

## **9 Attachment C - Methodology to Assess Available Transfer Capability**

The ISO shall calculate Firm and Non-Firm Available Transfer Capability ("ATC")

according to the procedures set forth in this Attachment C which adopts the "Rated System Path Methodology" established by the North American Electric Reliability Corporation's Reliability Standard MOD-029-1a, or its successors.. Any additional information or detail shall be set forth in the ISO's ATC Implementation Document ("ATCID").

## 9.1 Overview

The ISO shall calculate and post ATC values for its Internal and External Interfaces and for Scheduled Lines. The ISO's Interfaces represent a defined set of transmission facilities that separate Locational Based Marginal Pricing (LBMP) Load Zones within the New York Control Area and that separate the New York Control Area from adjacent Control Areas. External Interfaces may be represented by one or more Proxy Generator Buses for scheduling and dispatching purposes. Each Proxy Generator Bus may be associated with distinct, posted ATC values. Scheduled Lines represent a transmission facility or set of transmission facilities that provide a separate scheduling path interconnecting the ISO to an adjacent Control Area. Each Scheduled Line is associated with a distinct Proxy Generator bus for which the ISO separately posts ATC.

ATC shall be calculated and posted after the close of the ISO's Day-Ahead Market and Real-Time Market for all Internal and External Interfaces and for Scheduled Lines.- ATC for certain Scheduled Lines may be calculated by neighboring Control Area operators using their own procedures but shall be posted by the ISO.

The ISO's ~~shall calculate calculation of~~ ATC ~~values using a methodology that shall~~ reflects its provision of transmission service under an LBMP system and the schedules produced by its Day-Ahead Market and Real-Time Market software. The ISO shall not limit Transmission Customers' ability to schedule Firm Transmission Service across Internal Interfaces based on ATC values. If the posted ATC value for an Interface is zero that is an indication that the Interface is congested. The ISO may, however, still be able to provide additional Firm Transmission Service over Internal Interfaces for Transmission Customers that are willing to pay congestion charges by redispatching the New York State Power System. ▲

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## 9.2 Methodology for Computing Firm and Non-Firm ATC

The ISO also calculates Firm ATC based on the market schedules determined using its Security Constrained Unit Commitment (“SCUC”) process for the Day-Ahead Market and its Real-Time Commitment (“RTC”) and Real-Time Dispatch (“RTD”) (together, “Real-Time Scheduling” (“RTS”)) process for the Real-Time Market. These Firm ATC values shall be posted after the close of the Day-Ahead Market and Real-Time Market for all Interfaces and Scheduled Lines.

When calculating Firm ATC (“ATC<sub>F</sub>”) for an Interface for a specified period, the ISO shall use the algorithm established under Requirement 7 of MOD-029-1a. Specifically:

For all purposes and for all time periods, the ~~The ISO shall calculate and posts Firm ATC (“ATC<sub>F</sub>”) using the formula established under Requirement 7 of MOD-029-1a. Specifically: by first~~

$$ATC_F = TTC - ETC_F - CBM - TRM + Postbacks_F + counterflows_F$$

Where

ATC<sub>F</sub> is the firm Available Transfer Capability for the Interface for that period.

TTC is the Total Transfer Capability of the Interface for that period.

ETC<sub>F</sub> is the sum of existing firm commitments for the Interface during that period

(including Firm Transmission Flow Utilization).

CBM is the Capacity Benefit Margin for the Interface during that period.

TRM is the Transmission Reliability Margin for the Interface during that period.

Postbacks<sub>F</sub> are changes to firm Available Transfer Capability due to a change in the use of Transmission Service for that period, as defined in Business Practices.

counterflows<sub>F</sub> are the adjustments to ATC<sub>F</sub> as determined by the ISO and specified in its

ATCID.

