



Manual ##

Aggregation Manual Part 3

Issued: Month Year

WG/SUBCOMMITTEE DRAFT – NOT FOR COMMITTEE ACTION

1. Metering & Telemetry

Aggregations participating in the NYISO-administered wholesale markets must comply with the telemetry and metering standards identified in Services Tariff Sections 4 and 13, including but not limited to the provision of six-second Real-Time telemetry and hourly Revenue Quality Meter Data to the NYISO. Complying with the applicable metering and telemetry standards provides the NYISO with both the real-time operational data and after-the-fact settlement data are needed for accurate real-time situational awareness and accurate settlements.

1.1. Background

Revenue grade metering systems are necessary to provide hourly, Revenue Quality meter data used for settlement and billing must meet the reliability and accuracy standards described in the Revenue Metering Requirements manual [LINK]. Six-second telemetry data is required for real-time operations, pursuant to Services Tariff Section 13.2. More information on telemetry data can be found in the NYISO Control Center Requirements Manual [LINK] and Direct Communications Manual [LINK].

1.2. Metering Requirements

Aggregators must obtain wholesale metering and/or meter data services from a Meter Authority. For an Aggregator of a DER Aggregation the Meter Authority may be: (i) an authorized Meter Services Entity that the ISO has determined complies with the eligibility requirements pursuant to Services Tariff Section 13.3.2.1, (ii) the municipal electric utility for the municipality in which the DER within the Aggregation is electrically located, and/or (iii) the Member System in which Transmission District the Aggregation is located. An Aggregator may be its own Meter Services Entity if it meets the qualifications identified in Services Tariff Section 13.3.2. Single Resource Type (SRT) Aggregations may only obtain wholesale metering and/or meter data services from the applicable municipal electric utility or Member System. The Aggregator is ultimately responsible for the settlement data provided to the NYISO on their behalf by the Meter Authority and shall be subject to any applicable penalties.

For more detailed information about the Meter Services Entity framework, requirements, and obligations, please refer to MSE Manual [insert link]. For a list of NYISO-authorized Meter Services Entities, please see the following link: <https://www.nyiso.com/documents/20142/11268336/Approved-Meter-Services-Entities-MSE.pdf/2bafa41b-9bc5-4b10-e133-50aa2c5a8d14>.

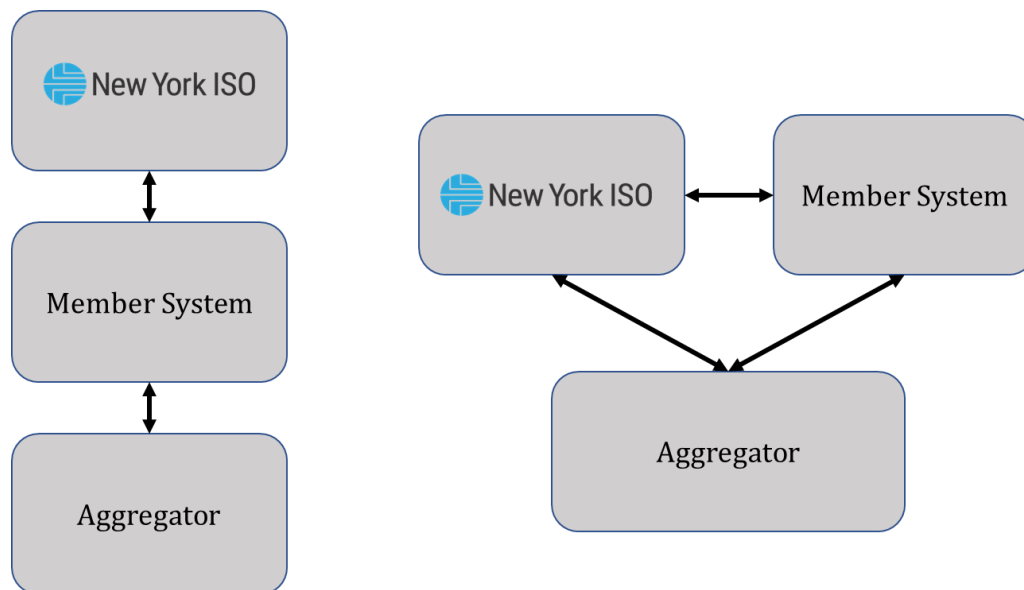
All Revenue Quality Meter (RQM) data shall reflect the Energy injections, Energy withdrawals, and Demand Reductions of all individual DER facilities in the Aggregation. RQM data required by the ISO for

