER in the Aggregation
  - Energy Injections
  - Energy Withdrawals (when the Aggregation contains at least one Withdrawal-Eligible Generator), and
  - Demand Reductions

Types of Metering Data

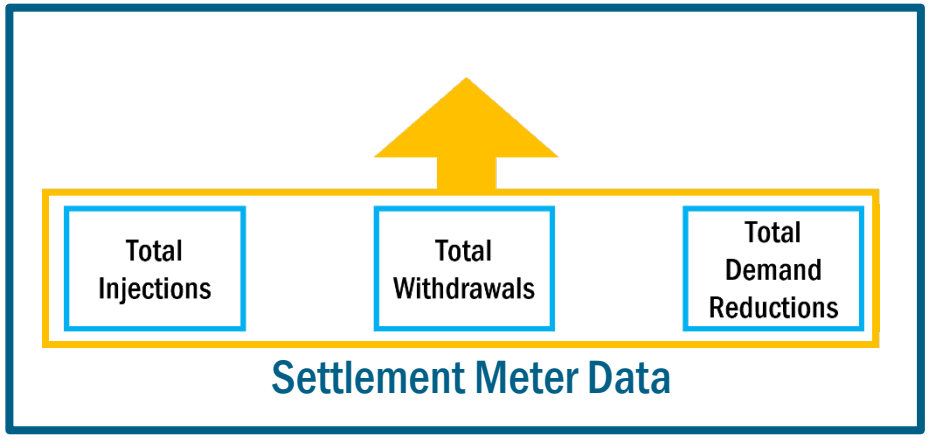
- RQM data required by the NYISO for settlement includes the following channels: Energy Injections, Energy Withdrawals (when the Aggregation contains at least one Withdrawal-Eligible Generator), and Demand Reductions of all individual DER facilities in the Aggregation

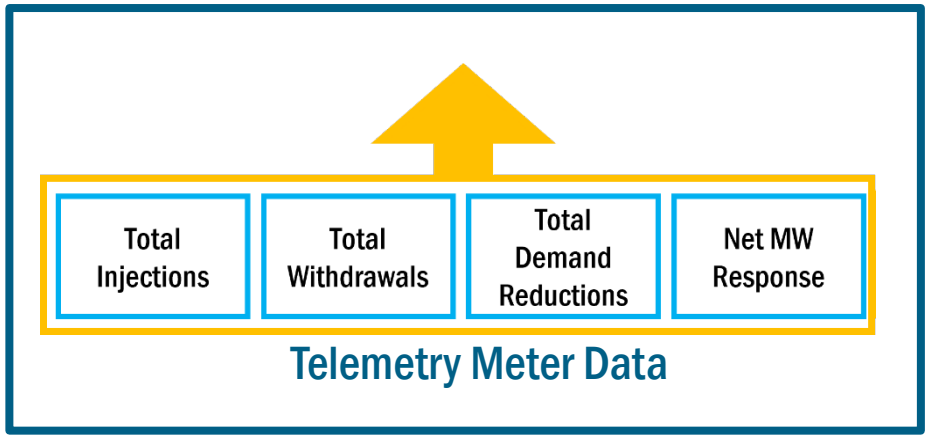
- Total Injections: Aggregate of all Injections of energy into grid/wholesale markets by all injecting facilities in Aggregation

- Total Withdrawals: Aggregate of all Withdrawals of energy from the grid used to charge one or more ESR facilities for later injection back into the grid

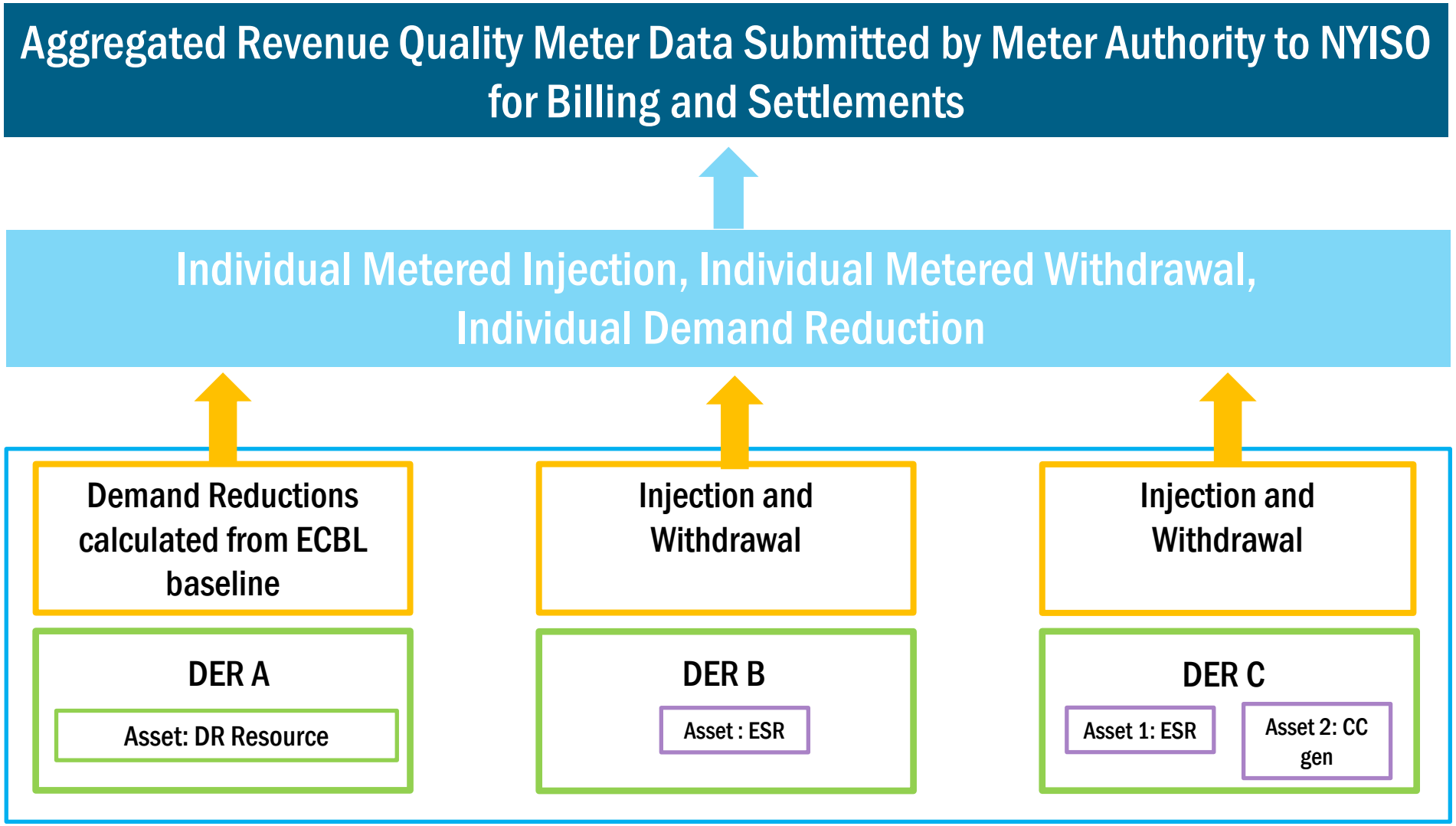
- Total Demand Reductions: Reductions in load measured by comparing actual load relative to a calculated ECBL baseline value (for Demand Side Resources part of DER Aggregation)