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determining Total Transfer Capability (“TTC”) and then subtracting Firm Transmission Flow Utilization and Transmission Reserve Margin (“TRM”). Thus:

$$ATC_{Firm} = TTC - \text{Transmission Flow Utilization}_{Firm} - (TRM)$$

When calculating non-firm ATC (“ATC<sub>NF</sub>”) for an Interface for a specified period, the ISO shall use the algorithm established under Requirement 8 of MOD-029-1a. Specifically:

For all purposes and for all time periods, the ISO shall calculate and post Non-Firm ATC Firm ATC (“ATC<sub>NF</sub>”) using the formula established under Requirement 8 of MOD-029-1a. Specifically:

$$ATC_{NF} = TTC - ETC_F - ETC_{NF} - CBM_S - TRM_U + \text{Postbacks}_{NF} + \text{counterflows}_{FNF}$$

Where

**ATC<sub>NF</sub>** is the non-firm Available Transfer Capability for the Interface for that period.

**TTC** is the Total Transfer Capability of the Interface for that period.

**ETC<sub>F</sub>** is the sum of existing firm commitments for the Interface during that period (including Firm Transmission Flow Utilization).

**ETC<sub>NF</sub>** is the sum of existing non-firm commitments for the Interface during that period.

**CBM<sub>S</sub>** is the Capacity Benefit Margin for the Interface that has been scheduled during that period.

**TRM<sub>U</sub>** is the Transmission Reliability Margin for the Interface that has not been released for sale (unreleased) as non-firm capacity by the ISO during that period.

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**Postbacks<sub>NF</sub>** are changes to non-firm Available Transfer Capability due to a change in the use of Transmission Service for that period, as defined in Business Practices

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**counterflows<sub>ENF</sub>** are the adjustments to ATC<sub>NF</sub> as determined by the ISO and specified in its ATCID.

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~~by first calculating the amount of Firm ATC and then subtracting Non-Firm Transmission Flow Utilization:~~

$$~~ATC_{Non-Firm} = ATC_{Firm} - Transmission\ Flow\ Utilization_{Non-Firm}~~$$

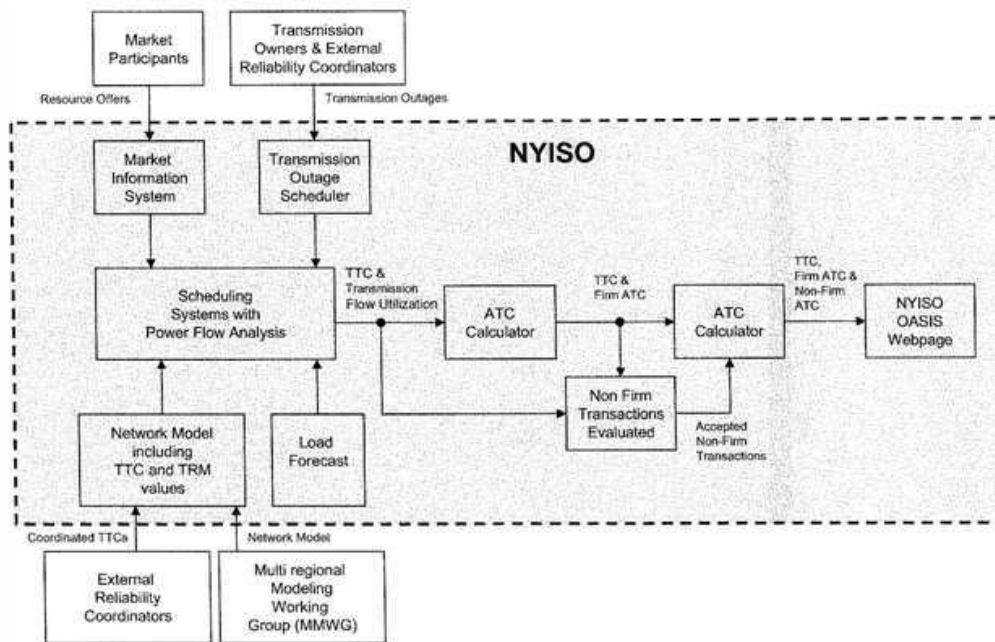
The ISO's ATC calculation algorithms are posted at the "ATC Detailed Algorithms" link at: ~~[http://www.nyiso.com/public/market\\_data/power\\_grid\\_data/dam\\_outages.jsp](http://www.nyiso.com/public/market_data/power_grid_data/dam_outages.jsp)~~

~~[http://www.nyiso.com/public/webdocs/market\\_data/power\\_grid\\_info/ATCDetailedAlgorithm.pdf](http://www.nyiso.com/public/webdocs/market_data/power_grid_info/ATCDetailedAlgorithm.pdf)~~

### 9.3 Process Flow Diagram

The following diagram illustrates the process that the ISO follows when computing and posting ATC.

