



# **Energy Storage Integration**

## **Market Concepts**

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# Discussion Topics

- **Background**
- **Scope**
- **Feedback Clarifications and Examples**
- **Market Design Concept Proposal**
- **Potential Future Market Design Concepts**
- **2017 Project Updates**
- **Timeline**
- **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**
- **Throughout this year the NYISO has collected feedback from stakeholders regarding such market participation**
  - ***The NYISO provided a summary of the feedback received from stakeholders at the August 4, 2016 MIWG meeting***

# 2016 Scope Updates

- **This initiative is for wholesale grid connected storage resources only (*i.e.*, resources in front of the meter on the transmission system without any load) and the remainder of this presentation addresses such grid connected energy storage resources**
  - ***All other storage resources will be addressed as part of the NYISO's Distributed Energy Resource (DER) program initiative***

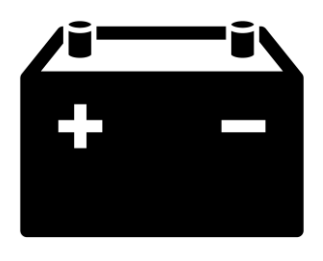
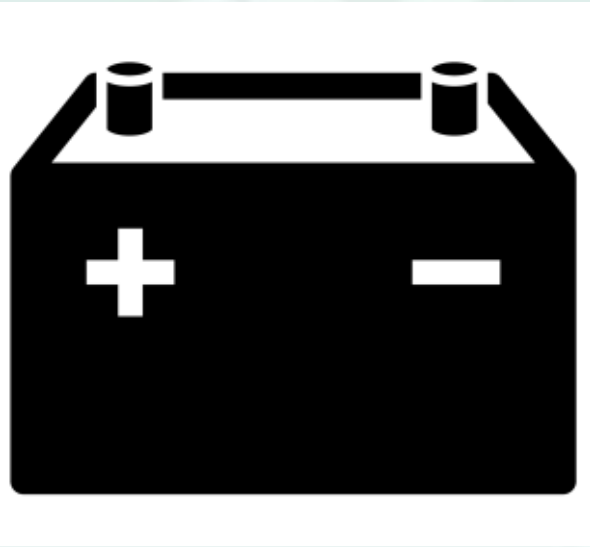
# Addressing Other Feedback

- **Further evaluate and enhance a “pay for performance (capacity) model”**
  - *This will be assessed as part of separate initiatives (i.e., the Performance Assurance Study and/or the DER Roadmap projects)*
- **Aggregations of capacity resources**
  - *This will be assessed as part of the DER Roadmap projects*
- **Evaluate the need for a “fast response” product to help alleviate intermittent RTD price spikes**
  - *This will be assessed as part of the Integrating Public Policy project*
- **Evaluate a concept of mobile storage or long term outage for reasons other than a maintenance outage**
  - *This is currently viewed by the NYISO as a product for distribution service and will not be assessed as part of this effort*

# Current Storage Participation Options

- **Currently, the NYISO has several resource classifications that can accommodate participation of storage in the wholesale markets**
  - ***Energy Limited Resource (ELR)***
    - Capacity, energy and/or ancillary services; no “state of charge” (SoC) management by NYISO
  - ***Limited Energy Storage Resource (LESR)***
    - Regulation only, no capacity, energy or other ancillary services; leverages SoC management by NYISO
  - ***Demand Side Ancillary Services Program (DSASP)***
    - Note: Outside scope of current Energy Storage Integration initiative
  - ***Special Case Resource (SCR)***
    - Note: Outside scope of current Energy Storage Integration initiative

# Clarification of LESRs/ELRs

Resource Type	Capacity Sold (MW)	DAM Offer Requirements						DAM Incremental Offer Options				SoC Signal		
		Duration	Energy		Reserves		Regulation	Energy		Reserves			Regulation (MW)	
			MW	MWh	MW	MWh	MW	MW	MWh	MW	MWh			
<b>Resource A</b> 1MW/4MWh Storage  4hrs @ max injection of 1MW/hr														
ELR	1	4 cons. hours	1	4	1	4	0	1	>=1	1	>=1	1	N	
LESR*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Non capacity Supplier	0	0	0	0	0	0	0	1	>=1	1	>=1	1	N	
<b>Resource B</b> 4MW/4MWh Storage  <1hr @ max injection of 4MW/hr														
ELR**	1	4 cons. hours	1	4	1	4	0	>=1	>=1	>=1	>=1	>=1	N	
LESR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	>=1	Y
Non capacity Supplier	0	N/A	N/A	N/A	N/A	N/A	N/A	>=1	>=1	>=1	>=1	>=1	N	

