

Pilot Program Framework Proposal

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June 21, 2017, 10 Krey Blvd, Rensselaer, NY 12144



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Background

Date	Working Group	Discussion points and links to materials
02-02-17	Posted	Distributed Energy Resources Roadmap for New York's Wholesale Electricity Market
02-28-17	Market Issues Working Group (MIWG)	Comparison of pilot projects and programs in organized wholesale electric markets
05-05-17	Market Issues Working Group (MIWG)	Pilot program framework proposal

Today's Agenda

- Review of proposed Pilot Program framework
- DER Pilot Program objectives
- Pilot Project selection criteria
- Pilot Program implementation example
- Pilot Program reporting obligations

Review of Proposed Framework

- Purpose of the DER Pilot Projects is to demonstrate DCEA/DER capabilities, integration, coordination and dual participation
- The Pilot Program will be administered through a test environment, not in the NYISO's production (i.e. "live") market and operations system
- Program limits
 - Maximum of 50 MW state-wide enrollment at any one time
 - Maximum of 10 MW enrolled capability serving a single transmission node
 - Limitation will minimize market and operational impacts at the node
 - Maximum of 5 individual Pilot Projects at any one time
 - Will consider adjusting this limit as appropriate based on staffing requirements and other factors
- Individual pilot project limits
 - Minimum of 100 kW of aggregated capability for energy and reserves, 200 kW for regulation service
 - Maximum of 10 MW of aggregated capability
 - Maximum pilot duration of 12 months
 - NYISO will have discretion to extend an individual project to meet program objectives
 - NYISO will also have discretion to terminate a project before anticipated end date

Follow Up to Stakeholder Feedback from 5/5 MIWG

- **Can Generators participating in the wholesale market also participate in the Pilot Program?**
 - Resources participating in the wholesale markets, except for Demand Side Resources, will not be eligible to participate in the Pilot Program
 - NYISO will review wholesale market Demand Side Resource participation in the Pilot Program on a case-by-case basis to ensure the resource can meet its existing wholesale market obligations
- **What type of interval metering will be required of individual DER in the Pilot Program?**
 - All DER must have at least hourly interval meters installed to be eligible (revenue grade is optional)
- **Can a Pilot Project with a DER aggregation size smaller than 1 MW be eligible to demonstrate reserves and regulation in the Pilot Program?**
 - NYISO will consider a Pilot Project with an aggregation size of at minimum 100 kW if demonstrating energy or reserve services, and 200 kW if demonstrating regulation service

Pilot Program – DER Pilot Objectives

- Pilot projects will focus on the following pilot objectives that will help evaluate its Market Design Concept Proposed targeted for Q4 2017 and inform efforts for Market Design Complete in 2018.
- Additional pilot objectives may be considered later.

NYISO DER Pilot Objectives

1. **Assess the capability of homogeneous and heterogeneous DER aggregations to provide energy and ancillary services and the associated benefits to the wholesale markets**

- Can a DER aggregation meet its instructed base point?
- Can the DER aggregation remain within an acceptable output tolerance even when ramping within its full operating range?
- Does performance depend on whether it is a homogeneous or heterogeneous DER aggregation?
- Which existing market products (i.e. energy, regulation, spinning and non-synchronous reserves, etc.) can DER aggregation effectively provide?
- Can a Pilot Participant provide a set of aggregated operating parameters (e.g. ramp rate, upper operating limit, etc.) that accurately characterize the capability of its DER aggregation?

NYISO DER Pilot Objectives (cont'd)

2. Develop and evaluate DER and DCEA measurement and verification (M&V) and monitoring and control (M&C) requirements

- Can Pilot Projects achieve the proposed one-way and round trip latency requirements for telemetry?
- Does a Pilot Project's aggregated telemetry and metering data deviate from the individual DER metering data (after-the-fact review)? If there is significant deviation, what were the causes?
- Are there alternative technologies or solutions other than what is widely available today that DERs can utilize to meet NYISO's proposed metering and telemetry requirements for DERs/DCEAs?
- Are specific baseline methodologies more effective for performance evaluation of demand side resources within a DER aggregation than others?
- Are specific DER metering configurations more effective for performance evaluation of DERs than others?
- Does the performance of a statistically sampled population reflect the actual performance of an entire aggregation?

