External Transaction Settlements at Non-Competitive Proxy Buses

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LECG
ECONOMICS
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Scheduling and Pricing Working Group

Albany, NY

October 17, 2002

AGENDA

The issue: Significant price distortions at an external proxy bus can occur in the absence of competitive import or export alternative offers at that external proxy bus.

The agenda for today's presentation is:

- Present illustrative examples of behavior that is possible at non-competitive external proxy buses;

- Describe the proposed settlement rules for the non-competitive external proxy buses.

Non-competitive external proxy buses can cause inefficient market results in several ways. We will illustrate two specific cases:

- The external interface is derated in the BME to a point where the day-ahead scheduled flows cannot be maintained;

- Wheel transactions are scheduled in the BME at levels that can only be accommodated on the interface.

The common element of these two scenarios is an external proxy bus where there are insufficient competitive alternatives which results in the scheduling of inefficient transactions that do not reflect a competitive market result.

CURRENT SETTLEMENT RULES

These scenarios are important because of the way real-time proxy bus prices are determined. Currently real-time proxy bus prices are set using the end-state ECA B logic.

When an external interface or DNI constraint is not binding in BME, the real-time external proxy bus price is set by SCD.

When an external interface or DNI constraint is binding in BME, the real-time external proxy bus price is set by BME regardless of whether the interface is import or export constrained.

In each of these scenarios there is a binding external interface constraint and the prices generated by BME set the real-time price.

INTERFACE DERATE

999 MW of transactions are scheduled as imports from Control Area 1 to New York in the Day-Ahead Market across an interface with a 1000 MW line limit. This transaction was submitted at the Control Area 1 proxy where there are insufficient transaction alternatives to insure a competitive market outcome.

The day-ahead prices and flows are shown below.

$40/ MWh

999 MW Scheduled

$40/ MWh

Control Area 1

1000 MW Limit
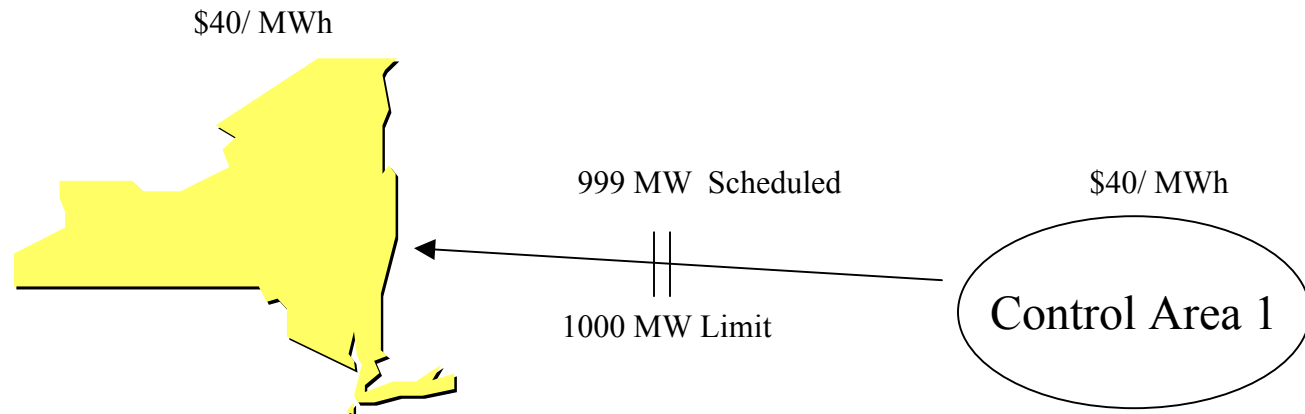
INTERFACE DERATE

In real-time the NYISO operators derate the Control Area 1 to New York interface to 499 MW.