settlement includes the following channels: Energy Injections, Energy Withdrawals (when the Aggregation contains at least one Withdrawal-Eligible Generator), and Demand Reductions. RQM data at the individual DER facility level may be requested by the NYISO for auditing and verification purposes – Aggregators should verify that the applicable Meter Authority responsible for sharing RQM data with the ISO has access to the RQM data for each individual DER facility. Aggregators should configure RQM infrastructure for individual DER facilities within Aggregations based on the guiding examples provided in the Revenue Metering Requirements Manual. All RQM Data must be provided to the NYISO by the Aggregation’s Meter Authority in accordance with the procedures outlined in the Revenue Metering Requirements Manual.

1.3. Telemetry Requirements

Six-second telemetry is required for each Aggregation. Aggregators must receive real-time communication from each individual DER, which real-time data must be aggregated and sent to the TO and NYISO in one of two possible configurations as further discussed below. Each DER must have the infrastructure to produce a 6-second telemetry signal to inform the Aggregation level signal to meet the NYISO’s dispatch, except for DER smaller than 100 kW, which are permitted to employ a NYISO-approved alternative telemetry mechanism as described in section [x]. Aggregators are responsible for measuring four streams (channels) of telemetry data: Energy injections, Energy withdrawals (when the Aggregation contains at least one Withdrawal-Eligible Generator), Demand Reductions, and the sum of Energy injections and Demand Reductions, minus the Energy withdrawals. The NYISO will send Base Point Signals for the Aggregation, and not for the individual facilities. This two-way communication of operational data will be established between the Aggregator’s control center and the NYISO through the applicable Member System, or alternatively between the Aggregator and the NYISO and Member System in parallel (Figure 1).

Figure 1: Acceptable telemetry communication data pathways between the NYISO, Aggregator, and applicable Member System.



The Aggregator is required to establish communications with the applicable Member System that meets the Member System’s requirements, including installation, configuration, and testing of any necessary hardware.

Aggregators opting to directly communicate with the NYISO shall communicate via Multiprotocol Label Switching (MPLS) or use Software-Defined Wide Area Network (SD-WAN) networks, pursuant to the requirements described in the Control Center Requirements Manual. Aggregators shall communicate with the NYISO via ICCP as the data protocol for two-way communication over MPLS. Aggregators shall communicate with the NYISO via ICCP or DNP3 as the data protocol for two-way communication over SD-WAN. Aggregators directly communicating with the NYISO shall also maintain a parallel communication connection with the applicable Member System that meets the Member System’s requirements as described above.

1.3.1. NYISO-Member System-Aggregator Telemetry Testing Procedure

NYISO staff will initiate the telemetry communications test after enrollment data has been (i) submitted by the Aggregator and (ii) approved by the applicable DU. The testing procedure can begin one month prior to the first month of DER participation in the market (e.g., Testing can begin on July 1 for August 1 market participation). The communications connection between the Aggregator and the applicable Member System must be in place before beginning the enrollment process or import of data to the NYISO’s Aggregation System.

The NYISO, Aggregator, and applicable Member System shall adhere to the following procedural steps

to initiate and complete the end-to-end testing of Aggregation telemetry communications:

1. NYISO power system applications engineering group will predefine telemetry Object ID blocks in Power Systems Explorer/Data Engineering (PSE/DE), per Member System – these blocks will include a range of points to be assigned to Aggregations that enroll in the applicable Member System’s territory.
2. When an Aggregator enrolls an Aggregation in the NYISO’s Aggregation System, one or more telemetry Object IDs from one of the applicable Member System’s predefined Object ID blocks will be assigned by NYISO DER enrollment staff. Each Aggregation will be assigned a set of unique telemetry Object IDs in the NYISO’s Aggregation System.
 - a. A complete list of Object IDs that will apply to Aggregations can be found in the NYISO Direct Communications Procedure – this document is CEII and must be requested through the NYISO’s Stakeholder Services department.
3. NYISO Distributed Resources Operations (DRO) will email the Aggregator, NYISO power system applications engineering group (PSAE) and the applicable Member System after approval from the applicable DU for each Aggregation and include the Aggregation’s preset telemetry Object IDs. For each Aggregation, DRO will send NYISO power system applications engineering group, Aggregator, and Member System:
 - a. Organizational contact(s) (Name, email, phone) of the applicable Aggregator responsible for the Aggregation(s)
 - b. Aggregation ID(s)
 - c. Applicable Telemetry Object ID(s) for each Aggregation
 - d. Transmission Node PTID(s)
 - e. Aggregation Type(s)

The Member Systems must configure the Aggregation(s) received in collaboration with the applicable Aggregator, and successfully test communication between the Aggregator control center and Member System control center – it is the responsibility of the Aggregator to reach out to the Member System to schedule this test. Member System contact information is located at the following link <LINK>. It is highly recommended that this test be completed within the first 5 days of the calendar month, leaving ample time for Step 5. Market entry may be delayed if the Aggregator fails to reach out for communications testing in a timely manner.

4. Upon successful completion of the communications test with the Member System, the Aggregator will email the PSAE shared inbox (<EMAIL>), and CC the Member System and DRO shared inbox (<EMAIL>), to schedule the end-to-end communications test.
5. Testing duration depends on the volume of Aggregations and complexity – NYISO power system applications engineering group staff will work collaboratively with Member System and Aggregator personnel to successfully test communications prior to an Aggregation beginning market participation.
6. NYISO power system applications engineering group then emails DRO indicating that the Aggregation has passed communications testing.

1.3.2. Demand Reductions

Actual Demand Reductions for each Aggregation shall be submitted to the NYISO. Actual Demand Reductions for an Aggregation are the aggregate sum of all Demand Reductions provided by DER facilities and/or Demand Side Resources within an Aggregation. This calculation is the greater of: (i) the Distributed Energy Resource’s adjusted Economic Customer Baseline Load or Regulation Baseline if dispatched for Regulation service for each five-minute interval minus the actual metered load for each six-second interval, and (ii) zero. Demand Reduction response for a DER facility is only calculated when the Aggregation is dispatched by the NYISO, and the DER facility is responding to meet the dispatch within the Aggregation. Otherwise, the Demand Reduction response of a DER facility is zero, regardless of baseline or metered Load of the facility. For more information on DER Aggregation and Single Resource Type Aggregation telemetry data please see Appendix Figures 2-5.

An Aggregator must identify to the NYISO the party (*i.e.*, the Aggregator, or the respective MA (whether a Member System, municipal electric utility or MSE)) will calculate ECBLs and calculating Actual Demand Reductions. Such identification must be the result of mutual agreement and provided to the NYISO in writing contemporaneously with the Aggregation’s enrollment materials, and updated as necessary when responsibilities change. The Aggregator is responsible for coordinating such procedure, and ultimately responsible for the accuracy of the data submitted to the NYISO. For more information on metering roles and responsibilities please see **Error! Reference source not found.**

1.3.3. Meter Data Services – Aggregator, DU, and Member System responsibilities

Aggregators must procure, or provide for itself as a qualified MSE, meter data services (as defined in Section [x] of the Meter Services Entity Manual) for each Aggregation it enrolls in the NYISO-administered markets. During the enrollment process, the Aggregator shall notify the NYISO of the entity (*e.g.*, Member System or Meter Services Entity) that will provide meter data services for the Aggregation. If more than

one entity will perform meter data services, the Aggregator shall identify which services will be performed by each entity. The Aggregator is responsible for ensuring NYISO's receipt of all real-time telemetry and Revenue Quality Meter (RQM) data in accordance with Services Tariff Section 13 and the standards established in the Control Center Requirements Manual, Direct Communications Procedure, Revenue Metering Requirements Manual and Accounting and Billing Manual.