NYISO DER Pilot Objectives (cont'd)

3. Establish and evaluate an operational coordination framework between NYISO, utilities, DCE, and DER.

- Does the coordination framework proposed by the NYISO provide effective and timely communication to all involved parties?
- Is the proposed NYISO market process feasible for DCEAs? If not, why and what changes may be necessary?
- What concepts are there that can address potential challenges for DERs to simultaneously provide wholesale and non-wholesale (e.g. retail, end-use) market services? If so, how do they seek to resolve the challenges?

NYISO DER Pilot Objectives (cont'd)

4. Establish and evaluate DER and DCEA registration processes

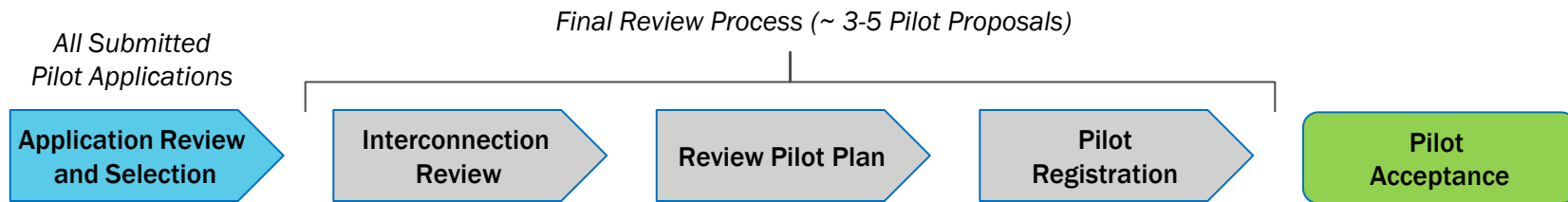
- What registration information is required for each DER aggregation?
- What registration information is required for an individual DER within a DER aggregation?
- What is an effective process for reviewing distribution mapping, interconnection, and utility account information of DERs within a DER aggregation registering with the NYISO?

5. Note: Stakeholders are encouraged to suggest other pilot objectives for NYISO to consider in the Pilot Program.

Pilot Program – Selection Criteria

Multi-step process for selecting pilot projects

Pilot Program Application Process Flow



Selection Criteria – Step 1: Screens

The first step of NYISO's Pilot Program selection process is to screen pilot proposals based on the following:

- **Eligibility**
 - Does the Pilot Project consist of at least 2 individual DER and is it at least 100 kW?
 - Are there other Pilot Projects participating at the Transmission Node where the Pilot Project is proposing to interconnect, and if so, will the total capability of all Pilot Projects at the Transmission Node 10 MWs or less?
 - Does the Pilot Participant intend to share information about its Pilot Project to achieve the Pilot Program reporting needs?
- **Alignment with NYISO DER Roadmap**
 - Does the Pilot Project address the stated Pilot Program objectives and align to the goals of the NYISO DER Roadmap?
- **Alignment with REV Goals**
 - Does the Pilot Project align with the goals of NYPSC's REV?
- **Pilot Funding**
 - Has the proposal provided how the Pilot Participant plans to fund the total cost of the Pilot Project?
 - For any external funding sources supporting the proposed Pilot Project, are there letters of support or commitment?
- **Ease of Implementation**
 - Will setting up the Pilot Project in the NYISO's test software require significant amounts of preparation by NYISO staff?
- **Readiness**
 - If the individual DERs within the Pilot Project are not already in-service, will the DERs be in-service within a reasonable timeline?
 - Will the individual DERs within the Pilot Project complete the relevant and required interconnection processes within a reasonable timeline?

Selection Criteria – Step 2: Value Assessment

The second step of NYISO's Pilot Program selection process is to assess pilot proposals based on the following (in order of importance, with the criteria of highest importance listed first):

- **Ability to Meet NYISO Pilot Objectives with Clear and Feasible Pilot Plan**
 - Does the Pilot Project proposal provide a clear and comprehensive pilot plan of how it aligns and can demonstrate specific Pilot Program objectives and is the plan likely to achieve those objectives?
 - Will the proposed Pilot Project demonstrate an innovative and alternative concept that is replicable and can reduce barriers to entry for DERs into the wholesale market and/or address DER integration issues?
 - Does the test plan detail the time, effort and resources that may be required by the Pilot Participant to successfully execute its pilot plan?
 - Does the Pilot Project proposal clearly and sufficiently describe the communication infrastructure between the NYISO and DCE, and additionally the DCE to each DER?
 - Does the Pilot Project proposal include a clear process and methodology to aggregate individual DER meter and telemetry data, and to provide individual DER meter data to the NYISO for performance verification?