Either 500 MW of imports scheduled day-ahead need to bought out of their day-ahead financial positions or 500 MWs of counterflow transactions need to be purchased.
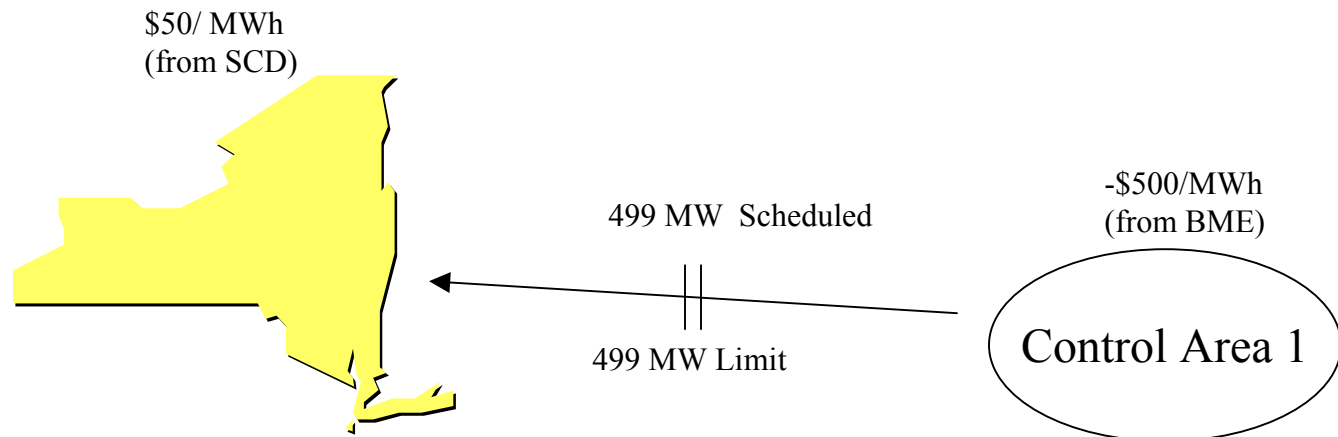
INTERFACE DERATE - DAM Reduction

Company X bids all of its day-ahead scheduled imports at -$500/MWh.

There are no competing import or export bids submitted by other market participants so the NYISO scheduling software is forced to reduce the 999 MW day-ahead scheduled import by 500 MW setting a price of -$500/MWh in BME.

The real-time flows and prices are shown below.

$50/ MWh
(from SCD)

-$500/MWh
(from BME)

499 MW Scheduled

499 MW Limit

Control Area 1

INTERFACE DERATE - DAM Reduction

In the example, the real-time settlement under the current rules would cost New York ISO participants $275,000.

$250,000 is paid to Company X to buy out of their day-ahead scheduled imports. 500 MW at -$500/MWh.

$25,000 is paid to internal New York generators that are dispatched up to meet New York load. 500 MW at $50/MWh.

There are no counter-parties to these transactions so these costs would show up in Schedule One energy, congestion and loss residual accounts.

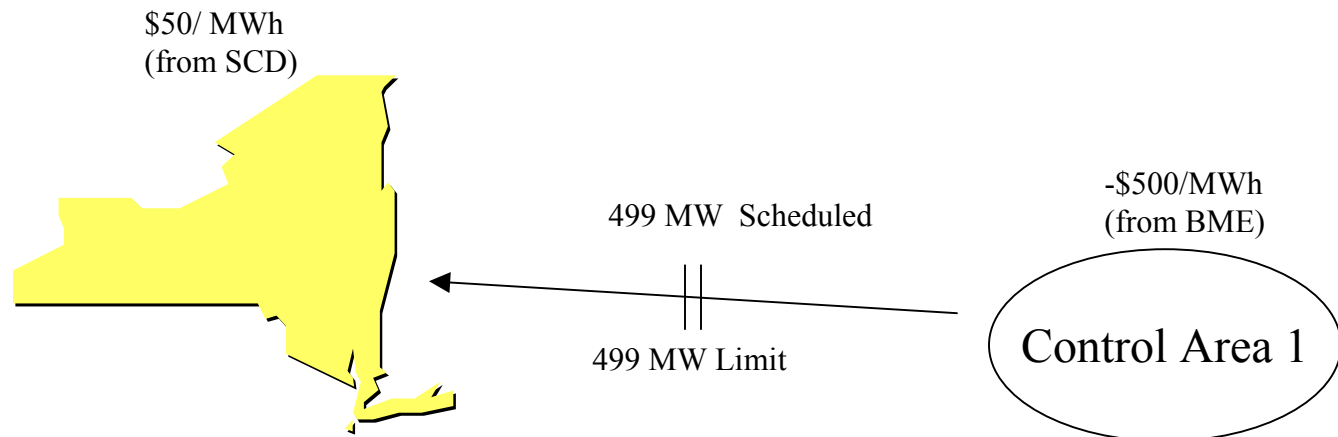| Transaction	Day Ahead (MW)	Real Time (MW)	Net Real Time (MW)	Settlement Price ($/MWh)	Paid By NYISO ($)
Import Transaction	999	499	-500	($500)	$250,000
Internal Load	20999	20999	0	$50	$0
Internal Generation	20000	20500	500	$50	$25,000
				Total Paid By NYISO ($)	$275,000

