New York ISO
Independent System Operator

Constraint Specific Transmission Shortage Pricing

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September 14, 2021

Agenda

- Project Background
- Pricing Impacts of Proposal

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Previous Presentations

Date	Working Group	Discussion points and links to materials
August 26, 2021	Market Issues Working Group (MIWG)	Constraint Specific Transmission Shortage Pricing
June 17, 2021	Market Issues Working Group (MIWG)	Constraint Specific Transmission Shortage Pricing : Updated Analysis and Proposal
May 19, 2021	Market Issues Working Group (MIWG)	Constraint Specific Transmission Shortage Pricing : Project Kickoff
Nov 21, 2019	Market Issues Working Group (MIWG)	Constraint Specific Transmission Shortage Pricing
Feb 15, 2019	Market Issues Working Group (MIWG)	Constraint Specific Transmission Shortage Pricing - Market Design Concept Proposal
October 2, 2018	Market Issues Working Group (MIWG)	Constraint Specific Transmission Shortage Pricing – Study Review
August 7, 2018	Market Issues Working Group (MIWG)	Constraint Specific Transmission Shortage Pricing – High Level Design Considerations
June 25, 2018	Market Issues Working Group (MIWG)	Constraint Specific Transmission Shortage Pricing – Analysis Update
April 10, 2018	Market Issues Working Group (MIWG)	Constraint Specific Transmission Shortage Pricing – Study Approach

Project Background

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A Grid in Transition – The Plan

- **Carbon Pricing**
- **Comprehensive Mitigation Review**
- **DER Participation Model**
- **Energy Storage Participation Model**
- **Hybrid Storage Model**

Aligning Competitive Markets and New York State Clean Energy Objectives

- **Enhancing Energy & Shortage Pricing**
  - Ancillary Services Shortage Pricing
  - **Constraint Specific Transmission Shortage Pricing**
  - Enhanced Fast Start Pricing
- **Review Energy & Ancillary Services Product Design**
  - More Granular Operating Reserves
  - Reserve Enhancements for Constrained Areas
  - Reserves for Resource Flexibility

Valuing Resource & Grid Flexibility

- **Enhancements to Resource Adequacy Models**
- **Revise Resource Capacity Ratings to Reflect Reliability Contribution**
  - Expanding Capacity Eligibility
  - Tailored Availability Metric
- **Capacity Demand Curve Adjustments**

Improving Capacity Market Valuation

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Project Background

- **This project seeks to develop enhancements to the current transmission constraint pricing (TCP) logic to better align the graduated transmission demand curve mechanism with the severity of transmission constraints**
  - The NYISO also intends to eliminate most occurrences of constraint relaxation by including pricing values for shortages that exceed the applicable constraint reliability margin (CRM) value as part of the revised graduated transmission demand curve mechanism
- **Project Deliverable: Market Design Complete in Q4 2021**

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Summary of NYISO's Proposal

- **The NYISO is proposing to implement a revised approach to the current TCP logic consisting of the following components:***
  1. Establish a revised six-step transmission shortage pricing mechanism for facilities currently assigned a non-zero CRM value (see the following slide for additional details)
     - Each step corresponds to a specified percentage of the applicable CRM value. The final step will price all shortages in excess of the applicable CRM value
  2. Apply a non-zero CRM value (e.g., 5 MW) to internal facilities currently assigned a zero value CRM, with a separate two-step transmission demand curve mechanism for such facilities
     - First step is valued at $100/MWh. This step would price transmission shortages up to the proposed CRM value.
     - Second step is valued at $250/MWh. This step would price all shortages in excess of the proposed CRM value.
  3. Maintain the current single value $4,000/MWh shadow price capping method for external interface facilities (zero value CRM) permitting the continued use of constraint relaxation for external interfaces

**Refer to the presentation at the June 17, 2021 ICAPWG/MIWG meeting for additional details regarding the NYISO's proposal*

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NYISO'S Proposal for Non-Zero CRM Value Facilities

- The proposed 6-step transmission demand curve structure for various non-zero CRM values is represented in the table below:

	Proposed Transmission Shortage Pricing Curve steps											
CRM Value (MW)	Step 1 (MW)	Step 1 ($/MWh)	Step 2 (MW)	Step 2 ($/MWh)	Step 3 (MW)	Step 3 ($/MWh)	Step 4 (MW)	Step 4 ($/MWh)	Step 5 (MW)	Step 5 ($/MWh)	Step 6 (MW)	Step 6 ($/MWh)
10	<=2	$200	>2-4	$350	>4-6	$600	>6-8	$1,500	>8-10	$2,500	>10	$4,000
20	<=4	$200	>4-8	$350	>8-12	$600	>12-16	$1,500	>16-20	$2,500	>20	$4,000
30	<=6	$200	>6-12	$350	>12-18	$600	>18-24	$1,500	>24-30	$2,500	>30	$4,000
50	<=10	$200	>10-20	$350	>20-30	$600	>30-40	$1,500	>40-50	$2,500	>50	$4,000
60	<=12	$200	>12-24	$350	>24-36	$600	>36-48	$1,500	>48-60	$2,500	>60	$4,000
65	<=13	$200	>13-26	$350	>26-39	$600	>39-52	$1,500	>52-65	$2,500	>65	$4,000
100	<=20	$200	>20-40	$350	>40-60	$600	>60-80	$1,500	>80-100	$2,500	>100	$4,000

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Pricing Impacts of Proposal

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Overview of Pricing Impacts

- **The proposed revisions to the TCP logic will impact the dispatch solution leading to difference in pricing outcomes**
  - The proposal will modify the value and quantity of MW available to market software from transmission demand curves to assist with managing constraints.
  - The proposal also assigns a non-zero CRM value (e.g., 5 MW) and transmission demand curve mechanism to current internal facilities assigned a zero value CRM (i.e., facilities accommodating flows out of generation pockets)
    - Currently, these facilities are subject to the single value $4,000/MWh shadow price capping logic
- **This presentation aims to illustrate how the proposed TCP enhancements could impact transmission constraint costs**
  - Illustrative examples are provided to demonstrate how the proposal could change transmission constraint costs
  - These examples are intended to provide additional background in reviewing the Consumer Impact Analysis for this project that is also being discussed at today's meeting.

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Example Scenarios

- **The following slides review potential impacts of the proposed TCP enhancements based on the hypothetical examples described below:**
  - Scenario 1 : This scenario assumes that the dispatch using the proposed enhancements results in utilization of same quantity of relief (MW) from the transmission demand curve for a transmission constraint as used with the current logic.
  - Scenario 2: This scenario assumes that the dispatch using the proposed enhancements results in utilization of a different quantity of relief (MW) from the transmission demand curve for a transmission constraint compared to the current logic.
  - Scenario 3: This scenario assumes that the dispatch using the proposed enhancements as well as the existing logic does not result in utilization of any quantity of relief (MW) from the transmission demand curve for a transmission constraint.

