Securing 100+kV Transmission Facilities in the Market Model

Market Design Concept Proposal

Reposted – Revisions shown in red font

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Market Issues Working Group

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Agenda

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- DAM Posting Time
- Facilities List
- Timeline
- Appendix: Previously discussed Factors of the Market Design Concept Proposal

Background

Background

Date	Working Group	Link
06-29-2017	Market Issues Working Group (MIWG)	Presentation on the NYISO's whitepaper
07-31-2017	MIWG	Presentation
08-25-2017	MIWG	Presentation

Purpose

- **The NYISO intends to secure select 100+kV transmission facilities within the market model. The proposed change addresses the State of the Market Recommendation from Potomac Economics.**
  - The NYISO will continue to work with stakeholders on tariff language after today's market design concept proposal.

Overview

- **The NYISO is the NERC Transmission Operator (TOP) for the NYCA 230 kV and higher system, while the Transmission Owners (TOs) are the TOPs for the lower kV system.**
  - The TOs are ultimately responsible to NERC for lower kV system security.
- **The NYISO helps the TOs to manage lower kV constraints through a number of out of market actions, which can lead to situations where market prices are not reflective of all actions required to maintain system reliability. These actions include:**
  - Transaction curtailments
  - PAR adjustments
  - Out of Merit (OOM) actions
  - Day-Ahead Reliability Unit (DARU) commitments
  - Supplemental Resource Evaluation (SRE)
  - Surrogate interface derates

State of the Market Recommendation

- **Potomac Economics recommends in each of the 2014 through 2016 State of the Market Reports* that 100+kV transmission facilities be secured in the NYISO's market model, stating that:**
  - Incentives to invest in resources on the 115kV system in upstate New York are inadequate
  - Managing lower kV facilities through out-of-market actions has increased power supplier uplift payments and contributed to the need for cost-of-service contracts to keep older resources operating
  - At times, transfer limits on internal and external interfaces are reduced to manage 115 kV security
- **Potomac maintains that managing the security of lower kV facilities in the DA and RT markets would be more efficient, and recognizes that this would be a significant effort, requiring additional coordination with the local TO.**
- **Potomac also recommends that mitigation measures be expanded to address the potential exercise of market power if lower kV facilities are to be secured within the market model.**

*Link to the 2016 State of the Market Report:
http://www.nyiso.com/public/webdocs/markets_operations/documents/Studies_and_Reports/Reports/Market_Monitoring_Unit_Reports/2016/NYISO_2016_SOM_Report_5-10-2017.pdf

Energy Market Mitigation

Energy Market Mitigation

- In areas where there are a limited number of resources capable of resolving transmission constraints, the potential for the exercise of market power exists. In these instances, market mitigation rules are essential for the protection of New York consumers.
  - Once certain 100+kV facilities are secured in the market model, the NYISO's current rules and software will need to be improved to permit the NYISO to implement appropriate mitigation rules for constrained load pockets outside of the currently defined "Constrained Area" (NYC).
- The NYISO is conducting further analysis to identify facilities that, when constrained, would trigger an Automated Mitigation Process (AMP).
- The NYISO is also considering setting an initial Load Pocket Threshold (LPT) of $10 for newly created Constrained Areas.
  - This is consistent with the current value for Rest of State reliability mitigation.

Energy Market Mitigation

- **Areas of the transmission system in upstate New York differ significantly from the transmission topology of the currently defined Constrained Area of Zone J.**
- **The upstate New York transmission system is not characterized by clearly defined closed interfaces.**
  - Once select lower kV facilities are secured in the market model, the exercise of market power upstate would be possible when certain constraints are binding. This could be influenced by outage conditions.

Energy Market Mitigation Process

- The NYISO will identify facilities that, when constrained, will activate AMP for a discrete set of Generators.
- If an identified facility is binding for any contingency, AMP will evaluate which resources could potentially exercise market power.
  - Identified resources will be tested for conduct and impact.
- The NYISO is currently conducting sensitivity analysis to determine whether resources have the incentive and capability to exercise market power during price formation.

