Comprehensive Scarcity Pricing

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Agenda

- **The purpose of this presentation is to provide more detail on the Comprehensive Scarcity Pricing proposal, including:**

- **Benefits**
- **Detailed Implementation Examples**
  - ***Including the impact on:***
    - **LI reserve limitation**
    - **LI reserve procurement**
    - **LI reserve clearing prices**

Agenda – cont'd

- **Tariff Revisions**
  - ***Provide overview of required tariff revisions***
- **Next Steps**

Benefits

- **Comprehensive Scarcity Pricing will improve upon the current implementation**
  - ***Proposal will incorporate the value of SCR/EDRP resources into the pricing software where prices and schedules are established***

Benefits

- **Additional benefits of Comprehensive Scarcity Pricing**
  - ***Appropriately reflects resource lost opportunity costs in energy, reserve, and regulation prices***
    - **Maintains consistent scheduling and pricing**
  - ***Reduce the potential for uplift from units when directed by the NYISO to buy out of a scarcity-priced reserve product to provide non-scarcity priced energy or vice versa***
  - ***During scarcity events, aligns prices paid by exports with prices paid by internal NYCA load, and prices paid to imports with prices paid to internal generators***
    - **Potomac Economics (2013 SOM) recommended the NYISO extend scarcity pricing to the External Proxy Buses**

Market Design Overview

- **Recall that operations calls SCR/EDRP resources to avoid a shortage of 10-minute or 30-minute reserves**

  - ***SCR/EDRP resources are currently paid the higher of $500 or the actual Real-Time LBMP to reduce load during activations***

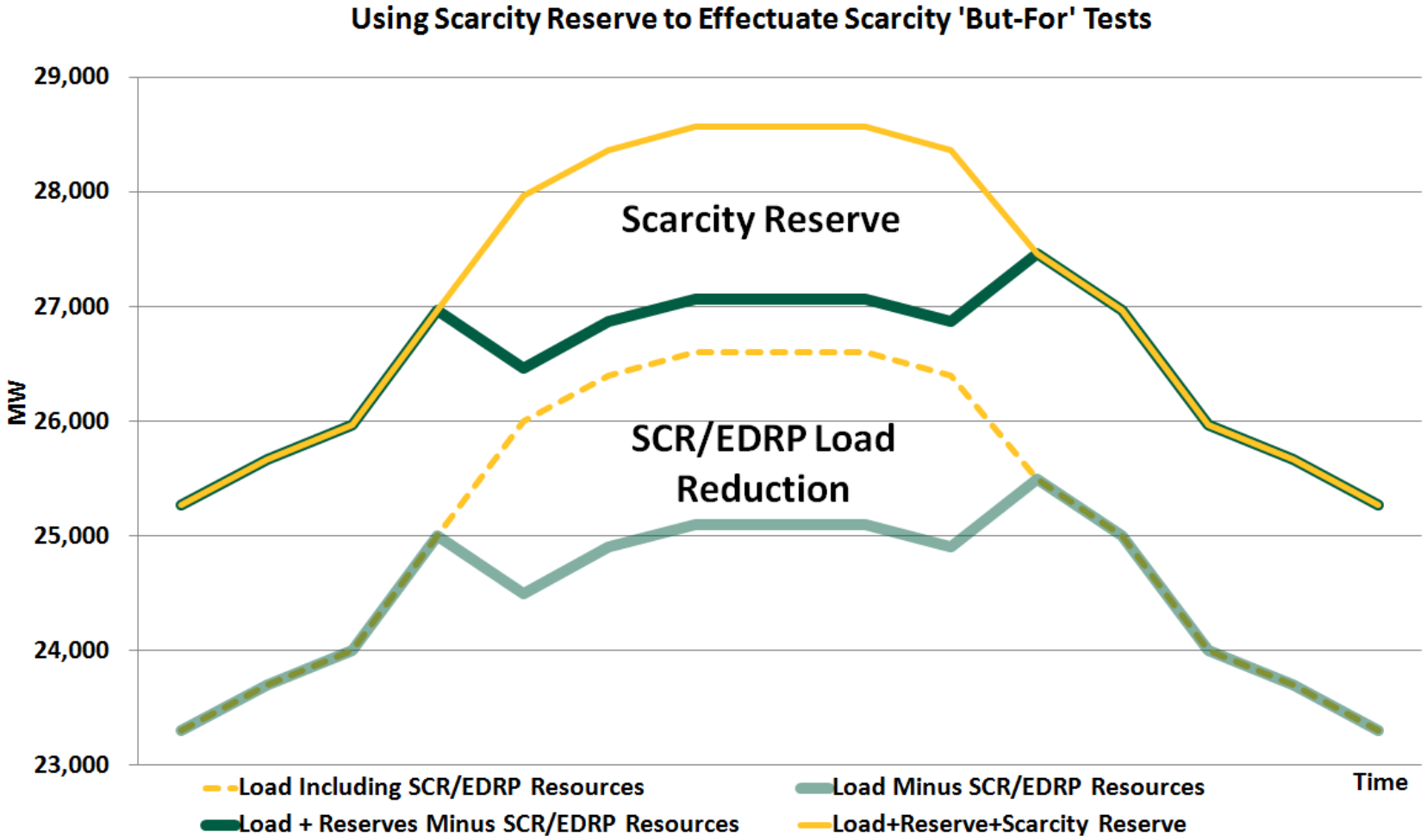
  - ***Absent a pricing mechanism to account for the value of SCR/EDRP resources, the resulting lower load during such events would lead to lower prices for other resources that are not reflective of system conditions***