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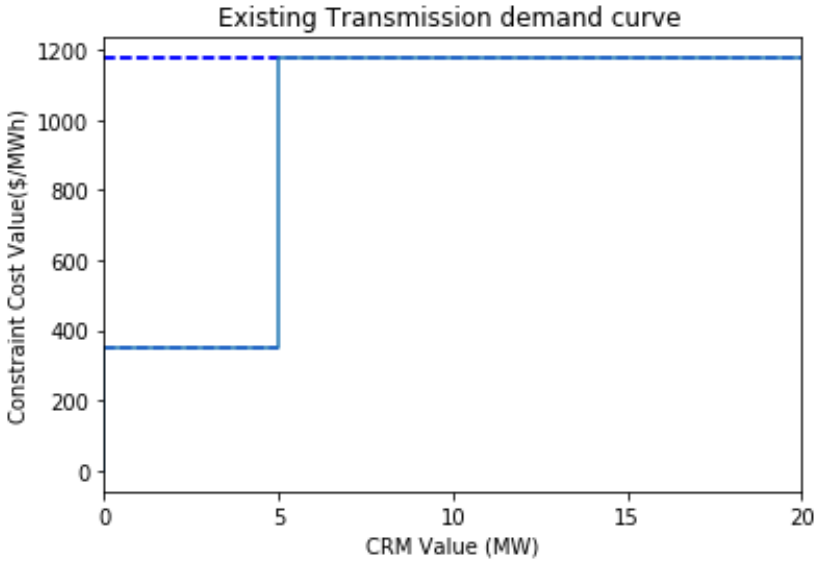
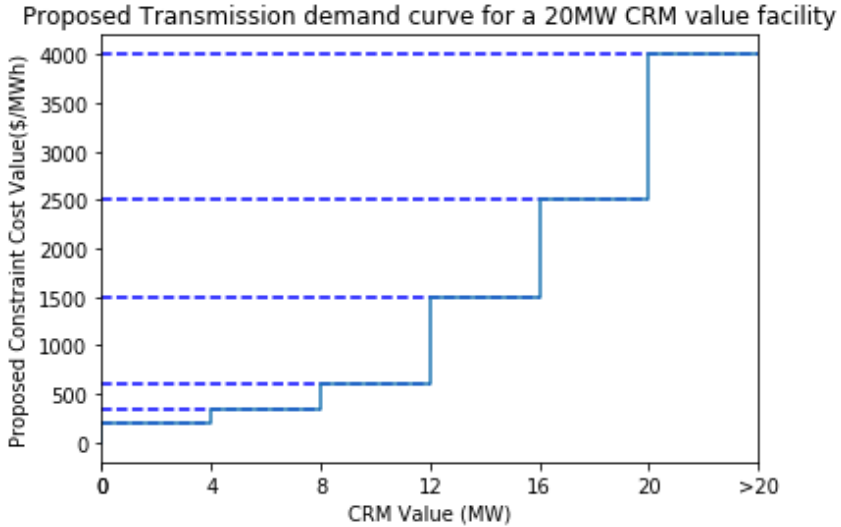
Example Scenarios

- **The example scenarios discussed in upcoming slides assume transmission facility assigned a 20 MW CRM value**
  - A 20 MW CRM transmission facility is used for these examples as this is the most common CRM value applied to transmission facilities by the NYISO
  - The charts below show the existing and proposed transmission demand curve that will be applicable to this example facility





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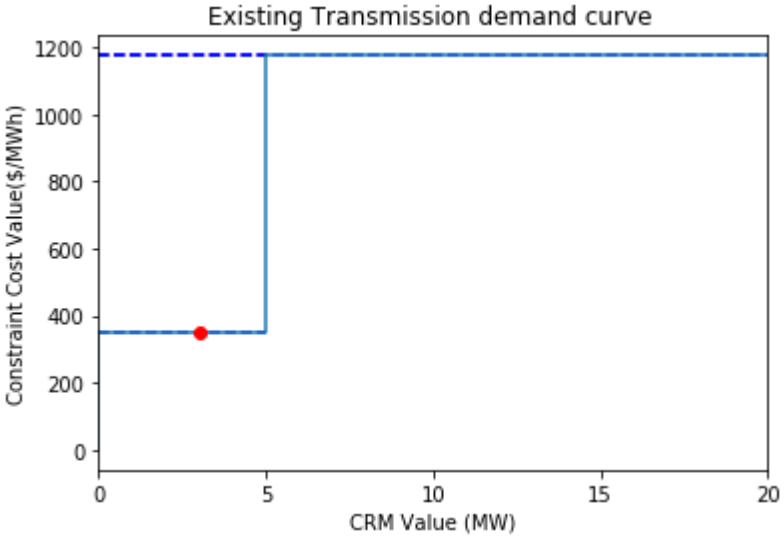
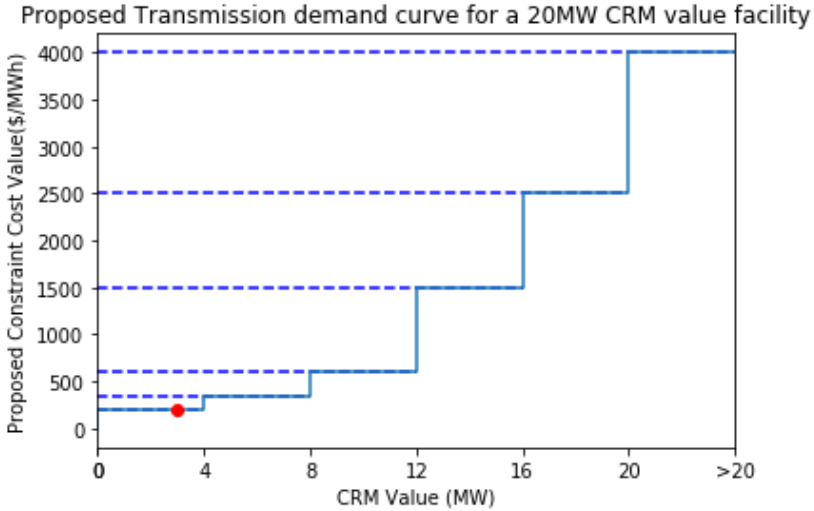
Example Scenario 1