Interim Energy Market Mitigation Solution

- **The software development timeline for the proposed energy market mitigation solution is uncertain.**
  - However, the NYISO would not want to delay implementation just for the mitigation solution. Instead an interim solution for mitigation may be deployed in the event the software development timeline for the proposed automated energy market mitigation extends too far beyond the 2019 EMS/BMS deployment.
- **If an interim solution is needed, the NYISO would apply the rules set forth on the previous slide to mitigate conduct that exceeds a specified conduct threshold without testing for market impact in any identified Constrained Area(s).**

DAM Posting Time

DAM Completion Time

- **Historical data was reviewed to track DAM completion time (476 sample days).**
  - Targeted posting time is by 9:30 am.
  - Tariff defined posting time is by 11:00 am.
- **The NYISO expects an additional 10 minutes for processing and review of DAM results is necessary after lower kV facilities are secured within the market model.**
  - The NYISO anticipates securing approximately 30 additional facilities.

Estimated DAM Posting Time Impact

- The NYISO estimates that it will miss the 9:30 am targeted posting time approximately 1 additional day per month after securing lower kV facilities within the market model.

Condition	Percent of Time Missed	# of Misses (30 Days Per Month)
Baseline	4.22%	1.3
100+kV	7.73%	2.3

Facilities List

Facilities List

- **The list of the facilities on the next slide will be subject to the NYISO's developing process to add lower kV facilities as secured in the market model.**
  - Depending on the outcome of this process, these facilities will be:
    - Added before the EMS/BMS deployment
    - Added after the EMS/BMS deployment, or
    - Not added

Zone	PTID	Limiting Facility - lower kV	Example(s) of Typical Contingency Event(s) that would cause a Limiting Facility to Bind
West	25267	101 Niagara-Lockport	NR2 Niagara-Rochester or SR1-39 Kintigh-Rochester
West	25103	102 Niagara-Lockport	NR2 Niagara-Rochester or SR1-39 Kintigh-Rochester
West	25104	180 Niagara-Gardenville	TWR Packard 77/78 (Packard Sawyer)
West	25075	191 Niagara Packard	192 Niagara-Packard
West	25099	192 Niagara Packard	TWR Niagara 61 & 191
West	25100	193 Niagara Packard	SCB 1414 Niagara (BK T2 & 195)
West	25101	194 Niagara Packard	SCB 1414 Niagara (BK T2 & 195)
West	25102	195 Niagara Packard	193 Niagara-Packard or 194 Niagara-Packard
West	25409	Niagara BK T1	TWR Packard 77/78 (Packard Sawyer)
West	25410	Niagara BK T2	TWR Packard 77/78 (Packard Sawyer)
West	26059	130 Packard-Huntley	base case
West	25906	129 Packard-Walck Rd	base case
West	26055	181 Packard- Erie St	TWR Packard 77/78 (Packard Sawyer)
West	26056	182 Packard-Gardenville	TWR Packard 77/78 (Packard Sawyer)
West	25414	Packard BK3	NR2 Niagara-Rochester or SR1-39 Kintigh-Rochester
West	26153	133 Huntley Zimmerman	TWR Packard 77/78 (Packard Sawyer)
West	26047	38 Huntley-Gardenville	TWR Packard 77/78 (Packard Sawyer)
West	26044	39 Huntley-Gardenville	TWR Packard 77/78 (Packard Sawyer)
West	26038	141 Dunkirk-Gardenville	TWR 73 & 74 Dunkirk-Gardenville
West	26037	142 Dunkirk-Gardenville	TWR 73 & 74 Dunkirk-Gardenville
Genesee	25096	24 Mortimer-Pannell	RP1 Rochester-Pannell or RP2 Rochester-Pannell
Genesee	25095	25 Mortimer-Pannell	RP1 Rochester-Pannell or RP2 Rochester-Pannell
Central	25080	977 Farmington-Border City	1 Pannell-Clay or 2 Pannell-Clay
North	26076	3 Browns Falls-Taylorville	7040 Chat-Massena & MSU1 Massena-Marcy or 4 Browns Falls-Taylorville or TWR Moses MA1/MA2
North	26077	4 Browns Falls-Taylorville	7040 Chat-Massena & MSU1 Massena-Marcy or 3 Browns Falls-Taylorville or TWR Moses MA1/MA2
North	26075	5 Taylorville-Boonville	6 Taylorville-Boonville
North	26070	6 Taylorville-Boonville	5 Taylorville-Boonville
Capital	25860	1 Albany -Greenbush	2 Albany -Greenbush
Capital	25868	2 Albany -Greenbush	1 Albany -Greenbush
Capital	26122	15 Mohican-Battenkill	1 Spier Falls-Rotterdam or 2 Spier Falls-Rotterdam

