



Annual Assessment of the New York Electric Markets 2000

Presented to

Joint Board of Directors/Management Committee Meeting

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Introduction to the Market Assessment

- This presentation provides highlights from the final market assessment of the New York electric markets for 2000.
- The full report for the year 2000 will be issued this month.
- The market assessment addresses the following areas:
 - ✓ Energy market prices and outcomes
 - ✓ Forecast of future prices
 - ✓ External transactions
 - ✓ Market participant bidding patterns
 - ✓ Ancillary services



Preview of Conclusions

- The highest priority must be to facilitate new generation and transmission - markets will grow increasingly vulnerable to substantial price increases;
- The markets have been competitive under most conditions and energy prices during 2000 have not been unreasonably high given fuel price increases and large unit outages;
- The mitigation measures have allowed the NYISO to remedy conduct resulting in material price increases, but the AMP is necessary to allow for more rapid implementation. Other changes in the mitigation plan are not necessary at this time.
- The seams issues with neighboring markets have had a significant effect on the New York markets and the resolution of these issues should be a high priority;
- Planned supply enhancements and pricing improvements in the ancillary services markets should ensure that they remain competitive and reduce energy prices during tight conditions;
- Encouraging additional demand-side response remains an important objective;

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Introduction to the New York Electric Market

- New York employs the most theoretically efficient market design -- resulting in minimized production costs and competitive prices at all locations.
- These benefits are predicated upon a bid-based auction design that provides a strong incentive for suppliers, in the absence of market power, to offer their resources at their marginal costs.
- Transmission limits in the state cause prices to vary at different locations
 - ✓ For example, prices in eastern New York will frequently be higher than prices in western New York (e.g. - when the Central-East transmission limit is binding).
 - ✓ Likewise, transmission limits into New York City sometimes cause higher prices to occur in the city than elsewhere in the State.
- These markets include a) a day-ahead market that produces an economic commitment of resources and schedules for the next day, b) an hour-ahead scheduling process (BME) that establishes hourly schedules for external transactions and non-dispatchable resources, and c) a real-time market to economically dispatch generation to meet load and resolve congestion.

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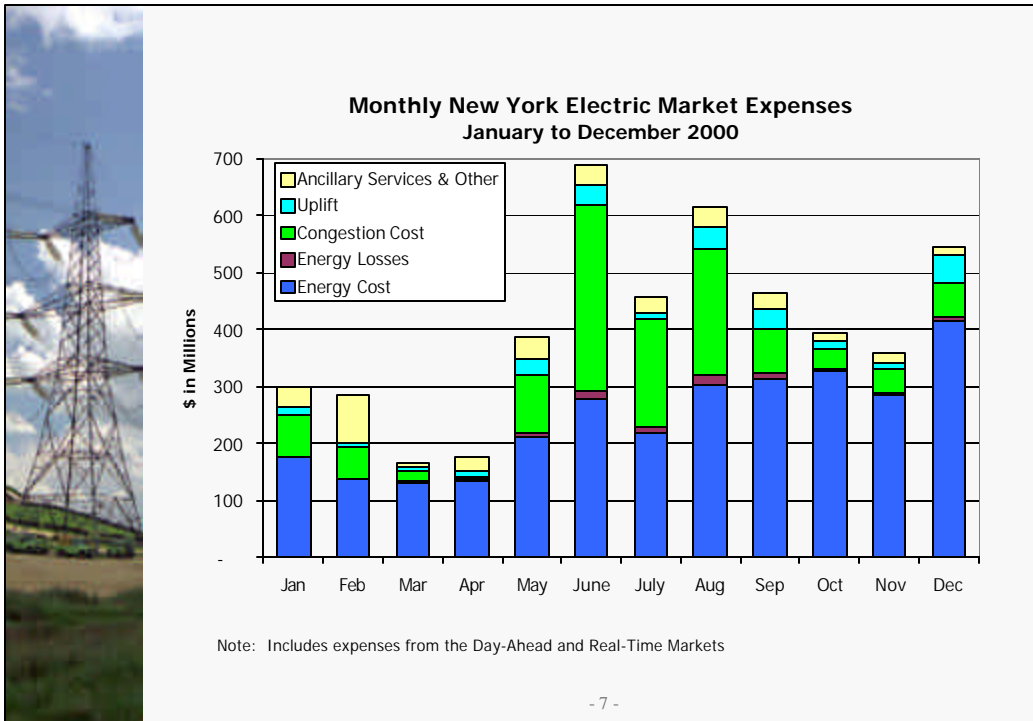


Market Prices and Outcomes



Total Electricity Costs in the New York Markets

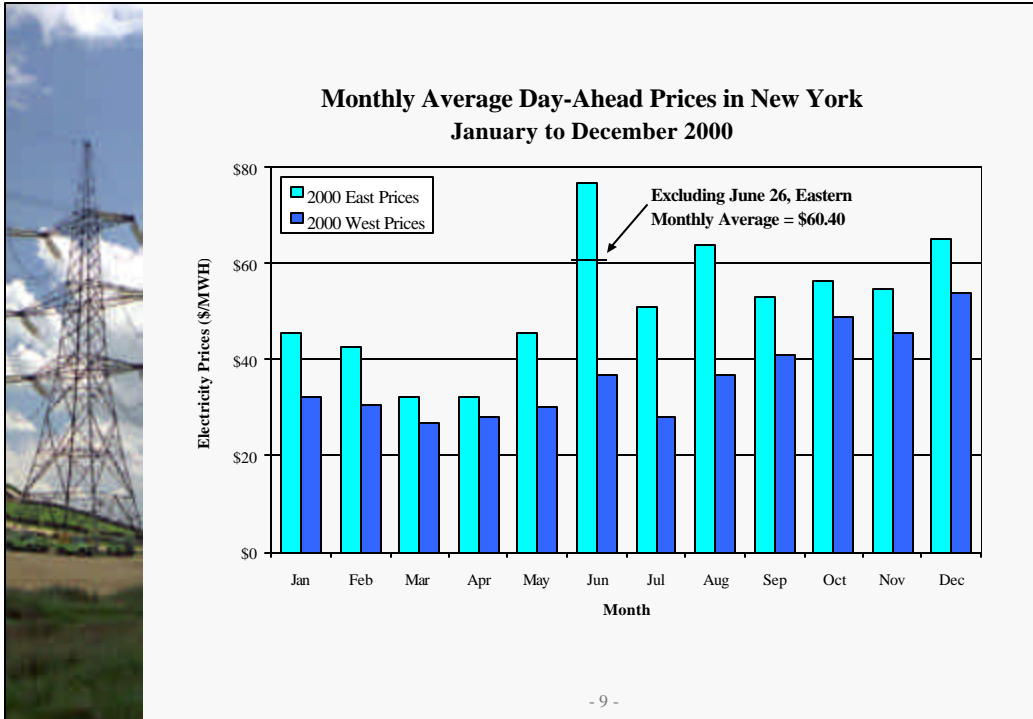
- The following chart shows the total monthly costs settled through the NYISO hours in the first nine months of 2000.
- The total costs for the year were approximately \$5.5 billion with more than 95 percent settling through the day-ahead market.
- As the figure shows, a large portion of the total costs are attributable to the the transmission congestion.
 - ✓ These costs are measured by the NYISO billing system and are related to differences in LBMP's at various locations within New York. These costs do not represent the total increase in costs versus market prices absent the congestion.
 - ✓ Measured in this manner, congestion costs exceeded \$1.2 billion in costs.



Energy Prices in the Day-Ahead Market

- The following chart shows average prices during all hours of 2000.
- As the chart shows, average electricity prices in the east were substantially higher on average than prices in the west due to the Central-East transmission constraint that is frequently binding.
 - ✓ Two price spikes during the summer of 2000 in the day-ahead market on June 26 and August 9. In both cases, the spikes occurred in eastern New York only.
- Price spikes in the energy market generate substantial revenue very quickly -- the spike on June 26 accounts for 20 percent of the average energy price for the month of June in Eastern New York.

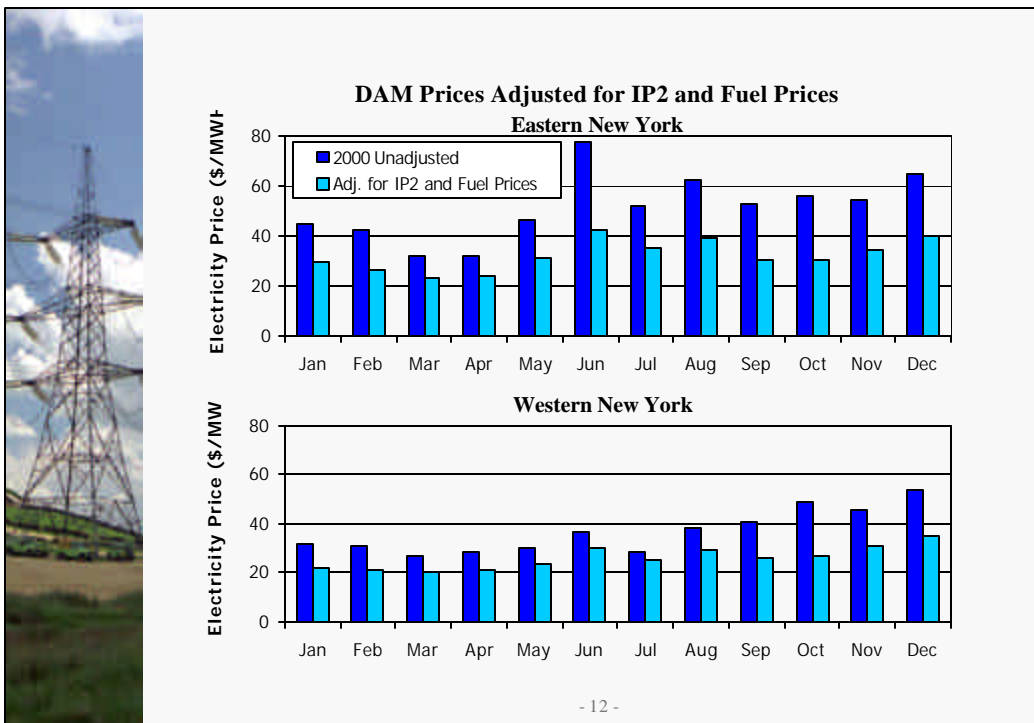
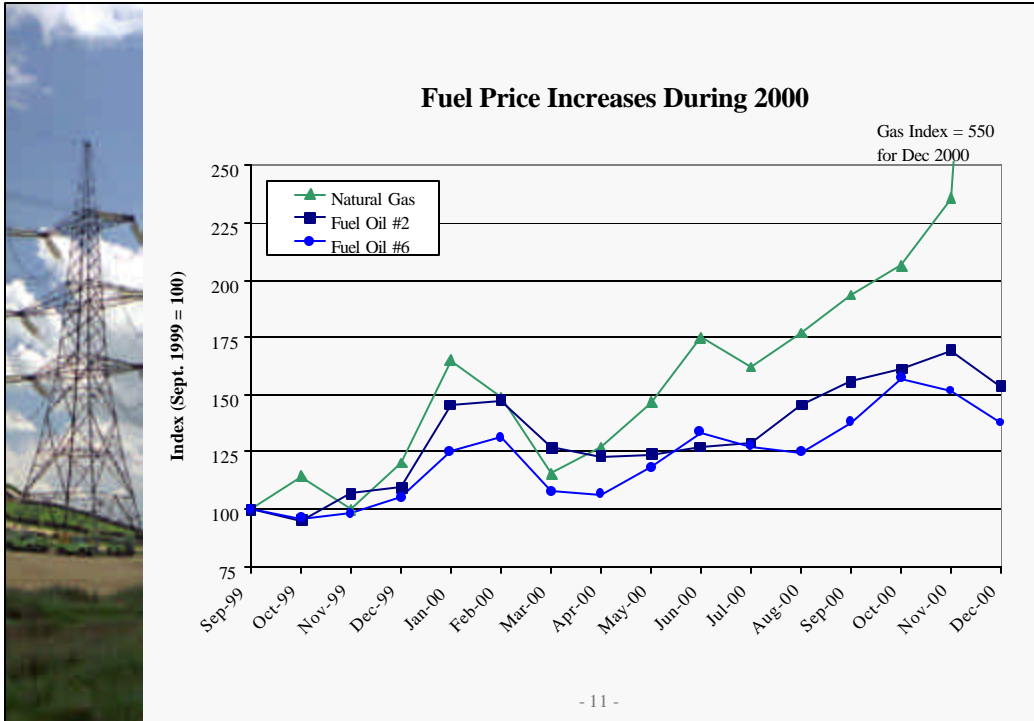
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Factors Contributing to Price Increases

- The increase in electric prices have been primarily attributable to:
 - ✓ Severe increases in natural gas and oil prices (gas or oil capacity is on the margin a large portion of the hours in Eastern New York) ; and
 - ✓ The outage of one gigawatt (1000 MW) of nuclear capacity in Eastern New York (Indian Point 2).
- An analysis of the effects of these two factors shows that prices in 2000 would have been 38% lower in Eastern New York and 29% lower in Western New York absent the rise of fuel prices and the outage of Indian Point 2 (IP2).
- The largest effects were in June and August in Eastern New York due to the effect of IP2 in mitigating the price fluctuations, and in the three months of the year reflecting the fuel price increases in those months.
- Other factors that have contributed to higher prices include 500 MW derating of the PJM interface and under utilization of the New England interface.

