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The New York Independent System Operator: A Ten-Year Review

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This White Paper was prepared at the request of the New York Independent System Operator. The paper reflects the views of the author, and not necessarily the views of the NYISO, or its members.

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EXECUTIVE SUMMARY

Background: In conjunction with its tenth-year anniversary, the New York Independent System Operator ("NYISO") commissioned this retrospective review of the first decade of its operations. Many of the participants in New York's electric industry also expressed interest in an assessment of NYISO's performance relative to the original goals that led to the establishment of NYISO as part of the restructuring of the state's electric industry. With that in mind, this report looks backwards in assessing NYISO's performance in light of the initial goals for establishing the organization, and looks ahead to identify areas for further improvement in the future.

Much has changed in New York State's wholesale electric industry in the years since its fundamental design elements were adopted during the 1990s, and since NYISO began to administer the high-voltage power grid and wholesale markets in 1999. Electricity is now delivered through competitive markets in New York. Hundreds of buyers and sellers of power have access to an open transmission system that underpins the market and provides reliable service. With one notable exception when a large blackout that started in the Midwest shut down the Northeast power grid in 2003, New York's power grid has consistently provided reliable power supply to New York State consumers. Although wholesale power prices rose over the course of the decade in New York as they did around the country, they rose largely as a result of underlying increases in the prices of natural gas and other fuel inputs.[1] Wholesale electricity prices have decreased noticeably in the last year, however, as natural gas prices dropped to their lowest levels in many years.[2] Many thousands of megawatts ("MW")[3] of new generating capacity were added over the course of the decade, with most of the new capacity built in relatively close proximity to population centers in downstate New York and with most of the financial risk borne by investors rather than by electricity customers. Wind power developers have been particularly active in recent years, and as of the end of 2009, New York ranked 7th among U.S. states in terms of the amount of wind generating capacity built and in operation.[4] Over 2,100 MW of demand-response resources had been signed up in the NYISO-administered markets as of 2009.[5] New York added three interconnections with neighboring regions.[6]

This report tracks these and other trends. After summarizing the forces that led to the establishment of NYISO in 1999, the report reviews an array of information that sheds light on the performance of NYISO as the administrator of the state's bulk power electric grid and wholesale power markets. From the vantage point of the end of 2009/beginning of 2010, the paper assesses New York State's first decade through two lenses: a quantitative one, which

tracks performance using a range of metrics; and a qualitative lens, which examines structural features and takes into consideration evaluative comments by observers of and participants in New York's electric industry. The paper relies on two principal types of information to analyze NYISO's actual performance: the report draws on the author's review and analysis of historical documents and quantitative data in the public domain; and the assessment reflects perspectives obtained through dozens of interviews with stakeholders at the end of 2009.

The report uses as its starting point the original goals and objectives for the new electric industry structure as established at the end of the 1990s. The hope of many in the state was to find a way to lower electricity prices and narrow the gap between electric prices to consumers in New York compared to those in other parts of the U.S.[7] The expectation was that by introducing competitive pressures into parts of the industry – power production and retail supply – customers would benefit from more efficient supply of electricity than was occurring under traditional regulation of vertically integrated electric utilities. Those broadly shared goals focused on introducing structural changes into the industry while continuing to provide world-class electric reliability and the production of power with lower environmental impacts.

Following the initial discussion of goals that led to the establishment of NYISO, this report is organized into three parts. First, it assesses NYISO's (and the state's) performance in terms of the hoped-for outcomes of electric industry restructuring. Second, the paper examines whether structural conditions exist that would provide confidence that NYISO markets are generally providing competitive outcomes. Third, the paper explores the manner in which these various outcomes, structural changes and NYISO actions have been accomplished (in terms of NYISO's performance from business enterprise, governance and cost points of view).

***Summary of Conclusions*:** NYISO (and more generally, New York's competitive wholesale market) has performed extremely well on many if not most of the outcomes to which the state's restructuring of its electric industry aspired. In many respects, NYISO stands as a model of a well-functioning electric market that relies extensively on competitive markets to provide benefits to the state's electricity consumers. That said, there are parts of the industry that have operated better than others:

- ***Electricity rate relief***: One of the most important goals of restructuring was to help reduce the disparity between electricity prices in New York and in other parts of the U.S. Today, New York's electricity prices remain high – but not because New York's wholesale power markets are not working. Many things not directly related to the NYISO's performance – such as increases in natural gas prices since 2000 and the high cost of doing business in New York State – have contributed substantially to electricity price increases in the state. These factors more than offset the power production efficiencies that occurred over course of the decade under electric industry restructuring and the NYISO's administration of wholesale markets. In the author's opinion, it is likely that prices would be no lower and indeed could have been higher without restructuring. Although New Yorkers actually spend less of their personal income and the State's overall economic product on electricity than the average American, the electricity *rate* disparities have remained constant through much of the last decade. This issue remains a source of continuing and high frustration in New York.

- ***Relying on market forces***: New York has had considerable success in relying on market forces to discipline costs in the wholesale power industry in the past. Thousands of megawatts of generating and demand-response capacity have been introduced in New York (over the past decade) without relying on consumers' rates to underwrite investment. Power plants are operating more efficiently today than they were a decade ago. Many New Yorkers – notably large industrial customers – are now exercising their right to choose their electricity supplier. Substantial market information is publicly available. Increasingly though, providers of generating capacity are seeking to sign long-term contracts with purchasers of power (e.g., utilities with responsibilities to provide 'basic service' electricity), which means that distribution utilities, and by extension retail consumers, may be underwriting more investment risk in the future than they did over the past decade.
- ***Keeping the lights on***: NYISO has performed its reliability functions exceptionally well. It has coordinated second-to-second operations of power plants, transmission facilities and customer loads in real time. It has also carried out long-term planning processes to support assurance of reliable system operations in the future. Power plant and demand-response resources in New York's electric industry are sufficient to provide reliable supply for many years ahead.
- ***Introducing structural changes***: An important part of New York's approach to restructuring its electric industry was the introduction of organizational changes that would support the competitive and reliable provision of power to customers. These changes included the establishment of an independent grid operator (i.e., NYISO) to assure non-discriminatory access to transmission for all participants in the market; divestiture of investor-owned utilities' power plants to help mitigate market power and stranded costs, and to allow entry of new players in the market; provision of and unbundling rates for power *delivery* service and power *supply* service; allowing retail customers the right to choose their electricity supplier (i.e., "customer choice"); and establishing mechanisms to provide visible price signals tied to the cost of providing power at different times and locations on the grid. New York has performed well on these structural metrics.
- ***Allowing for recovery of stranded costs***: As part of the bargain that launched electric restructuring and customer choice, New York allowed its formerly vertically integrated utilities to recover their stranded costs from their customers, after taking into account the proceeds from the utilities' sales of their power plants to non-utility companies. Thus, this reduced retail customers' share of total stranded costs.
- ***Assuring support for state-mandated environmental and other policies***: In the past decade, New York's electric industry has stimulated significant investment in new renewable power projects (such as wind turbines) and low-emitting natural gas plants, and caused strong interest in demand response. Together these have helped diversify the state's energy mix and lower the air emissions that contribute to acid rain, smog and global warming.
- ***Involving others besides utilities in the governance of the electric system***: As compared to the pre-NYISO years when eight transmission utilities exercised near-exclusive control over the New York Power Pool, over 350 Market Participants are now involved in shaping

policies and protocols of the NYISO, and in providing services that support the provision of efficient, reliable and clean electric service.

- ***Assuring that all customers have access to electric service***: New York's electric industry restructuring model has ensured not only that all customers of investor-owned utilities have the right to choose their electricity supplier, but also that any customer that wants "basic service" from its local utility can be assured of having it. NYISO's administration of reliability and market functions has supported this model by ensuring that all suppliers of commodity service can get access to transmission as well as necessary energy, ancillary and capacity services.
- ***NYISO as a business enterprise***: While not an explicit attribute of New York's expressed goals for a restructured electric industry, an element that is nonetheless critically important is the ability of NYISO to execute its roles and responsibilities with excellence and with the trust and confidence of stakeholders in and outside of New York. On this metric, NYISO as an enterprise has performed well in its role as the technical operator of the grid throughout the decade. On other "organizational execution" metrics, there have been three phases of NYISO operations. In its initial years of operation (roughly from the end of 1999 through 2004), NYISO was a start-up organization and worked through a number of challenging billing, settlement, reporting and other business-system issues. In the second phase, from around 2005 through 2007, NYISO focused aggressively on addressing these internal execution issues and improved its performance on a number of metrics. In the current phase, NYISO continues to focus on process improvements, while also addressing a wide range of external issues (such as working to align its systems with those of neighboring regions, as a way to accomplish "virtual" regional markets and to improve the overall efficiency of the New York markets). This focus on continued improvement in integrating Northeast markets is of critical importance to many NYSIO constituents – in no small part as a way to continue to address high electricity prices in New York State. NYISO should continue to focus on striving for "excellence in execution" but also on assuring that its organization is accountable, transparent and trustworthy to its constituents.
- ***NYISO in its "public trust" function:*** Many constituents in New York State strongly desire for NYISO to inspire much greater confidence among Market Participants and others that it adequately appreciates and acts on the important "public trust" functions given to it as the independent grid operator and administrator of New York State's electricity market. New Yorkers may rely more on market forces to provide electricity than they did a decade ago, but that does not mean that stakeholders view wholesale electricity as just any old commodity. This seems to have created a heightened interest among many stakeholders for NYISO leadership to demonstrate that it understands its role in serving New York consumers and in managing resources that they pay for. Implicitly, these stakeholders seem to suggest that while they appreciate the importance and value of having an *independent* system operator, they also want the organization to exercise its role in a more judicious, transparent and accountable, rather than a detached, way. That said, there is much respect for the high-quality job that NYISO is doing in the extremely technical and critically important function of assuring that New York's electricity is highly reliable.

PURPOSE OF THE STUDY

This White Paper was prepared at the request of NYISO, and reflects the views of the author, Susan Tierney[8] of Analysis Group, and not necessarily the views of NYISO or any of its Market Participants.

As requested by NYISO, this paper has two purposes. First, it provides a retrospective assessment of the first ten years of NYISO's operations as administrator of New York State's transmission system and wholesale power markets. Looking backward but starting with the objectives underlying the establishment of NYISO as part of restructuring the State's electricity market, this study focuses on whether New York's wholesale electric system, as it has evolved over the last decade, shows signs of having met all or at least many of its original objectives. Second, the report is designed to identify areas on which the NYISO Board and management, NYISO Market Participants, interested New York State and federal policy makers, and others may wish to focus attention in order to continue to improve the performance of NYISO.

The study is based on two sets of information. First, the author researched developments leading up to and since the establishment of NYISO. The documents and information she reviewed are in the public domain and include reports of regulatory proceedings at the New York State Public Service Commission ("NY PSC") and the Federal Energy Regulatory Commission ("FERC"), energy policy statements (including New York's State Energy Planning Board's 2009 State Energy Plan and prior state energy plan documents), state-of-the-market reports issued by NYISO and its market monitor, data posted on NYISO's website, and other public data sources.[9] Second, the author interviewed or received comments from approximately four dozen persons representing entities and observers with direct knowledge of developments in New York's wholesale power industry.[10] These perspectives were provided in confidential statements[11] from Market Participants, public officials and other observers, which were provided to the author during the last quarter of 2009 and into the start of 2010.

Public sources of information are noted in footnotes at the end of the document. Where indicated in the report, the study's author requested that NYISO provide certain data which she then reviewed and analyzed for this assessment. The author also reviewed documents published by a variety of other parties. While it was not possible to carry out a comprehensive survey of every document published or issued by NYISO, its Market Participants, New York State or federal regulators, other policy makers, and other interested parties on the performance of NYISO, the author nonetheless attempted to collect and review a wide range of documents in order to provide a fair assessment of the performance of NYISO and the markets and systems it administers as of the end of 2009 / beginning of 2010.

Finally, this report is neither an investigative journalism document, nor a management audit. It does, however, reflect the author's assessment, based on her judgment and nearly three decades of experience in electric industry economics and policy.

BACKGROUND: The Goals Underlying Changes in New York's Electric Industry in the 1990s

Overview

The structural changes in New York's electric industry that included the establishment of NYISO in 1999 had their origins in conditions that existed at the start of that decade. NYISO was established as part of an overall effort to lower electricity rates for consumers in New York State, while also ensuring that New Yorkers continued to enjoy reliable power supply. Electricity rates were viewed as high in absolute terms, but also in comparison to rates charged elsewhere in the nation.

If lowering consumers' electricity rates (and more importantly, their electricity bills) was the ultimate goal of many who sought changes in the state's electric industry, the intermediary objectives were: to increase reliance on market forces (as compared to traditional utility regulation) as a way to improve incentives for efficient power production and use; to shift investment risk from customers to investors and suppliers; to provide all customers with more choice in the provision of electric service; to maintain electric system reliability; to open up planning of the electric system and other utility processes to greater involvement by others; to continue to rely on the electric industry to deliver other policy objectives (including diversity of energy supplies, greater reliance on end-use energy efficiency, and cleaner energy resources); and to resolve the "stranded cost" implications of situations where customers could leave their traditional utility system and leave other customers (or the utility) having to pick up the costs previously invested to serve them.

Different players – large industrial customers, low-income consumer advocates, utilities, independent power producers, environmental groups, utility regulators, elected officials, and others – placed different weight on different objectives. But overall, the set of goals and objectives shown in Table 1 made up the core components of the policy agenda for the restructuring of New York's electric industry.

Table 1
Goals and Objectives of Restructuring New York's Electric Industry[12]

- Reducing New York's retail electricity rates relative to rates and utility bills in other parts of the U.S.
- Relying on market forces to discipline generation-related costs (and in turn, prices) by:
  - Shifting investment risk from customers to investors;
  - Addressing the tendency for cost overruns under traditional utility regulation;
  - Relying on competition to introduce greater efficiency in the production and use of power;
  - Affording customers with the opportunity to choose their supplier of power (but not their transmission/distribution provider); and
  - Assuring adequate information, monitoring and oversight, so that a market could be competitive.
- Assuring that with these changes, the electric system would maintain – if not improve – its reliability.
- Introducing structural changes in the overall electric industry as a way to accomplish these goals, including:
  - Opening up access to utilities' transmission systems so that competing suppliers of power could use them on a non-discriminatory basis;
  - Divesting a significant portion of power plant capacity owned by vertically integrated utilities, to reduce the opportunity for market power and to introduce new players into the market;
  - Monitoring markets to avoid the exercise of market power;
  - Providing greater information transparency; and
  - Establishing an independent grid operator, to assure non-discriminatory access to transmission systems owned by the utilities.
- Providing a means to allow utilities to recover the costs of their prior investments and contracts that were made on behalf of customers and that might become "stranded" if customers stopped purchasing power from the utility.
- Assuring support for state-mandated environmental programs and policies, and other policies (such as subsidized rates for low-income customers, provision of energy efficiency programs and other "system benefit" programs) that intersected with the provision of electricity.
- Allowing participation by non-utility players in governance of the electric system.
- Assuring that all customers could buy and receive electrical service from some "supplier of last resort."

New York's Electric Industry Before the Establishment of NYISO

At the start of the 1990s, New York's electric industry was dominated by several electric utility companies. Seven large investor-owned utilities – Central Hudson Gas & Electric Company ("CHG&E"), Consolidated Edison Company ("ConEd"), Long Island Lighting Company ("LILCO"), New York State Electric & Gas Company ("NYSEG"), Niagara Mohawk Power Corporation ("NIMO"), Orange & Rockland Company ("O&R"), and Rochester Gas & Electric Company ("RGE") – provided electric service to retail customers in various parts of the state. All of these companies were vertically integrated, and owned and operated power plants, transmission facilities, and distribution systems. They provided "bundled" electric service to retail electricity customers in franchise areas through cost-based rates regulated by the New York PSC.

The industry also had several other key players. Many small municipally owned distribution utilities were scattered around the state. The New York Power Authority ("NYPA"), the largest publicly owned utility in the state, provided transmission and generation service mainly to municipal utilities, large industrial customers and state agencies. Additionally, several independent power producers operated single, stand-alone power plants and sold power to utilities under long-term supply agreements.

New York's electric utilities had been operating their systems cooperatively for decades before NYISO began operations in 1999. Following the massive Northeast electrical blackout of 1965, New York's utilities established a state-wide, wholesale power coordinating institution, called the New York Power Pool ("NYPP"). Like its two neighboring regions (New England and the Mid-Atlantic states), NYPP was a "tight power pool" – a centralized electric reliability coordination organization responsible for managing the high-voltage grid. Individual electric utilities owned and contracted for generating resources, as well as built and operated transmission systems to serve their own requirements; but they also "pooled" their operation for the mutual benefit of the participating systems. NYPP carried out many of the reliability functions normally performed by an electrical control area operator: dispatching generating units according to schedules provided by the utilities; balancing electric system supply and demand in real time; maintaining voltage; and managing operating reserves and monitoring contingencies that require rapid response to assure system reliability. NYPP also provided a forum for arranging short-term trades among the utilities in the state and then for allocating the benefits of these trades based on a "split-savings" price formula.

NYPP differed from its two neighboring power pools, however, because it lacked centralized unit commitment. The other pools at this time decided which units should be started and stopped (that is, "committed") on the basis of pool-wide economics (i.e., minimizing the cost of producing power). The NYPP, instead, dispatched units to balance pool-wide supply and demand after the individual utilities in the pool had decided which units they would commit to meet the loads of their own customers.[13]

Above all, NYPP was a voluntary reliability coordination organization, with narrow but still-important functions to balance generation with loads in a reliable fashion and to share whatever savings could arise from efficient system balancing after each utility determined its own

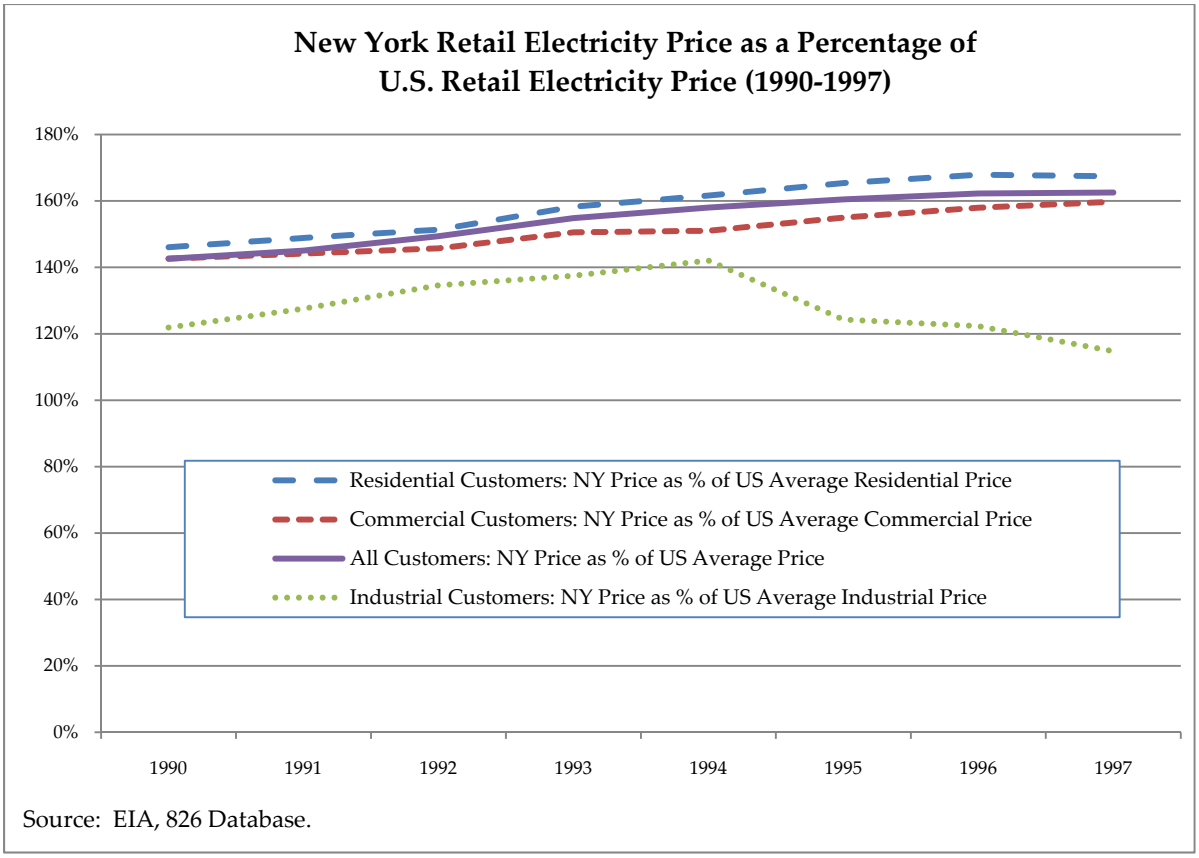
dispatch preferences for its own particular system. The cost to support NYPP was collected in consumers' retail electric rates.[14]

Impetus for Change: The Pressure of High Retail Electricity Prices

As of the early to mid-1990s, New York's retail electricity rates were among the highest in the country. Prices were high for many reasons, among them cost overruns resulting from construction of large new nuclear power plants in the prior decade, high-priced long-term power contracts signed under the New York's "six-cent" electricity law, and other costs (such as taxes, land, and labor costs) associated with building, owning and operating power plants in the state.[15]

Some of the largest industrial customers in the state, in particular, began to press for rate relief and other changes in the industry. In the first half of the 1990s, their retail rates (like those of other New York customers) were much higher than average electricity rates in the U.S. (See Figure 1.) Industrial customers were becoming increasingly effective in their demands for reforms because they could "escape" the local electric company's service by installing generating units on their own sites to produce their own power. Their threat to "leave" the local utility in many cases led to something less than full on-site generation: many large customers were able to enter into contracts for lower retail prices with their local electric utility.

Figure 1



Source: EIA, 826 Database.

These events raised larger policy questions for state regulators. One was how to use regulatory tools to create better incentives for efficient production of power and more cost-effective generation investment choices that did not shift so much risk onto ratepayers. Another was to assure that any changes put in place to help large industrial customers with competitive options did not introduce large rate increases for smaller customers (like households) with few if any competitive options. Both of these factors influenced regulatory attention toward identifying ways to make the generation portion of the electricity business more competitive – both from a power production efficiency and from a supplier diversity point of view. Regulators had to address these concerns while also assuring that the reliability of the electric system remained high, and while managing utilities' concerns that changes to introduce greater generation-related (or wholesale) competition would leave them with large stranded costs (i.e., unrecovered investment made on behalf of customers who left the system or bargained for discounted rates).