- Total Response: Net of the above 3 channels (For Telemetry purposes only)





Aggregation Settlement Data Flow



Economic Customer Baseline Load (ECBL)

- For DER Aggregations with one or more Demand Side Resources facilities:
  - ECBL represents baseline or typical Load of a Demand Side Resource participating in a DER Aggregation
    - Will be used to determine Demand Side Resource's Demand Reduction
    - Calculated for each 5-minute interval that Demand Side Resource is dispatched
  - Components of ECBL calculation
    - Unadjusted ECBL
      - Calculates a value for the Demand Side Resource's baseline using the Load of the facility at the same time interval during a window of similar days
    - In-day adjustment
      - Incorporates conditions of the specific operating day, by modifying the unadjusted ECBL based on in-day conditions 1 hr. prior to Aggregation's dispatch
      - The in-day adjustment is limited to ±20% of the unadjusted ECBL

Adjusted ECBL = In-Day Adjustment + Unadjusted ECBL

Weekday Unadjusted ECBL

Establish Weekday Unadjusted ECBL Window
- Aggregator selects 10 previous like weekdays immediately preceding dispatch day (NERC holidays excluded)

Aggregator will sort 6 second telemetry values for the 5- minute interval for each of the 10 days, from lowest to highest *

Unadjusted ECBL for 5-minute interval = Average of 5th and 6th values

* If telemetry values indicate a net injection for any interval, telemetry value will be set to 0 kW
* Proxy Load = telemetered value + measured Demand Reductions (if LBMP is higher than the MNBT)

Weekend Unadjusted ECBL

Establish Weekend Unadjusted ECBL Window
- Aggregator selects 3 previous like weekend days immediately preceding dispatch day (includes NERC holidays)

Aggregator collects telemetry values for each 5-minute interval for the 3 weekend days*

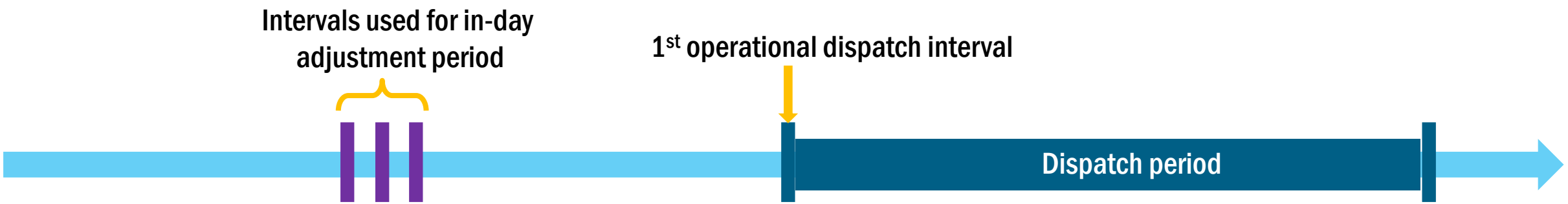
Unadjusted ECBL for 5-minute interval = Average of 3 values

* If telemetry values indicate a net injection for any interval, telemetry value will be set to 0 kW
* Proxy Load = telemetered value + measured Demand Reductions (if LBMP is higher than the MNBT)

ECBL – In-Day Adjustment

- Intervals used for in-day adjustment for dispatch period: Three consecutive 5-minute intervals 60 minutes prior to the first operating interval of the dispatch
- The same in-day adjustment will be used for each interval until it needs to be recalculated after two hours in which the Demand Side Resource was not dispatched by the NYISO

In-day adjustment for dispatch period = (Average of Actual telemetered load for 3 consecutive 5-minute intervals 60 minutes prior to 1st dispatch interval) − (Average of Unadjusted ECBL for 3 consecutive 5-minute intervals 60 minutes prior to 1st dispatch interval)



Monthly Net Benefit Threshold (MNBT)

- MNBT establishes the threshold price below which the dispatch of Energy from Demand Side Resources is not cost-effective
  - The MNBT is established by NYISO for each month
- Demand Reductions by Demand Side Resources within a DER Aggregation will be compensated when the Real-Time LBMP exceeds the MNBT*
- A DER Aggregation can offer into the Day-Ahead Market or Real-Time Market below the MNBT, but when the applicable LBMP is below the MNBT Demand Reductions will not be compensated*

*Exceptions noted in MST Section 4.5.2.1

Aggregation Energy Market Settlements

Settlement	Purpose	Calc. Interval
Day-Ahead Energy Settlement	Assessed to Aggregations with accepted Day-Ahead schedules	Hourly
Balancing Market Settlement	Accounts for energy variations in an Aggregation's Real-Time Dispatch from its Day-Ahead Schedule	Nominal 5 Minute

Aggregation Energy Market Settlements

Settlement	Purpose	Calc. Interval
Day-Ahead Bid Production Cost Guarantee	Intended to guarantee Aggregations that a net loss will not be incurred if committed in the Day-Ahead based on their accepted or mitigated Day-Ahead Bids	Daily
Real-Time Bid Production Cost Guarantee	Intended to guarantee Aggregations that a net loss will not be incurred based on their accepted or mitigated Real-Time Bids if committed above what was initially committed in the Day-Ahead	Daily
Day-Ahead Margin Assurance Payment	Payment made to Aggregations when required to purchase or sell energy and/or ancillary services in the Balancing Market as a result of being dispatched below its Day-Ahead Schedule Only applies when Aggregations is OOM for reliability	Hourly

Aggregation Energy Market Settlements

Settlement	Purpose	Calc. Interval
Transmission Service Charge (TSC)	Cost recovery of the Transmission System embedded costs. Transmission owner specific and billed directly by the Transmission Owner	RTD
New York Power Authority Transmission Adjustment Charge (NTAC)	Cost recovery of the New York Power Authority's Transmission System revenue requirement. These are embedded costs not recovered through the TSC and billed by NYISO on behalf of NYPA	RTD

Applicable only for Aggregations that contain one or more Energy Storage Resources (ESRs) when (i) the Aggregation is not providing a service, and (ii) the net of the Aggregation's Energy injections, Demand Reductions, and Energy withdrawals is negative