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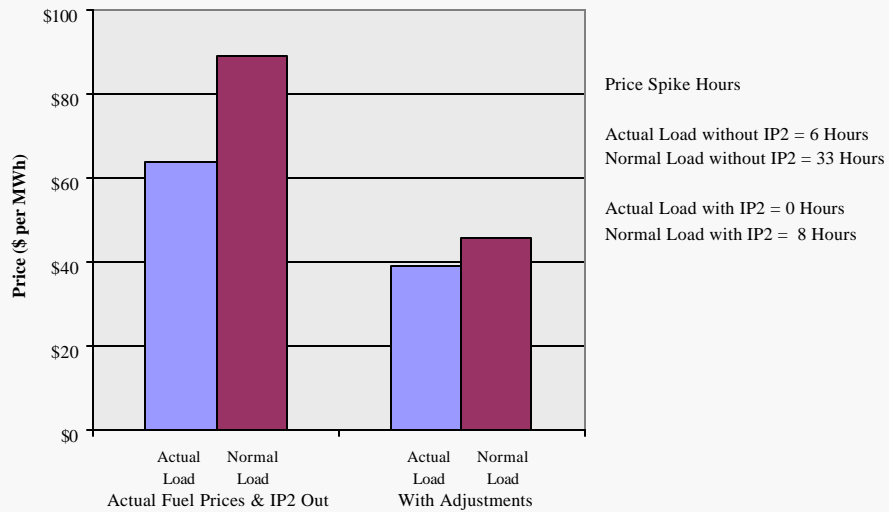
Effect of Weather on Summer Prices

- Cool weather during July and August contributed to loads that were considerably below forecasted levels for the summer.
 - ✓ The summer peak was 8 percent less than the forecasted peak.
- The lower actual load mitigated the higher prices caused by the fuel price increases and IP2 outage.
- The following chart shows the price effects of normal loads on the average price for the summer of 2000 in Eastern New York:
 - ✓ This chart shows that the adjusted prices estimated for Eastern New York would have been close to \$7 higher.
 - ✓ Applying the load adjustment to the actual summer 2000 prices (no adjustment for fuel price increases or IP2 outages), shows that prices would have been \$25 higher, an increase of 40% over the actual prices.
 - ✓ Both of these increases are largely due to the increased frequency of price spikes attributable to tight market conditions.

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Effects of Normal Weather on the Day-Ahead Energy Prices Summer 2000 in Eastern New York



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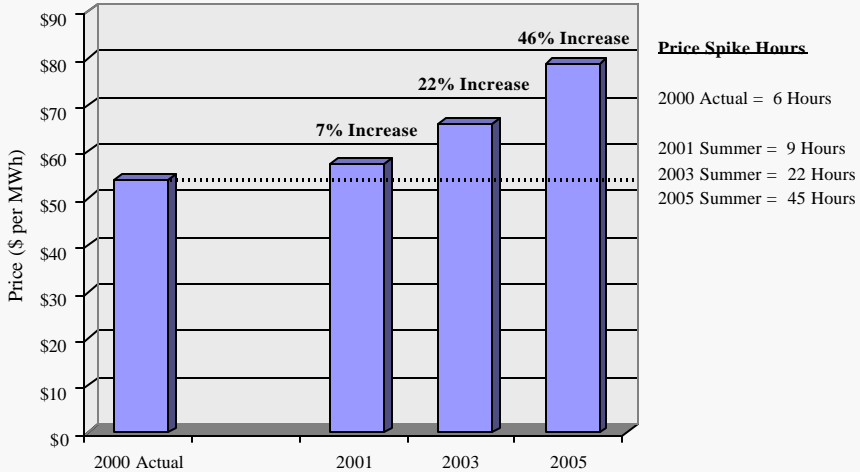
Longer-Term Price Trends

- The previous analysis can also be used to forecast future prices as load continues to grow.
- Over the past five years, barriers to entry have prevented meaningful new investment in generation and transmission facilities.
- The following chart shows the effect of allowing these barriers to remain:
 - ✓ The prices shown reflect the addition of 1500 MW of capacity in Eastern New York -- corresponding to the return of IP2, Astoria 4, and the projected addition of a number of GTs in New York City and on Long Island.
 - ✓ Even with these additions, prices are projected to be slightly higher this summer and 46% higher by 2005.
 - ✓ Like the previous analysis, these price increases are largely the result of an increased frequency of price spikes.
- These results underscore the need to remove the barriers to new investment to ensure the stability and competitiveness of the market.

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Forecast of Average Summer Prices in New York June to August -- All Hours



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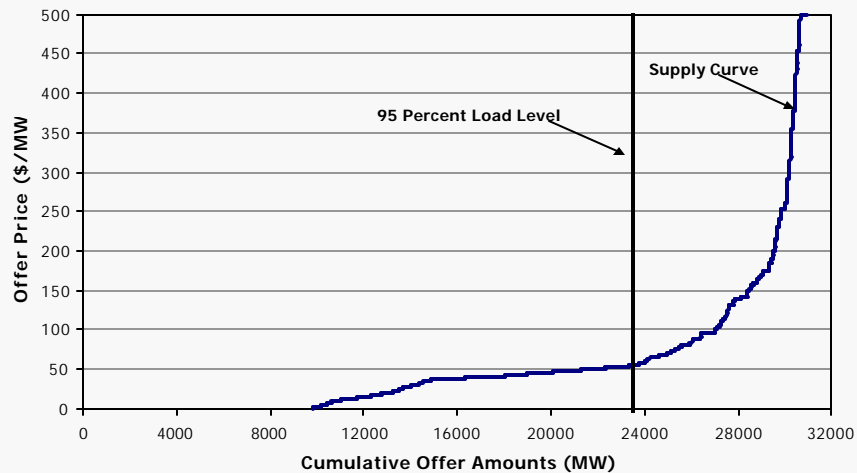
Supply Conditions and Prices in New York

- The following supply curve is similar to the supply curve in most electric markets -- flat over the vast majority of output levels and very steep at peak levels.
- This supply characteristic illustrates why market power is a concern during the “super-peak” and when transmission constraints are binding -- when prices are the most sensitive to changes in supply.
- The chart also shows the 95 percent load duration level (only 5 percent of the hours have a higher load), illustrating that the markets are not often close to the maximum supply level, although transmission constraints can cause tight conditions to occur in a smaller area.

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Supply Curve for Day-Ahead Energy August 15, 2000 -- Hour 14



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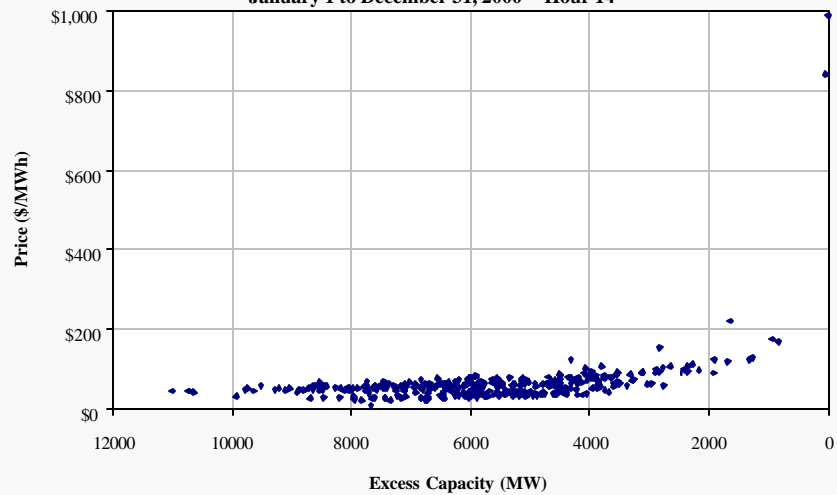
Supply Conditions and Prices in New York

- Because of the “L” shape of the supply curve, prices will tend to rise sharply under high load conditions when the excess capacity in the market has been eliminated.
- I define excess capacity as the derated capability minus scheduled energy, ancillary services, and economically unavailable resources;
 - ✓ This formula incorporates the effects of scheduled exports and imports.
 - ✓ Economically unavailable resources are those whose offer prices were substantially above accepted offer prices during workably competitive periods.
- Therefore, all substantial increases in prices should occur when the excess capacity quantities are very low, which has been the case during 2000.

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**Relationship of Excess Capacity to Prices
Day-Ahead Market -- East New York
January 1 to December 31, 2000 -- Hour 14**



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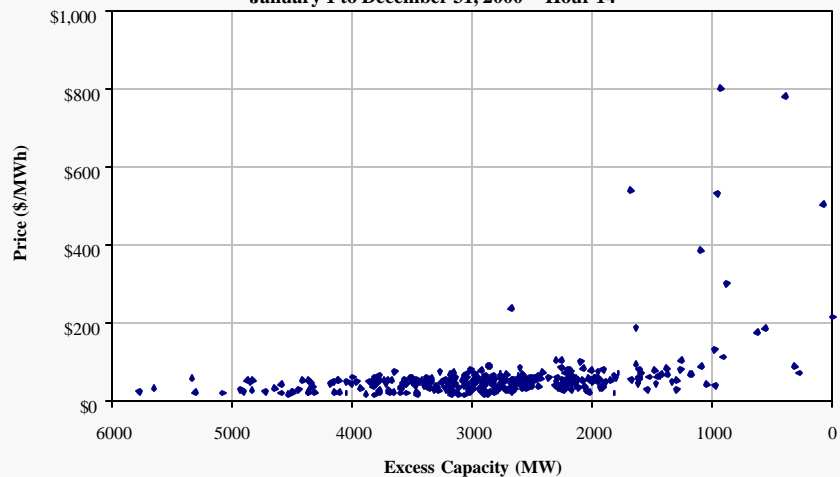
Supply Conditions and Prices in New York

- The previous chart demonstrates that the prices in the day-ahead market have been consistent with the supply curve relationship.
- The following chart shows the comparable chart for the hour-ahead market, which shows a less predictable relationship of prices to excess capacity.
 - ✓ Transmission congestion into New York City can cause higher average prices in Eastern NY when excess capacity in the region is relatively large; and
 - ✓ Model constraints sometimes require relatively expensive resources to resolve in the real-time market when resources that can respond quickly are limited.

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**Relationship of Excess Capacity to Prices
Real-Time Market -- East New York
January 1 to December 31, 2000 -- Hour 14**



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Market Operations and Performance



Market Operations

Despite the analysis in the previous section demonstrating that prices have been consistent with expectations, a number of modifications have been made to resolve design flaws or improve the operation of the market:

- ✓ Working with owners of quick-start GT's bidding as a group to allow each unit to be bid separately to improve dispatch flexibility and efficiency.
- ✓ Modifying its SCD software to prevent the miscalculation of real-time prices when large amounts of uneconomic block energy was dispatched, sometimes occurring due to minimum run time requirements;
- ✓ Implementing software changes to give external transactions scheduled in the day-ahead market priority over other transactions reviewed by BME;
- ✓ Extending bid production cost guarantee payments to external suppliers;
- ✓ Improving the information on load and resources used by the BME to more accurately reflect the prevailing real-time conditions. This improvement has allowed the BME prices to better forecast real-time prices;
- ✓ Making software changes to allow the SCD to secure the same constraints on the ConEd transmission system as the BME and SCUC models has reduced out-of-merit dispatch; and
- ✓ Modifying the NYISO software to prevent erroneous export curtailments.