An Aggregator may enter into an agreement with an MSE, municipal electric utility, or Member System to provide hourly RQM data to the NYISO for settlement purposes. The Aggregator is responsible for the purchase, installation, and maintenance of infrastructure that supports six-second real-time telemetry, which may be completed by the Aggregator directly or by a third party with whom the Aggregator has contracted to provide such services. Aggregators are responsible for certain meter data services, such as gathering and summation of DER-level hourly RQM data and six-second real-time telemetry to reflect Aggregation-level performance, and the calculation of the ECBL. An Aggregator may contract for the Meter Authority (Member System, municipal electric utility, or MSE) to provide these services. When a Meter Authority has agreed to provide these services for an Aggregator, the Aggregator must submit Meter Authority confirmation identifying the Meter Authority providing meter data services for the applicable Aggregation upon submission of enrollment data for the Aggregation.

Figure 1 in Appendix A of this Aggregation Manual depicts the various metering and meter data service requirements and the responsible entities. Please note that the Aggregator is responsible for all supporting infrastructure and communication of telemetry data with the NYISO, through the applicable TO.

1.3.4. Alternative Telemetry

The Aggregator must ensure that all measurements for metering and telemetry for the individual facilities it represents derive from either directly measured or calculated values, or a combination thereof, in accordance with the requirements set forth in the NYISO's procedures. The real-time six-second status of an individual facility may be calculated through a NYISO-approved methodology for facilities that are smaller than 100 kW. The use of an alternative methodology to measure the 6 second output of facilities smaller than 100 kW is subject to review and approval by the NYISO during enrollment. An Aggregator must submit a description of the proposed alternative telemetry methodology to the NYISO prior to entry of enrollment data for a DER facility in the Aggregation System. The use of an alternative methodology to measure the 6 second output of a facility must include the measured output of the facility from a meter at a periodicity of 5-minutes or less. The Aggregator is required to submit a description of the methodology to be reviewed by NYISO for approval.

1.4. Meter Data Audit

The NYISO may request meter data for each DER facility from the DER's Aggregator, consistent with Services Tariff Section 13.2. The NYISO will use the data to validate the accuracy of the Aggregator-submitted data used for telemetry and settlements, including applicable ECBL calculations. Meter data should be retained consistent with Services Tariff Section 30.6.3.

2. Settlements

Aggregations are subject to the Energy and Ancillary Services market settlement rules described in Services Tariff Sections 4.2.6, 4.5, 4.6, 15.3, 15.3A and 15.4. To facilitate accurate settlements, Aggregators are required to separately provide, for each Aggregation, Energy injections, Energy withdrawals, and Demand Reductions. Aggregation performance and settlement are administered at the Aggregation-level – the NYISO does not settle Energy injections, withdrawals, or Demand Reductions of the individual DER facilities comprising an Aggregation.

The Monthly Net Benefit Threshold is applied to Demand Side Resources participating in Aggregations; for further information, please see Market Services Tariff 4.5.2.

2.1. DAM and RTM Energy Settlement

Aggregations, like Generators (including Energy Storage Resources), are paid, or pay, for Energy injections and withdrawals in the same way that Generators and ESRs are paid, or pay, for Energy injections and withdrawals. Therefore, the NYISO has expanded two existing real-time Settlement formulas for Suppliers in Section 4.5.2 of the Services Tariff (i.e., Section 4.5.2.1.1 for positive LBMPs, and Section 4.5.2.1.2 for negative LBMPs, maximum generation pickup, and reserve pickups) to include all Energy injections and withdrawals by Aggregations. Similar to the rules for Energy Storage Resources, Aggregations that include one or more Withdrawal-Eligible Generators also pay for Actual Energy Withdrawals as negative generation at their Transmission Node in accordance with the Supplier Settlement formulas in Section 4.5.2.1 of the Services Tariff.

For more information on DER Aggregation and Single-Resource Type Aggregation settlement data flows please see Appendix Figures 2-5.

2.2. DAM and RTM Ancillary Services Settlement

An Aggregation that provides Ancillary Services will be settled according to the settlement rules applicable to the particular service.

