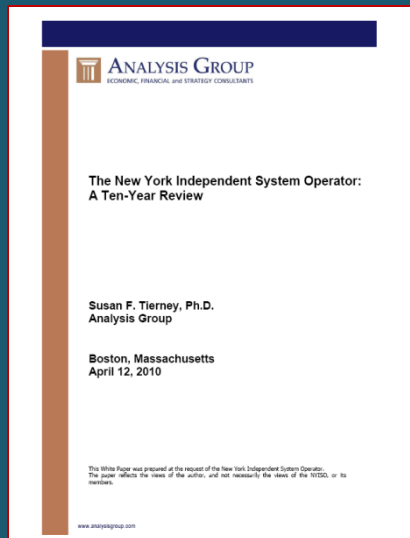


The New York ISO: A Ten-Year Review



Sue Tierney

**NYISO Management Committee
April 21, 2010**

Background: Assignment, Purpose, Approach

- **Prepared at the request of NYISO**
- **Two purposes:**
 1. Retrospective assessment of the first ten years of NYISO's operations
 2. Identification of areas for continued improvement in the future
- **Two sources of information.**
 - Research
 - Interviews

Assessing NYISO's first decade:

Overall approach to this assessment: three lenses

1. Start with the original goals for industry restructuring – and then review outcomes relative to goals
2. Compare NYIOS against the structural elements of well-designed markets
3. Examine NYISO as an institution in carrying out its responsibilities

Sources of information:

- Public information (e.g., NYISO data, State data, Federal data)
- Interviews with Market Participants and others (~50)

Assessing the first decade: limitations

Inherent analytic challenges:

- **Original goals for restructuring involved many elements – of which NYISO and wholesale markets were only a part**
 - Ultimate purpose of restructuring = changes at the retail level
 - NYISO only responsible for wholesale / bulk power system
- **No “counter-factual” exists for this assessment**
 - Impossible to know what NY outcomes would have been without restructuring its industry
 - Some things would have happened no matter what (e.g., technology choice, price of input fuels)

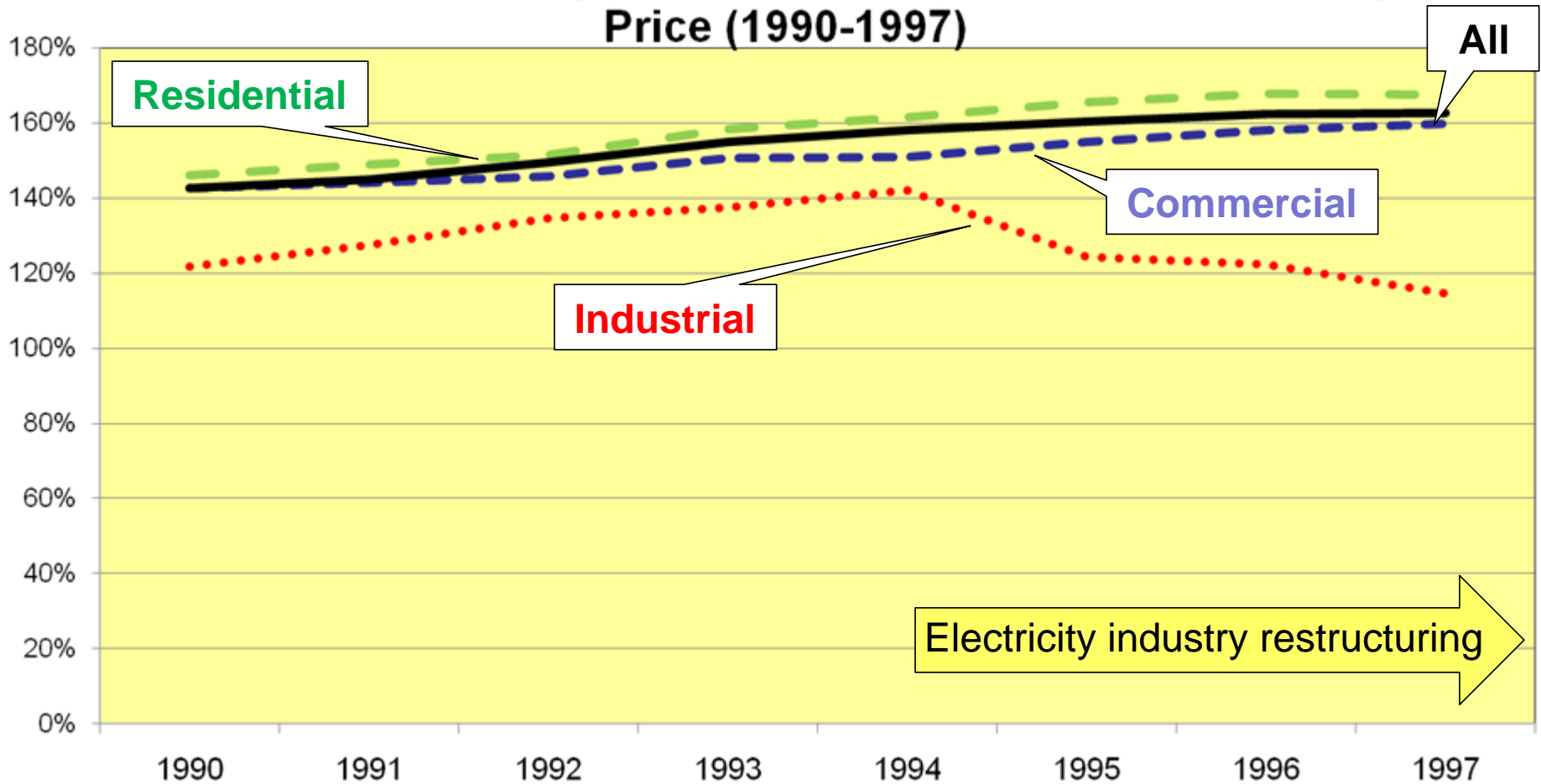
The Starting Point:

Goals of Restructuring NY's Electric Industry: mid-1990s

- **Reducing the gap between U.S. and NYS electricity prices**
- **Relying on market forces in the generation side of the industry, by**
 - Shifting investment risk
 - Addressing the tendency for cost overruns
 - Relying on competition to introduce more efficiency
 - Affording customers with the opportunity to choose their supplier of power
- **Assuring electric system reliability**
- **Introducing structural changes in support of these objectives, through**
 - Providing non-discriminatory access to utilities' transmission systems;
 - Divesting most utility power plant capacity to introduce new players into the market;
 - Providing greater information transparency;
 - Establishing an independent grid operator.
- **Assuring stranded cost recovery for utilities**
- **Assuring the provision of certain social and environmental programs**
- **Allowing participation of non-utility players in industry governance**
- **Affording all customers a back-stop supplier of electricity**

The Prime Impetus for Change: Retail Electricity Prices

NY Retail Electricity Price as a % of U.S. Retail Electricity Price (1990-1997)



Source: EIA, 826 Database.

Comparing NYPP era to the NYISO era

NYPP functions: (up to 12-1-1999)

▪ Reliability functions :

- non-centralized unit commitment
- short-term trades among utilities:
 - economic dispatch
 - “split savings” approach

Other elements of industry structure:

▪ “Utility industry” model

- Bundled electricity service and rates
- Cost of service regulation
- Vertically IOUs and publicly owned utilities

NYISO functions: (after 12-1-1999)

▪ Reliability and market functions with :

- Centralized unit commitment
- Bid-based, single clearing price markets, with LBMP
- Co-optimized energy and reserves
- Coordinated O&M schedules
- Wholesale markets for diversified products
- Transmission tariff administration
- State-wide reliability planning
- Market participants involved in “shared governance”
- Multiple overhead functions not borne by NYPP

Other elements of industry structure:

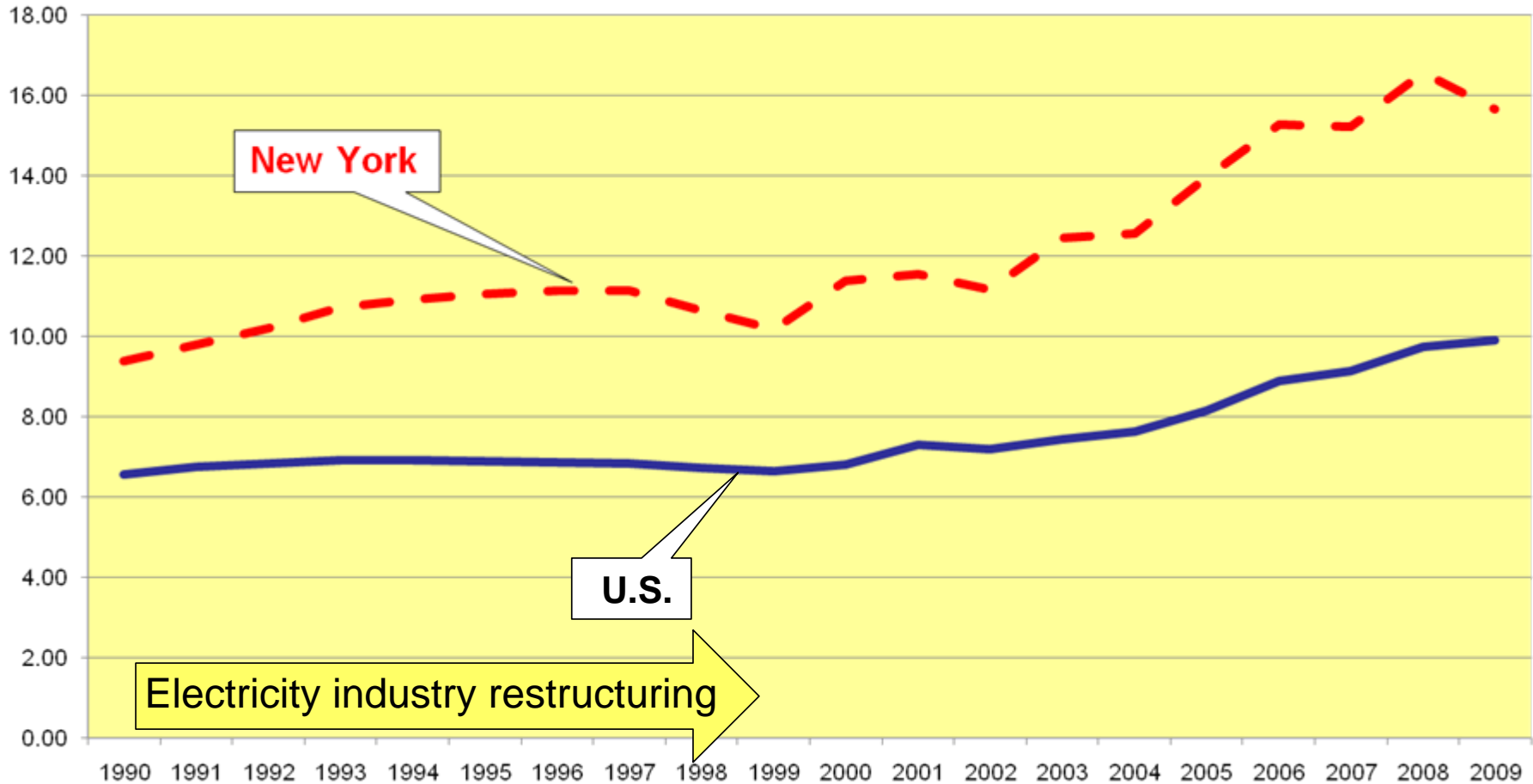
- Restructured industry model – with much plant divestiture, with NY PSC regulation of delivery functions, retail generation service
- Many publicly owned utilities (cost of service)
- Combination of wholesale spot market and bilateral contracts
- Retail choice allowed but “POLR” assured
- Stranded costs recovered