Market Operations

In addition, a number of other modifications are currently underway to improve the performance of the energy markets, with some of the items scheduled to be completed prior to the summer 2001. These modifications include:

- ✓ Implementing an automated procedure for imposing a market power mitigation measure when economic withholding results in substantial price effects consistent with the current Market Mitigation Plan;
- ✓ Modifying the inputs to the BME to more accurately reflect generation scheduled out-of-merit, external transactions failing the check-out process, and off-dispatch schedule changes by PURPA and intermittent units;
- ✓ Expanding the capability for load-serving entities to bid their load into the day-ahead market in a price-responsive manner; and
- ✓ Implementing an emergency demand-side response program and a day-ahead price responsive load program.

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Day-Ahead and Real-Time Market Convergence

- It would require extensive modeling to accurately determine the effects of any specific improvements listed on the prior two slides. However, this section of the report addresses a number of areas related to the operation of the markets:
 - ✓ Day-ahead and real-time energy market convergence;
 - ✓ Load-bidding;
 - ✓ Uplift;
- The following table shows the day-ahead and real-time characteristics of prices in three of the New York zones. The table shows that:
 - ✓ The means of the prices in the two markets are relatively close with the largest divergence occurring in the West zone.
 - ✓ In each zone, the variance of prices in the real-time market is considerably higher than in the day-ahead -- more than 5 times higher in New York City.
 - ✓ The higher volatility is consistent with other commodity markets and is caused, in part, by the smaller number of options the SCD model has available to resolve system constraints and meet load in real-time relative to the SCUC day-ahead model

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Day-Ahead and Real-Time Market Convergence

Table 1
Day-Ahead and Real-Time Pricing Statistics for Selected Zones
January to December 2000

	<i>New York City</i>		<i>Capital Zone</i>		<i>West Zone</i>	
	Day-Ahead	Real-Time	Day-Ahead	Real-Time	Day-Ahead	Real-Time
Mean	48.83	50.34	44.82	42.05	34.46	29.88
Std. Deviation	36.60	82.71	38.95	42.44	15.73	31.50
Variance	1,339	6,842	1,517	1,801	248	992
Minimum	0.01	(903.02)	(0.14)	(862.81)	0.01	(864.73)
Maximum	1,012.05	1,862.41	1,296.93	1,017.22	169.13	907.74

Note: The means shown above are not load-weighted as are most others in the report, resulting in lower averages in this table.

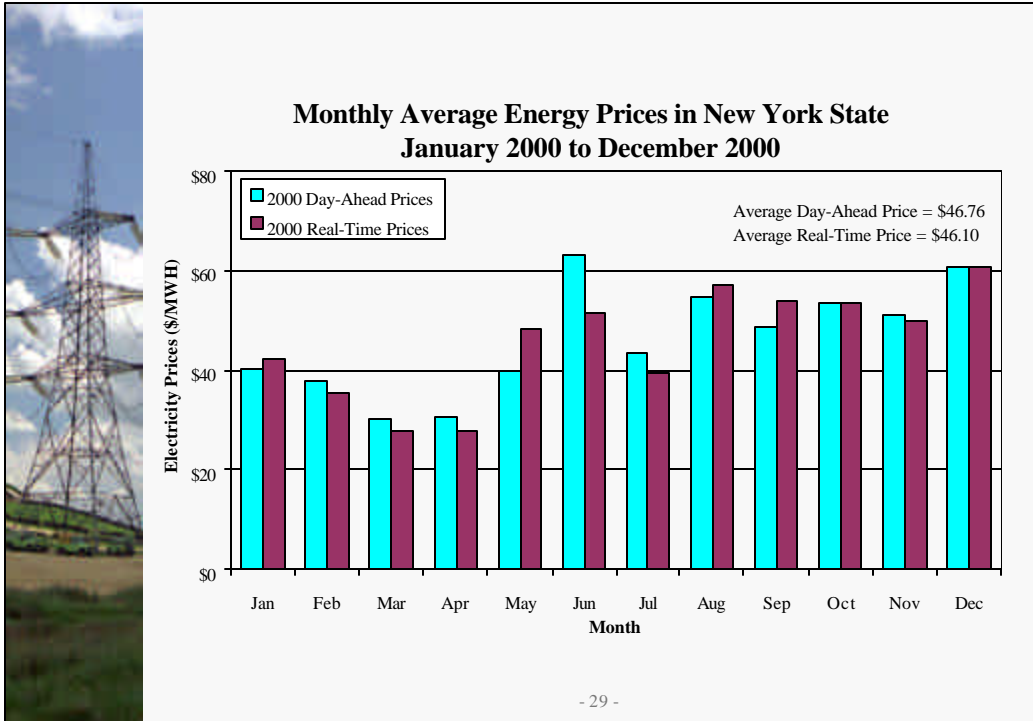
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Analysis of Market Operation and Performance

- The following chart shows a monthly comparison of the average day-ahead and real-time energy in New York.
- The results show a slight premium associated with prices in the day-ahead market, which is consistent with participants' risks:
 - ✓ Loads should place a premium on the day-ahead due to the higher volatility in the real-time market;
 - ✓ Generators selling in the day-ahead market bear an additional risk associated committing day-ahead and bearing the risk that the resource may experience an outage; and
 - ✓ If participants are risk -averse, these factors will generate a premium on the day-ahead prices.
- The day-ahead vs. real-time energy price differences are comparable to the differences experienced in PJM since the implementation of PJM's day-ahead market last June.

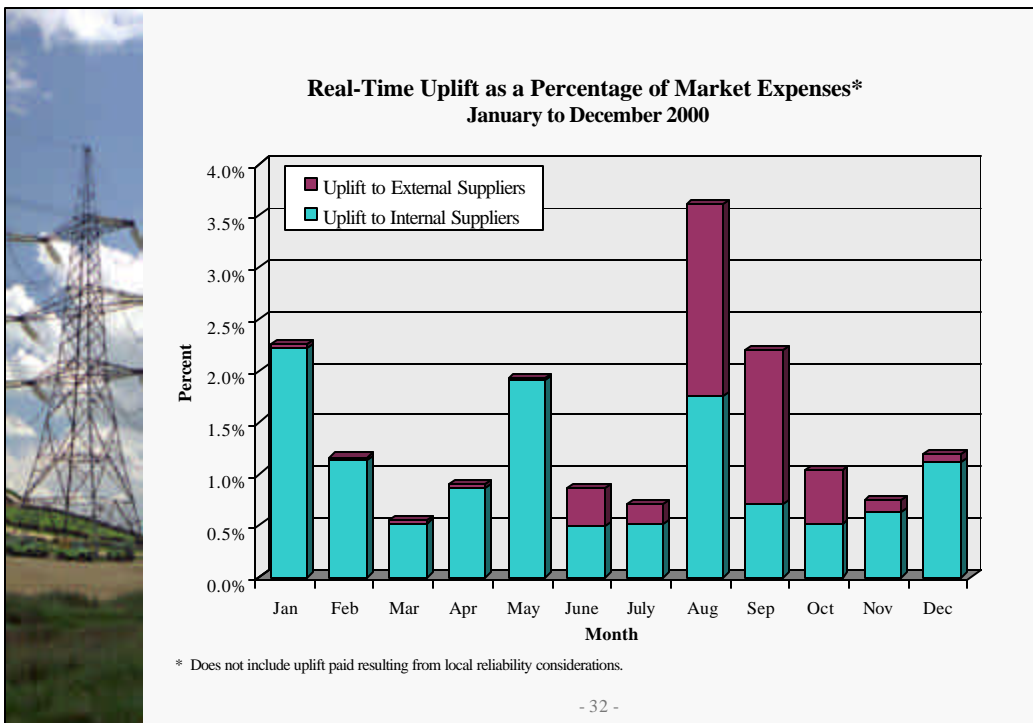
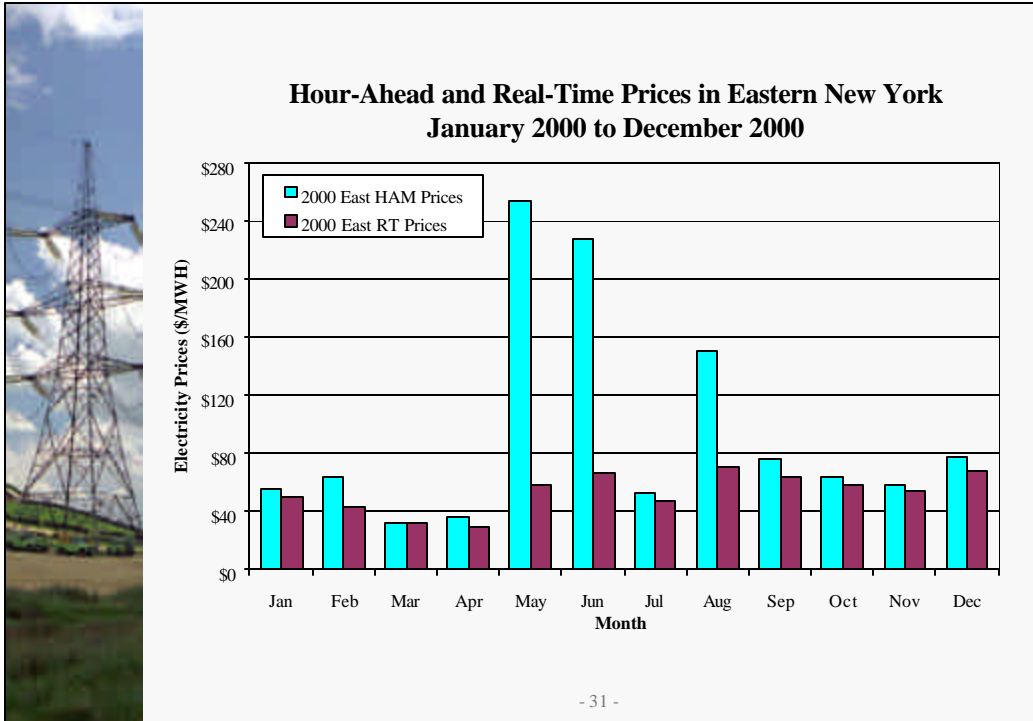
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Hour-Ahead Prices and Uplift

- Prior to the modifications made by the NYISO, the BME model did not accurately forecast real-time prices due to the quality of the inputs to BME and differences between the constraints modeled by the BME and SCD.
- Since the BME schedules external transactions and dispatches off-dispatch units, inaccurate prices can lead to the acceptance of costly external imports or generation that requires real-time uplift when real-time prices do not cover the bid costs.
- The following chart shows the portion of the markets' costs attributable to real-time uplift paid to internal and external suppliers.
 - ✓ This chart shows that these costs have been a relatively small share of the overall market costs with the exception of the relatively large payments to external suppliers in August and September.
 - ✓ These costs were eliminated following the issuance of ECA's A and B that resolved the misalignment of the prices used to schedule transactions versus those used to settle the transactions.

