2003 State of the Market Report
New York Electricity Markets

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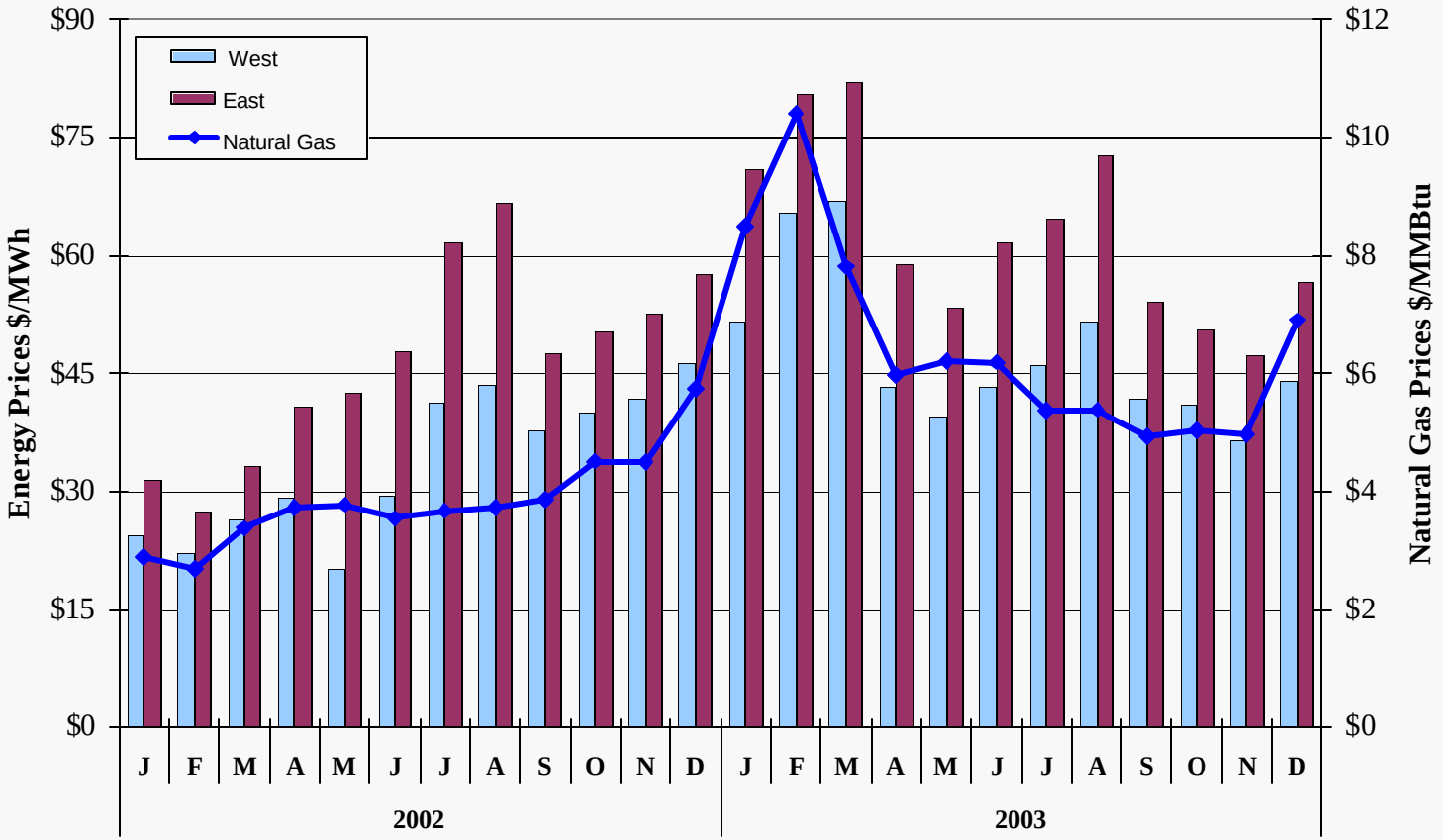
POTOMAC ECONOMICS

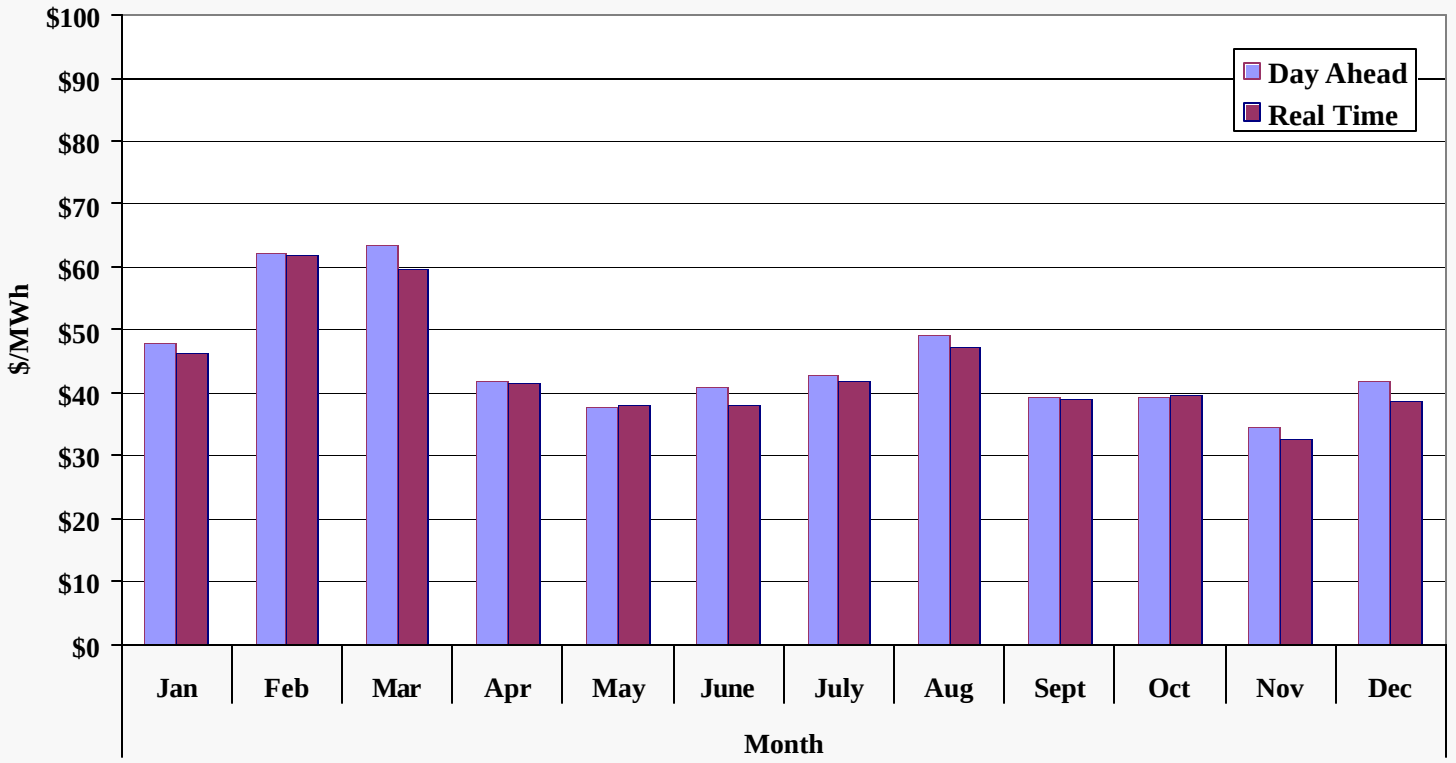
Introduction to the Annual Report

- This presentation provides highlights from the State-of-the-Market Report on the New York electricity markets for 2003.
- The market assessment addresses the following areas:
  - ✓ Energy market prices and outcomes
  - ✓ Market participant bid and offer patterns
  - ✓ External transactions scheduling
  - ✓ Capacity market
  - ✓ Ancillary services
  - ✓ Demand response programs

