

Coordinated Transaction Scheduling (CTS) between NYISO & PJM: Impact Analyses

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Background

- ◆ **A joint NYISO/ISO-NE evaluation (White Paper) provided three reasons for the current trading system not producing all the potential benefits of regional trading:**
 - *Existing energy trading does not always result in moving power from the lower cost region to the higher cost region*
 - *Uneconomic clearing occurs because both ISOs make separate scheduling decisions based on what is economic in their own region and not whether the transaction makes economic sense across the interface*
 - *Existing trading rules leave transmission capacity unused that could potentially move additional power from the lower cost ISO to the higher cost ISO in most hours of the year*
- ◆ **The objective of CTS is to improve interchange scheduling efficiency and capture the benefits of regional trading that the current system fails to produce**
- ◆ **In April 2012, FERC approved the NYISO & ISO-NE filing**

Overview

- ◆ **NYISO and PJM have been working on the CTS market design since the fall of 2012**
- ◆ **The objective of CTS with PJM is similar to that with ISO-NE**
 - *Stop the counter-intuitive flows when power flows from the higher priced region to the lower priced region*
 - *Increase the utilization of the interface that is currently underutilized even when the flows are going in the right direction*
 - *Capture the significant opportunities for market efficiencies; 31% of the time there is more than \$10 price difference between NYISO and PJM*
 - *CTS will help marketers arbitrage the price differences between the two markets*

Consumer Impact Analysis (IA) Evaluation Areas

- ◆ We will present the potential impact on all four evaluation areas

RELIABILITY

COST IMPACT/
MARKET EFFICIENCIES

ENVIRONMENT/
NEW TECHNOLOGY

TRANSPARENCY

Cost Impact

◆ Benefits of Improved Interchange Scheduling:

■ *Reduced Production Costs*

- Production costs are reduced by displacing higher cost resources in one control area by lower costs in the other control area. A July 10 Joint NYISO and PJM presentation shows cost reductions for both PJM and NYISO

■ *Reduced Consumer Costs*

- Improved consistency of prices and schedules should lead to consumer savings

■ *Improved Price Convergence*

- Improved price convergence should lead to greater utilization of the transmission system

Benefits of CTS

- ◆ **The June 25 and July 10 Joint NYISO-PJM meetings presented the following with regards to the benefits of CTS:**
 - *To show how the mechanism results in increased efficiency, PJM and NYISO performed a first phase analysis of three hours when there were price differences between PJM and New York and calculated the increased flow necessary to (approximately) equalize prices between PJM and New York.*
 - *Three hours were chosen based on hourly real time prices differences between NY and PJM at the interface.*
 - *RTD and SCED were rerun to determine what the change in schedule would be that would approximately equalize the prices in NY and PJM.*
 - *The following two hours were used as the basis for further cost benefit analysis:*
 - **1/3/2013 HB19: An increase of 350MW of flow from NY to PJM**
 - **2/18/2013 HB 12: An increase of 400MW of flow from PJM to NY**

Benefits of CTS, Contd.

Local Hour	Original Prices			Change in MW	Revised Prices	
	NYISO	PJM	NY-PJM		NYISO	PJM
1/3/2013 18:00	\$40.08	\$61.36	-\$21.28			
1/3/2013 19:00	\$37.50	\$70.03	-\$32.53	+350MW NY to PJM	\$54.39	\$64.52
1/3/2013 20:00	\$34.82	\$64.34	-\$29.52			
1/3/2013 21:00	\$33.72	\$45.92	-\$12.20			
2/18/2013 11:00	\$75.70	\$41.28	\$34.42			
2/18/2013 12:00	\$66.45	\$35.38	\$31.07	+400MW PJM to NY	\$45.89	\$36.09
2/18/2013 13:00	\$55.48	\$33.17	\$22.31			
2/18/2013 14:00	\$43.92	\$30.66	\$13.26			