Aggregation Ancillary Services Settlements: Cost-Based

Settlement	Purpose	Calc. Interval
Rate Schedule 1	Intended to recover a portion of NYISO's operating costs and FERC fees	Hourly

Baseline for Demand Side Resources

Providing Regulation Service

- Regulation baseline is calculated when Aggregation is dispatched for Regulation Service
  - For DER Aggregations with one or more Demand Side Resources
- Calculated as the Load of the facility six seconds prior to the Aggregation receiving a Regulation dispatch
- If the Demand Side Resource had been dispatched for Energy prior to a Regulation dispatch, the baseline is calculated as the sum of the measured Demand Reduction and the load six seconds prior to the Aggregation receiving a Regulation dispatch
- The baseline calculated for the six seconds prior to receiving a Regulation Service Dispatch is the baseline that will be used for duration of the Regulation Service dispatch

Demand Reduction during Regulation service for Demand Side Resources	=	Regulation Baseline - Metered load of facility for each 6 second interval

Aggregation Ancillary Services Settlements:

Market-Based

Settlement	Purpose	Calc. Interval
Day-Ahead Regulation Capacity	Intended to compensate Aggregations offering capacity as Regulation Service in the Day-Ahead	Hourly
Balancing Regulation Capacity	Intended to compensate Aggregations offering capacity as Regulation Service in the Real-Time	Nominal 5 Minute
Real-Time Regulation Movement	Intended to compensate Regulation-Scheduled Aggregations responding to NYISO's six second dispatch, correcting for Area Control Error	Nominal 5 Minute
Regulation Performance Charge	Intended to change Regulation Response Service Aggregations not responding or responding poorly to NYISO"s six second dispatch, correcting for Area Control Error	Nominal 5 Minute
Regulation Revenue Adjustment	Intended to properly compensate Aggregations for balancing energy if also providing Regulation Capacity Service in real-time	Nominal 5 Minute

Aggregation Ancillary Services Settlements: Market-Based

Settlement	Purpose	Calc. Interval
Persistent Under Generation Penalty	Intended to penalize Aggregations that are not providing Regulation Service causing regulation burden due to under-injection below its RTD Basepoint (MW) outside of acceptable tolerance levels	Nominal 5 Minute
Persistent Over Withdrawal Charge	Intended to charge Aggregations that are not providing Regulation Service causing regulation burden due to over-withdrawal above its RTD Basepoint (MW) outside of acceptable tolerance levels	Nominal 5 Minute
Day-Ahead Operating Reserves Availability	Intended to compensate Aggregations offering capacity as Operating Reserve Service in day-ahead	Hourly
Balancing Operating Reserves Availability	Intended to compensate Aggregations offering capacity as Operating Reserve Service in real-time	Nominal 5 Minute

Additional Resources

- Tariff:
  - Market Administration and Control Area Services Tariff
- Manuals:
  - Aggregation Manual
  - Installed Capacity Manual
  - Control Center Requirements Manual
  - Revenue Metering Requirements Manual
  - Accounting and Billing Manual
  - Transmission & Dispatch Operations Manual
  - Day-Ahead Scheduling Manual
  - Ancillary Services Manual
  - Accounting and Billing Manual

Additional Resources (cont.)

- User's Guides:
  - Aggregation System User's Guide
  - Market Participants User's Guide
  - NYISO's Grid Operations Coordination Portal (GOCP) User's Guide
- Market Training materials:
  - Market Training Course Materials: MT 201 New York Market orientation Course (NYMOC)
  - DER Onboarding Educational Suite
  - Aggregation System Training e-learning module
  - GOCP Market Training eLearning Materials
    - Versions available for TO, GO, and DSO

New York ISO

Distributed Energy Resources (DER) Participation Model Chapter 4

Mathangi Srinivasan Kumar

Program Lead, Market Training, NYISO

DER Participation Model

2024

eLearning Module

Chapter 4: Installed Capacity Market Participation

Participation in Installed Capacity Market

- Installed Capacity Market Qualification Rules
- Installed Capacity Market Enrollment
- Installed Capacity Market Participation Rules
- Derating Factors for Distributed Energy Resources and Aggregations
- Obligations and Other Capacity Market Rules
- Installed Capacity Market Mitigation
- Additional Resources

Installed Capacity Market Qualification Rules

- Aggregators may qualify Aggregations as ICAP Suppliers in the NYISO market
- Have a minimum capability of 0.1MW
- ICAP Suppliers must comply with the requirements of Services Tariff Sec. 5.12, including, but not limited to:
  - Outage scheduling and reporting,
  - Meeting Day-Ahead Market obligations, and
  - Submitting applicable DMNC test
- Aggregation participation in the NYISO-administered Capacity market is based on the capabilities of the individual facilities that comprise Aggregations
- For ICAP market participation,
  - Generators, ESR, Wind (IPR), Solar (IPR), ELR Single Resource Type (SRT) Aggregations shall follow the same rules as set forth for single resources of those types
  - An Aggregation comprised of Demand Side Resources or a heterogenous mix of IPRs of differing technologies (e.g., Wind, Solar, and Landfill Gas in an Aggregation), will be treated as a DER Aggregation

Installed Capacity Market Qualification Rules

- DER may participate in an Aggregation with an Energy Duration Limitation (EDL) of 2, 4, 6, or 8 hours
  - Each individual DER seeking participation in the NYISO's Installed Capacity Market via Aggregation must have a minimum daily energy duration of 1 hour
  - DER may time stack their daily energy durations to meet the Energy Duration Limitation hourly designation for the Aggregation (details to follow)
  - Performance-based generators (Wind, Solar, Landfill Gas) will not be eligible for a duration limitation, or time-stacking, if participating in a Single Resource Type (SRT) Aggregation

Installed Capacity Market Enrollment

- Aggregations and associated DER must be successfully enrolled in the NYISO's Aggregation System to participate in the Installed Capacity market
  - Along with requirements for Energy and Ancillary Services participation, Aggregators have ICAP specific submissions and requirements
    - Described in the Agg System training e-learning module
  - Both new DER and Aggregations, and existing resources transitioning into the DER participation model must be enrolled in the Agg System to participate in the Installed Capacity market

Installed Capacity Market Enrollment

- New facilities and Aggregations:
  - Installed Capacity Market Participation: May begin following the first month of Energy market participation
    - Aggregations must be successfully enrolled in the Aggregation System in order to submit DMNC test data
    - The timing of DMNC tests for individual DER and submission of the applicable information for the Aggregation influence the month in which an Aggregation can begin participating in the ICAP market
    - Aggregator must submit DMNC data for all DER that constitute the Aggregation, even if one or more DER do not provide capacity in the Installed Capacity market