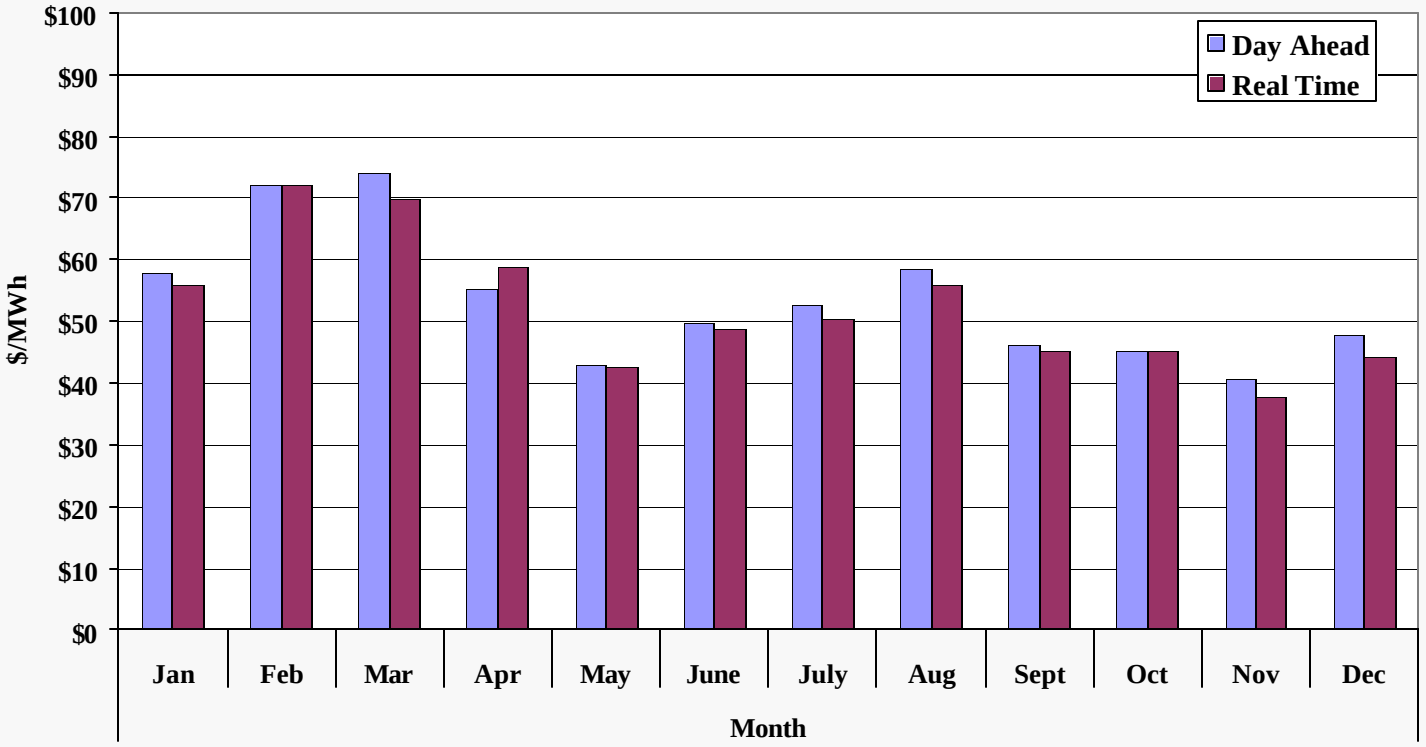
Energy and Natural Gas Prices
2002 - 2003



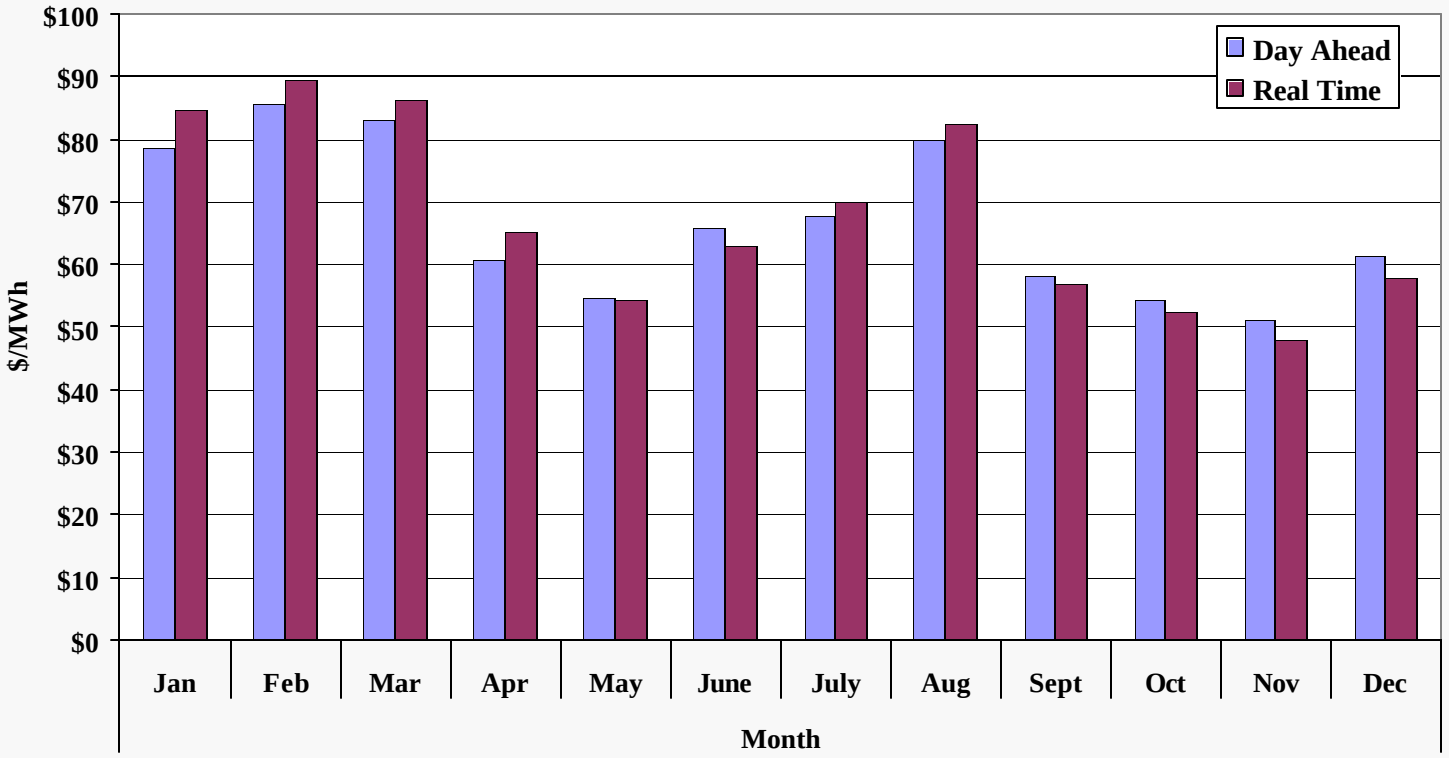
Average Monthly Day-Ahead and Real-Time Energy Prices West Zone 2003



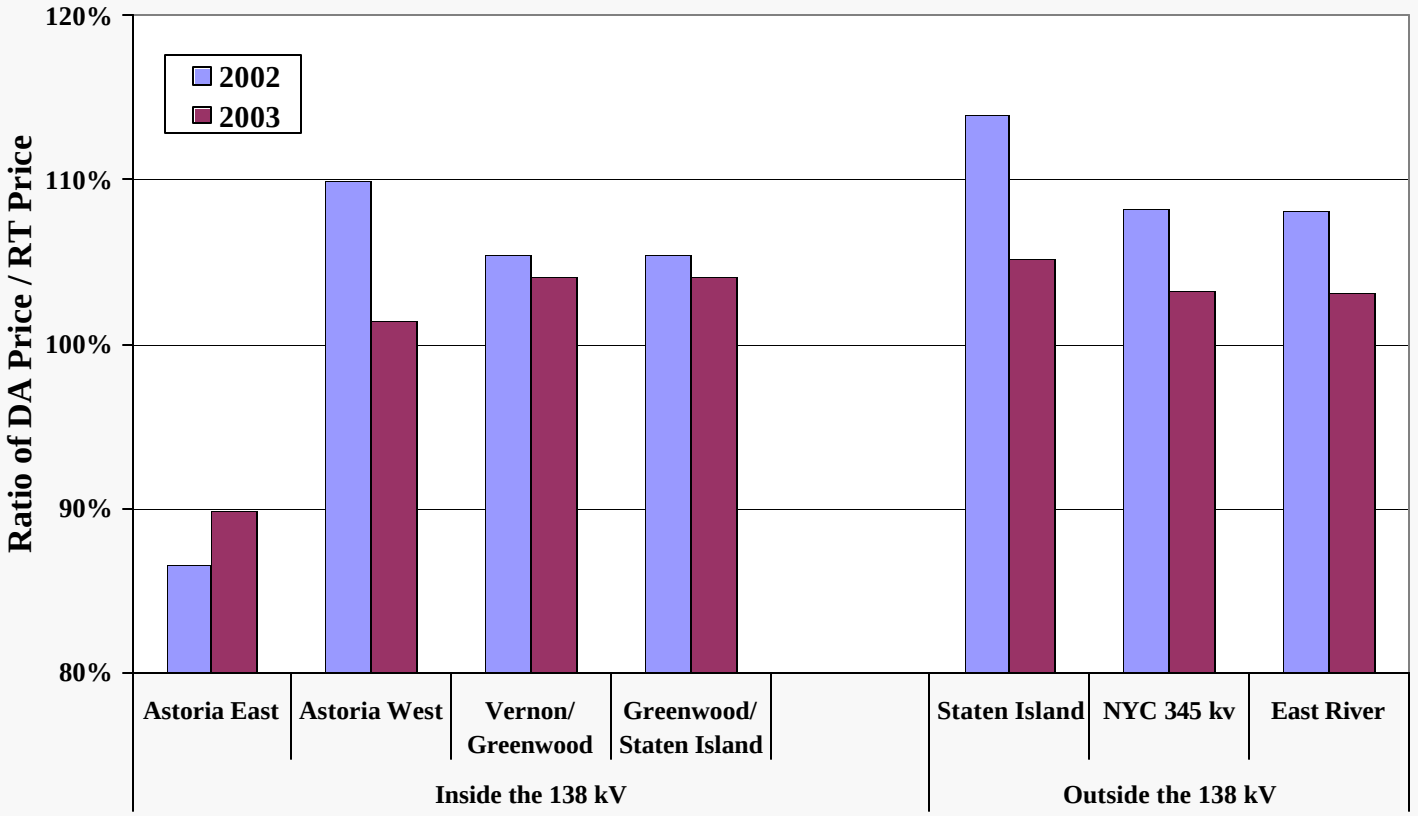
Average Monthly Day-Ahead and Real-Time Energy Prices Capital Zone 2003



