

# DER Real-Time Telemetry and Alternate Telemetry Approach for Small DER

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**MIWG/ICAP/PRLWG**

October 10, 2018

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# Background

Date	Working Group	Discussion points and links to materials
02-02-17	Posted	<a href="#">Distributed Energy Resources Roadmap for New York's Wholesale Electricity Market</a>
05-23-17	Market Issues Working Group (MIWG)	<a href="#">DER Measurement &amp; Verification, Monitoring &amp; Control, and Meter Data Study</a>
11-27-17	Market Issues Working Group (MIWG)	<a href="#">DER Measurement &amp; Verification and Monitoring &amp; Control</a>
12-19-17	Market Issues Working Group (MIWG)	<a href="#">2017 DER Market Design Concept Proposal Summary</a>
12-19-17	Posted	<a href="#">Distributed Energy Resources Market Design Concept Proposal</a>

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# Background

- **As part of the DER Roadmap document, which was published in February 2017, NYISO proposed to apply the existing 6-second scan rate requirement for real-time telemetered operational data applicable to Generators to DCEAs (i.e., DER aggregations)**
  - NYISO provided details for the operational need to apply existing requirement for 6-second scan rate for real-time telemetry to DCEAs at the May 23, November 27, and December 19, 2017 MIWGs
  - NYISO also provided details at these MIWGs of a potential alternate telemetry approach for small DER in a DCEA to help reduce the cost of providing 6-second telemetry
- **Some stakeholders have requested NYISO to provide additional details for the operational need for 6-second scan rate for real-time telemetry and of the alternate telemetry approach for small DER in a DECA**
  - This presentation provides these details

# DCEA Real-Time Telemetry

- **6-second telemetry communicated with NYISO will be at the DCEA level (i.e., DER aggregation)**
  - DCEA basepoint telemetry signal provided by the NYISO is the desired response of the aggregation as a whole
  - DCEA response telemetry signal provided to the NYISO should be the actual response of the aggregation as a whole
- **DCEA telemetry signal provided to the NYISO must reflect the response from all DER that comprise the aggregation within a 6-second time interval**

# Real-Time Telemetry Scan Rate Requirement

Additional details are available in a separate document posted along with this presentation

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

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

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

# Real-Time Telemetry Requirements for Power System Operations: 6-Second Scan Rate (Cont'd)

- NYISO currently requires 6-second scan rate for real-time telemetry for all market resources participating in NYISO's Energy and Ancillary Services Market<sup>†</sup> for the following reasons:
  - **Situational Awareness**
    - 6-second telemetry is needed for NYISO to maintain situational awareness of the NYCA power system, especially during times of significant or unexpected grid events or changes
    - System operators must have an accurate understanding of the power system conditions at all times in order to make quick decisions and direct resources as needed to maintain reliability
  - **Automatic Generation Control**
    - 6-second telemetry is necessary for NYISO's Automatic Generation Control process to control market resources in order to maintain NYCA generation and load balance
    - NYISO's Automatic Generation Control process operates every 6 seconds and provides all market resources basepoints of their required operating level

(Continued on next slide)

<sup>†</sup>DADRP Resources are not required to have telemetry

# Real-Time Telemetry Requirements for Power System Operations: 6-Second Scan Rate (Cont'd)

- NYISO currently requires 6-second scan rate for real-time telemetry for all market resources participating in NYISO's Energy and Ancillary Services Market † for the following reasons (Continued from previous slide):
  - **Reliability Compliance**
    - 6-second telemetry is needed to meet mandatory bulk power system transmission operating reliability criteria, including criteria unique to New York State
    - New York State Reliability Council's D.1 reliability requirement ‡ requires bulk transmission facility overloads above Short Term Emergency (STE) rating be relieved within 5 minutes
    - To meet the New York State Reliability Council's requirement, NYISO requires 6-second telemetry of market resources to develop and quickly communicate the required schedules to the market resources
  - **Emergency Response**
    - Even though NYISO's Security Constrained Economic Dispatch (SCED) nominally operates on a five-minute period, NYISO will use SCED at any time to immediately respond to unexpected system events
    - NYISO requires 6-second telemetry from market resources to develop and quickly communicate the required schedules to the market resources and confirm that they are responding as required
    - NYISO will dispatch any available market resources, including energy-only resources, to respond to reliability events and resolve them timely

