

# RTC – RT Convergence: ISO-NE

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## Background – Purpose of Initiative

- ◆ **In the 2007 State of the Market report, Dr. Patton indicates, “Prices between New York and adjacent markets have not been well-arbitraged.” The report also recommended the NYISO, “*evaluate potential improvements in its real-time commitment model (“RTC”) and the real-time dispatch model (“RTD”) to improve their consistency.*”**
- ◆ **Market Participants have indicated an interest in the efficiency of RTC’s forecast and scheduling at the external interfaces.**

## Purpose – What do we hope to achieve?

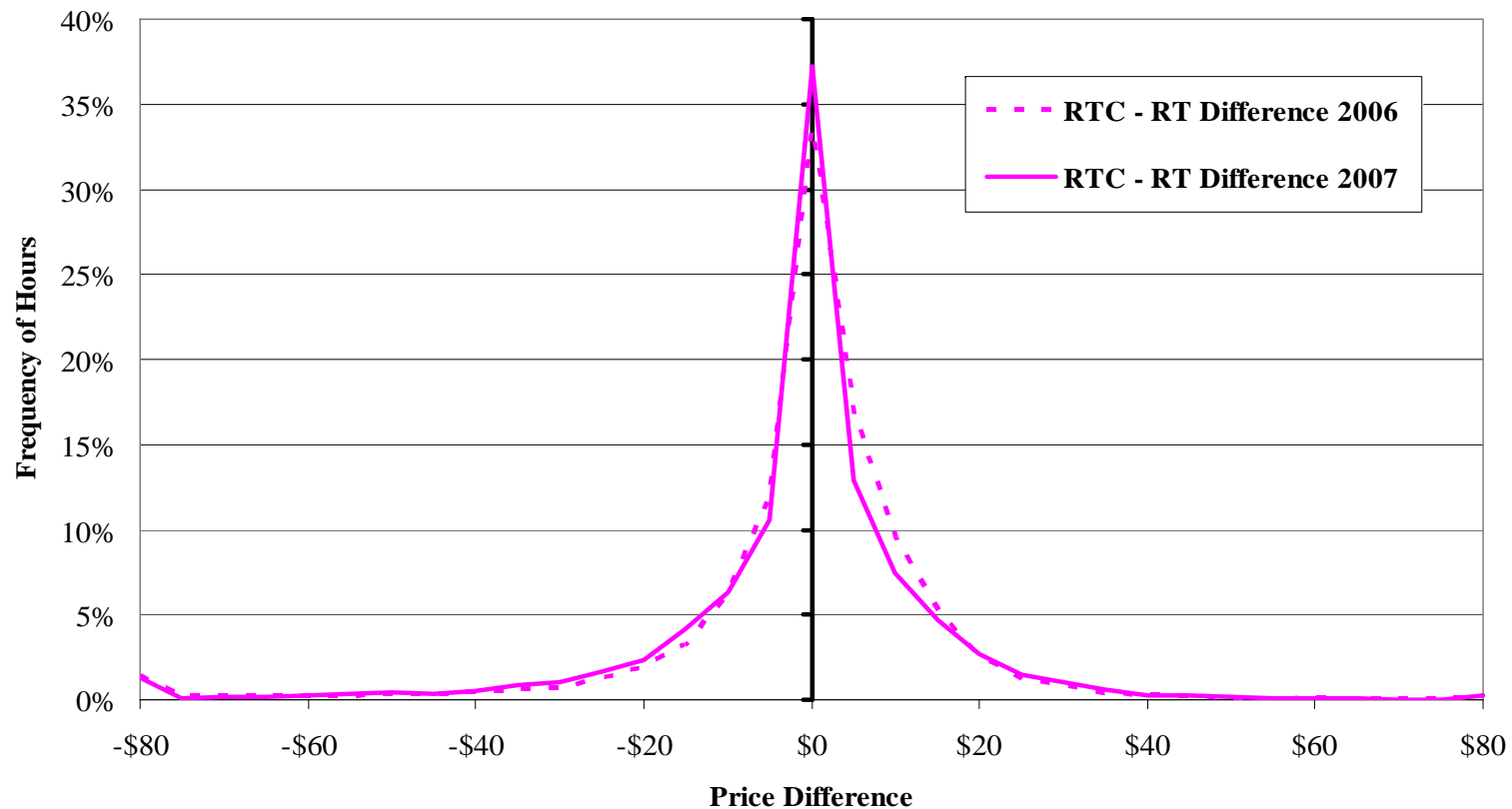
- ◆ Two fundamental questions must be answered.
- ◆ How much convergence do the prices show:
  - ***Between RTC forecast of RT and actual RT prices***
  - ***Between NY pricing of proxies and the other control areas' pricing of NY.***
- ◆ Ultimately what we want to know is, how effective are the NY RT transaction scheduling protocols.