Average Monthly Day-Ahead and Real-Time Energy Prices New York City 2003



Day-Ahead and Real-Time Energy Prices in NYC
2002 and 2003



Summary of Mitigation in 2003

Day-Ahead Market

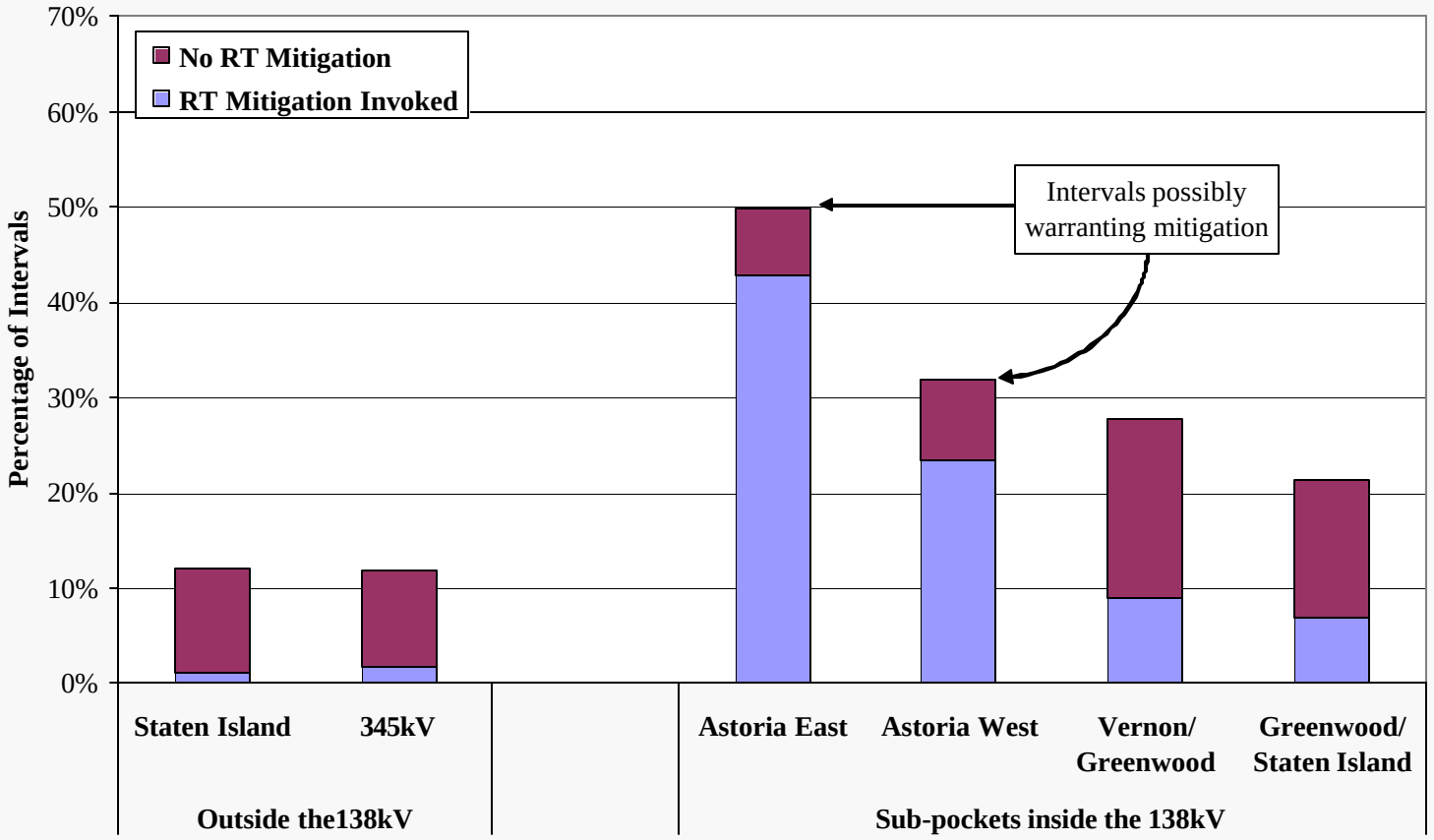
- Mitigation under the automated mitigation procedures ("AMP") did not occur in 2003.
  - ✓ The AMP is only applied outside New York City;
  - ✓ The AMP software only runs when energy prices outside the City are greater than $150 per MWh since the probability of the impact test being satisfied at lower pre-mitigation prices is extremely low.
  - ✓ The conduct and impact tests in the relatively high priced hours were not satisfied, so mitigation was not warranted.
- Mitigation under the ConEd mitigation measures for New York City occurred frequently, including every day in the summer of 2003.
  - ✓ The ConEd measures for New York City are triggered if there is congestion into NYC in the day-ahead market in any hour.