In recognition of these "competitive options" and a desire to create stronger incentives for promoting economically efficient power supply, state and federal regulators began to introduce structural changes in the industry. New York regulators, utilities and other stakeholders worked on a redesign of key elements of the industry to rely more on market forces. During the mid-1990s, the NY PSC sponsored a series of workshops, investigations, and regulatory proceedings in order to determine ways to support greater reliance on market forces in the state's electric industry (especially regarding power supply).[16]

The actions taken in New York were similar to those taken in many states[17] (including many close to New York such as New Jersey, Pennsylvania, and five of the six New England States) with high retail electricity prices in the late 1990s. New York regulators introduced a number of changes intended to move towards a future in which utility regulators relied more on market forces than administrative proceedings to better discipline costs in the power industry.[18] These changes were complex, and together:[19] (a) allowed greater choice for customers in determining what entity would supply their generation services over wires that would continue to be owned by the existing electric utilities; (b) encouraged vertically integrated, investor-owned utilities to divest their power plant assets so as to separate the competitive generation functions away from the monopoly wires functions;[20] (c) required the existing electric distribution utility to remain "supplier of last resort" for retail customers; (d) streamlined the regulatory process for siting generation and transmission facilities; and (e) established an independent grid operator to manage the operations of the grid and wholesale electricity markets in a non-discriminatory way.[21]

In parallel,[22] Congress introduced some of the early foundations for increased competition when it adopted the Energy Policy Act of 1992, which established several provisions favorable to wholesale markets. Building off of this new federal law, the FERC issued a number of regulations intended to support greater reliance on market mechanisms in the parts of the electric industry deemed to be capable of competition (e.g., generation) and to open up certain "bottleneck" facilities (e.g., high voltage transmission lines) that were needed to enable competition to occur. In 1996, FERC issued seminal rules ("Order 888"[23]) requiring all transmission providers in the U.S. – which included New York's investor-owned utilities – to

provide open access to their transmission systems in order to allow non-utility generating companies the opportunity to compete with utility-owned power supply. The regulations also encouraged the establishment of "independent system operators" ("ISOs") as a principal means to accomplish such open-access transmission.[24]

Planning for NYISO

In the second half of the 1990s, New York's transmission owners began to plan in earnest for the establishment of an independent grid operator, and filed with FERC a proposal to do so in 1997.[25] (The proposal fell under federal jurisdiction (rather than state regulation) by virtue of FERC's role in wholesale (or sales for resale) activities.) The transmission owners' proposal included several elements designed to satisfy both state and federal policy requirements:

- It would dissolve the NYPP and replace it with a new independent institution, the "New York Independent System Operator";
- A new organization (the New York State Reliability Council ("NYSRC")) would be established to develop reliability standards for the system, with which NYISO would have to comply;
- NYPP's prior reliability and generation-dispatch functions would be transferred to NYISO, with NYISO serving as the "control area operator" (a function traditionally performed by electric utilities) and backed up by a set of agreements transferring certain areas of operational control from the transmission owners to NYISO;
- A new consolidated regional transmission tariff to price access to and use of the transmission system, designed to recover the transmission owners' costs, and to be administered by NYISO on an non-discriminatory basis;
- NYISO would have a new governance structure with an independent board of directors unaffiliated with any market participants in New York's power market;
- While the NYISO board would have ultimate responsibility for the operation of the ISO, the administration of the ISO tariff, and the ISO budget, the various participants in the New York power markets would be able to participate formally in reaching decisions through collaborative committee structures,[26] but with ultimate decision-making resting with the NYISO board of directors in the event that the committee structure did not reach acceptable levels of consensus;
- A set of centrally-administered, bid-based electricity markets (including a power exchange for short-term energy markets) whose prices would vary according to location on the grid and congestion conditions at any point in time; and
- New wholesale power-supply rules that would allow market participants the ability to obtain power supply either through the power exchange and/or through bilateral contracts.

Thus NYISO would differ from the NYPP in many ways, as shown on Table 2.

In their filing, the New York transmission utilities identified several components as the "interrelated and essential"[27] elements at the heart of the design of the new wholesale power market system in New York: (1) the use of locational-based marginal pricing ("LBMP"); (2) the use of a two-settlement process for establishing schedules (for dispatching power plants to meet loads) and energy prices for the day-ahead and real-time markets; (3) the ability of the ISO to use a centralized unit commitment and dispatch based on the bids of market participants; (4) the existence of the NYSRC to establish reliability standards for the bulk power system in the state; and (5) a governance structure to ensure the independence and effectiveness of the ISO board. Together these elements were proposed to improve the efficiency of the wholesale electricity markets while maintaining the reliability of the grid, for the economic benefit of consumers of electricity in New York State.

Establishing NYISO

The FERC approved the NYISO proposal in a series of orders in mid-1998 and early 1999.[28] NYISO formally took over operational control of the bulk power transmission system and the dispatch of generation in New York State from NYPP and New York's transmission owners on December 1, 1999.[29] (Table 3 shows a timeline leading up to this event.) With this new role for NYISO, the administration of the wholesale market changed in design as well as in institutional form. As stated by NYISO in its first Annual Report in 2000, its mission was clear: "to ensure the reliability of the New York State power system; operate New York's transmission system and wholesale electricity markets in order to facilitate open, fair and effective competitive markets; improve regional cooperation for operations and planning; and meet or exceed customer expectations in all areas."[30]

Table 2

Comparison of Functions and Responsibilities Under New York's Restructured Electric Industry

NYPP functions:	**NYISO functions:**

▪ Tight power pool – up until 12-1-1999
▪ Reliability functions without centralized economic dispatch, with:
  o NYPP non-centralized unit commitment (i.e., dispatch)
  o NYPP arranged short-term trades among utilities, with benefits shared using "split savings" approach
	▪ Independent system operator – after 12-1-1999
	▪ Reliability functions with centralized dispatch based on generator bids (i.e., spot markets)
	  o Centralized unit commitment for all power plants – with single clearing price markets
	  o Location-based marginal price ("LBMP")
	  o Co-optimized energy and reserves
	  o Non-discriminatory access to transmission
	▪ Transmission tariff administration (including access to transmission, interconnection service, planning, and transmission congestion contracts)
	▪ State-wide reliability planning, coordination of O&M schedules
	▪ Market participants (including transmission owners and others) involved in "shared governance"

Other elements of industry structure:	**Other elements of industry structure:**
▪ Predominantly "utility industry" model, with vertically integrated, investor-owned electric utilities regulated by the NY PSC ▪ Many municipal electric utilities, and state public authority (NYPA) ▪ Distribution utilities provide bundled electricity service to retail customers (who had no ability to choose their provider of electricity) – under state policy ▪ Utilities control others' access to transmission ▪ Utilities conduct own plans, operations and maintenance ("O&M") schedules ▪ Investment and energy costs recovered in utility rates – with rates typically based on cost of service principles ▪ Utilities sign bilateral contracts with power suppliers (including independent power producers)	▪ Predominantly "restructured" industry model, including much divestiture of generating assets by utilities – with certain delivery functions, retail generation service and other activities of investor-owned utilities regulated by the NY PSC ▪ Many municipal electric utilities, and NYPA (and eventually, the Long Island Power Authority ("LIPA")) ▪ Generation investment, O&M expenditures, fuel, taxes, labor and other energy costs recovered in wholesale market prices ▪ Mix of generating resources supplied through wholesale spot market and bilateral contracts ▪ Retail choice allowed under new state policy, with customers required to take unbundled delivery service from the local utility but with the opportunity to buy generation supply from another entity; distribution utilities retain "provider of last resort" responsibilities to customers not migrating to another commodity supplier ▪ Stranded costs recovered through non-bypassable charges to retail customers ▪ State-mandated programs (e.g., energy efficiency, renewable energy requirements, low-income programs, air emissions) regulated by New York State agencies

Table 3
Timeline of Events Leading up to NYISO's Inception in 1999

	NY State's Utility Regulatory Environment	Events in Washington	Grid Operation Events
Pre-1990	1965: Formation of the NYPP, a voluntary association of 8 investor-owned and publicly owned electric utilities providing coordinated grid operations Post-1980s: Rising frustration over nuclear cost overruns (e.g., Shoreham), high-cost power contracts under NY's Six-Cent law, high electricity prices in NY relative to the national average Actions of the NY PSC to introduce market forces into the telecommunications and natural gas industries[31]	Efforts to introduce market forces into various utility industries (e.g., telecommunications, natural gas)	1965: Blackout of the Northeast Power system
1990-1994	Early 1990s: Growing frustration that NYPP's dispatch approach and split-savings pricing were no longer working well 1993: NY PSC investigates issues relating to electricity supply for large customers with "competitive opportunities" – with the desire to "seek ways the industry could be restructured in light of these options, taking account of the need to lower rates for all customers in order to spur economic development and to avoid jeopardizing safe and reliable electric service"[32] 1994: NY State coincident summer peak: 27,206 MW[33]	National Energy Policy Act of 1992 enacted by Congress, authorizing various elements of competitive framework in wholesale power industry in the U.S.	
1995-1998	1995-1996: NY PSC Order describing "vision" for principles of a competitive electric industry in NY State 8 major utilities that own transmission assets and run the NYPP remain the core electric industry players in New York	1995-1996: FERC "Order 888," adopting final rules requiring "open access" to transmission facilities by all transmission providers	Jan-1997: New York transmission providers file proposal to form NYISO in response to FERC Order 888 and NY PSC's competitive opportunities proceedings June-1998: FERC conditionally approves establishment of NYISO, in compliance with FERC Order 888
1999	Over the course of 1998-1999, divestitures of a significant portion of the generating capacity owned by NYSEG, O&R, NIMO, ConEd take place via sales to other companies 1999: New NY State coincident summer peak: 30,311 MW[34]	Dec-1999: FERC adopts "Order 2000" and the criteria for Regional Transmission Organizations to help support markets	Jan-1999: FERC approves NYISO tariff, as well as market-based rate authority for wholesale power sales Dec-1999: NYISO takes over responsibility for NY's bulk power market

ASSESSING HOW NEW YORK'S FIRST DECADE UNDER NYISO OPERATIONS MEASURES UP: Results

Overview

During the first ten years of its existence, how has NYISO (and New York's larger *wholesale* electricity market) lived up to its hoped-for benefits for consumers? Have the changes that have taken place since NYISO began to administer the operations of New York's electric grid and wholesale power markets at the end of 1999 led to noticeable outcomes in line with the original expectations? Even recognizing that the intent of restructuring was to help address New York's relatively high *retail* electricity prices through structural and operational changes designed to improve efficiencies in the reliable operation of the state's generating resources and transmission grid, how have the *wholesale* markets and operations performed in the past decade?

Determining the "success" or "failure" of a restructured system or organization is never easy – for any number of reasons. Arguably the thorniest problem is that no one can ever know with certainty what would have happened in the absence of the changes that were introduced. If we observe, for example, that prices increased over the past decade, would they have increased at the same levels, lower levels, or higher levels in the absence of the changes introduced in 1999? If billions of dollars of investment in new power plant capacity occurred in New York over the past decade, would there have been more or less today if the electric industry had remained as it was organized prior to 1999? Not being able to answer such questions creates inherent limitations as we try to evaluate "success" or "failure."

Even so, there are some useful ways to assess outcomes over the past decade and NYISO's performance related to them. We can start with the original goals, identify some relevant metrics that could shed light on how things have turned out relative to those goals, and then examine quantitative and qualitative information relative to those metrics. Such an analysis can provide insights into how well New York's high-voltage power system and wholesale electricity markets are performing a decade later, as well as point to areas where continued evolution and progress might be needed.

This approach will necessarily introduce attention to issues that are beyond the scope and control of the NYISO and its role in wholesale market administration. This happens because New York State's goals for restructuring its *overall electric industry* focused on reducing electricity prices to customers (i.e., the retail price of electricity), while the objectives for establishing the *NYISO* were indirectly supportive of this larger goal. NYISO's scope is not synonymous with the scope of restructuring of the entire industry, and only certain aspects of the changes that have occurred over the decade are attributable to the actions (or inactions) of NYISO. Additionally, there are factors that affected wholesale power markets that were well outside of the scope of influence of the NYISO; these include such things as the share of bilateral transactions in New York's wholesale markets; the level of property and other taxes that affect the power industry; the cost of input fuels to power generation; the technology choice of generator investors; and others.

In the remainder of this report, the analysis views NYISO's first decade through three lenses. The first takes as its starting point the goals and objectives which underpinned NYISO's creation, and then uses a variety of sources of information to examine outcomes relative to these goals. In this first part of the assessment, there is a table listing the original goals with a summary explanation of how this report evaluates, analyzes or otherwise comments on what has happened with regard to each goal or objective. (See the following section of this report.) Various charts and graphs rely on public data to evaluate outcomes.

Secondly, the report assesses performance by focusing on the structure of the electric industry, including NYISO's operational approaches and the New York wholesale power market design. As it turns out, there is actually a high degree of overlap between some of the original goals and expectations for introducing market forces into New York's wholesale power markets and more traditional economic measures that are relevant for evaluating a competitive market's performance generally. The report includes a table that lists these structural elements of well-designed markets and compares each element to those that exist in the system administered by NYISO.

The third part of the assessment focuses on NYISO itself as an institution and how NYISO has performed in carrying out the responsibilities it was given in 1999 and thereafter. Whereas the first two parts of the assessment focus on outcomes in New York's bulk power electric system and on some of their implications for customers and other participants involved in or affected by New York's electric industry, this third part focuses more narrowly and specifically on how the NYISO has done its job from an organizational and execution point of view.

Before viewing NYISO in these three ways, a brief summary of the key events in the first decade of NYISO's existence is presented. This high-level summary is then amplified further in the rest of the report.

Timeline of Events in NYISO's First Decade: 1999-2009

After NYISO assumed responsibility for coordinating the operations of New York's bulk power electric system at the end of 1999, many notable events occurred over the following decade. These are summarized in a high-level fashion in Table 4.

From the beginning, NYISO's original sponsors and then NYISO itself have developed institutions, structures, processes and rules to support reliable grid operations and a vibrant, competitive wholesale electricity market. NYISO has viewed itself as a grid operator with two responsibilities: assuring that the lights stay on, while also introducing and implementing market rules that keep wholesale prices as low as possible.

Table 4
Timeline of Events Relating to NYISO: 1999-2009

	NY State's Utility Regulatory Environment	Energy Policy Events in Washington	Grid Operation Events
1999	NY State summer peak: 30,311 MW[35] New companies begin to enter NY's power industry as they purchase generating assets divested by utilities 8 transmission owners remain key players in industry		Dec-1999: NYISO takes over responsibility for NY's grid, with two-settlement Day-Ahead and Real-Time Energy Markets, with co-optimized Ancillary Services markets in the Day-Ahead Market; Installed Capacity Market; and Transmission Congestion Contract market
2000-2004	2000: NY SRC sets an 18% installed reserve requirement Summer 2000: 3% of retail customers have migrated to an alternative supplier (3% for residential, 5% for non-residential)[36] 2000: NYISO Market Participants = 120 Sept-2001: Terrorist attack on the World Trade Center 2001: Amendments to NY Article X 2002: State Energy Plan	Jul-2002: FERC opens rule-making on Wholesale Power Markets ("Standard Market Design" ("SMD")) Apr-2003: FERC White Paper on Wholesale Power Market Platform	2001: NYISO successfully operates the grid in the wake of the September 11th attacks on NYC 2002: NYISO and ISO-NE discuss merger 2003: Northeast Blackout starts in Ohio and interrupts power in NY; NYISO restores power within 30 hours 2003: NYISO establishes Demand Curve for Installed Capacity Markets 2004: NYISO establishes Comprehensive Reliability Planning Process
2005-2009	Summer 2005: 7.4% of retail customers have migrated to an alternative supplier (36.4% of total retail sales) (55% of non-residential sales; 8.5% of residential sales)[37] Summer 2005: New NY State system peak: 32,075 MW[38] 2005: Net increase of 5,085 MW of new power plant capacity added since 2000 Summer 2006: New NY State system peak: 33,939 MW[39] 2006-2007: NY PSC proceeding on utility supply portfolios (including bilateral supply contracting) 2007: NY SRC requires Reserve Margin of 16.5% over summer peak[40] 2008: 367 NYISO Market Participants 2008: NY PSC order on utility energy efficiency programs Summer 2009: 18% of retail customers have migrated to an alternative supplier (46% of total retail sales) (62% of non-residential sales; 18% of residential sales)[41] 2009: New York State publishes its new Energy Plan 2009: 2,147 MW of demand response signed up, and 1,274 MW of wind capacity is built[42] 2009: NYISO's 10th year Anniversary	2005: Congress enacts national Energy Policy Act authorizing various elements of competitive framework in the wholesale power industry in the U.S., and introducing requirements for mandatory reliability standards for electric companies Feb-2007: FERC issues "Order 890," addressing long-term transmission planning and integration of clean energy resources Feb-2007: FERC issues series of orders adopting mandatory reliability standards for electric system operators Oct-2008: FERC "Order 719" establishing new policy on RTOs market monitoring, stakeholder involvement, and demand response	2005-2006: NYISO discusses potential merger with neighboring RTOs (ISO-NE, PJM) 2005: NYISO implements "SMD2" software allowing common platform for full co-optimization of the Day-Ahead and Real-Time energy markets 2005: NYISO issues its first Reliability Needs Assessment 2005: NYISO implements scarcity pricing for reserves 2008: NYISO implements long-term transmission congestion contracts 2008: NYISO implements Demand Response for Ancillary Service markets 2008: NYISO Implements wind forecasting into the Day Ahead and Real Time energy market dispatch 2008: Northeast Power Coordinating Council finds that NYISO has met the new mandatory reliability standards adopted by FERC 2009+/- NYISO participates in the "CARIS" (Congestion Analysis and Resource Integration Study) and the Eastern Interconnection-wide transmission planning process

NYISO's intention has been to operate a system that supports these two responsibilities by: sending appropriate price signals associated with electricity production and delivery, and providing information about the cost of supplying service at different times and places; encouraging investors to compete and to locate generation, demand response or transmission close to demand centers; creating incentives for suppliers to increase the efficiency of power production and fuel use; valuing supply of energy based on varying conditions in the power system – with the highest prices occurring when reliability is most valued and in jeopardy; encouraging investment in diverse forms of technology and fuels; and placing risk of investment on the private sector, not consumers.

These core elements of NYISO's mission were part of the original market design established in the initial filings submitted by the transmission owners in New York, commented on by various interested parties, and ultimately approved by FERC. The original market design included the following attributes:

- Supporting non-discriminatory access to transmission and other bottleneck/essential facilities, with access provided by an entity that is independent of market participants (e.g., open transmission access and standardized transmission interconnection policies; access to reliability services; access to centralized markets without prohibiting bilateral transactions; and elimination of "pancaked" access charges for using the transmission system within the state);
- Various elements of efficient market design (e.g., single clearing-price markets, with location-specific prices (LBMPs); efficient dispatch policy; efficient bidding policies and practices; payments for performance; efficient transmission policy, with a uniform access price and transmission congestion contracts and security-constrained dispatch to accomplish efficient congestion management; co-optimized energy and ancillary services markets; elimination of some but not all barriers at seams; and unified region-wide high-voltage transmission tariff for all of NY State);[43] and
- Investment in software and hardware systems as needed to enable implementation of enhanced real-time unit commitment and dispatch to help make the day-ahead and real-time energy markets converge.[44]

Even with these original market design elements at the outset, however, there were a number of issues that were identified as needing attention in order to improve the combined efficiency of the wholesale markets and reliability of the grid. For example,

- On issues relating to the siting of new power projects, many observers believed early on that New York would benefit from enhanced siting laws. The state legislature adopted power plant and transmission siting laws that facilitated the processes to determine whether to approve proposals to site facilities in particular locations;[45]
- The "central-east" transmission constraint – the interface between Western New York, PJM and Canada to Eastern New York and New England – was thought to be "likely the most economically significant transmission interface in the Northeast" and "responsible for the majority of the congestion costs produced in the New York market."[46] For a variety of

reasons, this constraint still exists, but considerable new power generation has been sited on the congested side of the constraint, thus reducing its impact on prices in New York;

- Facilitating significant demand-side response to wholesale prices was identified early on as a means to "improve both the competitiveness and reliability in the New York markets during peak demand conditions."[47] A growing level of demand-response resources has successfully taken place over the decade;
- Regarding efficiency improvements of regional Northeast markets that might accrue to the benefit of customers in New York, "considerations have prevented market participants from bidding external transactions to fully utilize the interfaces. These considerations include tariff provisions and conflicting market rules that hinder external transactions."[48] The "seams" issues has been an important issue for many Market Participants for some time, but it has yet to be fully resolved. Recently, resolving the seams issue has become a priority of the NYISO.

Part 1: Comparing Goals and Aspirations for NYISO with Outcomes

The first lens used here to assess NYISO's first decade focuses on a comparison of actual outcomes against the original goals and objectives that underpinned the establishment of NYISO as part of New York's restructured electric industry. Care is needed – and has been taken here – in attempting to discuss metrics for evaluating success in a way that focuses on things that the organization (NYISO) can control. Clearly NYISO has been in a position to influence some but not all of the factors that would account for success in accomplishing the outcomes that were hoped-for a decade ago. This report will try to identify circumstances where outcomes were within versus outside of NYISO's zone of influence. Table 5 summarizes the goals and objectives that were previously shown in greater detail in Table 1, and serves as a roadmap to this first part of the assessment.

Table 5
Summary of Goals for the Restructuring of New York's Electric Industry

- Keeping the lights on reliably;
- Reducing New York's electricity rates, especially relative to average U.S. rates;
- Relying on market forces to discipline generation-related costs, and in turn, prices, (to shift investment risk, minimize cost overruns, produce power more efficiently, provide means to afford customer choice, introduce more supply options for customers (including demand response), and assure adequate market information and oversight);
- Introducing structural changes in the overall electric industry to accomplish these goals (through providing "open access transmission," introducing new players in the market, establish an independent system operator, monitoring markets, and providing transparent pricing and planning information);
- Providing means to allow recovery of potentially stranded costs;
- Assuring support for state-mandated environmental and other policies;
- Involving others besides utilities in the governance of the electric system; and
- Assuring that all customers had access to electric service.

Source: NY PSC, Competitive Opportunities Order, pages 25-30.

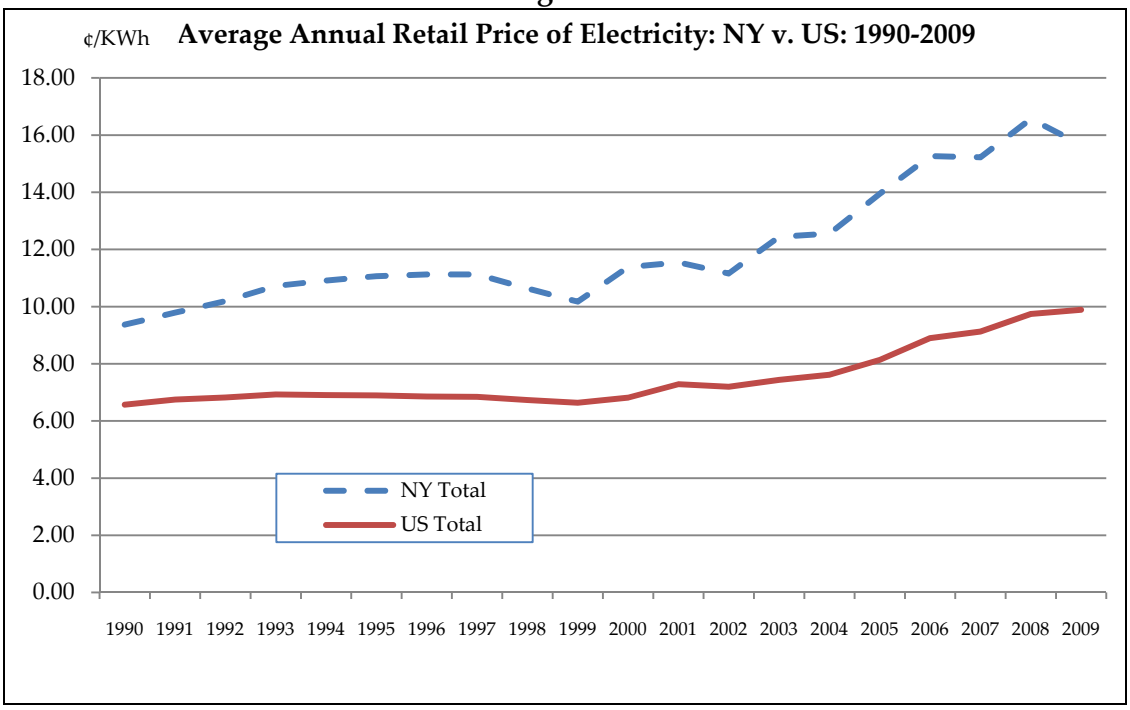
Electricity Bills and Prices

Retail Electricity Rates and Consumers' Electricity Bills

A decade ago, New York's retail electricity rates were among the highest in the nation. (See Figure 1 for New York's relative prices in the mid-1990s, when many in New York were demanding reforms to address this situation.) From the end-use customers' point of view, the relevant question is what has happened to their overall electricity bill, not simply the wholesale component of rates. The impetus for electric industry restructuring, after all, was very much focused on addressing prices to consumers, even if many of the structural reforms (like the establishment of NYISO) were aimed at improving efficiencies in the wholesale power component of bundled rates. Because so much of the original (and continuing) interest is focused on retail rates, this report examines what happened to them in the past decade. That said, the important focus of attention on NYISO's performance is properly on wholesale rates, since that is its domain. (Those issues are discussed below.)

