



Manual ##

Aggregation Manual

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Revision History

Version	Date	Revisions
1.0	MM/DD/YYYY	Initial Release

1. Background & Overview

This manual describes the procedures by which a Market Participant may group individual facilities located on the New York State Transmission System and/or the distribution systems located in the New York Control Area (“NYCA”) to form a single entity – an Aggregation – for the purpose of participating in the NYISO-administered Energy, Ancillary Services, and Installed Capacity markets. The Aggregation must satisfy all applicable eligibility and performance requirements necessary to participate in the NYISO-administered markets.

The procedures described in this manual apply to Aggregations and the individual DER participating in an Aggregation. However, this document is not the sole source of information for Aggregations and DER. Aggregations are subject to the rules generally applicable to all Resources except where noted. Market Participants should review all applicable market rules and corresponding manuals, guides, and technical bulletins as necessary.

1.1. Demand Side Resource Participation in NYISO Markets

Qualified Demand Side Resources may participate in a DER Aggregation. Demand Side Resources may also participate in the NYISO’s Emergency Demand Response Program (“EDRP”) or the Special Case Resource (“SCR”) program. A resource may not simultaneously participate as a DER in an Aggregation and as an EDRP Resource or an SCR. More information about the SCR program and EDRP is available in the NYISO Services Tariff (*e.g.*, Sections 5.12.11 and 22, respectively) and ISO Procedures (*e.g.*, Installed Capacity and Emergency Demand Response Program Manuals).

2. Operational Coordination

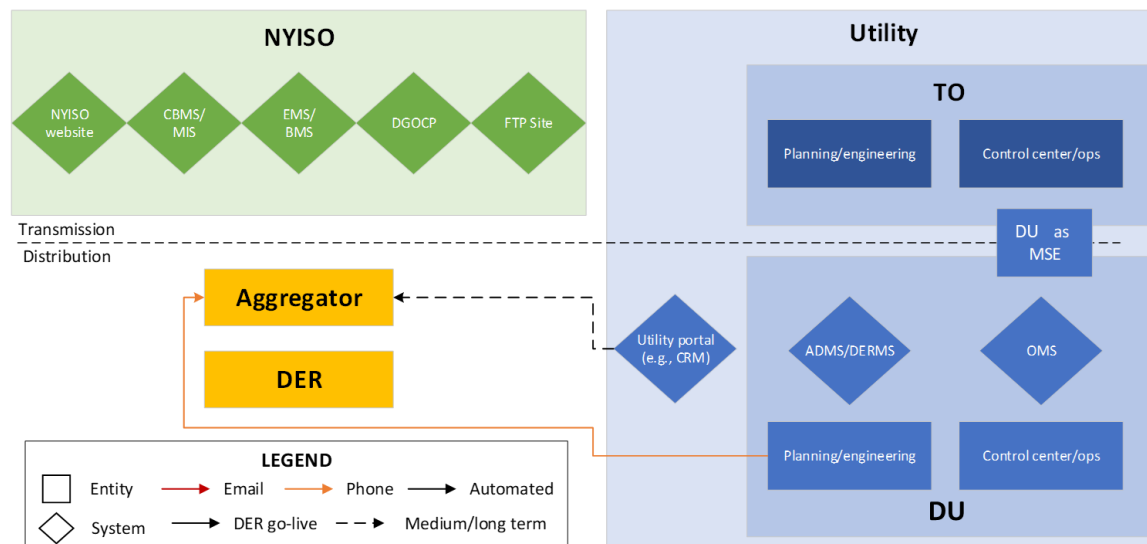
The NYISO, Aggregator and applicable Transmission Owner and distribution utility shall coordinate scheduling and dispatch for all Distributed Energy Resources participating in the NYISO-administered markets as part of an Aggregation. Aggregations are ‘dispatch-only’, meaning they do not submit commitment parameters (*e.g.*, minimum run-time and start-up costs) and will be treated as always available for dispatch, consistent with their Bids. The coordination protocols established in this Section 2 describe required data exchanges, roles and responsibilities of the parties, and the coordination processes applicable to Aggregation participation in Day-Ahead Market and Real-Time Market.

Note: For the Purposes of this Aggregation Manual, the term ‘distribution utility’ means the electric utility that owns and operates a distribution system in the NYCA (including municipalities and electric cooperatives)

connecting the NYS Transmission System to retail customers.