Summary of Mitigation in 2003

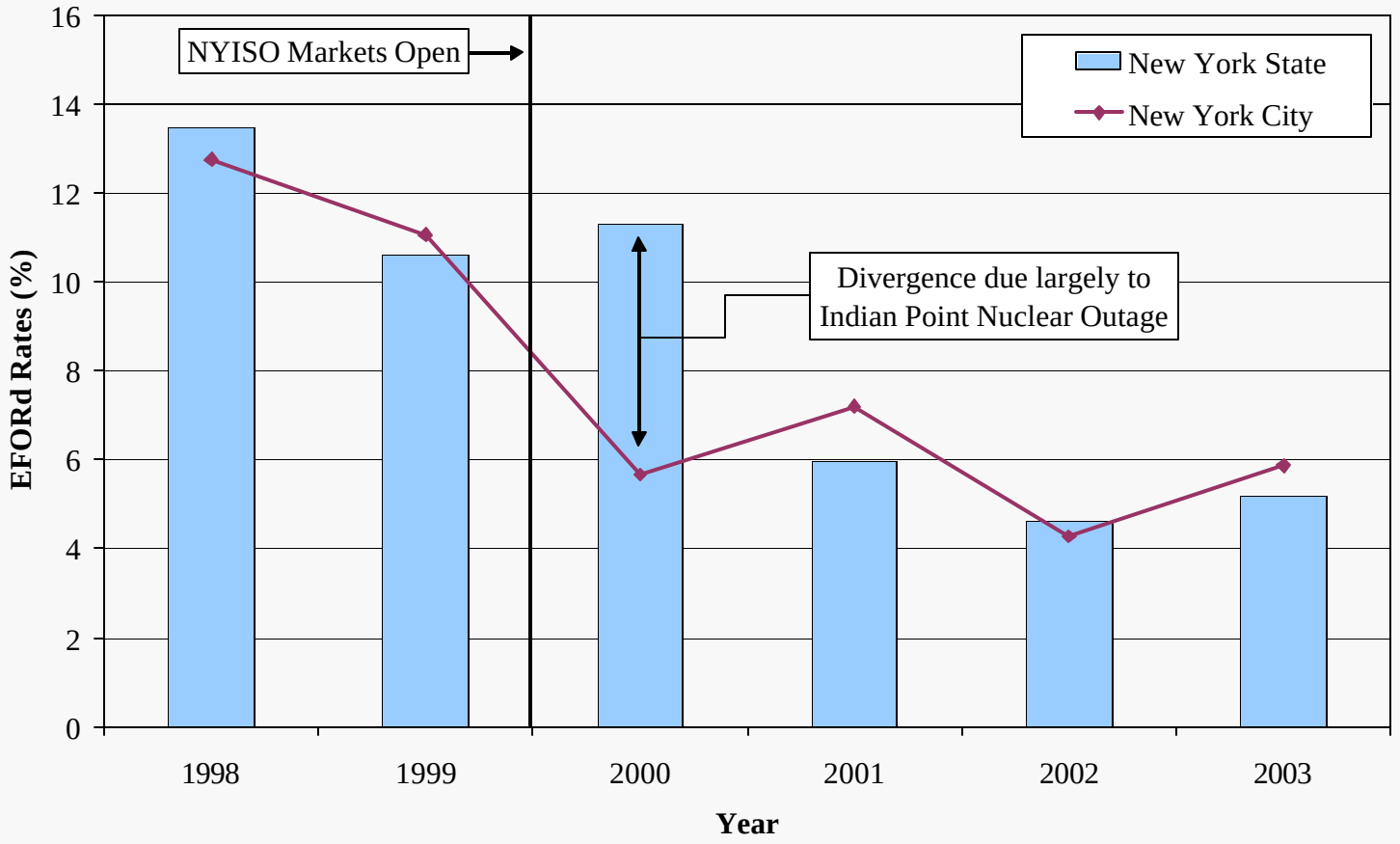
Real-Time Market

- Mitigation measures to address locational market power in the NYC load pockets were implemented when the modeling changes were made to model the constraints into the load pockets.
- The local market power mitigation measures for NYC are triggered when there are binding constraints into a load pocket.
- The following figure summarizes the frequency of constraints into the load pockets and the actual frequency of mitigation.
  - ✓ The columns show the percent of intervals with a cumulative shadow price into the load pocket that exceeds the load pocket mitigation threshold.
  - ✓ The figure also shows the share of those intervals in which one or more units in the given load pockets were mitigated.
  - ✓ Mitigation was most frequent in the smallest, most congested load pockets that have the lowest mitigation thresholds and the most severe potential market power.

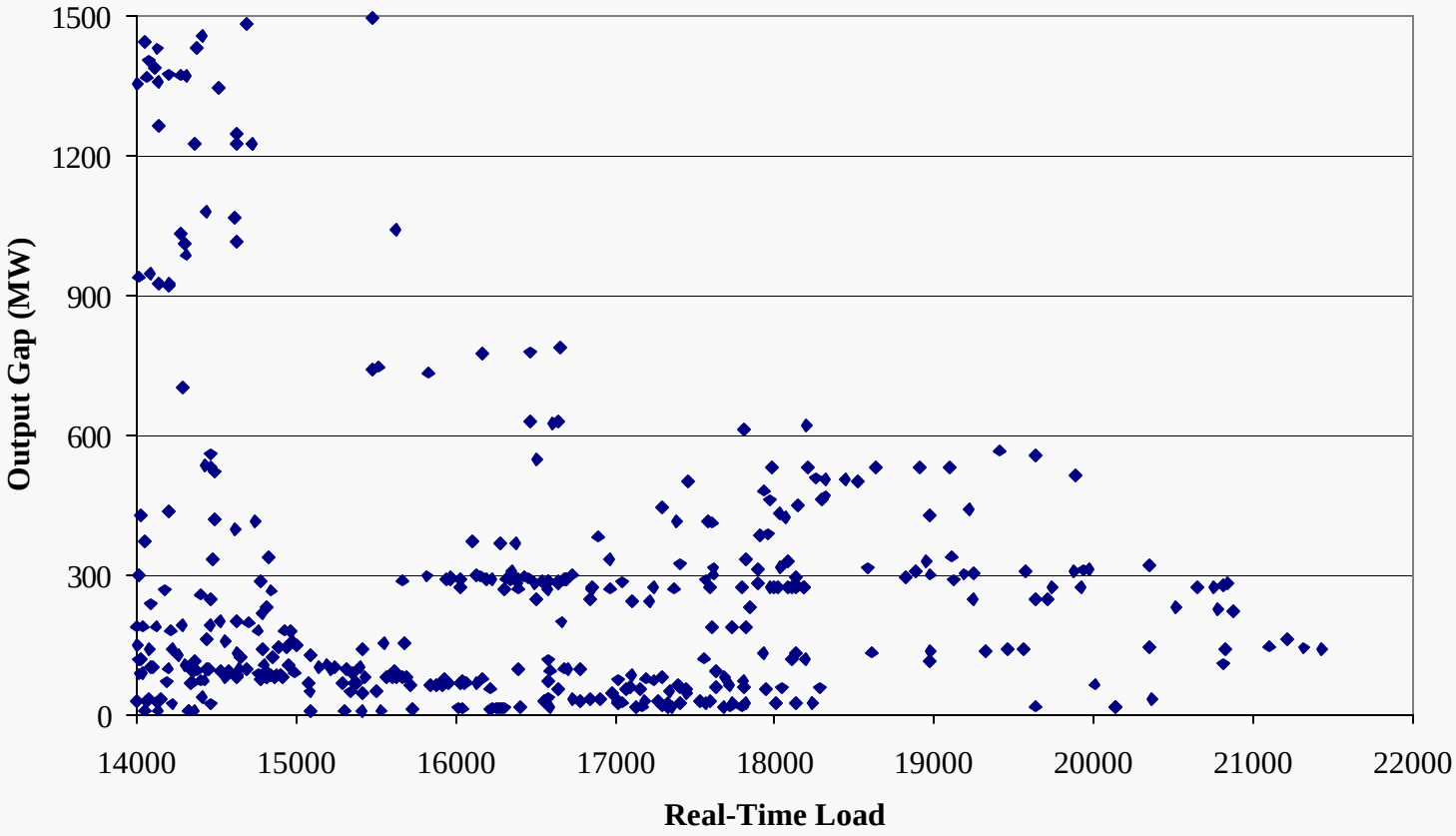
Frequency of Real-Time Constraints and Mitigation
New York City Load Pockets in 2003



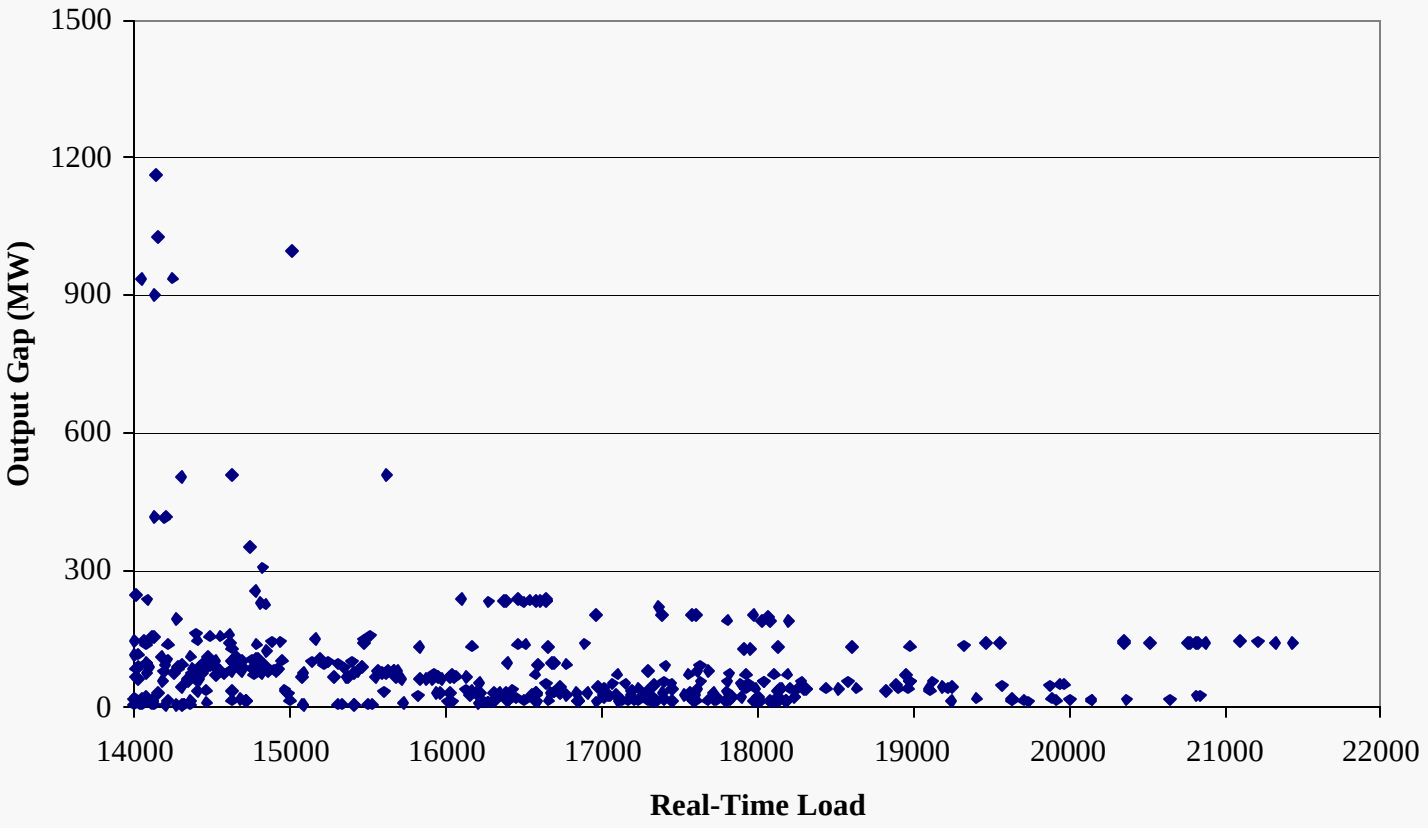
Equivalent Forced Outage Rates
1998 to 2003