There is no avoiding the fact that in the last decade electricity prices have risen throughout the country, as shown in Figure 2. Price increases have both occurred in states (like New York) that restructured their electricity industries, and those that did not.[49]

Figure 2



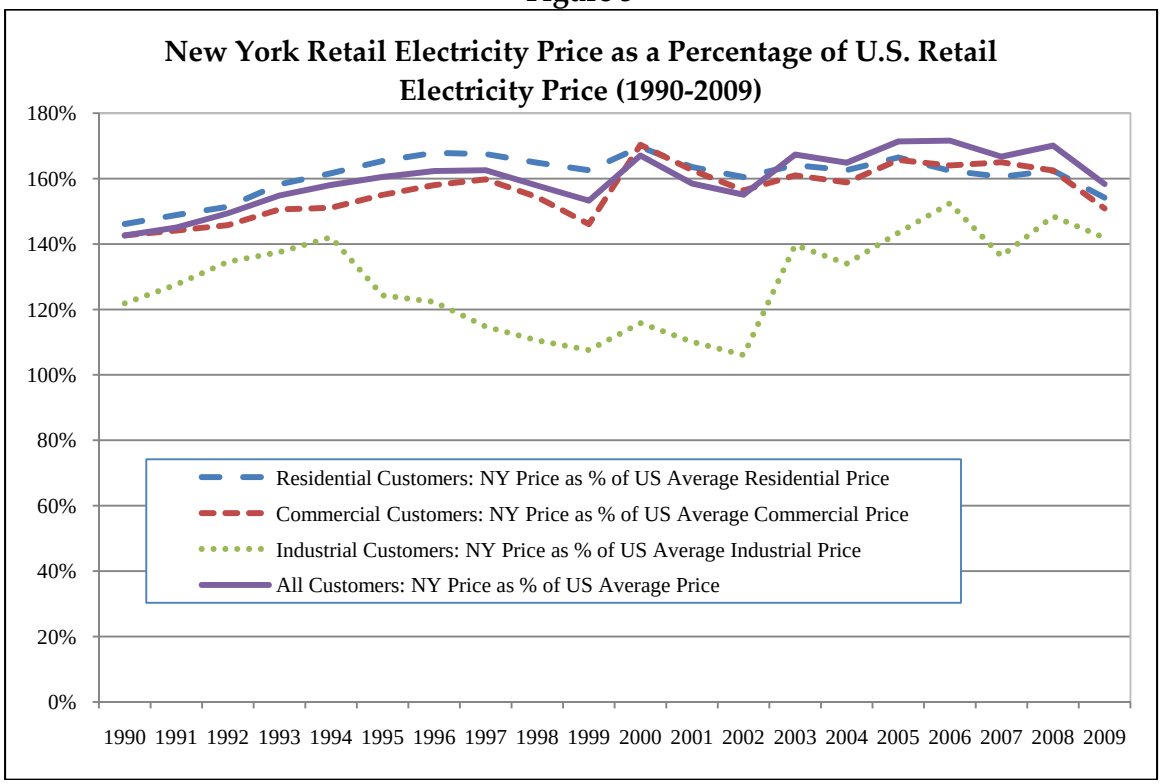
Source: EIA, 826 data.

Just as New York had among the highest retail electricity prices in the nation prior to restructuring its electric industry, it has remained a state with relatively high electric rates throughout the past decade as well. The price gap, therefore, is quite tenacious, and reflects an array of factors outside the control of the NYISO, the electric utilities or even other market

participants. These factors include high taxes, high labor costs, high land prices, strict environmental policies, an electricity supply mix that reflects relatively clean fuels (e.g., natural gas), and more.

As shown in Figure 3, the all-in average annual retail electricity price (rate) charged to New Yorkers has fluctuated from year to year, but has always been above the average U.S. price when observed on this basis. Industrial customers enjoyed a relative dip in rates for a number of years starting around 1994 – in part as a result of discounted electricity contracts starting in the mid-1990s, and in part as a result of competitive opportunities they enjoyed with customer choice.[50] Over the course of the decade of retail and wholesale competition in New York, however, the relative improvement in electricity rates enjoyed by industrial customers compared to average U.S. industrial prices was eroded, partly due to the effect of rising natural gas prices on power prices in New York and elsewhere (see further discussion, below).

Figure 3

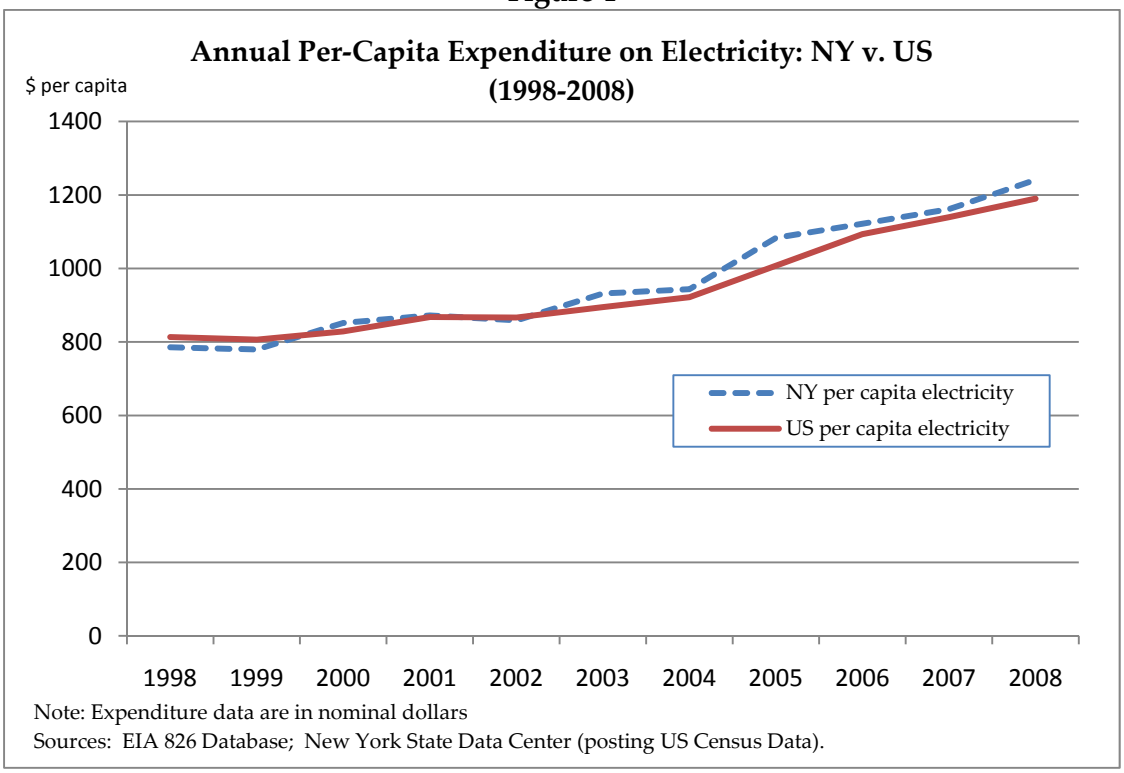


Source: EIA, 826 database.

Electricity prices rose everywhere in the U.S., and New York's residential and commercial customers' prices have remained relatively stable relative to the national average price during the past decade of competition. For small customers, these ten-year trends reflected a combination of influences, including the fact that most[51] residential customers remained on the utility's basic bundled service (which was subject to agreements that kept these rates relatively stable for a number of years) and that the utilities used a variety of techniques to assemble a diverse supply of electric resources for those customers taking commodity supply service from their utility (also known as basic service).[52]

The relative gap in *retail electricity rates* (or retail prices) only tells part of the story of how much New Yorkers have spent on their *electricity bills* in the decade since the electric industry was restructured. As shown in Figure 4, New Yorkers spent approximately the same amount per year on a per-capita basis as the average American – meaning that while electricity *prices* in New York are higher, New Yorkers use less electricity and so their total electricity expenditures are quite comparable to the U.S. average, and have been over the past decade.

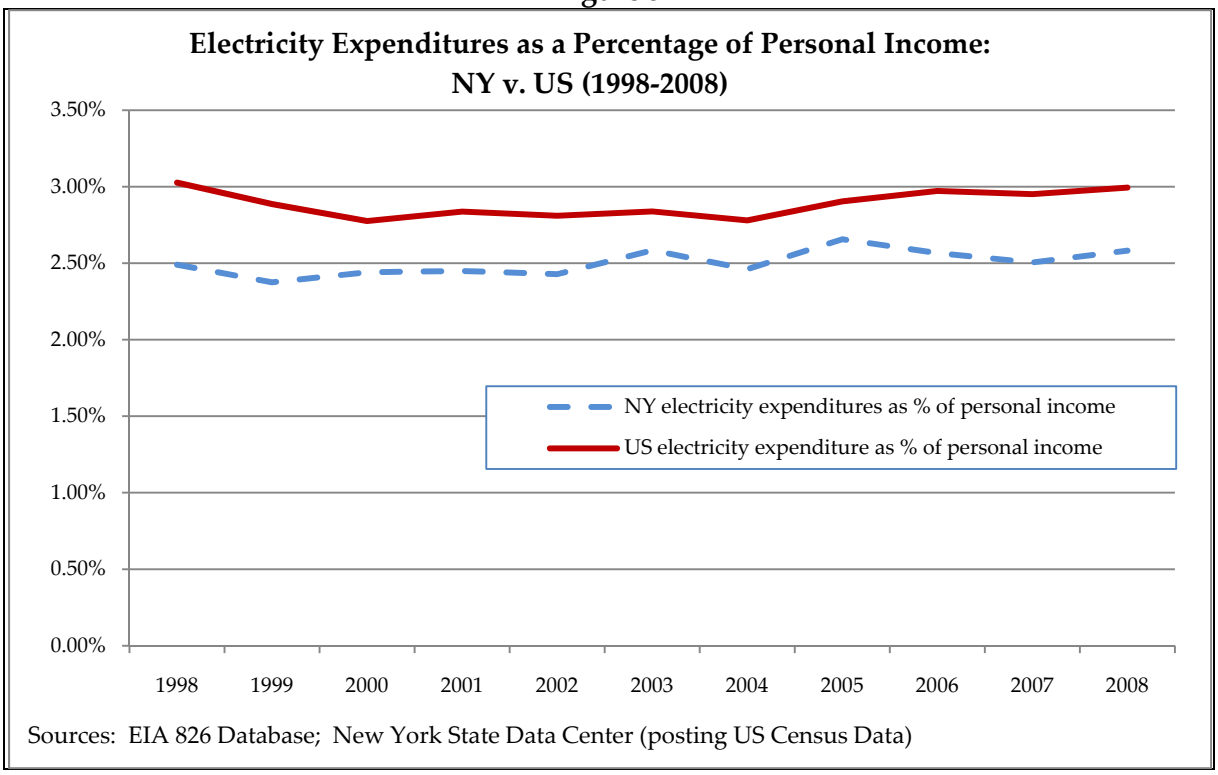
Figure 4



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

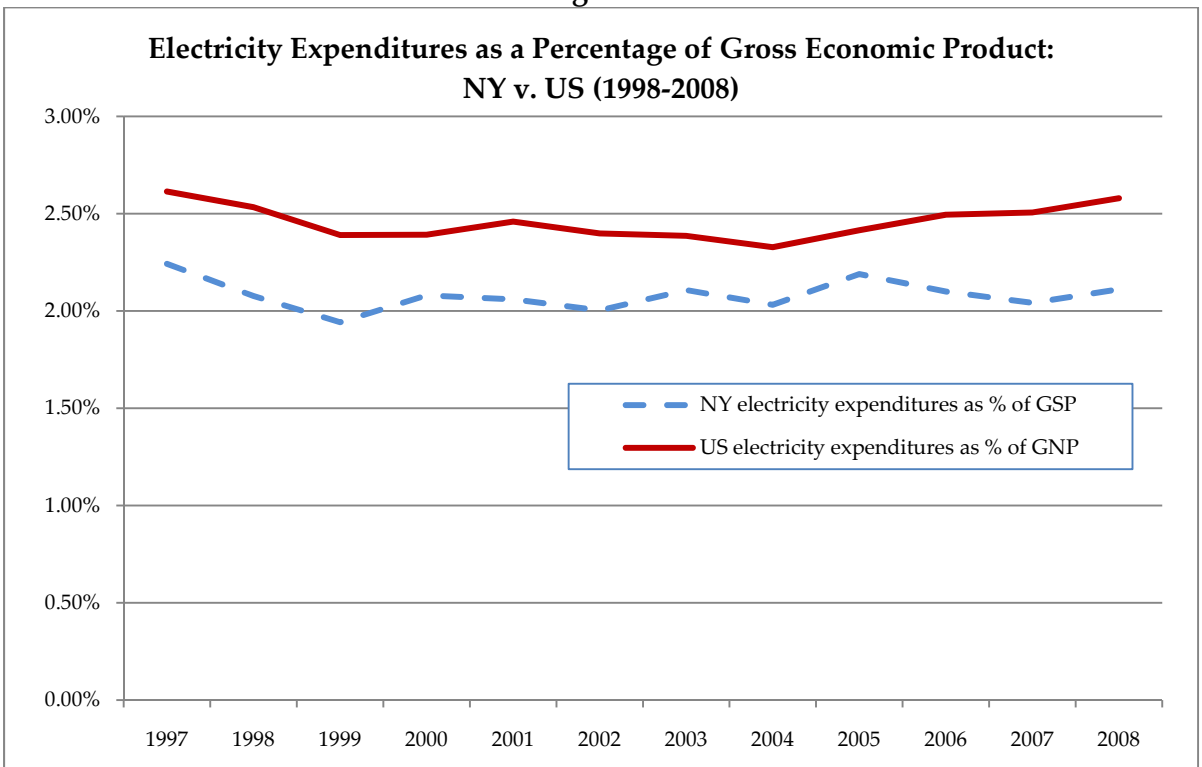
Furthermore, New Yorkers spend less on electricity as a percentage of their personal income and their state's gross economic product, as compared to the U.S. on average. (See Figures 5 and 6.) Again, these point to the fact that while the gap between New York's electricity prices and average U.S. prices has remained wide and persistent, New York's overall energy use per unit of economic activity in the state (and in terms of average household expenditures) is favorable compared to other parts of the nation. This results from many factors (such as state energy efficiency policies, and the price-elasticity effect on consumers' use of electricity) that are outside the control of the NYISO, to be sure. But these realities are just as important to mention as those that adversely impact New Yorkers' electricity budgets, even though the two seem to offset each other to a large degree. New York's economy uses electricity relatively efficiently, which should be understood as a strength of the state's electric system. This characteristic seems just as important to trumpet as the state's high unit price of power. Together, these factors result in New York consumers having surprisingly average-sized electricity bills.

Figure 5



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

Figure 6



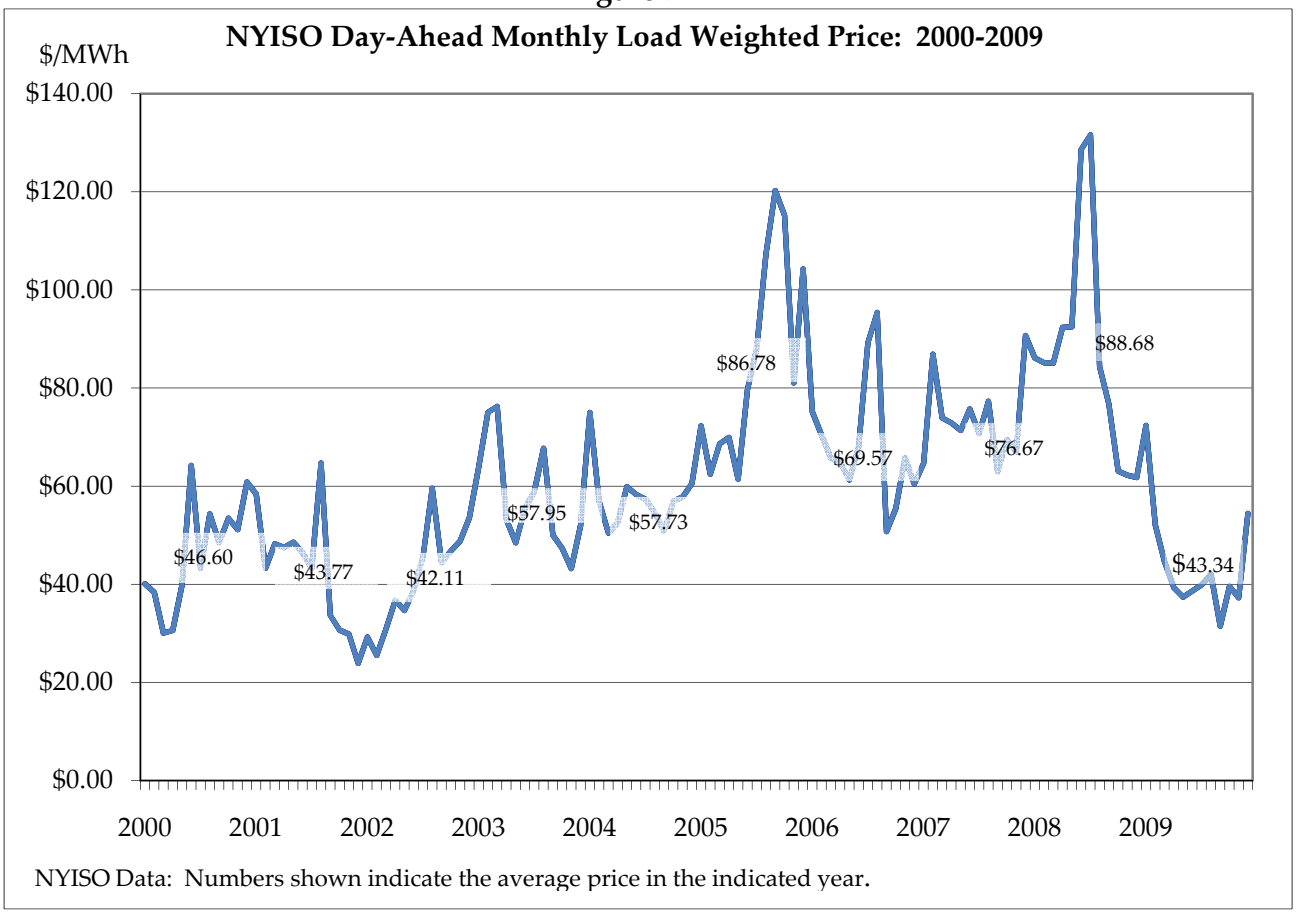
Sources: EIA 826 Database; New York State Data Center (posting US Census Data)

Wholesale Electricity Prices and Rates

The prior discussion of electricity prices and electricity bills has focused on the bottom line of what New Yorkers pay for their power. To be fair in this assessment of NYISO's performance, however, this analysis should highlight the portion of the electricity price (and the customer's bill) that is associated with electric energy supply. NYISO's role resides in the wholesale power market – with responsibility over only a portion of the delivered price of electricity supply to consumers in the state.

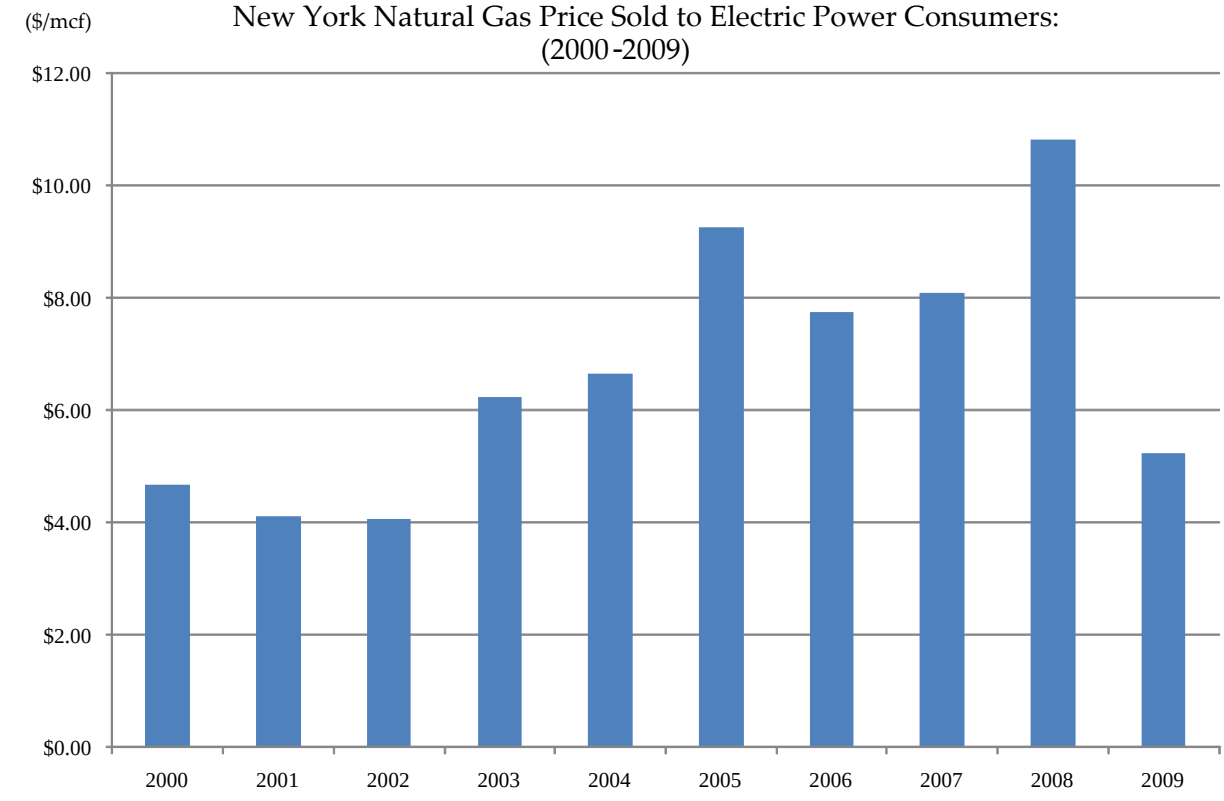
Wholesale prices over the decade have been highly variable, remaining relatively flat for several years after NYISO began to administer wholesale markets in 1999, rising thereafter through 2008, and then dropping substantially in the past year. (See Figure 7.) As described more fully below, natural gas has played an increasing role in electricity generation in New York – as it has in many other parts of the U.S. during the past decade. As a result, New York's electricity prices have become more sensitive to changes in natural gas prices. Comparing the NYISO wholesale electric prices (2000-2009) with the prices of natural gas to electric generators in New York State (2000-2008) (in Figure 8) shows the tight relationship that exists between the two. (See Figure 9.)