- **Scenario 1 : The dispatch using the proposed enhancements results in utilization of same quantity of relief (MW) from the transmission demand curve for a transmission constraint as used with the current logic**
  - With same quantity of relief from the transmission demand curve, the constraint cost could be different because of the difference in cost values assigned to MW quantities of the transmission demand curve
  - Example : Facility uses 3 MW relief from the transmission demand curve
    - The constraint cost is lower with the proposed enhancements compared to the current logic



Constraint cost = $350/MWh



Constraint cost = $200/MWh

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Example Scenario 1 (cont'd)

- **Scenario 1 examples from the Consumer Impact Analysis results:**
  - Two examples are shown in the table below from the re-runs conducted as part of the Consumer Impact Analysis that reflect the conditions similar to Scenario 1
    - These results are obtained by re-running a Day-Ahead Market (DAM) day with inclusion of the proposed TCP logic
    - In both examples, the quantity of relief from the transmission demand curve with the proposed enhancements are nearly equal to the relief with the current logic, but the shadow cost are different

Re-run day : June 28, 2021						
Contingency Name	Facility name	Time	Original		New	
			Shadow Cost ($/MWh)	Demand Curve MWs	Shadow Cost ($/MWh)	Demand Curve MWs
BUS:PORTJEFF_876_877& BK7&GENS	ELWOOD__- PULASKLI_69__670	16:00	$ 424.16	5	$ 600	4.26
TWR:PACKARD 77 & 78	PACKARD_- NIAGB130_115_181-922	17:00	-$350	2.67	-$ 200	3.18

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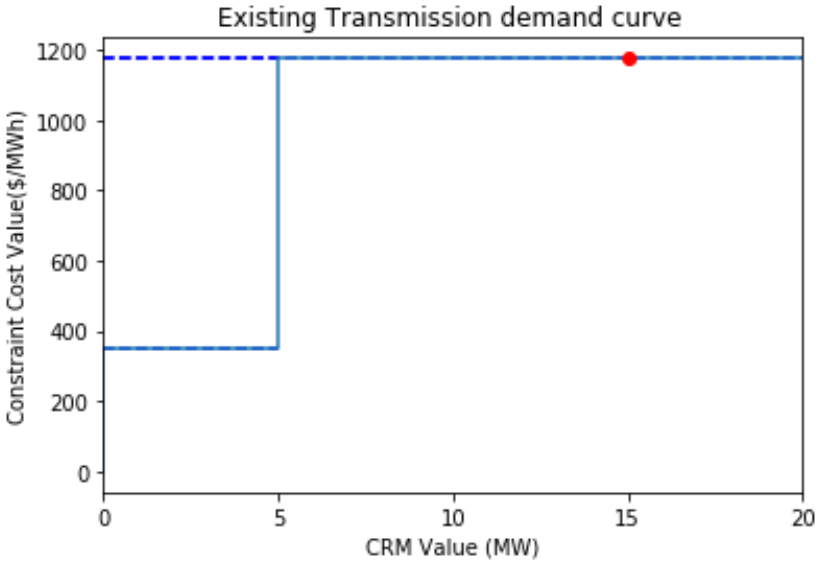
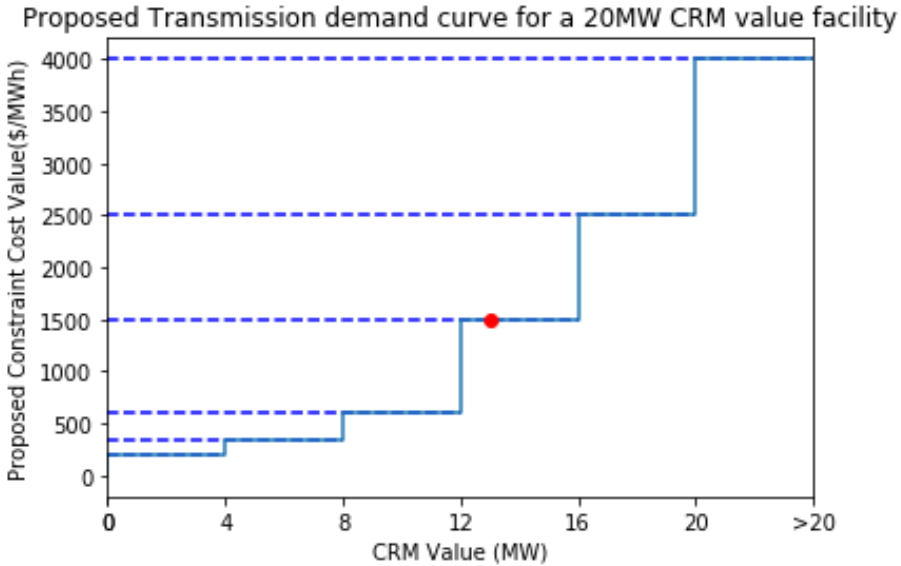
Example Scenario 2

