



Energy Storage Integration

Market Concepts

Thomas Golden

Manager, Energy Market Design

MIWG

November 29, 2016

Krey Corporate Center, Rensselaer, NY

Discussion Topics

- **Background**
- **Feedback**
- **Timeline**
- **Next Steps**

Background

- Leading up to the September 29, 2016 MIWG NYISO had been discussing Energy Storage Integration with stakeholders and requesting feedback
- Based on feedback received, the 2016 Market Design Concept (MDC) proposed was an enhancement of the Limited Energy Storage Resource (LESR) program allowing for more participation

Feedback

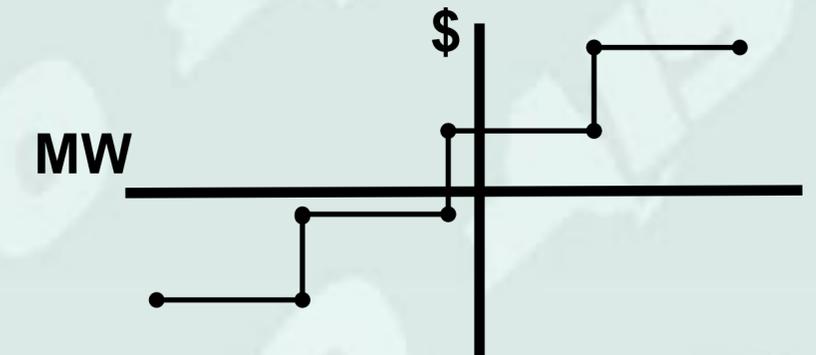
- **Stakeholder feedback received after the September 29, 2016 MIWG presentation indicated that stakeholders prefer that the NYISO instead should begin working on the “Energy Storage Offer” that was presented as a potential future MDC proposal at the September 29, 2016 MIWG meeting**

2017

- **NYISO will begin working on developing the Energy Storage Offer MDC instead of focusing efforts on expanding eligibility to participate in the LESR program**

- **Single Load/Injection Offer**

- This would provide a mechanism for a resource to offer to withdraw or inject intra-hour based on specified price points
- This provides RTC/RTD with more flexibility to fully utilize the resource's capabilities

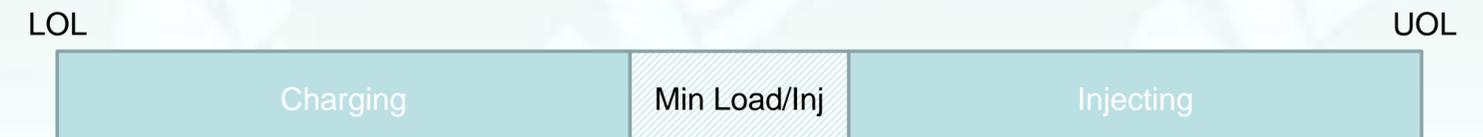


- **Transition Parameters**

- **Transition Time Parameter**
 - *This would be the number of minutes required to transition from Charging to Injection or Injection to Charging*
- **Basepoint Selection Method Parameter (NYISO to research creating this option)**
 - *An option to choose whether RTC or RTD provides the basepoint that is a Charging or Injection state*

- **Minimum Load/Injection Parameters**

- This would allow for specifying minimum load and minimum injection parameters (in between LOL and UOL) in which the resource is unable to operate



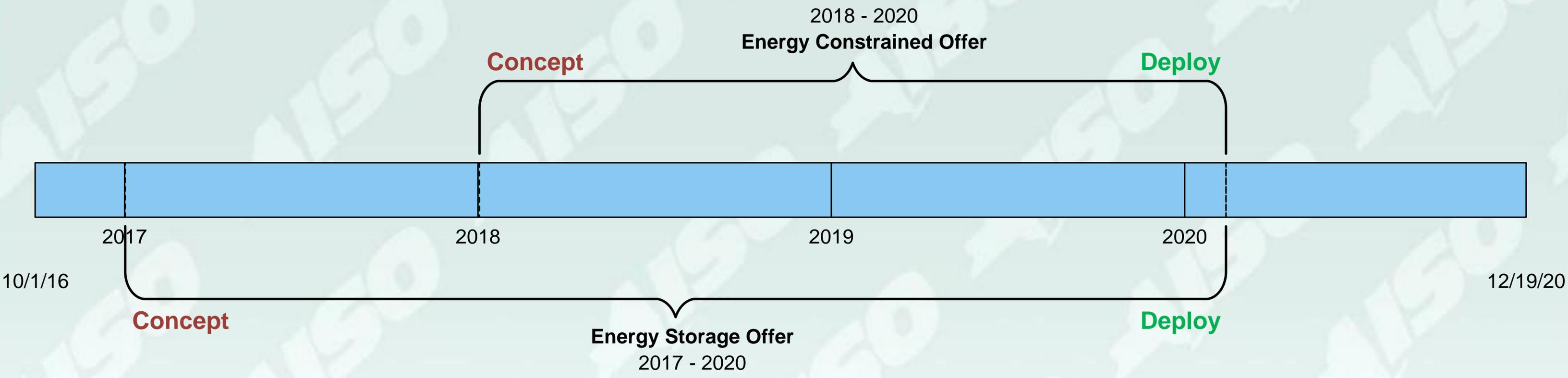
2018

- **NYISO to begin working on DAM “Energy Constrained Offer” Optimization MDC proposal**
 - *Similar to the Fuel Constrained Bidding concept previously discussed with stakeholders*
 - *DAM would schedule the resource to optimum timeframe for NYISO reliability and for lowest total production cost*

2019

- **NYISO to be working on development and review with stakeholders of tariff revisions for both the “Energy Storage Offer” and “Energy Constrained Offer”**
- **Software development to begin after tariff revision development is complete and the EMS/BMS upgrade is complete**
- **Currently targeting a deployment of both concepts in 2020**

Timeline



Next Steps

- **December 2016 – November 2017 – Development of “Energy Storage Offer” design**
- **December 2017 – Review final design with stakeholders**

Questions/Feedback

Please contact

Thomas Golden, tgolden@nyiso.com and/or

Daniel Noriega dnoriega@nyiso.com

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*

www.nyiso.com