Goals and Outcomes:

MEASURES OF NEW YORK STATE'S ELECTRIC RESTRUCTURING

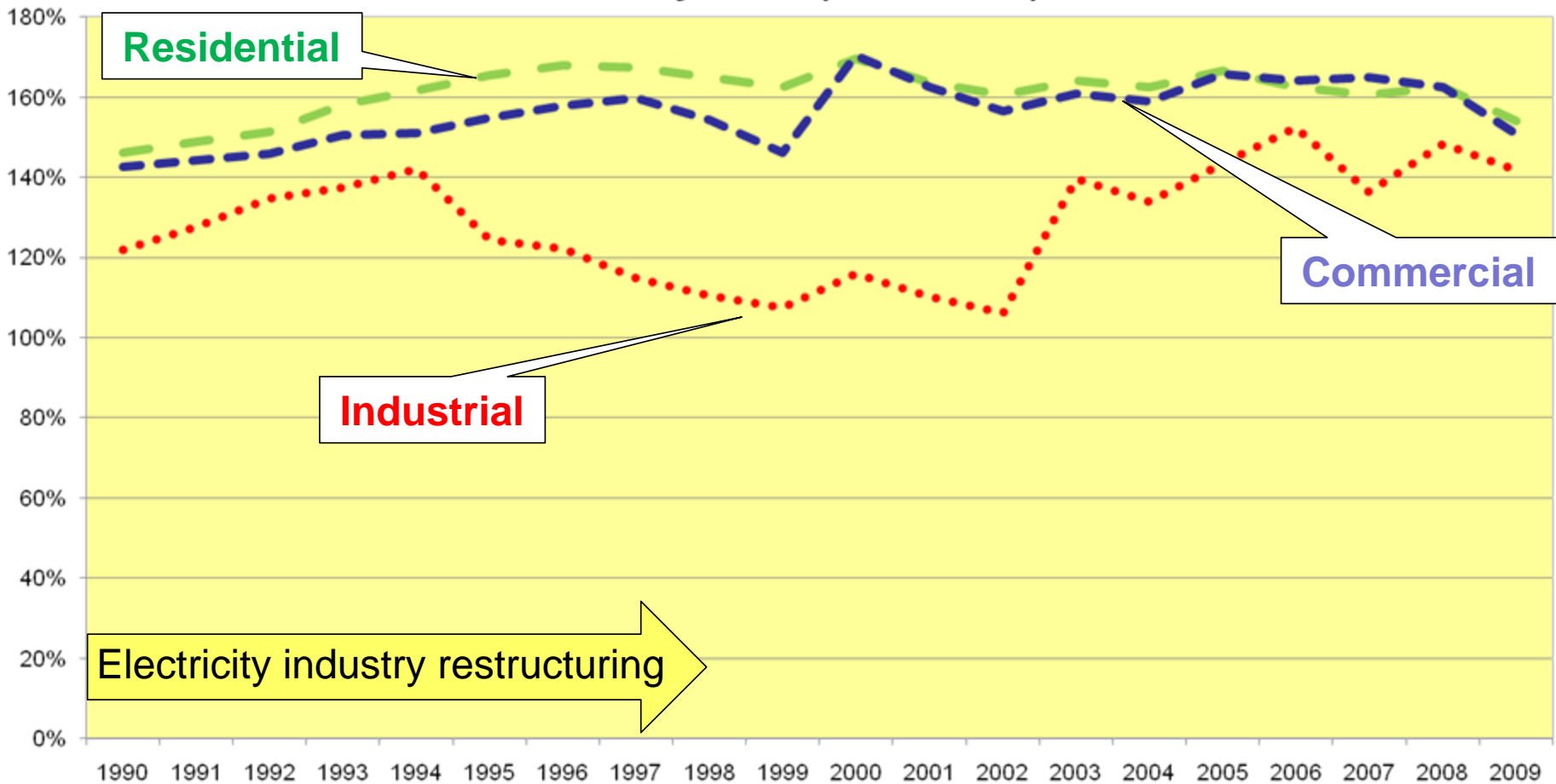
Retail electricity prices

Average Annual Retail Price of Electricity: NY v. US: 1990-2009



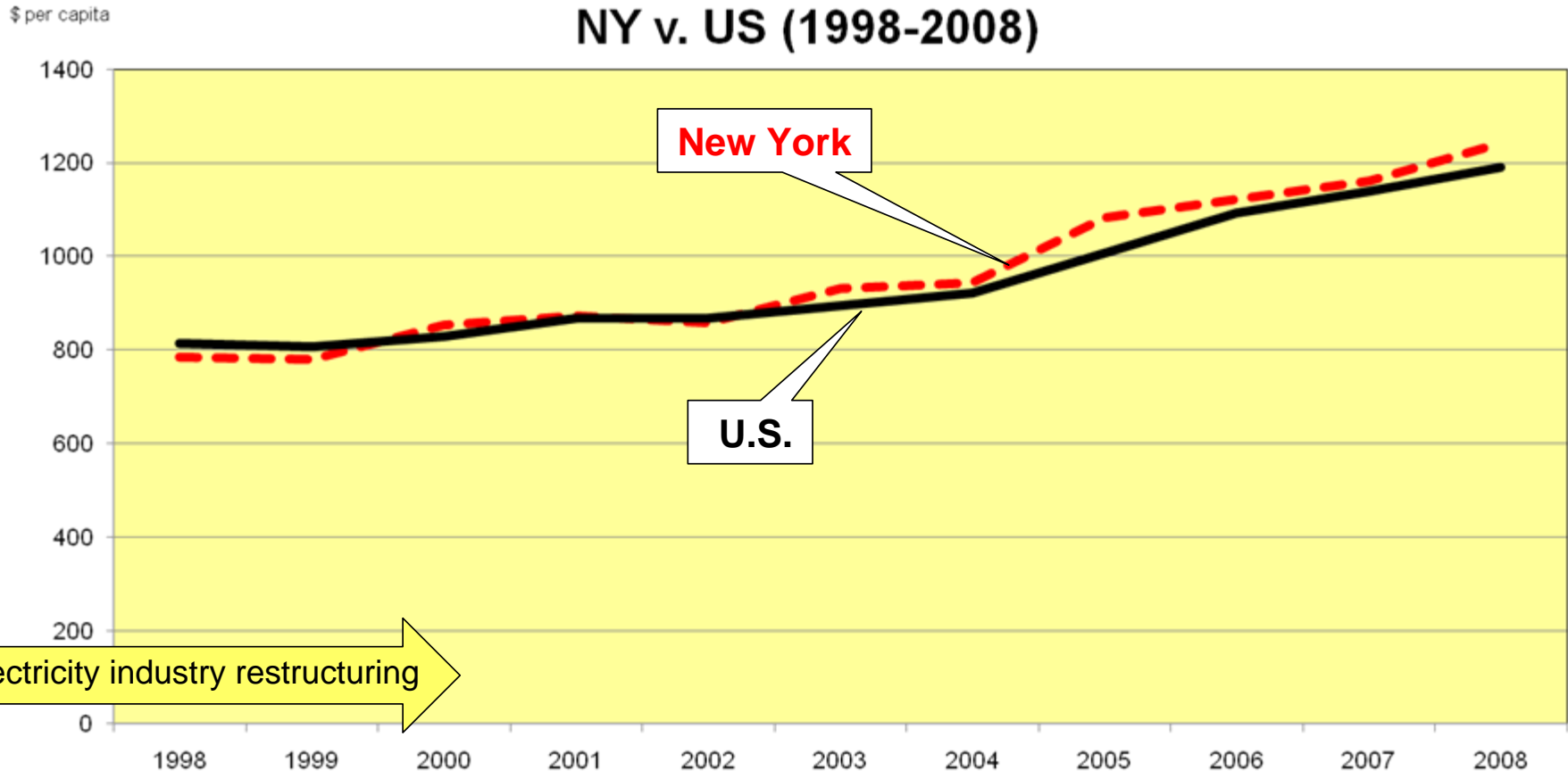
Retail electricity prices

New York Retail Electricity Price as a Percentage of U.S. Retail Electricity Price (1990-2009)



Electricity expenditures per person

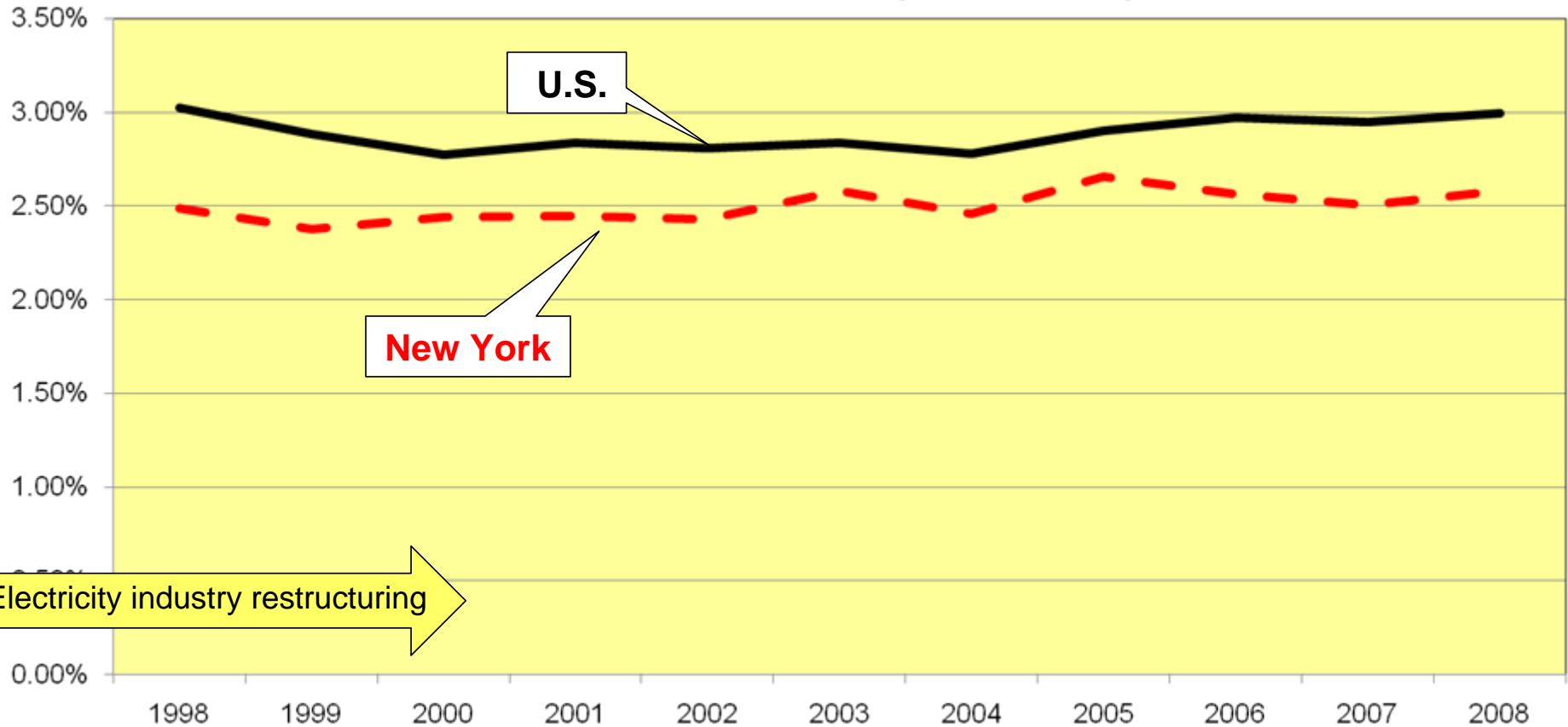
Annual Per-Capita Expenditure on Retail Electricity: NY v. US (1998-2008)



Note: Expenditure data are in nominal dollars
Sources: EIA 826 Database; New York State Data Center (posting US Census Data).