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INTERFACE DERATE - Counterflow

Company X bids all of its day-ahead scheduled imports at -$1000/MWh and submits 700 MW of real-time export bids at -$500/MWh.

There are no competing import or export bids submitted by other market participants so the NYISO scheduling software is forced to schedule 500 MW of counterflow export transactions setting a price of -$500/MWh in BME.

The real-time flows and prices are shown below.

$50/ MWh
(from SCD)

499 MW Scheduled

499 MW Limit

-$500/MWh
(from BME)

Control Area 1

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INTERFACE DERATE - Counterflow

In the example, the real-time settlement under the current rules would cost New York ISO participants $275,000.

$250,000 is paid to Company X for the 500 MW of export transactions. (500 MW at -$500/MWh.)

$25,000 is paid to internal New York generators that are dispatched up to meet New York load. (500 MW at $50/MWh.)

There are no counter-parties to these transactions so these costs would show up in Schedule One energy, congestion and loss residual accounts.

Transaction	Day Ahead (MW)	Real Time (MW)	Net Real Time (MW)	Settlement Price ($/MWh)	Paid By NYISO ($)
Import Transaction	999	999	0	($500)	$0
Counterflow Export	0	500	500	($500)	$250,000
Internal Load	20999	20999	0	$50	$0
Internal Generation	20000	20500	500	$50	$25,000
				Total Paid By NYISO ($)	$275,000

INTERFACE DERATE

Circumstances may arise either through a systemic lack of competitive participation or through NYISO control area operations restrictions that allow a single entity to in effect control the majority of resources eligible to submit Import/Export bids at the Control Area 1 proxy. In such instances, the NYISO may be forced to buy out of real-time congestion at prices higher than would be expected when many parties would otherwise be able to participate at the proxy.

There are typically no counter-parties to counterflow transactions required to buy out of real-time congestion so these costs would show up in Schedule One energy, congestion and loss residual accounts.

INTERFACE DERATE - Competitive Proxy

At a competitive proxy bus there would be more market participants willing to provide competitive counterflow export transactions.

Assume that Company X bids the import transaction and the counterflow transaction as they did before. But now also assume that there are six competitors willing to submit 150 MW counterflow export bids at prices ranging between $20 and $45/MWh. BME would now set a price of $30 at the Control Area 1 proxy bus and partially or fully schedule counterflow bids 3, 4, 5 and 6.

Transaction	Capacity (MW)	Bid ($/MWh)	Schedule (MW)
Import Transaction	999	($1,000)	999
Counterflow Export	700	($500)	0
Counterflow Export 1	150	$20	0
Counterflow Export 2	150	$25	0
Counterflow Export 3	150	$30	50
Counterflow Export 4	150	$35	150
Counterflow Export 5	150	$40	150
Counterflow Export 6	150	$45	150
		Net Flow	499

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INTERFACE DERATE - Competitive Proxy

Even at a competitive proxy bus the derate of the competitive interface would cost New York ISO participant $10,000. However, the competitive bidding of other entities at the proxy bus ensures the cost impact of the derate is controlled and based on competitive market bids.