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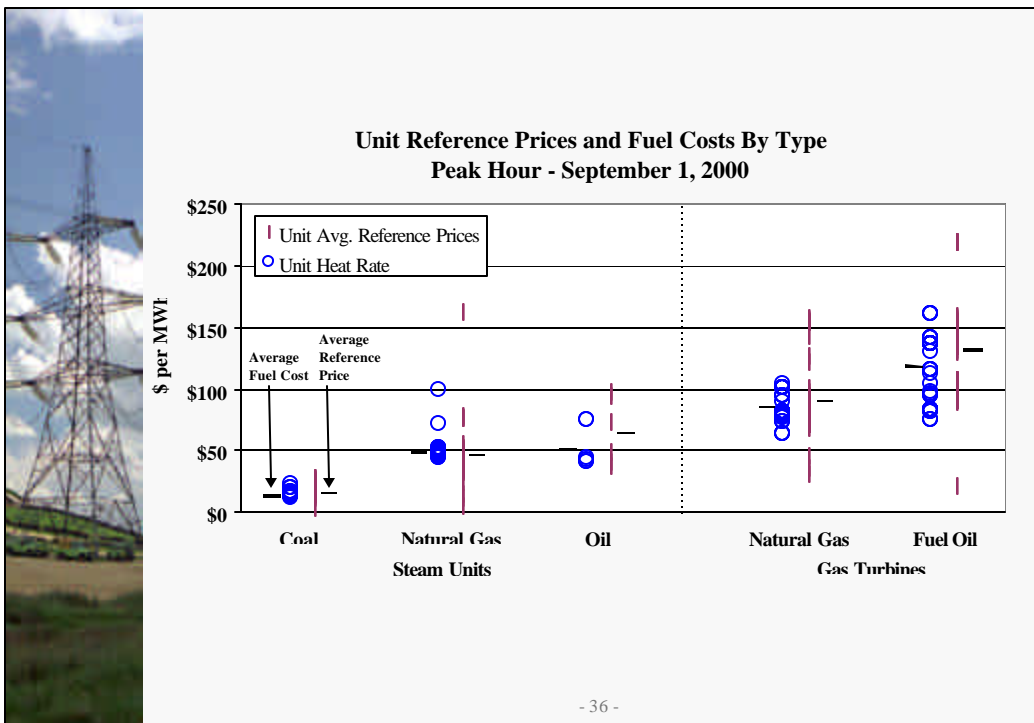
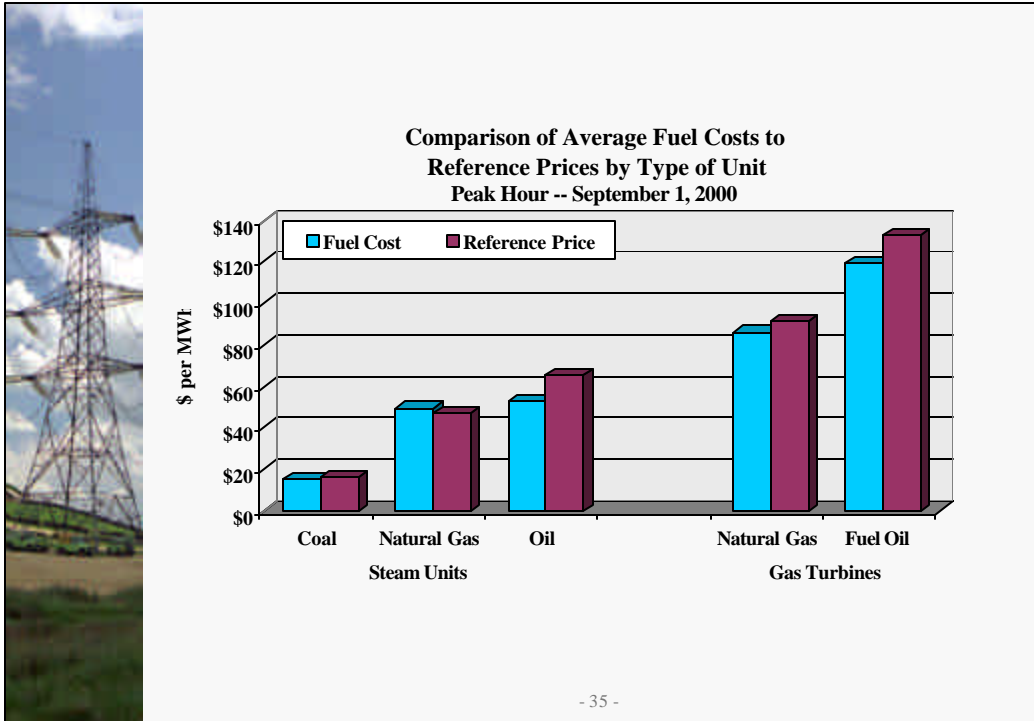


Analysis of Bidding Patterns



Generation Offers by Unit Type

- The market mitigation plan is premised on the presumption that the New York market design provides generators a strong incentive to offer their resources at marginal costs.
- Hence, the plan tracks each resources' historically accepted offers (i.e., reference price) as a measure of the units' marginal costs.
- The following analysis examines whether offer patterns for fossil units have diverged significantly from this marginal costs expectation.
- A reference price is normally calculated for every 10 MW segment of a units output curve -- this analysis produces a single average reference price for each unit and compares that value to its variable fuel cost.
- Output blocks with reference prices greater than \$500 are excluded as fuel costs generally do not reflect the marginal costs for these blocks, although this is a very small quantity of resources.





Analysis of Supply Bids

- The reference price methodology has been an effective means to monitor for withholding and indicates that suppliers are responding to the economic incentives to bid resources at marginal costs.
- Using only fuel costs as a proxy for marginal costs will tend to underestimate the units' costs because it does not include:
 - ✓ Emissions and other environmental costs;
 - ✓ Any relevant opportunity costs;
 - ✓ Intraday or other types of purchases of fuel at higher than average fuel prices;
- This daily monitoring using the reference prices is complemented by a longer-term analysis of bidding patterns to determine whether the New York markets are workably competitive under most conditions.

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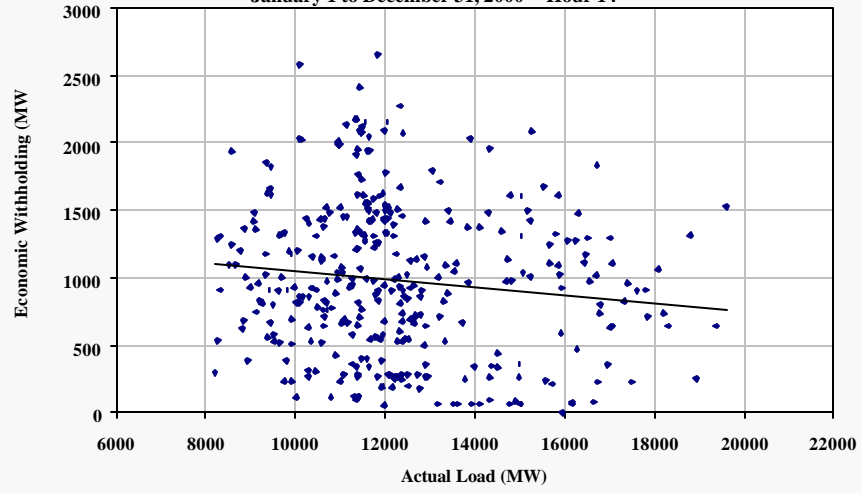
Analysis of Offer Patterns

- Suppliers should have an incentive to aggressively offer their resources, regardless of size.
 - ✓ Therefore, we assessed whether the size of each participant is correlated with the participant's bid patterns.
 - ✓ We found no correlation between participant size and the amount of capacity economically withheld or physically derated.
- Suppliers in a competitive market should increase bid amounts during higher load periods to sell more power at the higher peak prices, while those in markets that are not workably competitive will offer less at peak load levels when the market impact is the largest.
- Therefore, the correlation of withholding behavior to excess capacity levels have been assessed and are shown on the following charts.

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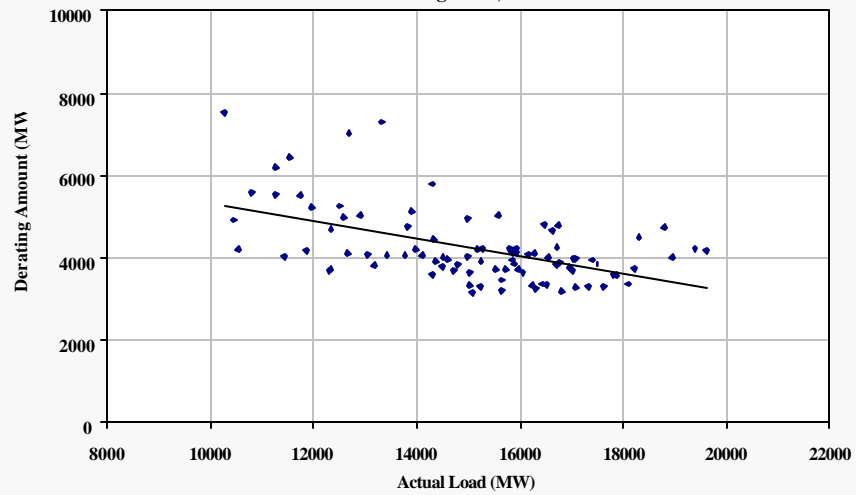
**Relationship of Economic Withholding to Actual Load
Day-Ahead Market -- East New York
January 1 to December 31, 2000 -- Hour 14**



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**Relationship of Deratings to Actual Load
Day-Ahead Market -- East New York
June 1 to August 31, 2000**



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Lower Threshold Analysis for Economic Withholding

- The following table shows how much additional output would have been screened for further investigation at lower thresholds than those in the Market Mitigation Plan.
- The lower conduct threshold tested was bids \$50 or 100 percent greater than the unit’s reference price. Four days were tested -- June 26 and August 9 exhibited large price fluctuations, and two other days were chosen randomly.
- In order for these offers to be of concern, they must meet the following conditions:
 - ✓ The offer must be close to or higher than the LBMP, otherwise the resource would be inframarginal and not affect prices;
 - ✓ The unit must be economic, therefore the unit’s reference price must be less than the LBMP; and
 - ✓ I also excluded prices below \$60 due to the elasticity of supply at these levels.
- Some had raised concerns that load-serving entities may intentionally under-bid its load to cause the day ahead market to clear at depressed prices.

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Analysis of Economic Withholding at Lower Screening Thresholds \$50 per MWh or 100% Increase Over Reference Price

Date	Amt. Exceeding Threshold	# of Bidding Organizations	Average LBMP	Average Bid	Average Reference
June 26	107	6	\$112.26	\$119.59	\$49.07
August 09	94	6	\$96.68	\$115.57	\$54.37
October 20	0	N/A	N/A	N/A	N/A
December 15	160	11	\$91.11	\$119.40	\$63.54

- This table shows that a very small additional quantity is identified under the lower thresholds and the conditions described above.
- In addition, these quantities are composed of offers by many different bidding organizations.
- Therefore, the lower thresholds do not identify conduct during these days that warrant further investigation.

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Effect of NYISO Markets on Resources Offered

- One of the benefits of moving to deregulated electric markets is that they provide strong incentives to maximize the amount of output that can be profitably provided from each generating unit.
- The following analysis assesses the net change in resources offered by suppliers in the energy markets.
 - ✓ For five selected days, I compared the amount of energy offered on a unit by unit basis under the NYISO markets to the unit ratings used to dispatch generation under New York Power Pool (NYPP) operations.
 - ✓ The NYPP ratings included the maximum rating that can be achieved under emergency operations (i.e., maximum rating) and the maximum rating under normal operations (i.e., normal rating).
 - ✓ For the energy offered under the NYISO markets, I compared all energy offered (i.e., NYISO rating) and then compared only the offers below \$500.
- The results of the analysis are shown in the following tables, organized by date and by type of generating unit -- both of which show that the NYISO markets have caused existing resources to substantially increase the energy they offer. In total, these increases have ranged from close to 1000 MW to more than 3500 MW.



Effect of NYISO Markets on Resources Offered

Comparison of NYISO Ratings to NYPP Ratings for Selected Dates

Date	NYISO Ratings -	NYISO Ratings -	Bids Below \$500 -	Bids Below \$500 -
	Max. NYPP Rating	Normal NYPP Rating	Max. NYPP Rating	Normal NYPP Rating
June 26, 2000	1411	2889	340	1740
August 9, 2000	2249	5064	1475	4290
September 1, 2000	2174	5090	1746	4662
October 20, 2000	513	1999	32	1576
December 15, 2000	2054	3071	1566	2588
Average	1680	3623	1032	2971



Effect of NYISO Markets on Resources Offered

Comparison of NYISO Ratings to NYPP Ratings By Type of Unit

Fuel Type	NYISO Ratings -	NYISO Ratings -	Bids Below \$500 -	Bids Below \$500 -
	Max. NYPP Rating	Normal NYPP Rating	Max. NYPP Rating	Normal NYPP Rating
Steam Units				
Natural Gas	240	445	176	381
Oil	771	1000	576	806
Coal	340	361	228	250
Other	-8	-8	-13	-13
Nuclear	27	29	-49	-47
Hydro	226	996	176	946
Gas Turbines				
Natural Gas	-189	159	-197	151
Oil	151	565	141	539
PURPA/Cogen	148	105	121	91
TOTAL	<u>1705</u>	<u>3652</u>	<u>1160</u>	<u>3103</u>