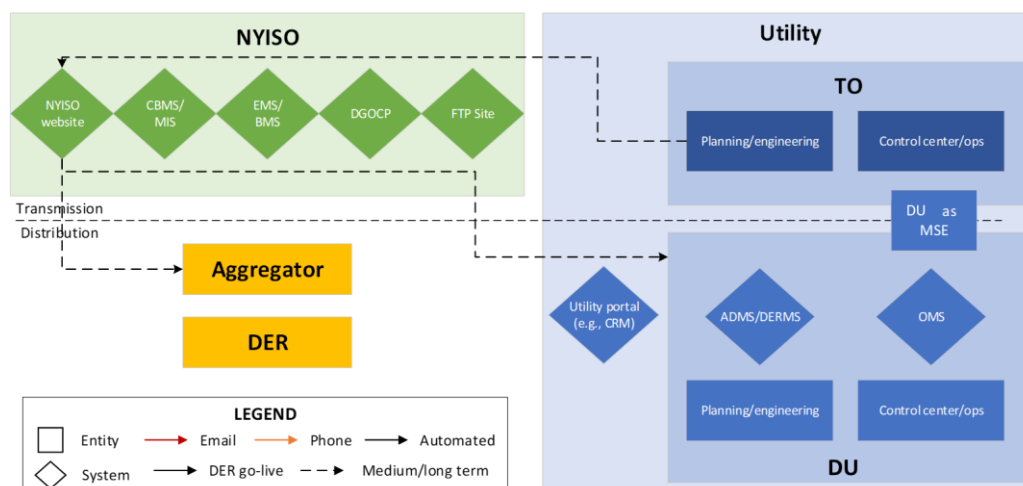
2.1. Operating Data Exchange

2.1.1. Planned Distribution System Maintenance



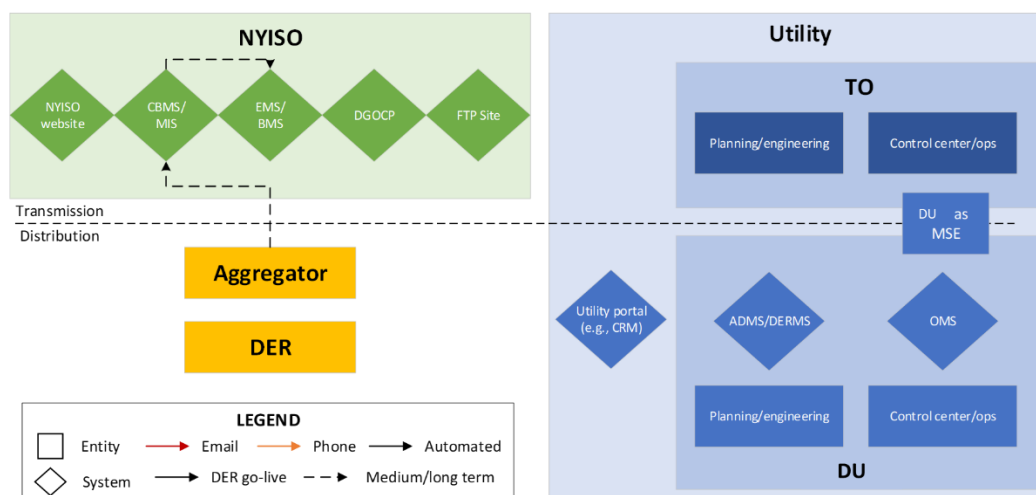
The Distribution Utility shall notify an Aggregator and DER when planned distribution system outages are expected to impact the operation of DER participating in the Aggregator's Aggregation. Planned distribution system outages may arise due to routine maintenance, scheduled repairs, or other anticipated events that impact the operation or deliverability of individual DER or an Aggregation. The Distribution Utility must notify the Aggregator, DER, and Transmission Owner of all planned distribution system outages that the Distribution Utility anticipates could impact the operation or deliverability of individual DER or Aggregations by 3PM two days prior to the day of dispatch. Day-Ahead Market Bids for Aggregations shall reflect distribution system conditions. If a planned distribution system outage causes a full or partial derate to one or more individual DER that were included within an Aggregation's operating plans, the Aggregator shall adjust the Aggregation's operating plans to reflect the capability of the Aggregation.

2.1.2. Planned Transmission System Maintenance



Transmission Owners are required to notify the NYISO when planned transmission system outages due to routine maintenance, scheduled repairs, or other anticipated events as described in Outage Scheduling Manual Section 2.2 that could impact the operation or deliverability of an Aggregation. Transmission Owners and Distribution Utilities are expected to communicate relevant outage information to each other as needed. The Transmission Owner shall be responsible for initiating this communication to the NYISO. All Transmission System outage information that is approved by NYISO is publicly available at <https://www.nyiso.com/power-grid-data> under the 'Outage Schedule' page. Notification to the Aggregator, Distribution Utility, and NYISO shall occur under the processes set forth in the NYISO Outage Scheduling Manual and Outage Scheduler User's Guide.