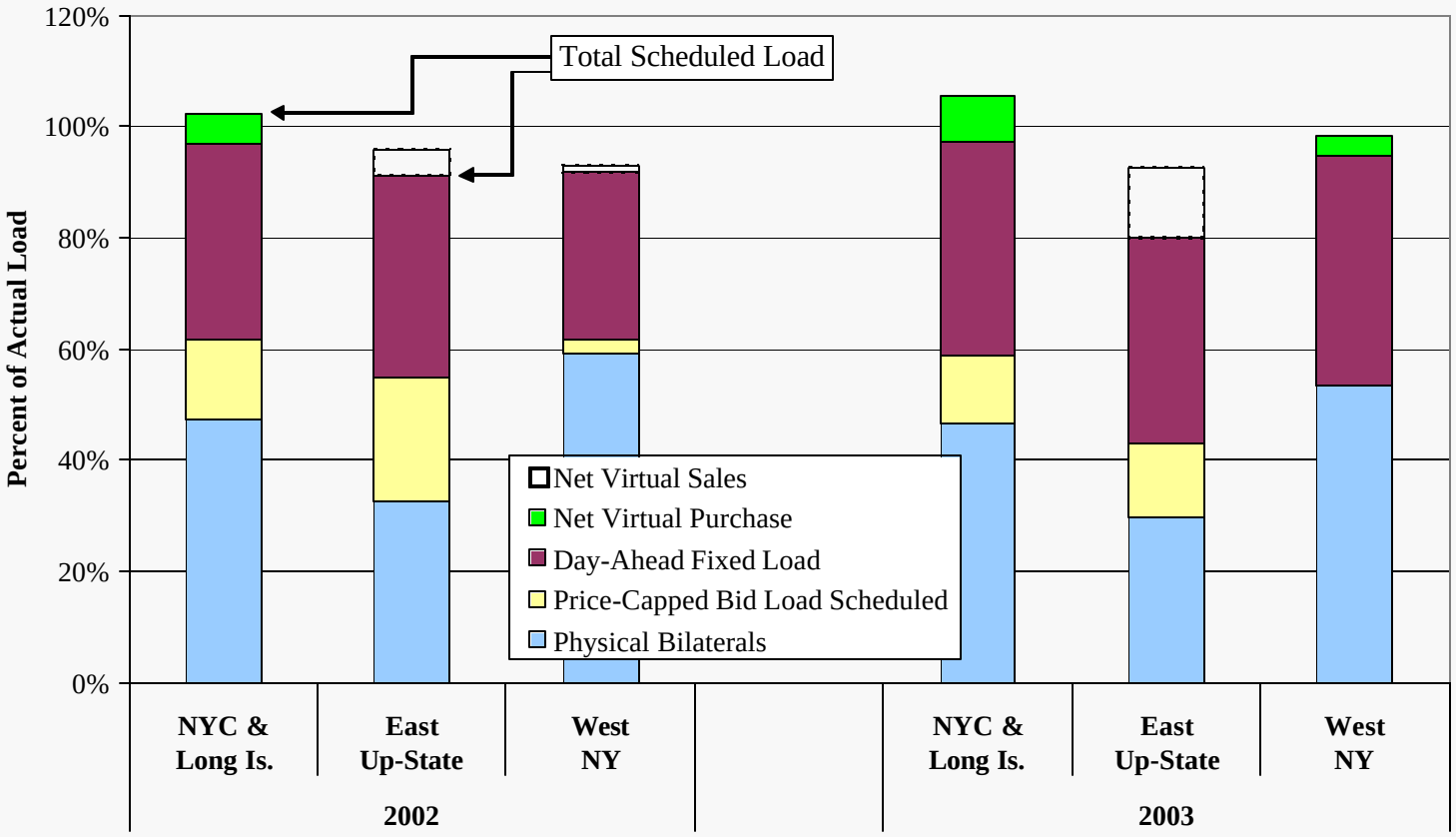
Output Gap at Low Threshold vs. Actual Load
Real-Time Market – East New York



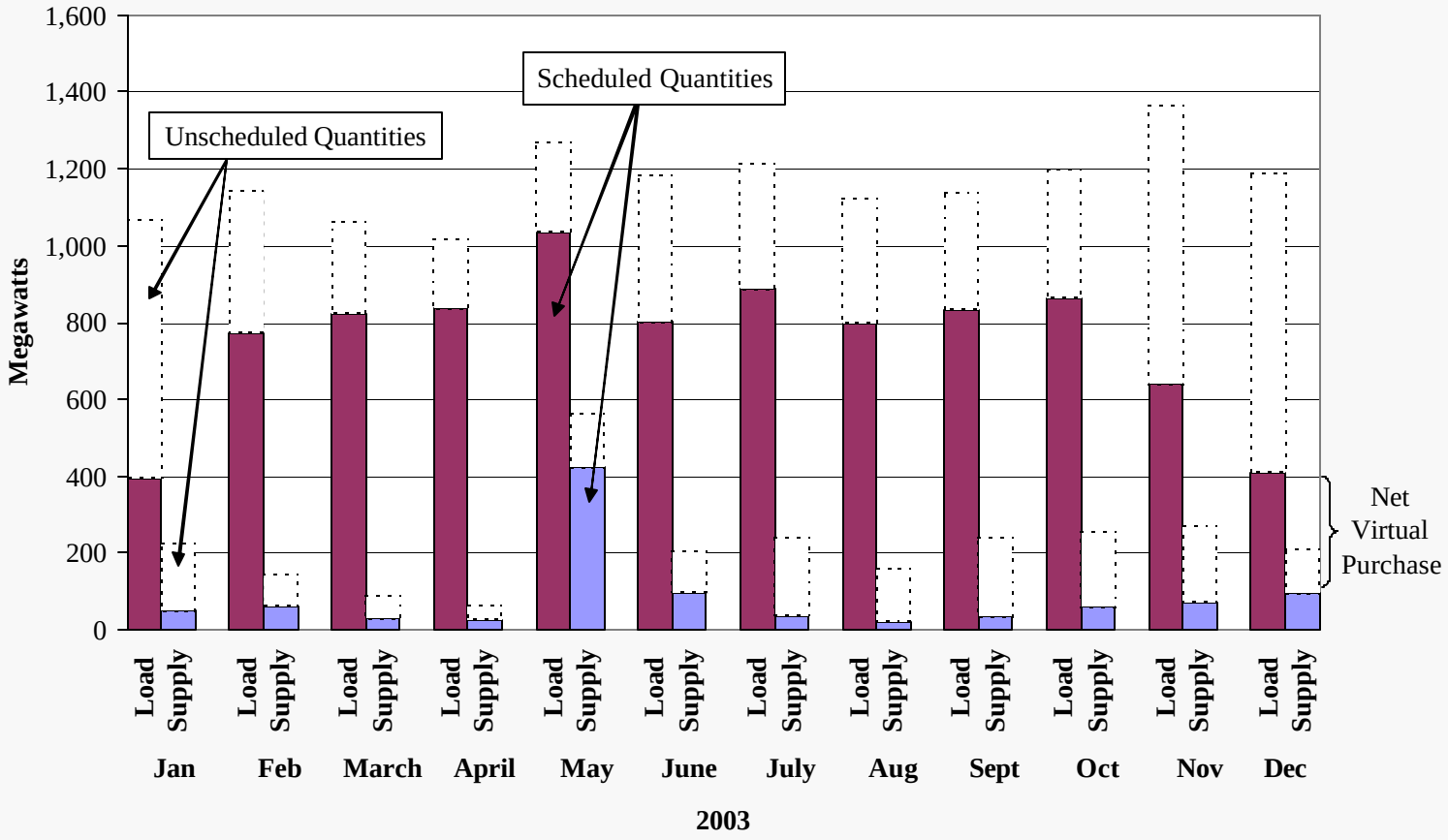
Output Gap at Mitigation Threshold vs. Actual Load
Real-Time Market – East New York