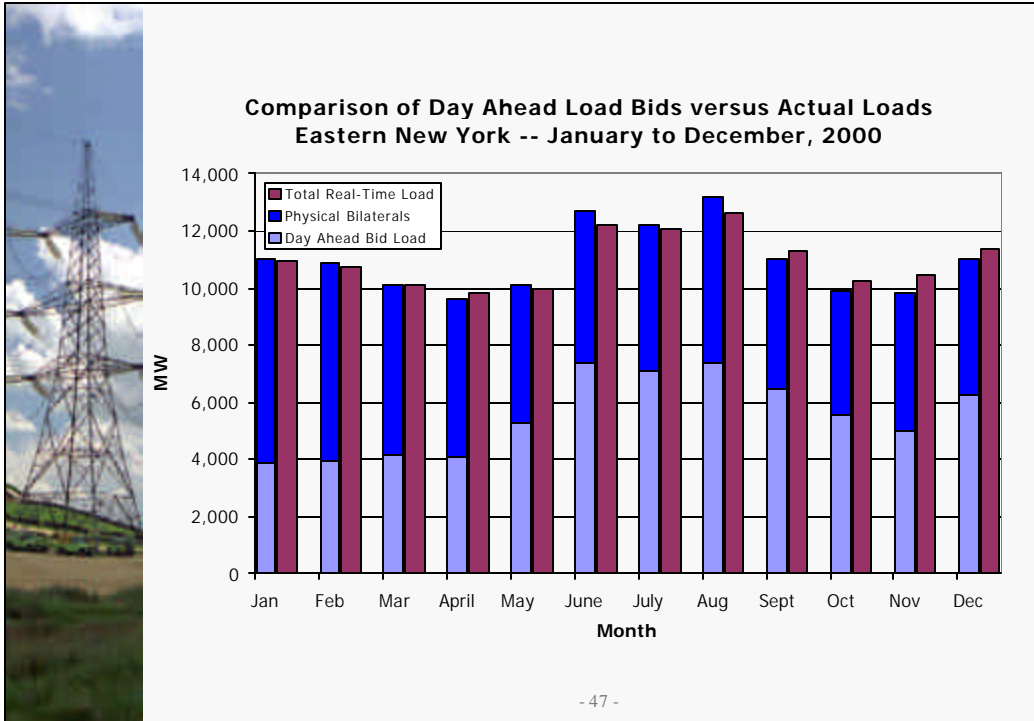
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Analysis of Load Bidding

- The NYISO also monitors the bidding patterns of load serving entities as specified in the mitigation plan.
- Some had raised concerns that load-serving entities may intentionally under-bid their load to cause the day ahead market to clear at depressed prices.
- The accompanying chart shows that loads have generally bid their entire load in the day-ahead market -- and more than the actual load during the summer.
- The day-ahead load consists of physical bilaterals and bid-in load:
 - ✓ Physical bilateral schedules as a percent of day ahead load has fallen from close to 75 percent to less than 50 percent.
 - ✓ This does not necessarily indicate that a higher portion of the load is exposed to day-ahead prices since participants can engage in financial bilaterals to hedge the day-ahead prices in a manner similar to the physical bilaterals. Purchases hedged by financial contracts will still show as bid-in load to the day-ahead market.

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Imports and Exports



Assessment of Imports and Exports

- Market participants have raised significant concerns about the NYISO's scheduling and curtailment of external transactions;
- In addition, FERC's report on the Northeast markets raises a concern with the fact that PJM and ISO New England utilize physical transmission rights while the NYISO uses an auction-based system;
- The analysis in this section has two focuses:
 - ✓ First, it seeks to assess the extent to which the interfaces with the neighboring markets in the Northeast are rationally utilized;
 - ✓ Second, it analyzes the results of the NYISO's import and export scheduling process to determine whether the NYISO models are market design have been an impediment to trading;

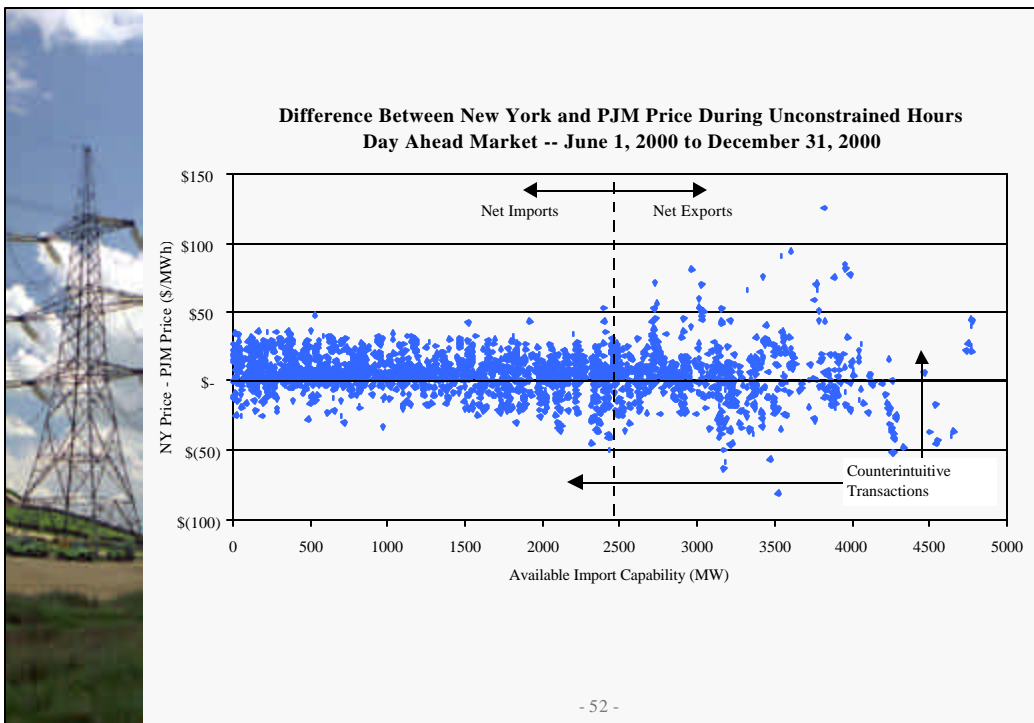
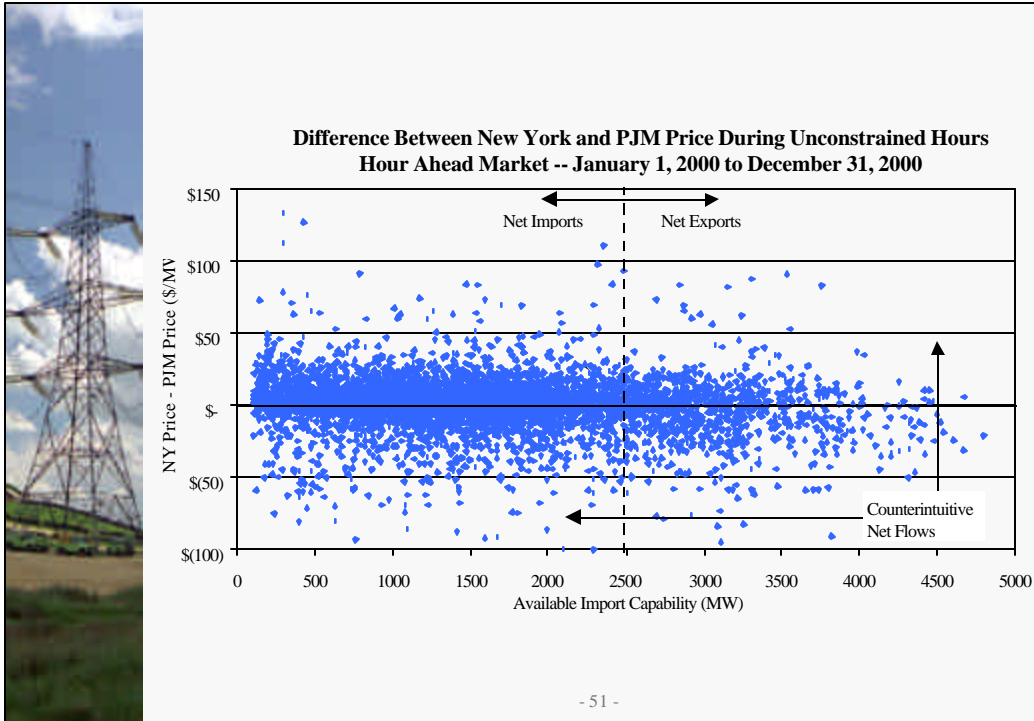
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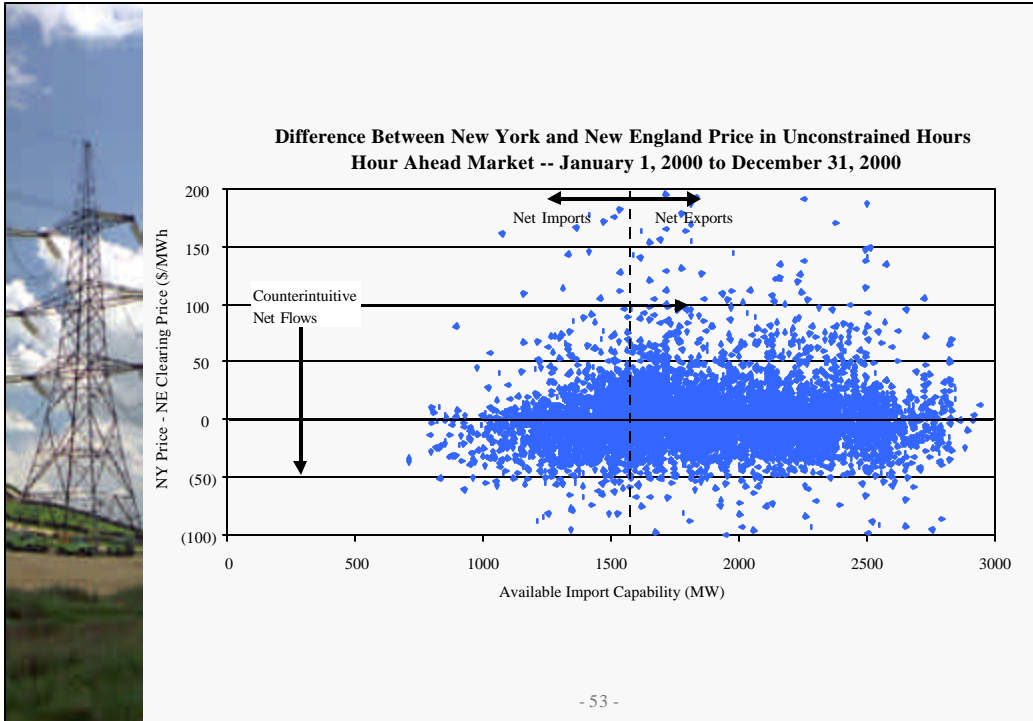


Utilization of the Interfaces

- The following three charts plot the hourly difference in prices between New York and neighboring markets against the available import capability during hours when transmission constraints are not binding.
- The price differences plotted against the left axis are always computed by subtracting the external price from the New York price (i.e., positive price differences mean prices are higher inside New York).
- The available import capability is computed in the following manner:
$$\text{Total Transfer Capability} - \text{Net Scheduled Import}$$
 - ✓ Therefore, when the NYISO is exporting (net scheduled import is negative), the available import capability will exceed the total transfer capability;
 - ✓ The vertical dashed line is shown at the approximate TTC level for each interface -- so higher points (to the right) generally represent exports while lower points (to the left) generally represent imports.
- The counter-intuitive net schedules identified in the following charts are a) net exports when NYISO prices exceed the adjacent market or b) net imports when NYISO prices are lower than adjacent prices.

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External Transactions with New England During High Priced Periods

June 26, 2000

Hour	Day Ahead Market			Real-Time Market		
	New England Proxy Price	Net Scheduled Import	Available Import Capacity	Net Scheduled Import	New England Proxy Price	New England Price
9:00 AM	\$558	-1086	2586	-941	\$183	\$38
10:00 AM	\$739	-896	2396	-450	\$196	\$48
11:00 AM	\$723	-541	2041	-363	\$189	\$55
12:00 PM	\$526	-235	1735	-180	\$164	\$68
1:00 PM	\$1,208	-545	2045	-77	\$122	\$55
2:00 PM	\$1,206	-546	2046	-80	\$122	\$52
3:00 PM	\$926	-300	1800	-176	\$159	\$53
4:00 PM	\$606	-100	1600	-60	\$138	\$52
5:00 PM	\$983	-100	1600	121	\$98	\$54
6:00 PM	\$739	-546	2046	-16	\$154	\$55

August 9, 2000

Hour	Day Ahead Market			Real-Time Market		
	New England Proxy Price	Net Scheduled Import	Available Import Capacity	Net Scheduled Import	New England Proxy Price	New England Price
12:00 PM	\$283	247	1353	96	\$40	\$43
1:00 PM	\$964	304	1296	-26	\$41	\$37
2:00 PM	\$1,000	304	1296	76	\$20	\$33
3:00 PM	\$125	244	1356	40	\$12	\$31

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Assessment of Imports and Exports

- This analysis shows that external transactions have not fully utilized the interfaces with neighboring markets.
- Some amount of unutilized capacity can be attributed to the fact that participants lack perfect foresight regarding relative prices between adjacent markets. However, this analysis reveals a potential concern that markets have not been efficiently arbitrated.
- This concern is particularly acute regarding imports from ISO New England because they serve Eastern New York, which has been (and will be) subject to spikes in energy and reserves prices;
 - ✓ The prior table shows that day-ahead exports were scheduled from New York to New England when prices were greater than \$1000 in New York and ultimately cleared at less than \$70 in New England.
 - ✓ Likewise, much larger day-ahead imports could have been scheduled on August 9 when prices in New York again were close to \$1000.