Figure 7



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

Figure 8



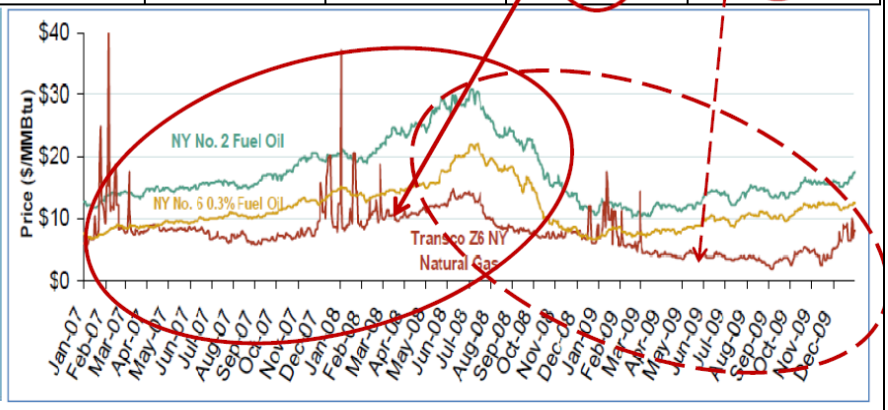
Source: EIA, natural gas price data, http://tonto.eia.doe.gov/dnav/ng/hist/n3045ny3a.htm.

While the overall share of total electricity produced from natural gas has remained relatively constant in New York over the last decade (with approximately 30 percent of power generated at natural-gas plants in 1999/2000 and in 2006/2007),[53] New York's energy prices tend to be disproportionally affected by the price of natural gas. This is particularly true in downstate New York (e.g., New York City and Long Island) where natural gas power plants set the price of electrical energy in virtually all hours of the year.[54]

One of the consequences of having New York's electricity prices tied directly to natural gas prices is that changes in the price of that fuel have a more rapid and pronounced effect in New York as compared to other regions – both from a negative and positive point of view. When natural gas prices rise, wholesale spot electricity prices in NYISO markets tend to rise; when natural gas prices fall, wholesale spot electricity prices in NYISO markets tend to fall. This can be seen in Figure 9, which shows wholesale price increases in three of New York's electrical zones from 2007 to 2008 (in parallel with increases in natural gas prices during the same period), and wholesale price decreases in those same electrical zones from 2008 to 2009 (in parallel with decreases in natural gas prices during that period).

Figure 9

	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%



http://www.ferc.gov/market-oversight/mkt-electric/new-york.asp; http://www.ferc.gov/market-oversight/mkt-snp-sht/2010/01-2010-snapshot-us.pdf

Economic Savings from Wholesale Power Markets

Analyzing New York's wholesale electricity prices in a way that takes into account (and "normalizes" for) the effect of changes in natural gas and oil prices is important in order to focus attention on the types of costs that New York's competitive wholesale markets can influence, versus those they cannot. Whenever assessing the performance of an entity, organization or policy it is important to focus on things that are under its control rather than attribute outcomes to factors beyond its influence. While the NYISO – through processes that involve Market Participants, state officials and federal regulators – has a degree of influence over its market rules, operating practices, and so forth, it is fair to say that neither NYISO (nor those Market Participants or public officials) can do much to control prices of natural gas in New York State.

Consequently, a significant proportion of the electricity price increases experienced by New Yorkers (and others around the country) in the last decade resulted from price increases in natural gas. And at the same time, the markets administered by NYISO have certainly led to more efficient production of electricity in New York.

NYISO has calculated the savings from the combined effect of its market rules, co-optimized market operations, its bid-based energy/ancillary service/capacity markets, the investors' introduction of more efficient generating capacity, improved power plant availability, the ability of demand response to discipline the overall level of prices in the markets, and other factors. NYISO has estimated that this combination of influences on the New York wholesale

power market has produced lower electricity costs, after controlling for the changing prices of input fuels (especially natural gas) that rose significantly since 2000. In other words, if fuel prices had not risen, then wholesale electric prices would have dropped over the first ten years of NYISO operations. (This is also known as reviewing electricity prices after "normalizing" for the effect of changes in fuel prices.)

In its 2009 Power Trends report, NYISO provided the following figure (Figure 10), and explained that between January 2000 and August 2008, fuel-adjusted wholesale electricity costs decreased by 10 percent.

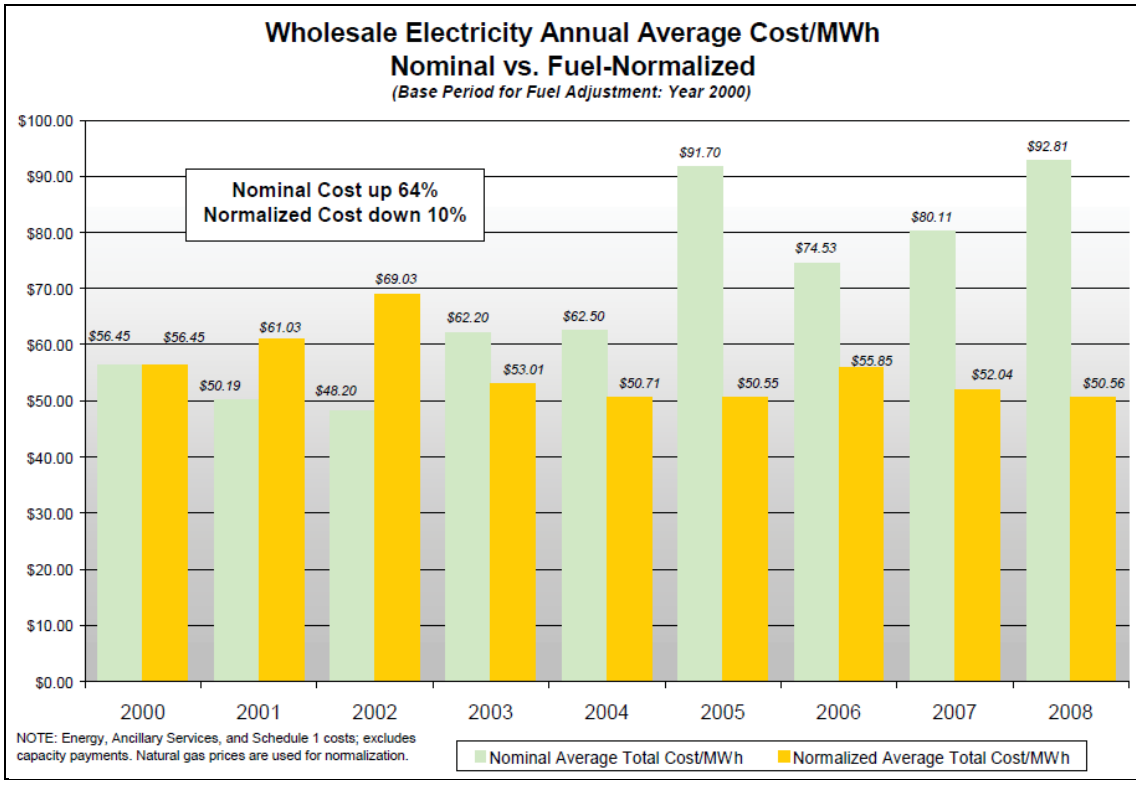
> This amounts to annual cost reductions of approximately $1.2 billion in today's dollars. During periods of increased usage, relatively more expensive units are often called upon to meet the increased demand. Nearly 70% of the time, these generating units are fueled by natural gas or oil. As long as the state remains so heavily reliant on natural gas and oil to produce power, wholesale electricity prices will be tied to the price of these fuels. Recent price trends highlight this connection. Between the summer of 2007 and the summer of 2008, while natural gas prices rose by 60%, wholesale power prices increased by 48%. More recently, between June 2008 and November 2008 as natural gas prices decreased by 45%, wholesale electricity prices in New York declined by 54%. Given this correlation, based on current oil and gas price forecasts by the U.S. Energy Information Administration and other independent analyses, New York consumers should see lower electricity prices in 2009.[55]

And indeed, prices did go down in 2009, as shown in Figures 2 and 3 (above) and Figures 10 and 11 (below).

Some Final Observations About Economic Savings and Electricity Prices

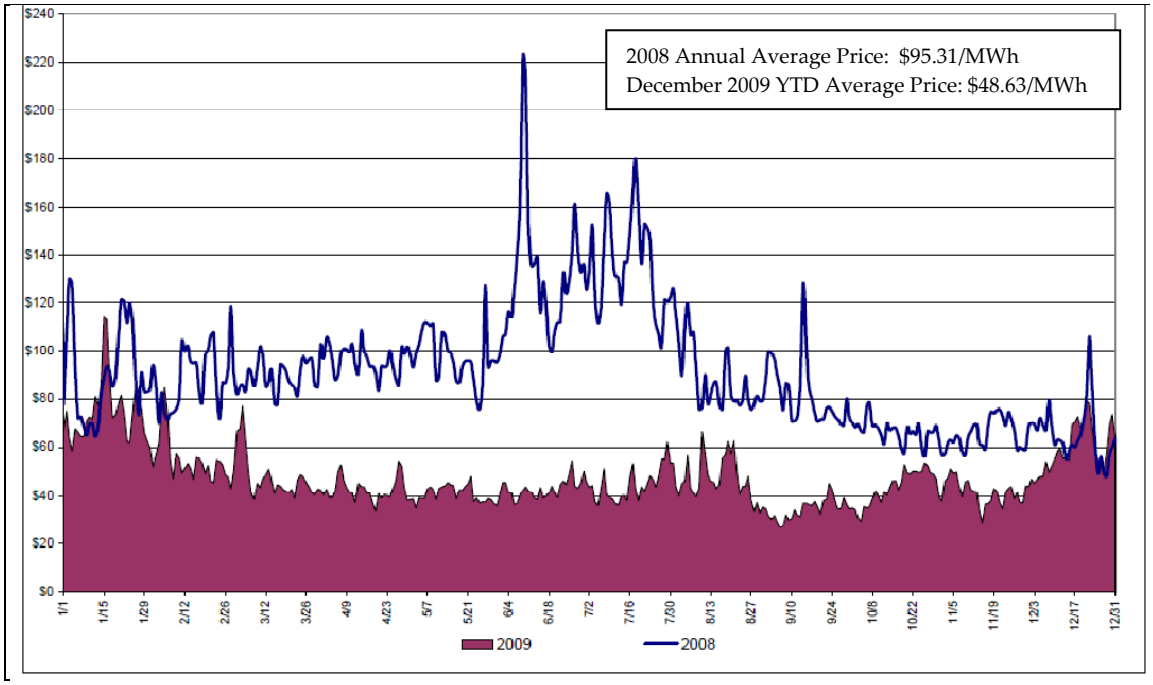
New York's electric industry is heavily influenced by events in natural gas markets. This is due in part to the types of generating units added in the past decade, and also because of market design. Even if New York had not restructured its electric industry when it did in the late 1990s, it is hard to imagine that the state's electric industry would have ended up with substantially different *types* of power plants added over the past decade. This seems likely, just knowing that by far the predominant types of new power plants added in the U.S. were those that burn natural gas or use renewable energy (like wind projects) in a mix that does not look too different than the last decade's capacity mix (discussed further below).[56] Furthermore, New York State's relatively strict environmental permitting requirements, its air-pollution control policies, and public attitudes about nuclear power plants would have made it difficult if not impossible to add anything besides gas-fired or renewable power projects – thus making the state inherently susceptible to the volatility of natural gas prices in recent years.[57]

Figure 10



Source: NYISO, 2009 Power Trends, page 9.

Figure 11
Daily NYISO Average Cost per MWh - Energy & Ancillary Services



Source: NYISO President's Report, Management Committee Meeting, January 20, 2010, page 4-A.

Thus, it seems fair to set aside the impacts of high natural gas prices on electricity prices and observe that New York's wholesale power market has produced savings over the past decade. *This view is shared and was in fact voiced voluntarily by most of the observers interviewed for this assessment.*

That said, it is also true that a high degree of frustration still colors public attitudes about high electricity prices in New York State.[58] This frustration is often directed at NYISO due to a sense among many observers that "markets" – rather than customers – see the benefits of power production efficiency gains. Although economists will tend to say that a more efficient market will produce savings for consumers relative to a less efficient market, many of New York's Market Participants and external observers raise concerns about whether consumers (rather than owners of generators) are seeing an adequate share of the savings.

When many Market Participants say, as they increasingly do, that they believe "NYISO has experienced significant problems and in several areas had not met the expectations that gave rise to its formation,"[59] they seem to be saying, in effect, that *customers* are not seeing a sufficient share of the benefits from more efficient production of and investment in electric energy systems. These same Market Participants view New York State's wholesale market design as better than in any other region of the U.S. They recognize that today's system – including its "co-optimized unit dispatch," its open-access transmission arrangements, its location-based energy pricing arrangements, and its transmission-congestion-contract model – produces efficient electricity production. But many are concerned with the composite effect of a number of features, including: capacity market payments in support of existing generators; allocation of costs to support NYISO operations that has reflected an 80/20 split between loads (i.e., customers) and generators; and a past approach to transmission planning that has, in their view, meant a reluctance to identify, introduce and support economical transmission investments in the state and between New York, New Jersey, and New England, that might better equalize prices for customers throughout New York and between downstate New York and neighboring regions.

To be sure, this is not an absolute consensus view – but it is one that is broadly shared by virtually all types of people interviewed for this assessment, except representatives of generating companies and, perhaps, by the NYISO Market Advisor who has pointed out in many of the recent annual "state of the market" reports that combined revenues across the various NYISO markets would not provide sufficient funding to induce new generating capacity to enter the market.[60] Clearly, though, there have been real consumer savings in New York State and yet there is still high frustration that consumers need to see more of the benefits of competition.

Surely this perspective results from the continuing gap between retail electricity *rates* in New York compared to the rest of the U.S. The gap remains wide and has not noticeably improved in the last decade; New Yorkers' annual expenditures on electricity have increased over the past decade. That said, the amount that New Yorkers pay for their electricity bills does not differ substantially from the average American's, on a per-capita basis. New Yorkers, in fact, spend a smaller share of their personal income on electricity than do average Americans; and New York

devotes a smaller share of its gross state product to electricity purchases as compared to the nation as a whole.

Much of this nuanced information about electricity prices is lost when the focus of attention is on the cent-per-kilowatt-hour ("kWh") price of electricity (whether retail or wholesale), rather than on total electricity payments. Given that electricity prices to consumers have increased in absolute (if not relative) terms over the last decade, it is understandable that many would question whether the core goal of electric restructuring – addressing New York's relatively high electricity prices – has been met. And given that an increasing percentage of New Yorkers' electricity dollars flow through the wholesale electricity markets administered by NYISO (see Figures 12 and 13), it is no wonder that so much attention is devoted to the question of whether NYISO is helping to close the gap between electricity prices in New York and the rest of the nation.

But posing the question in this way presents a fundamental analytic challenge, since it is impossible to know what would have happened in the absence of the changes introduced in New York's markets a decade ago. By definition, it is not possible to have a perfect "controlled experiment" that could shed bright light on whether the restructured electric system in New York State (with NYISO) during the last decade performed better or worse than a non-restructured system would have (without NYISO and the other changes introduced in the late 1990s in New York).

In light of the fact that these trends result from many diverse factors[61] – among them the effect of changes in the price of natural gas on electricity prices, the type of generating facilities that were (and could have been) added in New York State during the past decade, conditions in the state's macro-economy, energy policies in the state to support energy efficiency, the level of customers' demand for electricity in light of changes in price, the regulatory policies of the NY PSC, and the performance of NYISO-administered markets – this report attempts to focus in later sections on the role of the NYISO in mitigating the extent of increases in the commodity portion of customers' bills over the past decade.

With that in mind, the following section of this report focuses on NYISO's role in administering wholesale power markets and whether the benefits of introducing market forces into the electric industry have flowed through to New York's electricity customers.

Figure 12

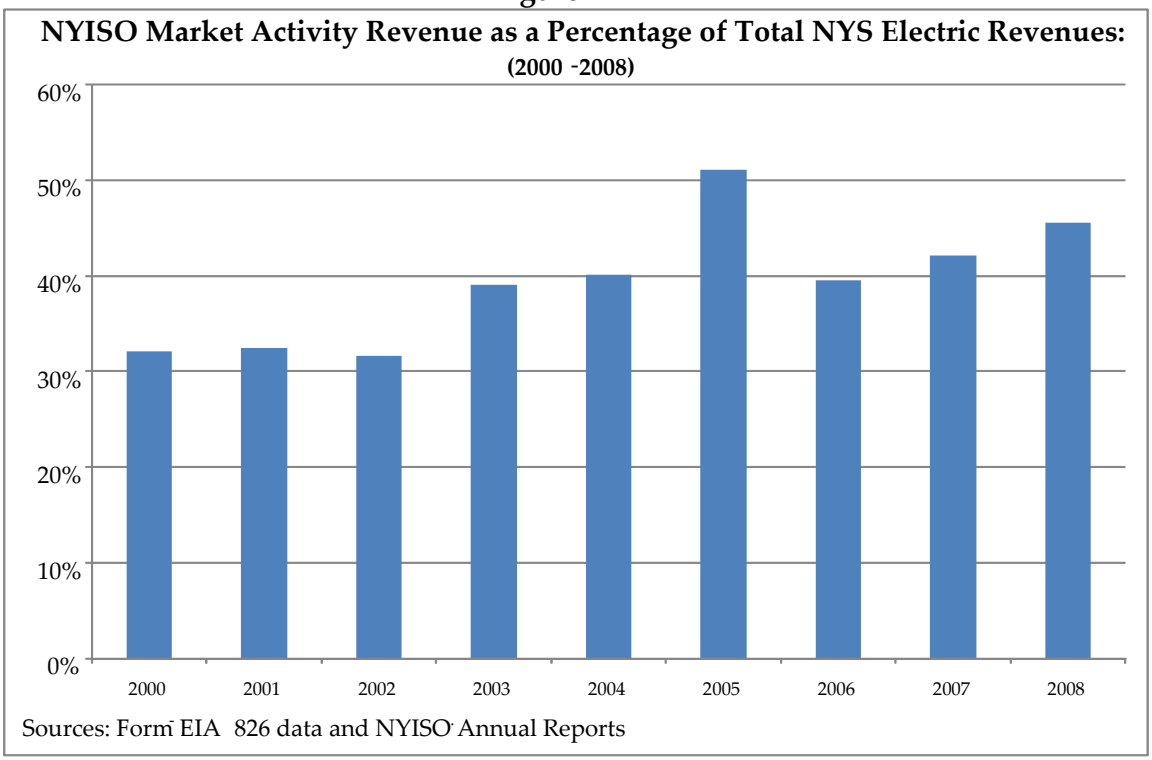
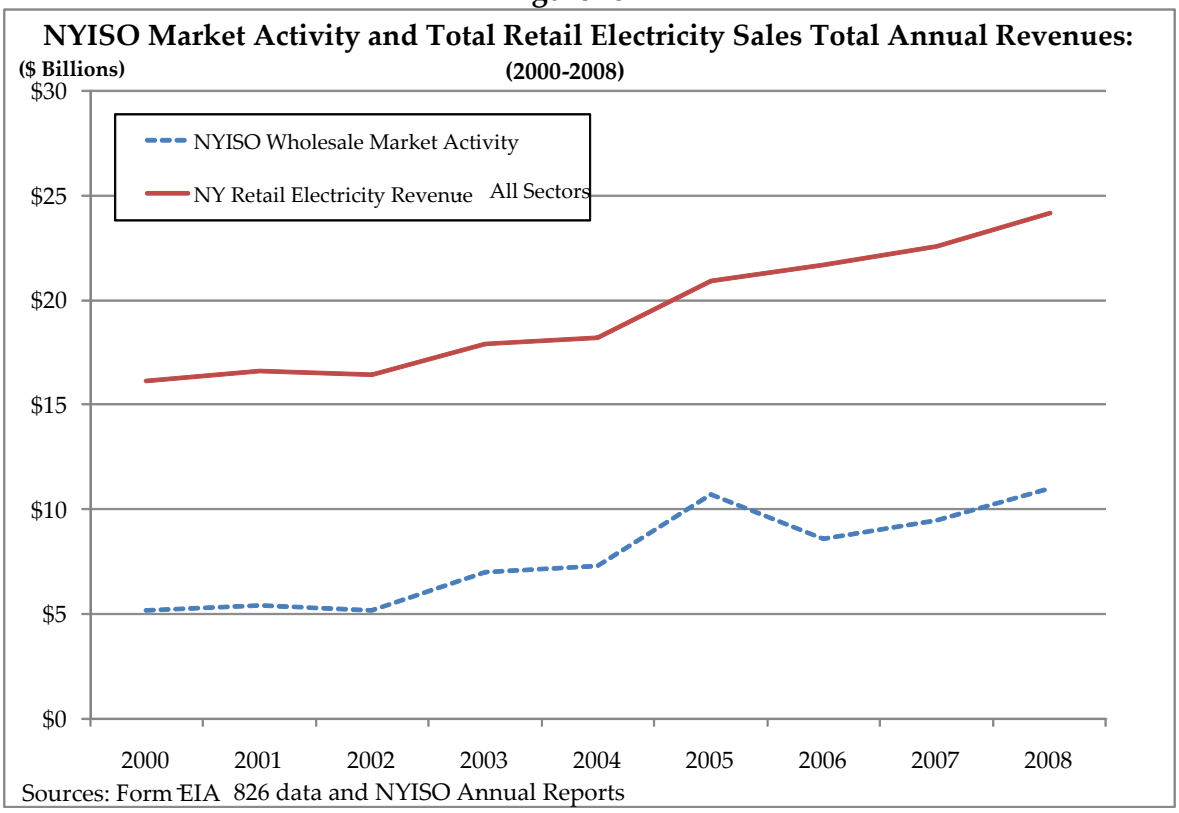


Figure 13



Introducing Market Forces into the Provision of Electricity

An important goal in establishing competitive power markets in New York State – both at the retail and wholesale level – was to introduce better incentives than existed under traditional regulation into those parts of the electric industry that could be subject to market forces. The hopes were that this would eliminate a reoccurrence of New York's experience in the 1980s and early 1990s when significant cost overruns of power plants built by electric utilities occurred and for which many believed that too much risks was borne by captive electric ratepayers. Introducing competitive generation markets would shift risk from customers to investors, better discipline power plant investment costs, allow for more light-handed regulation with a smaller staff at the state regulatory agency, produce efficiency gains in power-production, and provide for more innovation and service options for customers than were available under regulation. Additionally, it would produce savings through dispatching the entire state's fleet of generating units with a single co-optimized dispatch, rather than the prior dispatch under the NYPP in which each utility scheduled its own power and the state-wide pool was designed as a balancing system. This former approach neither created state-wide power production efficiencies nor guarded against situations where power flows from one utility's contract purchase were causing negative impacts on the rest of the state's power dispatch.

From the beginning, NYISO has focused on developing a competitive market design and administering competitive market operations. From the outset and using the market design platform proposed by the transmission utilities after countless hours of discussions, NYISO's market design has provided important incentives for efficient power production and for investment in new resources located in places where they were needed for reliability and/or to put pressure on power production prices.

As noted previously, the core elements of the design included establishing NYISO as an independent entity unaffiliated with any market participant; giving NYISO responsibility for administering the transmission tariff and market rules on a non-discriminatory basis; assigning to NYISO the job of managing the operations of the grid in a reliable way; and conducting those reliability functions through means that induced economic efficiencies (e.g., "security-constrained economic dispatch" with nodal location-based marginal prices, co-optimized energy and ancillary services, network transmission service, traceable transmission congestion contracts). Over time, NYISO added other market elements (such as the inclusion of virtual bids, automatic market-power mitigation mechanisms, capacity market changes, and reliability and economic planning functions) to introduce further enhancements. And at present, NYISO continues to look to add market enhancements (such as ways to harmonize market rules between New York's electricity markets and those in neighboring regions – the so-called "seams" initiative).

In saying that these are NYISO initiatives and actions, it is more accurate to depict them as market rules largely developed through a shared-governance process. In this process, the staff of NYISO and NYISO Market Participants typically collaborate to hone technical and policy elements of the design of market rules. Once such rules are fashioned in working groups and voted upon by Market Participant committees, these rules then make their way into documents

submitted to the NYISO Board by either NYISO (for various aspects of the markets) or the transmission owners (for various aspects of the transmission tariff filings). NYISO's Board has strong potential authority to act on its own, but in the majority of circumstances, core decisions of the institution emerge from this "shared governance" process. (See the later discussion on these governance issues.)