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#### **9.4 Existing Transmission Commitments (“ETC”)**

The ISO shall calculate ETC for firm Existing Transmission Commitments (ETC<sub>F</sub>) for a specified period for an Interface, using the formula established under Requirement 5 of MOD-029-1a. Specifically:

$$\text{ETC}_F = \text{NL}_F + \text{NITS}_F + \text{GF}_F + \text{PTP}_F + \text{ROR}_F + \text{OS}_F$$

**Where:**

NL<sub>F</sub> is the firm capacity set aside to serve peak Native Load forecast commitments for the time period being calculated, to include losses, and Native Load growth, not otherwise included in Transmission Reliability Margin or Capacity Benefit Margin.

NITS<sub>F</sub> is the firm capacity reserved for Network Integration Transmission Service serving Load, to include losses, and Load growth, not otherwise included in Transmission Reliability Margin or Capacity Benefit Margin.

GF<sub>F</sub> is the firm capacity set aside for grandfathered Transmission Service and contracts for energy and/or Transmission Service, where executed prior to the effective date of a Transmission Service Provider’s Open Access Transmission Tariff or “safe harbor tariff.”

PTP<sub>F</sub> is the firm capacity reserved for confirmed Point-to-Point Transmission Service.

ROR<sub>F</sub> is the firm capacity reserved for Roll-over rights for contracts granting Transmission Customers the right of first refusal to take or continue to take Transmission Service when the Transmission Customer’s Transmission Service contract expires or is eligible for renewal.

OS<sub>F</sub> is the firm capacity reserved for any other service(s), contract(s), or agreement(s) not specified above using Firm Transmission Service as specified in the ATCID.

The ISO shall calculate ETC for non-firm Existing Transmission Commitments (ETC<sub>NF</sub>) for a specified period for an Interface, using the formula established under Requirement 6 of MOD-029-1a. Specifically:

$$\text{ETC}_{NF} = \text{NITS}_{NF} + \text{GF}_{NF} + \text{PTP}_{NF} + \text{OS}_{NF}$$

**Where:**

NITS<sub>NF</sub> is the non-firm capacity set aside for Network Integration Transmission Service serving Load (i.e., secondary service), to include losses, and load growth not otherwise included in Transmission Reliability Margin or Capacity Benefit Margin.

GF<sub>NF</sub> is the non-firm capacity set aside for grandfathered Transmission Service and contracts for energy and/or Transmission Service, where executed prior to the effective date of a Transmission Service Provider's Open Access Transmission Tariff or "safe harbor tariff."

PTP<sub>NF</sub> is non-firm capacity reserved for confirmed Point-to-Point Transmission Service.

OS<sub>NF</sub> is the non-firm capacity reserved for any other service(s), contract(s), or agreement(s) not specified above using non-firm transmission service as specified in the ATCID.

OS<sub>F</sub> and OS<sub>NF</sub> shall include a Transmission Flow Utilization value which shall be based on the market schedules determined using the SCUC and RTS market software. The Day-Ahead Market and Real-Time Market schedules established by the market software are security constrained network powerflow solutions that are used to determine the Transmission Flow Utilization value for the ISO's Interfaces and Scheduled Lines. Thus:

Transmission Flow Utilization<sub>Firm</sub> for each Internal and External Interface is determined by the corresponding security constrained network powerflow solutions of SCUC or RTS, as applicable.

Transmission Flow Utilization<sub>Non-Firm</sub> for each Internal and External Interface is the sum of Non-Firm Transactions scheduled.