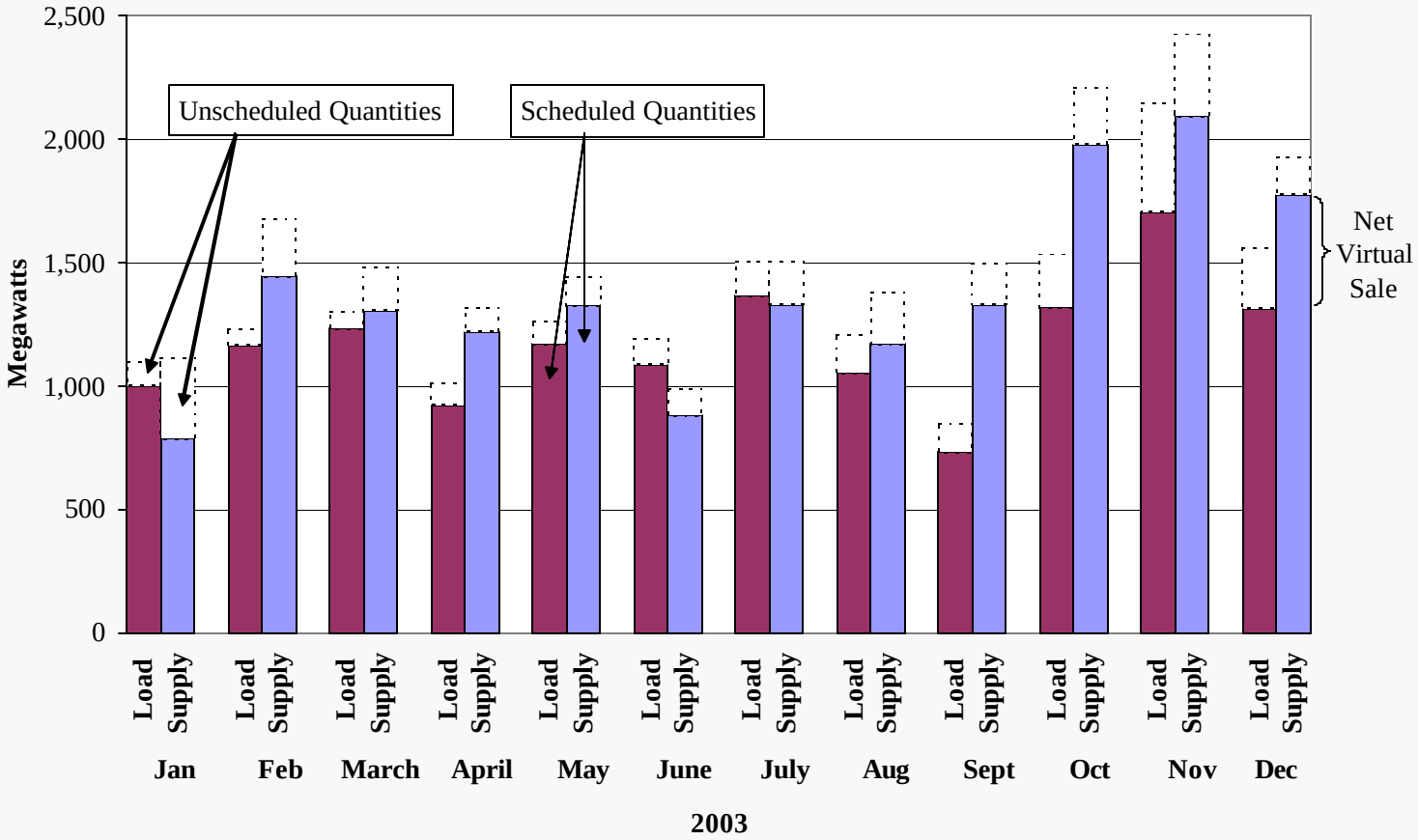
Composition of Day Ahead Load Schedules as Proportion of Actual Load - 2002-2003



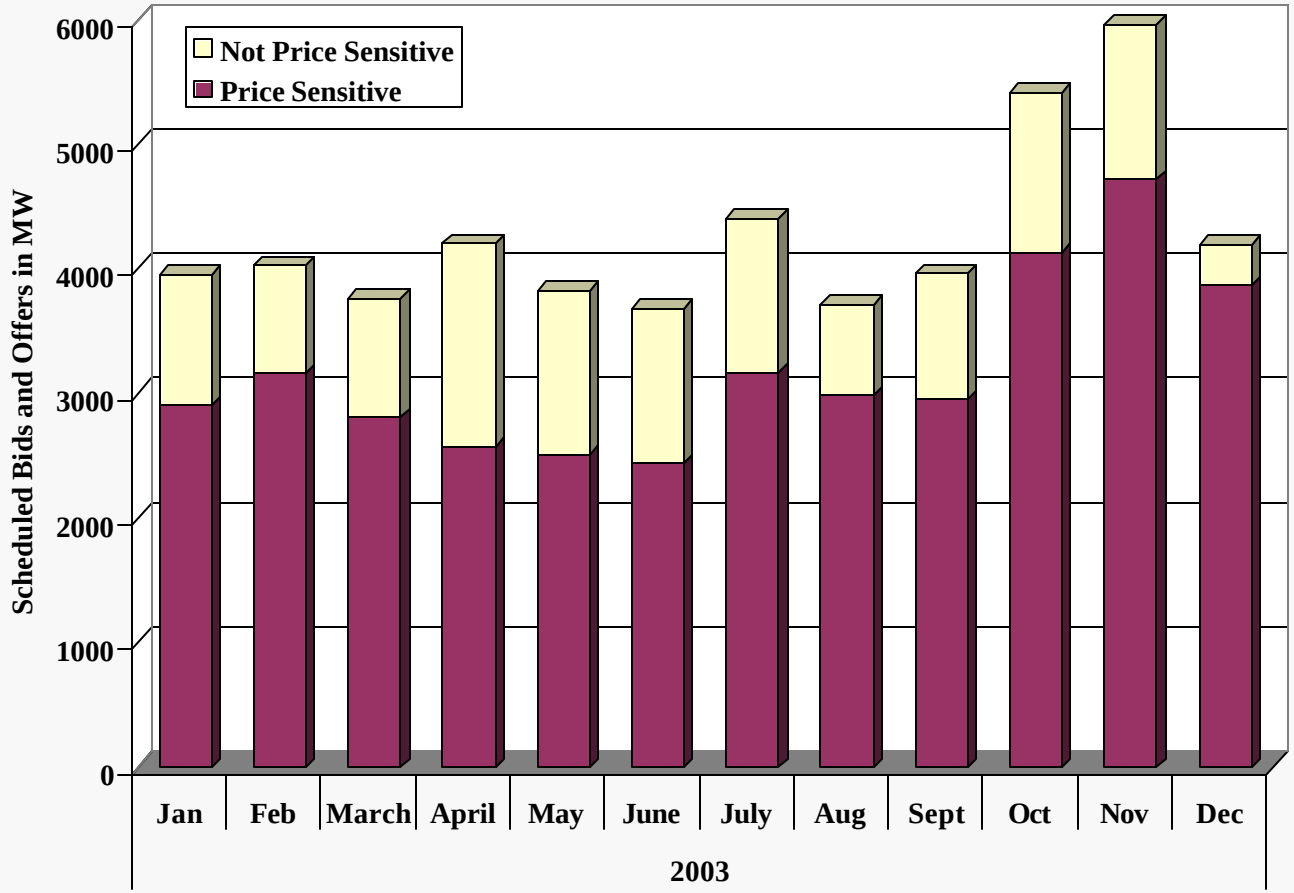
Hourly Virtual Load and Supply
New York City and Long Island - 2003