2.1.3. Day-Ahead and Real-Time Market Bids



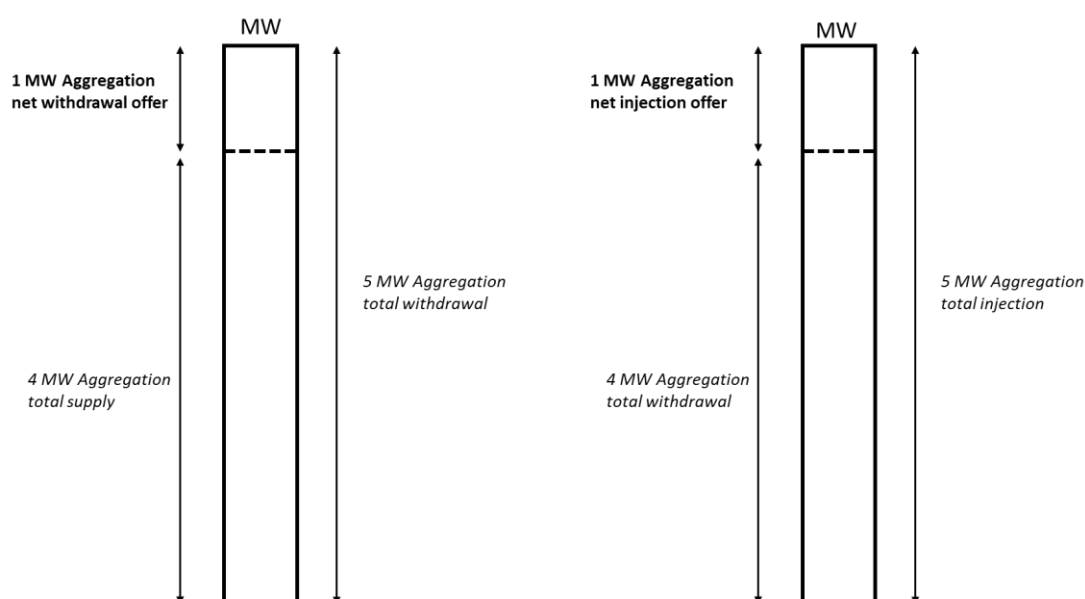
An Aggregation is a type of Resource, and all bidding obligations apply to the Aggregator and Aggregation, not to the individual facilities comprising the Aggregation. Aggregators and Aggregations will be subject to the NYISO's bidding and scheduling rules applicable to all Resources

except where noted. This Section 2.1.3 identifies certain bidding and scheduling requirements specifically applicable to Aggregators and Aggregations. Aggregators are not required to disclose their Bids to a Transmission Owner or Distribution Utility.

Aggregations will be scheduled consistent with 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. Both Day-Ahead and Real-Time Market Locational-Based Marginal Price (LBMP) will be calculated for each Transmission Node (See Section [xx] of this Aggregation Manual for additional information about Transmission Nodes).

If an Aggregation contains at least one Withdrawal-Eligible Resource (e.g., a battery), each point of the Aggregation's Bid Curve (or, for a Self-Committed Fixed Bid, the Aggregation's Bid) must reflect the net of Energy injections and Energy withdrawals for the bidding increment. Therefore, when an Aggregation's Bid reflects a net injection, the Aggregator shall reduce the Aggregation's Bid to supply Energy by the amount of Energy it intends to withdraw. Conversely, when an Aggregation's Bid reflects a net withdrawal, the Aggregator shall increase the Aggregation's Bid to supply Energy by the amount of Energy it intends to inject (Refer to Figure 1).

Figure 1: Aggregation Bidding Examples



Aggregators must select a bid mode for each Bid. Certain bid modes are only available to specific Aggregation types, consistent with the rules applicable to the participation model of the Aggregation:

Figure 2: Available Aggregation Bid Modes

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

Aggregators are permitted to balance the response of individual DER within an Aggregation to meet the NYISO dispatch signal. For example, an Aggregation containing one 5 MW battery and one 4 MW generator offers into the NYISO energy market and is scheduled to withdraw 1 MW in a given interval. The battery may withdraw 5 MW while the generator injects 4 MW, resulting in a net response of -1MW. In this example the Aggregation would be settled as 1 MW of energy withdrawal during the interval.

A homogeneous, single Resource type Aggregation shall comply with the bidding requirements of that particular Resource type, per existing NYISO tariffs and procedures. For example, an Aggregation comprising only of Energy Storage Resources must submit Bids consistent with the rules applicable to Energy Storage Resources (see NYISO’s Market Participant User’s Guide).

2.1.3.1. Day-Ahead Market Bids

Aggregators submitting Day-Ahead Market Bids for an Aggregation shall submit Bids in accordance with Section 4 of the Market Services Tariff and the Day-Ahead Scheduling Manual. An Aggregation that is an Installed Capacity Supplier must also comply with the scheduling, bidding, or notification requirements identified in Market Services Tariff Sections 5.12.1.6, 5.12.1.10, and 5.12.7.

2.1.3.2. Real-Time Market Bids

Aggregators submitting Real-Time Market Bids for an Aggregation shall submit Bids in accordance with Section 4 of the Market Services Tariff and the Market Participant User's Guide. Real-Time Market Bids for an Aggregation that includes Demand Reductions are subject to the Monthly Net Benefit Threshold (see Market Services Tariff Sections 4.4.1.2 and 4.5.7.).