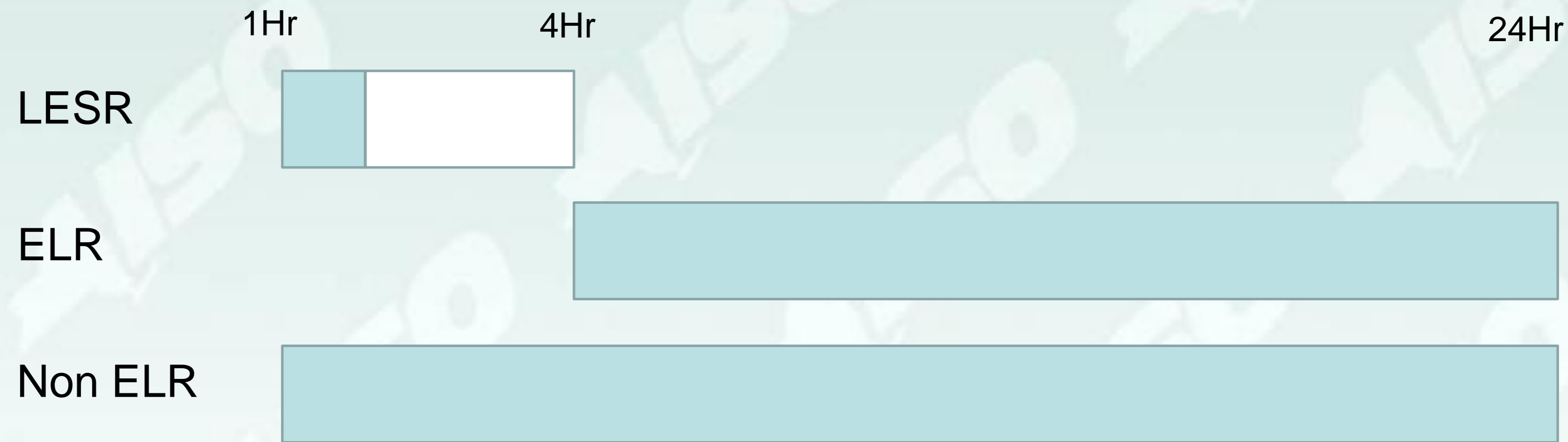
\*Resource A is not eligible to participate as a LESR because it can sustain its maximum output for more than 1 hour.

\*\*The qualification of Resource B as an ELR is premised on an assumption that the device can sustain an output of 1 MW for 4 consecutive hours.

NOTE: All numbers shown are theoretical (assumed 100% efficiency) and for illustrative purposes only

# LESR Eligibility

- Many stakeholders have expressed an interest in extending LESR eligibility to include resource types that can sustain their maximum Energy injection/withdrawal between 1 hour and 4 hours





# **Market Design Concept Proposal**

# Proposed Concept

- **Seek to reduce barriers for storage resources to participate in the wholesale markets by enhancing the current LESR product**
  - *Seek to align near-term efforts with enhancements that have received strong interest from, and/or appear to be a high near-term priority to, stakeholders*
- **Proposed enhancements to current LESR product**
  - *Expand eligibility to qualify as LESR to include resources with ability to sustain max. Energy injection/withdrawal for between  $\geq 15$  min and  $\leq 4$  hrs*
  - *Modify energy settlement for LESRs to use 5 min pricing instead of integrated hourly average*