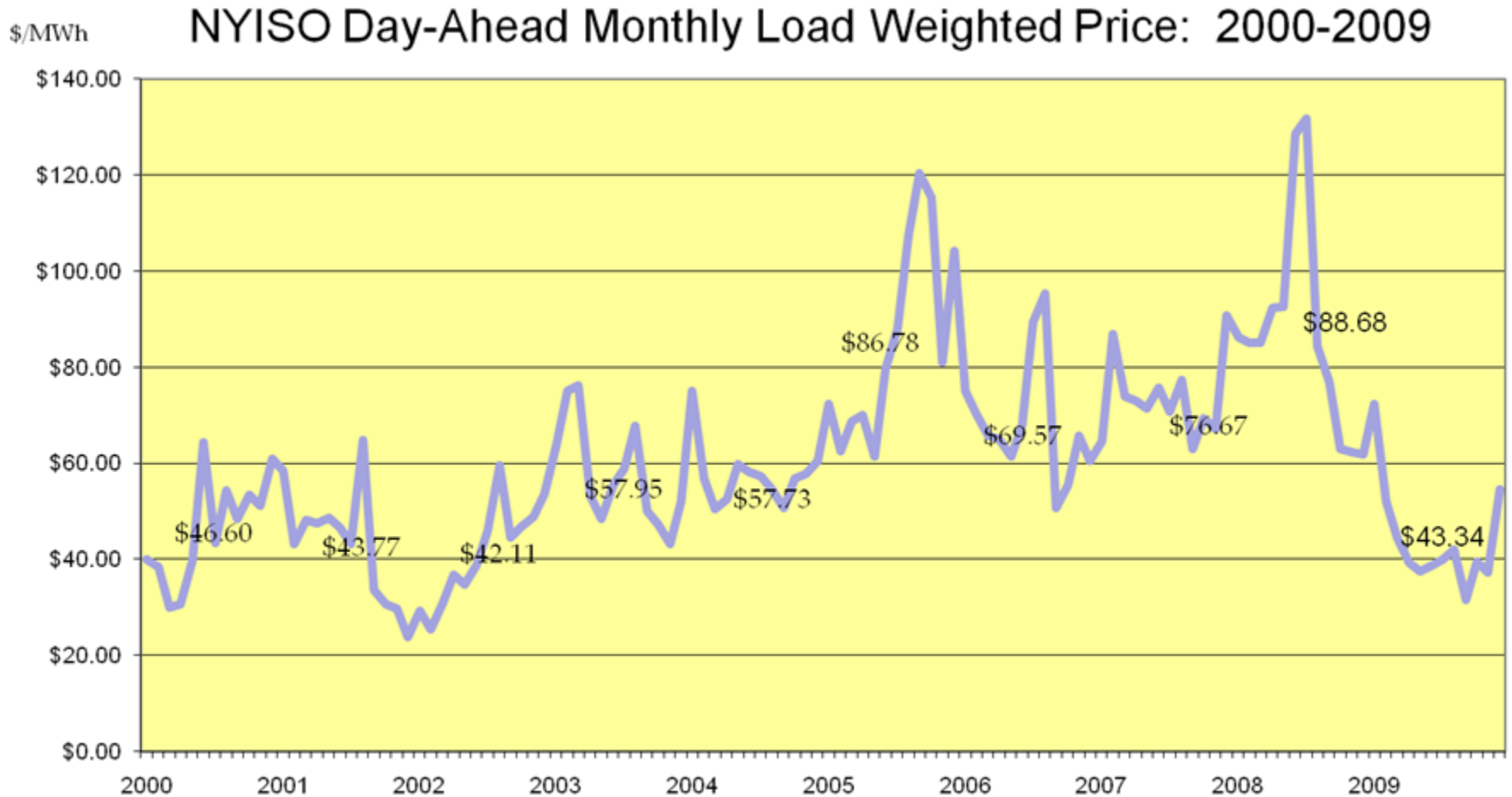
Electricity expenditures relative to income

Retail Electricity Expenditures as a Percentage of Personal Income: NY v. US (1998-2008)



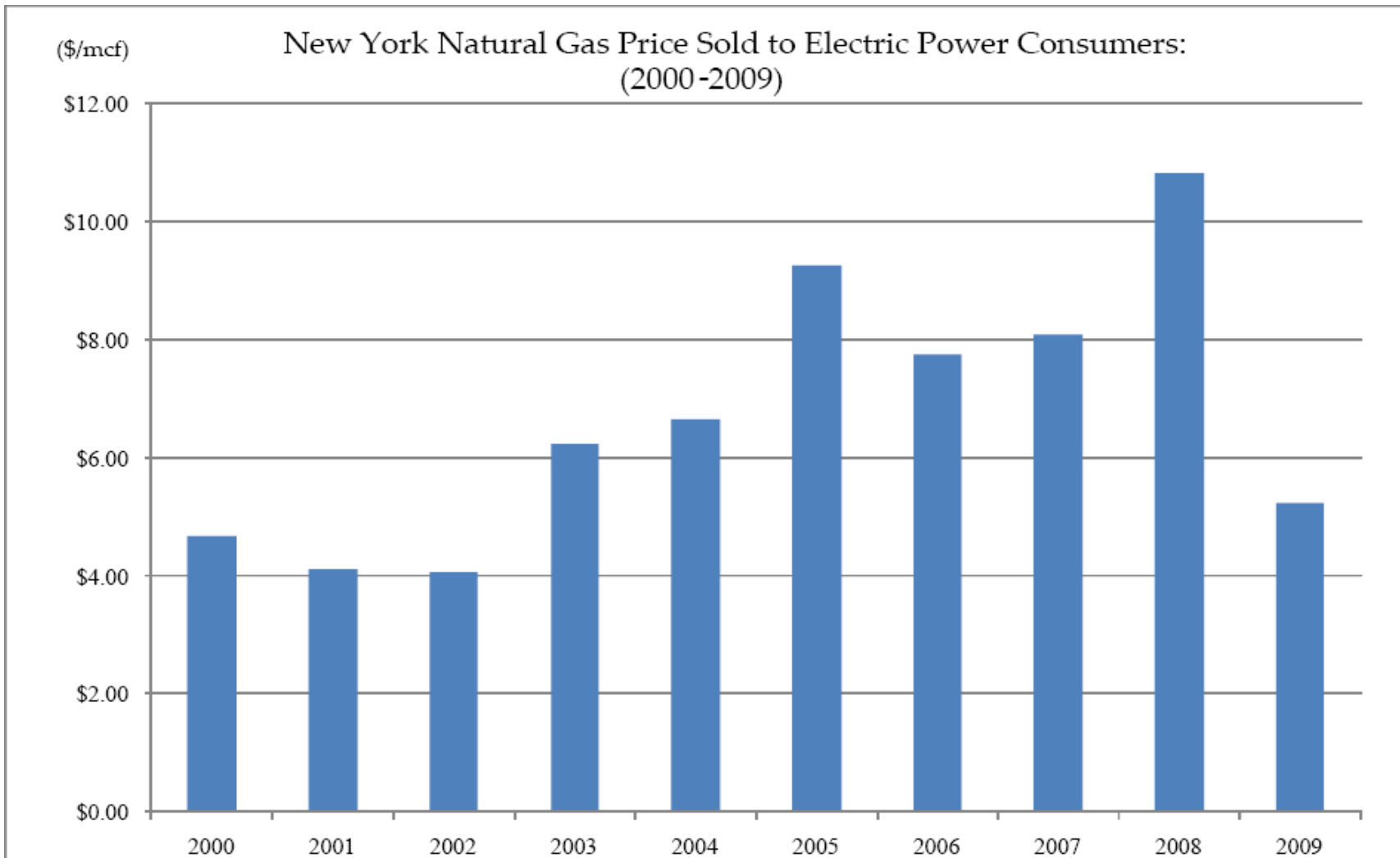
Sources: EIA 826 Database; New York State Data Center (posting US Census Data)

Wholesale Electricity Prices – NYISO Energy Market



NYISO Data: Numbers shown indicate the average price in the indicated year.

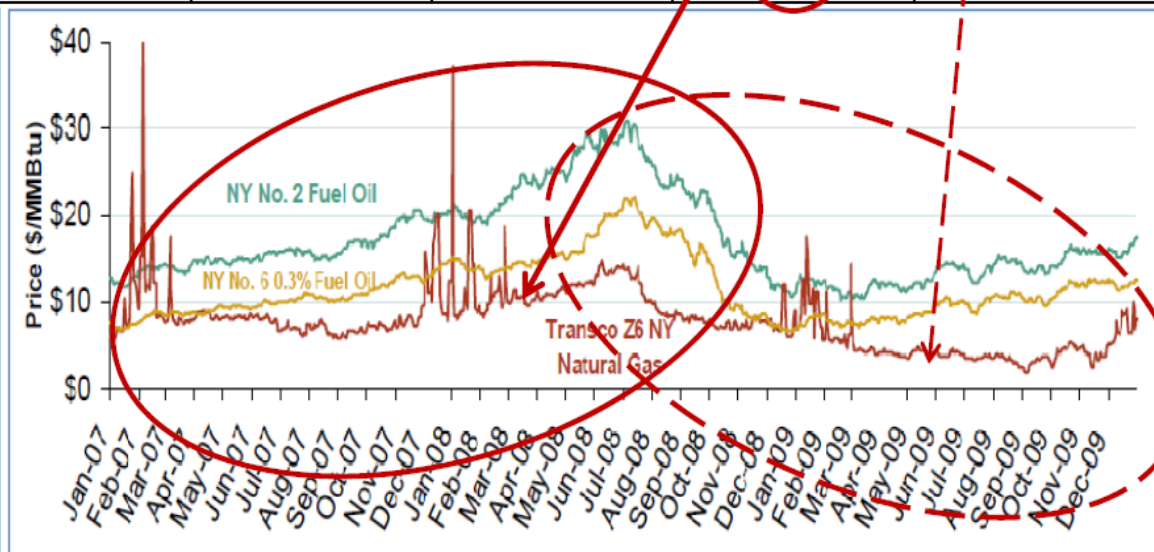
Natural Gas Prices to NY Power Producers



Source: EIA, natural gas price data, <http://tonto.eia.doe.gov/dnav/ng/hist/n3045ny3a.htm>.