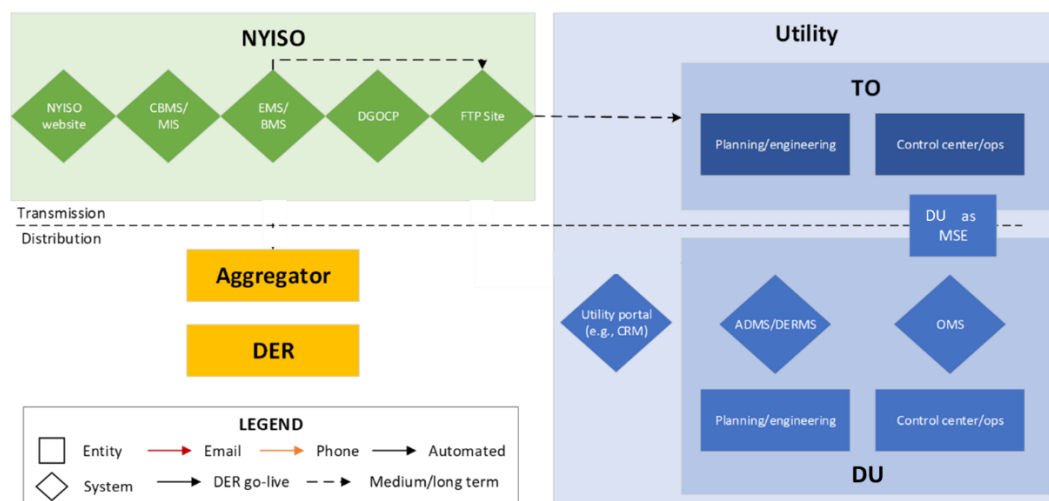
Monthly Net Benefit Threshold

The NYISO shall perform the Net Benefits Test for each month in accordance with Section 4.5.7.1 of the Services Tariff and post the Monthly Net Benefit Threshold by the 15th of the preceding month. The Monthly Net Benefits Threshold prices and a detailed stepwise description of the Net Benefits Test is available on the NYISO's website at: <https://www.nyiso.com/demand-response>.

An Aggregation may offer into the Day-Ahead Market or Real-Time Market below the Monthly Net Benefit Threshold. However, Demand Reductions by Demand Side Resources within an Aggregation shall not be eligible for Energy payments, Day Ahead Margin Assurance Payments or Bid Production Cost guarantee payments when the Monthly Net Benefit Threshold price is less than the Real-Time LBMP calculated for an interval at the Aggregation's Transmission Node.

A DER Aggregation is not permitted to balance Energy withdrawals by Withdrawal Eligible Generators with Demand Reductions in a Real-Time Market interval if the Transmission Node LBMP for that interval is less than the Monthly Net Benefits Threshold value.

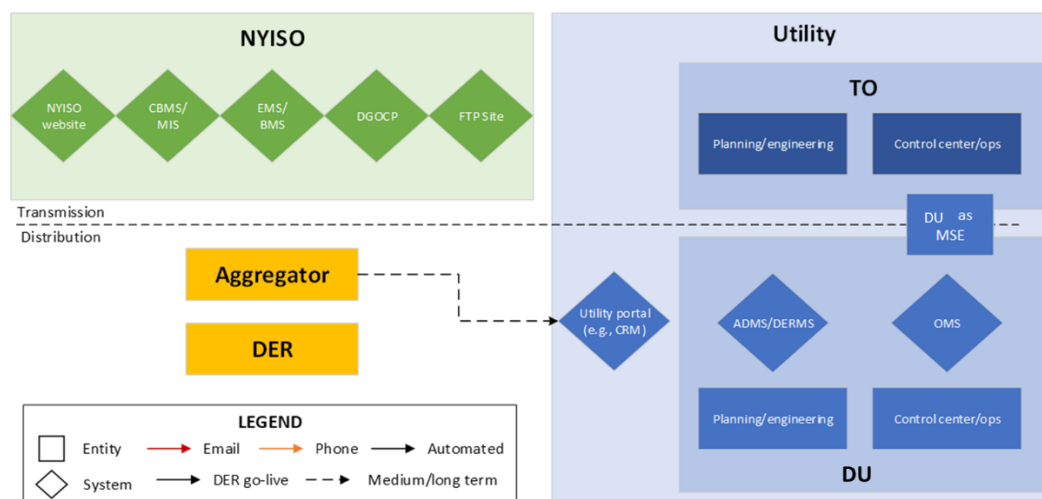
2.1.4. Day-Ahead Operating Plan



Per existing market processes, the NYISO shall issue the Day-Ahead Operating Plan (DAOP) reflecting the schedules of Aggregations (not individual DER). The DAOP shall be made available to the Transmission Owner via existing NYISO procedures. Transmission Owner users are required to obtain the necessary privileges and access to request the DAOP through an encrypted web-based

API, as the information is classified as CEII – Please contact NYISO Stakeholder Services for details on obtaining access at the following link: <https://www.nyiso.com/support>. Aggregators and Distribution Utilities will not have access to the DAOP.

