

April 21, 2017

By Electronic Delivery

Honorable Kimberly D. Bose, Secretary Federal Energy Regulatory Commission 888 First Street, NE Washington, DC 20426

Re: New York Independent System Operator, Inc., Docket No. ER17-____-000; Proposed Tariff Revisions to Clarify and Enhance Transmission Constraint Pricing

Dear Secretary Bose:

In accordance with Section 205 of the Federal Power Act¹ and Part 35 of the regulations of the Federal Energy Regulatory Commission ("Commission"), the New York Independent System Operator, Inc. ("NYISO") submits proposed revisions to its Market Administration and Control Area Services Tariff ("Services Tariff") and Open Access Transmission Tariff ("OATT") to clarify and enhance the operation of its transmission constraint pricing logic.²

The NYISO Management Committee approved the proposed revisions, without opposition, on March 29, 2017. The NYISO respectfully requests an effective date for the proposed revisions of June 20, 2017 (*i.e.*, sixty days from the date of this filing letter).

I. Documents Submitted

The NYISO respectfully submits the following documents with this filing letter:

- 1. A clean version of the proposed revisions to the Services Tariff ("Attachment I");
- 2. A blacklined version of the proposed revisions to the Services Tariff ("Attachment II");
- 3. A clean version of the proposed revisions to the OATT ("Attachment III"); and
- 4. A blacklined version of the proposed revisions to the OATT ("Attachment IV").

¹ 16 U.S.C. § 824d.

² Capitalized terms not otherwise defined herein shall have the meaning specified in Section 2 of the Services Tariff and Section 1 of the OATT.

II. Background

The NYISO's Security Constrained Unit Commitment ("SCUC") and Real-Time Market software dispatch and pricing algorithms utilize Transmission Shortage Cost values to establish an upper bound on the Shadow Price used to calculate Locational Based Marginal Prices. Having an upper bound allows the software to produce efficient and timely dispatch results by concluding its search for solutions to a given transmission constraint and establishing a price in the face of a transmission constraint that either cannot be solved or can only be solved at a Shadow Price higher than the established upper bound.

The NYISO first implemented a Transmission Shortage Cost in June 2007.³ Initially, the Transmission Shortage Cost consisted of a single upper bound of \$4,000 per MWh. With additional experience and analysis, the NYISO determined that using graduated price values could improve market efficiency. Unlike a single price, a graduated pricing mechanism establishes a series of upper bounds based on the severity of a transmission constraint "shortage."⁴ On February 11, 2016, the NYISO modified its transmission constraint pricing logic with the implementation of a graduated Transmission Shortage Cost.⁵

On August 29, 2016, the NYISO's Market Monitoring Unit ("MMU") presented a market report for the second quarter of 2016 at the Market Issues Working Group ("MIWG") meeting. The presentation raised several questions concerning transmission constraint Shadow Price levels following the implementation of the graduated Transmission Shortage Cost. This led stakeholders to request additional information and prompted the NYISO to commence an internal analysis of its transmission constraint pricing software.

As a result of its preliminary internal assessment, the NYISO issued a "Notice of Potential Market Problem" regarding the graduated Transmission Shortage Cost on October 6,

³ See Docket No. ER07-720-000, New York Independent System Operator, Inc., Revisions to its Market Administration and Control Area Services Tariff and its Open Access Transmission Tariff to Apply an Upper Limit on Transmission Shortage Costs Reflected in Locational Based Marginal Prices (April 5, 2007); New York Independent System Operator, Inc., 119 FERC ¶ 61,237 (2007); and Docket No. ER07-720-001, *supra*, Letter Order (January 11, 2008).

⁴ In the context of a transmission constraint, a "shortage" represents the absence of available resource capacity to relieve a transmission constraint for less than the prescribed Transmission Shortage Cost value.

⁵ See Docket No. ER15-485-000, New York Independent System Operator, Inc., Proposed Tariff Amendments to Revise Transmission Shortage Costs (November 25, 2014); and Docket No. ER15-485-000, *supra*, Letter Order (January 15, 2015). The Services Tariff currently defines the "Transmission Shortage Cost" as "a series of quantity/price points that define the maximum Shadow Price of a particular Constraint that will be used in calculating LBMP. The Transmission Shortage Costs are set at \$350/MWh for shortages above zero and less than or equal to 5MW, \$2350/MWh for shortages above 5MW and less than or equal to 20MW, and \$4000/MWh for shortages above 20MW."