Settlements for provision of Regulation Service will be calculated in accordance with Section 15.3 of the Services Tariff, as further described in Accounting and Billing Manual Section 5.2.

Settlements for provision of Operating Reserves will be calculated pursuant to Services Tariff Section 15.4. More information can be found in Section 5.3 of the Accounting and Billing Manual.

2.3. Real-Time Performance Charges and Penalties

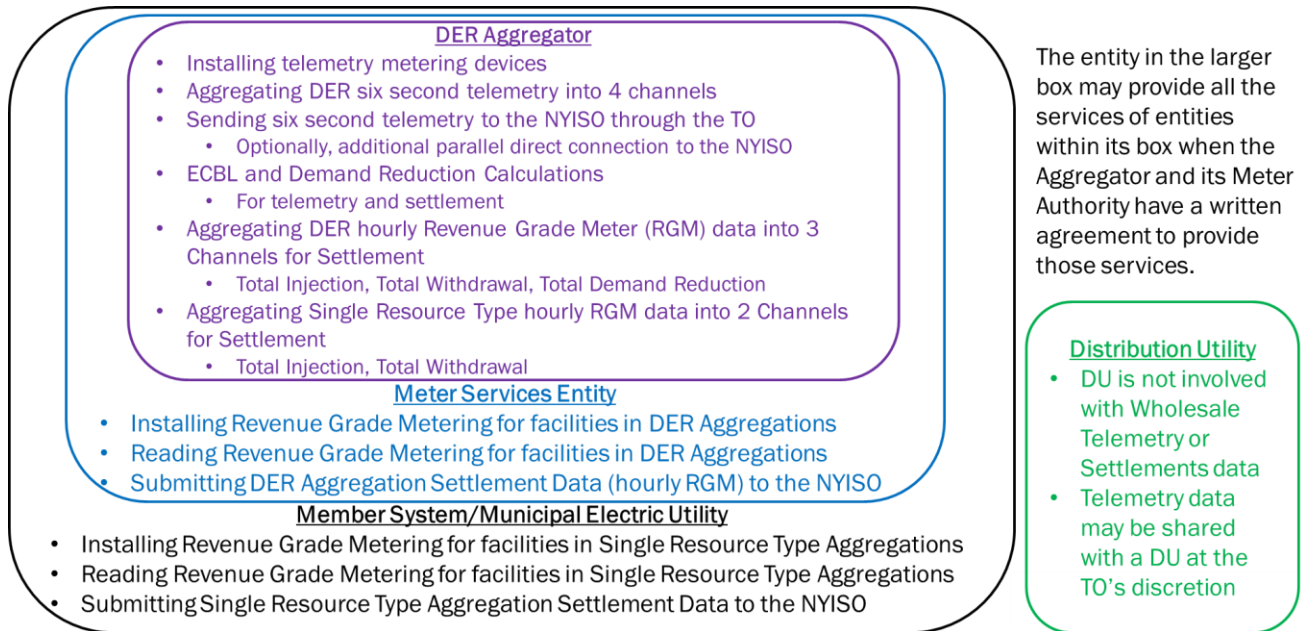
Aggregations shall be subject to all relevant performance penalties in real-time. An Aggregation's failure to meet its NYISO-issued dispatch due to the action of the applicable Distribution Utility shall not exempt said Aggregation from applicable penalties. Please refer to the Accounting and Billing Manual for more information regarding Persistent Undergeneration Charges, Persistent Over-withdrawal Charges, and associated exemptions.

