ISO NEW YORK INDEPENDENT SYSTEM OPERATOR

ConOp

Pre-Scheduling: Forward Ramp and Transmission Reservations

Concept of Operation

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Introduction

The pre-scheduling methodology described in this COO combines a system of forward ramp and transmission reservations and schedule commitments for transactions to and from the New York external proxy buses with the New York bid-based scheduling and financial rights system. With pre-scheduling, market participants may obtain advance ramping and transmission reservations for external transactions while committing themselves to physically supplying and/or withdrawing energy consistently with their pre-scheduled transactions. In subsequently scheduling additional bid-based transactions, the NYISO scheduling software, unit commitment and dispatch models will look ahead and evaluate NYISO ramp constraints in future hours, taking into account pre-scheduled commitments. The primary changes required to extend the New York market design to include pre-scheduling are enhancements to information systems to facilitate the submission of pre-schedules, to enable the NYISO scheduling interface software to evaluate control area ramping capability and inter-tie transmission capacity on a continuous basis, to facilitate the evaluation of future ramping constraints during BME and to impose appropriate inter-control area-specific ramp limits in SCUC and BME.

The proposed pre-scheduling methodology would accomplish several objectives: (1) it would allow market participants to schedule non-price sensitive transactions to and from the external proxy buses continuously, both in advance of the day-ahead market and before the balancing market evaluation; (2) it would further harmonize New York and PJM scheduling practices for external transactions; (3) it would be consistent with the NYISO's bid-based scheduling process for external transactions used during the day-ahead and balancing markets; (4) it would provide a framework for scheduling external transactions after BME has been run, on a best-efforts basis; and (5) it would provide a set of forward schedules that could be checked-out periodically with ISOs adjacent to New York, allowing advance coordination of ramp reservations between New York and other Northeast ISOs, and providing advance notice of other problems, such as with NERC tags.

This document begins with a detailed explanation of the format for pre-scheduling requests and of how the pre-scheduling process would work prior to SCUC and up to and past the time that BME is executed each hour. **[Changes to bidding, scheduling billing systems, tariffs, and software]**

Definitions and Abbreviations

Item	Description
ATC	Available Transmission Capacity
BME	Balancing Market Evaluation
DAM	Day-Ahead Market
MIS	Management Information System
NTAC	NYPA Transition Adjustment Charge
NYCA	New York Control Area
SCUC	Security-Constrained Unit Commitment
TSC	Transmission Service Charge
TUC	Transmission Usage Charge

Detailed Description

Form of Pre-Schedule Requests

Requests for pre-schedules will all take the same form, regardless of when they are submitted to the NYISO. Pre-schedules are requests to either:

1. Inject a specific number of MWhs in a specific hour or hours at a New York external proxy bus.

2. Withdraw a specific number of MWhs in a specific hour or hours at a New York external proxy bus.

3. Wheel a specific number of MWhs in a specific hour or hours between two New York external proxy buses.

Requests for pre-schedules that are accepted are converted into bids that, in effect, make the transactions "price taking." This requirement ensures that pre-scheduled transactions will be scheduled without regard to other transactions that are bid into SCUC or BME. Thus, pre-scheduled requests to inject at an external proxy bus will be assigned a bid of -$1000 in each hour. Pre-scheduled requests to withdraw at an external proxy bus will be assigned a bid of +$1000 in each hour. Finally, pre-scheduled wheeling requests will be assigned a decremental bid of -$1000 for the external supply source. Under the pre-scheduling system, the NYISO MIS software will be modified to limit SCUC and BME bids at external proxy buses for transactions that are not prescheduled to be between -$999 and +$999.[1] As a result, pre-scheduled transactions, which have bids of +/-$1000, will not be displaced in the SCUC and BME scheduling processes by other bids at the same external bus. This priority is provided by the pre-scheduling parties' implied willingness to pay for completing their pre-scheduled transactions.

The other important feature of pre-scheduled transactions is that once scheduled they may not be altered except as described below. This restriction will enable the NYISO and the other control areas to accept more transactions than would otherwise be the case, because it allows the NYISO to assume, in evaluating ramp and transmission constraints, that previously approved pre-scheduled transactions will flow in real time.

Market participants will be permitted to submit a number of pre-schedule requests for simultaneous evaluation.[2] By submitting a batch of pre-schedule requests for simultaneous evaluation, market participants may be able to craft bundles of transactions that in aggregate satisfy ramp or transmission constraints.

The parameters of a pre-scheduling request are described in the table below. These parameters apply to pre-schedules submitted prior to SCUC, between SCUC and BME, and following BME.

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[1] Bids at buses internal to the NYCA could still be +$1000 or -$1000.

[2] The decision about how many requests may be submitted simultaneously may be made at the time of the software specification. The minimal number of simultaneous requests will be determined based on market participant input and software capabilities.

Schedule Parameter	Description

Schedule origin
   New preschedule request
   Conversion of SCUC schedule
	Valid entries are either "new" or "SCUC Conversion"

Information to be supplied for requesting the conversion of an SCUC schedule to a preschedule:	
SCUC Transaction ID Number	This field should be left blank for new preschedule requests
Information to be supplied for new pre-schedule requests (should not be supplied for SCUC schedule conversion requests):	

Transaction type
   Injection
   Withdrawal
   Wheel
	Injection will be assigned a bid of -$1000
	Withdrawal will be assigned a bid of +$1000
	Wheel will be assigned a bid of -$1000 for supply source

MWs	Fixed number of megawatts
Start time	Day and hour in which the pre-scheduled transaction will start
End time	Day and hour in which the pre-scheduled transaction will end
Injection proxy bus (External proxy generator bus PTID)	Enter for injections and wheels. Valid entries are PJM, NEPOOL, Ontario and HydroQuebec
Withdrawal proxy bus (External proxy load bus PTID)	Enter for withdrawals and wheels. Valid entries are PJM, NEPOOL, Ontario and HydroQuebec
Transaction ID Number	A unique identifier, which could be chosen by transmission customer or assigned by scheduling interface software
NERC tag	
Real-time only	Check this box if the pre-scheduled transaction should be scheduled only in BME. If approved, these transactions would have no day-ahead settlements but would hold ramp in SCUC**.**

Evaluation of Pre-Schedule Requests Prior to SCUC

Pre-scheduling requests will be entered into the MIS, or into an alternate internet-based scheduling interface, as determined by the NYISO and its committees. This software will first check whether all of the parameters for the pre-scheduled transaction request are correctly entered. If any information is not valid, or was entered incorrectly, the customer entering the information will be informed immediately by the scheduling interface software and will have the opportunity to correct the error.

Once the information for a request has been entered, the scheduling interface software will query whether the customer would like the request to be evaluated immediately or would like to queue up one or more additional requests to submit for evaluation at the same time. The customer will have the option of creating a block of requests before indicating that they all be evaluated for feasibility at the same time. The scheduling software will then immediately determine whether or not the request (or requests) can be validated and provide this information to the customer. Pre-scheduling requests will be considered by the scheduling software in the order in which they are submitted for evaluation, not based on the time at which the pre-scheduling information is entered into the system.

The validation software will check ramping availability and transmission availability on the external interface(s) to the external proxy bus or buses.

Ramping Availability

Ramping constraints will be enforced for the NYCA as a whole, and also for interfaces with specific neighboring control areas. The NYCA ramping limit will be determined by the NYISO, and the ramping limits with neighboring control areas will be reached through agreements between the NYISO and PJM, the ISO-NE, HydroQuebec and the Ontario IMO.

