

# **Transmission Constraint Pricing**

## ***A Demand Curve Approach***

**MSWG / SPWG**  
**November 21, 2006**

# Outline of Today's Presentation

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- Background / Review
  - ✓ *Issue*
  - ✓ *Proposed Solution*
  - ✓ *Expected Benefits*
  - ✓ *Next Steps from Last Discussion*
- Historical Shadow Cost Analysis
- Testing Operational and Market Impacts
- Next Steps

# Review: Transmission Shortage Pricing Issue

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- The scheduling and pricing models in SCUC and RTS have always included a demand curve for transmission constraints.
- The existing demand curve is represented as very high penalty cost included in the objective function and is a multiplier of the highest energy supplier's costs.
- Penalty costs allow transmission constraints to be violated when sufficient resources are not available to obtain feasible solutions.
- Penalty costs are considered to be too high if they result in ineffective generation re-dispatch in response to transmission constraints given established operating practices and capabilities.

# Review: Transmission Shortage Pricing Issue

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- Most transmission constraint pricing issues occur in RTS as a result of unexpected operational conditions including the following:
  - ✓ *Unexpected transmission or generation operating conditions*
  - ✓ *NYC Area Thunderstorm Watch activations*
- Unexpected operating conditions can result in temporary constraint violations since generation scheduling is subject to unit ramping limitations and/or the commitment of resources.
- In recognition of the timing required for unit ramping and commitment, operating practices allow for temporary violations of transmission facility normal and contingency loadings, corresponding to defined operating criteria that require certain operator actions.

## Review: Proposed Solution (Conceptual)

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- A recalibration of the penalty costs for transmission constraints will improve the consistency between current operational practices and efficient generation resource scheduling during unexpected operating conditions.
- Efficient generation resource scheduling means that the dispatch of generating resources to address transmission constraints should be operationally effective, rational, and minimize operator intervention.
- Revised transmission constraint pricing in the ISO Day-Ahead and Real-Time Markets is consistent with the ISO Market Advisor's recommendation in his Six Month Assessment of the NYISO Markets Under SMD2:
  - ✓ *“Transmission demand curves could be used to prevent costly re-dispatch in situations where there is little or no reliability benefit.”*

# Review: Expected Benefits

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- Operations / Market Benefits
  - ✓ *Reduced need for operator intervention to address ineffective dispatches*
  - ✓ *Reduced Balancing Market Residuals as a result of more efficient generation resource scheduling during unexpected operating conditions*
  - ✓ *Reduced need for price corrections due to fewer operationally ineffective dispatches*

# Review: Next Steps from Last Discussion

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- Issue summary and conceptual straw proposal was discussed at the August 7, 2006 MSWG
- Next steps outlined at the close of that discussion included:
  - ✓ *Review historical transmission constraint pricing outcomes*
  - ✓ *Investigate operational and market impact of revised constraint penalty costs*
  - ✓ *Propose recommendation for revised transmission constraint penalty costs*

# Historical Shadow Cost Analysis

<i>Shadow Cost upto:</i>	<i>Frequency</i>	<i>Cumulative %</i>
500	136001	97.70%
600	643	98.16%
700	494	98.52%
800	295	98.73%
900	261	98.92%
1000	201	99.06%
1100	161	99.18%
1200	103	99.25%
1300	75	99.31%
1400	62	99.35%
1500	78	99.41%
1600	73	99.46%
1700	65	99.51%
1800	40	99.53%
1900	45	99.57%
2000	25	99.58%
3000	247	99.76%
4000	119	99.85%
5000	51	99.88%
6000	31	99.91%
7000	21	99.92%
8000	24	99.94%
9000	19	99.95%
10000	8	99.96%
More	58	100.00%
139200		

- Dataset includes non-TSA contingencies for the period of:  
10/1/2005 – 9/30/2006
- Illustrates the number (and cumulative %) of RTD intervals with a constraint shadow cost up to a given value



# Testing Operational and Market Impacts

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- Testing of the scheduling and dispatch software with revised constraint penalty costs in effect is an important component of NYISO's evaluation of operational and market impacts
- An ABB software change is necessary to perform this testing
  - ✓ *Allows discrete definition of constraint penalty costs rather than using a multiplier of the highest energy suppliers cost*
  - ✓ *NYISO drafted a specification for this change following the August 7 MSWG meeting and it was scheduled for an upcoming ABB release*
  - ✓ *NYISO expects to begin testing this change in late Q4 2007*

# Next Steps

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- Continue MSWG discussion of design concepts, including the appropriate value for revised transmission constraint penalty costs
- Propose recommendation for revised transmission constraint penalty costs
- Continue evaluation of operational and market impacts
- Further investigate and evaluate operational practices in place at neighboring ISOs / RTOs