2016.⁶ The notice indicated the existence of an inconsistency between the Services Tariff and the transmission constraint pricing software. Namely, the software does not apply the graduated Transmission Shortage Cost in certain circumstances that are not described in the Services Tariff.⁷

The graduated Transmission Shortage Cost is applied to constraints associated with transmission facilities and Interfaces that have a non-zero constraint reliability margin ("CRM")⁸ value and where sufficient resource capacity is available to fully resolve the transmission constraint prior to the execution of the economic dispatch processes that determine prices and schedules.⁹ For transmission constraints related to transmission facilities and Interfaces that fail the preliminary screening mechanism, as well constraints related to transmission facilities and Interfaces with a zero value CRM, the current software applies only a single \$4,000 per MWh value. In these cases, the current software establishes the Shadow Price for such transmission constraints, subject to a maximum allowable Shadow Price of \$4,000 per MWh.

The Services Tariff also does not describe the logic used by the NYISO's software to resolve infeasible transmission constraints in the economic dispatch.¹⁰ This logic resolves such infeasibilities by adjusting the otherwise applicable limit for an infeasible transmission constraint commensurate with the amount of resource capacity that is available to provide relief. This logic

⁸ The CRM defines a value below the maximum physical limit on a transmission facility or Interface that is used by the NYISO's market software as the effective limit when making economic commitment and dispatch determinations. CRM values are normally 20 MW or larger, but are zero for a limited number of internal transmission facilities and effectively zero for all external interfaces.

⁹ Prior to executing the economic dispatch, the current software conducts a preliminary screen to determine whether sufficient resource capacity is available to resolve each transmission constraint. This preliminary screen is conducted without regard to the value of Bids submitted by resources and without consideration of other constraints that must simultaneously be resolved (*e.g.*, other transmission constraints and Operating Reserve and Regulation Service requirements). If this preliminary screen indicates that there is insufficient resource capacity available to resolve a particular transmission constraint, the constraint is guaranteed to be infeasible in the economic dispatch. In these cases, the current software does not apply the graduated Transmission Shortage Cost to such a transmission constraint. Instead, the current software applies a single \$4,000 per MWh Shadow Price cap.

¹⁰ The logic for resolving infeasible transmission constraints, which is sometimes referred to as "constraint relaxation," has been in place since the NYISO's inception. It has been utilized in SCUC since 1999 and in the real-time scheduling system (*i.e.*, Real-Time Commitment and Real-Time Dispatch) since it was implemented in 2005. Although not currently described in the NYISO's tariffs, this logic is briefly described in Section 4.3.2 of the NYISO Day-Ahead Scheduling Manual.

⁶ Section 3.5.1 of the Services Tariff establishes various notification and procedural requirements for potential Market Problems. The notice complied with these requirements.

⁷ Further details regarding the current transmission constrain pricing software logic is provided in a presentation by the NYISO at the October 19, 2016 MIWG meeting, available at: <u>http://www.nyiso.com/public/webdocs/markets_operations/committees/bic_miwg/meeting_materials/2016-10-19/Transmission%20Constraint%20Pricing%2010192016%20MIWG%20FINAL%20vUpdate.pdf</u>.

applies to all infeasible transmission constraints regardless of whether they are subject to the graduated Transmission Shortage Cost or the single \$4,000 per MWh Shadow Price cap.¹¹

On November 3, 2016, the NYISO concluded that the inconsistency between its transmission constraint pricing software and the Services Tariff constituted a Market Problem because it had a material impact on the NYISO-administered markets. On January 6, 2017, the NYISO filed a waiver request with the Commission due to this inconsistency.¹² In its waiver request, the NYISO committed to working with its stakeholders to expeditiously consider tariff revisions and software enhancements to resolve the inconsistency.¹³

This filing represents the culmination of those efforts. The proposed revisions include both enhancements to the current transmission constraint pricing logic, as well as tariff revisions to ensure that this enhanced logic is fully described in the Services Tariff. Commission acceptance of the proposed revisions and implementation thereof by the NYISO will terminate the going forward need for the previously requested tariff waiver related to the NYISO's transmission constraint pricing.

III. Description of the Proposed Tariff Revisions

The NYISO proposes to revise its current transmission constraint pricing logic to: (i) apply the graduated Transmission Shortage Cost to all transmission facilities and Interfaces with a non-zero CRM value;¹⁴ and (ii) revise the current value assigned to the second "step" of the graduated Transmission Shortage Cost from \$2,350 per MWh to \$1,175 per MWh. The NYISO also proposes tariff revisions to ensure that the revised transmission constraint pricing logic is fully described in the Services Tariff.

