

# **Energy Storage**

## ***Market Integration and Optimization***

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# Topics

- ◆ **Background**
- ◆ **Scope**
- ◆ **Review current NYISO market products available for storage providers**
- ◆ **Review questions/feedback received from storage developers to date**
- ◆ **Longer-Term Market Design Considerations**
- ◆ **Next Steps**

# Background

- ◆ **Since the announcement of the NYS PSC REV initiative, there has been a growing interest in wholesale market participation of storage resources**
- ◆ **Currently the NYISO has several resource classifications that can accommodate participation of storage in the wholesale markets**
  - *Energy Limited Resource (ELR)*
  - *Limited Energy Storage Resource (LESR)*
  - *Demand Side Ancillary Services Program (DSASP)*

# Initiative Scope

- ◆ **In the short term, the NYISO is evaluating its current programs in which energy storage resources can participate and assessing potential needs for expanding and/or enhancing such existing programs**
- ◆ **In the longer term, the NYISO will evaluate storage optimization techniques that will provide additional tools to aid the scheduling of storage resources**

# **Energy Limited Resources (ELRs)**

# ELR Program Highlights

- ◆ **May provide Regulation Service, Operating Reserves, Energy and capacity**
  - *ELRs will need to qualify to provide each of the services*
- ◆ **To be eligible to sell capacity, the resource must be able to provide at least 1MW of grid injection for at least 4 consecutive hours**
- ◆ **Aggregation is not supported**
  - *Must have at least 1MW of dispatch capability*

# **ELR Program Highlights**

- ◆ **If a capacity supplier, ELRs must offer their capacity obligation into the DAM**
- ◆ **ELRs without a capacity sales obligation, may participate in the DAM, RTM or both**
- ◆ **ELRs are modeled as an in front of the meter generator with the capability to withdraw at that location**

# **Limited Energy Storage Resources (LESRs)**



# LESR Program Highlights

- ◆ **May only provide Regulation Service**
- ◆ **Eligibility limited to storage resources that can sustain maximum injection or withdrawal rate for less than one hour**
  - *Due to storage capability limitation, ineligible to provide Operating Reserves, Energy or capacity*
- ◆ **Must be able to respond to NYISO dispatch instructions**
  - *Six second instructions for Regulation Service*
- ◆ **Aggregation is not supported**
  - *Must have at least 1MW of dispatch capability*

# LESR Program Highlights

- ◆ *LESR's energy level will be managed by RTD to maintain regulation capability to the extent possible when there are no shortage conditions*
  - ◆ Receive hourly settlements for net injections and withdrawals related to the NYISO's management of charging capability
- ◆ LESRs may participate in the DAM, RTM or both for Regulation Service
- ◆ Regulation Capacity is settled in both the DAM and RTM
- ◆ Regulation Movement (pay for performance) is settled in the RTM only

# **Demand Side Ancillary Service Program (DSASP) Resources**

# DSASP Highlights

## ◆ May provide Regulation Service and Operating Reserves

- *Load that can be curtailed without the use of local generation may provide 10 minute and/or 30 minute synchronous reserves as well as Regulation Service*
- *Load that is curtailed with the use of local generation may only provide 10 minute and/or 30 minute non-synchronous reserves*
  - **Note: Load with storage is currently considered as a resource using local generation that is only eligible for non-sync reserves. A clarification from NPCC is needed to treat storage otherwise and to allow it provide sync reserves.**

# DSASP Highlights

- ◆ **Must be able to respond to NYISO dispatch instructions**
  - *Six second instructions*
    - DSASP performance evaluation is against the six second basepoint
- ◆ **May be aggregated**
  - *Must have at least 1MW of dispatch capability*
- ◆ **May participate in both RTM & DAM**
  - *There are no energy payments, only ancillary services payments. Resources cannot simultaneously participate in both DSASP and Day-Ahead Demand Response Program (DADRP). DADRP allows demand response to participate in the DAM for Energy; however, because load with storage is considered a resource using local generation it is not eligible to participate in the DADRP.*

# **Special Case Resources (SCRs)**

# SCR Program Highlights

- ◆ **Allows demand response to sell capacity**
- ◆ **To be eligible to sell capacity, the resource must be able to provide at least 100kW of load curtailment for at least 4 consecutive hours**
- ◆ **Aggregation is supported**
  - *100kW of minimum curtailment capability requirement can be met through aggregation of resources*
- ◆ **Load with storage can be in the SCR program as long as it can meet all the program requirements**

# **Energy Storage Feedback to Date**



# Energy Storage Feedback

- ◆ **NYISO is looking for feedback to help it develop a long term plan for the integration of storage resources into the market place, below are some questions being asked**
- ◆ **ELRs**
  - *Can the minimum operating time be reduced to less than 4 hours?*
  - *Could a state of charge management signal be provided?*
- ◆ **LESRs**
  - *Can the maximum operating time for LESRs be increased to more than one hour?*
  - *Can the LESR program be expanded to allow for provision of Operating Reserves and, if so, would the resource still receive a state of charge management signal?*

# Energy Storage Feedback

## ◆ DSASP

- *Could a state of charge management signal be provided?*
- *Can NPCC criteria for synchronous reserve providers be extended to include load curtailment using grid connected storage?*
- *If a behind-the-meter storage resource has a separate meter, could the resource qualify under DSASP to provide Regulation Service or spinning/synchronous reserves?*

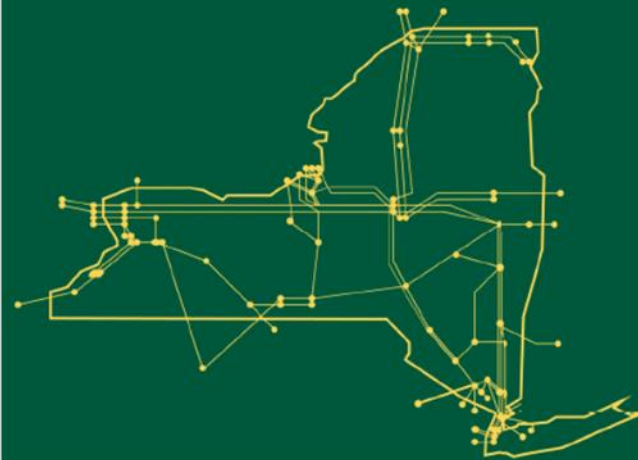
# Longer-Term Market Design Considerations

- ◆ **Increase bidding and optimization flexibility for offering storage resources into the DAM and RTM**
  - *Introduce ternary logic into the optimization and allow storage resources to submit inter-temporal offers with a desired start and end resource state*
  - *Resources would not have to pre-specify through hourly bids which hours they would like to charge/generate*
  - *Resources still submit hourly bids and marginal costs to the NYISO*

# Next Steps

Please provide feedback to James Pigeon ([jpigeon@nyiso.com](mailto:jpigeon@nyiso.com)) or Mike DeSocio ([mdesocio@nyiso.com](mailto:mdesocio@nyiso.com)) by April 1, 2016

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