The scheduling software will have information concerning these ramping limits and will keep a running tally of how much ramp room remains on each after each pre-schedule request is approved. Approved pre-schedule requests in the counterflow direction will provide "counter-ramp," increasing the amount of ramp available for subsequent transactions. Approved pre-schedules cannot be withdrawn without the approval of both of the affected control area operators; hence these transactions will both hold ramp and ramp may be scheduled against them.

In evaluating ramping limits, the software will examine all of the hourly transitions affected by the pre-schedule (or by a block of pre-schedules that are submitted for evaluation simultaneously). For example, if a transaction were proposed to come on line at hour t, the software would not only evaluate the ramp limits for the transition from hour t-1 to t, it would also look forward to hour t+1 and evaluate whether the ramp limits would be preserved in the transition between hour t and hour t+1. For injection and withdrawal schedules, ramping availability will be checked for all relevant ramping limits for four hourly transitions. Referring to the first hour of the transaction as hour t and the last hour as hour x, transitions will be checked between: hour t-1 and hour t; hour t and hour t+1; hour x-1 and hour x; and hour x and hour x+1.Wheeling transactions will not affect ramping availability for the NYCA as a whole. However, they may affect ramping limits on specific inter-control area interfaces. For each interface affected by a wheeling transaction, ramping will be checked for four hourly transitions, as described above.

Transmission Availability

External transmission constraints between the NYCA and each of its external proxy buses will be enforced by the scheduling software in evaluating pre-scheduling requests.[3] The limits on these interfaces are determined by …. and are updated …. **[Complete]** The ATC on each of the external interfaces that will be available for pre-schedules will be updated over time as transmission conditions change and can be more accurately forecasted. The ATC thus may change between 18 months before the dispatch-day, when pre-schedule requests may first be submitted, and the actual dispatch-day, reflecting available information regarding outages and loop-flow. The ATC that will be made available for pre-schedules to each external proxy bus at different points in time will also depend on analysis of past NYISO operating data

The scheduling software will have information concerning the ATC on the interface to each external proxy bus and will track how much capacity remains on each interface in each dispatch hour after each pre-schedule request is approved. Approved pre-schedule requests in the counterflow direction will increase the transmission capacity available for subsequent transactions.

Transmission availability will be checked for all hours of a pre-schedule request (or block of requests).

Evaluation Results

The NYISO scheduling software will automatically track pre-schedules and will accept prescheduled transaction requests until ramp or interface capacity is exhausted for one or more hours affected by the

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[3] The scheduling software will not check transmission availability within the NYCA that can be resolved through redispatch in SCUC or BME.

transaction.[4] In validating pre-scheduled transactions, the scheduling interface will simultaneously evaluate bundles of transaction requests submitted simultaneously by the market participant, thus allowing market participants to submit bundles of transactions that in aggregate satisfy ramp and transmission constraints when one (or more than one) ramp or transmission constraint is binding.

If either ramping or transmission capacity are not available for any hour of a pre-schedule request, the request will be denied by the scheduling software.[5] The software will provide the customer with the reason that the request has been denied and an opportunity for the customer to modify and resubmit its request. For example, if a request were denied because ramping was not available in the first hour, the customer might be able to resubmit the request after shifting the start of the transaction forward or back one hour in time.

If a pre-schedule request is not approved at one point in time, the customer may resubmit the request at a later time. The design of the scheduling software will facilitate resubmission by making it possible for market participants to save past requests to avoid reentering the same information a second time. If a request were denied because of limited transmission to the external proxy bus, the customer might wish to resubmit its request when ATC is updated.

Evaluation of Pre-Schedules in SCUC

Pre-scheduled transactions that are approved prior to SCUC will be automatically represented in SCUC, except if they opt to be settled in real time. No modifications will need to be made to the SCUC software to accommodate these transactions, although software will need to be written to translate accepted pre-schedules into SCUC bids. Injection pre-schedules would appear as bids of -$1000, withdrawal pre-schedules would appear as bids of +$1000 and wheeling pre-schedules would appear with bids of -$1000 for the supply source. Pre-schedules that opt to be settled only in real time will not be considered or represented in SCUC.

The final set of transactions scheduled in SCUC will likely differ from those prescheduled, because market participants will likely submit additional bids into SCUC. These additional bids could serve to relieve a binding ramp or transmission constraint or might cause such a constraint to become binding. All pre-scheduled transactions will generally be scheduled to flow in SCUC, except in the unlikely case that available transmission capacity is reduced due to outages and counterflow is not available. Since the pre-schedule bids indicate a willingness to pay a high price for counterflow, such a situation is unlikely.

To support pre-scheduling, SCUC will enforce appropriate interface-specific hour–to-hour ramp limits in the day-ahead market, as well as the NYCA limit. In addition, like the scheduling interface software, the SCUC ramping evaluation for hour t will not only evaluate ramp limits for the transition from hour t-1 to t, it will also look forward to hour t+1 and evaluate whether the ramp limit would be preserved in the transition between hour t transactions and hour t+1.[6] The SCUC optimization will implicitly take into

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[4] It should be recognized that it would still be possible for a prescheduled transaction on one interface to be displaced from the day-ahead market by a transaction on another interface due to differential transmission congestion effects.

[5] It is possible that ramp and/or interface constraints could become limiting for the interfaces with different control areas at different points in time. Thus, for example, additional pre-schedules might be feasible from Ontario, at a point in time when the transmission capacity from the NEPOOL proxy bus has been exhausted.

[6] These enhancements to SCUC would be desirable even in the absence of pre-scheduling.

account inter-hour "cascading" impacts that the ramping limits may have on hourly schedules.[7] Each unit commitment and scheduling step in SCUC will enforce the NYCA and interface-specific ramp limits in each hour. The final set of transactions resulting from SCUC, including pre-schedules, will satisfy all ramp constraints in all hours.

Pre-scheduling will require no changes to how SCUC models transmission limits. SCUC will continue to enforce internal NYCA transmission limits and transmission constraints to the external proxy buses.

Conversion of SCUC Bid-Based Transaction Schedules to Pre-Scheduled Transactions
After SCUC schedules are posted, customers that have been scheduled by SCUC at the NYISO external proxy buses may elect to convert their SCUC schedules to pre-scheduled transactions. A customer will make this change by entering the transaction into the external scheduling software interface, and checking a box to indicate that it wishes to convert an SCUC transaction schedule to a pre-scheduled transaction. The customer will supply the SCUC transaction ID number, but no other information, to the external scheduling software. To insure consistency, the scheduling software will retrieve all of the information about the SCUC schedule from the NYISO information systems, and then evaluate whether or not the pre-schedule can be accepted.[8] If the pre-schedule is accepted, the original schedule will be eliminated from the list of transactions scheduled by SCUC.

Conversion of an SCUC transaction schedule to a pre-scheduled transaction is an option that will enable customers to be scheduled on a bid-basis in SCUC, in order to manage the electricity market price that they will receive or pay, and then, if they are scheduled in SCUC, to "lock-in" their transaction schedule by converting it to a pre-scheduled transaction. Conversion to a pre-scheduled transaction will entail changing the bid for a transaction schedule from that submitted into SCUC to -$1000 for generation, +$1000 for load, or -$1000 for the supply source for a wheel. Thus, conversion to a pre-schedule means that the transaction will not be bumped on a bid-basis in BME, either by subsequent pre-schedules (with bids of +/-$1000) or by other BME bids made at the same external proxy bus.[9]

During a pre-defined interval following SCUC, such as ½hour, the NYISO will accept requests to convert SCUC transaction schedules to pre-scheduled transactions, but will not accept requests for new pre-schedules. Following this time, customers with SCUC schedules will continue to have the option to convert to a pre-schedule, but will face competition from other pre-schedule requests for ramping and transmission capacity.