A. Transmission Shortage Cost Definition

The NYISO proposes to revise the definition of "Transmission Shortage Cost" in Section 2.20 of the Services Tariff to remove the details regarding the pricing values associated therewith. The NYISO proposes to relocate the details regarding the Transmission Shortage Cost pricing values to Section 17.1.4 of Attachment B of the Services Tariff.

¹³ *Id.* at 10-12.

¹¹ For transmission constraints subject to the graduated Transmission Shortage Cost, the software accounts for the 20 MW of relief that is provided by the first two "steps" of this pricing mechanism when determining the applicable level of relaxation necessary to make the constraint feasible.

¹² See Docket No. ER17-758-000, New York Independent System Operator, Inc., Request for Tariff Waiver (January 6, 2017).

¹⁴ To broaden the application of the graduated Transmission Shortage Cost to all transmission facilities and Interfaces with a non-zero CRM value, the NYISO will, on the effective date of the proposed tariff revisions, discontinue use of the current preliminary screening mechanism described above that results in the application of only the single \$4,000 per MWh Shadow Price cap to certain transmission constraints associated with such transmission facilities and Interfaces.

The NYISO proposes to delete the substance of the duplicative definition of the term "Transmission Shortage Cost" in Section 1.20 of the OATT and replace it with a cross reference to corresponding definition of that term in the Services Tariff.

B. Section 17.1.4 of Attachment B of the Services Tariff

The NYISO proposes to revise Section 17.1.4 of Attachment B of the Services Tariff to more fully describe the NYISO's transmission constraint pricing logic. The proposed revisions clearly identify the difference in the logic applied depending on whether a transmission facility or Interface has a zero or non-zero CRM value. The proposed revisions also describe the existing software logic for resolving infeasible transmission constraints. The NYISO also proposes to clarify the existing provision that authorizes temporary changes to the transmission constraint pricing values in certain limited circumstances to expressly include an obligation to notify Market Participants of any temporary changes implemented pursuant to this provision.

The applicable transmission constraint pricing logic applied is dependent on whether the transmission facility or Interface has a zero or non-zero CRM value. For all transmission facilities and Interfaces that have a non-zero CRM value, the graduated Transmission Shortage Cost mechanism will apply. For transmission facilities and Interfaces that have a zero value CRM, the single \$4,000 per MWh Shadow Price cap will apply.

1. Transmission Constraint Pricing Logic for Facilities and Interfaces with a Non-Zero CRM Value

For transmission facilities and Interfaces that have a non-zero CRM value, the transmission constraint pricing logic will utilize the graduated Transmission Shortage Cost mechanism. The mechanism consists of both a demand curve and a Shadow Price cap. The first two "steps" of the graduated Transmission Shortage Cost are implemented as a demand curve, providing a total of 20 MW of additional resource capacity to help resolve applicable transmission constraints – 5 MW of resource capacity available at a cost of \$350 per MWh and, as proposed, an additional 15 MW of resource capacity available at \$1,175 per MWh.¹⁵ The amount covered by the demand curve portion of the mechanism (*i.e.*, 20 MW) represents the minimum CRM value that is applied to transmission facilities and Interfaces that have a non-zero CRM value.¹⁶ The final "step" of the graduated Transmission Shortage Cost operates as a Shadow Price cap of \$4,000 per MWh. As such, the transmission constraint pricing logic will, if needed, continue to pursue available resource capacity to resolve a transmission constraint at a

¹⁵ As further described below, the NYISO proposes to revise the current value assigned to the second "step" of the graduated Transmission Shortage Cost from \$2,350 per MWh to \$1,175 per MWh.

¹⁶ The NYISO maintains a list of transmission facilities and Interfaces that identifies both those facilities and Interfaces that utilize a CRM value greater than 20 MW, as well as those that have a zero value CRM. This list is available at:

http://www.nyiso.com/public/webdocs/markets_operations/market_data/power_grid_info/Constraint_Reliability_Margin_CRM.pdf.

cost greater than \$1,175 per MWh based on resource Bids and establish prices consistent with such Bids, subject to a maximum allowable Shadow Price of \$4,000 per MWh.¹⁷

Certain stakeholders have urged the NYISO to revise the treatment of the third "step" of the graduated Transmission Shortage Cost to utilize a demand curve construct rather than a cost capping mechanism. These stakeholders contend that such an implementation may obviate the need for using the constraint relaxation logic for these transmission constraints.