ICAP Manual, Section 4.1.1

Installed Capacity Market Enrollment

- Existing resources transitioning into the DER participation model:
  - Installed Capacity Market Participation: Can start 1st month after NYISO Review and successful enrollment
    - Resources must be existing capacity suppliers
  - Aggregations that these resources will be a part of can be in the Status: Pending NYISO Review or Enrolled in the Aggregations Enrollment screen when submitting the applicable DMNC test data
  - All DER within the Aggregation must provide capacity and must participate in the Installed Capacity market, by contributing to the Aggregation's UCAP
  - Two types:
    - Special Case Resources (SCRs): Provisional DMNC is submitted and validated during the month of NYISO Review
    - Stand-alone Generators: Provided SRT transfer DMNC is submitted and validated during the month of NYISO Review

* Refer to Section 4 of the Aggregation Manual for more details

Installed Capacity Market Participation Rules

Capacity Resource Interconnection Service (CRIS) Deliverability Rights

- CRIS is one of the eligibility requirements for a resource to participate as an Installed Capacity Supplier, in accordance with the NYISO Deliverability Interconnection Standard
- Allows for the Generator to offer capacity as a Supplier in the ICAP market
- DER (excluding Demand Side Resources), must obtain CRIS
  - Generators larger than 2 MW are subject to the NYISO's deliverability studies even if the DER facility participated in a Non-NYISO interconnection process
    - Resources smaller than 2 MW do not need to participate in a Deliverability Study to obtain CRIS
- For an Aggregation comprising DER with an Energy Duration Limitation, the maximum permissible CRIS that can be requested for each DER cannot exceed the minimum of the following:

  (a) Its expected maximum injection capability in MW for the Developer-selected duration;

  (b) The nameplate capacity of the DER (i.e., injection capability of the facility expressed in MW); or

  (c) The sum of DER's requested and existing ERIS, as applicable
- If a DER moves between Aggregations, the CRIS awarded to the facility stays with the facility and moves with it to the new Aggregation

Aggregation – Dependable Maximum Net Capacity (DMNC)

- Must perform a DMNC test once every Capability Period for the Aggregation as a whole, consistent with existing rules
  - Full duration test at maximum output
  - Include resource-specific breakdown of Aggregation's DMNC
  - Operating data can be submitted in lieu of a DMNC test
  - DMNC tests must be conducted within the applicable Summer and Winter "in-period" and/or "out of period" test windows
    - In alignment with the applicable Agg monthly DMNC calendar event
  - Aggregator must submit DMNC data for all DER that constitute the Aggregation, even if one or more DER do not provide capacity in the Installed Capacity market

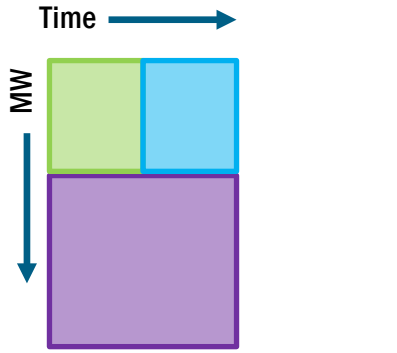
DMNC for DER in an Aggregation with EDL

- If the Aggregation has an Energy Duration Limitation (EDL) and has indicated that in their Aggregation enrollment file, DMNC tests for the DER must be submitted in accordance with rules set forth in the ICAP Manual, Section 4.2.2.2
- DMNC submission for facilities in an Aggregation with EDL also allows for time-stacking information to be submitted
- Time-stacking: Available to an Aggregation with Energy Duration Limitation (EDL), where DER that can provide a minimum of 1 hour of Energy, can be grouped up with other DER in the Aggregation through sequential time-stacking, to sum up to the Aggregation's EDL election
  - Available EDL elections are 2,4,6, and 8 hours
  - The Aggregator can configure the individual facilities' duration and capacity to meet the elected EDL

DMNC for DER with EDL: Example of Time Stacking

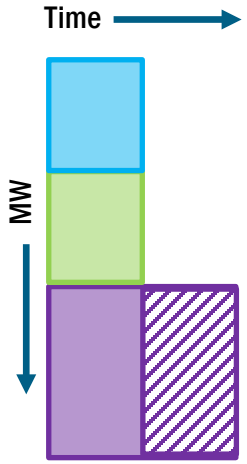
Aggregation with 3 facilities
DER #1: 3 MW with 2-hour capability
DER #2: 3 MW with 2-hour capability
DER #3: 5 MW with 4-hour capability