## Analysis Overview (What we show)

- ◆ For this phase of the analysis, Potomac Economics and the NYISO analyzed price convergence at the ISO-NE interface and scheduling efficiency.
- ◆ The following analysis shows a comparison of RTC forecasted prices to RT pricing, and an evaluation of scheduled and unscheduled transaction bids.

# RTC/RT Convergence Compared for NE

**Histogram of Price Differences, 2006 - 2007**

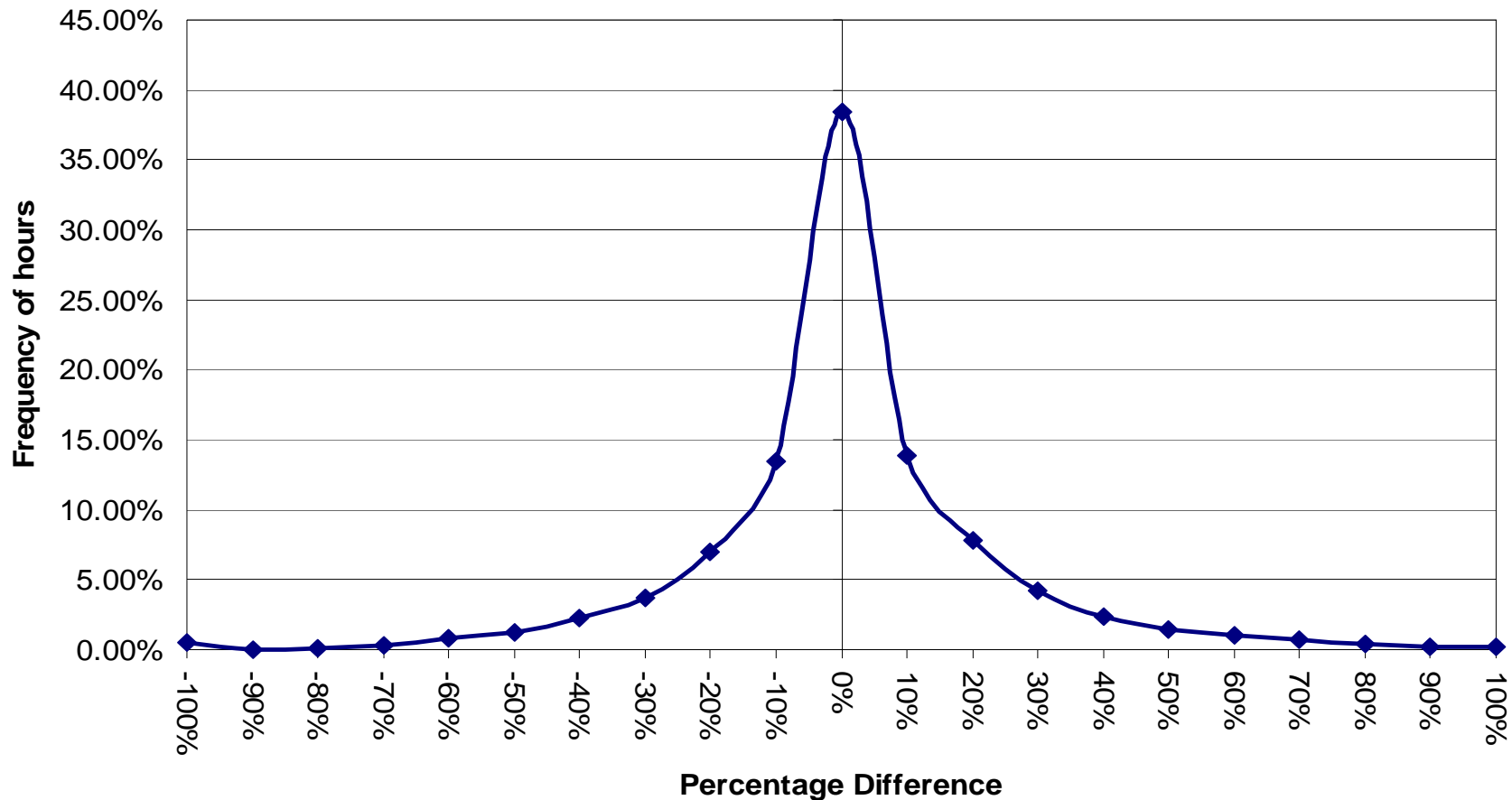


## Follow-up from 09/05 MIWG

- ◆ Market Participants had requested similar analysis on a percentage basis.
- ◆ A \$10 difference between RTC and RT can have measurably different impact if LBMPs are \$300 or if they are \$15.
- ◆ The following chart captures this data. It will show that price differences and percentage differences have similar characteristics.

