

# Congestion Impact Calculation Update

NYISO ESPWG  
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# 2003 Congestion Reporting

- Completed Tasks
  - Collect and Check Market Data for All 2003 Hours
  - Develop “PROBE Lite” No Transmission Constraint Unit Commitment and Dispatch from Market Data
  - 2003 Congestion Impact Calculation
  - Define an “Unusual Day” Analysis Approach and 2003 Days
  - Report Process and Results Interpretation for Planning Process Document
- Next Steps and Ongoing
  - Write-up Comprehensive Report on 2003 Analysis Approach and Results



# Revised Congestion Metric Calculations

1. Bid Production Cost Impact (Societal Cost) - Unchanged
2. Congestion Payments Impact (Accounting Cost) - Unchanged
3. Load Payment Impact (Bills Impact)  
Revised to Include All Market Based DAM Load Costs

TCC Shortfall

(Difference Between Load and Generation Congestion + TCC Payments)

Note: All TCC's assigned as hedges to load; bilateral contract hedging is ignored; TSC adjustments, TCC auction revenues and secondary TCC sales are not accounted for

4. Generation Payments Impact  
Revised to Include All Market Based DAM Generation Payments  
Bid Production Cost Guarantee



# Revised Congestion Metric Calculations

## Updated Features

- All Payments Accounted for
- Load and Generator Payments Balance

## Current Limitations:

- Congestion Allocation by Constraint for Congestion Payments Only
  - Thinking of Ways to Approximate for Load and Gen Payments



# Congestion Impact Reporting

- Annual Total or Year-to-Date
- Monthly Totals

	Report By			
	NY Total	Zones	Monitored Element	Contingency
Generation & Import Bid Production Cost	✓	✓	No	No
Total Load Payment	✓	✓	???	???
Load Congestion Payments TCC Hedge	✓	✓	???	???
Net Load Payments Due to Congestion	✓	✓	???	???
Total Load Congestion Payments	✓	✓	✓	???
Load Congestion Payments TCC Hedge	✓	✓	✓	???
TCC Unhedged Load Congestion Payments	✓	✓	✓	???
Total Generation & Import Payment	✓	✓	???	???



# 2003 New York Congestion

All Calculations Are Constrained – Unconstrained Values

## Societal Impact

The SCUC Minimization Objective

## Accounting Impact

LMP, Congestion Component Change ONLY

### Bid Production Cost Impact \$ Millions

A	WEST	-\$20.2
B	GENESE	-\$3.2
C	MHKVL	-\$42.0
D	NORTH	-\$1.2
E	CENTRL	-\$9.2
F	CAPITL	-\$9.7
G	HUDVL	-\$27.7
H	MILLWD	-\$0.1
I	DUNWOD	\$0.0
J	N.Y.C.	\$250.6
K	LONGIL	\$84.4
	<b>New York</b>	<b>\$221.7</b>
N	NPX	-\$7.0
O	OH	-\$14.3
P	PJM	-\$85.3
Q	HQ	-\$46.6
	<b>Imports</b>	<b>-\$153.2</b>
	<b>Total</b>	<b>\$68.4</b>

### Congestion Payments Impact (\$ Millions)

		Total Congestion Payments	TCC Hedge	Total Unhedged Congestion Payments
A	WEST	-\$0.2	\$3.8	-\$4.0
B	GENESE	\$1.6	\$2.2	-\$0.7
C	MHKVL	\$1.8	\$4.3	-\$2.6
D	NORTH	-\$0.1	-\$0.5	\$0.4
E	CENTRL	\$0.2	\$3.1	-\$2.9
F	CAPITL	\$14.2	\$10.0	\$4.2
G	HUDVL	\$10.4	\$26.3	-\$15.9
H	MILLWD	\$2.4	\$20.4	-\$18.1
I	DUNWOD	\$3.0	\$1.6	\$1.4
J	N.Y.C.	\$682.2	\$519.6	\$162.6
K	LONGIL	\$247.2	\$92.5	\$154.8
	<b>New York</b>	<b>\$962.7</b>	<b>\$683.4</b>	<b>\$279.3</b>
N	NPX	\$0.7	\$1.7	-\$1.0
O	OH	-\$0.2	-\$0.1	-\$0.2
P	PJM	-\$3.1	-\$0.7	-\$2.5
Q	HQ	-\$0.4	-\$0.9	\$0.5
	<b>Imports</b>	<b>-\$3.1</b>	<b>\$0.1</b>	<b>-\$3.1</b>
	<b>Total</b>	<b>\$959.6</b>	<b>\$683.5</b>	<b>\$276.2</b>