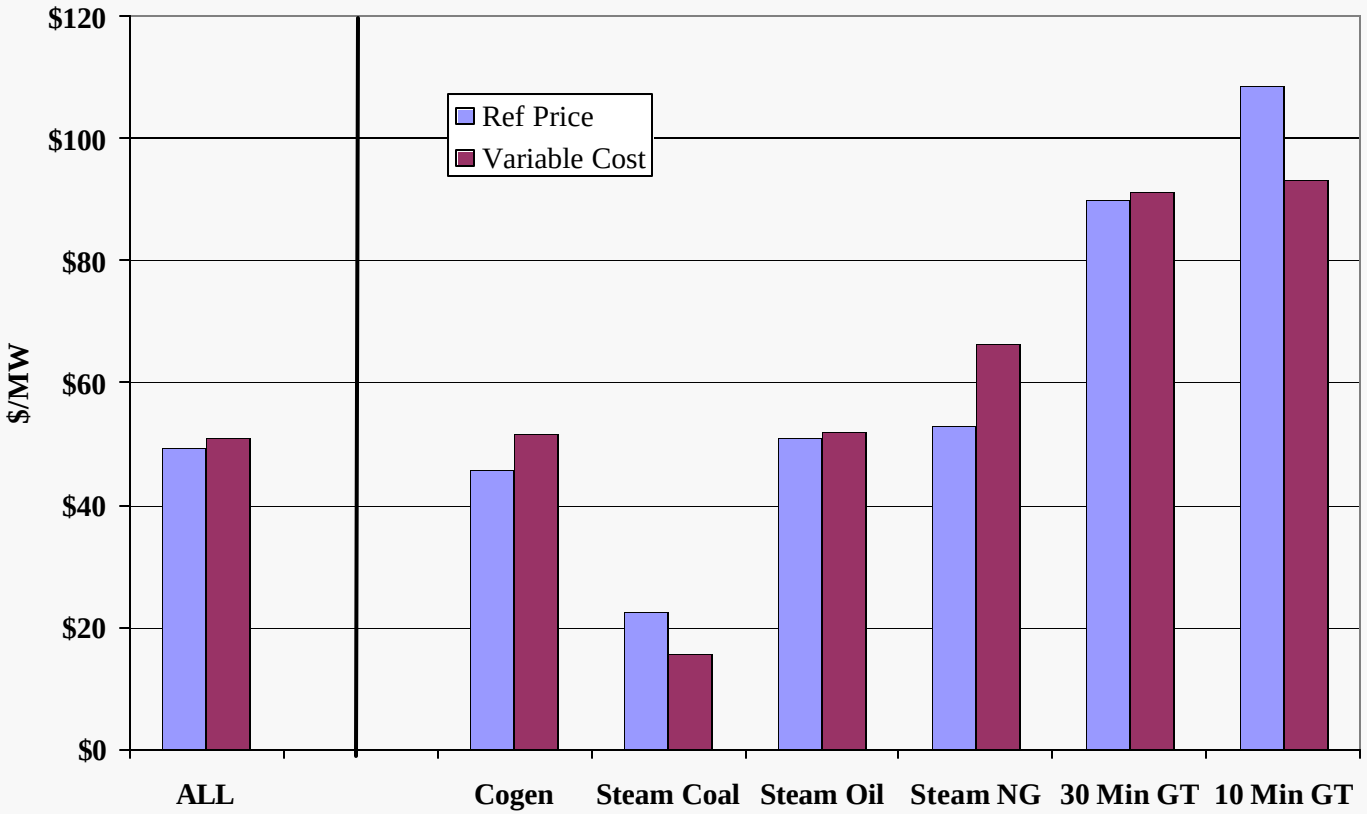
Hourly Virtual Load and Supply
Outside New York City and Long Island - 2003



Price Sensitivity of Virtual Load Bids and Supply Offers
New York State - 2003



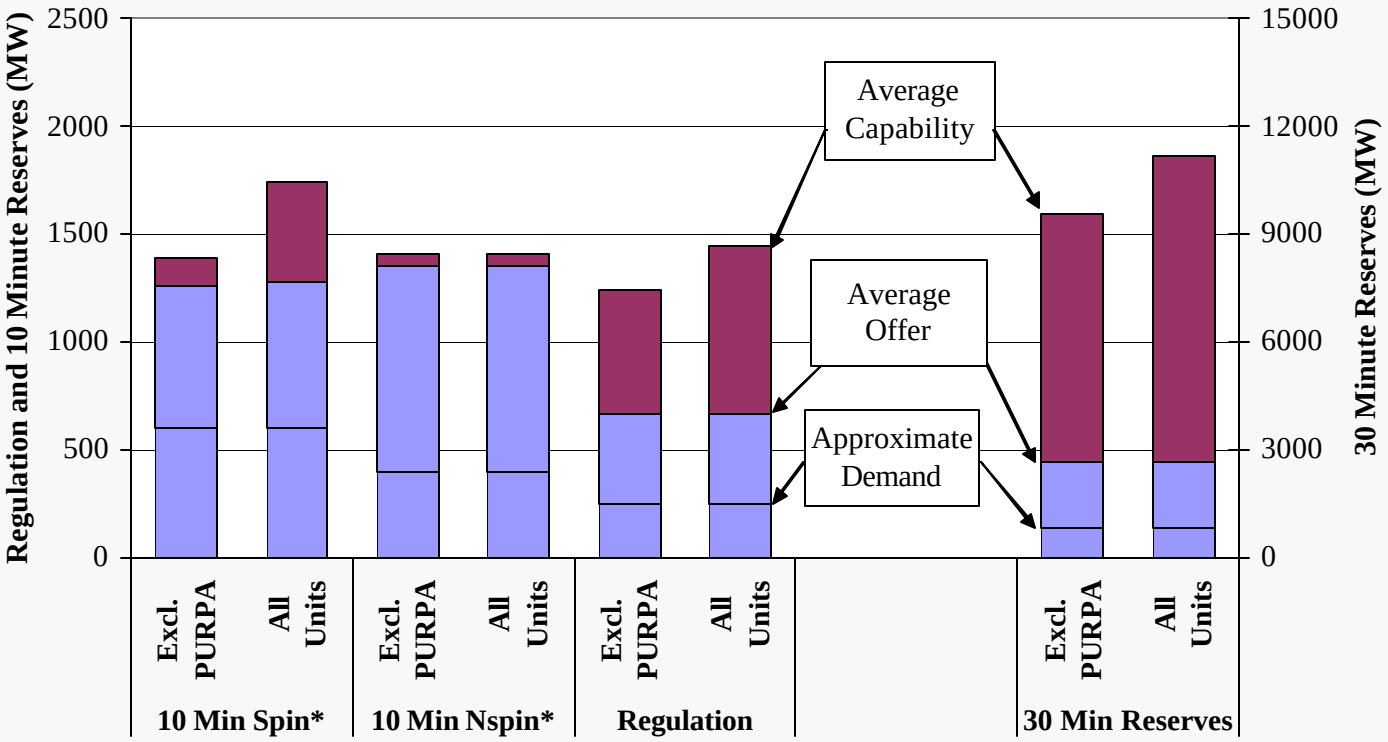
Reference Prices and Variable Costs



Ancillary Services

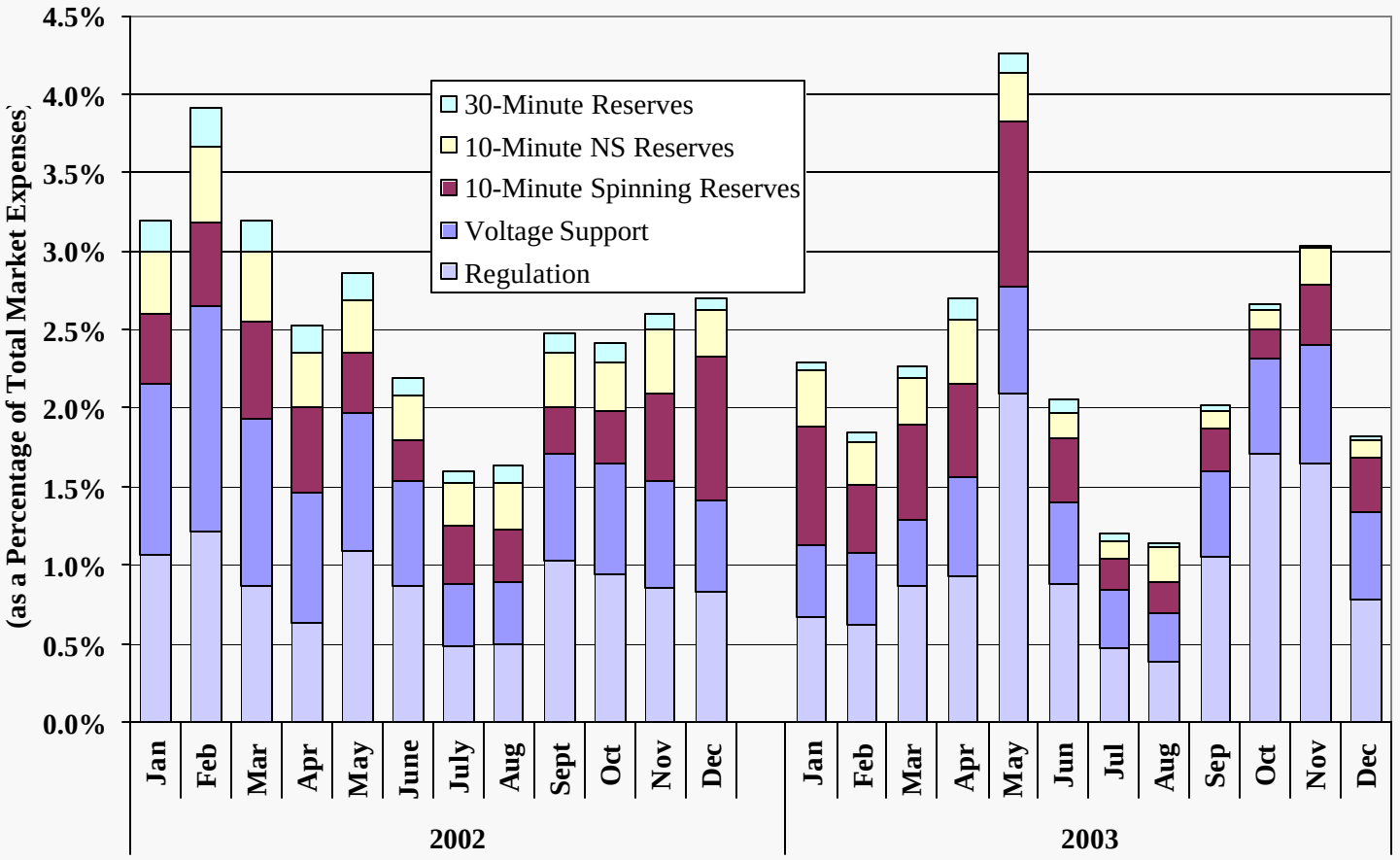
- A substantial portion of the capability of certain services is not offered in the day-ahead ancillary services markets, particularly for 30-minute reserves and regulation.
- However, ancillary services markets are generally not tight because offers to supply typically exceed approximate demand:
  - ✓ For 30 minute reserves, offers typically exceed approximate demand by 230 percent.
  - ✓ For total 10-minute reserves (spin and non-spin) east of the Central-East interface, offers typically exceed approximate demand by 160 percent.
  - ✓ For regulation and 10-minute spinning reserves, offers typically exceed approximate demand by 100-170 percent – but ignores the fact that some 10-minute spinning reserves can be purchased in the West.
- 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.