Natural Gas Price Changes – Strong Influence on Wholesale Energy Prices

	On-Peak Spot Wholesale Energy Prices: NY Zones (2007 – 2009)				
	2007 (\$/MWh)	2008 (\$/MWh)	2009 (\$/MWh)	% change (2007-2008)	% change (2008-2009)
NY Zone A (Western NYS)	\$64.02	\$68.34	35.54	6.7%	-48.0%
NY Zone G (Hudson Valley)	\$83.51	\$100.99	49.80	20.9%	-50.7%
NY Zone J (NYC)	\$94.15	\$112.63	55.77	19.6%	-50.5%

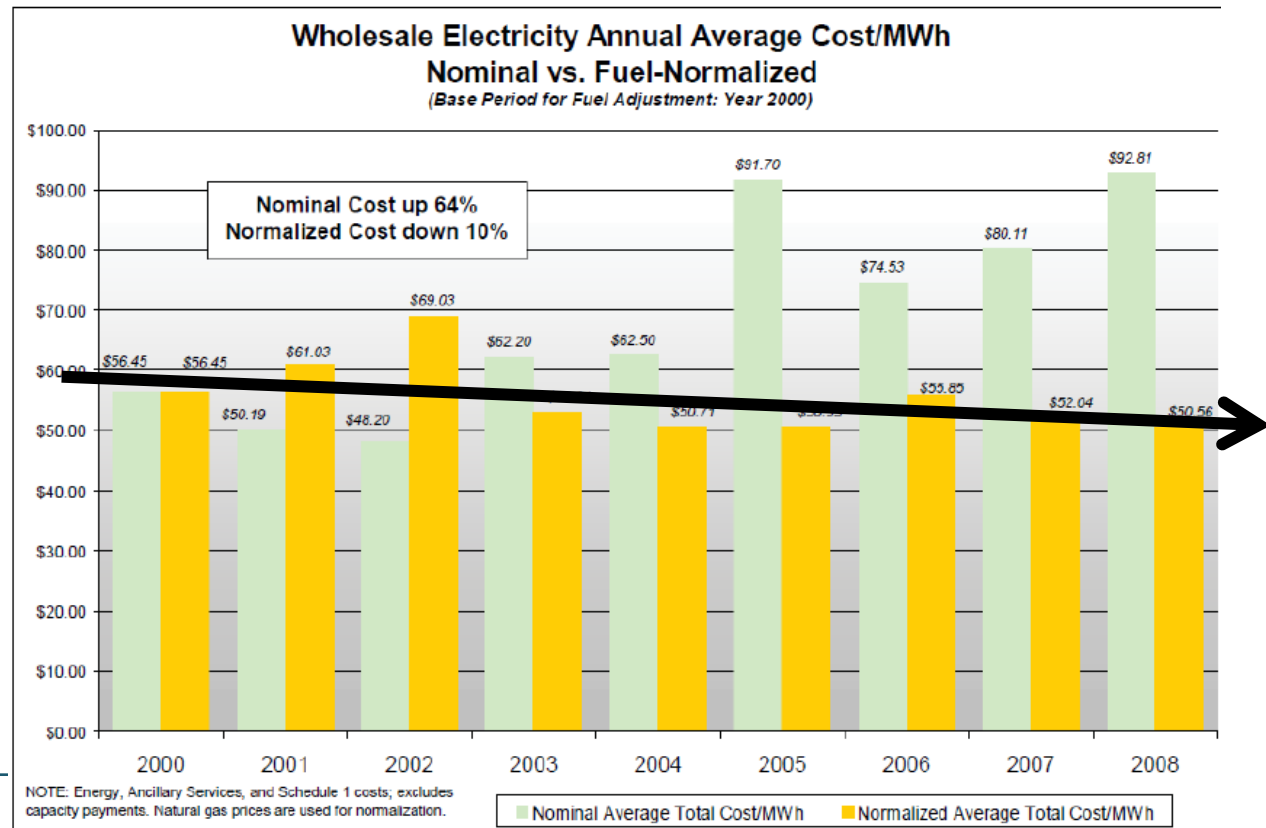


Economic savings from NY wholesale power markets

Wholesale prices “normalized” for change in natural gas & oil prices:

- Holding fuel prices constant from 2000 to 2008:

- 18% reduction in wholesale prices
- Annual cost reductions of \$1.2 billion in today’s dollars.



Other observations about “prices” and “savings”

Views about “what if” there had been no restructuring:

- Not likely that NYS would have seen a different generation mix
- Gas prices and plant investment would have affected power costs
- Other regions would have had higher % of power from coal
- Stranded costs would have been higher without \$ from plant divestitures
- *This view was voiced voluntarily by most observers interviewed*

Other observations about “prices” and “savings”

Views about the design and operations of NYISO markets:

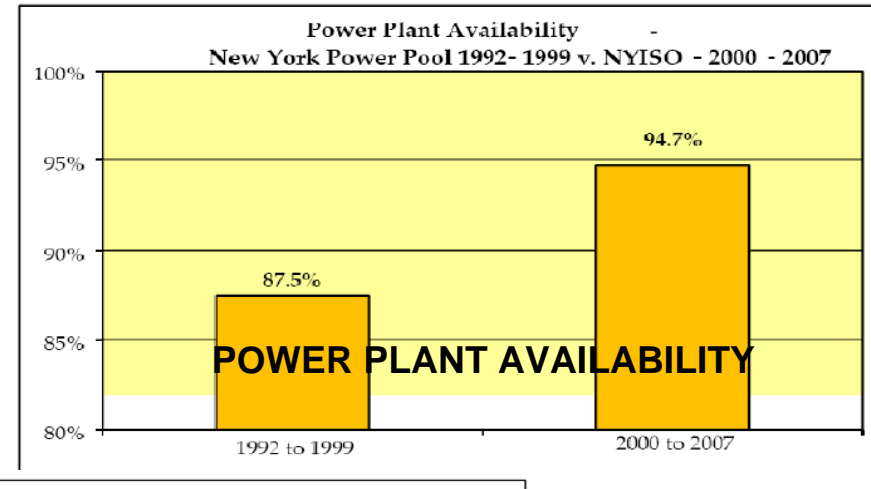
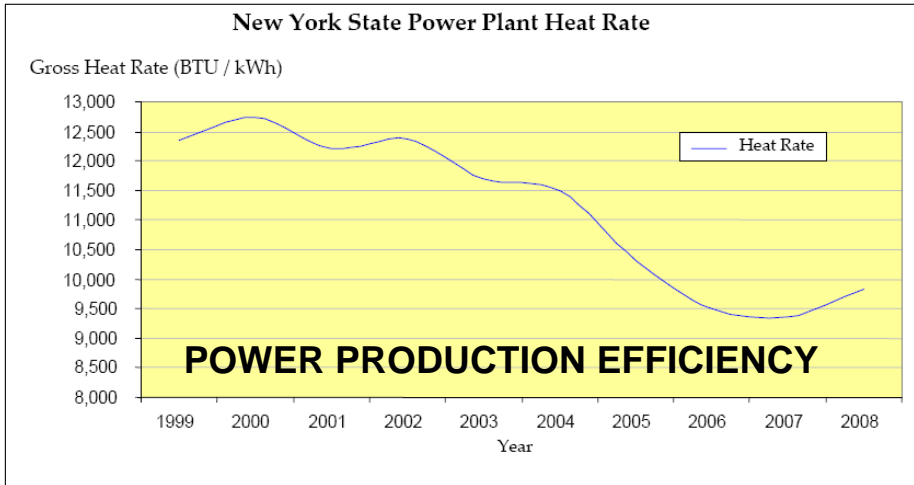
- Most Market Participants say that NYS has the best wholesale market design in the country, with real improvements from the past
 - “co-optimized unit dispatch,” transmission access and pricing policies, LBMPs, shared governance, bilateral and spot markets
 - “....most advanced market in the country,...world”
 - “We’ll always find things to complain about, but we’re very happy with the overall structure...”

Other observations about “prices” and “savings”

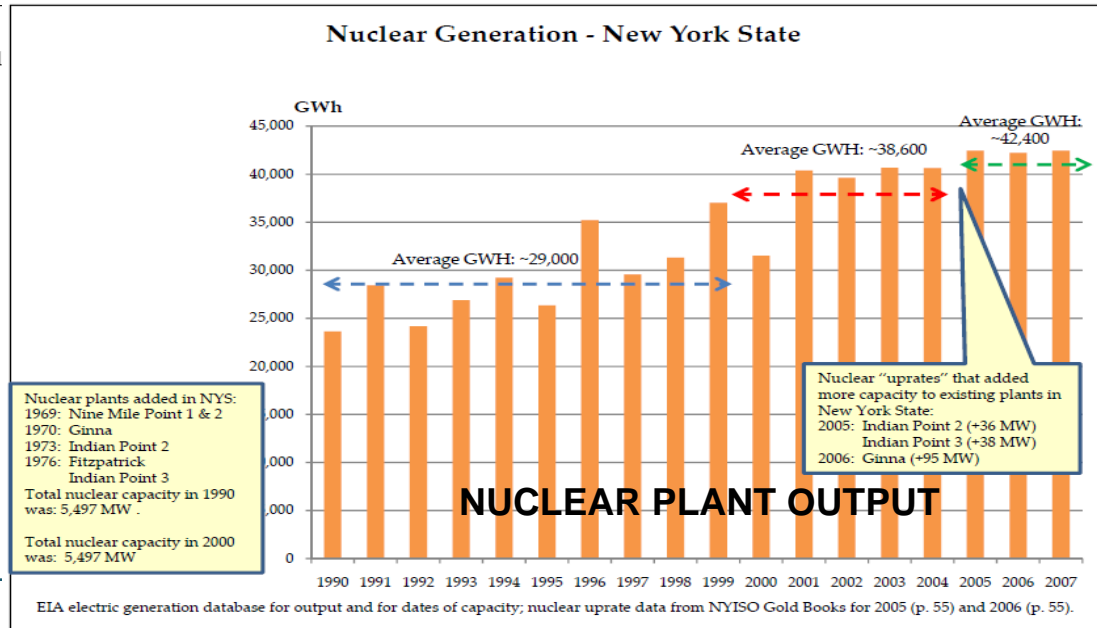
Even so, frustration exists about high retail and wholesale electricity prices in NYS:

- Often directed at NYISO due to a sense that “markets” – not customers – see the benefits of power production efficiency gains.
 - Concerns that loads “pay too much” (e.g., capacity market payments, 80/20 support for NYISO costs)
 - Concerns about inadequate attention to seams for too long (e.g., adding transmission at interfaces, harmonizing inter-regional market rules)