Selection Criteria – Step 2: Value Assessment

■ Capability to Demonstrate Energy and/or Ancillary Services

- Does the Pilot Project proposal clearly identify the market services it intends to demonstrate (energy, regulation service, reserves)
- Is the Pilot Project capable of demonstrating multiple market services?
- Does the information provided about the Pilot Project reflect its capability to demonstrate the market services identified in its proposal?
- Are the metering and telemetry capabilities of the proposed pilot sufficiently described in the proposal and can it meet existing NYISO metering and telemetry standards for dispatchable resources?
- Does the proposed Pilot Project allow the NYISO to test alternative metering and telemetry standards?

■ Blend of Resource Types

- Does the proposed Pilot Project have a diverse set of resources (e.g. storage, demand response, firm generation, intermittent generation)?

Selection Criteria – Step 2: Value Assessment

■ Technology Maturity

- Are the individual DERs comprised in proposed Pilot Project representative of the technologies that are anticipated to participate in the wholesale markets in the near-term?
- Do the individual DERs use technologies commonly available to other entities?
- Have the DER technologies that will be used in the proposed Pilot Project demonstrated reasonable reliability for the purpose of the Pilot Program?

■ DER and Aggregation Deployment Experience

- Does the proponent of the Pilot Project have the necessary expertise and experience to implement and operate the Pilot Project?
- Has the proponent demonstrated experience in deploying DER (wholesale or non-wholesale) similar to what it is proposing for the Pilot Project?

■ Testing Availability

- Do the individual DER in the proposed Pilot Project have other wholesale, retail or end-use customer obligations, and if so, how does the Pilot Project intend to avoid conflict between those obligations and Pilot Program obligations?
- Does the proposal clearly identify the conditions (e.g. number of hours per day, time of day, etc.) it will be available for testing?

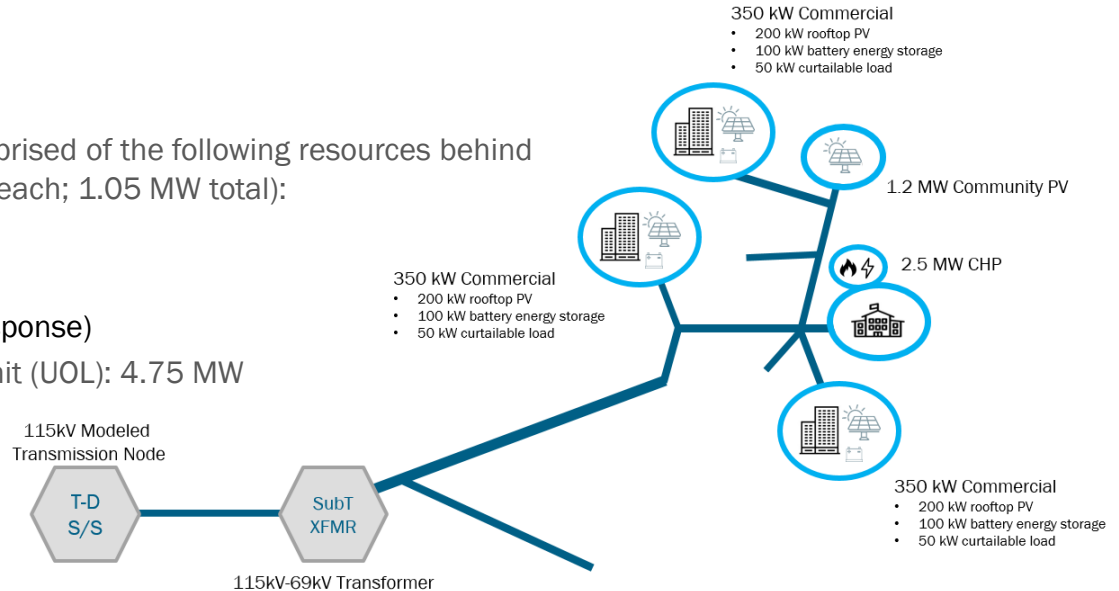
Pilot Program – Implementation Example

An illustrative example how a pilot project may be scheduled for testing

Example

- The following is a hypothetical and illustrative example of how a Pilot Project may participate in the NYISO Pilot Program:

- 2.5 MW combined heat and power unit
- 1.2 MW standalone community PV
- Three commercial installations, each comprised of the following resources behind its facility interconnection meter (350 kW each; 1.05 MW total):
 - 200 kW commercial PV
 - 100 kW battery energy storage
 - 50 kW curtailable load (demand response)
- Maximum aggregation upper operating limit (UOL): 4.75 MW



Scheduling Process

- Pilot Participants will coordinate with NYISO on the first business day of each week to communicate the Project's availability in a given week**
 - If a Pilot Project intends to participate, the Pilot Participant is required to submit its Hourly Capability each business day for the remainder of the week
 - If a Pilot Project declines to participate for a week, the Pilot Participant will not be required to submit its Hourly Capability during that week

First Business Day of Week	Remaining Business Days of Week		
	2 Days Prior to Operating Day	1 Day Prior to Operating Day	Operating Day (Real-Time)

**T = time of dispatch start*

		Market Process Timeline						
Time		1500	0900	1100	1300	1500	T-5 mins and T-6 secs	
From	Pilot Participant	DSP	Pilot Participant	ISO	Pilot Participant	DSP	ISO	
To	ISO	Pilot Participant, ISO	ISO	Pilot Participant, DSP	DSP	Pilot Participant, ISO	Pilot Participant	
Information	Status Update and Weekly Commitment	Network Conditions Impacting Pilots	DA "Hourly Capability" Deadline	DCEA DA Schedule	Individual DER DA Schedule	Network Conditions Impacting Pilots	DCEA RT Dispatch	
Communication Method	Teleconference	Report - Email	Spreadsheet - Email	Spreadsheet - Email	Spreadsheet - Email	Report - Email	Telemetry	



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Hourly Capability

- Each Pilot Project will submit its capability for each hour (“Hourly Capability”) as part of the Pilot Program scheduling process
- Hourly Capability template forms will be available for Pilot Participants to use and submit to the NYISO
- NYISO will use a Pilot Project’s Hourly Capability to schedule it for testing and will respect operating parameters provided by participants at registration

Example - Hourly Capability

- The Pilot Program will operate from HB8 to HB16 only, unless agreed upon between Utility, NYISO and Pilot Participant to allow otherwise
 - Pilot Participants are only required to submit capability for those hours
- For Unit Operations, if “Flexible” is selected, pilot may be dispatched up to UOL in Real-Time schedule regardless of Day-Ahead schedule

PILOT PTID	10004	UNIT OPERATIONS	SELF SCHEDULE MW	PILOT OPERATOR CONTACT
PILOT NAME	PILOT 1	X	00 15 30 45	NAME LARRY
MARKET	DAM	SELF COMMITTED FLEX		CONTACT NUMBER 888-888-8888
BID DATE	24-May-17	SELF COMMITTED FIXED		

HOUR	ATTRIBUTES							AVAILABLE SERVICES			MESSAGE	
	INTERMIT GEN (MW)	FIRM GEN (MW)	STORAGE (MW)	DR (MW)	UOL (MW)	MIN GEN (MW)	REG CAP (MW)	ENERGY	10M SPIN	30M SPIN		REG
HB8	0.00	0.60	0.00	0.15	0.75	0	0.5	X			X	
HB9	0.80	0.60	0.00	0.15	1.55	0	0.5	X			X	
HB10	1.20	0.60	0.00	0.00	1.8	0	0.5	X			X	
HB11	1.60	0.60	0.30	0.00	2.50	0	0.5	X			X	
HB12	1.80	2.50	0.30	0.15	4.75	0	0.5	X			X	
HB13	1.80	2.50	0.30	0.15	4.75	0	0.5	X			X	
HB14	1.80	2.50	0.30	0.15	4.75	0	0.5	X			X	
HB15	1.60	2.50	0.30	0.15	4.55	0	0.5	X			X	
HB16	1.20	2.50	0.00	0.00	3.7	0	0.5	X			X	