†DADRP Resources are not required to have telemetry

‡NYSRC Reliability Rules & Compliance Manual: <http://www.nysrc.org/pdf/Reliability%20Rules%20Manuals/RRC%20Manual%20V41.pdf>

# Real-Time Telemetry Requirements for Power System Operations: Scan Rate (Cont'd)

- **NYISO will require 6-second scan rate for real-time telemetry for DCEAs**
  - DCEAs (*i.e.*, DER aggregations) will have similar impacts on real-time grid operations as that of other market resources
    - Demand Side Resources participating as dispatchable DER will be seen as supply that is equivalent to traditional generation in the real-time grid operations and therefore requires the same treatment and visibility as generation resources
  - A critical aspect of DER integration is the ability to instruct all market resources, including DCEAs, to address reliability events such as providing relief on a overloaded transmission facility
  - NYISO will rely on DCEAs, like all dispatchable market resources, to satisfy the reliability requirements of the New York State Reliability Council
  - DCEAs will provide services comparable to generation resources for the purposes of real-time grid operations

# 6-Second Scan Rate Real-Time Telemetry Costs

- **NYISO's evaluation has indicated that multiple cost effective technologies exist for providing 6-second scan rate for real-time telemetry and is not a barrier to entry**
  - NYISO's 6-second telemetry accuracy requirement of  $\pm 5\%$  range is less stringent than the  $\pm 0.2\%$  range for the settlement data → cost effective approaches could be used for telemetry
  - NYISO gives the flexibility to the DCE (i.e., DER aggregator) to use cost effective technologies to acquire and transmit telemetry data between DER and DCE
  - There is no significant cost difference between 6-second scan rate versus 1-minute scan rate for telemetry
  - NYISO's evaluation indicates that the 6-second telemetry between DER and DCE for a 0.250 MW DER could be met with a cost \$1 per MWh/month
    - Based on one time metering device and installation cost of \$600 + optional secure gateway device and installation cost of \$1000; existing broadband internet connection and router; one time costs levelized over 5 years = \$26.70/month; monthly maintenance cost for the metering device and secure gateway of \$20.00/month → Total monthly costs = \$46.70/month; Based on 6 hour/day energy output → \$1.00 per MWh/month cost
- **NYISO is proposing that small DER in a DCEA can utilize alternate telemetry approach to minimize the cost of providing 6-second scan rate for the real-time telemetry**

# Alternate Telemetry Approach

This alternate telemetry methodology could be utilized by small DER participating in a DCEA

# Alternative Telemetry Approach

- NYISO proposes to allow small DER participating in a DCEA to provide real-time operational data for telemetry at a 6-second scan rate through an alternative method to directly metered methods *i.e.*, Traditional
- Alternative telemetry is the manner of deriving the status and output of a resource without a traditional meter on a six second basis.
- **Alternative telemetry concepts the NYISO is aware of:**
  - Representative devices of the responding resources i.e. thermostat
  - Use of status changes, communicated by exception, that indicate when the resource is output limited, de-rated to a specific range, or operating under a specific operating parameter
- **DER employing an alternative methodology for telemetry will be required to meet the same operational requirements as directly metered telemetry methods**
  - NYISO's existing telemetry requirements for all Generators (including Intermittent Power Resources, Energy Limited Resources, DSASP Resources) participating in NYISO's Energy Markets include:
    - 6-second (or faster) scan rate
    - Not to exceed 10-sec one-way latency (from the resource to NYISO or from NYISO to the resource)
    - Not to exceed 20-sec round-trip latency (from NYISO to resource and back to NYISO)
    - Not to exceed  $\pm 5\%$  full-scale error