Time stacking configurations for EDL fulfilment*



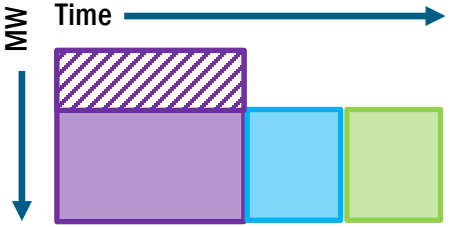
8 MW for 4 Hours

Aggregation has 4-hour EDL



11 MW for 2 Hours

Aggregation has 2-hour EDL

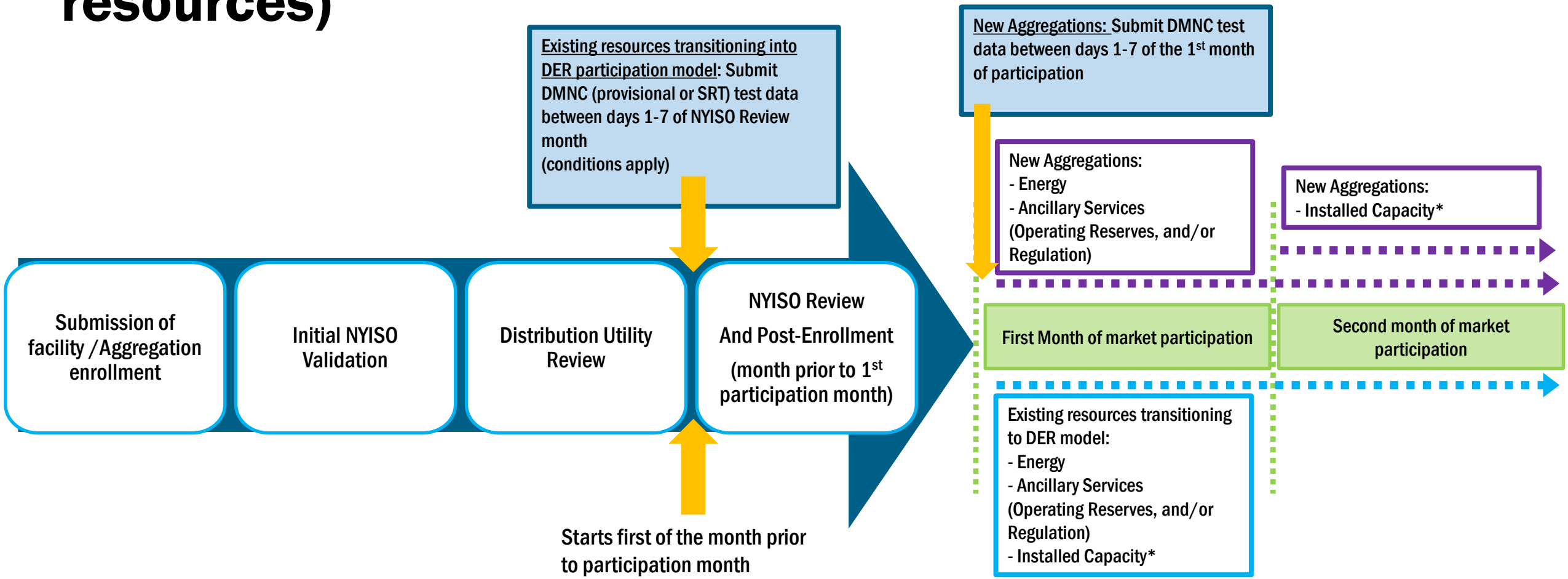


3 MW for 8 Hours

Aggregation has 8-hour EDL

*For details refer to Section 4.1.3 of the ICAP Manual

Installed Capacity Market Enrollment and Participation for Aggregations (new and existing resources)



* Provided DMNC test data is validated and approved by NYISO

UCAP and Calculating Derating Factors

ICAP and UCAP for Aggregations

- For an Aggregation,

Adjusted ICAP for Aggregation = Aggregation ICAP * Capacity Accreditation Factor for Aggregation

Aggregation ICAP = Sum of all individual DER ICAP MWs

- Aggregation's ICAP MW: Sum of all individual DER ICAP MWs for a given auction month
  - ICAP MW for each individual DER is a function of several variables, including:
    - Type of Aggregation in which the DER participates
    - Demand Reductions provided by the DER
    - Time-stacking, dependent on the presence of an Energy Duration Limitation (EDL)
    - DMNC MW
    - CRIS MW
    - Total Supply Declared Value MW
      - Refers to the total MW capability of an individual DER
      - Value reflects the Demand Reduction, Injection, and Withdrawal capabilities of the individual DER, and may be less than or equal to the CRIS or DMNC for a given month

Capacity Accreditation Factor for Aggregations: Refer to Section 7.2.1 of ICAP Manual and Section 5.12.14 of the MST

ICAP and UCAP for Aggregations

- For a given month,

Aggregation UCAP = Adjusted ICAP for Aggregation * (1 – Aggregation Derating Factor)

- Derating Factor for Aggregation:
  - Calculated consistent with type of Aggregation, and type of facilities contained in the Aggregation
  - For a specific month, derating factors for each DER within an Aggregation will be calculated using applicable values from two prior like capability periods
    - For a month in Summer 2024 Capability Period, applicable values from Summer 2023 and Summer 2022 Capability Periods will be used
    - For a month in Winter 2024-2025 Capability period, applicable values from the Winter 2023-2024 and Winter 2022-2023 Capability Periods will be used
  - For Aggregations with an Energy Duration Limitation (EDL):
    - Derating Factor will be measured in real time over the applicable Peak Load Window for applicable months
    - Activity that occurs outside of the applicable Peak Load Window will not affect the Derating Factor calculation

Aggregation Derating Factor Calculation

- Aggregation Derating Factor will be used to determine the amount of UCAP that an Aggregation will be permitted to provide for each month
- The Derating Factor applied to the Aggregation-level reflects the ratio of total available MW and the total ICAP MW for the Aggregation, based on the facilities contributing to the Aggregation's ICAP
  - Aggregation Derating Factor calculation will be adjusted to account for time-stacking for each individual facility that is part of an Aggregation with EDL when applicable
- Derating factors calculation dependent on Aggregation type and participation model rules for:
  - Facilities part of a DER Aggregation, or
  - Facilities part of a Single Resource Type (SRT) Aggregation

Calculating Facility Seasonal Unavailability/Availability Factor

- Calculating the derating factor (Seasonal Unavailability/Availability Factor) for a DER will be based on the characteristics of the DER by treating the DER as a single resource
- Calculating the derating factor for a DER that is 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*
  - Derating factor calculation will account for time-stacking between the facilities of the Aggregation
- Resources that have availability data for some, but not all, of the required timeframe will use the default values for the timeframes that are missing

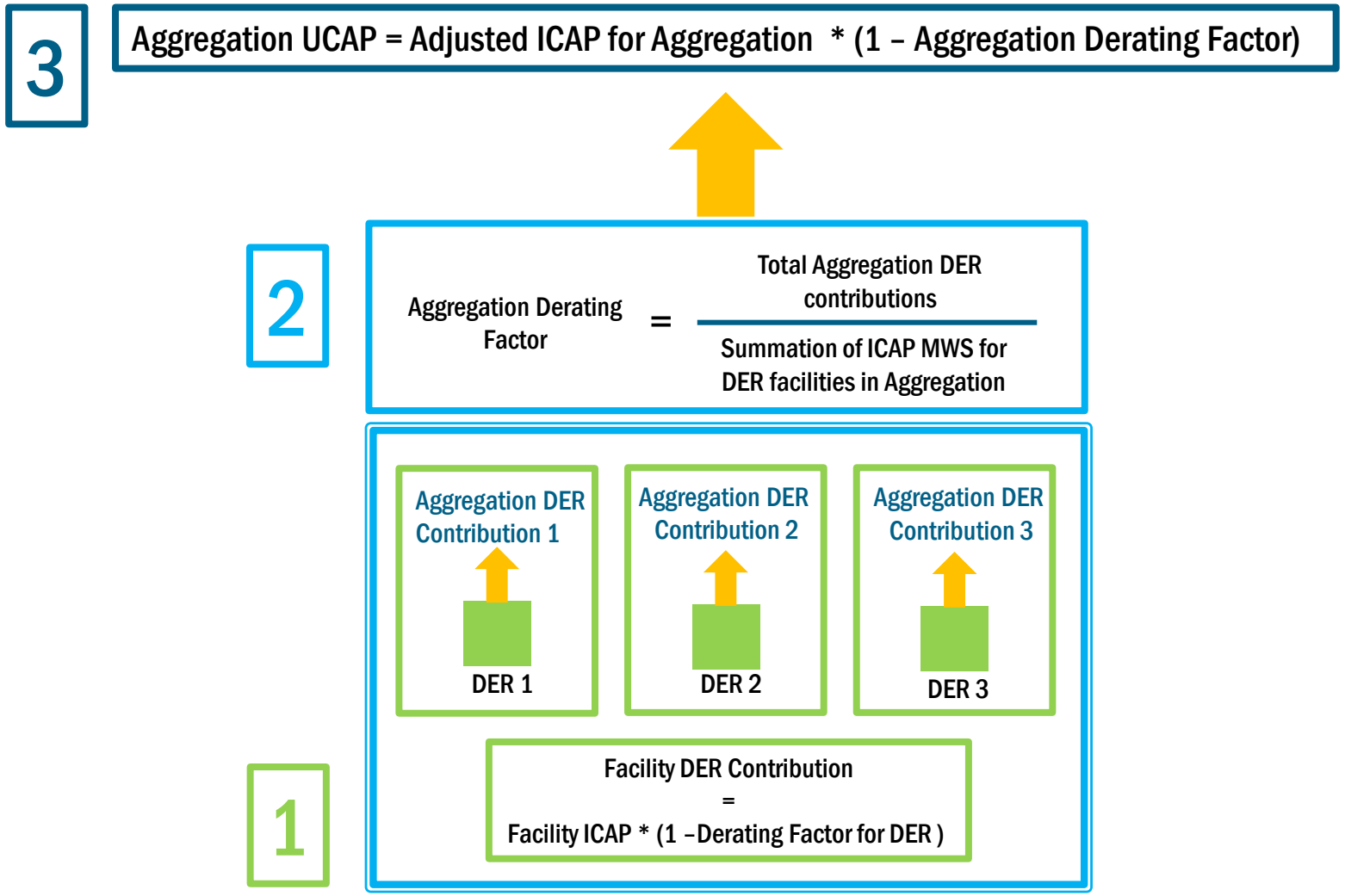
* Please refer to Section 4.5 of ICAP Manual for more details