# RTC/RT Convergence Compared for NE by Percent Deviation

**Histogram of Price Differences by Percentage, 2006 & 2007**



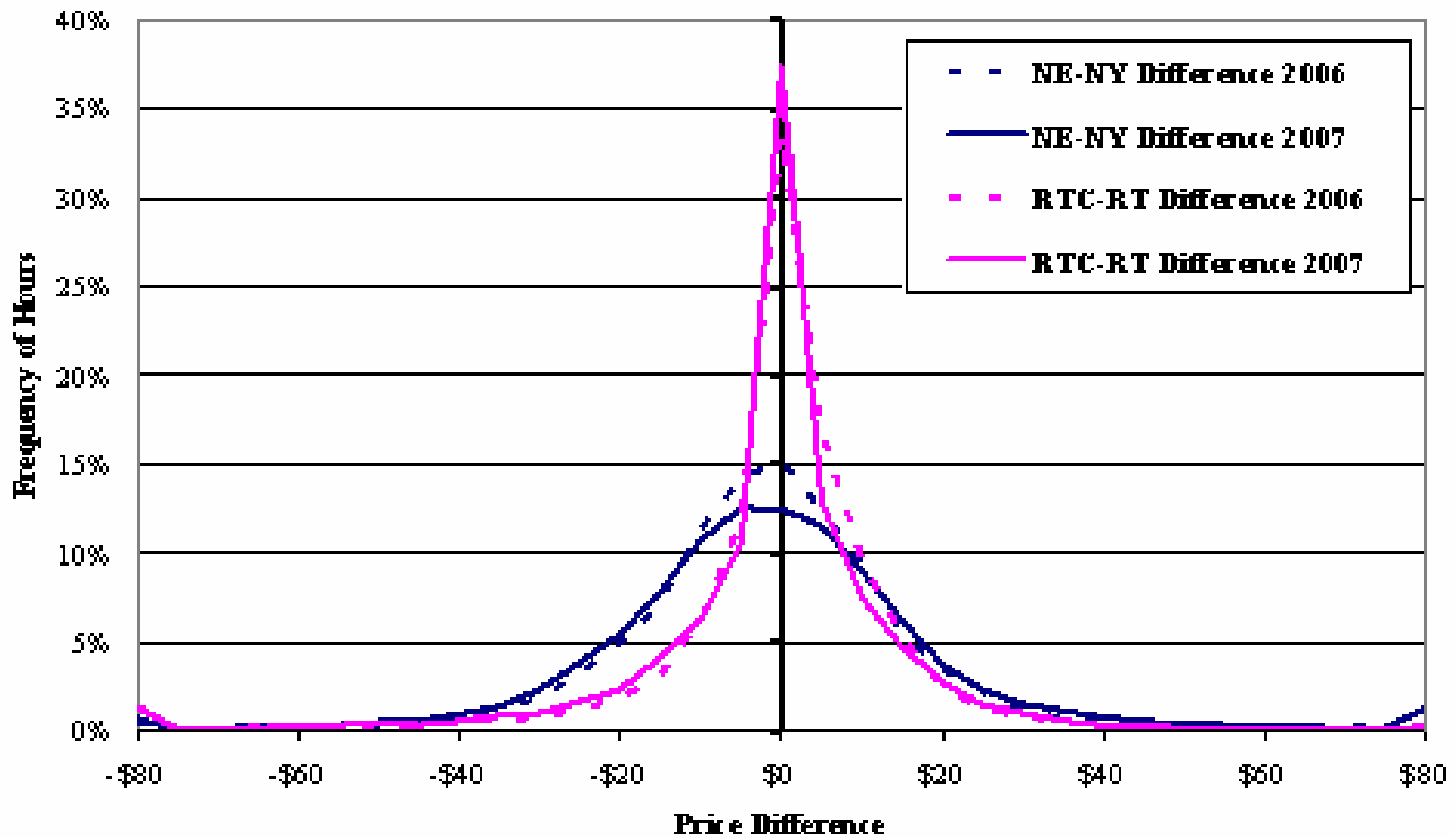
## NE-NY Convergence

- ◆ Similar analysis was performed comparing NY's pricing of the NY-NE proxy and NE's pricing.
- ◆ The next slide compares the RTC/RT divergence with that of the NE-NY divergence.