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[7] For example, in order to accommodate an increase in the proxy bus schedule in hour t+1, the proxy bus schedule might need to be prospectively increased in hour t, because the ramping limit constrains the total change that can be accommodated between hours t and t+1. But, an increase the inter-control area schedule in hour t might require a prospective increase in the inter-control area schedule in hour t-1, because of the ramping limit, and so on.

[8] The pre-schedule is likely to be accepted, since it was feasible in SCUC. However, the conversion might be held up by a pre-schedule that has elected to be settled only in real time. It also might not be possible to approve the conversion of an SCUC schedule to a pre-schedule if the SCUC feasibility depended on a counterflow SCUC schedule.

[9] It would still be possible for a prescheduled transaction to be displaced from the day-ahead market if the LBMP were to surpass its bid (+/-$1000) at the proxy bus, due to the effects of congestion and marginal losses.

Pre-Scheduled Real-Time Transactions

It is proposed that market participants have the opportunity to pre-schedule transactions prior to the day-ahead market that would be priced in real-time, but have no day-ahead settlement. These will be called real-time pre-schedules for the purposes of discussion.

The basic market design question raised in considering real-time pre-schedules is whether or not they would hold transmission and ramping capacity during SCUC. It is proposed that neither ramping nor transmission capacity would be reserved in SCUC for real-time pre-schedules, to avoid the possibility of revenue inadequacy.[10] Real-time-pre-schedules would then be reintroduced to the ramping and transmission capacity evaluation after SCUC is completed. This could lead some price-sensitive SCUC transactions to not clear BME as a result of pre-scheduled real-time transactions. The same outcome could arise from new pre-schedule requests made following SCUC but prior to BME.

A second consequence of this approach regards the relative priority of real-time pre-schedules and SCUC schedules that choose to convert to pre-scheduled transactions following SCUC. If real-time preschedules are added to the ramp and transmission capacity tallies after SCUC, but before SCUC conversions are considered, some SCUC transactions may not be able to convert to pre-schedules.[11]

Evaluation of Pre-Schedules Submitted between SCUC and BME

After the SCUC schedules for a given day have been posted, additional transactions can be pre-scheduled for that day to settle at real-time prices. This includes requests to convert SCUC transaction schedules to pre-scheduled transactions on a first-come first-served basis. These requests will be evaluated identically with schedules submitted prior to running SCUC, with adjustments to account for the treatment of SCUC schedules in determining ramping and transmission availability.

Ramping Availability

After the SCUC schedules for a given day have been posted, the scheduling software will continue to enforce ramping constraints for the NYCA as a whole, and for specific interfaces with adjacent control areas, in evaluating requests to preschedule additional transactions for the hours of that day.

After SCUC results have been posted, the determination of whether or not ramping room is available for a subsequent pre-schedule request will follow a set of decision rules designed to permit as much ramp and

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[10] If they were to hold transmission capacity or ramping capacity in the SCUC evaluation and scheduling process, it could lead to revenue inadequacy for TCC settlements if there were a day-ahead price for congestion for the pre-schedule that was higher than the real-time congestion price. The revenue gap could occur because the NYISO would collect the real-time price of congestion from parties with real-time pre-schedules, but would owe TCC holders the day-ahead price for the capacity reserved in the day-ahead market.

[11] A third approach, to include real-time pre-schedules in the ramp and transmission queues at the same time as SCUC conversions, would risk leading to an infeasible set of pre-scheduled transactions. This could occur because the real-time pre-scheduled capacity would not be reserved during the SCUC scheduling process. Hence, when constraints are binding, both the SCUC conversions and the real-time pre-schedules might not be feasible. To resolve this problem, the NYISO would face choices that are inconsistent with the firm commitments intended by pre-scheduling: (1) curtail pre-schedules in advance of BME to restore feasibility; or (2) attempt to schedule counter-flow or counter-ramp in BME to restore feasibility and, if not possible, curtail pre-schedules in real-time. A fourth approach, to include real-time pre-schedules in the ramp and transmission tallies *following* SCUC conversions, is not possible. It would imply that real-time pre-schedules are not finally evaluated and accepted until after SCUC conversions have been completed.

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transmission capacity to be prescheduled as possible, while also maintaining NYISO revenue neutrality and feasible schedules. Because of the need to consider hours on the boundary of the 24-hour SCUC day, a complete set of decision rules for the ramping evaluation is presented in this section. These general rules apply to ramping transitions that must be evaluated prior to hours in which SCUC has been run, after SCUC results have been posted, and after BME schedules have been posted.

For a pre-schedule proposed to come on line in hour t and to go off line in hour x, the decision rules address:

- The treatment of schedules in adjacent hours, (t-1, t+1, x-1 and x+1), for the purposes of evaluating ramping availability.

- The treatment of schedules in the hour in question (t or x) for the purposes of evaluating ramping availability.

- The equations to use to access ramping availability.

These decisions rules will apply to the evaluation of the NYCA ramping limit as well as to the evaluation of ramping limits between the NYISO and other Northeastern control areas.

The fundamental complexity underlying the criteria for evaluating pre-scheduled transactions submitted after SCUC has posted but before BME has run is that there are three kinds of transactions, backed by differing commitments, that need to be evaluated. First, there are prescheduled transactions that cleared in SCUC. The market participant is both financially and physically committed to these transactions. Second, there are transactions that cleared in SCUC but are not prescheduled. The market participant is financially committed to this transaction, but the transaction need not be scheduled in BME. Third, there are transactions, which were not scheduled in SCUC but have subsequently been prescheduled. There is a physical commitment to deliver backing these transactions, but the pricing has not been settled. Without carefully structured evaluation criteria, there would be a potential for the withdrawal of transactions that cleared in SCUC but were not prescheduled to require the NYISO to schedule counterflow transactions in BME at prices that would be out of merit in real-time. While the cost of the counter-flow transactions would be recovered from the imbalance charges to the entities withdrawing transactions scheduled in SCUC, those BME prices would also govern the settlements for pre-scheduled transactions settling at real-time prices.

Suppose, for example, that 750 MW of imports cleared in SCUC for hour t+1, and that an additional 400MW of imports have been prescheduled to settle at real-time prices. If both categories of import schedules were counted in determining the ramp limit for imports in hour t, it would appear that with a 500MW ramp limit, 1650 of imports could be scheduled in hour t. Suppose, however, that after the BME schedules for hour t were accepted, a 100MW import transaction scheduled in SCUC for hour t+1 was zeroed out by the customer, reducing scheduled imports to 1050 in hour t+1. Finally, we suppose that the NYISO was required to scheduled a 50MW import transaction at an asking price of $500 in hour t=1 in order to satisfy the ramp constraint. The entity withdrawing its day-ahead schedule would have to settle its imbalances at the BME price under ECA B, which would more than cover the cost of the 50MW import transaction scheduled at $500/MW.