Transaction	Day Ahead (MW)	Real Time (MW)	Net Real Time (MW)	Settlement Price ($/MWh)	Paid By NYISO ($)
Import Transaction	999	999	0	$30	$0
Counterflow Export	0	0	0	$30	$0
Counterflow Export 1	0	0	0	$30	$0
Counterflow Export 2	0	0	0	$30	$0
Counterflow Export 3	0	50	50	$30	($1,500)
Counterflow Export 4	0	150	150	$30	($4,500)
Counterflow Export 5	0	150	150	$30	($4,500)
Counterflow Export 6	0	150	150	$30	($4,500)
Internal Load	20999	20999	0	$50	$0
Internal Generation	20000	20500	500	$50	$25,000
				Total Paid By NYISO ($)	$10,000

CURTAILED WHEELS

999 MW of transactions are again scheduled as imports from Control Area 1 to New York in the Day-Ahead Market across an interface with a 1000 MW line limit.

The day-ahead flows and prices are shown below.

$40/ MWh

$40/ MWh

0 MW

Control Area 2

999 MW Scheduled

$40/ MWh

1000 MW Interface
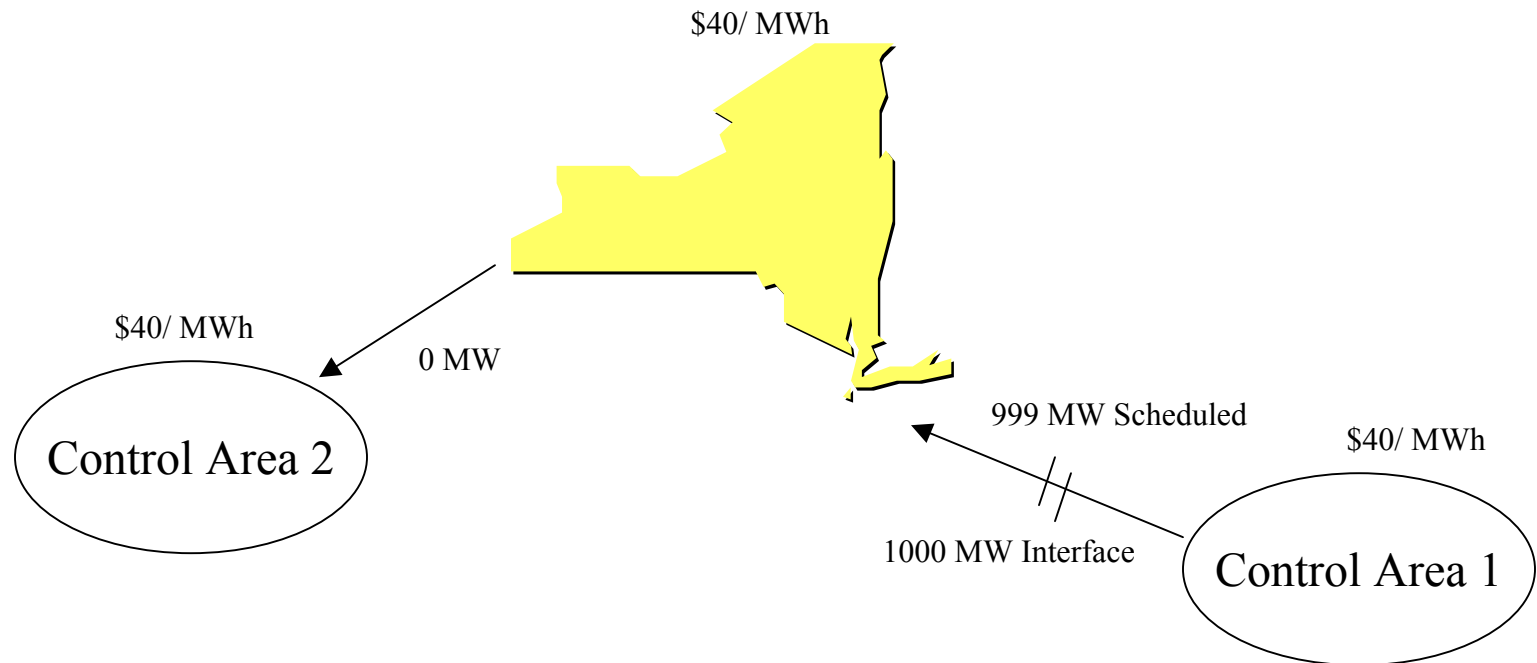
Control Area 1

CURTAILED WHEELS

Company X on the Control Area 1 side of the interface submits 501 MW of wheel bids in real-time from Control Area 1, through New York, to Control Area 2 with high congestion bids reflecting the company's willingness to pay a lot of congestion to get these transactions scheduled.