Impact on NY Loads

- ◆ **To calculate the impact on loads, we picked two of these hours, one where the PJM price was higher than the NYISO price and one where the NYISO price was higher than the PJM price**
- ◆ **We calculated the dollar impact by looking at the difference between costs/savings at the original price and costs/savings at the revised price after CTS**
- ◆ **For both hours, we calculated the costs/savings of each 5 minute interval for all 11 zones**
- ◆ **The costs/savings shown in Tables 3 and 4 on the next two slides are based on the 5 minute interval calculation and averaged for the hour**

Table 1

Cost To Load (January 3, 2013 – HB 19:00)

Base Costs

Hourly Zonal Physical Energy Cost Summary											
WEST	GENESE	CENTRL	NORTH	MHK VL	CAPITL	HUD VL	MILLWD	DUNWOD	N.Y.C.	LONGIL	Total
\$69,559	\$49,477	\$85,975	\$30,151	\$48,461	\$98,482	\$74,067	\$24,587	\$44,301	\$344,878	\$418,305	\$1,288,245

Base Reserve Cost

East	West	NYCA			
Spin	Spin	10 - Min Non Spin	30 - Minute	Regulation	Total Res. Cost
\$0	\$269	\$0	\$0	\$963	\$1,232

Study Costs

Hourly Zonal Physical Energy Cost Summary											
WEST	GENESE	CENTRL	NORTH	MHK VL	CAPITL	HUD VL	MILLWD	DUNWOD	N.Y.C.	LONGIL	Total
\$103,828	\$75,222	\$130,753	\$47,786	\$73,358	\$118,401	\$94,577	\$31,296	\$56,457	\$439,717	\$454,251	\$1,625,646

Base Reserve Cost

East	West	NYCA			
Spin	Spin	10 - Min Non Spin	30 - Minute	Regulation	Total Res. Cost
\$372	\$253	\$773	\$0	\$1,458	\$2,856

Cost Comparison

Hourly Zonal Physical Energy Cost Comparison											
WEST	GENESE	CENTRL	NORTH	MHK VL	CAPITL	HUD VL	MILLWD	DUNWOD	N.Y.C.	LONGIL	Total
-\$34,269	-\$25,744	-\$44,778	-\$17,636	-\$24,896	-\$19,919	-\$20,510	-\$6,709	-\$12,156	-\$94,839	-\$35,946	-\$337,401

Reserve Cost Comparison

East	West	NYCA			
Spin	Spin	10 - Min Non Spin	30 - Minute	Regulation	Total Res. Cost
-\$372	\$16	-\$773	\$0	-\$495	-\$1,624

Total Cost to Load

BASE	\$1,289,477
STUDY	\$1,628,502
Net Cost	-\$339,025

Table 2

Cost To Load (February 18, 2013 – HB 12:00)

Base Costs

Hourly Zonal Physical Energy Cost Summary											
WEST	GENESE	CENTRL	NORTH	MHK VL	CAPITL	HUD VL	MILLWD	DUNWOD	N.Y.C.	LONGIL	Total
\$72,463	\$42,414	\$83,149	\$5,514	\$46,314	\$292,920	\$175,080	\$57,793	\$110,238	\$917,541	\$384,009	\$2,187,435

Base Reserve Cost

East	West	NYCA			
Spin	Spin	10 - Min Non Spin	30 - Minute	Regulation	Total Res. Cost
\$2,215	\$3,706	\$7,840	\$0	\$1,196	\$14,956

Study Costs

Hourly Zonal Physical Energy Cost Summary											
WEST	GENESE	CENTRL	NORTH	MHK VL	CAPITL	HUD VL	MILLWD	DUNWOD	N.Y.C.	LONGIL	Total
\$10,859	-\$1,420	\$7,568	-\$21,104	\$2,854	\$281,902	\$155,404	\$51,490	\$98,016	\$815,842	\$337,723	\$1,739,133

Study Reserve Cost

East	West	NYCA			
Spin	Spin	10 - Min Non Spin	30 - Minute	Regulation	Total Res. Cost
\$1,833	\$2,558	\$5,863	\$0	\$1,026	\$11,280