Goal: Improving efficiency of electric power production

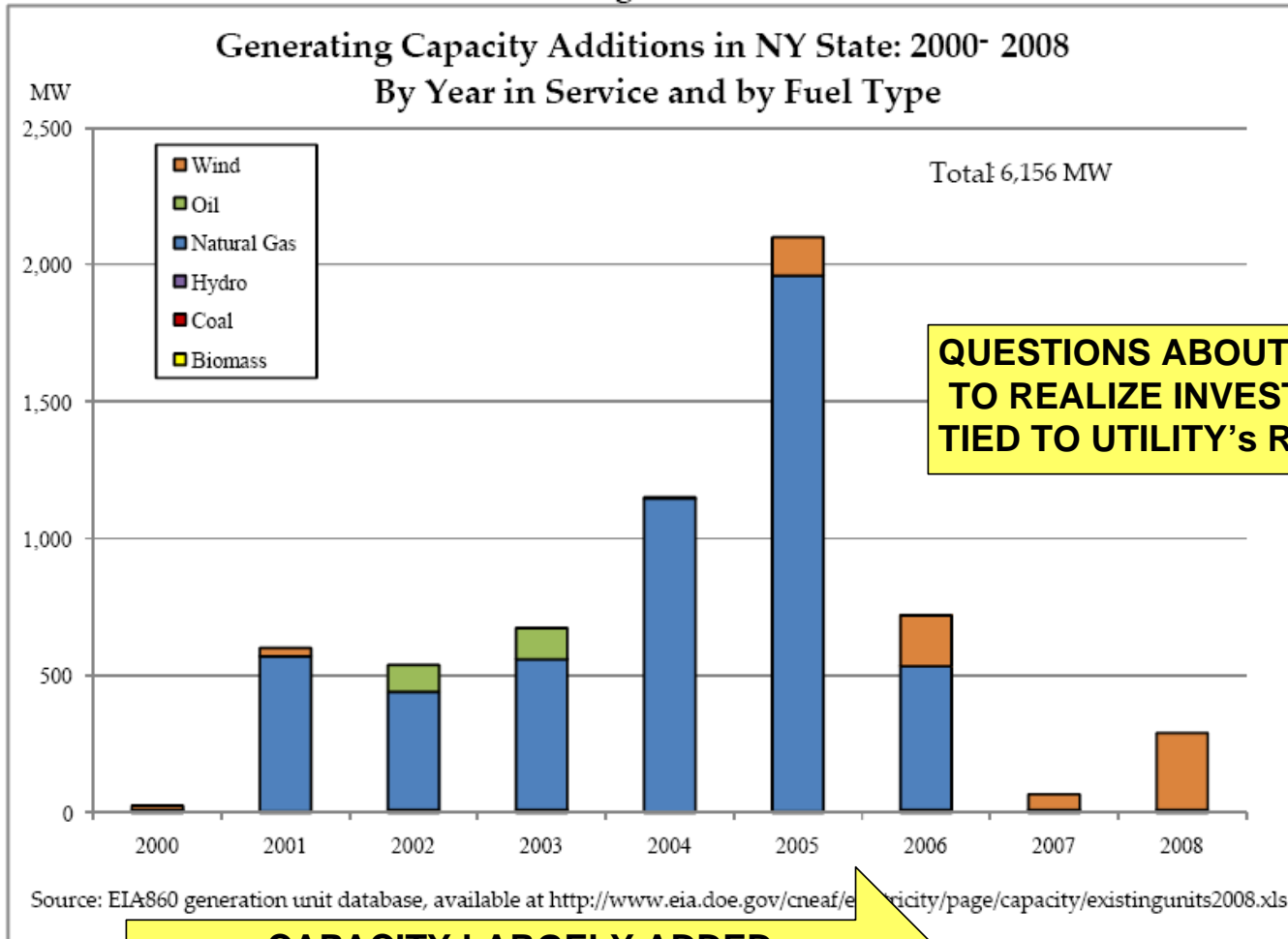


Source: S. Whitley, "Foundation to the Future: remarks at NYISO's Annual Symposium, April



EIA electric generation database for output and for dates of capacity; nuclear uprate data from NYISO Gold Books for 2005 (p. 55) and 2006 (p. 55).

Goal: Disciplining costs by shifting investment risk from consumers to investors

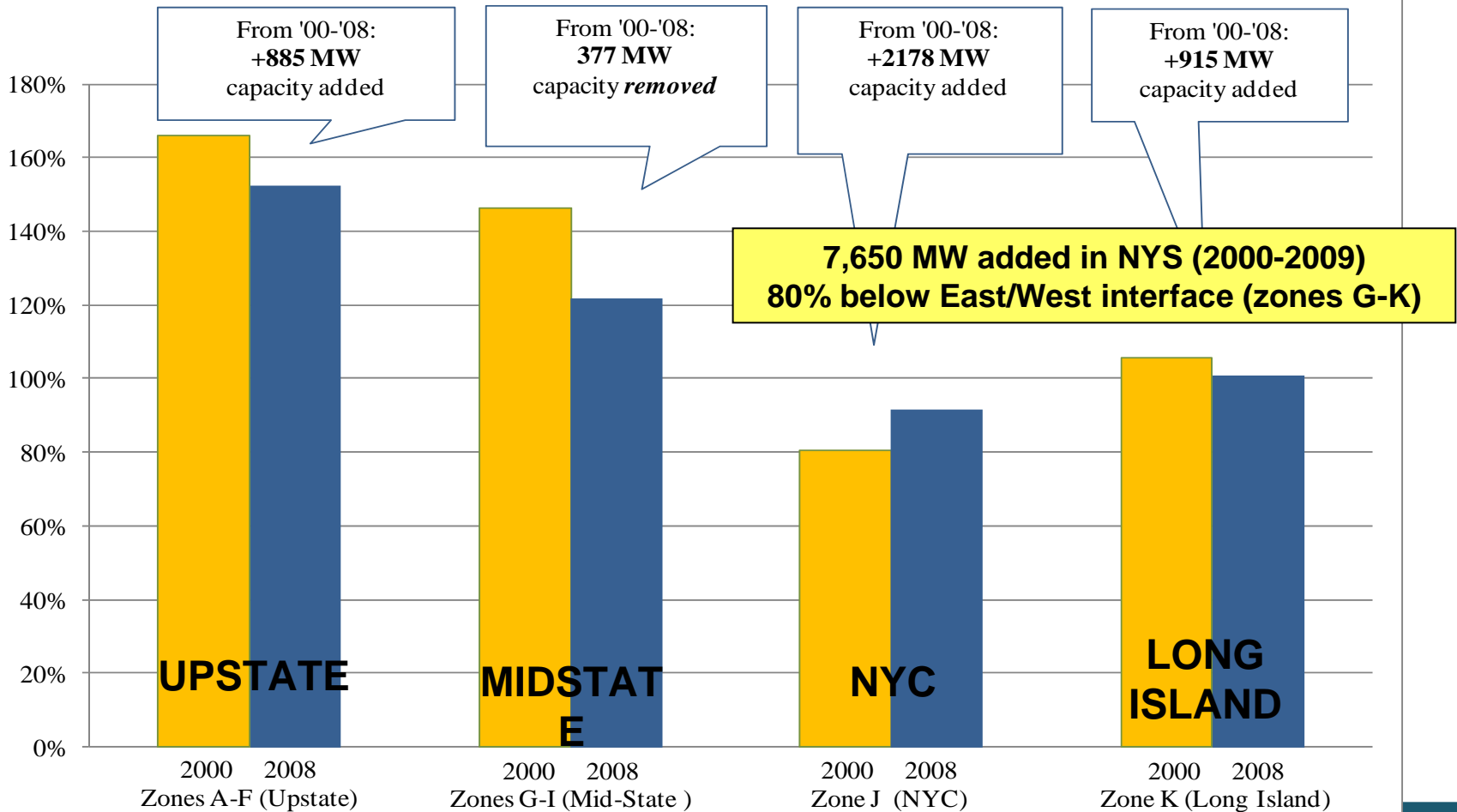


QUESTIONS ABOUT THE FUTURE ABILITY TO REALIZE INVESTMENT WITHOUT PPAs TIED TO UTILITY'S RETAIL CUSTOMER BASE

CAPACITY LARGELY ADDED OUTSIDE OF UTILITY RATE BASE

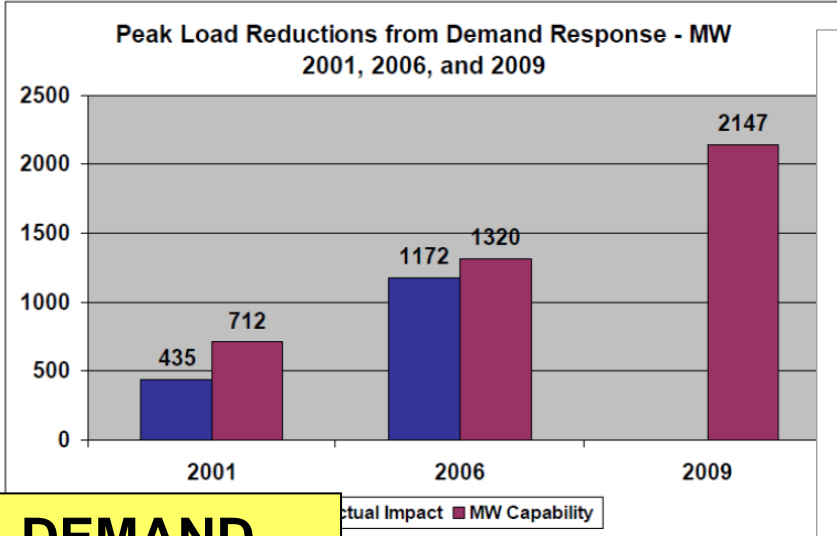
Goal: Ensure reliability more cost effectively

Percentage Installed Reserve for Different Electrical Zones of New York State:
Upstate, Mid-State, NYC, and Long Island - 2000 versus 2008

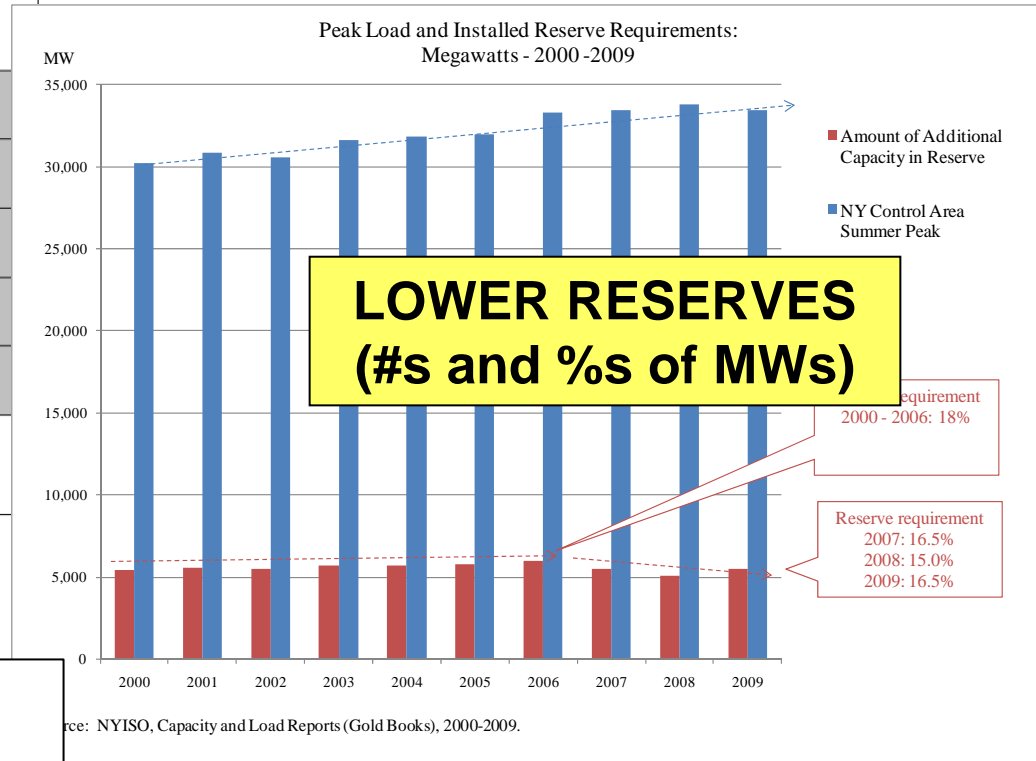


Source: NYISO Gold Books for 2000, 2008; comparison in each year for each area is the zone's installed capacity divided by coincident summer peak load (actual).