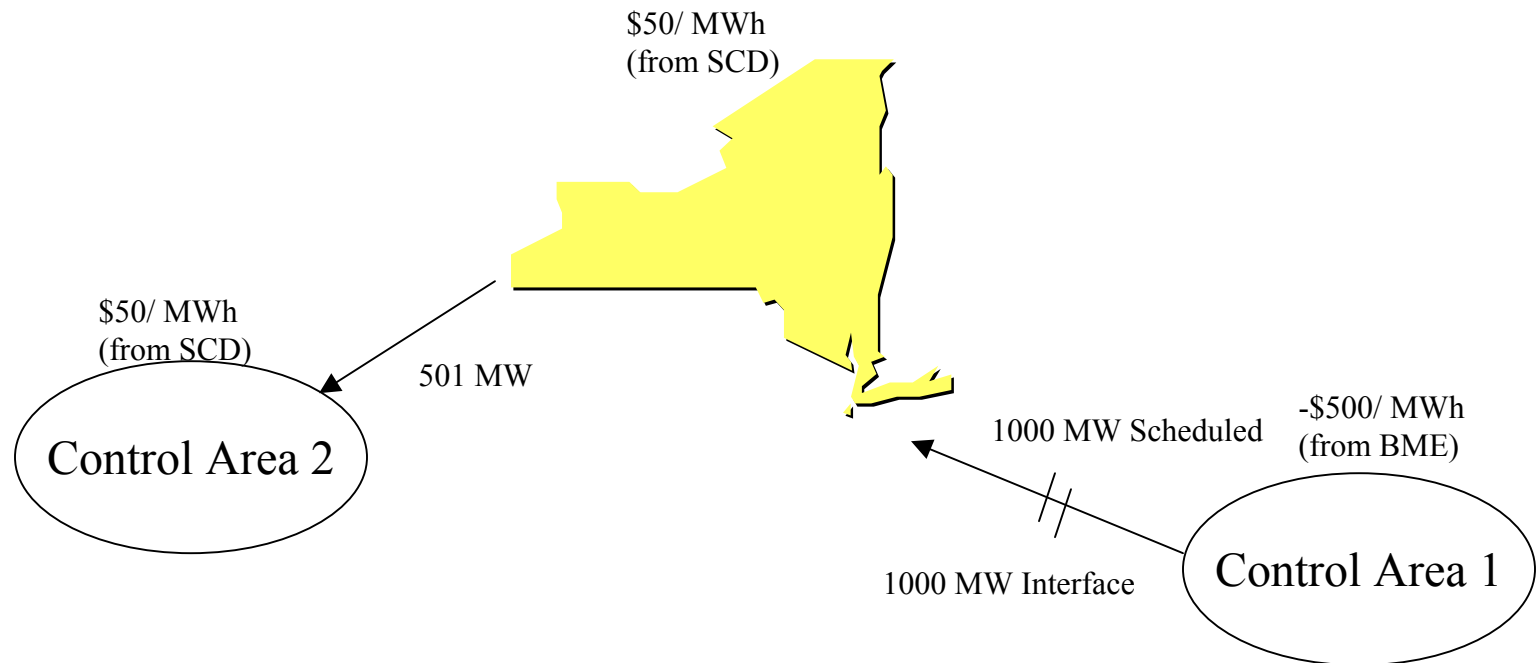The bids and schedules for the Company X transactions are shown below.

The $800/MWh congestion bid on the wheel requires that the wheel be scheduled so long as the price differential between Control Area 1 and Control Area 2 does not exceed $800/MWh.

Transaction	Capacity (MW)	Bid ($/MWh)	Schedule (MW)
Import Transaction	999	($1,000)	999
Counterflow Export	700	($500)	500
Wheel Transaction	501	$800	501
		Net Flow	1000

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CURTAILED WHEELS

The congestion bids submitted by the wheel transactions are sufficiently high that the -$500/MWh counterflow export transactions must be scheduled to maintain the schedules of the day-ahead imports (-$1000/MWh) and the wheel ($800/MWh).