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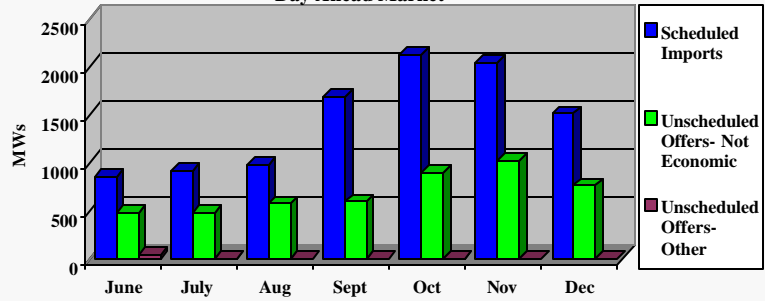
NYISO Scheduling of External Transactions

- The NYISO schedules external transactions in the DAM and the HAM (BME) based on the bids and offers associated with the transactions. This scheduling process has the benefits of:
 - ✓ Eliminating any possible withholding of capability; and
 - ✓ Ensuring that the most valuable transactions are scheduled.
- Some have argued that flaws in the design or execution of the NYISO's scheduling process has caused the under-utilization of transfer capability between the markets;
- The following bar charts show the hourly average import and export transactions that were scheduled or unscheduled in each month during 2000. Those that are unscheduled are divided among those that are uneconomic versus those not scheduled for other reasons (e.g., failed checkout process).

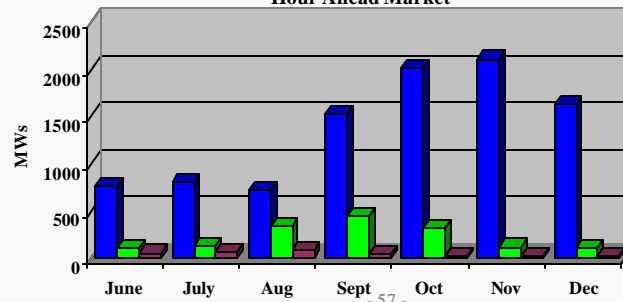
- 56 -



Imports from PJM Day Ahead Market



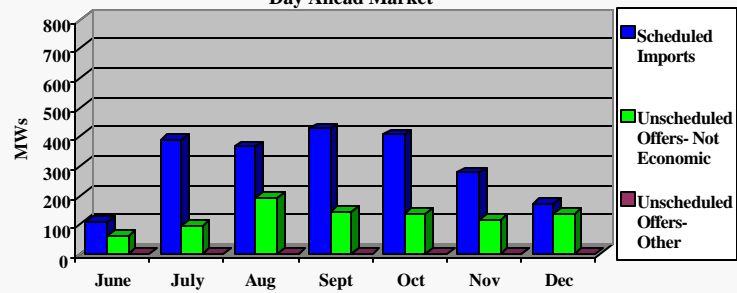
Hour Ahead Market



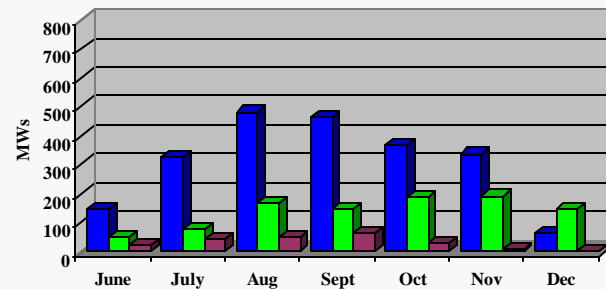
- 57 -



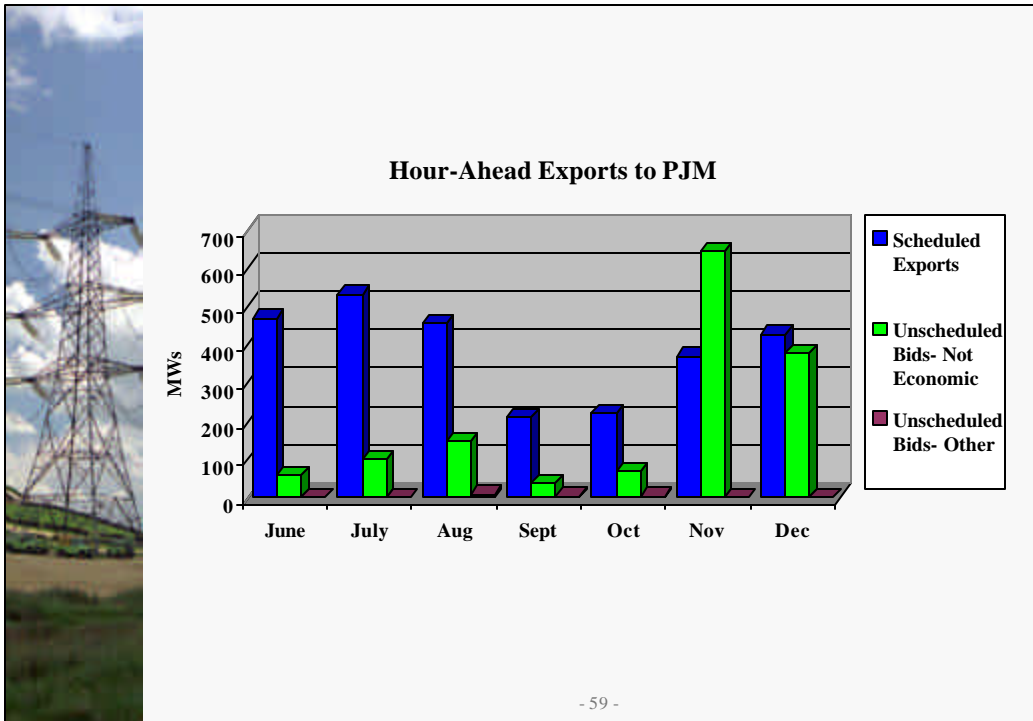
Imports from New England Day Ahead Market



Hour Ahead Market



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Assessment of Imports and Exports

This analysis contains of important results:

- The fact that the interfaces with PJM and NE have not been fully utilized is a primarily result of the bids/offers (or lack of) received from participants.
- The vast majority of the unscheduled transactions are unscheduled because they are not economic.
- Virtually none of the unscheduled transactions in the DAM are rejected for reasons other than economics.
- Transactions are more often unscheduled for other reasons in the HAM than the DAM, but spot checking of the NYISO logs has not revealed rejected transactions that should have been accepted.
- Therefore, the utilization concern associated with the NYISO interfaces cannot be directly attributed to the NYISO scheduling process.
 - ➔ However, the results do suggest that there are significant “seam adjacent markets that need to be addressed.

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Assessment of Imports and Exports

Based on preliminary review, the following contribute to higher transactions costs and lower utilization of the interfaces between New York and neighboring ISOs:

- The physical transmission rights system in New England does not facilitate full utilization of the interface -- rights are required to schedule transactions and can be difficult to acquire.
- Even when a participant has a physical right, the New England market rules currently hinder hourly exports to New York by refusing to schedule any transaction that would cause the New England price to rise above the offer of an uncommitted unit.
- Concurrent scheduling in New York and New England also makes arbitrage more difficult by making it impossible for a participant to know if a transaction has been accepted in one market before scheduling it in the neighboring market.
- Costs and risks associated with congestion at the external interfaces is higher than that associated with internal congestion given the lack of: a) coordinated bidding/scheduling for use of the interfaces between the ISOs and b) transmission rights that span the external interfaces;
- Misalignment of prices used to schedule transactions in the HAM versus those used to settle transactions in the real-time resulted in higher risks and gaming opportunities -- resolved by ECAs currently to be modified in tariff.

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External Transactions ECAs

- Two ECA's issued by the NYISO this fall have improved the scheduling of external transactions significantly.
 - ✓ Both ECA's address problems that were related the fact that the BME schedules the transactions in the hour-ahead based on the prices that it computes, while the transactions are settled at real-time prices produced by SCD.
 - ✓ "ECA A" causes a participant with a transaction that was accepted in the BME and subsequently fails checkout due to the participant to settle with the ISO at the difference between its BME bid/offer and the SCD price (i.e., we take the transaction at the participants bid/offer, and they buy it back in real-time). This ECA eliminates the incentive to engage in phantom transactions.
 - ✓ "ECA B" causes transactions to be settled at the BME price when constraints bind in the BME at the interfaces. This substantially reduces the risk that participants were facing that accepted day-ahead transactions would be cut by BME at one price and that the participant would have to settle the transaction at a much different price in SCD. It also has created a much better incentive for counter-flow transactions that can allow more transactions to be accepted.

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Conclusions: External Transactions

- NYISO has begun efforts on multiple fronts to address issues related to improving the utilization of the transmission capability to and from adjacent markets:
 - ✓ MOU process to identify and resolve “seams” issues with neighboring control areas -- holds the potential to achieve significant shorter-term improvements.
 - ✓ The DAM study has identified a number of longer-term options that are designed to improve the integration of the Northeast power markets and the utilization of the transmission capability.
- Identifying and implementing improvements prior to this summer should be a high priority.
 - ✓ Some modifications have been made by New England to its physical rights system for scheduling external transactions to improve the utilization of the interface.
 - ✓ NYISO has worked with PJM to improve coordination between the ISOs on external transactions to alleviate problems involving ramp capability and other scheduling issues. PJM is also moving to a single proxy bus matching NYISO.

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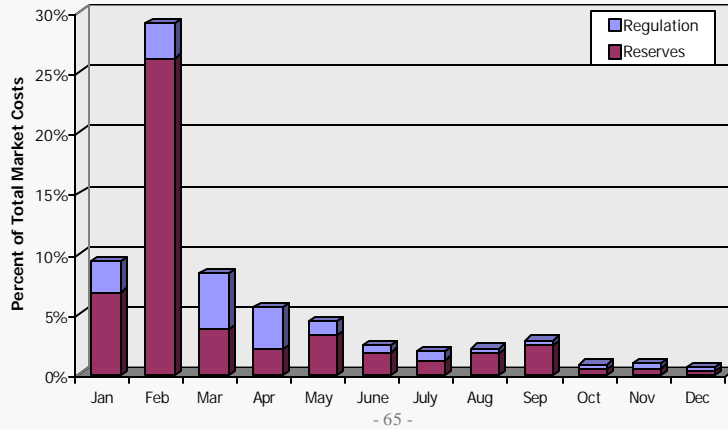
Ancillary Services Markets



Ancillary Services Markets

- Following the events in the reserves markets in the first quarter of 2000, prices in the reserves and regulation markets have been very reasonable, accounting for a very small share of the total market costs.