2.4. DAM and RTM Make-Whole Payments

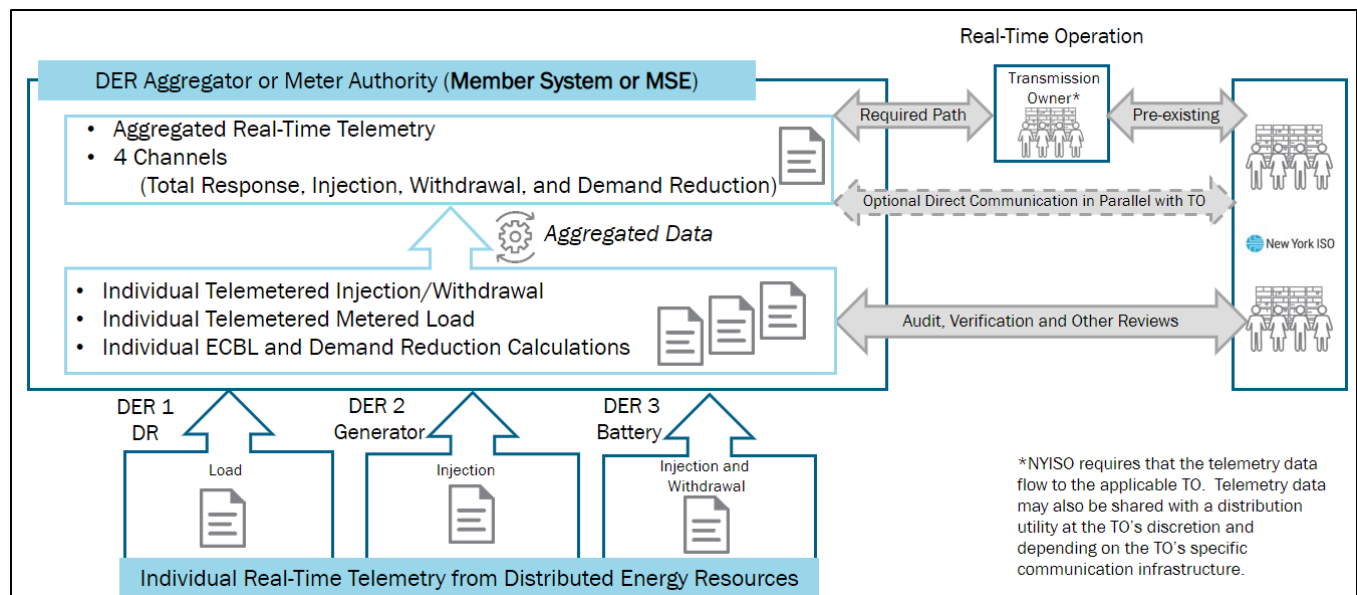
Aggregations may be eligible for Bid Production Cost Guarantee Payments, and Day-Ahead Marginal Assurance Payments (DAMAP). For more information regarding eligibility for Day-Ahead and Real-Time BPCG, see Services Tariff Section 18. For more information regarding eligibility for DAMAP see MST section 25.

Appendix A

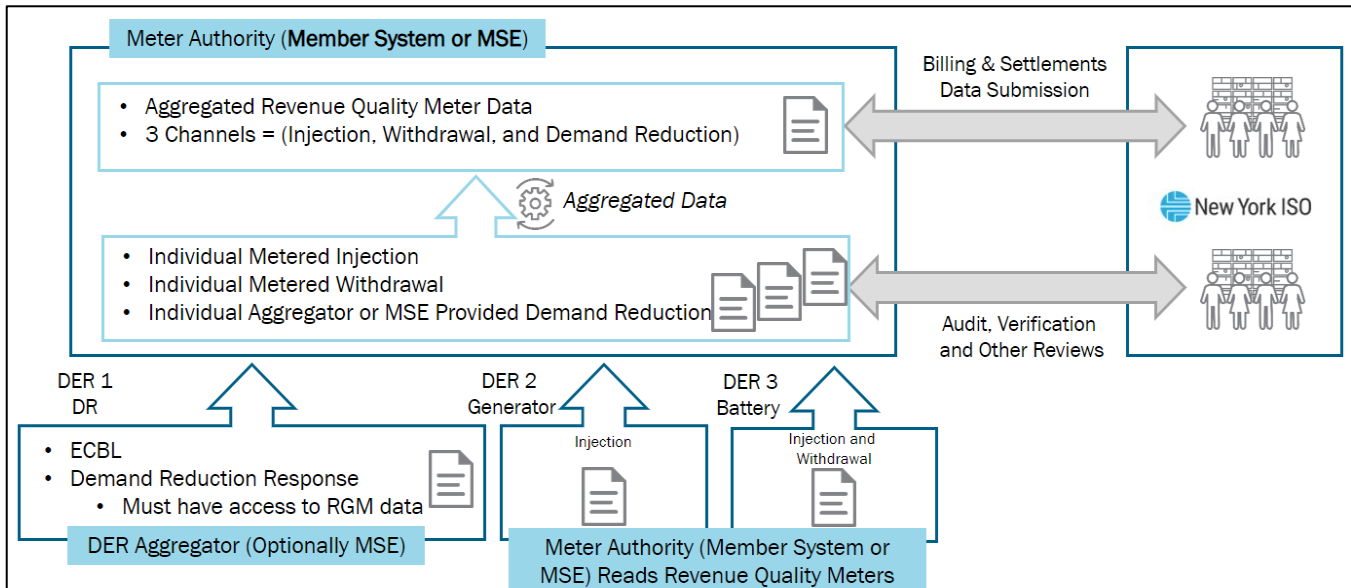
Appendix Figure 1: Metering & Telemetry Data Responsibilities