Many observers inside and outside of New York think that NYISO has the "best market design in the country." In research for this 10-year assessment, the majority of comments elicited by a wide variety of stakeholders (including generators, transmission owners, marketers, consumer advocates, environmental groups, market monitors and experts) were favorable to the design and operations of the wholesale markets administered by NYISO. While there are many detailed suggestions from one or another Market Participant on some improvement that is needed or might be useful, most comments were strongly favorable with regard to the overall design of NYISO markets. This seems all the more significant since many of the commenters have experience in neighboring regions (like ISO-New England, PJM and MISO) where these commenters say that the overall design and operations of the market is not as strong as it is in New York.

Examples of the types of comments made about the NYISO markets are:

- "Amazing credit is due to the original developers of this electricity market for the early, hard work they performed; they did their homework; they stuck to good principles."
- The "fundamental design is sound, with improvements over time, with a very capable operations staff."
- NYISO has a "very good market design."
- "We'll always find things to complain about, but we're very happy with the overall structure."
- We "believe that New York is the most advanced market in the country and in the world – from the point of view of both design and implementation."
- New York's market was "far more ambitious in terms of what the stakeholders chose to implement, but it was done well – even with some missteps along the way (such as with some information-technology issues early on). And even though it's not as transparent as we'd sometimes like, New York was more forthcoming in terms of what's happening and what needs to be done when you compare it to the other RTOs."

The staff of the NY PSC has said that "New York's wholesale markets are among the most advanced in the nation and that wholesale competition has led to significant efficiencies."[62] And more recently, New York's State Energy Planning Board has recently concluded that New York's wholesale market design based on its "locational based marginal pricing" model and "uniform" single clearing price auction design "results in the system being dispatched in the most efficient manner that minimizes total production costs, thus providing power to consumers at the lowest possible price…. As long as markets are competitive, the uniform clearing price auction will provide the most efficient result. The upstate New York market has consistently been competitive; however, downstate generators are required to bid within strict bounds of their actual marginal costs to mitigate issues related to market power."[63]

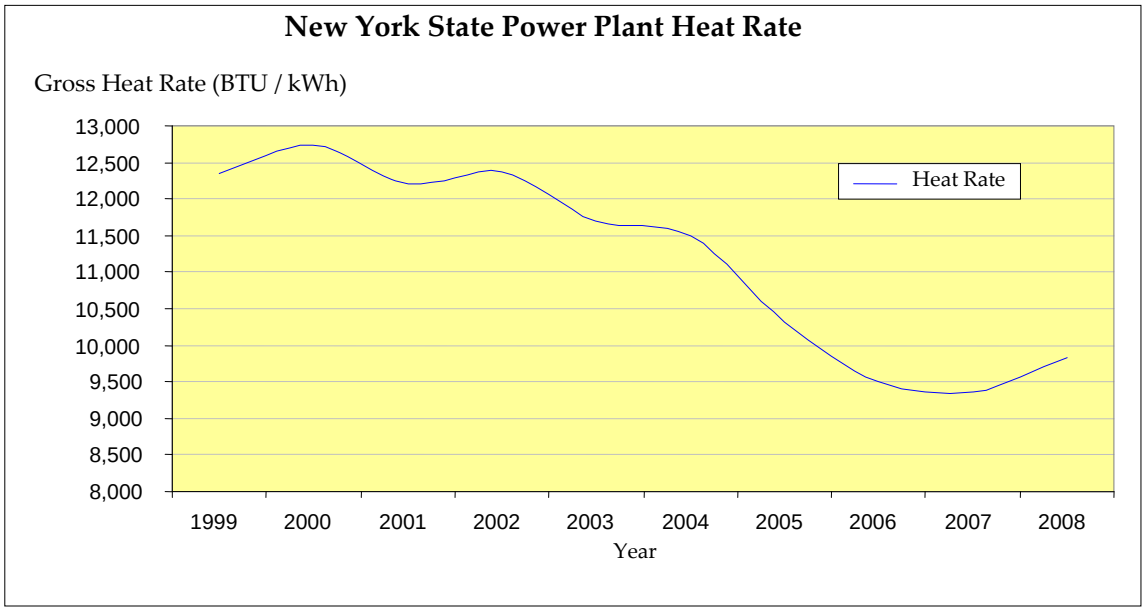
These overall favorable comments about the wholesale market design in New York can be corroborated in some sense by the fact that over time, some of the other regions have gravitated toward the same market design elements – e.g., location-based marginal prices with network transmission service and transmission-congestion contracts – that existed from the beginning in New York State.[64]

Additionally, there are a number of quantitative metrics that tend to support the view that NYISO's market design has accomplished some of the hoped-for benefits of more efficient power production, gains in the efficiency of operations of the production and delivery of electricity, and investments in generation at helpful places on the grid. A brief discussion of these metrics follows

Power plants – improved performance: less fuel for the amount of electricity produced

New York State's overall fleet of fossil fuel power plants today uses less fuel to produce electricity than it did at the start of the decade. Thus, for a given amount of electricity output, the power plants use less fuel and the market spends less on it. (Also, New York's power plants produce fewer air emissions.) This improved efficiency (or fuel economy) can be seen in Figure 14, which depicts the overall system "heat rate" for New York State's fossil plants and shows that between 1999 and 2008, the fleet improved its efficiency of power production by 21 percent. (To put this statistic in context, 69 percent of New York State's generating capacity uses a fossil fuel – natural gas, coal or oil – to produce power. Upstate, only 50 percent of power plant capacity is fossil-based, while all of New York City's and 98 percent of Long Island's capacity is based on fossil fuel.[65])

Figure 14



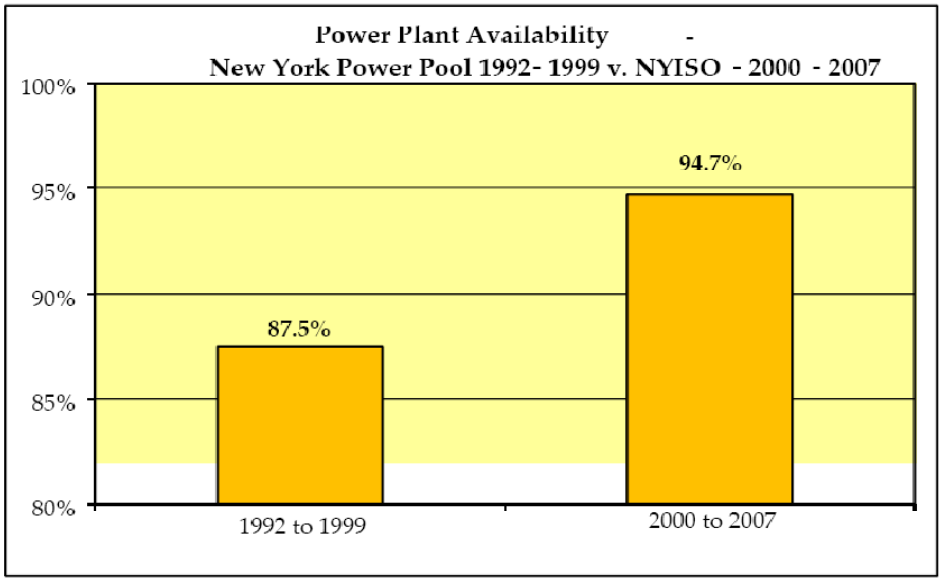
Source: S. Whitley, "Foundation to the Future: Infrastructure, Innovation, Investment," Opening remarks at NYISO's Annual Symposium, April 30, 2009, using data from USEPA Clean Air Markets,

As discussed further below, improvements in overall power production efficiency have resulted from several factors in the past decade, most notably the addition of new power generation facilities[66] that use more modern and efficient technologies, including 5,175 MW of natural-gas fired power plant capacity which has the combined effect of producing power with less fuel and causing relatively inefficient generating capacity to operate less often.[67]

Power plants – improved performance: reduced outages for maintenance

The owners of New York's fleet of power plants improved their operations by reducing the length of planned and unplanned outages, thus making the plants "more available" to operate and able to produce more power with a given amount of generating capacity. This improvement was apparent as early as 2000, the end of the first year of full operations of the system under a competitive market.[68] During that year, unlike prior years under the NYPP and the prior traditional industry structure, generators were paid for performance: a generator only received payments in NYISO's spot markets if the owner's power plant was available to run and then was selected to be dispatched for energy or ancillary services. This put pressure on power plant owners to make their plants more reliable, and to improve their plants' availability through improved maintenance, among other things.[69] In the years since then, the system has continued to show improved operating capability. As shown in Figure 15, the average plant availability increased from 87.5 percent (1992–1999) to 94.7 percent (2001–2007), equivalent to adding 2,400 MW of available capacity to the system (without actually adding that amount of new power plants on to the system).

Figure 15

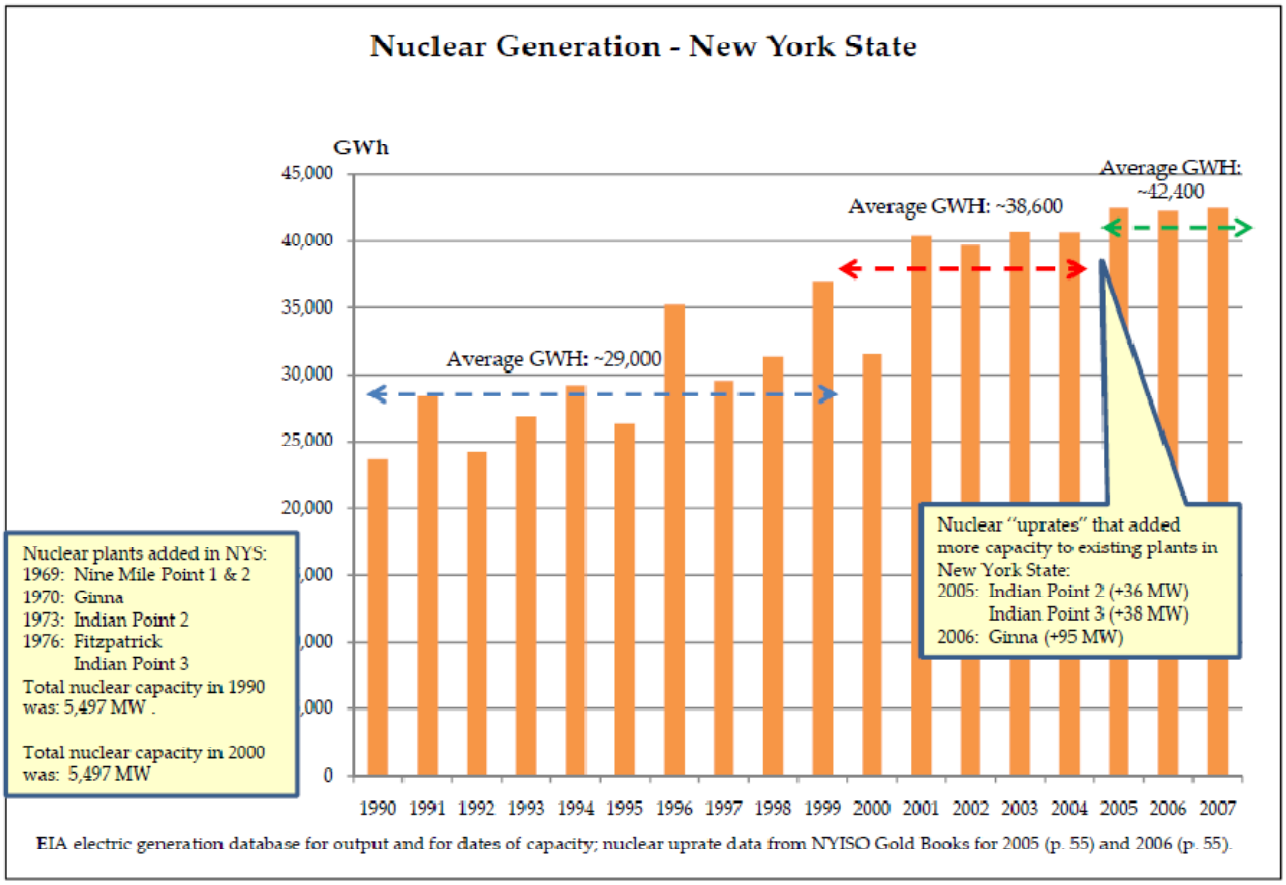


Source: NYISO data using NERC-GADS data, as provided in S. Whitley, "Foundation to the Future: Infrastructure, Innovation, Investment," Opening remarks at NYISO's Annual Symposium, April 30, 2009,

Nuclear power plants – improved performance

All of New York State's currently operating nuclear power plants were in service at the start of the NYISO markets. (Figure 16 lists the dates when each of New York's six nuclear units commenced operations during the late 1960s-to-mid-1970s.) In the decade before NYISO took charge of the New York grid, these nuclear plants averaged approximately 29,000 gigawatt-hours ("GWh") of electricity generation each year. From the year 2000 onwards, nuclear output increased significantly even though no additional capacity was added until 2005. From 2000 through 2005, output increased 33 percent relative to the average annual output from 1990 through 1999. Another increase in average output occurred after 2005, when three plants (indicated in Figure 16) received approvals from federal nuclear regulators to make changes that increased the output of these plants. Thereafter, average annual electricity production at New York's nuclear plants increased by 46 percent relative to the period prior to restructuring. The increased output of power from nuclear plants meant that less efficient and more expensive power plants could be dispatched less often, thus creating significant downward pressure on prices.

Figure 16



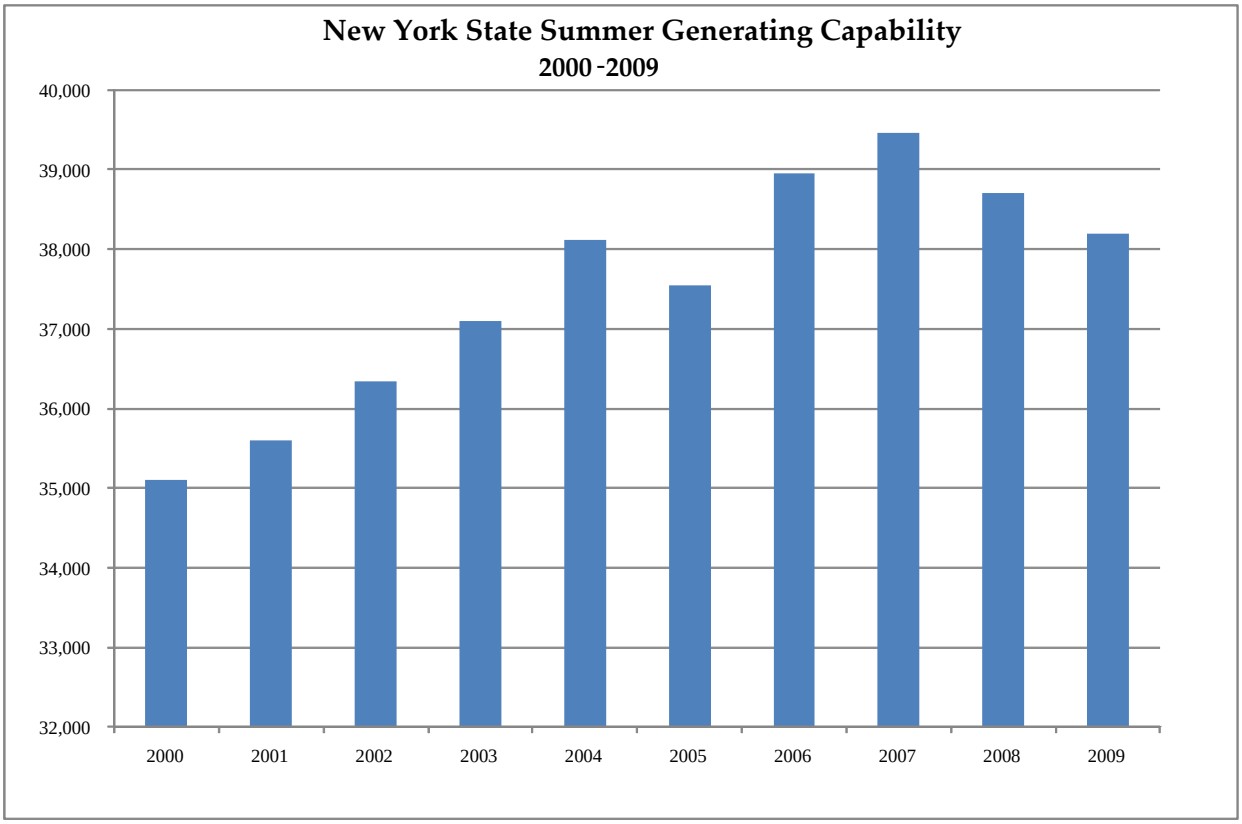
Power plants – investment risk shifted from ratepayers

During the past decade, considerable investment in new power plants has occurred in New York. Figure 17 shows total generating capacity installed on the system, as of the first quarter of each year, and reflects the effect of capacity additions (including contracts with out-of-system resources) as well as retirements (or contract terminations) of generating capacity available to New York.[70] Installed generating capacity grew through much of the decade – rising from 35,098 MW in 2000 to a peak of 39,459 MW in 2007. Similarly, Figure 18 shows the amount and type of power plant capacity added from 2000 through 2008. It shows that over 6,000 MW of net generating capacity was added during the last decade. Most of this new capacity was added from 2000 through 2005, when a total of approximately 5,083 MW (net) was added, or nearly a 14 percent increase in generating capability.

As shown, most of the power plant capacity additions took place in the first half of the decade, following the restructuring of the industry. Most of this was natural gas-fired power plant capacity, with wind projects becoming increasingly important in recent years. While not particularly diverse in terms of the type of generating capacity added during a single decade, this mix of plants is quite similar to the fuel/technology mix

added throughout the country during this period of time, and did serve to diversify New York State's overall fleet of power plants, as shown in Figure 19 (which shows the type of fuel used by New York's fleet of power plants, by the decade during which the plant entered service). That said, virtually all of the power plants added in New York City and Long Island since 1999 have been natural gas power plants.

Figure 17



Note that the "generating capability" figures as reported by NYISO reflect the derating of wind capacity, since "capability" is a measure of the extent to which capacity can be counted on during the system's peak operating conditions. Source: Data from NYISO annual Load and Capacity Reports for the years 2000 through 2009.[71] For 2000-2004, data are reported as of January 1st of the indicated year. For the remaining years, the data are reported as of April 1st of the year.

Figure 18

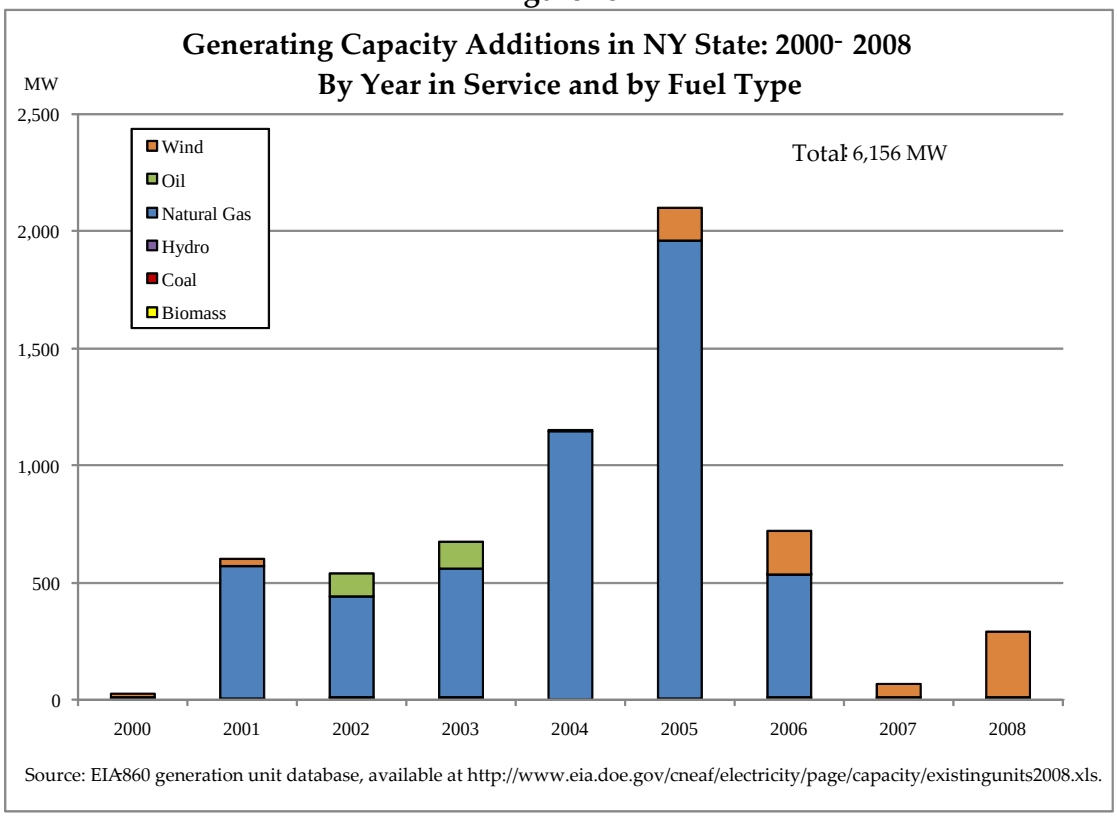
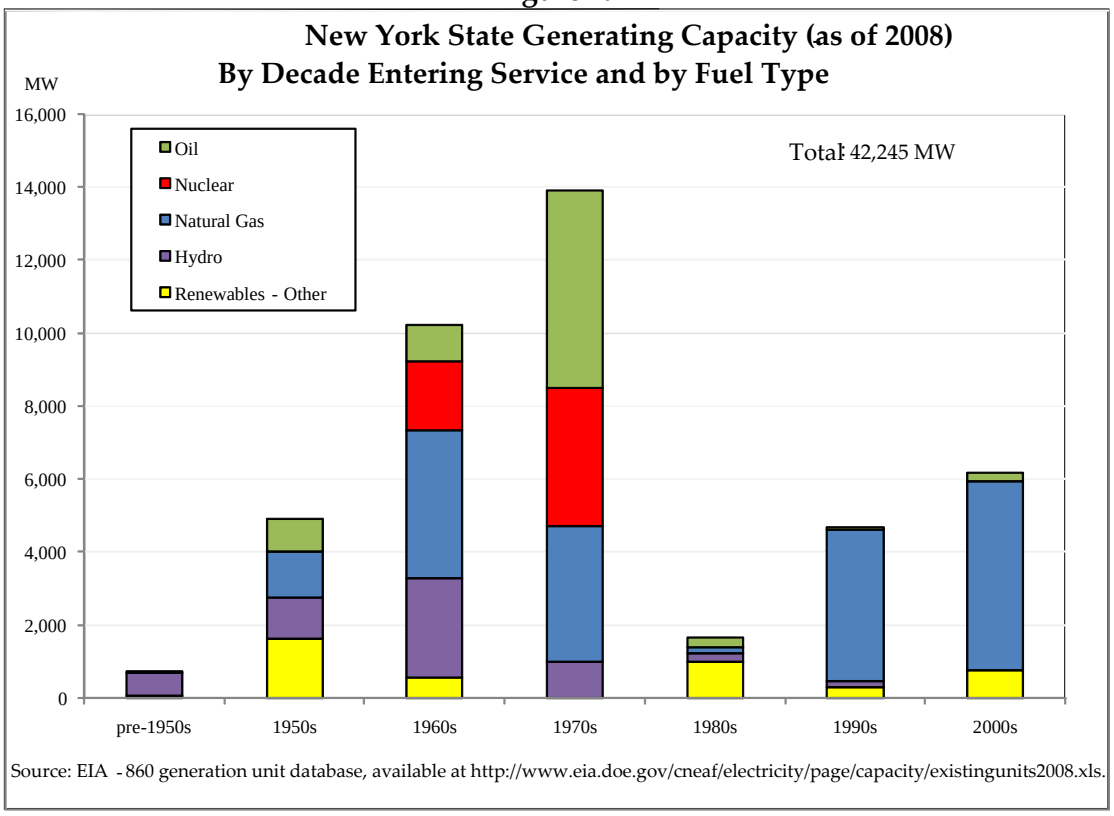


Figure 19



Since the advent of New York's restructured electric market, the state's investor-owned electric utilities have not directly built and/or invested in new power plant facilities.[72] Notably, most of the capacity additions – at least that occurred in the first half of the last decade – were made by companies that were not utilities at all. Of the power plant capacity built prior to 2005 (the period with the largest amount of capacity addition during the decade, as shown on Figure 19), 570 MW was added by utilities (i.e., the New York Power Authority and a few municipal utilities) and the remaining amount was added by non-utility generating companies. Of the 6,156 MW of new capacity added over the last decade, 1,152 MW (or 19 percent) was built by publicly owned utilities, while the rest was added by generating companies (i.e., NYISO Market Participants that were not investor-owned transmission/distribution utilities in New York State).[73]

The total investment in new generating facilities has been $5.5 billion since 2000.[74] Using a metric that includes new investment, operating costs, and payments to utilities to purchase power facilities (with this purchase payment contributing to reducing the stranded costs that had to be borne by New York consumers as part of the transition to a competitive market), the Independent Power Producers of New York have said that "New York's independent power producers have invested over $10 billion to purchase, construct, and operate their facilities… located throughout New York State."[75]

Most of this capacity has been added in the parts of New York State where capacity was needed – either to meet customers' loads and/or to produce power more economically. This can be seen in Figure 20, which shows that between 2000 and 2008, more capacity was added in downstate New York (2,178 MW added in the New York City zone; and another 885 MW added on Long Island) than in upstate New York (where 885 MW was added in the northern part of the state, from Albany west; and where a net 701 MW was removed in the mid-state area between Albany and New York City). Figure 21 is taken from a recent NYISO presentation showing the location of new capacity additions north and south of the east/west interface and shows that the majority of new capacity (80 percent) has been added south of this interface. This meant that the high amount of surplus capacity (i.e., installed generating capacity relative to loads) that existed in the upstate area in the beginning of the decade (pre-electric industry restructuring) decreased over time, and reserve levels in downstate areas improved. More generating capacity was added in New York City than load grew over the period, so that the in-city installed reserve improved; Long Island added slightly less generating capacity than it experienced in customer load growth which had the effect of removing nearly all of its surplus installed capacity. In effect, the reserves across the state moved towards – but did not achieve – equalization.