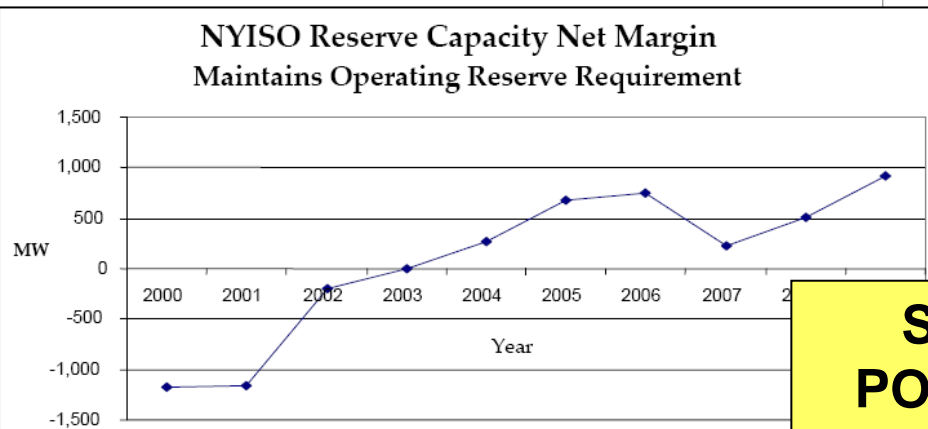
Goal: Ensure reliability more cost effectively



DEMAND RESPONSE

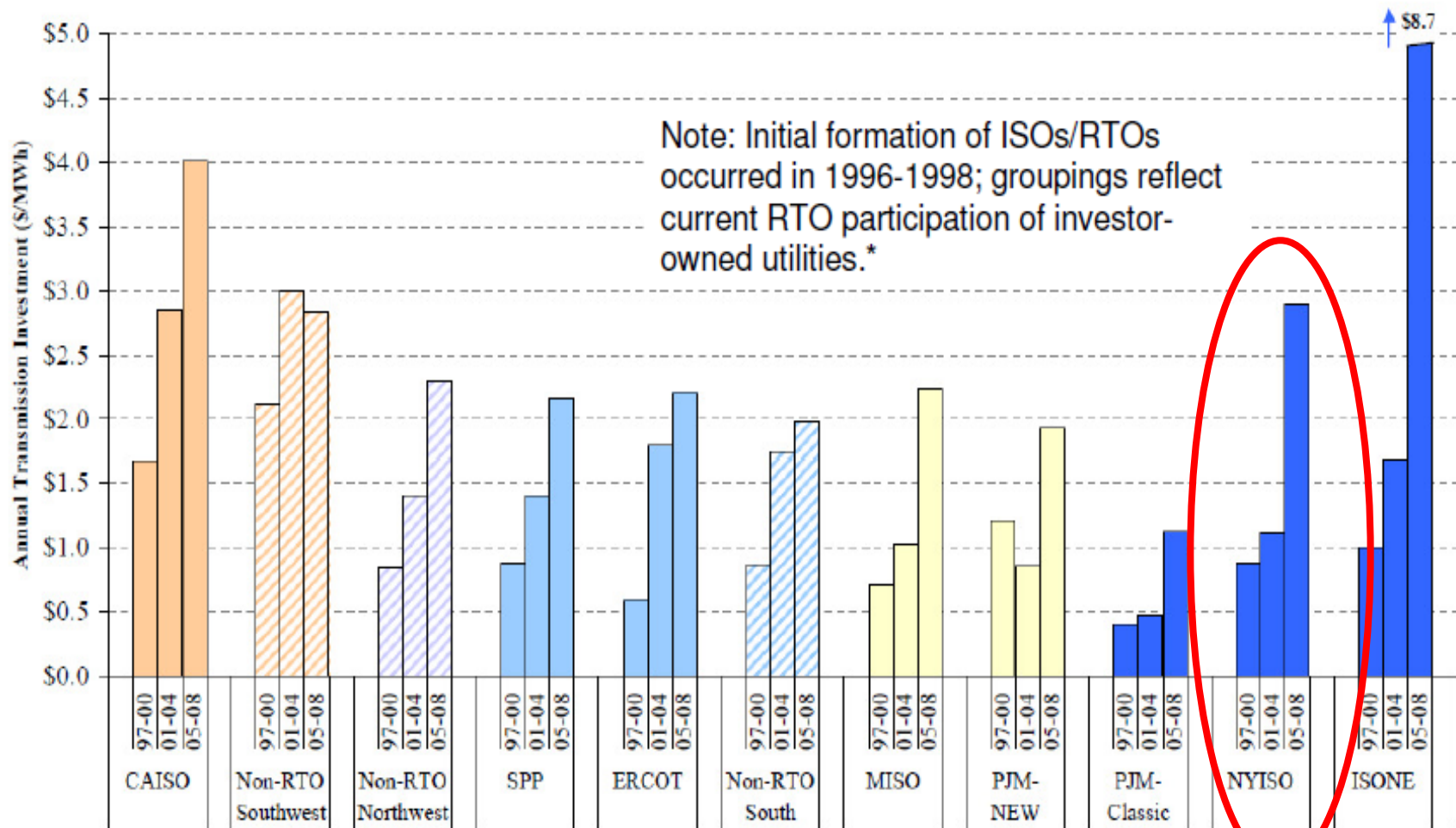


LOWER RESERVES (#s and %s of MWs)



SURPLUSES – POSTPONING MW ADDITIONS

Ensuring reliability: transmission additions

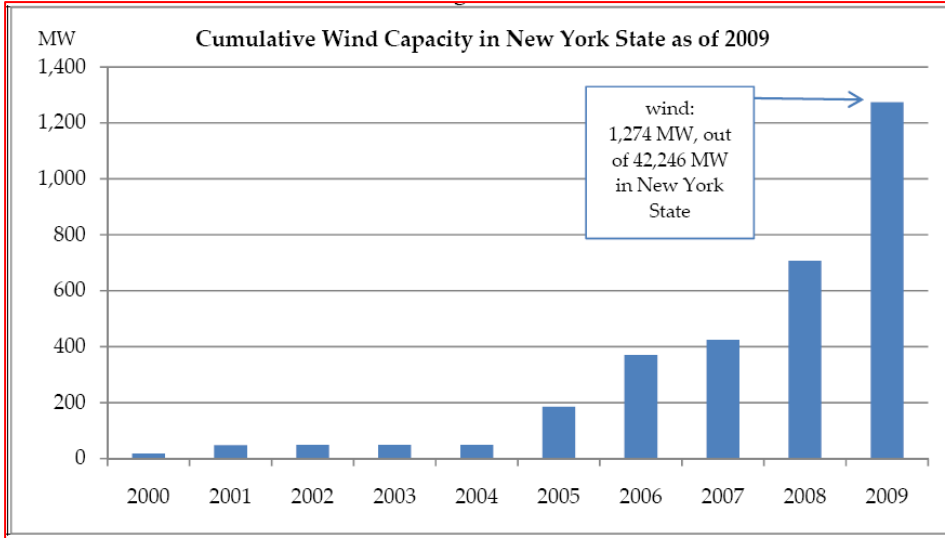


Source: The Brattle Group based on FERC Form 1 and EIA Form 861 data compiled by Global Energy Decisions, Inc., The Velocity Suite.

*Transmission investment of investor-owned utilities; expressed as total investment dollars per MWh of retail sales.

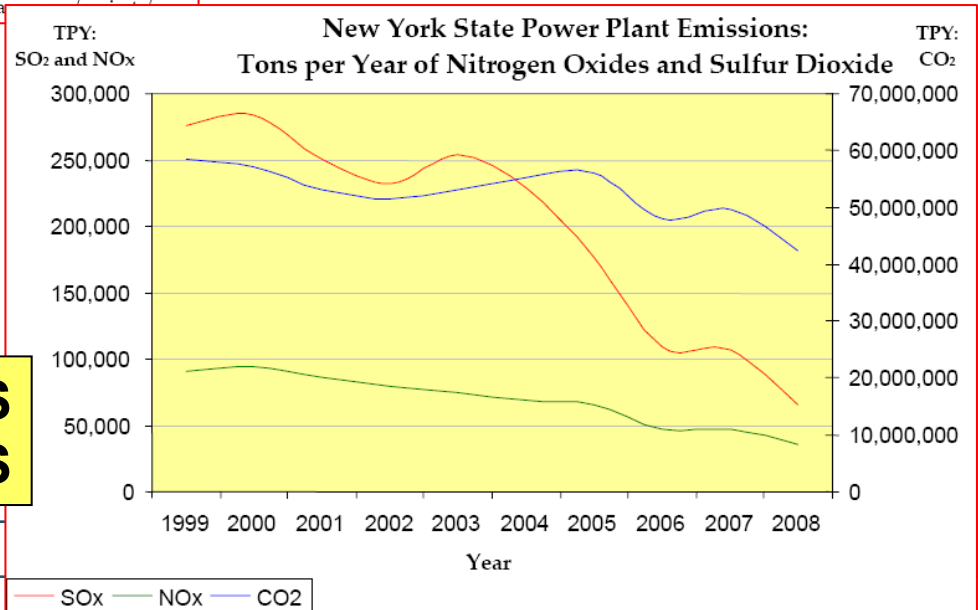
PJM-New includes Commonwealth Edison, AEP, Dayton, Duquesne, and Dominion. PJM-Classic includes all other PJM members.