2.1.5. Individual DER Schedule Review and Notice

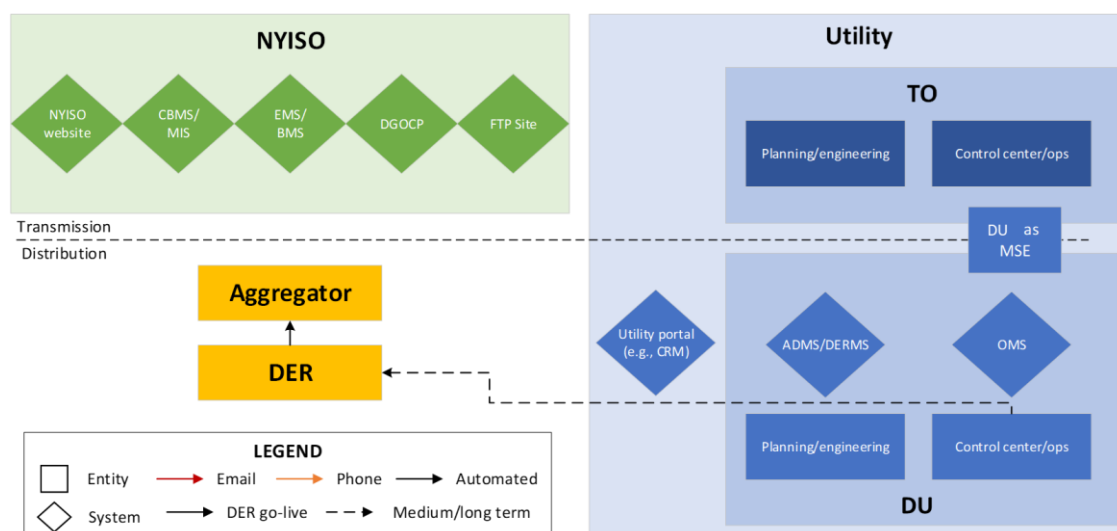


The Aggregator shall provide the planned schedules for each DER within its portfolio to the applicable Distribution Utility, so that the Distribution Utility may verify that outage notifications or other pre-existing conditions do not affect the proposed operation of the DER in aggregate. The Aggregator shall provide the planned schedules for each DER within its portfolio to the applicable Distribution Utility, so that the Distribution Utility can verify that individual DER or Aggregation schedules do not impact the safety and reliability of the distribution system (E.g., multiple DER / DERA on a feeder or circuit). The NYISO does not have visibility into the distribution system and the Distribution Utility is responsible to secure or control it.

The Distribution Utilities will use this data to analyze the injections and reductions to understand conditions such as station or feeder issues, equipment loading, voltage profiles, outages and impacts on reconfigured or rerated circuits, compliance with Non-Wires Alternatives (NWA) calls, etc.

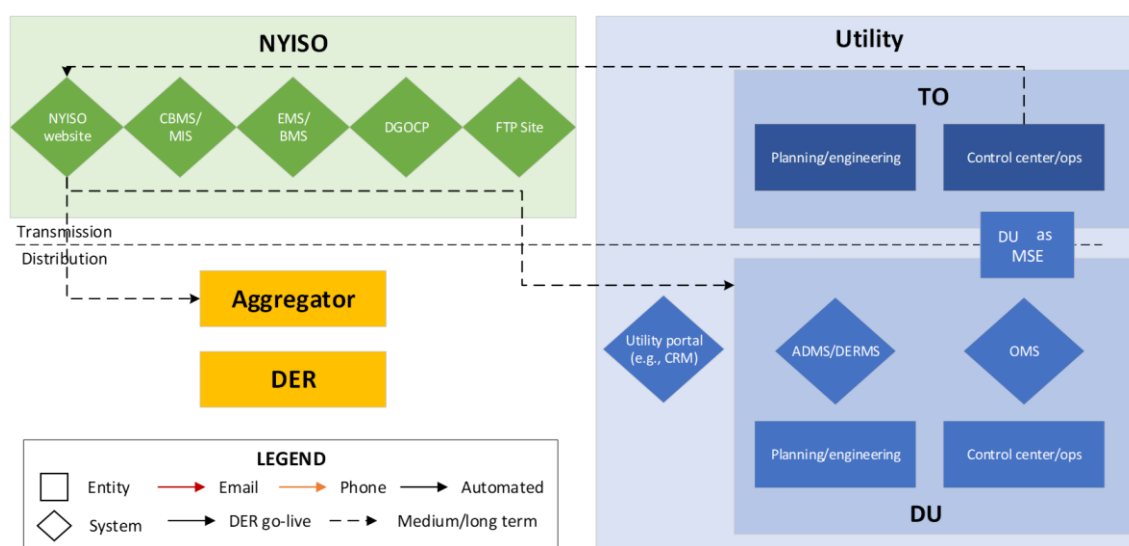
The Distribution Utilities shall communicate any identified reliability or safety concerns to the Aggregator consistent with Section 2.2.1. Communication Between Distribution Utility and Aggregator.

2.1.6. Unplanned Distribution System Conditions



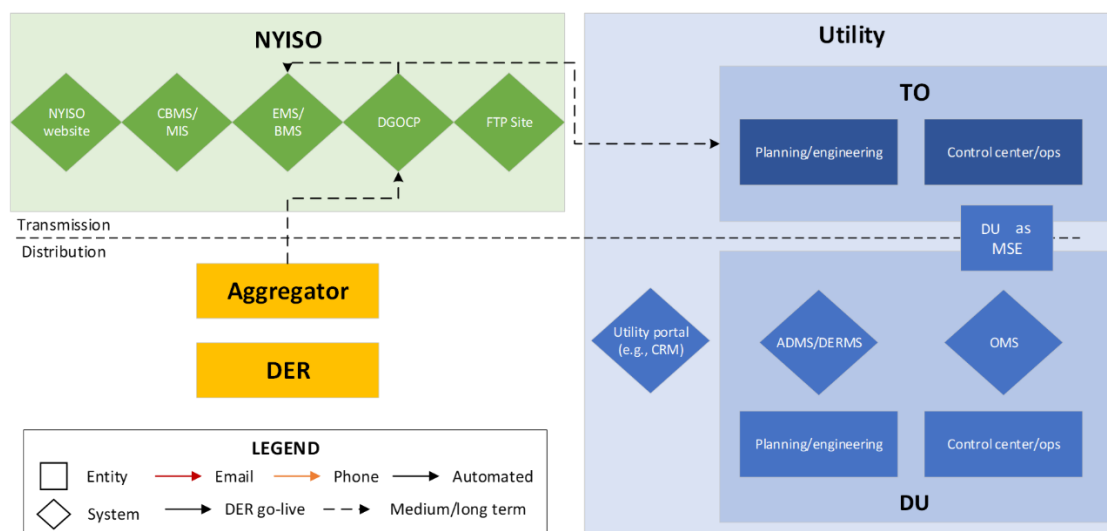
On an ongoing basis, the Distribution Utility will provide notification (utilizing existing communication practices between distribution operations and customer accounts, please contact the applicable Distribution Utility for more information regarding communication expectations and capabilities) to the Aggregator, DER, and Transmission Owner of any unforeseen conditions on its distribution facilities, actual or anticipated, that the Distribution Utility determines would impact the operation or deliverability of individual DER or Aggregations. Distribution system conditions are not required to be reported to the NYISO; rather, the Aggregator should adjust bids/offers for Aggregations to appropriately respond to any service interruptions when possible. If adjustment is not feasible based on the conditions, the Aggregator must report a full or partial outage for the Aggregation using the NYISO's Grid Operations Coordination Portal (GOCP).