The logic for resolving infeasible transmission constraints has been in place since the NYISO's inception and is heavily integrated into the NYISO's existing market software. Removing this logic would be a significant undertaking and require substantial software redesign. Such an effort could potentially take years to ultimately implement. Pursuit of such an effort at this time in lieu of the proposed revisions would unnecessarily delay the ability to resolve the present inconsistency between the transmission constraint pricing software logic and the Services Tariff provisions describing such logic. This would indefinitely extend the continued need for the NYISO's previously requested tariff waiver regarding this matter. This would also unnecessarily prolong marketplace uncertainty regarding the NYISO's transmission constraint pricing and market outcomes resulting therefrom to the detriment of all market participants.

The NYISO has committed to exploring further enhancements to its transmission constraint pricing with stakeholders beginning later this year. This assessment will include reviewing potential modifications to the manner in which the third "step" of the graduated Transmission Shortage Cost is applied in the NYISO's market software and/or other enhancements that may reduce the need to utilize constraint relaxation (*e.g.*, the potential development of more constraint-specific pricing values). The NYISO requests that the Commission accept the current structure of the graduated Transmission Shortage Cost. Discussions regarding any changes thereto should be deferred to the upcoming stakeholder process that will assess potential future enhancements to the NYISO's transmission constraint pricing logic.

2. Value of the Second "Step" of the Graduated Transmission Shortage Cost

In seeking to broaden the application of the graduated Transmission Shortage Cost, the NYISO also reassessed the current value assigned to the second "step" of this mechanism (*i.e.*, \$2,350 per MWh). The NYISO established this value because it is equal to the total, cascaded cost of going short 10-minute total reserves in both the East of Central-East and Southeastern New York ("SENY") reserve regions.¹⁸ Establishing equivalent shortage costs for these

¹⁷ To maintain consistency between prices and schedules, if a resource is available to provide relief, but its costs exceed \$4,000 per MWh, the Shadow Price for the transmission constraint is capped at \$4,000 per MWh and the resource is not dispatched to provide relief.

¹⁸ See Docket No. ER15-1061-000, New York Independent System Operator, Inc., Proposed Tariff Revisions to Ancillary Service Demand Curves and the Transmission Shortage Cost at 11-12 (February 18, 2015).

scenarios was intended to ensure that the market software viewed limiting transmission shortages to 20 MW or less and avoiding shortages of 10-minute total reserves in the East of Central-East and SENY reserve regions as equally important. Actual operating experience since the implementation of the graduated Transmission Shortage Cost mechanism, however, has demonstrated that the potential need for trade-offs between securing transmission constraints or avoiding a simultaneous shortage of 10-minute total reserves in both the East of Central-East and SENY reserve regions is likely not a practical concern.

This operating experience has demonstrated that a more appropriate value for the second "step" of the graduated Transmission Shortage Cost mechanism should provide an efficient price signal to recognize that avoiding exhaustion of the CRM is a higher priority than avoiding a shortage of 10-minute total reserves in the East of Central-East reserve region, which has an assigned shortage cost of \$775 per MWh.¹⁹ The proposed value of \$1,175 per MWh provides an appropriate price signal that recognizes this relative priority in resolving Constraints without establishing an unnecessarily high price to reflect system conditions in such circumstances.²⁰ This proposed revision is intended to provide for the use of a value that more appropriately reflects expected system conditions and needs during periods when this pricing value is likely to be relevant, as determined based on actual operating experience since the graduated pricing mechanism was implemented.

3. Transmission Constraint Pricing Logic for Facilities and Interfaces with a Zero Value CRM

The proposed revisions to Section 17.1.4 also clarify the current transmission constraint pricing logic applicable to transmission facilities and Interfaces that have a zero value CRM. These transmission constraints are subject to a single \$4,000 per MWh Shadow Price cap.

This construct is consistent with the structure of the graduated Transmission Shortage Cost mechanism. The first two "steps" of the graduated Transmission Shortage Cost are designed to price use of the CRM to assist in resolving transmission constraints. Thus, these interim pricing values would not logically apply to transmission facilities and Interfaces without a CRM. For these facilities and Interfaces, any shortage would go beyond the applicable physical limit of the facility. Consistent with the graduated Transmission Shortage Cost, shortages of this magnitude are subject to the \$4,000 per MWh Shadow Price cap.

¹⁹ See Section 15.4.7(f) of Rate Schedule 4 of the Services Tariff.