Derating Factor Calculation for DER in an Aggregation

Aggregation Type	Derating factor calculation
DER	Availability Factor
ESR	Availability Factor
Generator	EFORd (based on GADS data)
Landfill Gas	Resource Specific Derating Factor (RSDF)
Solar	Resource Specific Derating Factor (RSDF)
Wind	Resource Specific Derating Factor (RSDF)

For Aggregations with EDL, Derating factor calculation will account for any time-stacking between the facilities of the Aggregation

Summary: High-Level UCAP Calculation for Aggregations



UCAP Calculations for Aggregations

- DER Aggregations:
  - DER Aggregations without Demand Reduction capability and without an EDL (6.9.1)
  - DER Aggregations without Demand Reduction capability and with an EDL (6.9.2)
  - DER Aggregations with Demand Reduction capability without an EDL (6.9.3)
  - DER Aggregations with Demand Reduction capability with an EDL (6.9.4)
- Single Resource Type Aggregations:
  - ESR Aggregations without an EDL (6.9.5)
  - ESR Aggregations with an EDL (6.9.6)
  - Generator Aggregations (EFORd based on GADS data) (6.9.7)
  - Energy Limited Resource (ELR) Aggregations (EFORd based on GADS data) (6.9.8)
  - Generator Aggregations (AOF based on GADS-equivalent data) (6.9.9)
  - Energy Limited Resource (ELR) Aggregations (AOF based on GADS-equivalent data) (6.9.10)
  - Intermittent Power Resource (IPR) Aggregations (6.9.11)

Note: Single resource type LESR Aggregations cannot participate in the NYISO's ICAP market

Installed Capacity Market Obligations

Installed Capacity Market Obligations

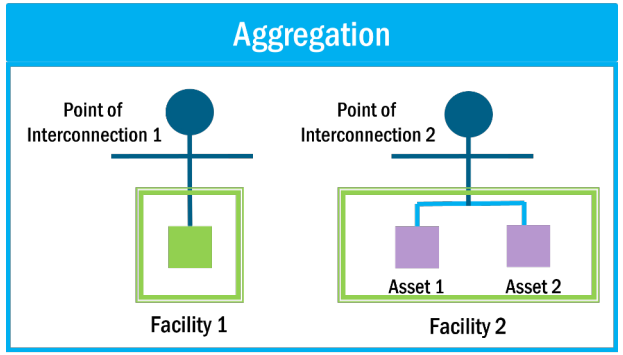
- Aggregations must comply with Bid/Schedule/Notify obligations for capacity market participation
- Aggregations must submit DMNC data according to specified timelines in the ICAP Event Calendar
- For Aggregations with an Energy Duration Limitation:
  - EDL election can be made once every Capability year (annual election by August 1st for next Capability year)
- Facilities can change between Aggregation types, once every Capability year during the annual election (by August 1st)
  - For example, a facility can switch from being part of a SRT aggregation to a DER aggregation or vice versa
- Facilities can switch between aggregations of the same type on a monthly basis, via the Aggregation System enrollment process

Outage Scheduling

- Aggregations are required to follow the same outage scheduling process as all other Generators
  - Planned Outage Schedules two years forward from the anticipated date of first offer into the capacity market, submitted through the Outage Management System (OMS)
- Operational coordination process:
  - GOCP and outage coordination for planned and forced outages/derates

GADS Submission for DER

- All assets (except Demand Side Resources) enrolled within an Aggregation must submit GADS data for every month that the Aggregation is enrolled to participate in the NYISO's Installed Capacity market under the DER Participation model
- DER assets submit Event and Performance data based on GADS rules for their respective technology type and fuel type
  - Example 1: Generator assets submit monthly event and performance data
  - Example 2: ESR and Wind/Solar IPR assets only submit minimum equivalent performance data
  - Assets that are Demand Side Resources do not submit any GADS data



GADS Submission for DER

- All components of the asset must share the same generating technology and fuel type to enroll as a singular asset with an associated GADS submission record
  - Multiple solar panels that form part of a solar Resource, located behind a single POI and are associated with a single utility account and net meter will be grouped together as one asset for GADS data submission
  - An ESR located behind the same POI with solar and associated with the same utility account and net meter will be considered a separate asset from the solar resource for GADS data submission
- Each conventional generator participating as an asset must be enrolled as a singular asset with an associated GADS submission record
  - Two thermal generators behind the same POI and associated with a single utility account and net meter will be considered two separate assets for GADS data submission

Aggregations - Selling Capacity as an ICAP Supplier

- Selling capacity as an ICAP Supplier
  - NYISO Auctions
    - Capability Period or Strip Auction
    - Monthly Auction
    - Spot Market Auction
  - Bilateral Transactions
  - In accordance with current rules, similar to other ICAP Suppliers

Certification for Aggregations as Installed Capacity Suppliers

- Aggregations that have sold capacity as a supplier in NYISO auctions, or have sold capacity in Bilateral Transactions must follow all current Certification rules and obligations for an ICAP Supplier
- Exact timelines and deadlines for Certification obligations identified in the ICAP Event Calendar

Determining ICE of the UCAP Supplied

- ICE is the Installed Capacity Equivalent of the amount of Unforced Capacity that the Aggregation supplies in a specified month
- For every month that the Aggregation receives UCAP supplier payments:

$$\text{Installed Capacity Equivalent Of UCAP Supplied (ICE)} = \frac{\text{UCAP Supplied by Aggregation for given month}}{(1 - \text{Aggregation Derating Factor for given month}) * (\text{Aggregation CAF for given month})}$$