Figure 1
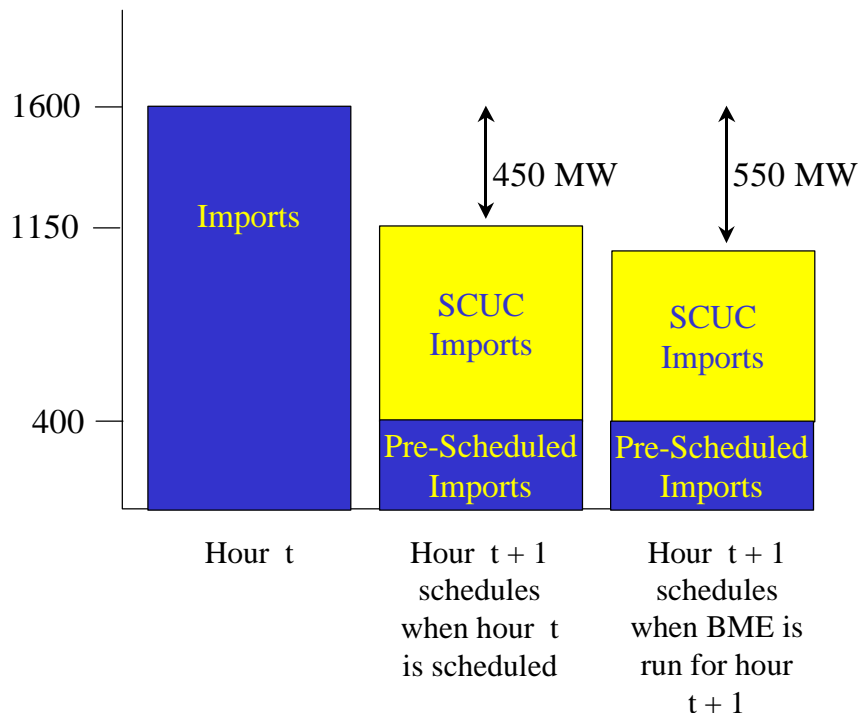
The key problem would be the treatment of the 400MW of prescheduled transactions settling at real-time prices. If all of these transactions were also settled at the BME price under ECA B, the NYISO would not be revenue adequate as the NYISO would need to buy the additional 400MW at $500 and resell it at real-time prices, which would likely be much lower. The approach below is to establish rules that preclude the NYISO from being put in this position.[12]

The ramp and transmission evaluation rules below avoid the potential for revenue inadequacy by identifying the minimum level of transactions that the NYISO can depend upon for scheduling purposes. One minimum is the level of pre-scheduled transactions. Since pre-scheduled transactions cannot be withdrawn without the NYISO's permission, the NYISO can be assured of schedules at least equal to the pre-scheduled quantity. Thus, if, as illustrated in Figure 2, the NYISO did not schedule more than 900MW of imports in hour t, it could not be required to schedule uneconomic imports in the BME for hour t+1 because there would be at least 400 MW of pre-scheduled transactions. On the other hand, while SCUC transactions can be withdrawn, those transactions are financially binding and if the NYISO was required to purchase imports to replace transactions scheduled in SCUC, the NYISO would be revenue adequate because the payments to imports scheduled in BME would be offset by payments by importers scheduled in

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[12] An alternative approach would be to provide that pre-scheduled transactions would settle at real-time prices not ECA B prices. This would avoid NYISO revenue inadequacy, because there would be no production cost guarantee for imports bid in at $-1000, but this approach would bring back the undesirable scheduling incentives that existed prior to the implementation of ECA B, and effectively force all market participants to bid -$1000.

SCUC. Thus the other lower limit is the total quantity of transactions scheduled in SCUC. The overall ramping or import limit is therefore the higher of these two limits.

Figure 2
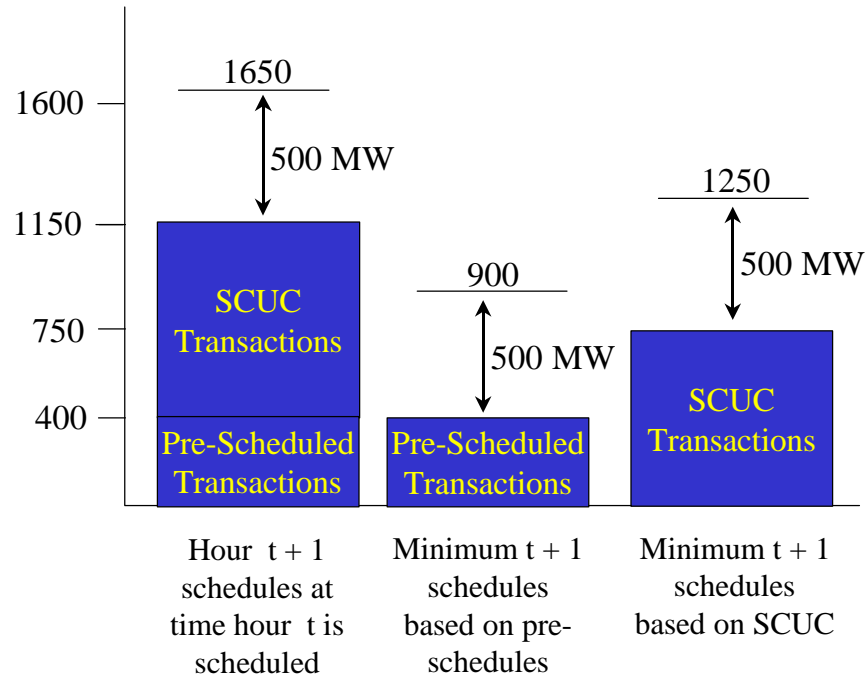
Treatment of Schedules in Adjacent Hours

Schedules in the hours adjacent to the hours in which a pre-schedule has been requested to come on or go off line (hours t-1, t+1, x-1, x+1) can be one of a number of types. Some types of schedules differ in their settlement obligations and in whether or not they can be withdrawn without the consent of the NYISO. These differences affect how they will be counted in the determination of ramping availability.

- *If BME has been completed for the adjacent hour in question*[13] the schedules in the adjacent hour will consist of BME schedules (BME) and possibly additional pre-scheduled transactions (PS4) accepted after the close of BME. For purposes of determining ramping availability, it is not necessary to distinguish between different types of accepted BME schedules, since there are incentives and mechanisms in place to insure that the market cannot be gamed through withdrawal of transactions accepted in BME, i.e., external transactions scheduled in BME that fail to flow in real-time face a market-based penalty under ECA A and pre-scheduled transactions cannot be withdrawn without the consent of both affected ISOs.

- *If BME has not yet been run for the adjacent hour, but SCUC schedules have been posted*, the schedules in this hour may consist of: (1) SCUC schedules that were not pre-scheduled (S); (2) pre-schedules accepted prior to SCUC, which have been settled at day-ahead prices (PS1); (3) pre-schedules accepted prior to SCUC that will be settled at real-time prices (PS2); and (4) pre-schedules accepted after SCUC but before BME, which will be settled at real-time prices (PS3).

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[13] This is only likely to be the case for hour t-1.

- *If neither BME nor SCUC has been run for the adjacent hour*, the schedules in this hour consist of accepted pre-schedules, which may be designated for settlement at either day-ahead (PS1)or real-time (PS2) prices.