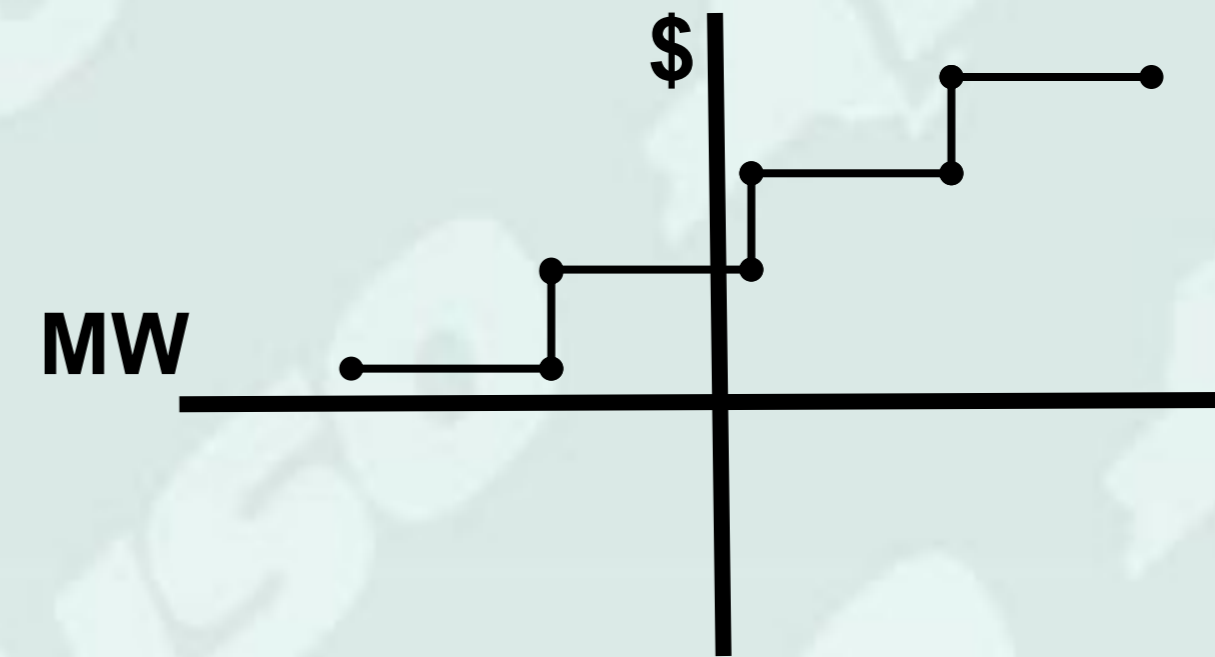


# **Ideas Considered for Potential Future Market Design Concepts**

# Other Concepts Considered for Potential Future Projects

## Energy Storage Offer

- **Single incremental offer**
  - This would allow a resource to withdraw or inject intra-hour based on specified price points
- **Transition Constraints**
  - **Transition Time Constraint**
    - *This would be the number of minutes required by the unit to transition from charging to injection or injection to charging*
  - **RTC Selection Method**
    - *Option for RTC or RTD to select the charging or injection state*
- **Forbidden Operating Region Constraint**
  - This would be a “Forbidden Operating Region” (FOR) between LOL and UOL in which the unit is unable to operate



# Other Concepts Considered for Potential Future Projects, cont.

## DAM “Energy Constrained Offer” Optimization

- *Similar to the Fuel Constrained Bidding concept previously discussed with stakeholders*
- *DAM would schedule the resource to optimum timeframe for NYISO reliability*

# 2017 Project Updates

## ~~• State of Charge Management~~

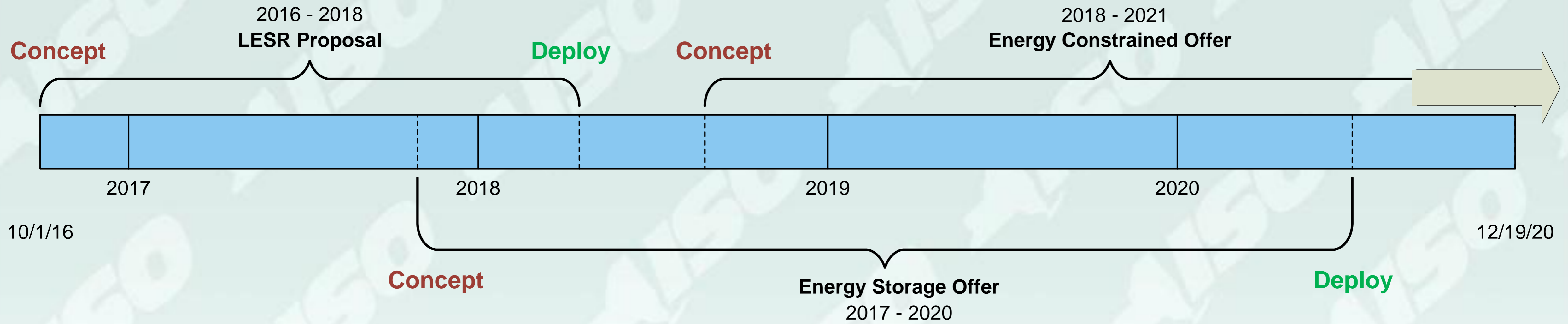
- ~~▪ *There is a proposed project for 2017 to assess making “State of Charge Management” for regulation signal available to more storage resource types than just LESRs*~~

*Note: Changes to availability of “State of Charge Management” for storage resource types other than LESRs is expected to be addressed as part of the DER Roadmap projects*

## • Energy Storage Optimization and Integration

- *There is a proposed project for 2017 to continue this project and assess further opportunities to optimize and integrate grid connected energy storage resources in the wholesale market*

# Proposed Timeline



# Next Steps

- **Currently anticipated timeline is as follows:**
  - *November 2016 MIWG – LESR enhancements proposal update*
  - *February/March 2017 MIWG – continued discussion of LESR enhancements proposal including review of draft tariff revisions*
  - *March/April 2017 BIC/MC – seek stakeholder approval of proposal and associated tariff revisions*
  - *Target implementation for Q1 2018*



# Questions/Feedback

Please contact

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**The Mission of the New York Independent System Operator, in collaboration with its stakeholders, is to serve the public interest and provide benefit 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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