# RTC/RT Convergence Compared to NE-NY Convergence

**Histogram of Price Differences, 2006 - 2007**



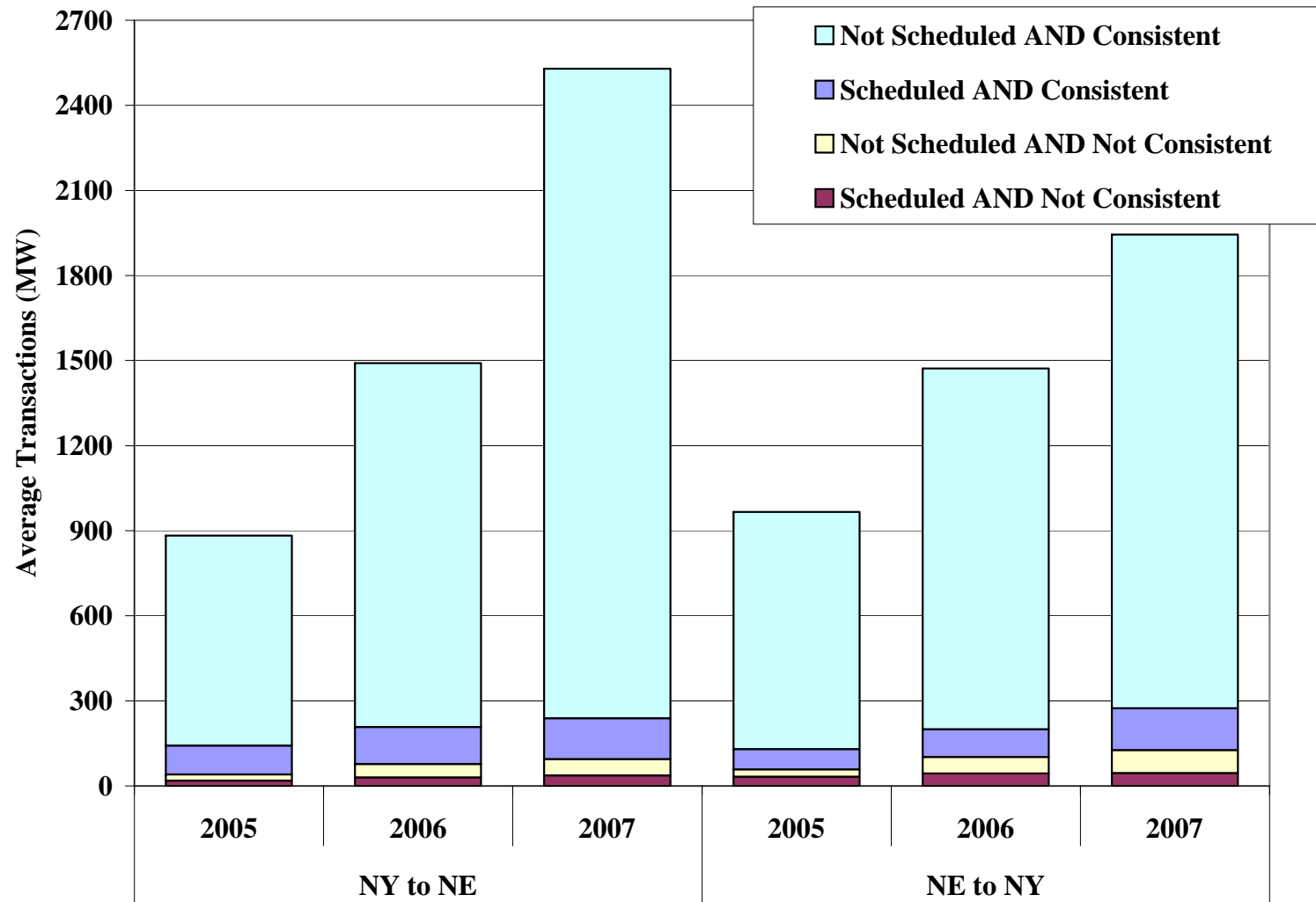
## Transaction Scheduling “Efficiency”

- ◆ The next few slides will discuss the price divergences between NE and NY pricing as well as what these divergences mean for transaction scheduling.

# Terminology

- ◆ The term “Consistent” as used later indicates a transaction that was or was not scheduled in accordance with RT prices.
  - *An export was scheduled if the bid was greater than RT prices and not scheduled if the bid was less than RT prices.*
- ◆ The term “Not Consistent” is not the same as inefficient. In order to determine efficiencies, these transactions need to be referenced against the price difference between NY and NE.
- ◆ The term “Profit” as described on the next slide indicates economically efficient pricing between NY and NE. So an export scheduled from NY to NE would have a higher NE price on the proxy than NY price on the proxy. “Non-Profit” would indicate the opposite, or a potentially inefficient schedule.