2.1.7. Unplanned Transmission System Conditions



On an ongoing basis, the Transmission Owner will provide notification (utilizing existing communication practices between distribution operations and customer accounts, please contact the applicable DU for more information regarding communication expectations and capabilities) to the Aggregator, DER, NYISO, and applicable Distribution Utility of any emerging conditions on the transmission system, actual or anticipated, that would impact the operation or deliverability of an Aggregation. All Transmission System outage information that is approved by NYISO is publicly available at <https://www.nyiso.com/power-grid-data> under the 'Outage Schedule' page.

2.1.8. Outage Reporting

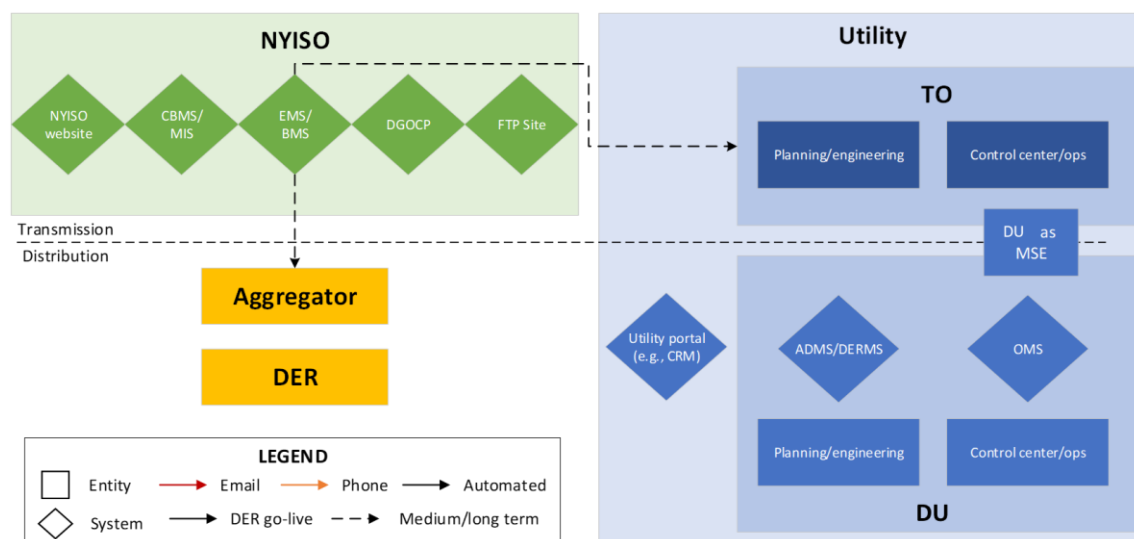


On an ongoing basis, the Aggregator will submit forced outage and planned outage notifications to the NYISO. The Aggregator is responsible for submitting outage information, both planned and unplanned, for all Aggregations in its portfolio. Individual DER outages should not be reported to the NYISO. As described in Outage Scheduling Manual Section 3.2.1, planned outages must be reported to the NYISO as soon as practicable. The submission of outage data to the NYISO does not automatically modify Bids or offers that may be impacted by those outages; the Aggregator is responsible for modifying Bids and offers based on outage information separately.

An Aggregator must notify the NYISO of Forced Outages that affect an Aggregation's ability to meet its schedule. See Section 3.2.4 Forced Generator Outages (Full or Partial) of the Outage Scheduling Manual. To the extent that an Aggregation can utilize DER not included in its operating plan as replacement for DER that are fully or partially derated, the Aggregator is not required to report a Forced Outage.