+ Number Means Congestion Increases Supplier Production Cost

+ Number Means Congestion Increases Load Cost



## 2003 New York Congestion Details

All Calculations Are Constrained – Unconstrained Values

Societal Impact

The SCUC Minimization  
Objective

**Bid Production Cost Impact (\$ Millions)**

	Constrained	Unconstrained	Difference
New York	-\$788.6	-\$1,010.3	\$221.7
Imports	-\$172.7	-\$19.5	-\$153.2
<b>Total</b>	-\$961.3	-\$1,029.8	\$68.4

2003 Congestion Statistics

# of Hours Constrained – ALL

Most number of Constraints/Hr – 13

13:00 7/22 & 8/7

Average Hourly Constraints - 4

Accounting Impact

LMP, Congestion Component  
Change ONLY

**Congestion Payments Impact (\$ Millions)**

	Constrained	Unconstrained	Difference
<b>Total Congestion Payments</b>	\$959.6	\$0.0	\$959.6
<b>TCC Hedge</b>	\$683.5	\$0.0	\$683.5
<b>Total Unhedged Congestion Payments</b>	\$276.2	\$0.0	\$276.2



# 2003 New York Congestion

All Calculations Are Constrained – Unconstrained Values

## Bills Impact

Energy, Losses, & Congestion  
Components Change

### Load Payments Impact (\$ Millions)

		Total Load Payments	Hedge	Total Unhedged Load Payments
A	WEST	-\$136.8	\$3.8	-\$140.5
B	GENESE	-\$39.6	\$2.2	-\$41.8
C	MHKVL	-\$161.5	\$4.3	-\$165.9
D	NORTH	-\$45.3	-\$0.5	-\$44.8
E	CENTRL	-\$26.4	\$3.1	-\$29.5
F	CAPITL	-\$33.2	\$10.0	-\$43.2
G	HUDVL	-\$59.2	\$26.3	-\$85.5
H	MILLWD	-\$39.7	\$20.5	-\$60.2
I	DUNWOD	-\$7.9	\$1.6	-\$9.4
J	N.Y.C.	\$804.3	\$519.6	\$284.7
K	LONGIL	\$217.0	\$92.5	\$124.5
<b>Total</b>		<b>\$471.8</b>	<b>\$683.5</b>	<b>-\$211.7</b>

+ Number Means Congestion  
Increases Load Payments

## Payments Impact

Energy, Losses, &  
Congestion Components  
Change

### Generation Payments Impact (\$ Millions)

		Total Generation Payments
A	WEST	-\$111.9
B	GENESE	-\$21.8
C	MHKVL	-\$144.7
D	NORTH	-\$36.1
E	CENTRL	-\$20.1
F	CAPITL	-\$25.6
G	HUDVL	-\$72.0
H	MILLWD	-\$54.9
I	DUNWOD	-\$0.5
J	N.Y.C.	\$365.8
K	LONGIL	\$157.9
<b>New York</b>		<b>\$36.1</b>
N	NPX	-\$13.9
O	OH	-\$42.1
P	PJM	-\$134.0
Q	HQ	-\$57.9
<b>Imports</b>		<b>-\$247.9</b>
<b>Total</b>		<b>-\$211.7</b>

+ Number Means Gen  
Payments Went Up  
Due to Congestion





## 2003 New York Congestion Details

All Calculations Are Constrained – Unconstrained Values

### Bills Impact

Energy, Losses, & Congestion  
Components Change

### Payments Impact

Energy, Losses, &  
Congestion Components  
Change

#### Load Payments Impact (\$ Millions)

	Constrained	Unconstrained	Difference
<b>LMP Components</b>			
Energy	\$8,626.5	\$9,273.7	-\$647.2
Congestion	\$959.6	\$0.0	\$959.6
Losses	\$323.7	\$352.5	-\$28.8
<b>Total LMP Components</b>	<b>\$9,909.9</b>	<b>\$9,626.3</b>	<b>\$283.6</b>
<b>Schedule 1 DAM Component</b>	<b>-\$84.4</b>	<b>-\$116.3</b>	<b>\$31.9</b>
<b>TCC Shortfall to TSC</b>	<b>\$156.3</b>	<b>\$0.0</b>	<b>\$156.3</b>
<b>Total Load Payments</b>	<b>\$9,981.7</b>	<b>\$9,510.0</b>	<b>\$471.8</b>
<b>Hedge</b>	<b>\$683.5</b>	<b>0</b>	<b>\$683.5</b>
<b>Total Unhedged Load Payments</b>	<b>\$9,298.3</b>	<b>\$9,510.0</b>	<b>-\$211.7</b>