The subset of transaction schedules for an adjacent hour n that will be counted in the evaluation of ramping limit q for a pre-scheduled transaction request scheduled affecting hour n-1 or hour n+1 will be called the Ramp Schedule$_{q,n}$. The basic equation for Ramp Schedule$_{q,n}$ is[14]:

$$\text{Ramp Schedule}_{q,n} = \quad \sum \text{BME}_{q,n} + \sum \text{PS4}_{q,n}, \text{ if BME has been run for hour n}^{[15]}$$

$$= \sum \text{PS1}_{q,n} + \max \left(\sum S_{q,n}, \left(\sum \text{PS2}_{q,n} + \sum \text{PS3}_{q,n} \right) \right), \text{ if SCUC has been run for hour n but BME has not}$$

$$= \sum \text{PS1}_{q,n} + \sum \text{PS2}_{q,n}, \text{ if SCUC has not been run for hour n.}$$

If BME schedules have been posted, the equation for calculating Ramp Schedule$_{q,n}$ means that the ramp evaluation will assume that all BME schedules and subsequent pre-schedules will flow in real-time. If SCUC schedules have been posted but BME has not yet run, the evaluation cannot assume the same level of certainty regarding the transactions that will actually flow, since SCUC transactions may be altered prior to BME. Hence, if SCUC schedules have been posted but BME has not yet run, Ramp Schedule$_{q,n}$ is the maximum of the bid-based schedules resulting from SCUC (that were not pre-scheduled) and any approved pre-schedules that will be settled at real-time prices, plus any pre-schedules approved prior to SCUC that hold first settlement obligations. As discussed above, the purpose of this equation is to insure that the NYISO's scheduling criteria does not make assumptions about transaction schedules in adjacent hours (t-1, t+1, x-1 or x+1) that could cause it to approve a pre-scheduled transaction that could later lead to a situation in which the NYISO would be required to schedule uneconomic purchases or sales in BME to satisfy ramping limits in adjacent hours.

The potential financial exposure of the NYISO to the costs of uneconomic purchases or sales in BME arises because SCUC transactions may be altered prior to BME. For example, situations could arise in which the withdrawal of SCUC transactions prior to BME could require the NYISO to accept uneconomic external transactions in order to stay within its ramping constraints. These uneconomic purchases or sales would not give rise to NYISO financial exposure, so long as the costs of the uneconomic transactions are borne under the two-settlement system by those that alter their SCUC schedules prior to BME. The potential for NYISO financial exposure arises if the scheduling of uneconomic external purchases or sales to satisfy ramp limits affects the NYISO's settlement obligations at the proxy buses for pre-scheduled transactions that will be settled at BME prices rather than day-ahead prices. If the NYISO is required to schedule external purchases at BME prices exceeding the real-time proxy bus price or schedule external sales at BME prices below the real-time proxy bus price in order to satisfy ramp or transmission constraints, these price differentials would give rise to uplift costs. The rules above ensure that the NYISO's evaluation of prescheduled transactions is based on conservative criteria that will not require it to schedule uneconomic external purchases or sales in order to provide ramp for pre-scheduled transactions.

The values of Ramp Schedule in the hours adjacent to the hour in which a pre-scheduled transaction request would come on line (hour t) or go off line (hour x) determine the limits on the schedules that are feasible in hours t and hour x, since the ramp limit constrains the total change in schedule between hours t and x and adjacent hours. For example, suppose that for the NYCA as a whole the Ramp Schedule in hour t-1 were 500 and the Ramp Schedule in hour t+1 were 1250 and the ramp limit between hours was +/- 1000 MW. (For purposes of this example, assume that positive numbers are net imports to the NYCA). In this case, the

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[14] All of the variables representing pre-schedules in this COO (PS1, PS2, PS3 and PS4) do not include any pre-schedules that have been withdrawn with the approval of the NYISO.

[15] This is only likely to be the case for hour t-1.

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maximum schedule in hour t would be minimum (Ramp Schedule$_{NYCA, t-1}$, Ramp Schedule$_{NYCA, t+1)}$ + 1000 = 1500, since the NYISO can ramp up a maximum of 1000 MW from hour t-1 to hour t and can ramp down a maximum of 1000 from hour t to hour t+1. Similarly, the minimum schedule in hour t would be maximum (Ramp Schedule$_{NYCA, t-1}$, Ramp Schedule$_{NYCA, t+1}$) - 1000 = 250. These equations mean that a pre-scheduled transaction request can be accepted in hour t if, after taking the transaction into account, the NYCA schedule in hour t is between 250 MW and 1500 MW. In the subsequent discussion, these will be referred to as the "upper" and "lower" limits on the Ramp Schedule in hour t.

Treatment of Schedules in the Pre-Schedule Start and End Hours

Evaluation of ramping limits also requires decision rules regarding the treatment of SCUC transaction schedules in hour t and hour x, when evaluating a pre-scheduled transaction that starts in hour t and ends in hour x. The issues regarding transaction schedules in hour t and hour x are: (1) whether or not SCUC transactions can be displaced by subsequent pre-scheduled transaction requests and (2) under what conditions SCUC transactions will provide counter-ramp that supports subsequent pre-scheduled transaction requests.

The decision rules presented below assume that SCUC transactions in hour t and hour x can be displaced by subsequent pre-scheduled transactions, since pre-scheduled transactions requested between BME and SCUC may displace SCUC transactions during the BME evaluation. Pre-scheduled generation injections, for example, will have bids of -$1000 in BME, whereas SCUC transactions may have bids only as low as -$999 in BME. [16] If there is a ramping constraint in BME, the pre-scheduled transactions will receive BME schedules before the SCUC transactions. Pre-scheduled transactions, if approved following SCUC, would be able to "bump" one or more SCUC transactions from the ramp queue in the BME economic evaluation. Thus, hour t SCUC transactions in the positive direction will not be tallied in the evaluation of whether or not a proposed pre-schedule will bring the NYISO over an upper limit for the hour t Ramp Schedule, and hour t SCUC transactions in the negative direction will not be tallied in the evaluation of whether or not a proposed pre-schedule (in the negative direction) will bring the NYISO below a lower limit for the hour t Ramp Schedule.

The decision rules provide that SCUC transactions may provide counter-ramp to support subsequent pre-schedule requests. [17] For the purposes of this discussion, "counter-ramp" means transactions in the negative direction (S^{neg}) when evaluating an upper limit for the hour t Ramp Schedule, and transactions in the positive direction (S^{pos}), when evaluating a lower limit for the hour t Ramp Schedule. If counter-ramp SCUC transactions are withdrawn, and there consequently are high BME prices due to a ramping limit, the NYISO's real-time financial settlements (which may be based on BME-prices) for the new counter-ramp will be compensated by the two-settlement obligations of the SCUC transactions that have been

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[16] Bids may be changed following SCUC, but bids of +/-$1000 at the external proxy buses are reserved for pre-scheduled transactions.

[17] Without the counter-ramp provided by SCUC schedules, it is possible that the schedule in hour t might not fit the ramp even before taking into account any new requests for pre-scheduled transactions.

withdrawn.[18] Under the two-settlement system SCUC transactions may either provide counter-ramp in real-time, or, if they do not flow, will pay the NYISO's cost of scheduling replacement flows in BME.[19]

The discussion above indicates that the calculation of the schedule in hour t, Ramp Schedule$_t$, that will be used for the ramping evaluation will differ for the evaluation of the upper and lower schedule limits for hour t, and that the direction of the flows will enter into the calculation.