Cost Comparison (Base Costs minus Study Costs)

Hourly Zonal Physical Energy Cost Comparison											
WEST	GENESE	CENTRL	NORTH	MHK VL	CAPITL	HUD VL	MILLWD	DUNWOD	N.Y.C.	LONGIL	Total
\$61,604	\$43,834	\$75,582	\$26,618	\$43,460	\$11,018	\$19,676	\$6,304	\$12,222	\$101,698	\$46,286	\$448,302

Reserve Cost Comparison (Base minus Study)

East	West	NYCA			
Spin	Spin	10 - Min Non Spin	30 - Minute	Regulation	Total Res. Cost
\$381	\$1,148	\$1,977	\$0	\$170	\$3,677

Total Costs to Load

BASE	\$2,202,392
STUDY	\$1,750,413
Net Savings	\$451,979

Impact on Loads

- ◆ We next looked at data for the first four months of 2013 (January 1 to April 30) and calculated the number of hours where the price difference between NYISO and PJM was less than \$15; between \$15 and \$25; between \$25 and \$35 and greater than \$35 as shown in Table 3 on the next slide
- ◆ The hours in each category are broken into a positive price difference and a negative price difference, the former indicating that price in NY was higher than PJM and the later indicating that price in PJM was higher than NY
- ◆ To compute the total impact of CTS over these four months, we applied the total costs/savings derived in Tables 1 and 2 to the hours in these different categories
 - *For the hours where the price difference was between \$25 and \$35 and for the hours where it was greater than \$35 we applied 100% of the total costs/savings from Tables 1 and 2*
 - *For the hours where the price difference was between \$15 and \$25, we applied 50% of the total costs/savings from Tables 1 and 2*
 - *We did not compute any costs/savings for the hours where the price difference was less than \$15*

Table 3

Impact on Loads					
(Based on 4 Months Through April 30, 2013)					
	Total Hours	Percentage of Total Hours	Percentage of Positive & Negative Price Difference	Costs/Savings	Percentage of Hourly Cost
Total Number of Hours	2880				
Positive Price Difference	1523	52.9%			
Negative Price Difference	1357	47.1%			
Price diff \$0 - \$15					
Price diff \$0 - \$15	2105	73.1%			
Positive	1152	40.0%	54.7%		
Negative	953	33.1%	45.3%		
Price Dif \$15 - \$25					
Price Dif \$15 - \$25	329	11.4%			
Positive	157	5.5%	47.7%	\$35,480,352	50%
Negative	172	6.0%	52.3%	-\$29,156,150	50%
Price Dif \$25 - \$35					
Price Dif \$25 - \$35	129	4.5%			
Positive	58	2.0%	45.0%	\$26,214,782	100%
Negative	71	2.5%	55.0%	-\$24,070,775	100%
Price Dif > \$35					
Price Dif > \$35	325	11.3%			
Positive	160	5.6%	49.2%	\$72,316,640	100%
Negative	165	5.7%	50.8%	-\$55,939,125	100%
Total \$				\$24,845,724	

Positive = NY Price > PJM Price
 Negative = NY Price < PJM Price

Potential Impact of Eliminating fees

- ◆ To estimate the potential impact of eliminating fees, we extended the results of Table 3 to also include the hours where the price difference between NYISO and PJM was less than \$15
- ◆ As shown in Table 4, we applied 10% of the costs/savings from Tables 1 and 2 to the hours when the price difference was less than %15
- ◆ The difference in the total costs/savings between Tables 3 and 4 is the potential impact of eliminating fees