Figure 20

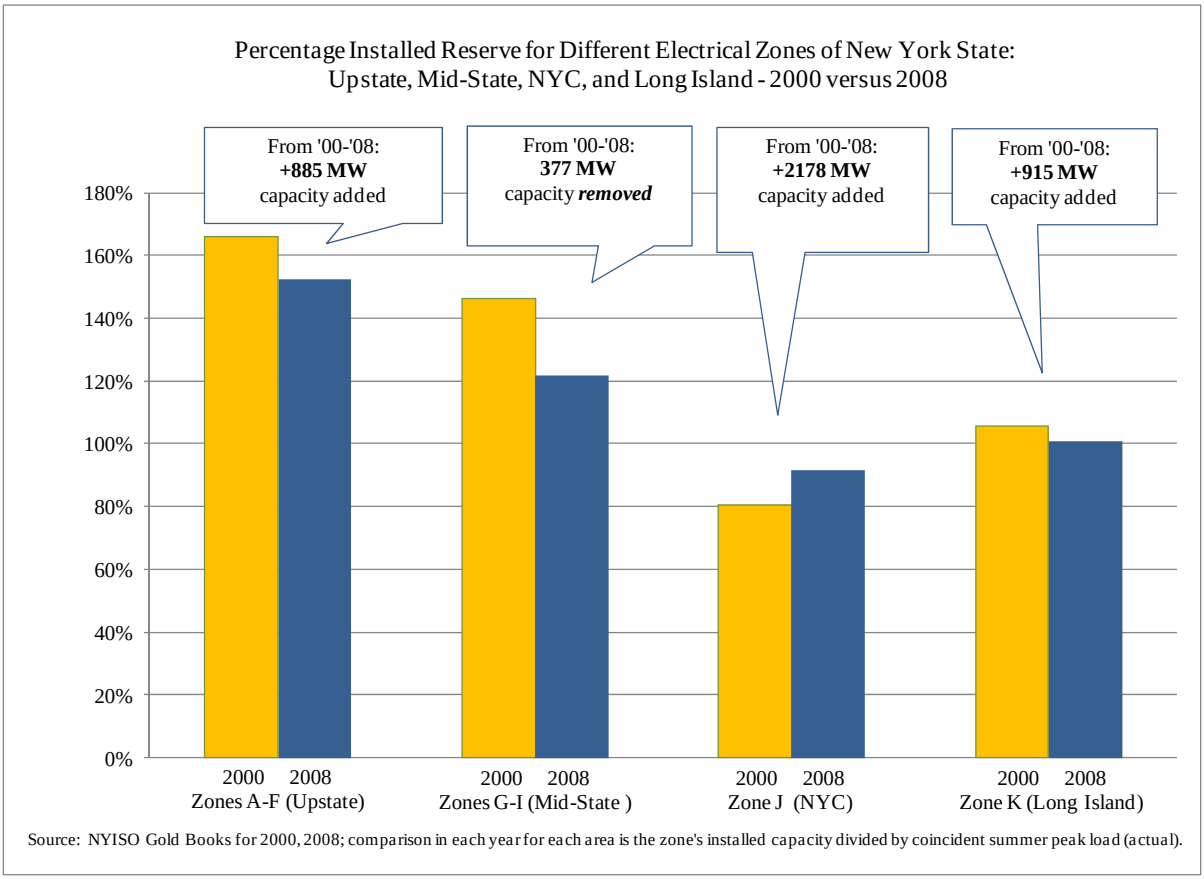
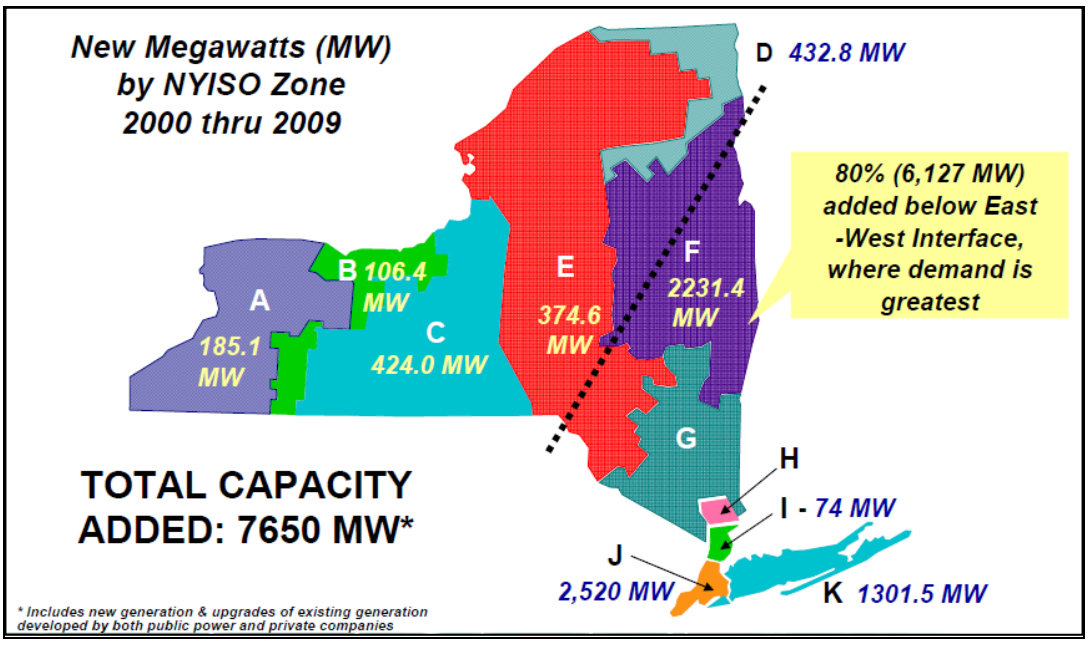


Figure 21



Source: S. Whitley, "Foundation to the Future: Infrastructure, Innovation, Investment," Opening Remarks at NYISO's Annual Symposium, April 30, 2009.

Figures 16 through 21 together show that a relatively significant amount of generating capacity was added without ratepayers bearing various risks that they often bore during the pre-electric-restructuring era in New York. Industry observers – including NYISO Market Participants, state officials, and the market monitor – attribute New York's market design as having helped to enable these outcomes. Much of the power plant capacity added (or in development but eventually not added) was carried out in a way that shielded electricity consumers from certain risks, such as the risk of cost overruns occurring during plant construction periods, or the investment risk in projects that were terminated prior to entering service or that did not operate at performance levels expected when they were originally conceived.

In commenting on these developments over the past decade, many observers note that the timing of so much at-risk power plant investment in NYISO's market can be attributed in large part to the combination of a number of market design elements, including: access to transmission; the design of the energy, ancillary service and capacity markets; New York's location-based energy market price that sent signals for power plant developers to put plants in the downstate market areas; the "pay-for-performance" nature of the markets; and the power plant siting policies of the state at the time, which relied on market structure as the basis for determining whether new plants were needed.

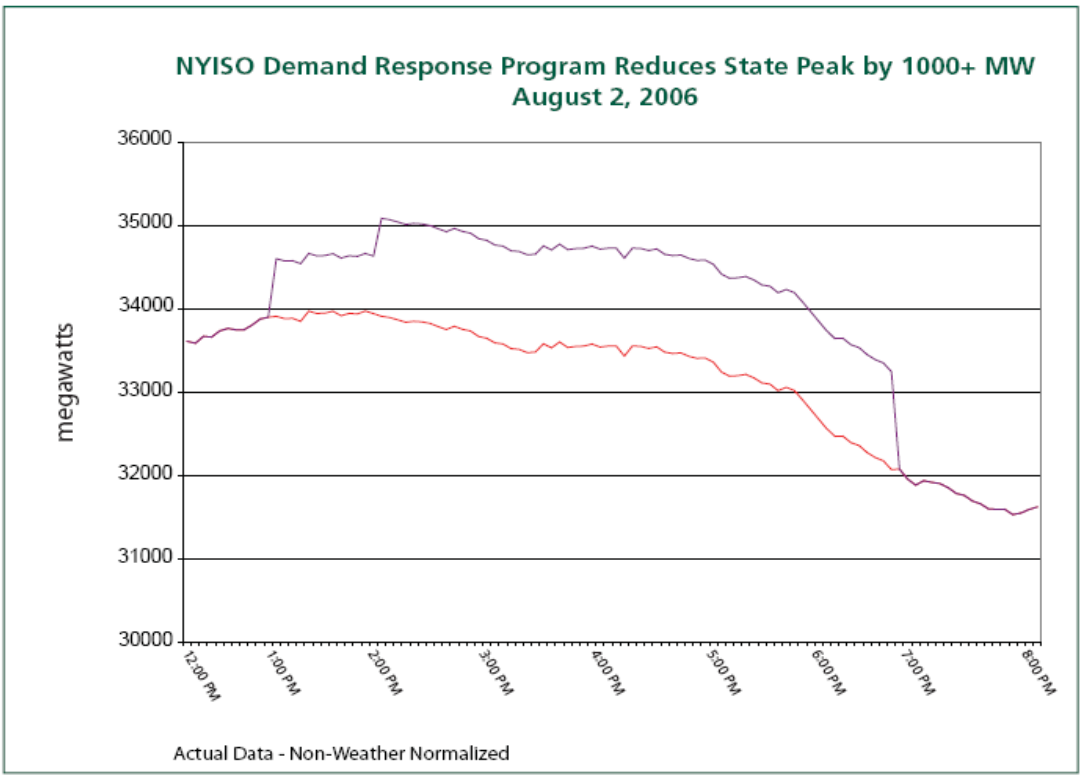
Some of these commenters also observed, however, that the favorable investment conditions that existed in the early part of the decade changed over time – as New York's "Article X" power plant siting law expired without renewal; as the nation's merchant generators experienced financial struggles (including bankruptcies of some of the non-utility generating companies) in the wake of the California electricity crisis and post-Enron challenges; as surplus capacity conditions occurred in many regions of the country that affected power companies' finances generally; and as financing for new, at-risk investment in the power sector tightened in the second half of the decade.

Some of the new power plant investment that has occurred in recent years has come with a long-term contract with a utility company providing financial support for the new plant – which means that while the contract tends to include provisions that pay the power provider for performance, the utility's customers may be bearing more of the risk of the project's financing than occurred in New York's competitive power markets. Indeed, some observers also see the design and load-serving entities' requirement to pay for generating capacity under New York's current capacity markets as providing customer-based underwriting of certain financial risk for generators.

Demand Response – Getting Customers Voices into the Market

One of the developments that has occurred with the advent of New York's restructured electricity market is "demand response" – a mechanism through which a system administrator can manage consumer electricity consumption in response to supply issues such as critical demand peaks or specific price-related triggers. . Demand-response "capacity" is provided by customers that have signed up to be available to have some or all of their load curtailed at times, in return for compensation. This provides the wholesale market administrators and system operators with a resource to dispatch in conjunction with the portfolio of power plant resources available on the system. Operators do not need to call upon demand-response capacity unless or until price points are reached – at which point, "dispatching" such demand response means that a customer has offered to turn down his or her usage of electricity, thus enabling the system to avoid turning on a more expensive power plant. Figure 22 shows what New York's load profile looked like on a day when demand response was dispatched (the lower (red) line) and what it would have looked like without this resource (the top (purple) line). The figure illustrates that calling on demand response when it is more expensive to dispatch a power plant will flatten load and result in a lower electricity price than otherwise would have occurred.

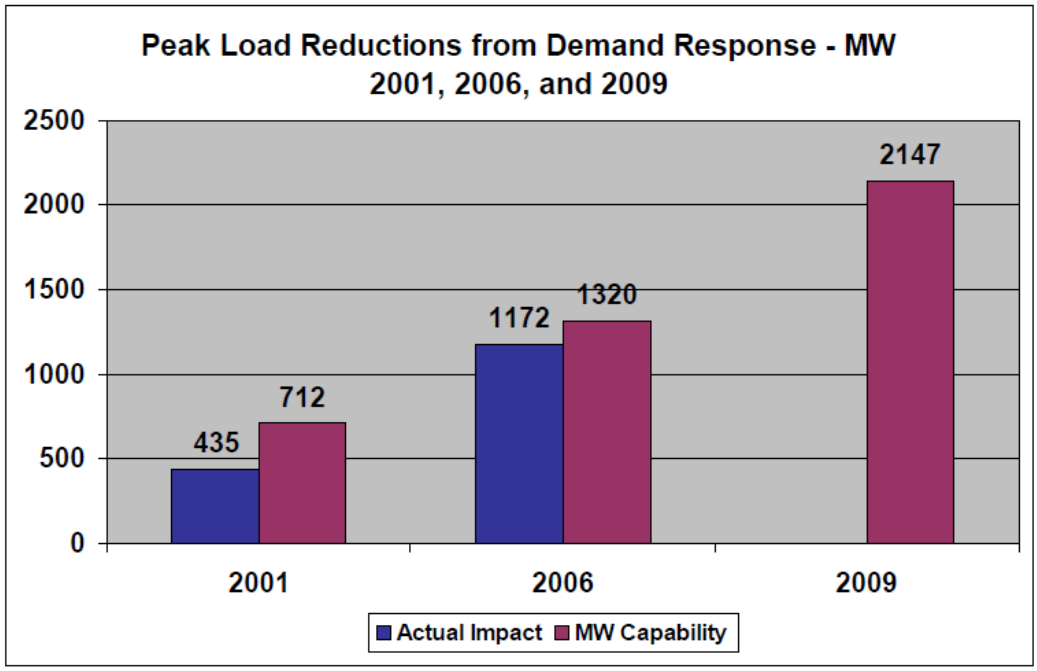
Figure 22



Source: NYISO, Power Trends 2007, Table 6.

Figure 23 shows the amount of demand response that NYISO has signed up ("MW capability") and actually had to call upon ("Actual Impact") in different years over its first decade of operations. According to a recent report prepared for the FERC on demand response, New York has a relatively high level of large commercial and industrial customers participating in the NYISO-administered demand-response programs.[76]

Figure 23



Source: S. Whitley, "Foundation to the Future: Infrastructure, Innovation, Investment," Opening remarks at NYISO's Annual Symposium, April 30, 2009.

According to New York's State Energy Planning Board, these NYISO demand-response programs have helped provide reliability assistance to the state's grid on a number of occasions: "Since the summer of 2001, the NYISO has activated these two reliability programs a total of 17 times: four times each in 2001 and 2002, twice in 2003 (during the August blackout restoration), once in 2005 and six times in 2006 (primarily in zone J during a network outage in the Con Edison service territory).[footnote in the original] Six of these events were called statewide; the remaining events were called in the eastern and southeastern zones (zones F-K) in various combinations. In 2007, the NYISO activated [demand-response resources] under the zone J Targeted Demand Response Program… on only two occasions…. More than 2,700 large commercial and industrial customers have participated; approximately $24 million in incentives were paid to [NYISO demand-response] program participants; peak load was reduced by as much as 900 MW during reserve shortages; these programs have been very important in helping

New York City meet its reserve requirements, especially in 2001; programs accelerated the recovery process after the August 2003 blackout."[77]

Reliability of New York's Electric System

One of the essential ingredients of New York's electric industry both before and after the establishment of NYISO was to assure that New Yorkers would have reliable power. Since NYISO took over operational control of the New York grid in 1999, New Yorkers have continued to enjoy highly reliable electricity service on the bulk power, high-voltage system. On two occasions during the past decade New York's electrical system was severely 'tested' in some sense, even though the events were not in any way NYISO's doing. One event occurred over several days in August 2003, when much of the Northeast U.S. experienced a blackout after problems occurred on parts of the electrical system in the Midwest.[78] The other occurred immediately following the September 11th terrorist attack on New York City, when parts of New York City's electrical system were destroyed.

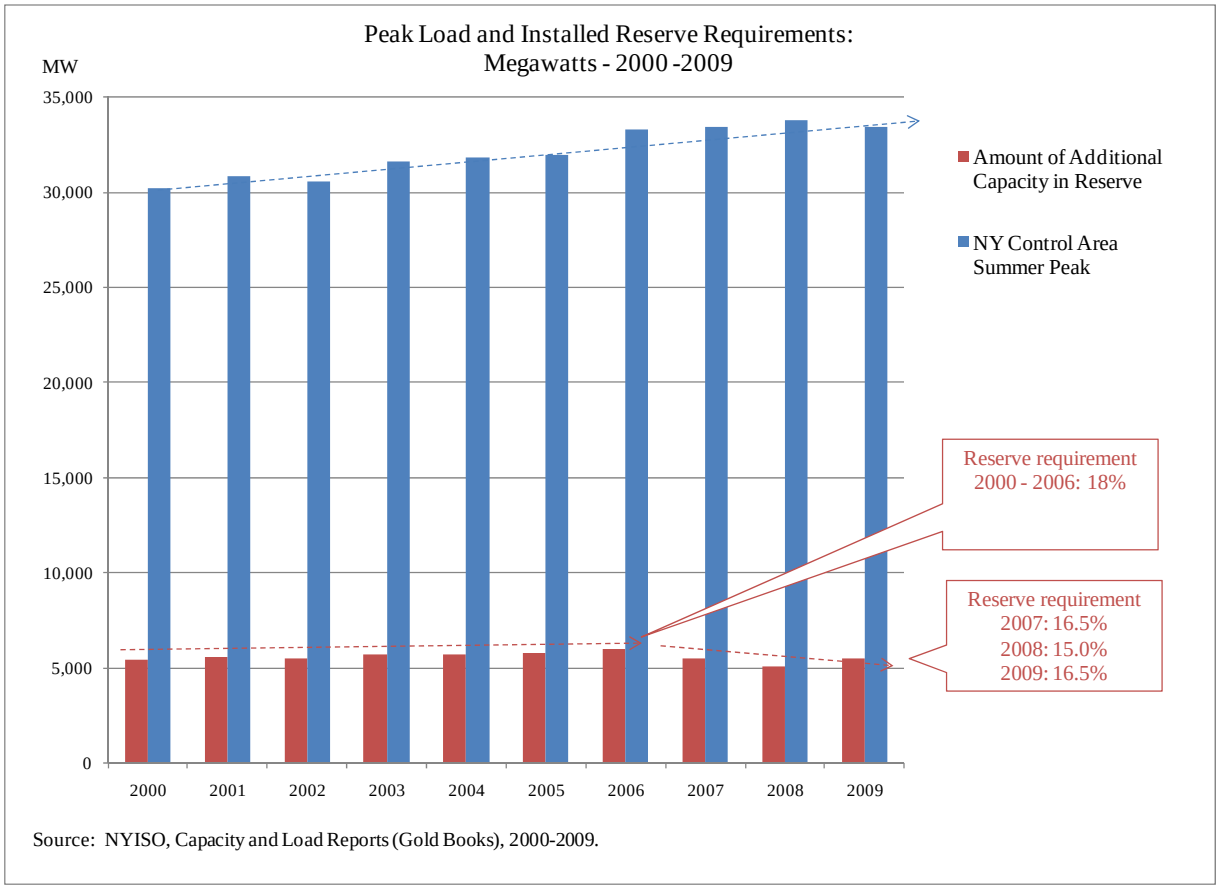
According to Market Participants interviewed for this report, NYISO has acquitted itself very well in supporting the protection of electrical equipment and helping to provide safe and speedy restoration of service. They also report that more routinely, NYISO's performance on reliability issues has been excellent. This outcome has meant that NYISO has operated the system both reliably and efficiently, with – for example – fewer reserve activations than were needed under NYPP; better transmission outage scheduling; co-optimized system management; and improved and more centralized load and wind generation forecasting.

In electric systems, reliability is often discussed in terms of two things: operational security (keeping the lights on from second to second as contingencies occur), and resource adequacy (ensuring that there are enough generation, transmission and demand-control resources on the system at any point in time such that the operators can be assured of having the appropriate tools in place to operate the system securely).[79] On both measures, NYISO has performed well throughout the decade. Using words that reflected the comments of many, one Market Participant said, "NYISO is the best RTO from an operations point of view."