Reserves and Regulation Costs



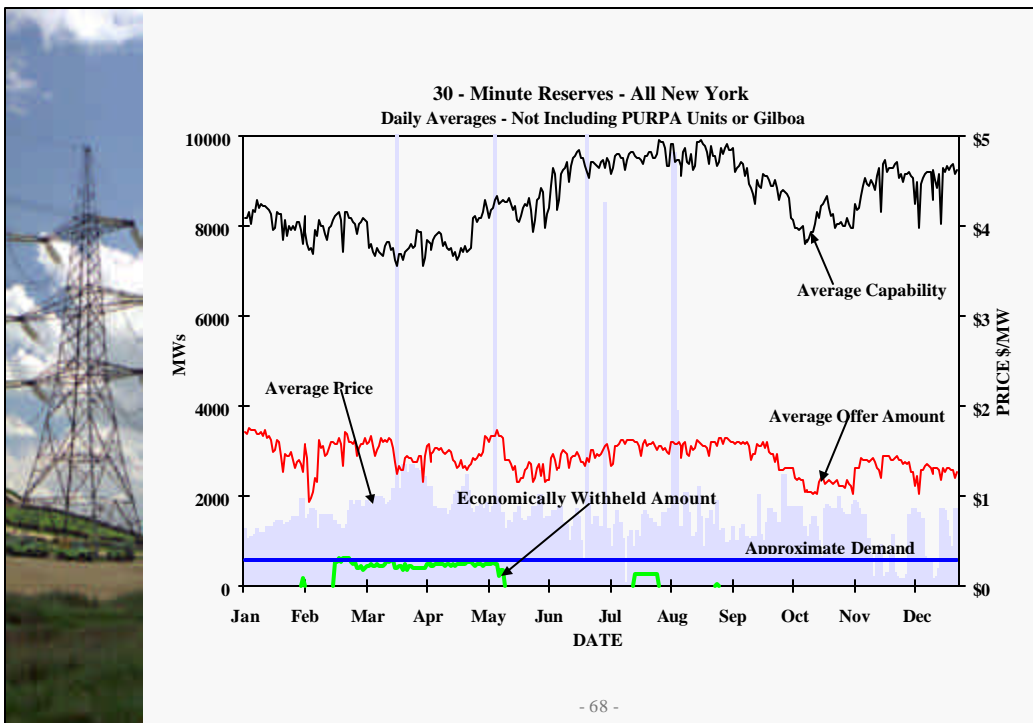
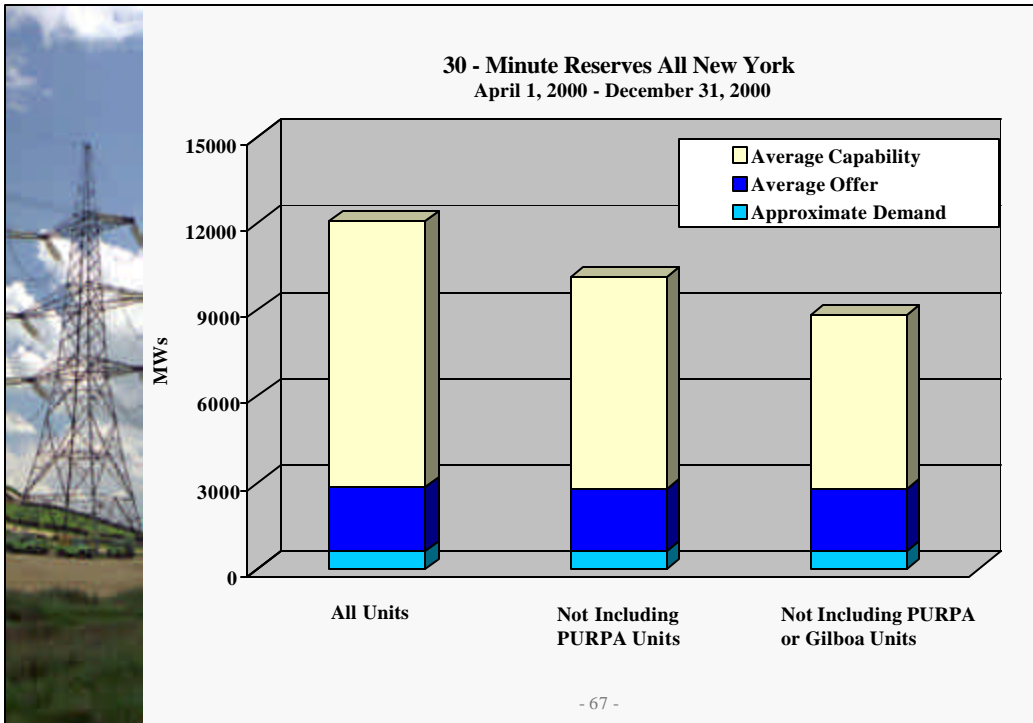
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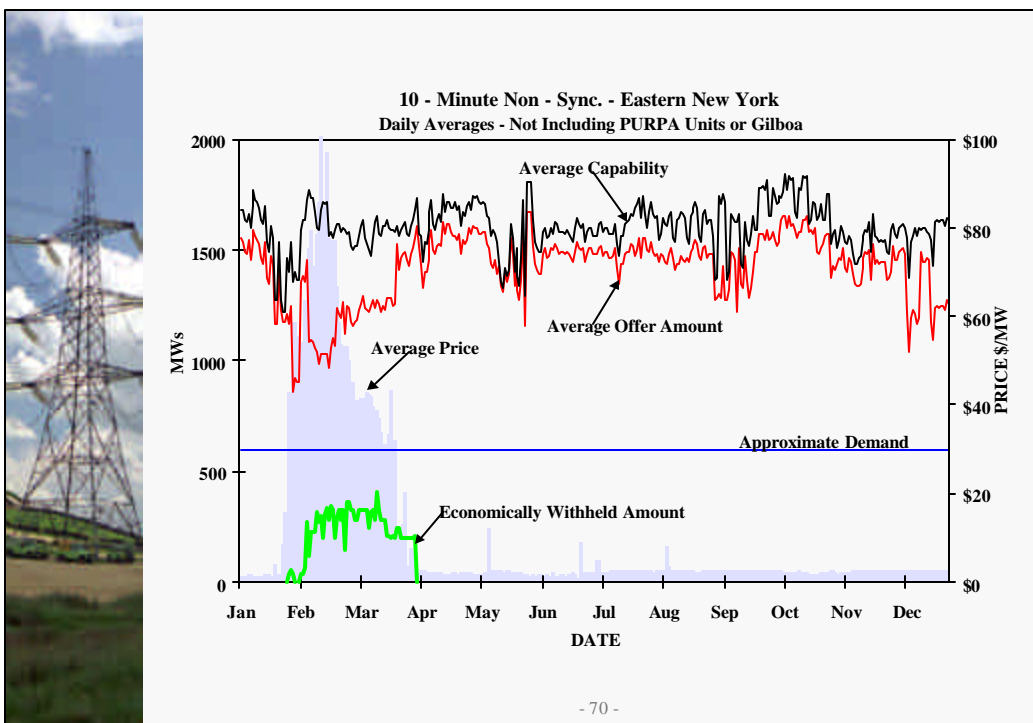
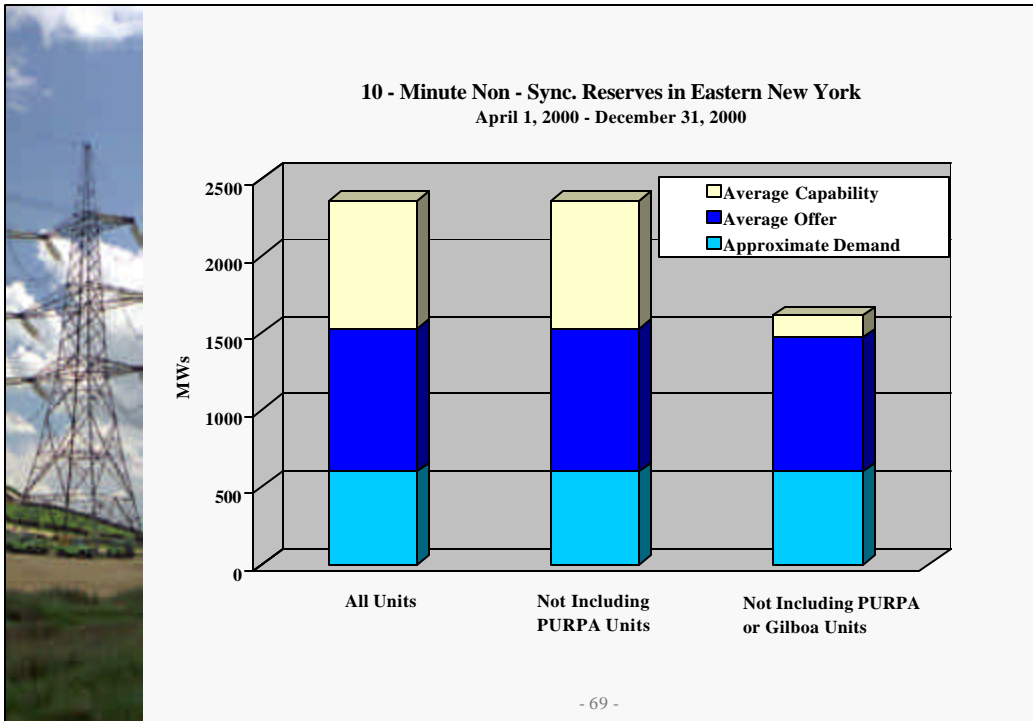


Ancillary Services Markets

- The following pairs of charts provide a summary and a more detailed depiction of offer patterns in each of the NYSIO ancillary services markets.
- The summary chart for each service shows three bars --
 - ✓ One that includes the average capability, offer amount, and demand amount for all units;
 - ✓ One that shows these values for non-PURPA units; and
 - ✓ One that shows these values for all units except PURPA and the Gilboa pumped storage unit.
- ✓ These three bars are useful to examine separately because many PURPA units claim contractual (e.g. energy-only contracts) or legal issues related to providing ancillary services.
- ✓ Gilboa has considerable capability to provide ancillary services, but was limited initially by a modeling agreement with the owners and now by a reliability limit on the of reserves the NYISO will purchase.
- In addition, the 30 minute reserves and regulation charts are shown for capability throughout the state because they have no locational requirements (excluding Long Island), while 10 minute spinning and non-synch. reserve charts show capability only in the East.

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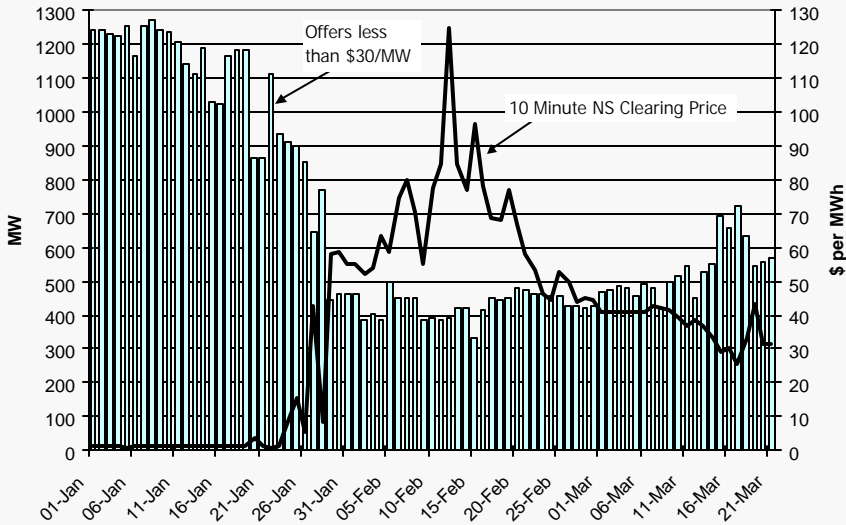
10-Minute Non-Synchronous Reserves

- The previous chart shows that in the first quarter of 2000, a significant amount of economic withholding occurred simultaneously with a large reduction in capability offered.
- The combination of these two actions are better shown on the following chart that shows the offers into the 10-minute non-synch market at prices below \$30.
 - ✓ The \$30 level represents an amount that should substantially exceed the opportunity costs and risk premiums of most 10-minute non-synch. resources.
- These actions caused prices to rise in a number of the ancillary services markets:
 - ✓ Because higher value resources will be substituted for lower value resources when supply of the lower value resources become scarce, withholding in the 10-minute NSR market caused the prices of 10-minute spinning reserves to rise sharply.
 - ✓ Consequently, regulation prices were also affected as many of the resources that can provide regulation were pulled into the 10-minute reserve market.