- **Scenario 2: The dispatch using the proposed enhancements results in utilization of a different quantity of relief (MW) from the transmission demand curve for a transmission constraint compared to the current logic**
  - With different quantities of relief from the transmission demand curve, the constraint cost could be different because of the difference in cost values assigned to MW quantities of the transmission demand curve
  - Example : Facility uses 15 MW of case relief from the transmission demand curve with the current logic and 13 MW with the proposed enhancements
    - The constraint cost is higher with the proposed enhancements compared to the current logic



Constraint cost = $1175/MWh



Constraint cost = $1500/MWh

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Example Scenario 2 (cont'd)

- **Scenario 2 example from the Consumer Impact Analysis results:**
  - An example is shown in the table below from the re-runs conducted as part of the Consumer Impact Analysis that reflects the conditions of Scenario 2
    - These results are obtained by re-running a DAM day with inclusion of the proposed TCP logic
    - The quantity of relief provided by the transmission demand curves differs for each case. In this example, the shadow cost of constraint is lower with the proposed enhancements compared to the current logic

Re-run day : June 29, 2021						
Contingency Name	Facility name	Time	Original		New	
			Shadow Cost ($/MWh)	Demand Curve MWs	Shadow Cost ($/MWh)	Demand Curve MWs
COLTON__-HIGLEY___115_1	COLTON__-FLATROCK_115_2	16:00	297.79	0	200	2.51

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Example Scenario 3

- **Scenario 3: The dispatch using the proposed enhancements as well as the existing logic does not result in utilization of any quantity of relief (MW) from the transmission demand curve for a transmission constraint**
  - The incorporation of proposed enhancements can change the dispatch solution compared to the existing TCP logic. This could therefore result in a different transmission shadow costs compared to the current logic

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Example Scenario 3 (cont'd)

- **Scenario 3 example from the Consumer Impact Analysis results:**
  - An example is shown in the table below from the re-runs conducted as part of the Consumer Impact Analysis that reflects the conditions of Scenario 3
    - These results are obtained by re-running a DAM day with inclusion of the proposed TCP logic
    - Although no relief is provided from the transmission demand curve in either case, the proposed enhancements result in a change in the cost for the constraint. The cost difference is due to a change in physical dispatch between the two cases.

Re-run day : June 29, 2021						
Contingency Name	Facility name	Time	Original		New	
			Shadow Cost ($/MWh)	Demand Curve MWs	Shadow Cost ($/MWh)	Demand Curve MWs
BASE CASE	VERNON__-GREENWD__138_31231	9:00	-0.21	0	-65.5	0

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Questions?

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Our mission, in collaboration with our 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 policymakers, stakeholders and investors in the power system

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