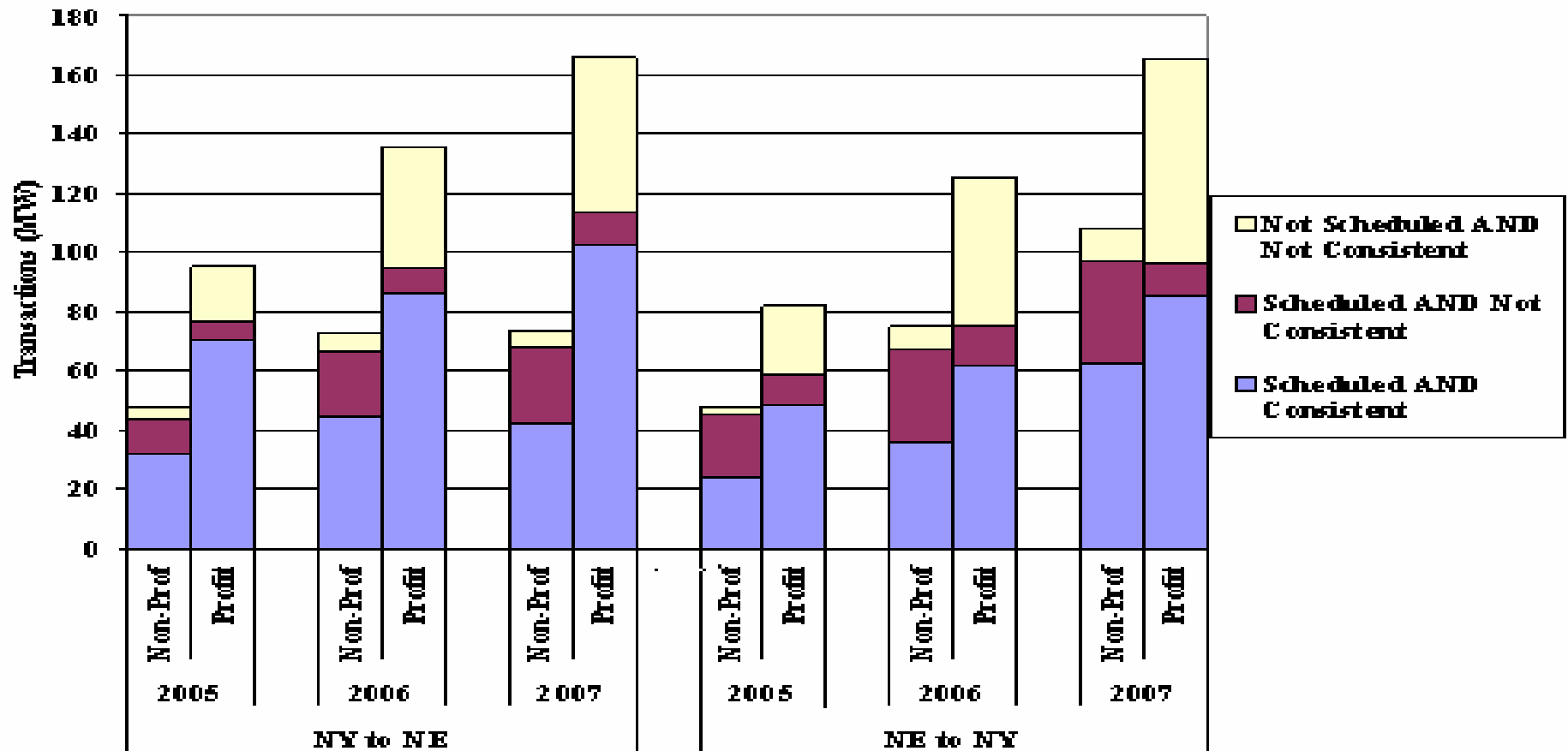
# Transaction Scheduling NE & NY



## Transaction Scheduling NE & NY (efficiency)

- ◆ The next slide breaks down the previous chart.
- ◆ First, transactions that were not scheduled and consistent are removed for scaling.
- ◆ Second, each bar is broken into two further categories, “Non-Profit” and “Profit”.