Transmission Flow Utilization<sub>Firm</sub> for Scheduled Lines is determined by the corresponding security constrained network powerflow solutions of SCUC or RTS, as applicable.

Transmission Flow Utilization<sub>Non-Firm</sub> for Scheduled Lines is the sum of Non-Firm Transactions scheduled.



#### **9.45 Total Transfer Capability (“TTC”)**

The ISO shall develop TTC values for each Interface and Scheduled Line in conformance with all applicable requirements of of MOD-029-1a, or its successors. External Interfaces may be represented by one or more Proxy Generator Buses for scheduling and dispatching purposes. Each Proxy Generator Bus associated with an External Interface may be associated with distinct, posted TTC values. Each Scheduled Line is associated with a distinct Proxy Bus for which the ISO separately posts a TCC value.

The TTC value for each Interface and Scheduled Line shall be the maximum amount of electric power that can be reliably transferred over the New York State Transmission System. The ISO shall use studies that it performs, joint studies conducted with neighboring Control Areas, and real-time system monitoring to determine the appropriate TTC values. The TTC values are periodically reviewed and may be updated as warranted to ensure that accurate values are posted.

Databases used in the determination of the TTC values include MultiRegional Modeling Working Group system representations, and the ISO’s Day-Ahead Market and Real-Time Market system representations.

The normal maximum Interface and Scheduled Line TTC values correspond to TTC assessments that assume: (1) all significant Bulk Power System transmission facilities are in service, (2) Capability Period forecast peak-load conditions, (3) no significant generation outages with generation output levels consistent with typical operation for Capability Period forecast peak-load conditions, and (4) coordination with neighboring Control Area transfer capability assessments.

Interface or Scheduled Line TTC values may be modified in response to identified transmission facility or generation outage conditions. TTC values may also be modified to account for neighboring Control Area transfer capability assessments for identified transmission facility or generation outage conditions, assuming the NYISO receives timely notification of such conditions, or to account for operating conditions affecting the New York State Transmission System.

## **9.5—Transmission Flow Utilization**

~~With respect to the ATC calculation that the ISO performs after the closing of the Day-Ahead Market and the Real Time Market, the ISO shall use the SCUC and RTS market software to determine market schedules. The Day Ahead Market and Real Time Market schedules established by the market software are security constrained network powerflow solutions that are used to determine the Transmission Flow Utilization value for the ISO's Interfaces and Scheduled Lines. Thus:~~

~~Transmission Flow Utilization<sub>Firm</sub> for each Internal and External Interface is determined by the corresponding security constrained network powerflow solutions of SCUC or RTS, as applicable.~~

~~Transmission Flow Utilization<sub>Non-Firm</sub> for each Internal and External Interface is the sum of Non-Firm Transactions scheduled.~~

~~Transmission Flow Utilization<sub>Firm</sub> for Scheduled Lines is determined by the corresponding security constrained network powerflow solutions of SCUC or RTS, as applicable.~~

~~Transmission Flow Utilization<sub>Non-Firm</sub> for Scheduled Lines is the sum of Non-Firm Transactions scheduled.~~

## 9.6 Transmission Reliability Margin ("TRM")

TRM is the amount of transmission transfer capability necessary to ensure that the interconnected transmission network remains secure under a reasonable range of system conditions. TRM accounts for the inherent uncertainty in system conditions and the need for operating flexibility to ensure reliable system operation as system conditions change.

The ISO shall maintain a TRM Implementation Document ("TRMID") in compliance with the requirements of MOD-008-1, or its successors..

Databases used in the determination of the TRM values include the MultiRegional Modeling Working Group system representations and the ISO's Day-Ahead Market and Real-Time Market system representations.