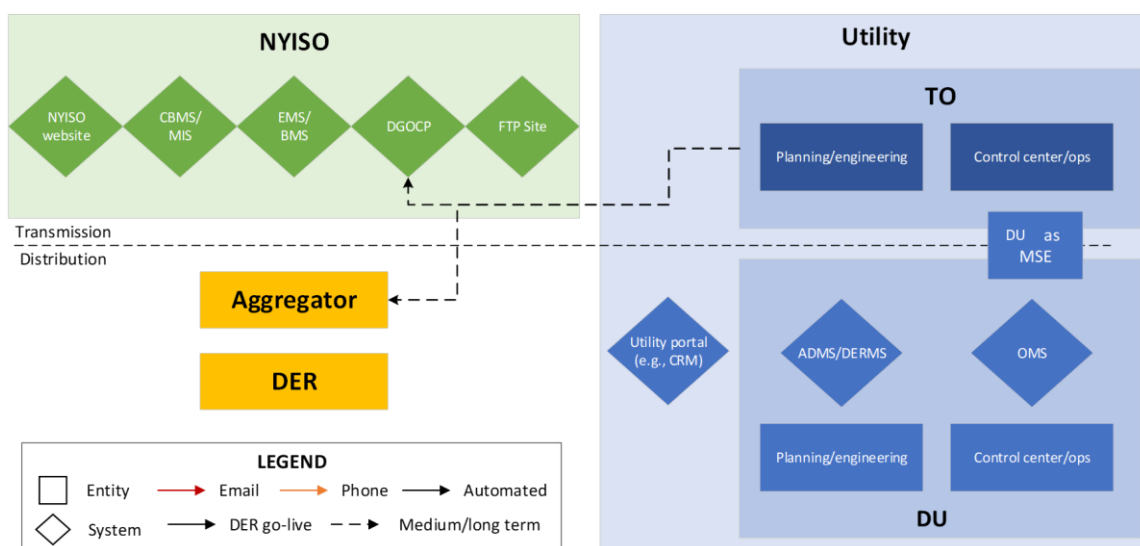
Aggregation Forced Outages must be submitted to the NYISO Grid Operations Coordination Portal (GOCP) in the event that the Aggregation cannot meet its dispatch. Please refer to the NYISO Grid Operations Coordination Portal (GOCP) User's Guide for more information.

2.1.9. Real-Time Dispatch Instructions



The NYISO shall issue dispatch instructions to Aggregators as described in the Transmission and Dispatch Manual. Dispatch instructions for Aggregations of DER will be issued via the applicable Transmission Owner when an Aggregation communicates with the NYISO through the 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. These processes are further detailed in the NYISO Direct Communications Manual and NYISO Direct Communications Procedure, and the Control Center Requirements Manual. The manuals are available at the following link: <https://www.nyiso.com/manuals-tech-bulletins-user-guides> (Please contact NYISO Stakeholder Services for details on obtaining the Direct Communications Procedure at the following link: <https://www.nyiso.com/support>).

2.1.10. Supplemental Resource Availability for Distribution or Transmission System Reliability



Capability of an Aggregation above what was accepted as part of the Day Ahead Evaluation may be needed by the NYISO, Transmission Owner (TO) or Distribution System Operator (DSO) to reliability operate the electric system. The ‘Supplemental Resource Availability,’ (SRA) process is used to make dispatch range of a dispatch-only Aggregation available for NYISO, TO or DSO operators to address reliability issues. The SRA process enables NYISO operators to reserve available dispatch range of dispatch-only resources, as Aggregations cannot be committed using the conventional SRE processes. SRA requests may be made after the close of the Day-Ahead market, and before the Real-Time dispatch interval. To evaluate SRA requests, the NYISO will follow a process similar to the procedures outlined in the *Transmission & Dispatch Operations Manual* Section 6.7.9 to process TO or DSO requests for SRE. A TO or DSO may not request supplemental availability of an individual DER. Any request for individual DER must be communicated to the Aggregator directly. The NYISO will not communicate SRA request results to Distribution Utilities.

Transmission Owners are responsible for notifying Distribution Utilities of Aggregations reserved via the Supplemental Resource Availability process. If a Distribution Utility identifies a distribution system reliability need, the request for an SRA by the NYISO must be submitted via the applicable Transmission Owner. The process for requesting an SRA is detailed in the NYISO’s *Grid Operations Coordination Portal (GOCP) User’s Guide*.

2.2. Roles & Responsibilities

Aggregators, Distribution Utilities, and Transmission Owners must be available for real-time operation verbal communication twenty-four hours a day, seven days a week, to maintain distribution and transmission system safety and reliability. Aggregators are responsible for evaluating current NERC definitions and guidance to ensure compliance with, for example, Generator Operator classification.

2.2.1. Communication Between Distribution Utility and Aggregator

- The Distribution Utility shall report emerging distribution system issues (*e.g.*, feeder reconfigurations) to the Aggregator as soon as practicable.
 - Distribution system issues may require individual DER full or partial derates.
- All operating information (*e.g.*, dispatch signals, telemetry) will be shared between the Aggregator and the Distribution Utility control centers in both Day-Ahead and Real-Time.
- If a DER or Aggregation creates or exacerbates Distribution System issues, the Distribution Utility shall direct the DER and/or Aggregator to curtail or disconnect any individual DER, when necessary, to preserve reliability and safety.
- All metering and telemetry must be provided to the Distribution Utility (via the applicable Transmission Owner) consistent with the NYISO's requirements and the Aggregator must notify the Distribution Utility as soon as practicable when the operating status of its DER changes (*e.g.*, that a unit is unavailable or can return to service).
- All DER curtailment directions to preserve distribution system safety will be communicated to the Aggregator as soon as practical. The Aggregator may operate other DER in its Aggregation to meet its NYISO schedule provided that the Distribution Utility authorizes the Aggregator's revised operating plan.