The equation to be used in determining the Ramp Schedule in hour n that will be counted in the evaluation of an upper limit on ramping constraint q is:

$$\text{Ramp Schedule}^{upper}_{q,n} = \sum \text{BME}_{q,n} + \sum \text{PS4}_{q,n}, \text{ if BME has been run for hour n}^{20}$$

$$= \sum \text{PS1}_{q,n} + \sum \text{PS2}_{q,n} + \sum \text{PS3}_{q,n} + \sum S^{neg}_{q,n,} \text{ if SCUC has been run for hour n but BME has not}$$

$$= \sum \text{PS1}_{q,n} + \sum \text{PS2}_{q,n}, \text{ if SCUC has not been run for hour n.}$$

Approved pre-schedule requests in the negative direction will provide "counter-ramp," decreasing the sums in all of these equations. SCUC schedules in the positive direction will not be included in the calculation; they will not be assumed to hold ramp room in evaluating an upper ramp limit for a new pre-schedule proposed to come on line in hour t. SCUC schedules in the negative direction will decrease Ramp Schedule$^{upper}_{q,,n}$.

In evaluating a lower limit, the equation to be used in determining the Ramp Schedule in hour n that will be counted in the evaluation of ramping constraint q is:

$$\text{Ramp Schedule}^{lower}_{q,n} = \sum \text{BME}_{q,n} + \sum \text{PS4}_{q,n}, \text{ if BME has been run for hour n}^{21}$$

$$= \sum \text{PS1}_{q,n} + \sum \text{PS2}_{q,n} + \sum \text{PS3}_{q,n} + \sum S^{pos}_{q,n,} \text{ if SCUC has been run for hour n but BME has not}$$

$$= \sum \text{PS1}_{q,n} + \sum \text{PS2}_{q,n}, \text{ if SCUC has not been run for hour n.}$$

Approved pre-schedule requests in the positive direction will provide "counter-ramp," increasing the sums in all of these equations. SCUC schedules in the negative direction will not be included in the calculation; they will not be assumed to hold ramp room in evaluating a lower ramp limit for a new pre-schedule proposed to come on line in hour t. SCUC schedules in the positive direction will increase Ramp Schedule$^{upper}_{q,n}$.

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[18] The withdrawal of the SCUC counter-ramp at times when there are also post-SCUC counter-ramp pre-schedule, does not appear to lead to financial exposure for the NYISO. This is because there would be offsetting real-time settlements between any post-SCUC transactions that are pre-scheduled against the post-SCUC counter-ramp and the post-SCUC counter-ramp itself. This issue will be analyzed further prior to the next draft.

[19] So long as the ramp constraint is binding in BME, the BME prices will be used for calculating the second settlement payment due from parties that unschedule their SCUC counter-ramp during BME.

[20] This is only likely to be the case for hour t-1.

[21] This is only likely to be the case for hour t-1.

Equations for Evaluating Ramping Availability

In evaluating ramping limits, the scheduling software will examine all of the hourly transitions affected by the requested pre-schedule, for all affected ramping limits. This evaluation may include transitions between two SCUC days, between a BME schedule and an SCUC schedule, or between hour 24 of an SCUC day and hour 1 of a day for which SCUC has not yet been run. In any event, the ramping evaluation will use the most current information concerning schedules for each hour, up to and including the last accepted pre-scheduled transaction.

The equations for evaluating whether or not there is ramping available for a pre-scheduled transaction proposed to start in hour t and to end in hour x are:

- *Evaluation of upper limit for hour t*: Ramp Schedule$^{upper}_{q,t}$ + Proposed Pre-Scheduled Transaction$_t$ (MWs) <= min (Ramp Schedule$_{q,t-1}$, Ramp Schedule$_{q,t+1}$) + Ramp Limit$_q$ (MW)

- *Evaluation of lower limit for hour t*: Ramp Schedule$^{lower}_{t}$$_{q,t}$ + Proposed Pre-Scheduled Transaction$_t$ (MWs) >= max (Ramp Schedule$_{q,t-1}$, Ramp Schedule$_{q,t+1}$) - Ramp Limit$_q$ (MW)

- *Evaluation of upper limit for hour x*: Ramp Schedule$^{upper}_{q,x}$ + Proposed Pre-Scheduled Transaction$_x$ (MWs) <= min (Ramp Schedule$_{q,x-1}$, Ramp Schedule$_{q,x+1}$) + Ramp Limit$_q$ (MW)

- *Evaluation of lower limit for hour x*: Ramp Schedule$^{lower}_{t}$$_{q,x}$ + Proposed Pre-Scheduled Transaction$_x$ (MWs) >= max (Ramp Schedule$_{q,x-1}$, Ramp Schedule$_{q,x+1}$) - Ramp Limit$_q$ (MW)

A requested pre-scheduled transaction must pass the relevant inequality tests for all affected ramping limits. Upper limit tests are relevant when positive transactions (i.e., transactions that increase Ramp Schedule$_n$) are beginning or negative transactions are ending. Lower limit tests are relevant when negative transactions are beginning or positive transactions are ending. The meanings of "positive" and "negative" will be based on conventions established for each ramping limit.

The methodology for evaluating ramping limits should not impede market participants from increasing inter-control area flows in response to market signals. While the rules limit the extent to which SCUC schedules will be relied upon in the evaluation of ramping availability, pre-schedules are always assumed to be firm and can be used to "walk up" inter-control area flows over a number of successive hours.

Transmission Availability

Following SCUC, the scheduling software will continue to enforce external transmission constraints between the NYCA and each of its external proxy buses. The ATC on each of these interfaces that will be available for pre-schedules will continue to be updated over time as transmission conditions change.

The basic equation for evaluating the transmission availability in hour n for external transmission constraint z is:

ATC$_{z,n}$ – Transmission Schedule$_{z,n}$ – Proposed Pre-Scheduled Transaction$_n$ (MW) >=0.

where,

Transmission Schedule$_{z,n}$ = $\sum$ BME$_{z,n}$ + $\sum$ PS4$_{z,n}$, if BME has been run for hour n[22]

= $\sum$ PS1$_{z,n}$ + $\sum$ PS2$_{z,n}$ + $\sum$ PS3$_{z,n}$ + $\sum$ S$^{counter}_{q,n}$, if SCUC has been run for hour n but BME has not

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[22] This is only likely to be the case for hour t-1.

$= \sum PS1_{z,n} + \sum PS2_{z,n}$, if SCUC has not been run for hour n.

The calculation of Transmission Schedule$_{z,n}$ adds up the transmission capacity requirements in each hour for all pre-scheduled transactions. Approved pre-schedule requests in the counterflow direction provide counter-flow, decreasing this tally, as do any SCUC schedules that provide counter-flow in the opposite direction of the pre-scheduled transaction request across the external constraint ($S^{counter}_{q,n}$). Under the two-settlement system these SCUC transactions may either provide counter-flow in real-time, or, if they do not flow, will pay the NYISO's cost of scheduling replacement flows in the transmission capacity that has been scheduled in each hour for each external transmission constraint BME.