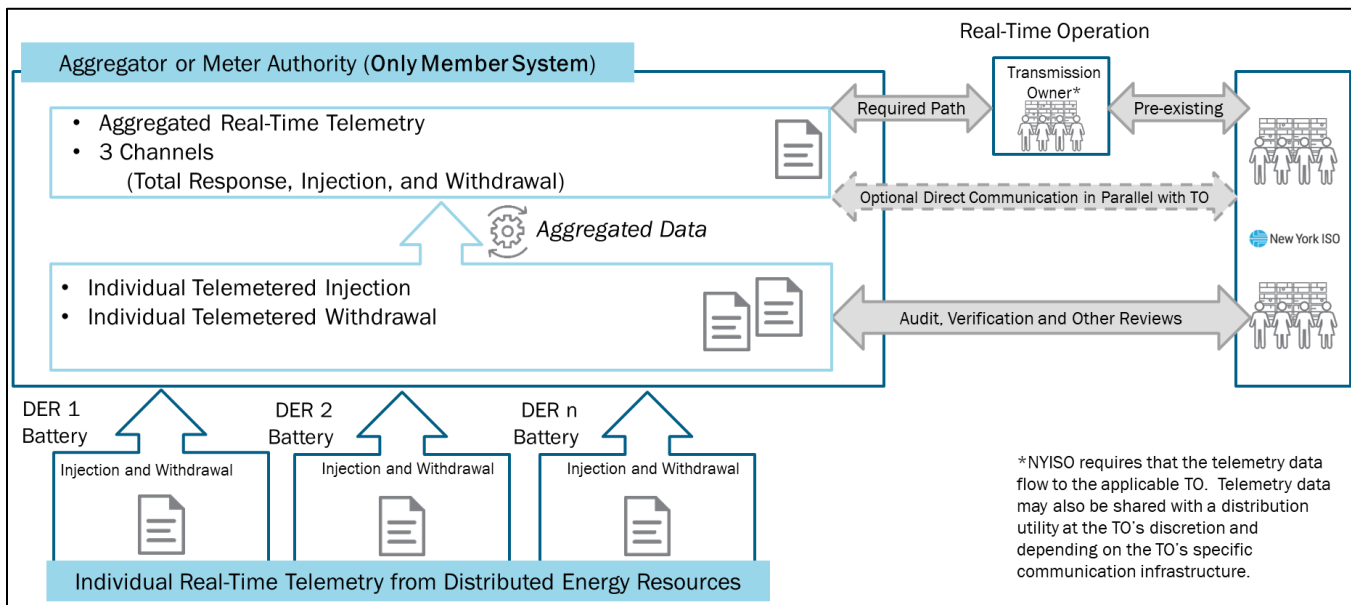
Appendix Figure 2: DER Aggregation Telemetry Data Flow



Appendix Figure 3: DER Aggregation Settlement Data Flow



Appendix Figure 4: Single Resource Aggregation Telemetry Data Flow



Appendix Figure 5: Single Resource Aggregation Settlement Data Flow