CAF = Capacity Accreditation Factor

Day-Ahead Market Obligations

- Aggregations that have sold UCAP, must do one or more of the following:
  - Bid [Offer] Energy in the DAM
  - Schedule a Bilateral Transaction

  AND/OR
  - Notify the NYISO of any outage
- The amount of Energy that is B/S/N must be greater than or equal to the Installed Capacity Equivalent of the UCAP sold
- On a daily basis, for Aggregations with an EDL

Lesser than or equal to Peak Load Window	• B/S/N during the PLW for at least the number of consecutive hours that corresponds to the EDL
Greater than Peak load Window	• B/S/N for the entirety of the PLW and for additional hours immediately preceding and following the PLW covering the remaining hours of the EDL that fall outside the PLW

Day-Ahead Market Obligations

- Additionally, for ESR Single Resource Type (SRT) Aggregations, on a daily basis:

Aggregations without an EDL	• B/S/N obligation includes the maximum of the negative Installed Capacity Equivalent or Lower Operating Limit, such that the value reflects the entire withdrawal to injection operating range

Aggregations with EDL ≤ Duration of Peak Load Window	• For each hour within the PLW:
	  • B/S/N to inject at least the ICE of UCAP sold for each hour of the PLW
	• For each hour beyond the PLW:
	  • Bid in the DA or notify of outages – the maximum of the ESR Aggregation's negative Installed Capacity Equivalent or Lower Operating Limit

Aggregations with EDL > Duration of Peak Load Window	• For each hour beyond the ESRs EDL: • Bid in the DA or notify of outages – the maximum of the ESR Aggregation's negative Installed Capacity Equivalent or Lower Operating Limit

- The amount scheduled, Bid, and/or declared to be unavailable must reflect the Energy Storage Resource's entire withdrawal operating range

Installed Capacity Settlements

- Capacity Payments based on MWs awarded in an auction and the applicable auction clearing price ($/kW-month)
  - Convert MWs to kW by multiplying by 1000
  - Then multiply by auction clearing price
  - This monthly capacity payment is then allocated to the weekly invoice accordingly

Installed Capacity Market Mitigation

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 New York's Mitigated Capacity Zones (New York City and Zones G-J)
  - DER Injection resources are subject to this rule
  - DER Demand Side Resources are not subject to this rule
- 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) –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

- Buyer Side Mitigation evaluation is conducted at the individual DER level for facilities that are in Mitigated Capacity Zones, that form the Aggregations that participate in the NYISO's Installed Capacity market
- Certain DER (that can provide greater than 2MW injection on to the grid) located in NYISO's Mitigated Capacity Zones (New York City and Zones G-J) may be subject to Buyer Side Mitigation, pursuant to NYISO tariff and procedures
- DER that satisfy the goals specified in New York State Climate Leadership and Community Protection Act (CLCPA) are excluded from Buyer Side Mitigation evaluations
  - For example, Energy Storage Resources (ESRs), Demand Side Resources, Wind and Solar Intermittent Power Resources are all excluded from BSM evaluations

Buyer Side Mitigation

- DER that can provide greater than 2 MW injection to the grid, and are not excluded facilities as mentioned below will be evaluated for Buyer Side Mitigation
  - Evaluations happen concurrent with the deliverability study process of NYISO's Interconnection process and could lead to offer floors or be granted an exemption depending on study results
  - This process is similar to other generator types that go through BSM
- Aggregations offer into the NYISO's ICAP Auctions based on the offer floors for groupings of the DER that make up the Aggregation
  - Aggregation buckets corresponding to the groupings of DER by their offer floors can be found in the ICAP AMS and the Agg system screens
  - For more information, please refer to the Agg System training e-learning module

Additional Resources

- Tariff:
  - Market Administration and Control Area Services Tariff
    - MST Attachment H, Section 23.4.5 Installed Capacity Market Mitigation Measures
- Manuals:
  - Aggregation Manual
  - Installed Capacity Manual
    - Attachment J, Unforced Capacity for Installed Capacity Suppliers, ICAP Manual
    - Attachment K, Reportable Operating Data, ICAP Manual
- User's Guides:
  - Aggregation System User's Guide
  - Market Participants User's Guide
  - ICAP Automated Market System (AMS) User's Guide

Additional Resources

- Market Training materials:
  - Market Training Course Materials, New York Market Orientation Course (NYMOC) – MT 201
  - Market Training Course Materials, Intermediate ICAP Course – MT 305
  - DER Onboarding Educational Suite
  - Aggregation System Training e-learning module
  - NYISO GADS Training e-learning suite

Distributed Energy Resources (DER) Participation Model Chapter 5

Mathangi Srinivasan Kumar
Program Lead, Market Training, NYISO

DER Participation Model
2024
eLearning Module

Chapter 5: Transition to and from the DER Participation Model

Participation Model Transitions

- Resources that participate in other NYISO markets that wish to transition to the DER participation model, or DER that wish to transition out of the DER participation model must follow the requirements and deadlines that may vary depending on the participation model it currently belongs to
  - Examples:
    - SCR ⟷
    - EDRP ⟷
    - DSASP/DADRP →
    - BTM:NG Resources ⟷
    - Stand alone generator ⟷

⟷ Bi-directional transition to and from DER participation model

→ One-directional transition to the DER participation model

Participation Model Transitions

- Resources that transition to the DER participation model must utilize the enrollment process as described in Chapter 2 of this presentation suite, in order to enroll in the Agg System and be able to participate in NYISO markets and services
  - The Aggregation and facilities enrollment import template have specific fields that will identify these as existing resources
  - Resources will also need to complete ICAP market tasks like submission and validation of DMNC in order to participate in the ICAP market; see relevant section in this presentation
- DER that wish to transition out of the DER participation model will need to separate from the Aggregation
  - See Aggregation System Training e-learning module for details
  - For a detailed description of all the rules, please also refer to the Aggregation Manual – Section 4, Participation Model Transitions to and from DER

Participation Model Transitions

- If qualified, Generators (less than 20 MW) and Demand Side Resources are permitted to transition to the DER participation model and will be added to an Aggregation on a monthly basis
  - Please note that the requirements and important deadlines vary depending on the participation model that the resource currently uses, and when it intends to transition to the DER participation model
  - Existing Market Participants must register as an Aggregator prior to beginning the DER and Aggregation transition process or assign the resource to another Aggregator's Aggregation
  - The Aggregator must provide notice to the NYISO and the applicable TO expressing intent to transition to or from the DER participation model