Market Design Overview

- **The NYISO proposes to replace the current logic implemented as part of the Enhanced Scarcity Pricing project with Comprehensive Scarcity Pricing proposal**
  - ***The proposal will model the load reduction due to SCR/EDRP resources as an increase in the quantity of applicable reserves procured by the NYISO***
    - **A shortage of the proposed scarcity reserve product will not violate any applicable reliability rule/ requirement**

Market Design Overview

- An increase in the applicable quantity of reserves procured for the activation duration approximates the expected SCR/EDRP load reduction



Activation Example for Multiple Zones

Multiple Zones Example

SCR/EDRP Activation in Multiple Zones

- **Operations activates SCR/EDRP resources in NYC (Zone J) and LI (Zone K) for 30-minute reserves in real-time, assume:**
  - ***There are 300 MW and 70 MW of SCR/EDRP resources in Zones J & K, respectively***
  - ***The Expected SCR/EDRP MW for this mandatory activation are calculated as 195 MW for Zone J and 35 MW for Zone K***
  - ***The applicable reserve limitation in effect on Long Island is 540 MW***
    - **With the activation of Comprehensive Shortage Pricing in November 2015, the 30-minute reserve requirement each hour for LI will serve as a limitation on the maximum amount of reserves procured on LI**

LI Reserve Limitation

- NYISO Operations only activates SCR/EDRP resources in Zone K to assist meeting reliability needs in other areas when flows over the Y49 and Y50 lines ensure deliverability of this reserve when converted to energy can flow from LI

- In this example, the applicable 540 MW reserve limitation for LI is increased by 35 MW to 575 MW
  - The NYISO would only schedule up to 575 MW of reserves on LI

Scarcity Reserve Region

- A new scarcity reserve region is created for the duration of the SCR/EDRP activation
  - *This scarcity reserve region includes Zones J & K*

Scarcity Reserve

- 30-minute scarcity reserve in an amount equal to 230 MW (195 MW from J + 35 MW from K) is established for the Zones J & K scarcity reserve region

- Scarcity reserve in this region is fulfilled by available reserves in Zones J & K to the extent of economic availability

  - *If available reserves in Zones J & K are unable to economically meet the desired amount of scarcity reserve, shortage pricing would apply for the scarcity reserve product*

Scarcity Demand Curve

- A scarcity reserve demand curve will be created for the scarcity reserve region to price any shortage of the additional scarcity reserve product

- Scarcity reserve demand curve value set at $500

  - *In this example, a scarcity reserve demand curve will be created for the Zones J & K scarcity reserve region, pricing 230 MW of the 30-minute scarcity reserve product at $500*

LI Reserve Clearing Price

- **30-minute reserve for NYC and LI will settle based on the reserve clearing price for the Zones J & K scarcity reserve region**
  - ***The zonal 30-minute reserve clearing prices posted for Zone K and Zone J will be equal***
    - **If the scarcity reserve region contains at least one zone in addition to Zone K, the applicable reserve clearing price for LI will be equal to the clearing price for the scarcity reserve region**