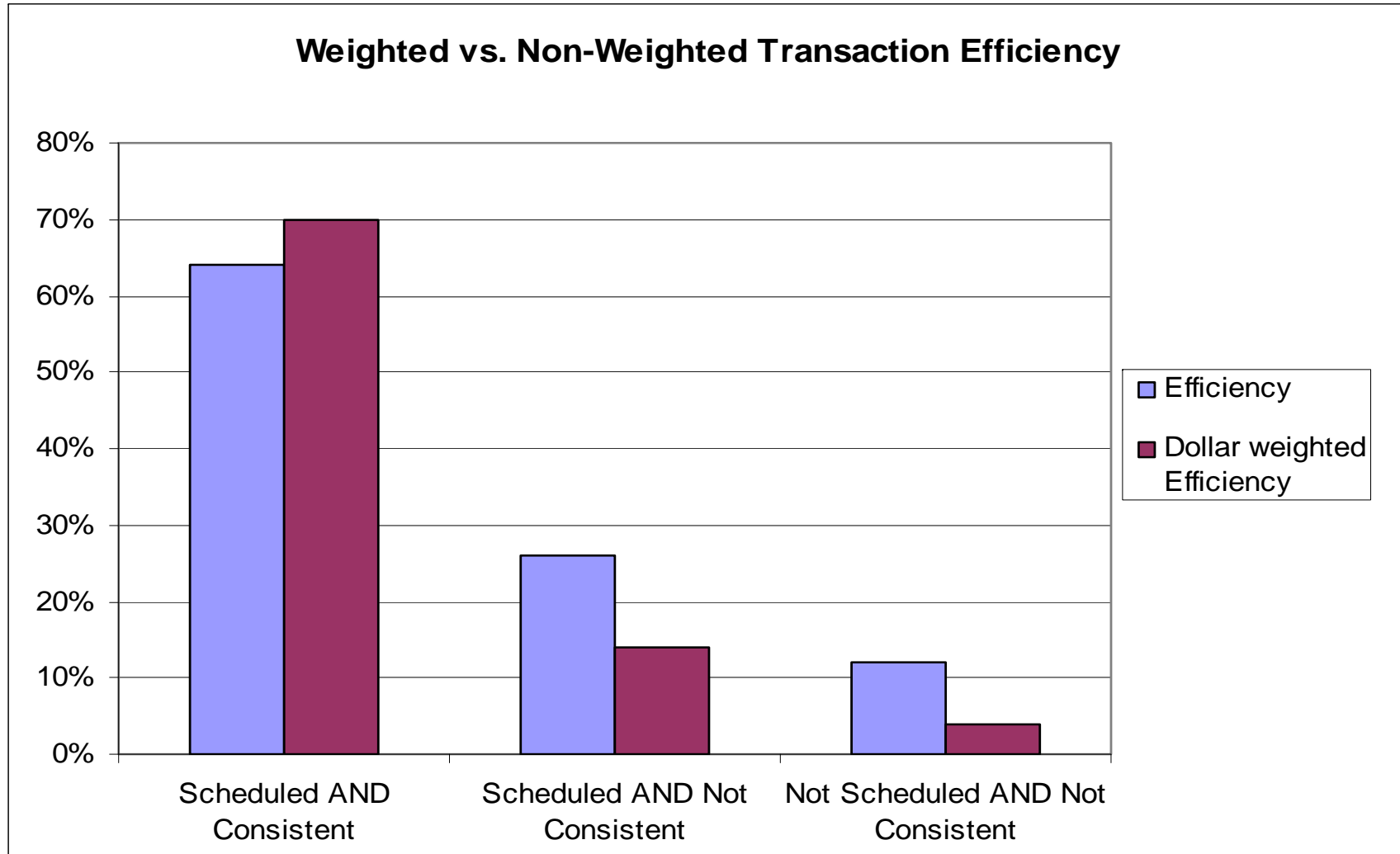
# Transaction Scheduling NE & NY (Efficiency)



# Transaction Scheduling NE & NY Summary

- ◆ “Scheduled AND Consistent” – 64 percent of the MWs of these transactions were profitable (i.e. 64% of these outcomes were efficient).
- ◆ “Scheduled AND Not Consistent” – 26 percent of the MWs of these transactions were profitable (i.e. 26% of these outcomes were efficient).
- ◆ “Not Scheduled AND Not Consistent” – 88 percent of the MWs of these transactions would have been profitable if scheduled (i.e. 12% of these outcomes were efficient).

# Transaction Scheduling NE & NY Summary – weighted by profits





## Transaction Scheduling NE & NY Summary – weighted by profits

- ◆ **“Scheduled AND Consistent”** – The margin averaged **\$17/MWh** for profitable transactions and **-\$13/MWh** for unprofitable transactions, which results in **70% efficiency** based on total dollar-weighting.
- ◆ **“Scheduled AND Not Consistent”** – The margin averaged **\$9/MWh** for profitable transactions and **-\$22/MWh** for unprofitable transactions, which results in **14% efficiency** based on total dollar-weighting.
- ◆ **“Not Scheduled AND Not Consistent”** – The margin would have averaged **\$40/MWh** for profitable transactions and **-\$12/MWh** for unprofitable transactions, which results in **4% efficiency** based on total dollar-weighting.

## What does this mean?

- ◆ The data indicates that pricing divergence between the NY and NE prices is a major factor in the profitability of transactions. This divergence needs to be addressed.