#### Generation Payments Impact (\$ Millions)

	Constrained	Unconstrained	Difference
<b>New York</b>			
<b>LMP Components</b>			
Energy	\$7,481.0	\$7,913.6	-\$432.6
Ancillary Services	\$126.6	\$112.8	\$13.8
Congestion	\$453.1	\$0.0	\$453.1
Losses	\$43.0	\$22.8	\$20.2
<b>Total LMP Components</b>	<b>\$8,103.7</b>	<b>\$8,049.2</b>	<b>\$54.5</b>
<b>Bid Production Cost Guarantee</b>	<b>\$148.0</b>	<b>\$166.4</b>	<b>-\$18.4</b>
<b>Total New York</b>	<b>\$8,251.8</b>	<b>\$8,215.6</b>	<b>\$36.1</b>
<b>Imports</b>			
<b>LMP Components</b>			
Energy	\$1,152.7	\$1,395.0	-\$242.3
Congestion	-\$20.7	\$0.0	-\$20.7
Losses	-\$85.6	-\$100.7	\$15.1
<b>Total LMP Components</b>	<b>\$1,046.5</b>	<b>\$1,294.4</b>	<b>-\$247.9</b>
<b>Total Imports</b>	<b>\$1,046.5</b>	<b>\$1,294.4</b>	<b>-\$247.9</b>
<b>Total</b>	<b>\$9,298.3</b>	<b>\$9,510.0</b>	<b>-\$211.7</b>



# 2003 New York Congestion Load & Congestion Payments by Constraint

**A Positive Number Means Congestion Costs Load**

## 2003 Congestion Payments Top 10 Limiting Transmission Facilities

Facility	Total Congestion Payments	% of Total Positive Congestion Payments	TCC Hedge	Unhedged Congestion Payments	% of Total Positive Unhedged Congestion Payments
Dunwoodie - Shore Rd 345 kV	\$155,190,223	8%	\$58,912,153	\$96,278,070	16%
Central East Voltage Limit	\$105,836,469	6%	\$37,334,293	\$68,502,177	12%
Leeds to New Scotland 345 kV	\$53,055,639	3%	\$13,981,369	\$39,074,269	7%
Rainey to Dunwoodie 345 kV	\$192,767,907	10%	\$154,413,248	\$38,354,658	7%
Rainey to Vernon 345 kV	\$162,561,196	9%	\$124,514,332	\$38,046,864	6%
UPNY - ConEd Interface	\$18,737,644	1%	\$6,203,515	\$12,534,130	2%
Valley Stream to East Garden City 138 kV	\$9,180,855	0%	\$4,097,046	\$5,083,809	1%
East 179th Street to Hellgate 138 kV	\$46,901,529	2%	\$43,607,377	\$3,294,151	1%
Pleasant Valley to Leeds 345 kV	\$4,085,494	0%	\$1,232,741	\$2,852,752	0%
Sprainbrook to West 49th Street 345 kV	\$192,325,930	10%	\$189,684,679	\$2,641,251	0%

### Cumulative Sum of Totals

**95%**

**97%**

### Total Congestion Payments\*

\$961,422,420

\$679,291,101

\$282,131,319

\*Rounding May Cause a Small Variation from Other Tables



## Important Assumptions

- The Calculation is the Difference of the “As Given” Network and a Totally Unconstrained System. Removing All Constraints is not Truly Practical
- Bids are Assumed to Be Unchanged for All Calculations
- Bilateral Market Hedging is Not Included
- TCC Hedging Attributed Totally to Load. More Detailed Analysis of TCC Ownership May Be Required
- Net Effect of TCC Shortfall on TSC, TCC Auction Revenue, or Secondary TCC Sales Effects are Not Represented
- Virtual Load, Virtual Generation, and Price Capped Load Assumed to be Fixed MWhr in the Unconstrained Case (\$ Payments Change)
- No Adjustment for “Unusual Events”



## Future Considerations

- Much More Information on Congestion Will Be Available for Market Participants and the Planning Process
- Congestion is Mainly in Relatively Few Facilities. This does NOT Mean Congestion is Easy to Remedy. Other Constraints Appear and Costs Shift, Resulting in a Small Net Benefit to Transmission Investment
- Data and PROBE Can be Used for Specific Transmission Improvements, Maintenance Practice, Operating & Market rules “What If” Assessments
- This Type of Analysis Beginning for 2004 Data



# Future Efforts

## First Priorities

- Align SCUC and PROBE Modeling **Underway**
- Collect 2004 Data **Underway, Data Received 1/1/04 – 4/17/04. Saved Daily**

## Next Priorities

- Develop Automated SCUC – PROBE Results Comparison
- Automate Calculation Process
- Report Metrics Monthly Going Forward