Ancillary Services Capability and Offers

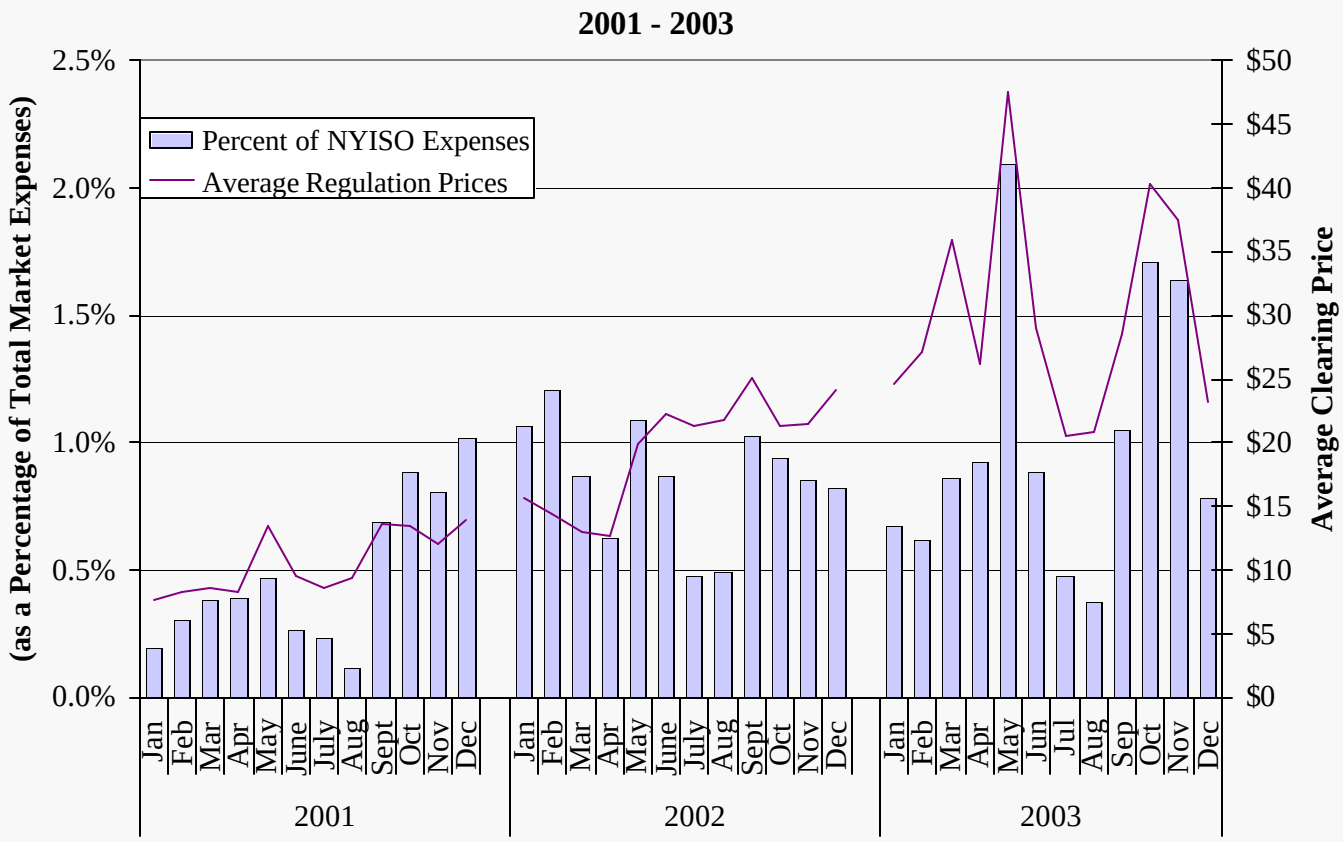


*Eastern side of the Central-East Interface only

Expenses for Ancillary Services
2002 - 2003



Average Clearing Price and Expenses for Regulation



Ancillary Services Recommendations

- To address the failure to offer a substantial amount of capability in the reserve markets, I had recommended in prior market reports that the NYISO:
  - ✓ Modify the pricing for ancillary services to set the price for each at its marginal cost to the system; and
  - ✓ Implement multi-settlement markets for reserves and regulation.
- These changes are part of the new Real-Time System ("RTS") to be implemented in Fall 2004.
- I recommend that the NYISO allocate its available resources to implementing RTS rather than making interim changes to the ancillary services markets.

Summary of Conclusions

- The NYISO markets continued to perform competitively in 2003 with no evidence of significant economic or physical withholding.
- Energy prices were substantially higher in 2003, due primarily to higher fuel prices.
- The net revenue (market revenue – variable production costs) provided by the markets in 2003 continue to be less than the annualized costs of a new gas turbine in New York City or the rest of the state.
  - ✓ This does not indicate a market issue since external factors caused net revenues to be lower in 2003 than they are expected to be going forward.
- Although shortage pricing provisions were implemented prior to the summer 2003, mild load conditions and increased net imports from New England prevented any shortages.
- Day-ahead and real-time energy prices continued to exhibit good convergence.

Summary of Conclusions

- Forced outage rates have fallen substantially from the time the NYISO markets were implemented through 2003.
  - ✓ This is consistent with the increased incentives a competitive market provides for high availability.
- Virtual trading volumes increased in 2003, which contributed to the good convergence between the day-ahead and real-time prices outside of NYC.
- The capacity demand curve implemented in 2003 has been successful in stabilizing capacity prices and facilitating price convergence between the various UCAP auctions.
- The NYISO's demand response programs provide a substantial amount of real-time load reductions when necessary – however, mild conditions in 2003 limited the need for such reductions.

Areas of Potential Improvement and Recommendations

- Real-time prices in adjacent regions continued to not be efficiently arbitraged.
  - ✓ Implementation of the VRD provisions that are under development with New England will address this issue.
  - ✓ Eliminating the export fees with adjacent regions would also help improve the efficiency of the interchange between markets.
- Apparent reductions in real-time transmission limits has caused substantial congestion costs in real-time.
  - ✓ Introduction of RTS should address this concern because the RTS and SCUC software will operate on the same platform.

Areas of Potential Improvement and Recommendations

- Supplemental commitments through the local reliability pass of SCUC and the SRE process continue to be significant, which can distort energy prices.
  - ✓ In the long-term, we recommend incorporating the local reliability requirements in the initial commitment.
  - ✓ In the short-run, we recommend that the operators pre-commit units that they know will be required to meet local reliability requirements.
- Price convergence in NYC is still not good, although it was improved in 2003.
  - ✓ The ability to make virtual purchases and sales within the NYC load pockets would likely improve price convergence in these areas.
  - ✓ We recommend the ISO consider allowing virtual trading in the load pockets if convergence does not improve under RTS.