Not only has the system operated well, but New York's system has produced reliability relatively economically. For example, the improved availability of power plants on the system has contributed favorably to the decisions of the New York State Reliability Council to lower the reserve requirement (i.e., from 18 percent of load as of 2000, to 16.5 percent for 2007, to 15 percent for 2008, 16.5 percent for 2009) towards the end of the decade). (Even though the NY RSC has raised the reserve requirement to 18 percent for 2010 and 2011, that doesn't not diminish the real savings that consumers have experienced in recent years in not having to pay for as much reserve capacity on the system.) As shown in Figure 24, these lower reserve levels allowed New York to maintain, in effect, the same amount of installed capacity despite 4,000 MW of growth in customers' peak load over the decade. This represents a savings for customers, in that they do not have to pay generators and other capacity providers for approximately 500 MW of installed reserves.[80]

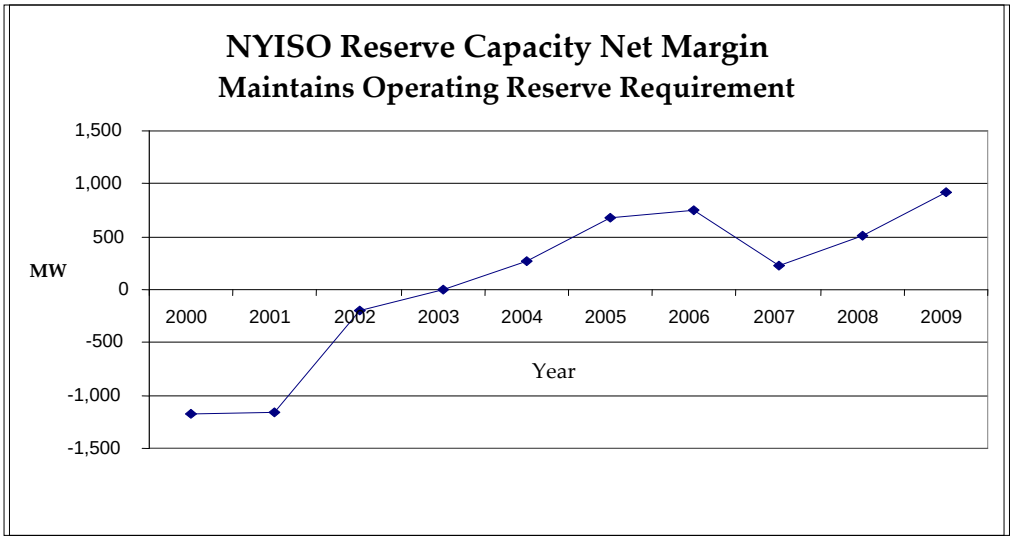
Additionally, as New York's market attracted generation investment in the early years of the decade in particular, New York has benefitted from a large surplus of installed capacity beyond the levels required by reliability standards. Figure 25 shows the improvement in actual reserve margins ('operable reserves') over the course of the decade.

Figure 24



Source: NYISO, Capacity and Load Reports (Gold Books), 2000-2009.

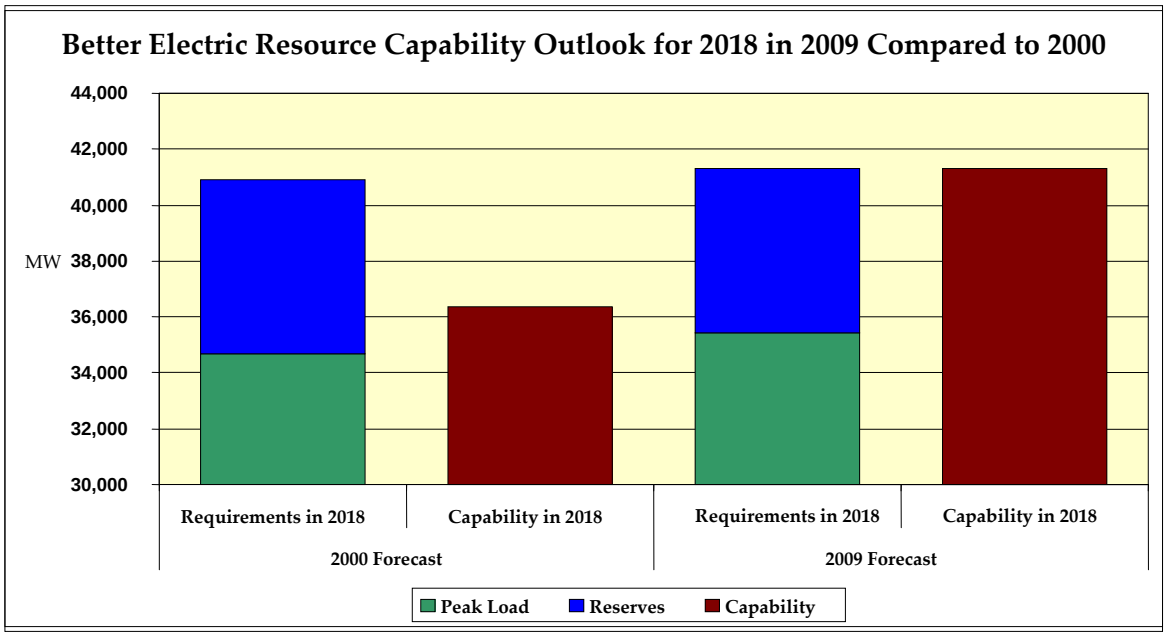
Figure 25



Source: S. Whitley, "Foundation to the Future: Infrastructure, Innovation, Investment," Opening remarks at NYISO's Annual Symposium, April 30, 2009

Current projections show that with current levels of capacity existing on the system, the state will not need to add capacity even by 2018. By contrast, a decade ago, long-term forecasts indicated that the system would need to add 4,000 MW to meet installed reserve requirement. (See Figure 26.)

Figure 26

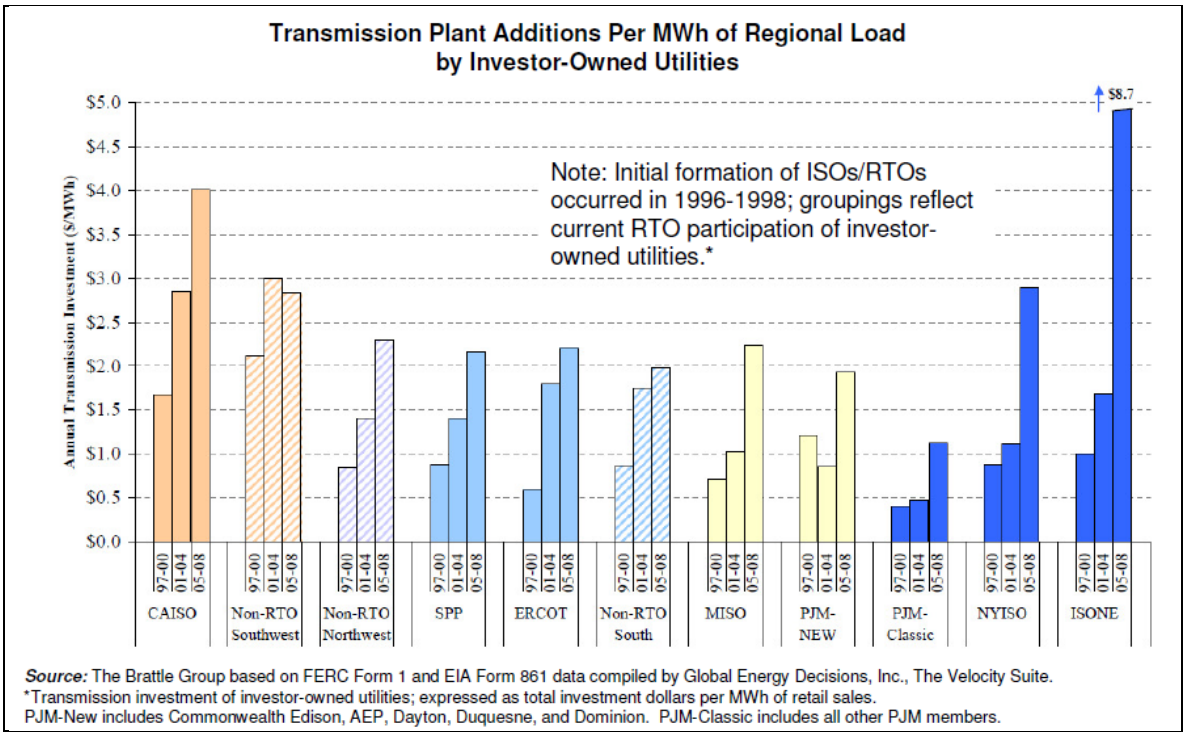


Source: Stephen Whitley, "Benefits of Competitive Markets – Report Card - Wholesale Electricity Markets in New York: 10 Year Review," April 21, 2009.

In addition, over the course of the decade, there was a net increase of nearly 100 miles of high-voltage transmission facilities in the state.[81] Most of the transmission mileage was added by National Grid, who added approximately 169 miles of overhead 345 kilovolt ("kv") lines. Additionally LIPA was directly responsible for adding a significant amount of transmission line mileage, having added 30 miles of underground 138 kv transmissions lines on its own, and supporting through a long-term contract the construction of the Neptune and Cross Sound Cable DC transmission lines, which connect Long Island to New Jersey and to Connecticut, respectively.[82] Rochester Gas and Electric and the New York Power Authority each added under 25 circuit miles of new 115 kv overhead transmission.[83]

Based on the relative size of customers' peak electricity use, New York added more investment during the last decade than in the years prior to NYISO's operations. Additionally, compared to other regions, more transmission was added in New York than in other regions (except New England, California and parts of the Southwest). (See Figure 27, below, which compares for three time periods (1997-2000, 2001-2004, and 2005-2008) the dollar investment in transmission for various electrical regions.)

Figure 27



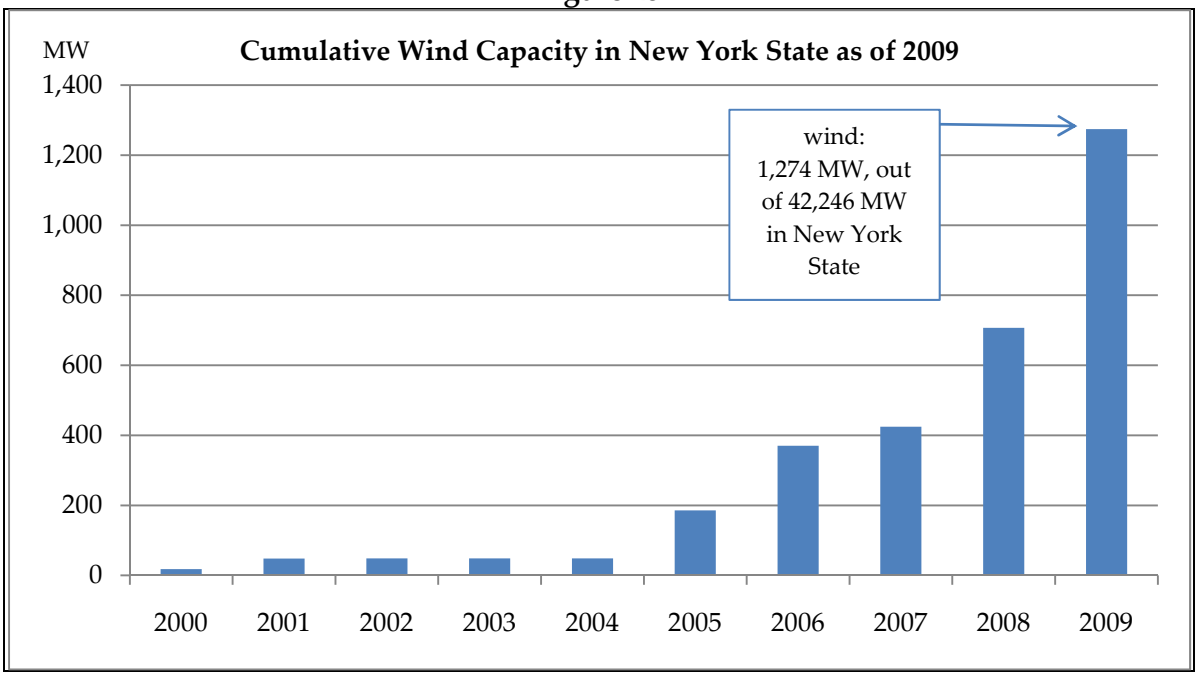
Source of figure: Johannes Pfeifenberger, Peter Fox-Penner, Delphine Hou (The Brattle Group), "Transmission Investment Needs and Cost Allocation: New Challenges and Models," Presentation to the FERC Staff, December 1, 2009.

Other Electric Supply Portfolio Objectives: Renewable Resources, Fuel Diversity, Lower Air Emissions, Greater Energy Efficiency

As part of its electric industry restructuring objectives, New York hoped that various indirect outcomes would be achieved, including: reducing total air emissions from power production in order to assist New York in meeting state and federal air quality laws; diversifying the fuels used in New York State's electricity mix; continuing to provide funding support for the implementation of cost-effective energy efficiency measures by electricity customers; and introducing more renewable power resources into the state's electricity portfolio.

While these outcomes may be only indirectly related to actions of the NYISO, the overall process of restructuring the industry, combined with other public policies, has had positive impacts in these areas. For example, New York's relatively strong policies in support of renewable energy (driven in large part by the state's "Renewable Portfolio Standard") interacted with the state's (and NYISO's) open access transmission policies and market designs (i.e., LBMP with single clearing price energy markets) and contributed to the introduction of a significant amount of wind development in the state. Figure 28, below, shows the amount of wind generating capacity that has been added in New York State over the decade. (Note that estimates of wind generating capacity additions sometimes vary due to differences in whether they are reported as nameplate capacity, or seasonal capability.) According to the American Wind Energy Association ("AWEA"), which tracks wind projects and changes in wind capacity in states across the U.S., New York ranks sixth among the 50 states in terms of the amount of wind generating capacity added in the last year, and eighth in terms of total installed wind capacity as of the end of 2009.[84] Furthermore, AWEA and other analysts have assessed the ease of entry of wind capacity into electric systems around the country and have concluded that RTOs like New York's, with open access to transmission and single clearing price competitive markets, provide a relatively supportive environment for renewable project investment.[85]

Figure 28

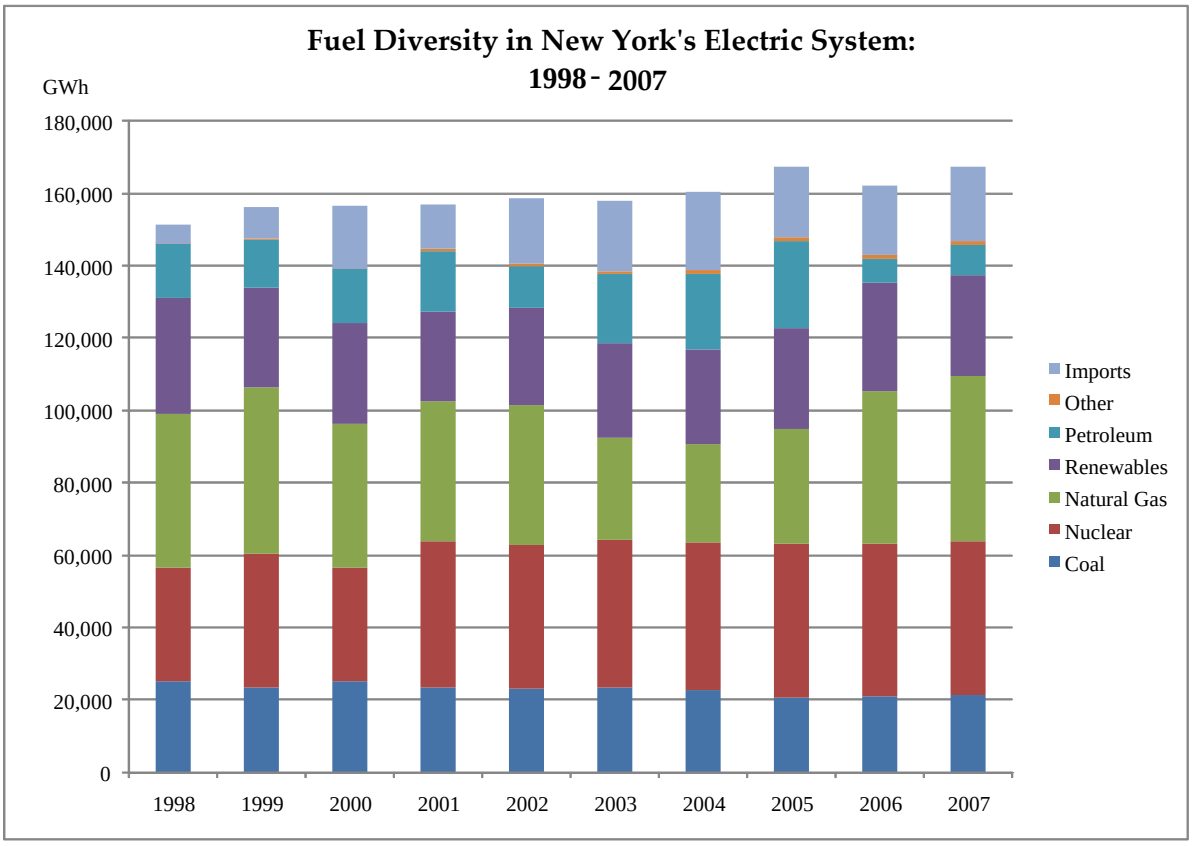


Source: American Wind Energy Association, projects as of 12-31-2009 http://www.awea.org/projects/

As previously reported, New York introduced a substantial quantity of demand-response capacity into the wholesale market. As shown in Figure 23, by 2009 there were 2,147 MW of demand-resources that had been signed up into NYISO-administered markets.[86] This provides the state with the ability to satisfy reliability requirements with less generating capacity and at an equal or lower cost to the system. NYISO's market monitor has said that "The NYISO's demand response programs provide a substantial amount of potential real-time load reductions when necessary."[87]

The past decade has seen a changing mix of resources deployed to meet New Yorkers' electricity requirements. In some sense, the fuel mix is relatively diverse when viewed on a state-wide basis.[88] Figure 29 displays the sources of power used to meet customer demand ("sendout") from 1999 through 2007, taking into account net imports of power from neighboring regions. The trends show the state's increasing demand and well as its increasing reliance on nuclear and natural gas-fired power plants as compared to power from coal-fired power plants; this shift results in lower emissions per kWh of electricity consumed.

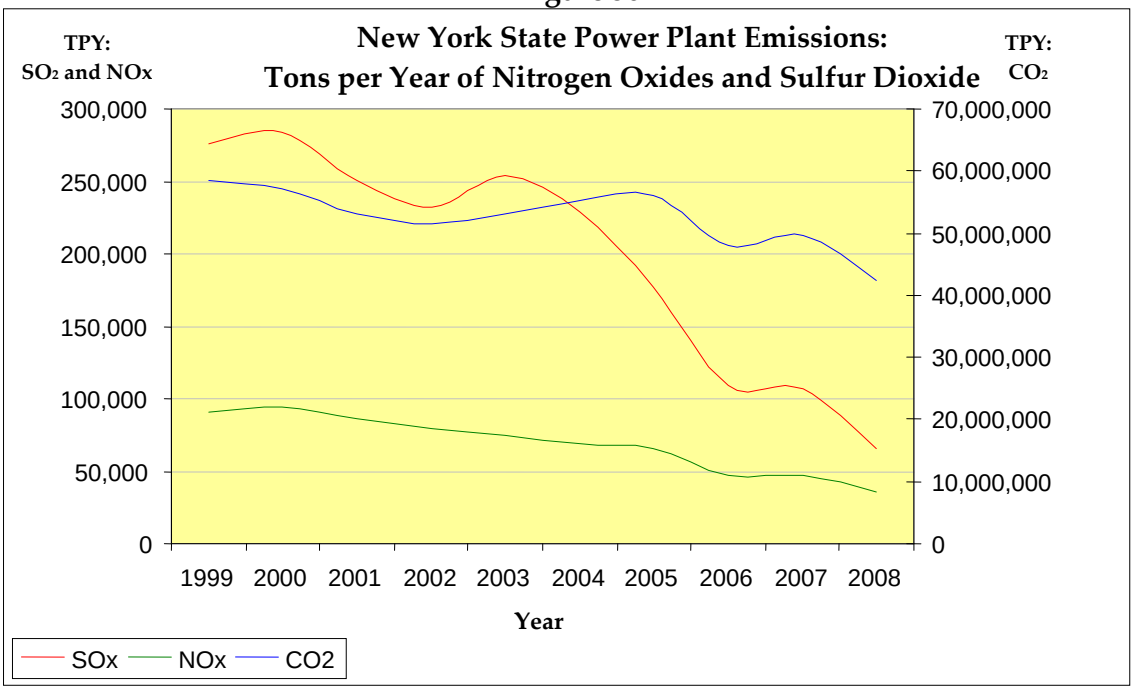
Figure 29



Source: EIA generation data ("electricity send-out") for New York State (netting out energy for pumped storage); imports data for New York Control Area from NYISO.

One of the consequences of this changing mix of resources is that air emissions from the power sector have declined in New York. Historically, New York has had high levels of air pollution that caused the state to be out of compliance with many federal air quality standards. As a result New York has adopted and implemented air permitting requirements for new power plants that would assure that only plants with the best available control technology for certain air emissions would be sited in the state. These requirements, combined with the fact that developers were introducing power plants that used relative clean fuels (e.g., natural gas, wind), helped to contribute to an overall increase in the state's reliance on natural gas for power production and have helped New York lower the overall emissions from power plants located in the state. This is shown in Figure 30, below.

Figure 30



Source: S. Whitley, Opening Remarks to the NYISO Conference: "Foundation to the Future: Infrastructure, Innovation, Investment," April 30, 2009, data from USEPA Clean Air Markets.

These power plant emissions trends are notable in that they will help buffer the New York power market (and its consumers) from the kinds of effects on prices that are likely to be experienced in the upcoming decade as those older, dirtier and less efficient power plants face investment hurdles to meet multiple new air emissions reductions requirements. There are many upcoming regulatory requirements that will affect coal-fired power plants, not even taking into consideration the effects of possible new national laws limiting carbon emissions from the power sector. New York's power generation fleet will face fewer air-emissions regulations than will occur in other regions, which may help to narrow the price gap between New York and states relying heavily on coal-fired generation.

Regarding energy efficiency, New York State has already shown significant gains – both in the wholesale and retail portions of the industry. For one thing, power is produced much more efficiently than in the past, as described previously in this report and shown in Figure 14. This means that New York State's overall fleet of fossil fuel power plants today use less fuel to produce an equivalent amount of electricity than they did at the start of the decade. Additionally, the introduction of NYISO-administered demand response means that resources on the customer side of the meter – rather than generating resources – are called upon to provide reliability and/or economic services to the grid. (See Figures 22 and 23.)

New York has excelled in deploying retail energy efficiency programs as well, ranking fifth among states in a recent survey of states' efforts on energy efficiency.[89] While not a specific subject of this report (which focuses on New York's wholesale electric industry and NYISO functions), New York State's retail energy efficiency programs indirectly impact the wholesale

provision of power since they affect electricity consumers' demand for electricity and they have the effect of lowering New Yorkers' total electric bill. According to New York's 2009 State Energy Plan, "New York has a decades-long history of supporting efficiency improvements. Annual funding committed to efficiency programs by New York's utilities and energy authorities began with a modest $25 million in 1984 and has risen to over $750 million for 2009. From the mid-1990s through 2008, most State support has been channeled through NYSERDA [New York State Energy Research and Development Authority], NYPA, LIPA and the Division of Housing and Community Renewal (DHCR)…. Programs administered by NYSERDA have achieved more than 3,000 Gigawatt Hours (GWh) in annual electricity reductions; [footnote in the original] NYPA and LIPA have contributed nearly 2,000 GWh in annual electricity reductions. These energy reductions have saved consumers billions of dollars in electricity and fuel costs. … Current annual expenditures on these initiatives are expected to exceed $750 million. NYSERDA administers the System Benefits Charge (SBC) program of approximately $175 million. NYPA plans to spend approximately $135 million and LIPA expects average spending of more than $90 million. The expected PSC authorization of utility and NYSERDA spending is $330 million on electricity efficiency programs."[90] As a point of reference, 5,000 GWh of electricity (i.e., 3,000 GWh of savings delivered through NYSERDA programs plus 2,000 GWh delivered through NYPA and LIPA programs) would be equivalent to approximately 3 percent of New York State's 2008 electric energy usage.[91]

Other Outcomes (Participation of Non-Utility Players in the Electric System; Retail Choice; and Stranded Cost Recovery)

Finally, there were three other objectives that motivated the restructuring of New York's electric industry. In different ways, these three other policy issues – retail choice, stranded cost recovery, and achieving more non-utility participation in New York electric industry matters – all had indirect and in some ways direct implications for the wholesale markets and systems that NYISO administers. Thus, they are discussed here, with a focus on these interactions with NYISO operations and systems.