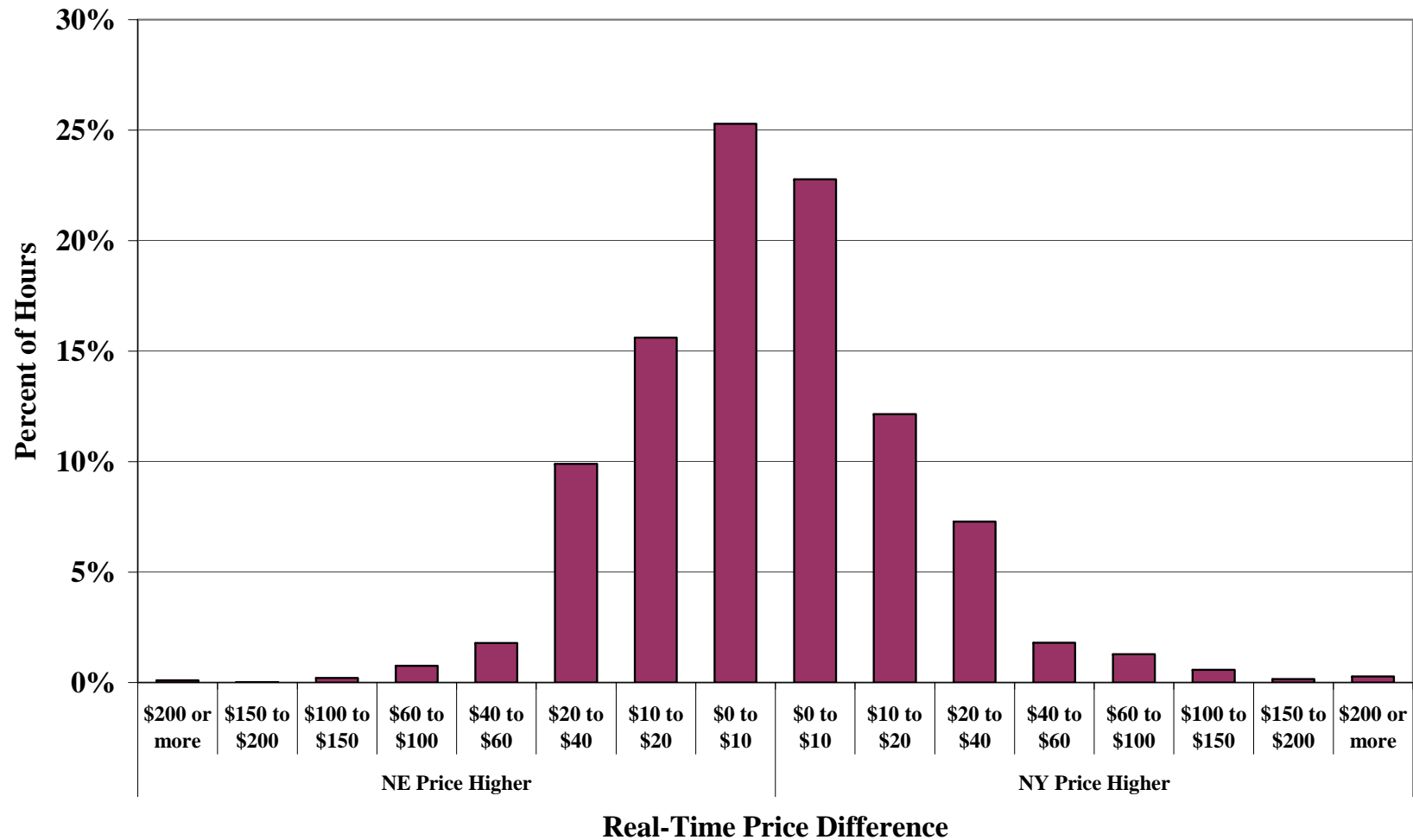
# Potential Benefits

- ◆ The NYISO and Potomac Economics have calculated better coordination of flows between New England and up-state New York would benefit consumers on both sides of the interface.
- ◆ Simulations were done to include all of 2006 and 2007. Optimal hourly scheduling of the interface would have saved:
  - *\$59 million in 2006 and \$177 million in 2007 for New York customers;*
  - *\$61 million in 2006 and \$22 million in 2007 for New England customers;*
  - *\$17 million in 2006 and \$21 million in 2007 of production costs.*
  - *These simulations only included TTC limits.*

## Price Convergence Between New England and Up-state New York

- ◆ The following figure summarizes the hourly integrated Real-Time price differences on the interface between New England and up-state New York.
  - *In 2006 & 2007, the price difference exceeded \$40/MWh in 7 percent of hours and \$100/MWh in 1.4 percent of hours.*
- ◆ A significant portion of benefits could be achieved in a small amount of hours.
- ◆ In most hours with poor convergence between control areas, the interface is not fully utilized.

## Histogram of Hourly Avg RT Price Differences NY Sandy Pond Bus vs. NE Roseton Bus, 2006 & 2007



Note: NY side is based on the RTD price rather than the real-time price for settlement purposes.