Timeline

Tentative Timeline

- **September/ October 2017**
  - Autumn 2017 auction for:
    - One Year TCCs effective from 11/1/2017 to 10/31/2018
    - Six Month TCCs effective from 11/1/2017 to 4/30/2018
- **October 2017**
  - Initial stakeholder discussion of "Constraint Specific Demand Curves" project.
- **November 2, 2017 MIWG**
  - Present Consumer Impact Analysis for "Securing 100+kV Transmission Facilities in the Market Model" project.
- **Q1 2018**
  - Publish procedure to add and/or remove lower kV facilities.
- **February/ March 2018**
  - Spring 2018 auction for:
    - Two Year TCCs effective from 5/1/2018 to 4/30/2020
    - One Year TCCs effective from 5/1/2018 to 4/30/2019
    - Six Month TCCs effective from 5/1/2018 to 10/31/2018
- **Q2 2018**
  - Begin securing pre-2019 facilities.
  - Once a lower kV facility is secured in the Day-Ahead market model, subsequent TCC market auctions will also model that facility as secured.
- **Q3 2018**
  - Vote to approve the market design for "Securing 100+kV Transmission Facilities in the Market Model" project.
- **2019**
  - Deploy EMS/BMS system upgrades.
- **After 2019 EMS/BMS Project Deployment**
  - Implement Constraint Specific Demand Curves.*
  - Secure remaining 100+kV Transmission Facilities in the Market Model.*

*Subject to Stakeholder, NYISO Board of Directors, and FERC approval

Appendix: Previously discussed Factors of the Market Design Concept Proposal

Benefits and Challenges

Benefits

- **Optimality – In many cases, the market software is likely able to provide a lower cost solution when securing these transmission constraints, compared to other means of securing these constraints.**
- **Price Formation/ Transparency – the current approach mutes price signals for investment that would improve system reliability and efficiency.**
  - The absence of transmission constraint costs in LBMPs can lead to inefficient investment; suppliers have no visibility into potential revenue opportunities, and policy makers and the TOs cannot easily quantify the benefits of transmission solutions.
    - This lack of transparency could result in the need for reliability contracts that impose significant cost on consumers. Improved transparency may produce a lower cost market solution.
  - It will become increasingly important to incorporate the impacts and value of maintaining transmission system reliability into wholesale electricity market prices as Distributed Energy Resources (DERs) are expected to be located at the 100+kV level in the future.
- **Securing these facilities may also reduce power supplier guarantee payments (uplift).**