SCR transition to DER

- Resources that are active participants in the SCR program may initiate the transition to the DER participation model on a monthly basis
- If MP intends to transition during a current Capability Period:
  - Must be separated in DRIS
  - Effective end date: last day of NYISO review month
  - For more information, refer to Section 4.3.3 of the Agg Manual for separation process in DRIS
- If an SCR would like to participate as an ICAP Supplier in their first month under the DER participation model, the Aggregator must submit provisional DMNC in the Agg system
  - Equivalent to the declared value, maximum allowed is the ACL value for the SCR
    - Enables uninterrupted capacity market participation for resources switching from SCR capacity market participation into the DER participation model
  - A provisional DMNC record must be validated with a regular in-period DMNC test for the applicable Capability Period
    - Dates and deadlines for submission of in-period DMNC testing for Summer and Winter Capability Periods can be found in the ICAP Event Calendar

SCR Transition to DER

- **Performance testing:** Resource must satisfy all performance testing obligations during and after the transition to the DER participation model
  - During the Enrollment period in the Agg system, resource must either complete a performance test or submit SCR event data to fulfil testing obligations
  - Once the SCR has transitioned as a DER, it must conduct its performance test in the same manner as its previous SCR characteristics, including metering configuration and response type for the duration of the Capability Period in which the DER previously participated as an SCR
  - Once Capability Period is over, the resource does not have to respond to SCR performance test requirements, and will perform and submit resource capability testing as per DER participation model rules

EDRP transition to DER

- EDRP Resources transitioning to the DER participation model will be treated as a new resource for Installed Capacity market participation
- Resource will have no testing obligations related to SCRs transitioning to DER
- EDRP Resource must unenroll and set an effective end date in DRIS prior to intended start date as a DER

DSASP and DADRP transitions to DER

- Resources that are active participants in the DSASP or DADRP may initiate the transition to the DER participation model on a monthly basis
- The DSASP Provider or Demand Reduction Provider (DRP) for the Resource must coordinate with NYISO Customer Registration to remove the DSASP or DADRP Resource from the NYISO markets prior to participation in the NYISO markets as a DER
- The DSASP Provider or DRP is responsible to coordinate the removal any bids submitted to NYISO that are not already being evaluated for the Day-Ahead or Real-Time market prior to participation as a DER
- A DSASP or DADRP Resource transitioning to the DER participation model that is also participating as an SCR or EDRP must additionally follow the transitioning steps for SCRs or EDRP resources, as applicable

BTM:NG Resource Transition

- A BTM:NG Resource is a Generator co-located with an on-site Host Load, which is routinely served by the on-site Generation
  - BTM:NG Resources are precluded from using the DER participation model
- A BTM:NG Resource may withdraw from that participation model and transition to become a DER
  - BTM:NG Resources that want to do so must thereafter serve its Host Load from the grid, rather than primarily from the on-site generation source
- A BTM:NG Resource may serve its Host Load either using a single generating unit, or multiple generating units
  - Regardless of the configuration of generating units, the Resource should enroll as a DER that reflects any load reduction capability, injection capability, or withdrawal capability that will be provided through an Aggregation as a DER

BTM:NG Resource Transition

- The DER enrollment should reflect the number of generating units as assets within a single DER
  - Example: If the BTM:NG Resource facilitates load reduction through the use of a gas turbine generator, and has load reduction curtailment capability
    - The resource should enroll as a DER with a Demand Side Resource asset, and a generator asset to accurately reflect the full range of capabilities of the DER

Existing Generators transitioning into the DER Participation Model

- Qualified resources that meet the size requirement, and are enrolled in the NYISO markets in any of the following participation models, may transition to the DER participation model:
  - Generator, Energy Storage Resource (ESR), Limited Energy Storage Resource (LESR), Solar, Wind, Landfill Gas, or Energy Limited Resource (ELR)
  - Some resource types may need to submit an annual election prior to transitioning to becoming a DER, including BTM:NG Resources and retail load modifiers
  - For more information regarding annual election requirements, please refer to the ICAP manual

Existing Generators transitioning into the DER Participation Model

- Upon deciding to transition, the Market Participant must submit a notice to NYISO Customer Registration of the end effective date for the current Resource
  - The market participant shall submit a notice, in the form of an email, to NYISO Customer Registration (customer_registration@NYISO.com) and DRO (DER@nyiso.com)
  - Notice must be provided prior to the import of enrollment data in the Aggregation System for the applicable Resource seeking to transition to DER
    - Before the Aggregator can submit data to enroll a Resource that is transitioning to become a DER, the NYISO must acknowledge and approve its end effective date notice as a standalone generator
- Once the NYISO has received an approved the end effective date notice for the current Resource enrollment, and the Market Participant has successfully become an Aggregator, the Aggregator may begin the process of enrolling the Resource as a DER

Existing Generators transitioning into the DER Participation Model

- To retain the rules and treatment of the Resource's prior participation model, the resource must be enrolled as part of a Single Resource Type (SRT) Aggregation
  - All other facilities in the Aggregation must be the same technology type and operating characteristics
  - For example, an Energy Limited Resource (ELR) must aggregate with other ELRs that share the same limiting characteristic in order to form an ELR Aggregation
- SRT Transfer for stand-alone Generators: Previously approved DMNC value being currently used for Installed Capacity market participation
  - Enables uninterrupted capacity market participation for resources switching from stand-alone generator capacity market participation into the DER participation model
- An SRT Transfer record must be validated with a regular in-period DMNC test for the applicable Capability Period
  - Dates and deadlines for submission of in-period DMNC testing for Summer and Winter Capability Periods can be found in the ICAP Event Calendar

Transitioning out of DER Participation Model

- Resources that are enrolled in the DER participation model and actively participating in an Aggregation may elect to separate from the DER model to participate as a stand-alone Resource
  - All applicable rules must be followed, including a minimum size of 1 MW for injection-only generators, or 100 kW for ESRs
- Applicable annual election rules must be adhered to, for participation in the Installed Capacity market
- The Aggregator is required to notify NYISO Customer Registration of the intent to transition from the DER program to another program prior to initiating the removal process
- After the NYISO has been notified, the Resource will be able to proceed with registering for the new program, consistent with existing processes
- For more information on separating the resource from the DER participation model, refer to the Agg system training e-learning module

Additional Resources

- Tariff:
  - Market Administration and Control Area Services Tariff
- Manuals:
  - Aggregation Manual
  - Installed Capacity Manual
  - Ancillary Services Manual
- User's Guides:
  - Aggregation System User's Guide
  - Market Participants User's Guide
  - ICAP Automated Market System (AMS) User's Guide
- Market Training materials:
  - Market Training Course Materials, New York Market Orientation Course (NYMOC) – MT 201
  - DER Onboarding Educational Suite
  - Aggregation System Training e-learning module

Questions?

For any future assistance, please contact NYISO Stakeholder Services at stakeholder_services@nyiso.com or by phone at (518) 356-6060