In tallying Transmission Schedule$_{z,n}$, the scheduling software will *not* count SCUC transactions that have been scheduled in the same direction as the pre-scheduled-transaction request, unless they have been converted to pre-schedules. This is because any transactions that are pre-scheduled following SCUC will have bids of +/-$1000 going into BME, whereas the SCUC transactions will have less extreme bids.[23] This means that if an external transmission limit is reached in BME, the pre-scheduled transactions will be able to "bump" one or more SCUC transaction schedules, based on economics. Thus, the SCUC transactions do not hold transmission capacity to the external proxy buses away from pre-scheduled transactions that are requested between SCUC and BME, unless they have been converted to pre-schedules. If sufficient transmission capacity is available, all of the SCUC transactions may continue to be scheduled in BME. At the other extreme, if all transmission capacity is assigned to pre-scheduled transaction requests that are approved prior to BME, and no counter-ramp is bid into BME, the transactions scheduled in SCUC will not be scheduled to flow in BME and will, instead, receive a balancing market settlement. The general principal is that in BME transactions scheduled in SCUC (as well as any other transactions that are bid into BME) will compete on a bid-basis to be scheduled, after taking into account the ramping and transmission requirements of pre-scheduled transactions.

The scheduling software will keep a running tally to track how much capacity remains to each external proxy bus after each pre-schedule request is approved.

Transmission availability will be checked for all hours of a pre-scheduled transaction request.

Evaluation Results

The NYISO scheduling software will automatically track SCUC schedules, BME schedules and pre-schedules and will accept prescheduled transaction requests until ramp or interface capacity is exhausted for one or more hours of the transaction.[24] In validating pre-scheduled transactions, the scheduling interface will simultaneously evaluate all linked bundles of transaction requests submitted by the market participant, thus allowing market participants to submit bundles of transactions that in aggregate satisfy ramp and transmission constraints when one (or more than one) ramp or transmission constraint is binding.

If either ramping or transmission capacity are not available for any hour of a pre-schedule request, the request will be denied by the scheduling software.[25] The software will provide the customer with the

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[23] Bids may be changed following SCUC, but bids of +/-$1000 at the external proxy buses are reserved for pre-scheduled transactions.

[24] It should be noted that it would still be possible for a prescheduled transaction on one interface to be displaced from the day-ahead market by a later transaction on another interface due to differential transmission congestion effects.

[25] It is possible that ramp and/or interface constraints could become limiting for the interfaces with different control areas at different points in time. Thus, for example, additional pre-schedules might be feasible from Ontario, at a point in time when the transmission capacity from the NEPOOL proxy bus has been exhausted.

reason that the request has been denied and an opportunity for the customer to modify and resubmit its request. For example, if a request were denied because ramping was not available in the first hour, the customer might be able to resubmit the request after shifting the start of the transaction forward or back one hour in time.

If a pre-schedule request is not approved at one point in time, the customer may resubmit the request at a later time. The design of the scheduling software will facilitate resubmission by making it possible for market participants to save past requests so as to avoid reentering the same information a second time. If a request is denied because of limited transmission to the external proxy bus, the customer might wish to resubmit its request when ATC is updated.

Evaluation of Pre-Schedules in BME

Pre-scheduled transactions that are approved prior to BME will be automatically represented in BME. No modifications will need to be made to the BME software to accommodate these transactions, although software will need to be written to translate accepted pre-schedules into BME bids. Injection pre-schedules would appear as bids of -$1000 at the external proxy bus, withdrawal pre-schedules would appear as bids of +$1000 and wheeling pre-schedules would appear with bids of -$1000 for the supply source.

The final set of transactions scheduled in BME will likely differ from those prescheduled, because market participants will likely submit additional bids into BME. These bids could serve to relieve a binding ramp or transmission constraint or might cause such a constraint to become binding. All pre-scheduled transactions will generally be scheduled to flow in BME, except in the unlikely case that available transmission capacity is reduced due to outages and counterflow is not available. Since the pre-schedule bids implicitly place a high value on this counterflow, such a situation is unlikely.

To support pre-scheduling, BME will be modified to enforce appropriate interface-specific hour–to-hour ramp limits, as well as the NYCA limit. In addition, like the scheduling interface software, the BME ramping evaluation for hour t will not only evaluate ramp limits for the transition from hour t-1 to t, it will also look forward to hour t+1 and evaluate whether the ramp limit would be preserved in the transition between hour t transactions and hour t+1. Since final BME bids for hour t+1 are not due until after BME schedules have been posted for hour t, the ramping evaluation in BME for hour t will need to use the decision rules described above for calculating Ramp Schedule$_{t+1}$. Enhancement of the ramping evaluation will require some modifications to BME, which need to be made in any event. Each unit commitment and scheduling step in BME will enforce the NYCA and interface-specific ramp limits. The final set of transactions resulting from BME, including pre-schedules, will need to satisfy all ramp and transmission constraints for the hour in question.

Pre-scheduling will not require changes in how BME models transmission limits. BME will continue to enforce internal NYCA transmission limits and transmission constraints to the external proxy buses.

Evaluation of Pre-Schedules Submitted Following BME

Transmission customers may continue to submit pre-schedules to the NYISO after BME schedules have been posted; these will be known as hourly transactions. Hourly transactions will be processed and validated by the NYISO on a best efforts basis. An hourly transaction request will only be accepted if ramp and transmission room remains available after taking into account all BME schedules and any prior pre-schedules accepted following BME. As hourly transactions are accepted, the NYISO scheduling software will automatically tally the remaining ramping and transmission capacity and will use best efforts to accept additional pre-scheduled transaction requests if ramp and external transmission capacity are available. The equations and procedures that have been previously described for evaluating transactions following SCUC also extend to the evaluation of pre-schedules submitted following BME.

It may, additionally, be desirable to provide an option for Hourly Transactions to indicate that they are not willing to pay congestion. This option would apply only to wheeling transactions. If a transaction

indicated that it was not willing to pay congestion, it would be approved only if the NYISO did not expect there to be congestion between the injection and withdrawal proxy buses. Once scheduled, it would be treated identically to all other non-firm transactions under the NYISO Tariff.

Deadlines for Submission of Pre-Schedules

Requests for pre-scheduled transactions may be submitted to the NYISO up to 18 months in advance of the DAM, between the DAM and BME and after BME. The following table provides the deadlines for submitting requests for pre-schedules, based on the first hour, t, and ending hour, x, of the transaction.

Start and End Times of Pre-Scheduling Request	Deadlines for Pre-Scheduling Requests
Start time, t, is after the last posted SCUC run **[review PJM deadlines]**	Earliest request time: 18 months in advance of the dispatch day of hour x Latest request time: 4:30 a.m. of the day before the dispatch day of hour t
Start time, t, is one of the hours of the last posted (current) SCUC run SCUC Conversion	 Earliest request time: one-half hour after the posting of the SCUC results for the dispatch day of hour t and 18 months in advance of the dispatch day of hour x Latest time for completing request: 100 minutes prior to BME for hour t
New Pre-Schedule Request	Earliest request time: one hour after the posting of the SCUC results for the dispatch day of hour t and 18 months in advance of the dispatch day of hour x Latest time for completing request: 100 minutes prior to BME for hour t
Start time, t, is the last posted (current) BME hour	Earliest request time: 10 minutes after the posting of the BME results for hour t and 18 months in advance of the dispatch day of hour x Latest time for completing request: 20 minutes before the real-time dispatch for hour t These requests will be accommodated on a best efforts basis

Pre-Scheduling Information Available on the OASIS [or elsewhere?]

As pre-scheduled transaction requests are accepted, the scheduling software will calculate how much ramp room has been scheduled and how much remains unscheduled for the NYCA as a whole and to each external proxy bus, for each hour.