The resulting flows and prices are shown below.

$50/ MWh
(from SCD)

$50/ MWh
(from SCD)

501 MW

Control Area 2

1000 MW Scheduled

-$500/ MWh
(from BME)

1000 MW Interface

Control Area 1

CURTAILED WHEELS

If these transactions were settled as scheduled by New York there would be no impact on the Schedule One settlements as the Transmission Usage Charges (TUCs) collected from the 501 MW wheel would be sufficient to either buy back the day-ahead scheduled imports or pay for real-time counterflow transactions with enough left over to pay the additional 500 MW of generation needed to provide power to support the 500 MW wheel transaction and all internal load. ($50 * 500 MW = $25,000)

There is an additional $550 of congestion rents collected from the wheels for the 1 MW of interface capacity that was not scheduled day-ahead.

Transaction	Day Ahead (MW)	Real Time (MW)	Net Real Time (MW)	Settlement Price ($/MWh)	Paid By NYISO ($)
Import Transaction	999	999	0	($500)	$0
Counterflow Export	0	500	500	($500)	$250,000
Wheel Transaction	0	501	501	$550	($275,550)
Internal Load	20999	20999	0	$50	$0
Internal Generation	20000	20500	500	$50	$25,000
				Total Paid By NYISO ($)	($550)

CURTAILED WHEELS

However, if the wheel transactions are cut by the receiving control area, in this case Control Area 2, subsequent to BME, then the TUC revenue necessary to buy back the imports or schedule counterflow would not be collected. (The interface would not be constrained in real-time)

These cuts could occur either because of operational limitations or because the transactions don't clear in the Control Area 2 market.

CURTAILED WHEELS

Real-time TUCs are only charged to wheel transactions that actually flow in real time. If the wheel transaction into Control Area 2 does not flow in real-time then the revenues necessary to pay for the reduced day-ahead imports or real time counterflow exports are not collected.

The $275,000 shortfall would again need to be recovered through Schedule One while Company X receives $250,000 for receiving 500 MW counterflow energy in real-time.

Transaction	Day Ahead (MW)	Real Time (MW)	Net Real Time (MW)	Settlement Price ($/MWh)	Paid By NYISO ($)
Import Transaction	999	999	0	($500)	$0
Counterflow Export	0	500	500	($500)	$250,000
Wheel Transaction	0	0	0	$550	$0
Internal Load	20999	20999	0	$50	$0
Internal Generation	20000	20500	500	$50	$25,000
				Total Paid By NYISO ($)	$275,000

CURTAILED WHEELS - Competitive Proxy

Assume that Company X bids the import, wheel and counterflow transactions as they did before. But now also assume that there are six competitors willing to submit 150 MW counterflow export bids at prices ranging between $20 and $45/MWh.

BME would now set a price of $30 at the Control Area 1 proxy bus and partially or fully schedule counterflow bids 3, 4, 5 and 6.

Transaction	Capacity (MW)	Bid ($/MWh)	Schedule (MW)
Import Transaction	999	($1,000)	999
Counterflow Export	700	($500)	0
Wheel Transaction	501	$800	501
Counterflow Export 1	150	$20	0
Counterflow Export 2	150	$25	0
Counterflow Export 3	150	$30	50
Counterflow Export 4	150	$35	150
Counterflow Export 5	150	$40	150
Counterflow Export 6	150	$45	150
		Net Flow	1000

CURTAILED WHEELS - Competitive Proxy

At a competitive proxy bus, even if the wheel transactions does not flow in real-time the costs incurred by the New York ISO participants are limited to $10,000.

Transaction	Day Ahead (MW)	Real Time (MW)	Net Real Time (MW)	Settlement Price ($/MWh)	Paid By NYISO ($)
Import Transaction	999	999	0	$30	$0
Counterflow Export	0	0	0	$30	$0
Wheel Transaction	0	0	0	$20	
Counterflow Export 1	0	0	0	$30	$0
Counterflow Export 2	0	0	0	$30	$0
Counterflow Export 3	0	50	50	$30	($1,500)
Counterflow Export 4	0	150	150	$30	($4,500)
Counterflow Export 5	0	150	150	$30	($4,500)
Counterflow Export 6	0	150	150	$30	($4,500)
Internal Load	20999	20999	0	$50	$0
Internal Generation	20000	20500	500	$50	$25,000
				Total Paid By NYISO ($)	$10,000

PROPOSED SETTLEMENT RULES

For non-competitive interfaces the following settlement rules will be applied:

- If the interface is import constrained, all net real-time positions at that external proxy bus will be settled at the lower of the Day-Ahead Market price or the SCD real-time price.