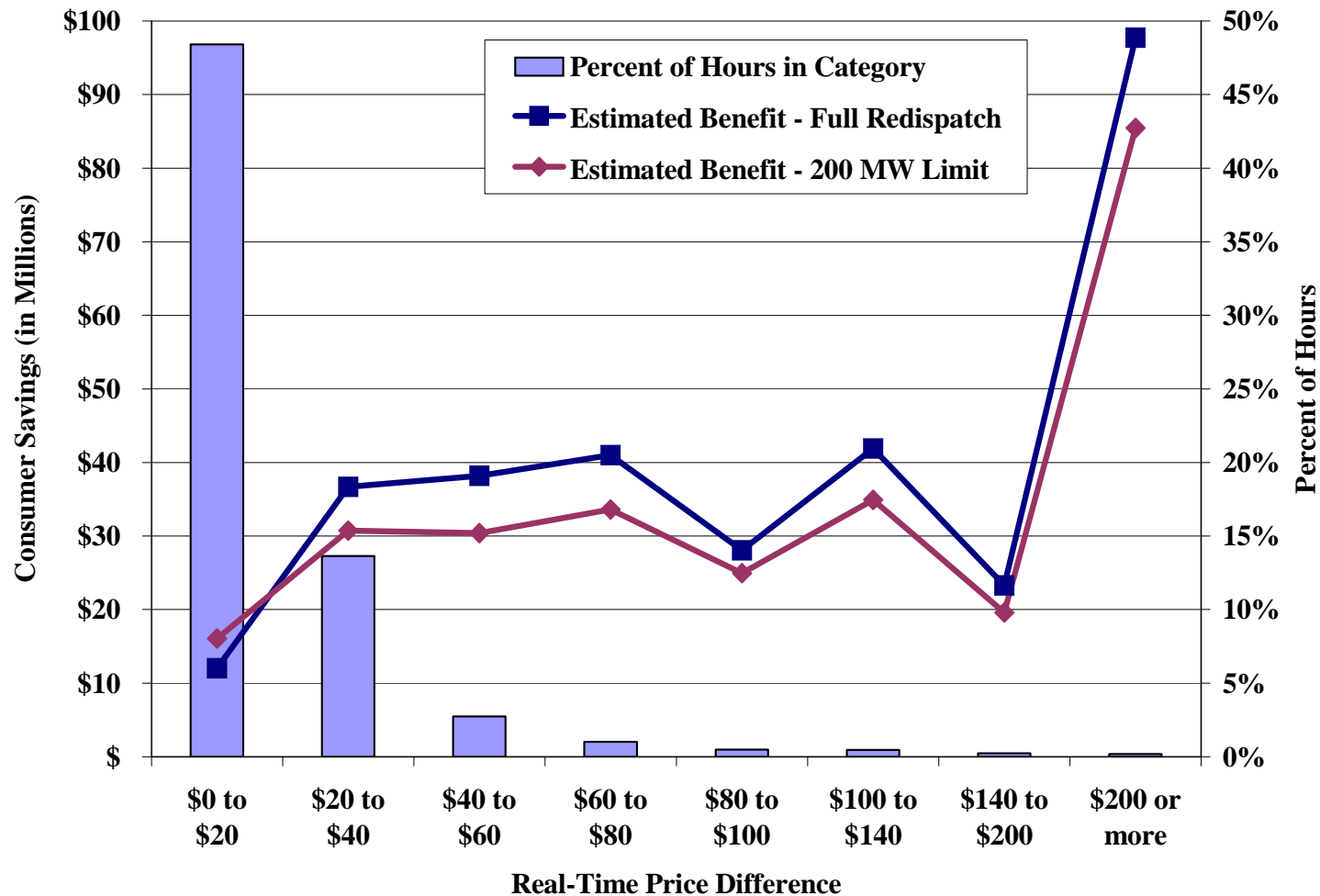
## Distribution of Benefits Across Hours

- ◆ **The following figure summarizes how the estimated benefits are distributed across hours according to the price difference.**
- ◆ **The simulations assume that transfers are limited based on active internal constraints in each area and the Total Transfer Capability of the interface.**
  - *The first line summarizes the benefits by the price difference between control areas. An average change of 229 MW would have been necessary to optimize.*
  - *The second line summarizes the benefits assuming a maximum change of 200 MW. 86 percent of the benefits are realized in the first 200 MW of re-dispatch.*

## Distribution of Benefits Across Hours Continued

- ◆ **Benefits are concentrated on a small share of the total hours.**
  - ***99 hours with reserve shortages account for 25 percent of the benefits if we limit re-dispatch to 200 MW. (Includes hours with two or more shortage intervals of NE system-level requirements or NY 30-min, 10-min spin, or eastern 10-min.)***
  - ***152 hours with a price difference > \$100/MWh account for 44 percent of the benefits if we limit re-dispatch to 200 MW.***
  - ***878 hours with a price difference > \$40/MWh account for 72 percent of the benefits if we limit re-dispatch to 200 MW.***

# Distribution of Consumer Savings Across Hours for 2006 & 2007







The New York Independent System Operator (NYISO) is a not-for-profit corporation that began operations in 1999. The NYISO operates New York's bulk electricity grid, administers the state's wholesale electricity markets, and provides comprehensive reliability planning for the state's bulk electricity system.

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