The NYISO OASIS site will post and update the following information on a continuous basis for each dispatch hour:

1. Ramp room available for exports or imports into the NYCA as a whole and for each ramp-constrained interface with a neighboring control area.

   • Upper limit on ramp schedules in hour t = min (Ramp Schedule$_{q,t-1}$, Ramp Schedule$_{q,t+1}$) + Ramp Limit$_q$ (MW)

- Lower limit on ramp schedules in hour t = max (Ramp Schedule$_{q,t-1}$, Ramp Schedule$_{q,t+1}$) - Ramp Schedule$_{q,t+1}$ (MW)

- MWs available for ramping up = min (Ramp Schedule$_{q,t-1}$, Ramp Schedule$_{q,t+1}$) + Ramp Limit$_q$ (MW) – Ramp Schedule$^{upper}_{q,t}$

- MWs available for ramping down = max (Ramp Schedule$_{q,t-1}$, Ramp Schedule$_{q,t+1}$) - Ramp Schedule$_{q,t+1}$ (MW) - Ramp Schedule$^{lower}_{q,t}$

2. Transmission capacity available for imports or exports to each external NYISO proxy bus.

   - ATC to each external proxy bus.

   - MWs available for imports or exports.

Withdrawal of Pre-Schedules

Once accepted by the scheduling interface, prescheduled transactions can only be withdrawn with the approval of the NYISO and the other affected control area. Once accepted, pre-scheduled transactions are, in effect, firm transactions, and will both reserve ramp and transmission capacity and provide ramp and transmission capacity for counter-scheduling. The NYISO's evaluation of whether or not a pre-scheduled transaction may be withdrawn will be based on the methodologies previously described, to determine whether or not the withdrawal would cause a violation of ramping or transmission constraints.[26] The earlier a request for withdrawal occurs, the more likely it is that it will be approved.

The process for approving the withdrawal of pre-schedules will need to be arranged between the NYISO and each adjacent control area. Once the NYISO receives a request to withdraw a transaction, the NYISO would determine whether the NYISO would approve withdrawal of the transaction and immediately communicate its evaluation to the other affected control area. If and when the neighboring control area approves the withdrawal, the NYISO control room operators would complete processing the NYISO-side of the request.[27] If both control areas approve the request, the affected party would be immediately notified and the appropriate changes would be made to the ramping and transmission tallies contained in the scheduling interface software and posted on the OASIS.

Charges for Pre-Schedules

Pre-schedules into, out of or through New York will be subject to the same charges as transactions scheduled on a bid-basis through SCUC or BME.

- Transmission Service Charge. Pre-scheduled transactions serving load will pay the TSC, which is a charge per MWh actually withdrawn from the New York grid. In the case of external transactions, the charge is levied based on the MWh scheduled to be withdrawn at an external New York proxy bus. Thus only through and out pre-schedules will pay the TSC. The TSC rate is calculated based on a flow-weighted average of the TSC rates of the Transmission Providers over whose inter-connections the external transaction flows.

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[26] Thus a request to withdraw a 100 MW pre-scheduled injection at the NEPOOL proxy bus would be evaluated as a request to pre-schedule a 100 MW load at this bus.

[27] Until the withdrawal of the schedule is confirmed by the other affected control area, no transactions could be scheduled against the withdrawn transaction. This logic is not detailed in the criteria above.

- Congestion and Losses. Pre-schedules will pay charges for the marginal cost of congestion and losses based on New York's LBMP pricing methodology. Pre-schedules that are generation injections will be paid an LBMP per MWh that includes the marginal cost of congestion and losses at the proxy bus where the injection has been scheduled; these may either increase or decrease the LBMP received. Similarly, pre-schedules that are withdrawals will pay an LBMP per MWh that includes the marginal cost of congestion and losses at the proxy bus where the withdrawal has been scheduled. Wheels through New York will pay a Transmission Usage Charge (TUC) per MWh, which is equal to the LBMP at the withdrawal proxy bus minus the LBMP at the injection proxy bus.   The TUC is equal to the marginal cost of congestion and losses attributable to the wheeling transaction.

  In all cases, the congestion component of the LBMPs used in settling pre-scheduled transactions may include congestion on an external interface, on internal constraints, or both.

  An hourly pre-scheduled transaction that is approved prior to SCUC will be settled based on day-ahead LBMPs, except if it specifically requests settlement based on real-time prices.   Pre-schedule transactions approved after SCUC has been run for an hour will be settled based on the real-time proxy bus settlement price determined under ECA B.[28] If a pre-scheduled transaction spans multiple days, early hours of the transaction might settle based on real-time prices, while later hours would settle based on day-ahead prices.

- Supplemental Payments (also called make-whole payments or uplift). Pre-scheduled import transactions scheduled after SCUC would be eligible for supplemental payments in the extremely unlikely event that real-time prices were inconsistent with their implicit bids, i.e., real-time prices were less than -$1000 at a proxy bus.

- NYPA Transition Adjustment Charge. Pre-scheduled transactions serving load will pay the NTAC, which is a charge per MWh withdrawn from the New York grid. In the case of external transactions, the charge is levied based on the MWh scheduled to be withdrawn at an external New York proxy bus. Thus only through and out pre-schedules will pay the NTAC.

- Ancillary Services. Pre-scheduled transactions will pay the same charges for ancillary services as paid by transactions scheduled on a bid-basis in SCUC or BME.   At present, ancillary services are charged to loads on a per MWh basis and the only charges that apply to external loads are System Control and Dispatch Service (Schedule 1) and Spinning Reserves.

Assignment of Transmission Service

Pre-scheduled transactions will be assigned transmission service after they are accepted by the external scheduling software. They will all receive firm service, since they must be willing to pay congestion.

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[28] BME bids can determine real-time settlement prices at the external proxy buses in hours in which external interface or DNI constraints are binding. Thus, if imports into New York are limited in BME by an external interface constraint or a DNI constraint, then real-time settlement prices at the affected external proxy buses will be the lower of the market-clearing price in BME at that proxy bus or the real-time price in SCD at that external proxy bus. Conversely, if exports from New York are limited in BME by an external interface constraint or a DNI constraint, then real-time settlement prices at the affected external proxy bus will be the higher of the market-clearing price in BME at that external proxy bus or the real-time price in SCD at that external proxy bus.

Curtailment

In some hours it may not be possible for the NYISO or other affected control area to accommodate all pre-scheduled transactions. The NYISO will use best efforts to forecast future transmission conditions so as to avoid accepting pre-schedules that must later be curtailed. However, unexpected conditions, such as transmission or generation outages, may lead to unavoidable curtailment of pre-scheduled transactions.

Involuntary curtailment may occur in situations in which the NYISO must cut transactions close to real time in order to maintain system reliability. In this time frame, the NYISO will have no opportunity or ability to correct security violations using market mechanisms. In these situations, the NYISO may curtail all external transactions with __ minutes advance notice in order to maintain system reliability. **[Add details as required]** These curtailments may proceed without regard to bids and, in particular, without distinguishing between pre-scheduled transactions and those that were scheduled on a bid basis in SCUC or BME.

Prior to reaching the stage of involuntarily curtailing transactions close to real-time, the NYISO will attempt to maintain pre-schedules by scheduling counterflow on a bid-basis in SCUC and BME.

Tariff Issues
[To be completed]

Preliminary Software Impact Identification
[To be completed]