- If the interface is export constrained, all net real-time positions at that external proxy bus will be settled at the higher of the Day-Ahead Market price or the SCD real-time price

- If individual interface ramp constraints are binding similar rules will be applied to settling real-time imbalances when ramp constraints are binding.

PROPOSED SETTLEMENT RULES

Note that the proposed settlement rules do not use the BME price at all. This removes the possibility that very high or very low prices determined by BME are used in real-time settlements.

The proposed settlement rules will override the ECA B end-state rules for non-competitive proxy buses.

The proposed settlement rules either use the SCUC price for the proxy bus or the real-time proxy bus price determined by SCD i.e. excluding any congestion on the external interface.

Under the proposed settlement rules for a constrained non-competitive proxy bus, prices will only be negative or very high in real-time if either SCUC or SCD were trading in those same price ranges.

INTERFACE DERATE

Under the new settlement rules the interface derate case would be settled as as shown in the tables below. Regardless of whether the derate is solved by buying counterflow or cutting imports, the power is bought back by the generators or bought by the counterflow loads at the lower of the day-ahead price ($40) or the SCD price ($50) which in this example is $40/MWh.

The cost of the derate to New York ISO participants is $5000.

Schedule Counterflow Exports

Transaction	Day Ahead (MW)	Real Time (MW)	Net Real Time (MW)	Settlement Price ($/MWh)	Paid By NYISO ($)
Import Transaction	999	999	0	$40	$0
Counterflow Export	0	500	500	$40	($20,000)
Internal Load	20999	20999	0	$50	$0
Internal Generation	20000	20500	500	$50	$25,000
				Total Paid By NYISO ($)	$5,000

Buy Back DAM Imports

Transaction	Day Ahead (MW)	Real Time (MW)	Net Real Time (MW)	Settlement Price ($/MWh)	Paid By NYISO ($)
Import Transaction	999	499	-500	$40	($20,000)
Counterflow Export	0	0	0	$40	$0
Internal Load	20999	20999	0	$50	$0
Internal Generation	20000	20500	500	$50	$25,000
				Total Paid By NYISO ($)	$5,000

CURTAILED WHEELS

If the transactions from the wheel example were settled as scheduled using the new settlement rules there would be sufficient revenues received from the wheel transaction and the real-time counterflow transactions with enough left over to pay for the additional 500 MW of internal generation needed to support the 500 MW wheel transaction and all internal load.

$40/MWh (the lower of the DAM price ($40) or SCD price ($50)) is again used to settle real-time imbalances at the Control Area 1 proxy bus.

Schedule Counterflow Exports

Transaction	Day Ahead (MW)	Real Time (MW)	Net Real Time (MW)	Settlement Price ($/MWh)	Paid By NYISO ($)
Import Transaction	999	999	0	$40	$0
Counterflow Export	0	500	500	$40	($20,000)
Wheel Transaction	0	501	501	$10	($5,010)
Internal Load	20999	20999	0	$50	$0
Internal Generation	20000	20500	500	$50	$25,000
				Total Paid By NYISO ($)	($10)

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CURTAILED WHEELS

If the wheel does not flow in real-time the cost to New York ISO participants is limited to $5,000 (the TUC collected from the wheel).

Transaction	Day Ahead (MW)	Real Time (MW)	Net Real Time (MW)	Settlement Price ($/MWh)	Paid By NYISO ($)
Import Transaction	999	999	0	$40	$0
Counterflow Export	0	500	500	$40	($20,000)
Wheel Transaction	0	0	0	$10	$0
Internal Load	20999	20999	0	$50	$0
Internal Generation	20000	20500	500	$50	$25,000
				Total Paid By NYISO ($)	$5,000

For Discussion Only