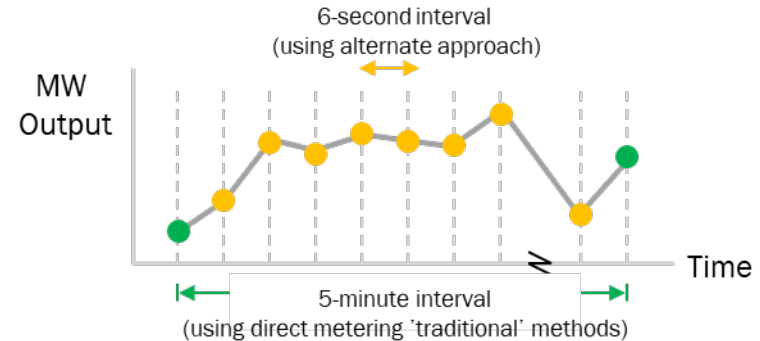
# Alternative Telemetry Eligibility

- **This option for alternative telemetry will be limited to DER with a peak demand/max injection below 100 kW**
  - DER below 100 kW cannot individually participate in NYISO wholesale markets and, because of their capability, their operating information must be aggregated by a DCEA
  - The NYISO is attempting to lower barriers to market entry for resources small enough where traditional telemetry solutions may not be cost-effective
- **Alternative telemetry methodologies must employ the status or measurement of a physical device**
  - ex. Thermostat
- **Alternative telemetry solutions must incorporate traditionally metered telemetry with a periodicity of 5 minutes or faster**
- **The use of alternative telemetry methodologies must be communicated to and approved by the NYISO before use by a DER**
- **DCEA's electing to use alternative telemetry would be ineligible to offer Regulation Service**

# Alternative Telemetry Requirements Recap

## ■ Operational Requirements:

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



## ■ Reporting Requirements:

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

# Next Steps

- In 2018, the NYISO will develop rules for energy and capacity market offer requirements, mitigation, forecasting and interconnection
- The NYISO will also more fully develop the market rules and tariff language to implement the 2017 MDCP
- The NYISO will evaluate the implementation of rules through the pilot program
- NYISO plans to conclude development of rules in 2018 for the eventual implementation of DER in 2021

# Feedback?

- To ensure all feedback is captured please email additional feedback to: [DER\\_Feedback@nyiso.com](mailto:DER_Feedback@nyiso.com)
- Reminder – All comments received will be posted on the NYISO Distributed Energy Resources [webpage](#)

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

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



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# Appendix A - Acronyms

- DER – Distributed Energy Resource
- DCE – DER Coordinator Entity
- DCEA – DCE Aggregation
- DSP – Distributed System Platform
- DR – Demand Response
- RT - Real-Time
- DA – Day-Ahead
- RTC – RT Commitment
- RTD – RT Dispatch
- DAM – DA Market
- RTM – RT Market

# Appendix B

## Telemetry Related Terms

# Terms and Existing Requirements (Previously presented at November 27, 2017 MIWG)

- **Metering system** – includes all components, such as revenue meters, current transformers, voltage transformers, transducers, remote terminal units (RTU), wiring, connecting blocks, and the cabinet/panels that house the above, to provide data to the NYISO for energy billing and real-time operation
- **Two types of data often derived from a metering system**
  - Revenue quality meter data – metered data for after-the-fact settlement of energy transactions
  - Real-time operational data – instantaneous data for power system operational visibility and dispatch instructions
- **Telemetry** – two-way communication of real-time operational data between the resource and NYISO
- **The metering system for the provision of real-time operational data to the NYISO can, but does not need to be, derived from the same infrastructure used for the provision of revenue quality meter data**

# Terms and Existing Requirements (cont'd)

(Previously presented at November 27, 2017 MIWG)

- **Specifications for Telemetry Data with NYISO**
  - Scan rate - the periodicity that an entity (e.g., NYISO, TO) queries data from a source over telemetry
  - One-way latency – the time delay as measured when telemetered data is transmitted from the source to when it is received by the destination
  - Round-trip latency – the time delay as measured when telemetered data is transmitted from the source to when it has received a response by the destination
  - Full-scale error – maximum combined error of full scale reading (e.g., MW) as measured at the NYISO or TO control room
  
- **NYISO's existing telemetry requirements for all Generators (including Intermittent Power Resources, Energy Limited Resources, DSASP Resources) participating in NYISO's Energy and Ancillary Services Markets include:**
  - 6-second (or faster) scan rate
  - Not to exceed 10-sec one-way latency (from the resource to NYISO or from NYISO to the resource)
  - Not to exceed 20-sec round-trip latency (from NYISO to resource and back to NYISO)
  - Not to exceed  $\pm 5\%$  full-scale error