* TABLE IS FOR ILLUSTRATIVE PURPOSES ONLY

** INTERMIT GEN, FIRM GEN, STORAGE AND DR MW ATTRIBUTES CURRENTLY ARE BEING CONSIDERED FOR PILOT PROGRAM USE ONLY



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Test Profiles and Scenarios

- **NYISO will develop operating profiles to test through the Pilot Program. Examples of test profiles may include:**
 - Regulation service with various regulation movement profiles
 - Energy-only dispatch with various patterns
 - Profile shape (e.g. fixed level, variable, step changes, ramping)
 - Profile duration (e.g. 1 hour continuous, 6 hours continuous)
 - Conversion from reserves to energy in real-time
 - Combination of energy, regulation and reserves (if capable of providing all three services)
- **NYISO may coordinate with the Utility to simulate scenarios for testing coordination. Examples of situations to test coordination may include:**
 - Feeder outages
 - De-rate (e.g. initiated by Pilot Participant, ISO or Utility)
 - Real-Time dispatch deviating from Day-Ahead schedule

Example – Schedule

- NYISO will provide Day-Ahead advisory schedules to each Pilot Project, provided that the Pilot Project is available for test in a given week
 - Day-ahead advisory schedules for Pilot Projects will not be generated through SCUC
- Depending on whether the unit is “Flexible” or “Fixed”, basepoints may be adjusted in real-time

RESOURCE NAME	RESOURCE PTID	DATE & TIME	MARKET	SCHED ENERGY	SCHED 10 MIN SPIN	SCHED 30 MIN SPIN	SCHED REG CAPACITY	MESSAGE
PILOT1	10004	05/22/2017 08:00:00 EDT	DAM	0.65	0.1	0	0.25	

* TABLE IS FOR ILLUSTRATIVE PURPOSES ONLY

Pilot Program – Reporting Obligations

A key part of the Pilot Program is learning through information sharing

Reporting to NYISO Stakeholders

- **Once a Pilot Project is a registered, NYISO will present stakeholders with the following information:**
 - Zone and transmission node
 - In-service date and anticipated completion date
 - Pilot Project Capability (MW)
 - High level description of the particular Pilot Project objective and DER technologies
- **When a Pilot Project is complete, NYISO will present stakeholders with the following information:**
 - Actual completion date
 - Actual MWh test energy
- **NYISO will provide periodic updates to Stakeholders with aggregated and masked information on Pilot Program results and lessons learned**

Reporting of Findings

- **General Public Reporting Guidelines**

- Periodic updates will focus on information relevant to NYISO Pilot Program objectives
- Presentation of the Pilot Program data will be masked and aggregated to disguise identity of Pilot Participants

- **Updates of the Pilot Program may consist of:**

- Information on demonstrated capabilities of aggregations ("Can they...")
- Information on dispatch performance of general pilot population ("How well...")
- Information on effectiveness of proposed DER integration processes and methodologies
- General verbal feedback of pilot experience from Pilot Participants
- Suggested changes to Pilot Program or DER market design and rules

NYISO – Pilot Participant Reporting

- **Information that Pilot Participants can expect to receive from NYISO:**
 - Operational instructions (e.g. basepoints)
 - NYISO system data via public website and other established methods
 - The test profiles used by the NYISO (after-the-fact)
 - Performance metrics for the Pilot Project (based on aggregated meter data and telemetry)
 - Individual DER meter data must be submitted no later than 5 business days after actual dispatch
 - Detailed verbal feedback on its pilot performance and lessons learned
 - Weekly status and coordination meeting between each Pilot Participant and NYISO staff, as needed
- **Information that the NYISO expects to receive from Pilot Participants:**
 - Information required for registration and modeling
 - Factors impacting performance during Pilot Project
 - Appropriate metering and telemetry data
 - Cause and explanation of any de-rates or unavailability of the pilot resource
 - After-the-fact MW dispatch activity of individual DER to meet aggregation basepoint instruction (submitted no later than 5 business days after actual dispatch)

Next Steps

- NYISO is still considering whether tariff revisions are necessary to implement the Pilot Program
- NYISO will publish a Pilot Program guide which will include the framework rules and additional program details
- NYISO anticipates formal announcement of the Pilot Program in Q3 2017

Feedback?

- Email additional feedback to: pilots@nyiso.com

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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