Challenges

- **There are a number of challenges that the NYISO may have to resolve to move forward.**
- **The technical considerations include:**
  - Computation size impacting software execution performance
  - Longer software execution time resulting in increased risk of later posting of the DAM
  - Network topology solutions to 100+kV transmission constraints are not currently available to the optimization algorithm, see next slide for additional detail
  - Transmission constraint price volatility due to cycling units at the 100+kV level
  - A lower CRM (relative to 230+kV lines) may be more appropriate for some lower kV facilities; this will require Graduated Transmission Demand Curve modifications
  - The Automated Mitigation Process (AMP) will likely require modification if constrained areas are identified in upstate New York
  - Much of the 100+kV system does not have local generation to resolve 100+kV transmission constraints, possibly resulting in sustained pricing with the Graduated Transmission Demand Curve, which will require software modifications

Network Topology Solutions

- **If a constraint forms during real time, the local TOs may be able to open a breaker to alleviate the constraint.**
  - The NYISO's market model eventually catches up to this topology change; prices and line flows then reflect the new system conditions.
- **The NYISO is not proposing to model line sectionalization/ load switching with this project.**
  - The NYISO does not have direct control over transmission topology
  - Optimizing transmission topology would require extensive revisions to the NYISO's market software processes.

Comparison to other ISOs/RTOs

Comparison to other ISOs/RTOs

- **NYISO secures 230 kV and higher transmission facilities throughout the NYCA, 138 kV facilities in New York City (Zone J) and on Long Island (Zone K), and a single 115 kV line in northern New York in our market model.**
  - Normal ratings are used for base case constraints.
  - Applicable limits are used for contingency constraints.
- **ISO-NE secures transmission elements 115kV and above, as well as a few selected elements below 115 kV, to Long Term Emergency (LTE) within their market model.**
  - Normal ratings are used for base case constraints.
  - LTE limits are used for contingency constraints.
- **ERCOT secures all transmission elements down to 69 kV in their market model.**
  - Normal ratings are used for base case constraints.
  - Emergency ratings are used for contingency constraints.
    - Normal ratings are used for contingency constraints that are part of an Interconnection Reliability Operating Limit (IROL).
- **PJM secures most facilities 100 kV and above in their market model.**
  - Normal ratings are used for modeled base case constraints.
  - LTE limits are used for modeled contingency constraints.
- **CAISO secures different facilities depending on whether the facility is in the northern or southern region; all transmission elements greater than 200 kV, as well as some 138 kV, 115 kV, and 69 kV elements are secured in the market model in the southern region, while all transmission elements 60 KV and above are secured in the northern region.**
  - Normal ratings are used for base case constraints.
  - Emergency ratings are used for contingency constraints.

Procedure to Add/ Remove Lower kV Facilities

Procedural Modifications

- **The method NYISO intends use to evaluate 100+kV transmission facilities for inclusion in the market model will be consistent with legacy constraint modeling efforts.**
  - Identify candidate transmission facilities and contingencies.
  - Verify expected constraint flows in the Day-Ahead and real time Energy market models.
  - Identify generators with adequate shift factors to resolve candidate constraints.
  - Determine if additional market power mitigation rules are necessary/ feasible.
- **In addition, the NYISO will develop a process for notifying NYISO Stakeholders of DAM/RTM modeling changes to implement transmission facility constraints.**

Procedure to Add/ Remove Lower kV Facilities

- **The NYISO is currently preparing more detailed documentation of the procedures to add and/or remove lower kV facilities.**
  - This document will also state the methodology used to identify resources with adequate shift factors to resolve candidate constraints.
- **This document will identify:**
  - Facilities to be added prior to the deployment of the EMS/BMS project
  - Facilities to be added after the deployment of the EMS/BMS project

Guarantee Payment (Uplift) Cost Allocation

Guarantee Payment (Uplift) Cost Allocation

- Any uplift resulting from securing additional, lower kV facilities in the market model will be allocated statewide.
- If a local TO requests an out of market action, such as a DARU or OOM, then any uplift paid to a generator as a result of that action will be allocated to the local TO.
- The NYISO will continue to closely monitor uplift once 100+kV facilities are secured in the market model.

The Mission of the New York Independent System Operator is to:

- Serve the public interest and
- Provide benefit to stakeholders 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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