Table 4

Impact on Loads					
(Based on 4 Months Through April 30, 2013)					
	Total Hours	Percentage of Total Hours	Percentage of Positive & Negative Price Difference	Costs/Savings	Percentage of Hourly Cost
Total Number of Hours	2880				
Positive Price Difference	1523	52.9%			
Negative Price Difference	1357	47.1%			
Price diff \$0 - \$15					
Positive	1152	40.0%	54.7%	\$52,067,981	10%
Negative	953	33.1%	45.3%	-\$32,309,083	10%
Price Dif \$15 - \$25					
Positive	157	5.5%	47.7%	\$35,480,352	50%
Negative	172	6.0%	52.3%	-\$29,156,150	50%
Price Dif \$25 - \$35					
Positive	58	2.0%	45.0%	\$26,214,782	100%
Negative	71	2.5%	55.0%	-\$24,070,775	100%
Price Dif > \$35					
Positive	160	5.6%	49.2%	\$72,316,640	100%
Negative	165	5.7%	50.8%	-\$55,939,125	100%
Total \$				\$44,604,622	

Positive = NY Price > PJM Price
 Negative = NY Price < PJM Price

Other Impacts

◆ Reliability

- *No Negative Impact*
- *There will be a reduction in check out failures as CTS should improve consistency between planned and actual flows across the interface*

Other Impacts

◆ Environment

- *The use of a broader supply of resources to serve load will lead to more efficient dispatch across the interface*
- *15-minute scheduling will provide a wider range of resources/loads over which to absorb variations in wind as well as other generation*

Other Impacts

◆ Transparency

- *CTS will lead to an improvement in the economic direction of the flow schedule*
- *Consolidate rules and procedures between NYISIO and PJM*

Appendix

Impact on Loads

(Based on 4 Months Through April 30, 2013)

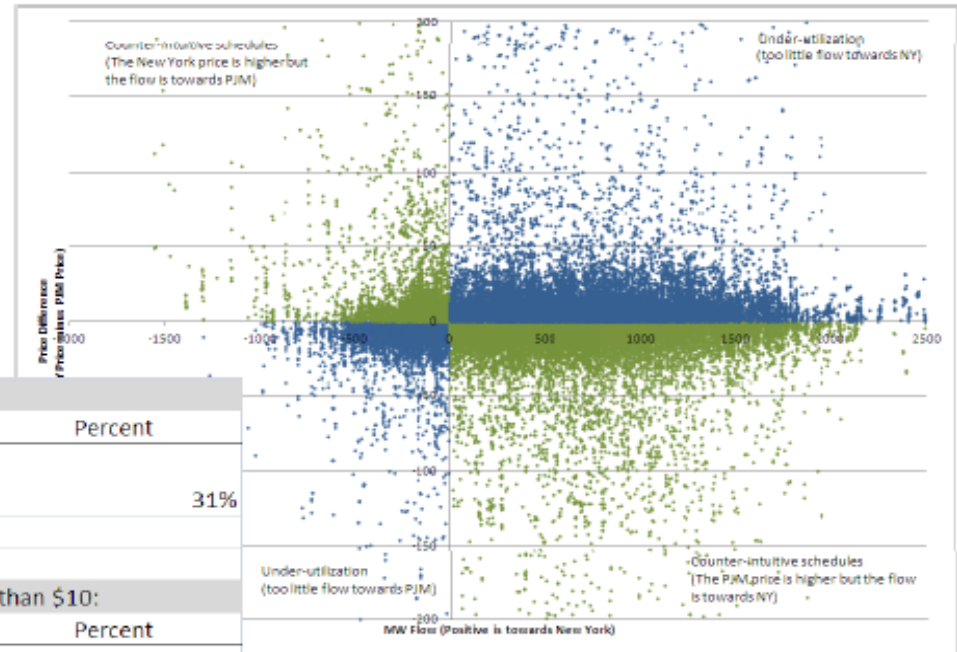
	Total Hours	Percentage of Total Hours	Percentage of Positive & Negative Price Difference	Costs/Savings	Percentage of Hourly Cost
Total Number of Hours	2880				
Positive Price Difference	1523	52.9%			
Negative Price Difference	1357	47.1%			
Price diff \$0 - \$5	1067	37.0%			
Positive	593	20.6%	55.6%		
Negative	474	16.5%	44.4%		
Price diff \$5 - \$10	707	24.5%			
Positive	385	13.4%	54.5%		
Negative	322	11.2%	45.5%		
Price diff \$10 - \$15	338	11.7%			
Positive	179	6.2%	53.0%		
Negative	159	5.5%	47.0%		
Price Dif \$15 - \$25	329	11.4%			
Positive	157	5.5%	47.7%	\$35,480,352	50%
Negative	172	6.0%	52.3%	-\$29,156,150	50%
Price Dif \$25 - \$35	129	4.5%			
Positive	58	2.0%	45.0%	\$26,214,782	100%
Negative	71	2.5%	55.0%	-\$24,070,775	100%
Price Dif > \$35	325	11.3%			
Positive	160	5.6%	49.2%	\$72,316,640	100%
Negative	165	5.7%	50.8%	-\$55,939,125	100%
Total \$				\$24,845,724	