Long Island Activation Example

LI SCR/EDRP Activation

- Operations activates SCR/EDRP resources in Zone K to protect 30-minute reserve, assume:
  - *There are 70 MW of SCR/EDRP resources in Zone K*
  - *The Expected SCR/EDRP MW for this mandatory activation are calculated as 35 MW*
  - *The applicable reserve limitation in effect on Long Island is 540 MW*

LI Scarcity Reserve Limitation

- **NYISO Operations performs an analysis to determine the deliverability of energy from LI before activating SCR/EDRP resources in Zone K**
  - ***The reserve limitation is increased by the Expected SCR/EDRP MW during the activation to reflect this deliverability***
    - ***In this example, the 540 MW reserve limitation for LI is increased by 35 MW to 575 MW (540 MW + 35 MW)***
  - ***The NYISO would only schedule up to 575 MW of reserves on LI***

LI Scarcity Reserve

- The amount of reserves procured on LI will be increased by the Expected SCR/EDRP MW
  - *In this example, the 540 MW of 30-minute reserves procured would be increased by 35 MW to 575 MW*
    - The NYISO would have to economically procure 575 MW of 30-minute reserves on LI to avoid the application of shortage pricing for the scarcity reserve product

LI Scarcity Demand Curve

- A scarcity reserve demand curve will be created for the Zone K reserve region to price any shortage of the additional scarcity reserve
  - *In this example, a scarcity reserve demand curve will be created for Long Island, pricing 35 MW of the 30-minute scarcity reserve product at $500*

LI Reserve Clearing Price

- **LI will settle at the SENY 30-minute reserve clearing price, unless there is a SCR/EDRP activation of multiple zones for the same activation reason that includes Zone K**
  - ***In this example, because SCR/EDRP was activated only on LI, the LI 30-minute reserve clearing price will be equal to the SENY 30-minute reserve clearing price***

Tariff Revisions Overview

Retired Tariff Language

- It is anticipated that the majority of tariff language specifying the current scarcity pricing logic will be retired upon the activation of Comprehensive Scarcity Pricing

Shadow Price Cascading

- **Additional cascading logic will be required to establish reserve clearing prices during SCR/EDRP activations**
  - ***A shadow price will be included for each scarcity reserve region and product***
    - **This ensures the value of SCR/EDRP resources are appropriately reflected in reserve clearing prices**

Scarcity Reserve Demand Curve

- **Define the reserve demand curve price used for the additional reserve in effect during SCR/EDRP activations**
  - ***A shortage of the scarcity reserve requirement will be priced at $500***

SENY Reserve Demand Curve

- The reserve demand curve price for shortages of SENY 30-minute reserve will be increased to $500

Next Steps

- ✓ June 9, 2015 MIWG
  - ✓ *Provide additional information regarding mechanics of proposal*
  - ✓ *Present overview of tariff revisions*
- ◆ June 2015
  - ▪ *Present Consumer Impact Analysis*
  - ▪ *Present and discuss draft tariff language*
- ◆ July 2015 BIC/MC
  - ▪ *Seek market design / tariff approval*
- ◆ August 2015
  - ▪ *Seek Board of Directors approval*
- ◆ Q4 2015
  - ▪ *Development Complete**
- ◆ Q2 2016
  - ▪ *Deploy and activate software changes*

*** "Development Complete" refers to having the software code written but not tested, deployed or activated**

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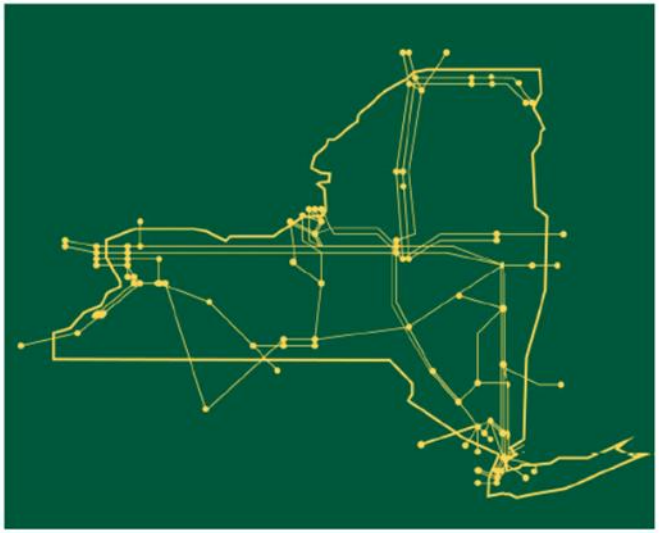

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