2.2.2. Communication Between Distribution Utility and Transmission Owner

- All operating data, including telemetry and revenue grade metering data, that is received by the Transmission Owner from NYISO for any Aggregation must be shared with the applicable Distribution Utility with the exception of TO-proprietary information such as the NYISO-issued Day-Ahead Operating Plan.
 - Data may include, but is not limited to: NYISO DAM schedules, NYISO dispatch signals.
- All operating data, including telemetry and revenue grade metering data, that is received by the Distribution Utility from the Aggregator for any Aggregation must be provided to the applicable Transmission Owner in order to communicate such information to the NYISO.
 - *E.g.*, Real Time dispatch telemetry.
- If the Distribution Utility determines one or more DER in an Aggregation must be derated in full or in part to maintain the reliability and safety of its distribution system, the Distribution Utility will notify the TO as soon as practicable, who will in turn notify the NYISO of the Aggregation derate.

2.2.3. Communication Between Transmission Owner and Aggregator

- The Transmission Owner will report emerging transmission system issues to affected Aggregators as soon as practicable.
 - Transmission system issues may require full or partial derates of individual DER.
- If a DER or Aggregation creates or exacerbates Transmission System issues, the TO shall direct the DER and/or Aggregator to curtail or disconnect any individual DER, when necessary, to preserve reliability and safety.
- All metering and telemetry must be provided to the Transmission Owner consistent with the NYISO's requirements and the Aggregator must notify the Transmission Owner as soon as practicable when the operating status of its DER changes (*e.g.*, that a unit is unavailable, or can return to service).
- All curtailments to preserve transmission system safety will be communicated to the Aggregator and NYISO as soon as practical. The Aggregator may then seek Transmission Owner authorization to operate different DERs to meet its NYISO schedule.

2.2.4. Communication Between Transmission Owner and NYISO

- When an Aggregation communicates to the NYISO and TO in parallel, telemetry to and from Aggregations must be sent simultaneously to/from the TO and NYISO. These processes are further detailed in the *NYISO Direct Communications Manual* and *NYISO Direct Communications Procedure*, and the *Control Center Requirements Manual*.
- Real-time communications regarding DER participation in the wholesale market shall be communicated between the Transmission Owner's designated operating desk and the NYISO control room.
- The Transmission Owner and NYISO shall notify each other as necessary to initiate a Supplemental Resource Availability (SRA) for reliability purposes.
- If a curtailment of an Aggregation by the Transmission Owner becomes necessary to maintain transmission system security, the Transmission Owner shall notify the NYISO by phone, or other agreed upon means.

2.2.5. Communication Between Aggregator and NYISO

- If an Aggregation is dispatched under the NYISO's SRA rules, the Aggregator will receive an updated schedule and dispatch instructions from the NYISO to reflect the SRA, either directly or through the applicable TO, depending on the telemetry communication configuration established.

- Aggregators are responsible for submitting offers to the NYISO market software reflective of composite Aggregation capabilities and performance, report outages of Aggregations to NYISO market applications and receive/respond to NYISO dispatch signals.

2.3. Coordination Timeline

2.3.1. Until 3:00 PM Two Days Before Dispatch

The Distribution Utility and/or Transmission owner shall notify the Aggregator (and individual DER if necessary) of planned distribution and/or transmission system maintenance that may impact operations. This information will allow the Aggregator to Bid in a manner consistent with distribution and transmission system conditions.

2.3.2. Up to 14 Days Prior and Until 5:00 AM on the Day Before Dispatch

Aggregator may submit and update Day-Ahead Market Bids through the NYISO's Market Information System.

2.3.3. By 11:00 AM on the Day Before Dispatch

NYISO will provide Aggregators with Day-Ahead Schedules for its Aggregation(s). Per existing processes, the NYISO shall also provide each Transmission Owner with its Day-Ahead Operating Plan. Upon receipt of the Day-Ahead Operating Plan, the Transmission Owner shall communicate with the NYISO to re-dispatch Aggregations as necessary.

2.3.4. By 12:00 PM on the Day Before Dispatch

An Aggregator shall communicate the schedules of the individual DER it intends to dispatch to meet its Day-Ahead Market Schedule to the Distribution Utility. The Distribution Utility will use this information to verify that the Aggregator's dispatch plan reflects applicable distribution system conditions. The Aggregator must include (i) the applicable Transmission Node, (ii) feeder used for each DER, (iii) unique identifier (*e.g.*, utility account number and meter number) for each DER being dispatched, (iv) minimum and maximum operating limits for each DER being dispatched, and (v) the timing of the dispatch. For additional information on this process, the applicable Distribution Utility should be consulted.

2.3.5. After 12:00 PM and No Later than 10:00 PM on the Day Before Dispatch

The Distribution Utility may review each Aggregator's submitted dispatch plan. If the Distribution Utility determines an Aggregator's planned dispatch is inconsistent with distribution system conditions, the Distribution Utility shall advise the Aggregator as soon as practical. 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 Real-Time Market Bids that account for the changed condition.

2.3.6. Day After Dispatch

The Aggregation's Meter Authority will send revenue meter data for each hour of the Dispatch Day to the NYISO, according to existing NYISO processes described in the NYISO's *Revenue Metering Requirements Manual*.