Other objectives: clean energy



WIND CAPACITY ADDED

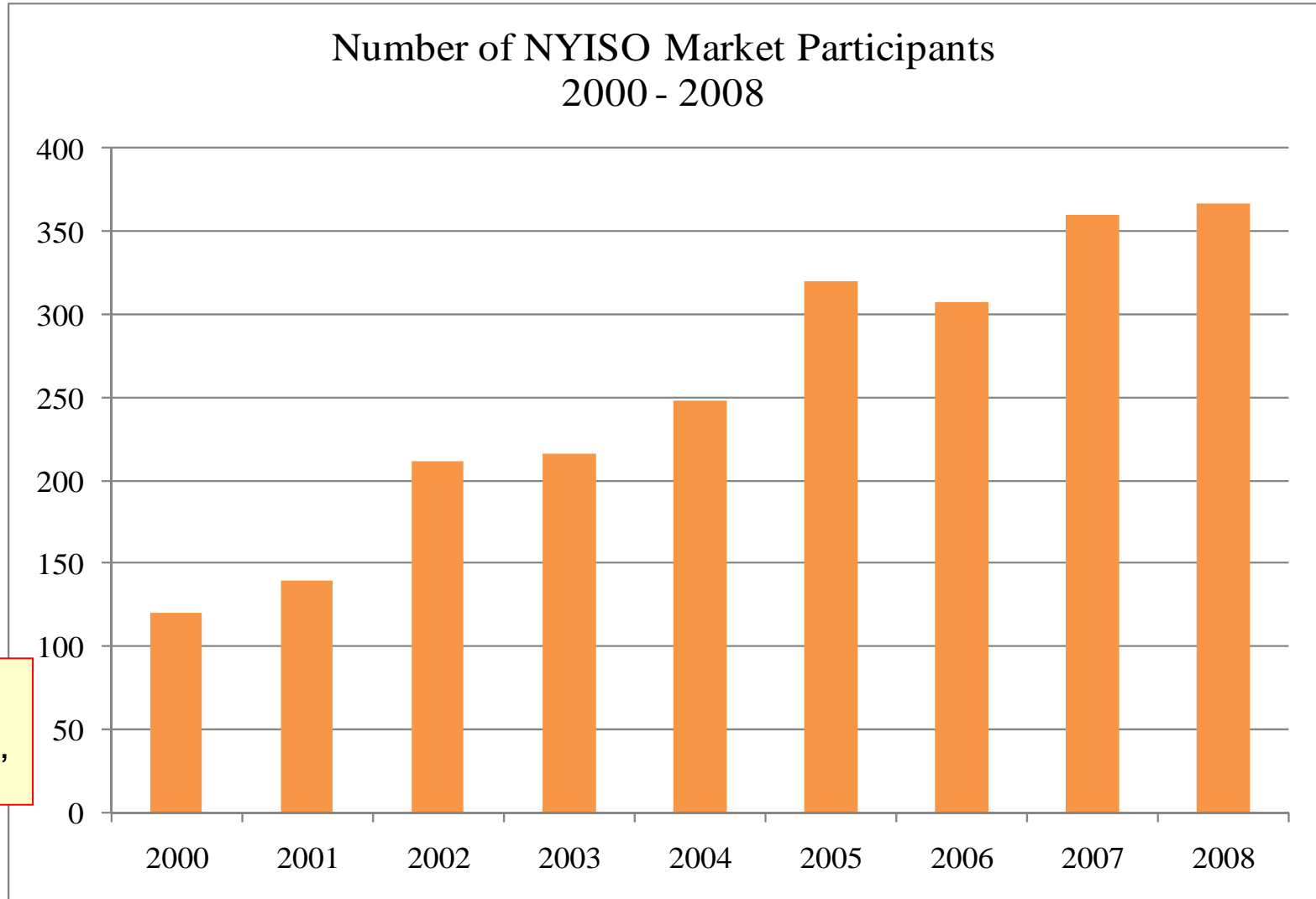
Source: American Wind Energy Association, projects as of 12-31-2009 <http://www.a>



EMISSIONS REDUCTIONS

— SOx — NOx — CO2

Other objectives: entry of new market participants



**Pre-NYISO:
8 TOs,
plus munies,
a few IPPs**

Other objectives: Retail choice combined with stranded cost recovery

Table 6

New York State - Retail Competition

Percentage of Customers and Loads (MWh) Supplied by Competitive Electricity Suppliers (August 2009)

	Total		Non-Residential (Large TOU)		Non-Residential (SM & ST LGT)		Residential	
	Customer	Load	Customer	Load	Customer	Load	Customer	Load
	Accounts (#)	MWh	Accounts (#)	MWh	Accounts (#)	MWh	Accounts (#)	MWh
Total eligible for retail choice	6,625,965	9,933,484	7,607	2,446,555	903,553	3,930,033	5,714,805	3,556,896
Total migration to competitive supply	1,210,583	4,619,089	4,039	1,873,248	241,337	2,097,080	965,207	648,762
% of eligible that has migration to competitive supply	18.3%	46.5%	53.1%	76.6%	26.7%	53.4%	16.9%	18.2%
% of total eligible competitive	-	-	0.1%	24.6%	13.6%	39.6%	86.2%	35.8%
% of total competitive	-	-	0.3%	40.6%	19.9%	45.4%	79.7%	14.0%

3/4th

1/2

~1/5th

Note: Non-Residential customers are split into two groups: 1) Large Time of Use and 2) Small / Medium and Street Lighting.

Source: http://www.dps.state.ny.us/Electric_Migration_Web_Report_Aug09.pdf

Structural Analysis:

DESIGN OF NYISO MARKETS

Structural issues

Attribute	Indicator
Many buyers & sellers	Increase in # of Market Participants, offering many differentiated products
Low barriers to entry	OASIS Prices that support long-run entry Energy facility siting policy Access to information
Non-discriminatory access to essential facilities	NYISO-administered OASIS tariff NYISO-administered planning process
Efficient prices	Market design - co-optimized markets, LBMPs, TCCs, transmission network access, virtual trading, convergence of DA and RT prices Investment risk internalized by investors [Early concerns about % of uplift costs and current concerns re: seams issues]
Mitigation of market power	Structure with ISO administration of T tariff MMU (internal, external) and market mitigation rules
Transparent prices	Extensive data on prices by location, time, products
Stability and transparency of market rules	Continuity of key market design elements Shared governance [Concerns relating to transparency of some NYISO processes]
Reliability delivered efficiently	Addition of significant MW Reliable transmission investment Reliability audit compliance [Concern about whether planning process favors generation]
Clean power resources	Reduced emissions Renewable MW additions

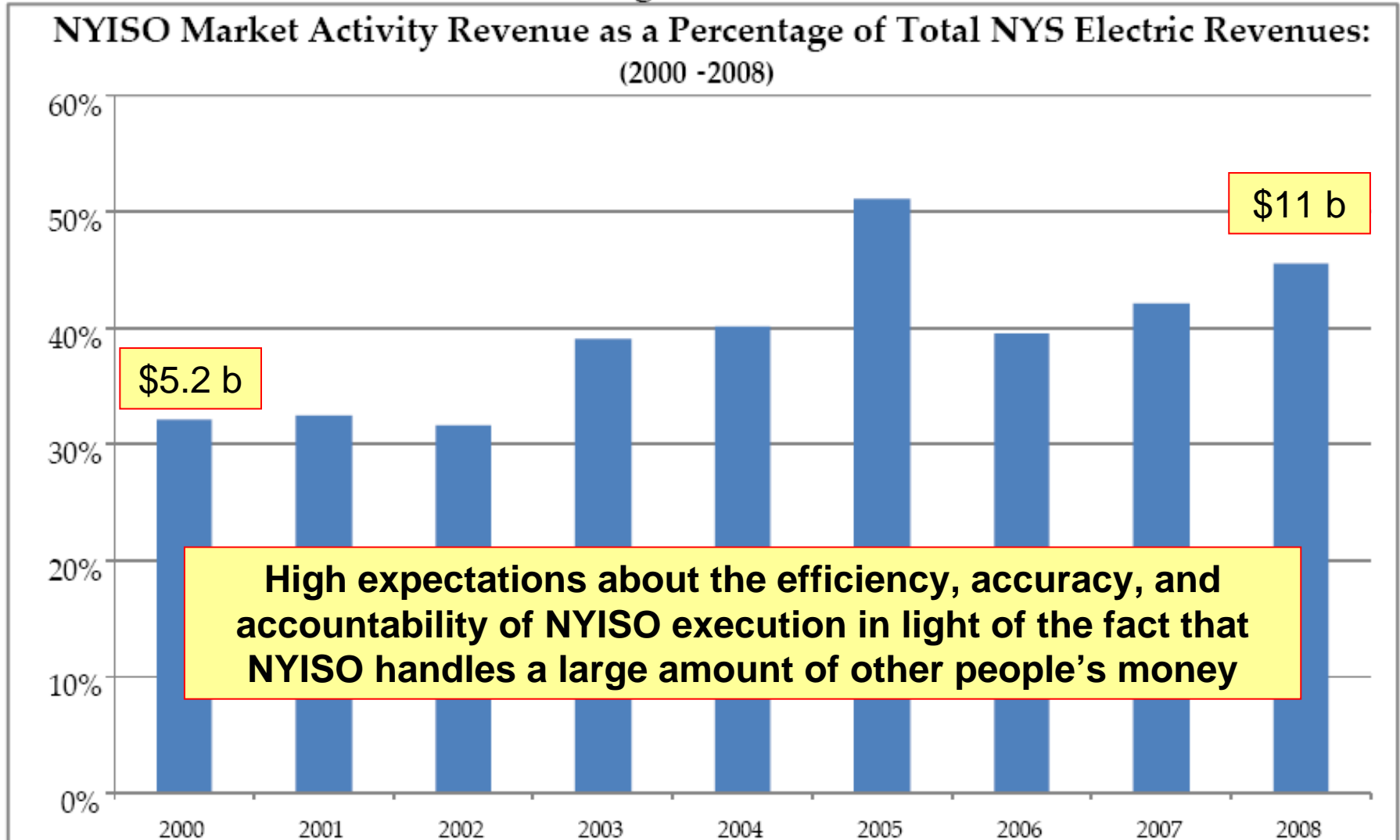
Institutional Analysis:

NYISO'S PERFORMANCE IN EXECUTING ITS RESPONSIBILITIES

3 Eras of NYISO operations / execution

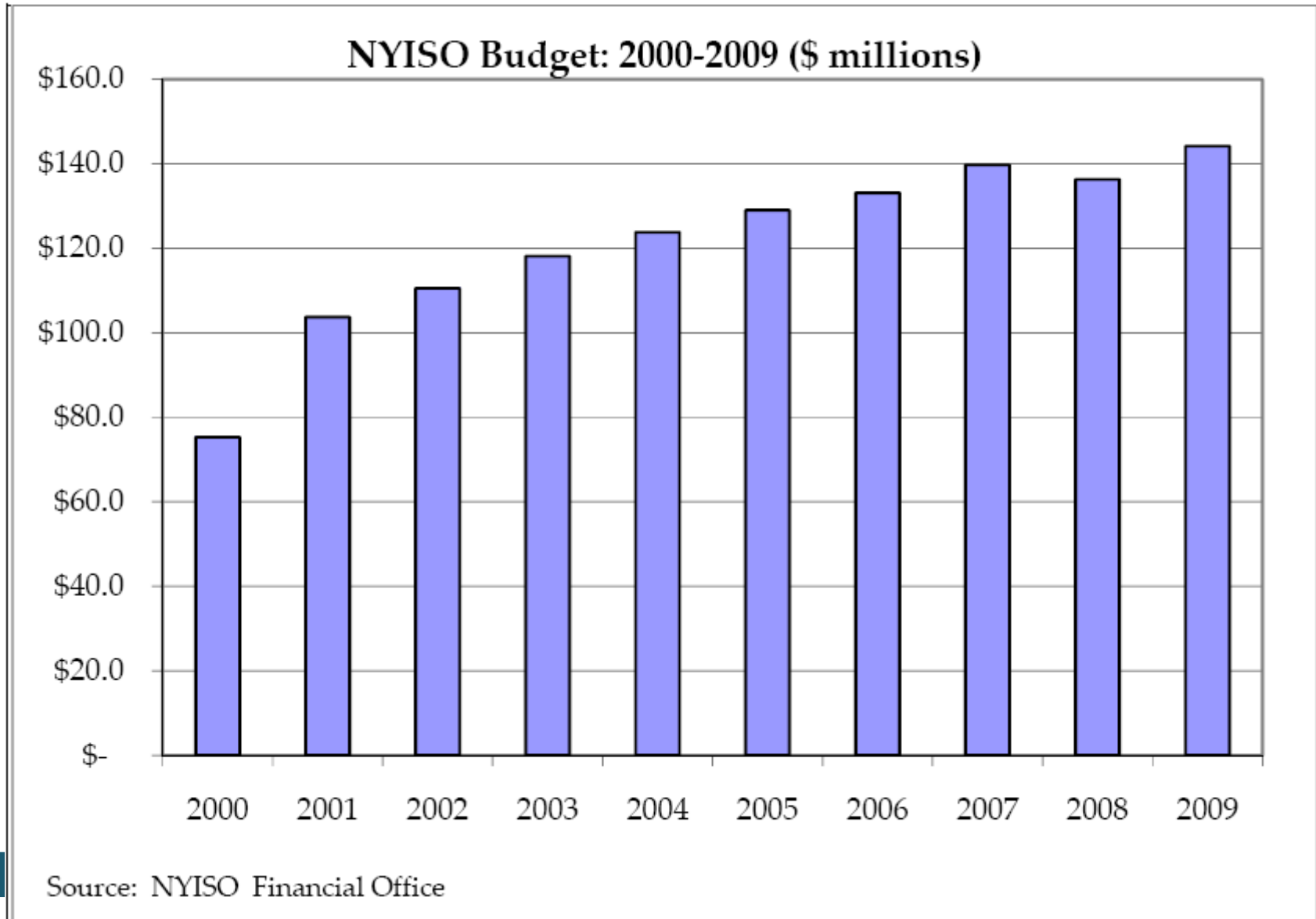
- **Start-up phase (starting in December 1999):**
 - NYISO performed well on external reliability and market design, but less well on business systems (e.g., pricing corrections, settlement and billing issues)
- **Second phase (beginning around 2005/2006) – internal focus on:**
 - striving for “excellence in execution” (including reliability and market functions)
 - hunkering down to address and improve upon business system challenges
- **Third phase (beginning a few years ago): added external focus, attempting to address implications of:**
 - High natural gas prices affecting NYS wholesale power prices
 - Implications of economic and financial crisis that affected NYS and US
 - Implications of a volatile political atmosphere in the state
 - Growing unease among the general public about whether to trust markets.

Dollar Value of market activity administered by NYISO

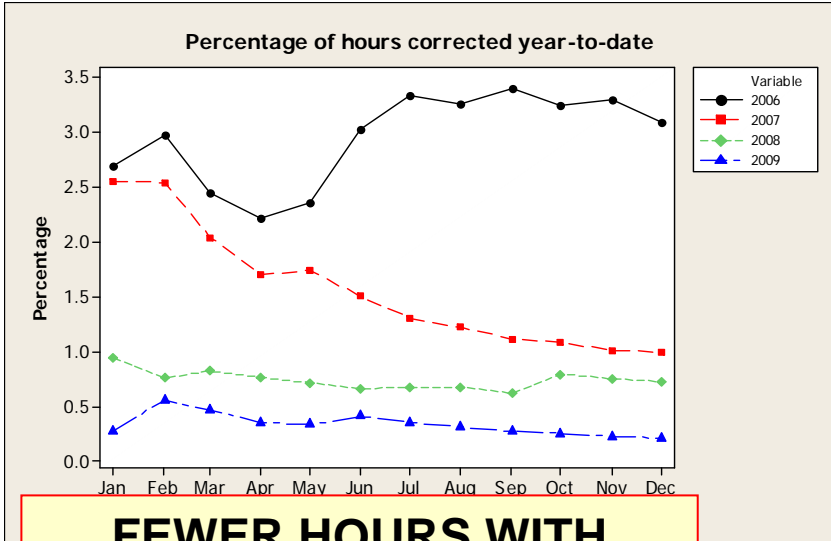


Sources: Form EIA 826 data and NYISO Annual Reports

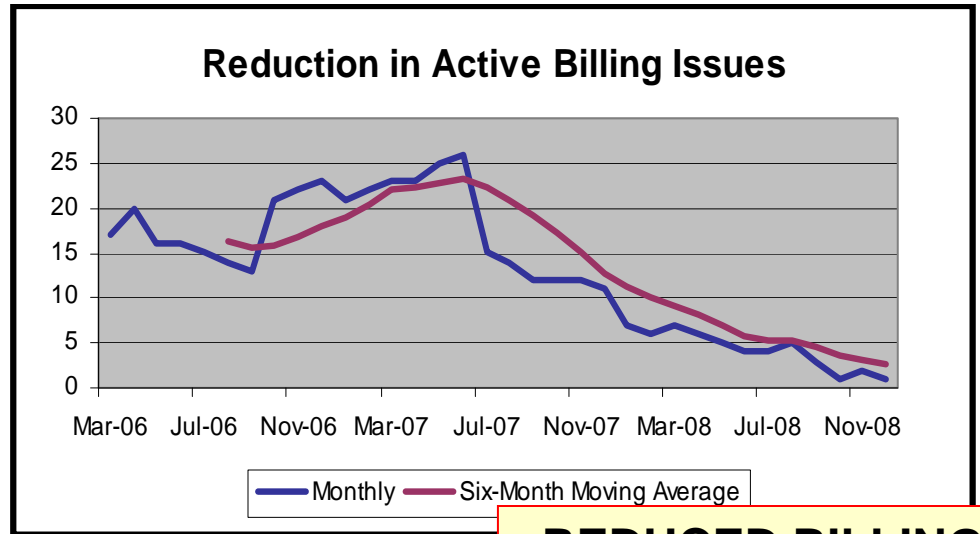
NYISO Cost of Operations



Execution of business systems

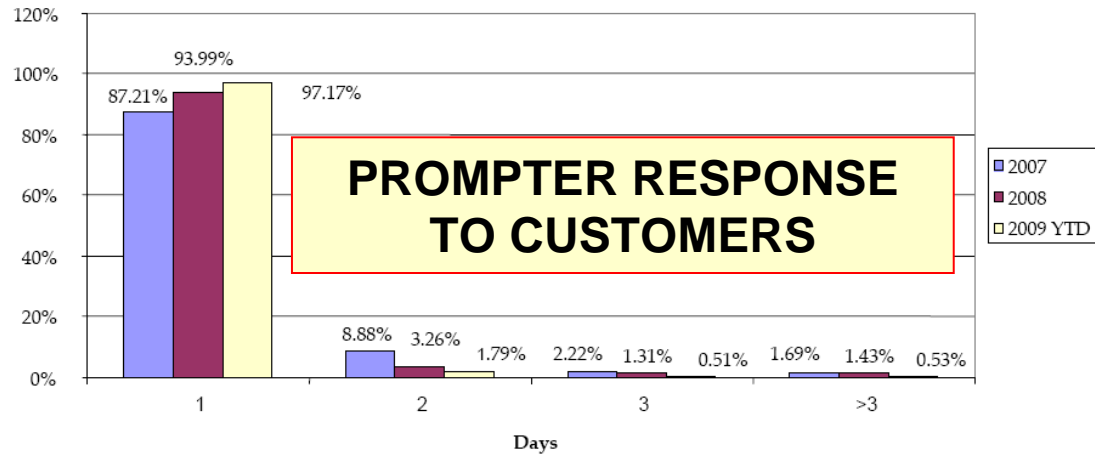


FEWER HOURS WITH PRICE CORRECTIONS



REDUCED BILLING ISSUES

Time period for responding / engaging SME support to Customer Inquiry



Views of stakeholders (MPs and others)

NYISO function	Views expressed in interviews:
Grid operator	Strong consensus that NYISO excels in reliability functions
Market administrator	Strong consensus that NYISO has strong orientation toward market efficiency Still: concern that NYISO is focused on markets rather than implications of markets for consumers
Business systems	Predominant view that NYISO’s execution has significantly improved Formerly: too slow in correctly billed and settlement errors Still: room for improvement (e.g., errors; response time)
Cost of operations	Recognition that costs borne by NYISO cover much wider range of responsibilities and more complex market than NYPP (e.g., # of transactions and products, transmission interconnections, # of market participants, market monitoring and mitigation, wider range of technologies (e.g., intermittent resources, demand response), planning functions, information provision) Still: concerns about cost containment
Governance and organizational accountability	Significant support for shared governance process Still: concerns that NYISO decision-makers have been too slow to bring material issues to the attention of the MPs;

NYISO: Stakeholders' views about organizational accountability

- **High frustration among stakeholders in several instances where NYISO either acted too slowly on important issues:**
 - re: Lake Erie loop flow (prior to 6/2008)
 - Re: Proposal to construct new operations center, 2009
- **Mixed views about shared governance model:**
 - Strong view that it is better than in other regions – and allows for adoption of decisions without as much acrimony and administrative appeals
 - Small MPs tend to view it as extremely time-consuming and at times inefficient
 - Broad views that NYISO Board should resolve impasses more frequently than now.

NYISO: Stakeholders' views about organizational accountability

- **Concerns that NYISO leans too heavily to one or other side of the market – with groups taking somewhat predictable sides:**
 - **E.g., supply side views: concerns that**
 - certain technical rules favor lower capacity price and energy market mitigation
 - **E.g., buy-side views: concerns that**
 - consumers underwrite too much of the risk of investment;
 - imposition of buyer mitigation in NYC was uncalled-for;
 - 80% of cost of NYISO operations borne by buyers;
 - NYISO language focuses on “markets” rather than “consumers”;
 - delay in attention to addressing seams issues (and savings in NY markets)

NYISO:

Stakeholders' views about organizational accountability

- **Shareholders still view electricity as a public service:**
 - NYS may have moved to rely more on market forces to provide electricity, but stakeholders still view wholesale electricity as just any old commodity.
 - Many view it as a public service, provided by markets as long as the markets are trusted.

- **Strong and broadly shared desire for NYISO Board to inspire greater confidence among stakeholders:**
 - To show that it adequately appreciates its “public trust” functions

- **Desire for greater transparency in Board and senior NYISO management decision-making – for example**
 - Open records of the organization (Board minutes and actions, organization charts, compensation metrics)
 - Practices/policies on disclosures more along the lines of shareholder-owned enterprises.

Looking Ahead: Continuing efforts to improve performance

- **Strong support for NYISO’s continuous improvement excellence in a technical entity:**
 - Focus on reliability
 - Focus on ways to improve markets (e.g., demand-side resources, non-dispatchable resources, planning) to meet well-established and changing needs (e.g., plug-in hybrid, clean technologies)
 - Focus on “execution with excellence”
- **Strong support among many MPs for NYISO’s efforts to “broaden the markets” (including spreading cost of operations)**
 - Widen the geographic focus of regional planning, alignment of regional rules, congestion issues (including transmission) between regions
- **Weaker support for the range of activities that NYISO has identified as priorities for “deepening the markets.”**
 - Less support for NYISO to play active role in dynamic pricing

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