TRM equal to the sum of the following components shall be applied to calculations conducted up to eighteen months before the Dispatch Day to address unexpected system conditions including: (1) uncertainty in unscheduled loop or parallel flows ranging in value from zero (0) MW to five hundred (500) MW based on the greater of the average of the last three months of historical parallel flows observed for each External Interface or the average of the deviation in parallel flows observed over the last three months for each External Interface, (2) load forecast uncertainty (normally this value is set to zero (0) MW), (3) uncertainty in external system conditions (normally this value is set to zero (0) MW), and (4) External Interface transmission facility availability ranging in value from zero (0) MW to one thousand (1000) MW reflecting the uncertainty of transfer capability resulting from the most significant single transmission facility outage for each External Interface.

The TRM used for purposes of ATC calculations conducted for External Interfaces for the Day-Ahead Market and the Real-Time Market shall be used to address unexpected system

conditions equal to the sum of the following components: (1) uncertainty in unscheduled loop or parallel flows ranging in value from zero (0) to five hundred (500) MW based on the greater of the average of the last three months of historical parallel flows observed for each External Interface or the average of the deviation in parallel flows observed over the last three months for each External Interface, (2) load forecast uncertainty, normally of value zero (0) MW, and (3) uncertainty in external system conditions, normally of value zero (0) MW. ▲

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The TRM used for purposes of the ATC calculations conducted for Internal Interfaces for the Day-Ahead Market and the Real-Time Market shall normally be equal to the sum of the following components or a value of one hundred (100) MW, although the ISO may increase it above that level if necessary. TRM is applied to these ATC calculations to address unexpected system conditions including: (1) unscheduled loop or parallel flows normally of value zero (0) MW, (2) load forecast uncertainty normally of value zero (0) MW, (3) uncertainty in external and internal system conditions normally of value one hundred (100) MW, and (4) ISO Balancing Authority requirements normally of value zero (0) MW.

The TRM used for purposes of the ATC calculations conducted for Scheduled Lines for the Day-Ahead Market and the Real-Time Market shall normally be equal to the sum of the following components, which will ordinarily be expected to have a combined value of zero (0) MW, although the ISO may increase it above that level if necessary: (1) unscheduled loop or parallel flows ranging based on the average of the last three months of historical parallel flows observed for each associated External Proxy Generator Bus, normally of value zero (0) MW, (2) load forecast uncertainty, normally of value zero (~~0e~~) MW, and (3) uncertainty in external system conditions, normally of value zero (0) MW.

TRM is used to decrement TTC from External and Internal Interfaces and from Scheduled Lines when calculating ATC, and thus is not available when requesting Non-Firm transmission service. The ISO may, however, still be able to provide additional Firm Transmission Service over Internal Interfaces for Transmission Customers that are willing to pay congestion charges by redispatching the New York State Power System.

The specific values of TRM used on each Internal and External Interface and Scheduled Line are posted on the ISO's website. The TRM values are periodically reviewed by the ISO and may be updated as warranted. In compliance with Requirement 4 of MOD-008-1, or its successors, the ISO shall establish TRM values at least every thirteen months in accordance with its TRMID.

~~9.7 Existing Transmission Commitments (“ETC”)~~

~~The ISO shall not set aside transmission capacity as ETC when calculating ATC or otherwise in developing SCUC and RTS market schedules.~~

### **9.78 Capacity Benefit Margin**

~~The ISO shall not set aside transmission capacity as CBM, or account for “postbacks” when calculating ATC or otherwise in developing SCUC and RTS market schedules. Neither CBM nor postbacks are used in the ISO’s LBMP based system.~~ The ISO shall not set aside transmission capacity as CBM but shall maintain a CBM Implementation Document (“CBMID”) in compliance with the requirements of MOD-004-1, or its successors, which shall include all of the information required by that Reliability Standard. In compliance with Requirements 5 and 6 of MOD-004-1, or its successors, the ISO shall establish CBM values at least every thirteen months in accordance with its CBMID.



### **9.89 Coordinated ATC Postings**

The ISO's practice is to make joint TTC/ATC postings along with neighboring system operators on the website of the Northeast Power Coordinating Council. The ISO does not coordinate its ATC calculations with neighboring system operators because they do not incorporate the Transmission Flow Utilization information produced by the ISO's market software into their ATC calculations.