Positive = NY Price > PJM Price
 Negative = NY Price < PJM Price



Opportunity

The percentage of inefficient schedules is generally around 31%



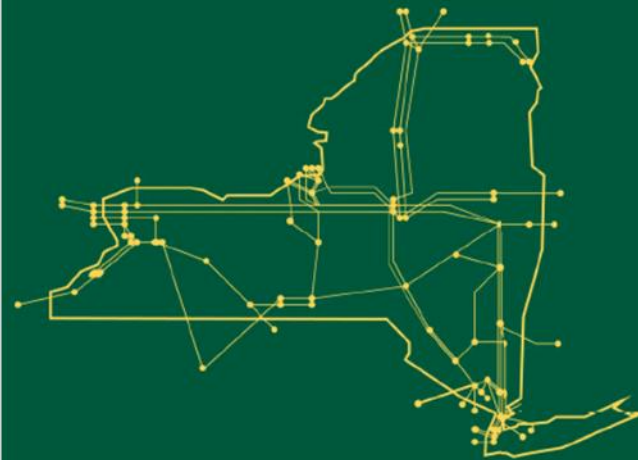
2012 Q1-Q3		
	Number of Intervals	Percent
When the price difference is greater than \$10	23995	31%
All Intervals	77008	
Looking only at intervals when the price difference is great than \$10:		
	Number of Intervals	Percent
Positive Price difference	13196	55%
Negative Price difference	10799	45%
Total	23995	
Flow towards NY (positive)	19363	81%
Flow towards PJM (negative)	4632	19%
Total	23995	
Counter Intuitive	11968	50%
Under-Utilization	12027	50%
Total	23995	



Cost Benefit Analysis Results

200 MW Restriction			
	\$5 Scenario	\$10 Scenario	\$15 Scenario
<i>PJM</i>	\$8,230,774	\$7,175,130	\$5,932,766
<i>NYISO</i>	\$5,295,982	\$3,531,881	\$2,971,989
TOTAL	\$13,526,755	\$10,707,010	\$8,904,755
300 MW Restriction			
	\$5 Scenario	\$10 Scenario	\$15 Scenario
<i>PJM</i>	\$12,019,419	\$10,557,342	\$8,770,504
<i>NYISO</i>	\$7,968,964	\$5,273,887	\$4,386,418
TOTAL	\$9,988,383	\$15,831,229	\$13,156,922
400 MW Restriction			
	\$5 Scenario	\$10 Scenario	\$15 Scenario
<i>PJM</i>	\$15,703,931	\$13,883,108	\$11,555,548
<i>NYISO</i>	\$10,555,156	\$6,922,806	\$5,738,145
TOTAL	\$26,259,087	\$20,805,915	\$17,293,692

The New York Independent System Operator (NYISO) is a not-for-profit corporation responsible for operating the state's bulk electricity grid, administering New York's competitive wholesale electricity markets, conducting comprehensive long-term planning for the state's electric power system, and advancing the technological infrastructure of the electric system serving the Empire State.



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