²⁰ The proposed value of \$1,175 per MWh is consistent with the initial value that was proposed by the NYISO and approved by the Commission prior to the NYISO's implementation of it revised shortage pricing in November 2015. *See* Docket No. ER15-485-000, *supra*, Proposed Tariff Amendments to Revise Transmission Shortage Costs (November 25, 2014); and Docket No. ER15-485-000, *supra*, Letter Order (January 15, 2015).

The transmission constraint pricing logic in these cases does not include the demand curve functionality included as part of the graduated Transmission Shortage Cost mechanism.²¹

4. Resolution of Infeasible Transmission Constraints

The proposed revisions to Section 17.1.4 also describe the existing logic utilized by the NYISO's software to resolve infeasible transmission constraints in the economic dispatch. Infeasible transmission constraints represent circumstances in which insufficient resource capacity is available to resolve a given constraint at its otherwise applicable limit in the software.

When faced with these circumstances, the NYISO's software has, since its inception, included logic for resolving such infeasibilities. If an infeasible transmission constraint is identified in the economic dispatch, the infeasibility is resolved by adjusting the otherwise applicable limit for the constraint consistent with the quantity of resource capacity that is available. The software resolves the infeasibility by adjusting the otherwise applicable limit to the value that is achievable by the available resource capacity, plus 0.2 MW.

For an infeasible transmission constraint that is subject to the graduated Transmission Shortage Cost mechanism, the additional 20 MW of available resource capacity provided by the demand curve functionality included as part of such mechanism is accounted for in determining the limit adjustment that is necessary to resolve the infeasibility.

IV. Effective Date

The NYISO respectfully requests an effective date of June 20, 2017 (*i.e.*, sixty days from the date of this filing) for the proposed tariff revisions.

Commission acceptance, and NYISO implementation, of the proposed revisions will terminate the going forward need for the previously requested tariff waiver regarding the NYISO's transmission constraint pricing logic.²²

V. Requisite Stakeholder Approval

The proposed tariff amendments were approved by the NYISO Management Committee, without opposition, on March 29, 2017. The NYISO's Board of Directors approved the proposed revisions on April 11, 2017.

²¹ Internal transmission facilities with a zero value CRM consist primarily of export-constrained generation pockets where the transmission system infrastructure was generally designed to provide only the capability necessary to accommodate delivering the generation output within such areas to the system. Applying the graduated Transmission Shortage Cost to these transmission facilities could result in anomalous and undesirable negative price outcomes in certain circumstances without providing the affected generation facilities the ability to Bid in a manner that would minimize their curtailment risk if the applicable transmission facilities become constrained.

²² See Docket No. ER17-758-000, supra, Request for Tariff Waiver (January 6, 2017).

The NYISO has also reviewed the proposed revisions to its transmission constraint pricing logic with the MMU. The MMU has authorized the NYISO to indicate that the MMU supports the proposed changes as appropriate, reasonable and a material improvement to the current logic. The MMU, however, continues to urge the NYISO to pursue further enhancements, including the assessment of implementing constraint-specific pricing mechanisms and further reducing use of the current transmission constraint relaxation logic. The NYISO understands that the MMU is likely to file comments in response to the NYISO's proposal to further describe its position.

VI. Communications and Correspondence

All communications and service in this proceeding should be directed to:

Robert E. Fernandez, General Counsel Raymond Stalter, Director, Regulatory Affairs *Garrett E. Bissell, Senior Attorney 10 Krey Boulevard Rensselaer, NY 12144 Telephone: 518-356-6107 Email: gbissell@nyiso.com

*Person designated for receipt of service.

VII. Service

The NYISO will send an electronic link to this filing to the official representative of each of its customers, to each participant on its stakeholder committees, to the New York State Public Service Commission, and to the New Jersey Board of Public Utilities. In addition, the complete filing will be posted on the NYISO's website at <u>www.nyiso.com</u>.

VIII. Conclusion

The NYISO respectfully requests that the Commission accept the proposed revisions to the Services Tariff and the OATT that are attached hereto with an effective date of June 20, 2017.

Respectfully submitted,

<u>/s/ Garrett E. Bissell</u> Garrett E. Bissell Senior Attorney New York Independent System Operator, Inc.

cc: Michael Bardee Nicole Buell Anna Cochrane Kurt Longo David Morenoff Daniel Nowak Larry Parkinson J. Arnold Quinn Douglas Roe Kathleen Schnorf Jamie Simler Gary Will