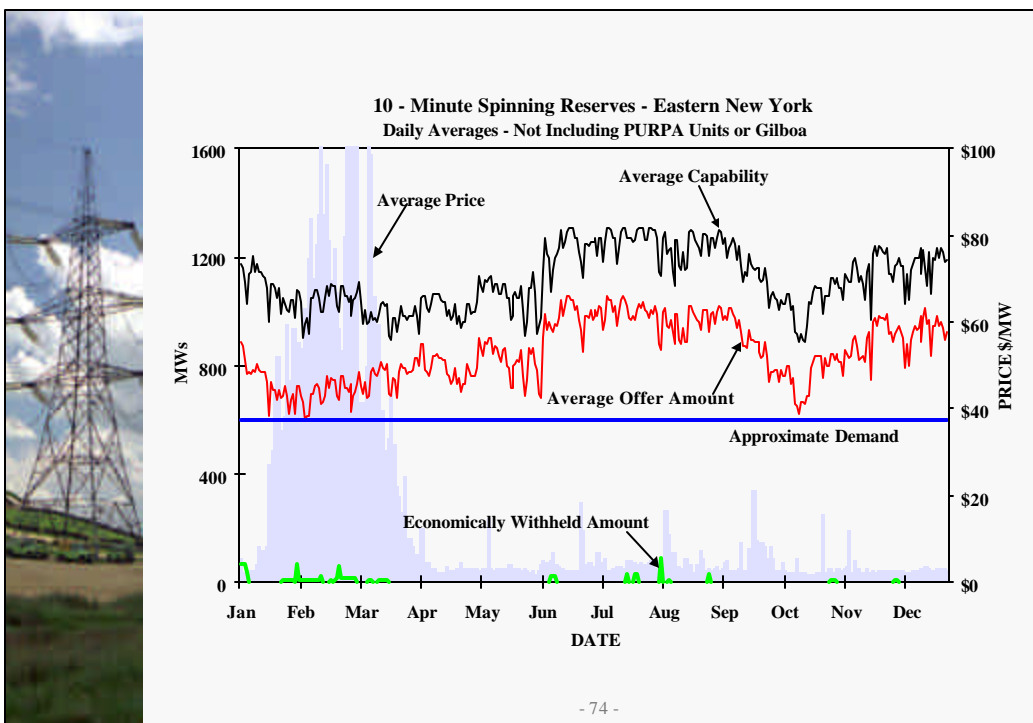
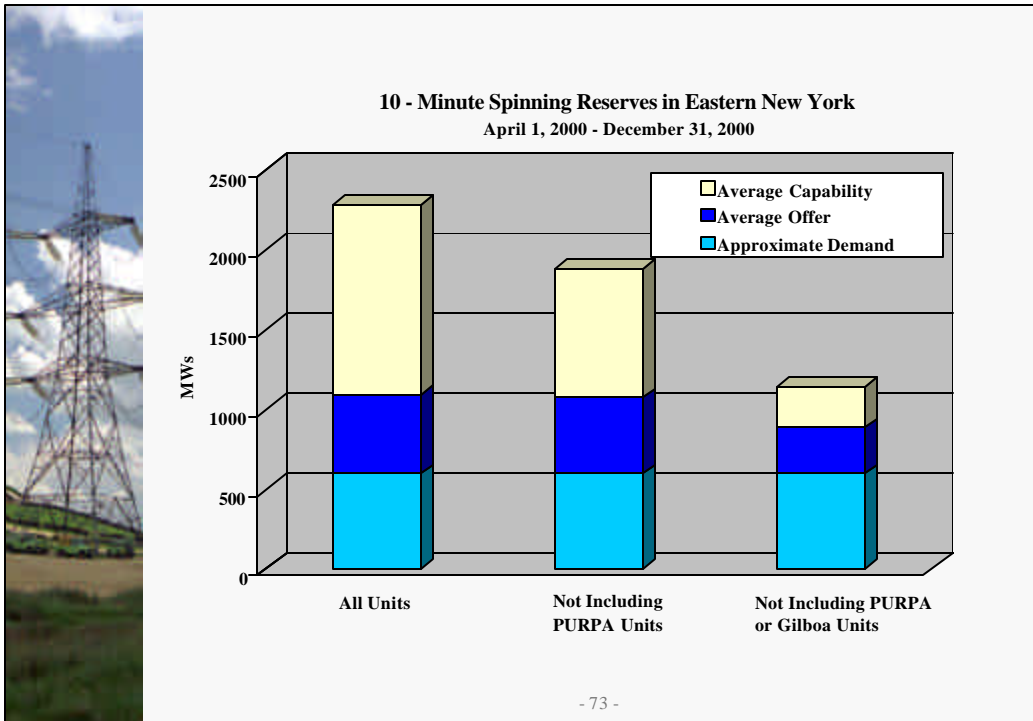
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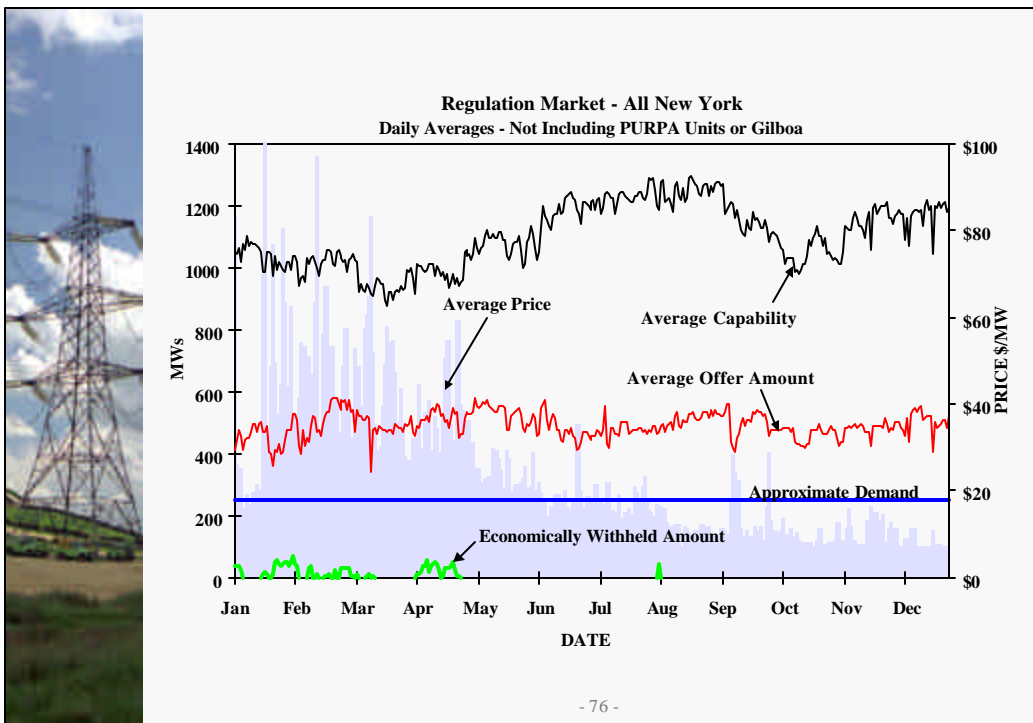
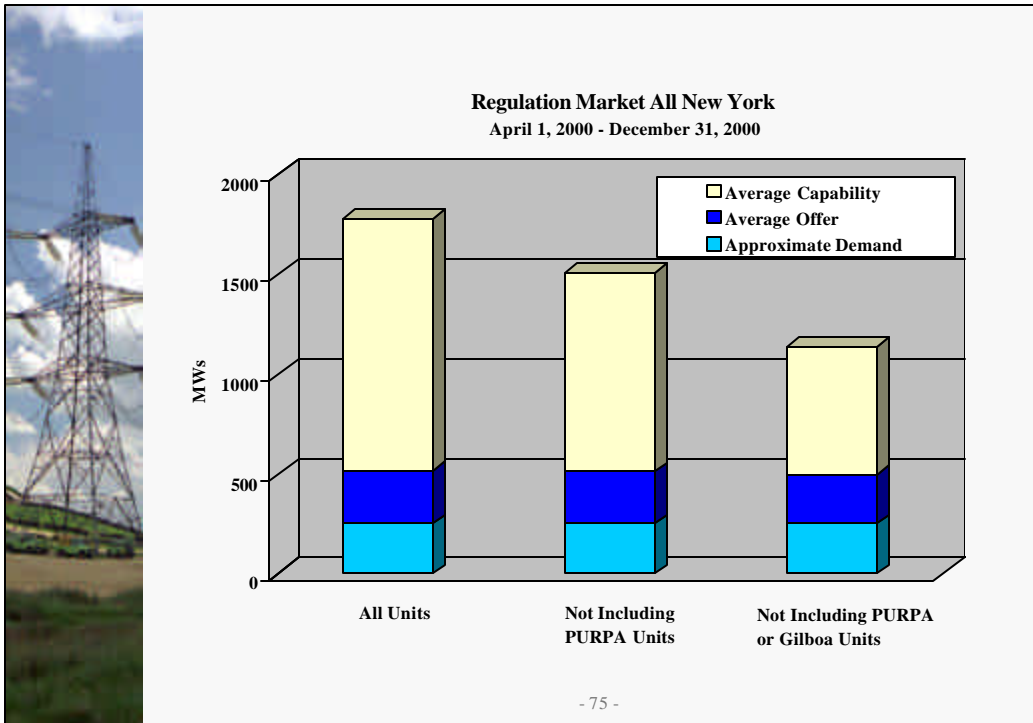


10 Minute Non-Synch Clearing Prices and Offers less than \$30 per MW
Daily Averages for January 1 to March 21



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Ancillary Services Summary

- We typically receive substantially more offers than the approximate demand:
 - ✓ For 30 minute reserves, we receive 380 percent offers more than the approximate demand (almost five times the demand);
 - ✓ For 10 minute NSR, we generally receive 160 percent more than the approximate demand -- although this market currently is subject to a requirement to sell and a bid cap;
 - ✓ For 10 minute spinning reserves, we typically receive offers that are 75 percent more than the approximate demand -- ignores the fact that we can purchase some 10 minute spinning reserves in the West and substitute additional non-synch to meet the 10 minute reserve requirement in the East;
 - ✓ For regulation, we receive 75 percent more than the approximate demand;
- Therefore, the ancillary services markets are generally not tight. However, since these markets are jointly optimized and the same resources are offered in multiple markets, energy and other AS markets can bid resources away from a given service resulting in relatively tight conditions.
- In addition, tight conditions in certain ancillary services markets contributed to the high energy price events during 2000 by causing relatively economic energy supplies to be scheduled in the ancillary services markets.


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Ancillary Services Summary

- Additional supply of 10-minute NSR resources will help ensure that the market remains competitive once the bid cap is removed.
- A number of provisions to increase supply in the 10-minute NSR markets are being investigated or implemented:
 - ✓ The modeling enhancements to Gilboa will allow it to carry a much larger amount of 10-minute reserves and improve its flexibility as a reserve supplier.
 - ✓ The NYISO is investigating modifications that would allow 30-minute turbines to supply 10-minute NSR for the portion of its output that would be available within 10 minutes.


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Ancillary Services Conclusions

- The most important improvements to the ancillary services markets are those that increase the supply of reserves/regulation:
 - ✓ Maximizing the amount of reserves that may be offered from the Gilboa units;
 - ✓ Executing reserve sharing arrangements with New England; and
 - ✓ Making changes to facilitate fuller participation in the regulation market based on the results of the investigation of penalties, offer parameters (ramp rates), and incentives for units to be on dispatch and providing regulation.
- The NYISO should also implement locational pricing of reserves for generators (e.g.- high value reserves on Long Island do not set prices in west New York), and also consider billing loads for ancillary services on a locational basis over the longer-term.

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Ancillary Services Conclusions

- In the longer term, other modifications in the pricing and operation of ancillary services should be considered:
 - ✓ Multi-settlement system for ancillary services -- eliminates potential for double payment;
 - ✓ Facilitate conversion of units from 30 minute to 10 minute reserves when possible;
 - ✓ Establishing efficient, consistent pricing methodology for all reserves in the day-ahead market that includes the sum of lost opportunity costs and availability of the marginal unit selected for each service;
 - ✓ Investigate whether reserves may be “imported” from the West to meeting Eastern requirements;
- The additional supplies available to the 10-minute NSR market should make that market more competitive and ultimately allow the removal of the cap.

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Conclusions



Conclusions

- The first priority for ensuring the competitiveness of the New York markets must be to facilitate the entry of new generation and investment in transmission:
 - ✓ The inability of investors to site significant amounts of new generation in the face of growing loads will make the markets increasingly vulnerable to large price fluctuations in the absence of strategic withholding;
 - ✓ This situation will also increase the vulnerability of the market to abuses of market power as transmission constraints and tight supply cause withholding to have a larger effect on prices.
- The electric markets in New York have been competitive under most conditions experienced to date:
 - ✓ Prices have not been unreasonably high given fuel price increases and large unit outages;
 - ✓ Differences in the Market Rule Sets at the New England Interface has resulted in sub-optimal utilization of that interface leading to higher prices at times;
 - ✓ The market may be subject to higher prices and tighter conditions next summer since the summer was unusually cool in 2000.



Conclusions

- Except for several isolated instances, my analysis revealed that suppliers bid in a manner consistent with workable competition.
- These instances can be effectively remedied under the current mitigation measures, and the AMP should effectively address the one day lag in the implementation of mitigation.
- Lower conduct thresholds for identifying economic withholding do not appear necessary at this point, but further assessments will be made.
- Work to resolve seams issues with neighboring markets should continue as rapidly as possible -- interim improvements should be implemented prior to summer.
- Modifications to increase supplies in the ancillary services markets will improve the competitiveness of those markets, and improve conditions in the energy market during tight periods.
- Facilitating significant demand-side response to wholesale prices will improve both the competitiveness and reliability of the New York markets.