Open participation in NYISO processes

One rationale for restructuring the electric industry in New York was to open it up to greater participation by non-utility entities. On this metric, the New York system scores very well.

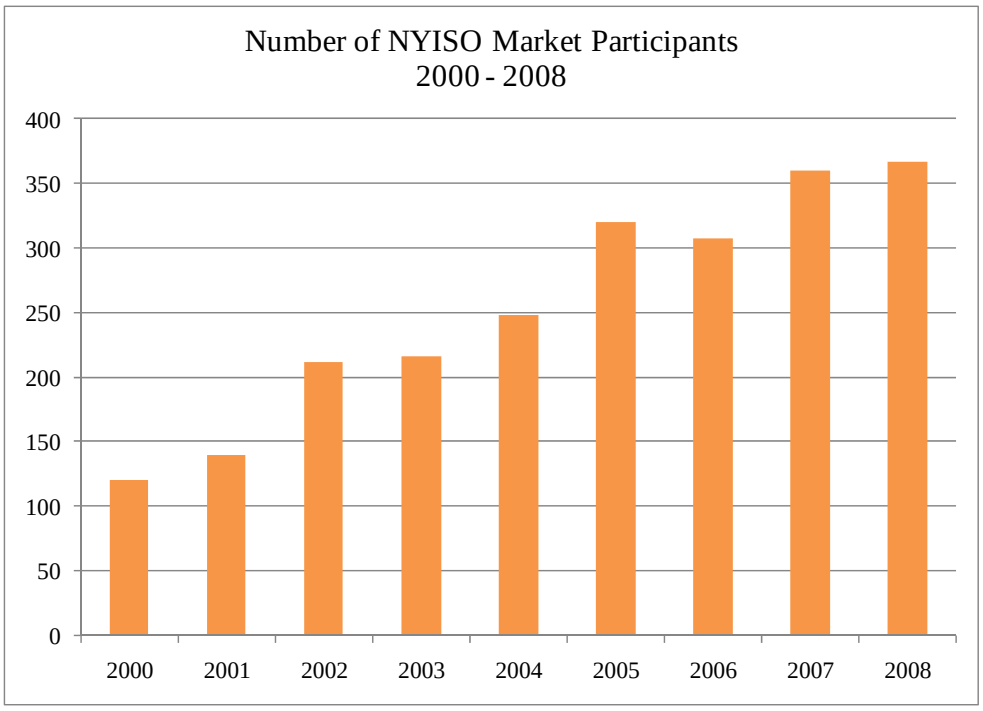
Under the old system, there was a strong sense that the utilities and their operating entity, the NYPP, were insufficiently transparent in terms of information about operations, plans, transactions on the grid, and a variety of other types of information. While some information could be obtained through regulatory proceedings at the state or federal government levels, the prevailing view was that the utilities only shared information they wanted to share until it had to be turned over to regulators. By contrast, a vast amount of information about operations, operational conditions, capacity, customer loads, plans, prices of various products, and other data is available to

the public under today's system. This type of information is routinely posted on NYISO's website, including highly granular information about prices and other conditions (with the exception of actual bids by Market Participants in recent transactions).

In addition to the relative transparency of information about today's electricity system, it is also much more open in terms of involvement by non-utility entities. Figure 31 shows the growth in the number of Market Participants involved in NYISO-administered markets. These entities include:[92]

- public and investor-owned transmission utilities (i.e., the eight transmission owners),
- any power plant companies that are owned by 15 "generation owners,"
- approximately a dozen municipally owned and cooperative electric utilities (such as Freeport, Jamestown, Bath, Plattsburgh, Lake Placid, and others),
- large and small end-use consumers (such as Alcoa, IBM, Wegmans Food Markets, various universities and hospitals),
- government agencies (NYSERDA),
- other consumer representatives (NYS Consumer Protection Board),
- environmental representatives (American Lung Association, American Wind Energy Association, Environmental Advocates, Natural Resources Defense Council, PACE Energy & Climate Center), and
- many "other suppliers" (comprised of retail energy service companies, power marketing firms, power trading companies, merchant transmission companies, power importers from neighboring regions, demand-response companies, financial institutions, wind power projects, and others).

Figure 31



Source: NYISO Annual Reports for the years 2000-2008.

As shown in Figure 31,[93] the number of NYISO Market Participants was 120 in 2000, and grew to 367 Market Participants by 2008. By contrast, there were eight members of the NYPP prior to the advent of electric industry restructuring in the state. These trends suggest a vibrant market of buyers and sellers of power in New York's electric industry, and active participation by hundreds of entities.

As described by New York's State Energy Plan, "Under the NYISO's shared governance structure, tariff filings made at FERC under Section 205 of the Federal Power Act are subject to approval by the NYISO's Management Committee. The Management Committee is the senior of three standing Committees: the Business Issues Committee, the Operating Committee, and the Management Committee, with the first two being subordinate to the latter one. The Committee voting structure is made up of five sectors: transmission owners, generation owners, other suppliers, end-use consumers, and public power and environmental parties. Actions by the committees require a 58 percent voting approval to pass. The PSC, the New York State Energy Research and Development Authority (NYSERDA) and the Consumer Protection Board (CPB) work with the NYISO and its committees to represent State and consumer interests with regard to all reliability and wholesale market issues.[94]"

According to many of the commenters who provided information as part of this 10-year assessment, the dominant view was that NYISO's "shared governance" process is among the best and most participatory in the country. Compared to the past, when 100-percent consensus was required among a select group (i.e., the transmission owners),

today's process is broadly viewed as a more inclusive and open. This strong shared-governance system has produced demonstrated benefits over time, as measured by the availability of: substantial and growing amounts of transparent information; customer training; a means for active involvement and training of market participants; attempts to improve NYISO's operations from a business point of view; and the reasonable cost to administer the system over time while still maintaining high service quality.

That said, it is quite a time-consuming process for participants, and in that way is not very different from many if not most democratic decision-making processes. Some commenters observed that while it is open and inclusive, it is nonetheless quite difficult for small market participants or entities with few resources to participate as actively as others in working group meetings, committee meetings, and in other processes that make up the practical decision-making process in NYISO's shared governance process. (See more on this below.)

Retail choice and stranded costs

Under New York's restructured electric industry, retail customers of investor-owned utilities are able to choose their electricity supplier, with distribution service remaining the responsibility of the local utility. Partly in exchange for this outcome, New York regulators also allowed investor-owned utilities to recover their prior investments in generating capacity and their long-term power supply agreements that they made as part of their public service obligations to provide bundled electricity supply to all customers in their service territory. NYISO facilitated both policies – retail choice and stranded cost recovery – in an indirect but important way: by providing open access to transmission to third-party power companies who might wish to buy utilities' divested generating assets; by creating a wholesale power market in which any retail power marketer could purchase power supply and all related ancillary and capacity services to back up its supply commitments to retail customers; by creating a market into which large retail customers could act on their own to buy and sell power; and so forth. These were essential elements in the development of retail markets. These elements also supported a means to help retire a portion of the investor-owned utilities' stranded costs, reducing the amount that would need to be retired through system benefit charges paid for by customers of the state's investor-owned utilities.

With regard to stranded costs, retail customers in many parts of the state continue to pay "transition charges" to support recovery of the stranded costs from the 1990s (and earlier).[95] These remain non-bypassable charges that will continue to be in place until the utility's stranded costs are fully retired.

While they have no direct relationship to the NYISO, some comments obtained from Market Participants during this assessment process expressed a degree of frustration that remains in the minds of some consumers (especially large ones) and consumer advocates more generally. These parties feel that New York's restructuring of its electric industry introduced multiple levels in which customers were underwriting the

transition to competition. Some customers feel as though they have had to pay for restructuring by supporting transition charges associated with large and previously expensive nuclear generating units built by utilities under prior regulatory rules. These same customers complain that they feel they are now picking up expensive costs for such nuclear plants by paying energy spot market prices in NYISO markets. Their view is that NYISO's single clearing price markets provide the same payment to nuclear plant owners with low variable costs as they do to owners of natural gas plants whose high fuel costs tend to drive spot market prices. While this perspective ignores many things (such as the investment-recovery risk that today's nuclear plant owners took and the asset purchase prices they paid when they were buying New York's nuclear plants from New York's utilities that owned these nuclear assets; and the fact that these purchase payments already paid off some of the stranded costs so that customers would not have to), this point of view nonetheless reflects an attitude of frustration that New York's markets are not benefitting customers.

As of August 2009, more than one out of every five electricity customers in New York State was buying power on the competitive retail electricity market. (See Table 6.) Most of these customers are large, commercial or industrial electricity customers – and likely to be customers for whom power costs are a relatively large part of their budgets. Over half of all small and medium non-residential electricity customers and over three-fourths of all large non-residential customers have competitively supplied electricity. These customers make up approximately 40 percent of all competitively sold retail power in the state. By contrast, many fewer residential customers (17 percent of all residential customer accounts) purchase power from a competitive supplier. Even so, nearly a million residential customers in New York buy from a competitive supplier. Approximately 20 percent of small and mid-sized non-commercial customers buy in the retail competitive market, and these are the larger customers within these service classes since over half of total usage in these classes is competitively supplied.

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 Accounts (#)	Load MWh	Customer Accounts (#)	Load MWh	Customer Accounts (#)	Load MWh	Customer Accounts (#)	Load 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%

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

In recent years, the NY PSC has ordered that investor-owned electric utilities provide electricity to large commercial customers according to advanced time-of-use meters that allow customers to see the price of electricity as it varies over the hours of the year (also known as "dynamic pricing").[96] Such a pricing option would not be available without the type of transparent wholesale market pricing available in the NYISO-administered markets.

Part 2: Comparing NYISO's Markets and Operational Features Against Structural Elements Associated with Competitive Markets

From a structural point of view, standard economic theory dictates that a successful competitive electric market would display most, if not all, of the following structural attributes – which provide a second framework for evaluating whether NYISO's markets are competitive.

- *Many buyers and many sellers* – A successful competitive electric market would be characterized by the presence of many buyers and sellers, so that no single or small number of market participants is able to exercise control over electricity prices and products offered in the market.
- *Low barriers to entry (including prices over time that support new entry)* – Establishing a market characterized by many market participants requires that there be low barriers to entry (i.e., buyers or sellers seeking to enter the market are able to do so without unduly complex, burdensome, time-consuming, or costly obstacles). All else equal, the higher (or more difficult) the barriers to entry, the more costly it will be for a potential efficient competitor (e.g., new entrant) to compete with existing suppliers and the more likely it is that the latter may be able to exercise market power. In the long run, competitive markets should be

expected to produce prices that yield revenues high enough to cover the costs of an efficient new competitor (or new investment from existing market participants) entering the market. Without prices over the long run producing such a signal for new investment, there will be inadequate incentives for efficient new entrants – contributing to likely shortages of supply, with attendant ability of incumbent suppliers to command prices above efficient levels for some period of time.

- *Non-discriminatory access of market participants to essential facilities necessary to participate in markets* – Given the importance of transmission and distribution to link generators' supplies with customers' demands, a successful competitive electric market requires that participants be given non-discriminatory access to the "bottleneck" facilities needed to participate in the market. At the wholesale level, these critical elements include equal access to the delivery infrastructure (the "wires"), grid-operation/reliability services, and other market-administration functions.
- *Means to mitigate the ability of market participants to exercise market power* – Market power is the ability of a single market participant to exercise control over prices for electricity or the type or number of electric products offered in the market. A participant with market power may be successful in raising electric prices without losing its customers to alternative market participants. In addition to other features, such as entry and exit conditions, competitive electric markets will be supported by structural and behavioral policies and controls in place to mitigate the potential exercise of market power.
- *Transparency and diversity of prices and options* – In order to compete successfully, market participants must be able to easily identify and understand the electric products, prices, and options available to them. This includes providing information about price trends, transmission resources, congestion, loads, forecasts, and other planning information. Additionally, participants should also have the ability to offer innovative services and products, including unbundled products with different terms and conditions.
- *Relatively stable and transparent market rules* – Attracting new market participants to a competitive electricity market requires that relatively stable and transparent market rules exist. This is important not only for minimizing the cost to market participants of conducting business in the market – and in turn the cost to their ultimate customers, - but also the cost of minimizing the barriers that potential new competitors face when entering the market. All else equal, stable and relatively transparent market rules reduce risk, foster economical operation, and support investment – all contributing to efficient competitive market conditions and price levels.

Over the years, the NY PSC and the FERC have identified a similar set of components for a successful competitive market, which indicate many of the structural elements identified above. For example, among its objectives for restructuring the electric industry in the State, the New York PSC indicated its vision that there should be: *many market participants;*[97] *efficient prices;*[98] *independent institutions to administer the grid and the markets, provision of non-discriminatory access to transmission and information;*[99] *and appropriate market oversight*.[100]

FERC also embraced many similar goals "to ensure that customers have the benefit of competitively priced generation, and determined that non-discriminatory open access transmission services… were the most critical component of a successful transition to competitive wholesale electricity markets."[101] FERC envisioned various structural elements and outcomes similar to those mentioned above: independent institutions to administer the grid and the markets, providing non-discriminatory access to transmission and information;[102] efficient pricing and market performance, through methods such as "increased efficiency through regional transmission pricing and the elimination of rate pancaking; improved congestion management; more accurate estimates of ATC; more effective management of parallel path flows; more efficient planning for transmission and generation investments;… reduced transaction costs";[103] improved grid management and reliability;[104] development of environmentally preferred generation in states with retail access programs;[105] and appropriate but more light-handed regulation.[106]

These elements provide a framework for qualitatively examining the performance of New York State's wholesale power market. Table 7 shows the measures of success used in this second part of the assessment of NYISO and New York State's wholesale power markets. Some of these are *quantitative metrics* relating to: trends in various price-related issues over time; power production efficiency; infrastructure investment; capacity additions in resources of importance to state policy goals (e.g., renewables, demand-side resources); environmental emissions; fuel diversity; trends in the number and range of supplier market participants and product offerings; other reliability metrics; and administrative and overhead costs. Many of the figures in Part 1 of this assessment provide information about these structural issues. Additionally, there are many relevant and informative *qualitative metrics* that shed light on how well New York's restructured electric industry has exhibited features that should allow for an efficient wholesale electricity market to develop and flourish. These metrics focus on: institutions and processes that support non-discriminatory access to transmission; elements of efficient market design; trends in structural barriers to entry trends in planning processes for generation and transmission; availability of market monitoring and oversight; governance institutions and processes; and transparency of information about markets, conditions, and plans.

These quantitative and qualitative metrics are discussed after Table 7.

Table 7
Measures of Success –
New York's Electric Restructuring and Wholesale Power Market

Attribute or measure	Evidence that could shed light on whether NY has a competitive power market structure	Assessment of New York wholesale market (and the NYISO's administration of it)
Many buyers and many sellers	Number of market participants (e.g., sellers, buyers)	Substantial increase in the number of market participants in NYISO markets. (See Figure 31)
	Range of market participants and product offerings	Highly differentiated product markets (e.g., energy, ancillary services, installed capacity, transmission congestion contracts, virtual trading, and other product markets).[107]
Low barriers to entry	Access to bottleneck facilities (e.g., transmission, information about markets, reserves)	NYISO administers a FERC-approved "Open Access Transmission Tariff" under which buyers and sellers of power may gain access to transmission in New York State. NYISO's website provides highly granular information about short-term and long-term prices by location on the grid.
	Prices that in the long run yield revenues high enough to induce entry	According to NYISO's market monitor, New York's markets do not routinely provide revenue support high enough to induce entry;[108] but in light of the state having installed capacity well above reserve requirements (see Figures 24-26), this is consistent with conditions in the market.
	Energy facility siting policies	During the early part of the decade, NYS had in place the Article X power plant siting law, which provided a coordinated process for environmental and other siting permits for a project. This was broadly viewed as supporting entry of new generating capacity into NYS's market. Article X expired on January 1, 2003.
Non-discriminatory access to essential facilities necessary to participate in markets	Non-discriminatory access to bottleneck facilities necessary to participate in markets	NYISO administers the open-access tariff on a non-discriminatory basis to all Market Participants.
	Effective planning processes (e.g., for transmission investments)	NYISO has administered a reliability planning process since 2004. After FERC issued Order 890[109] (2007), NYISO has conducted long-term transmission planning (for reliability and economic benefits) and, planning for the integration of clean energy resources
Efficient prices	Efficient market design and operations: ▪ Mechanism for efficient power plant dispatch and for efficient pricing and bidding approach ▪ Regional transmission pricing ▪ Efficient congestion management ▪ Price convergence ▪ Effective planning processes ▪ Effective demand-side market Efficient levels of transaction costs, and administrative overhead costs	NYISO's market design – including a bid-based clearing price market with LBMPs, co-optimized energy and reserve markets, unbundled transmission service, network transmission service, efficient congestion management, virtual trading, demand-response resources, price convergence in the day-ahead and real-time markets at the zone level – is viewed as one of the best in the country.[110] The basic elements of this structure were in place from the outset of NYISO's market administration. Concerns have been raised in recent years regarding barriers that prevent efficient transactions between NYISO and neighboring markets – which results in part from variations in rules and infrastructure constraints. In the early years of NYISO's operations, there were concerns that uplift payments (e.g., relating, for example, to the costs of running plants out of economic merit order because of reliability issues) were too high; these payments have dropped in recent years. Additionally, concerns have been raised about the overhead costs associated with NYISO operations.

Table 7 [Continued]
Measures of Success – NYS's Electric Restructuring and Wholesale Power Market

Attribute or measure	Evidence that could shed light on whether NY has a competitive power market structure	Assessment of New York wholesale market (and the NYISO's administration of it)
Resource adequacy and reliable system operations	Adequate infrastructure resources: ▪ Investment in generating capacity additions ▪ Investment in transmission ▪ Availability of demand response Conformity to reliability standards	New York's market has seen the introduction of significant resources (generation and demand-response MWs) over the decade, enabling the state to have resources well above the levels required for reliable operations. (See Figures 17-21, and Figures 23-26.) Transmission infrastructure has been added to meet reliability requirements (see Figure 27), and inter-regional merchant transmission has been made to connect Long Island with Connecticut and with New Jersey. Some commenters feel that NYISO's long-term infrastructure planning focus tipped too much in favor of purely market driven options (generation or transmission), which may not be forthcoming in terms of concrete market barriers, or may not adequately coincide with timing and expectations of long-term governmental policy. Examples noted were problems in planning for inter-regional transmission that requires discussion of cost-allocation principles among NYISO and the other region's RTO. Some participants question the assumption of a market structure that places a monopoly (most transmission lines) in direct competition with open market competitors (generation), with a concern expressed that this may not adequately support the development of workable competition in the downstate areas of New York. Though recognizing the value of the market in shifting investment risk for most of the generation additions in the past decade, commenters expressed that NYISO's strict view that markets should be relied upon for infrastructure investment makes it unlikely that New York will see investment in certain types of very-long-lived and capital intensive investments in transmission and generation that might be valuable for the state's consumers in the long run. In 2009, NYISO has completed its new reliability audits[111]
Development of environmentally preferred resources	Renewable resources and the environment Demand-side resources Fuel diversity	NYS's power market has added resources (especially gas, wind, and demand response) that support NYS's goals of reducing air emissions from the power sector. (See Figures 18, 28-30.) Also, the increased output of nuclear units in NY has enabled more demand to be met with lower air emissions. (See Figure 16.) And state-wide fuel diversity is strong (see Figure 29), even though NYC and Long Island are quite dependent on gas.

Table 7 [Continued]
Measures of Success – NYS's Electric Restructuring and Wholesale Power Market

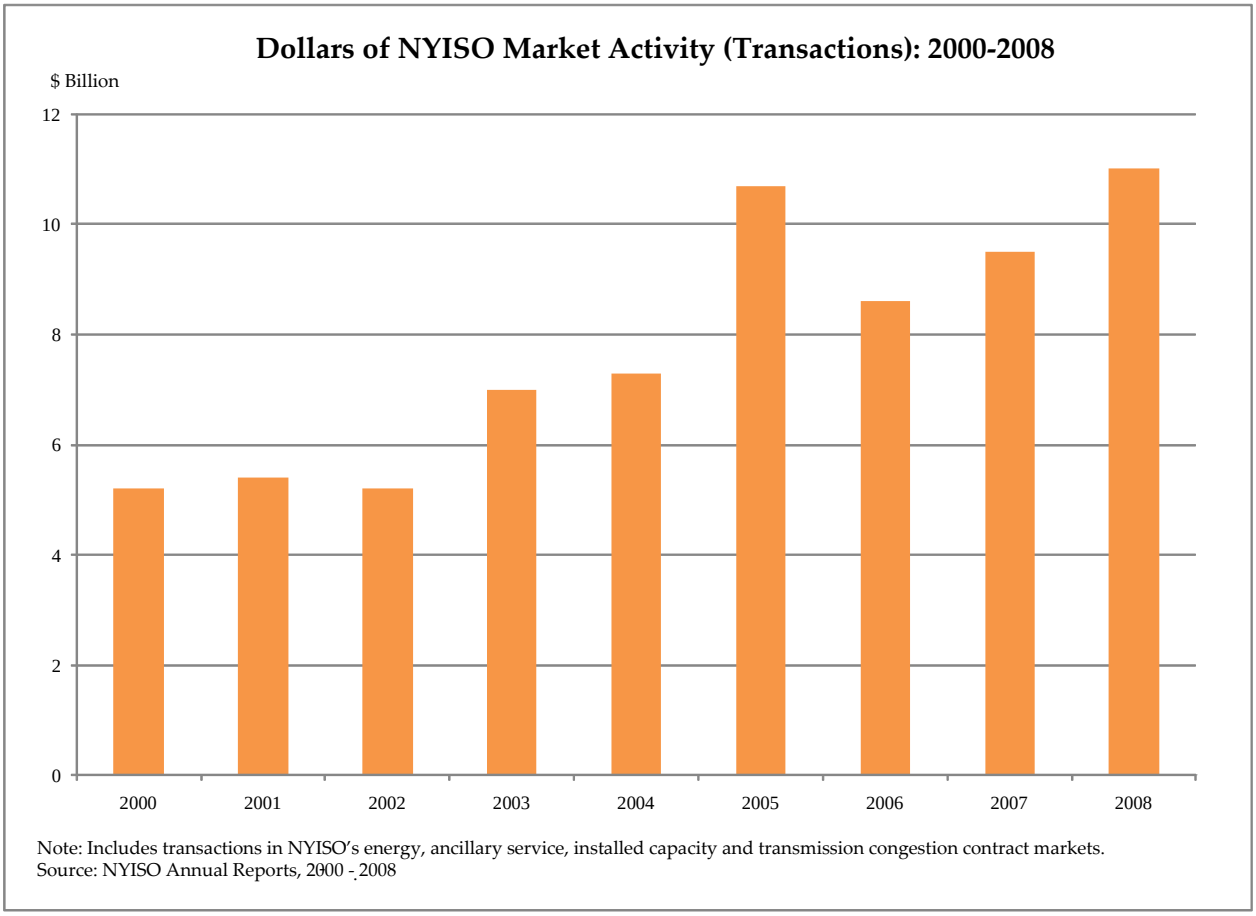
Attribute or measure	Evidence that could shed light on whether NY has a competitive power market structure	Assessment of New York wholesale market (and the NYISO's administration of it)
Means to mitigate the ability of Market Participants to exercise market power	Market monitoring and mitigation measures, institutions, processes, actions Structural conditions for mitigating market power (information, governance, due process, low barriers to entry, non-discriminatory access to bottleneck facilities and systems)	The structure of NYS's wholesale market (e.g., an RTO) provides a means to mitigate market power – including the ability of a vertically integrated utility to offer others access to its transmission facilities at less favorable terms than it gives itself, and lower barriers to entry through transparency of information, active participation of buyers in the market through price-responsive demand. (See Part 2 generally.) NYISO markets are monitored by both an internal unit as well as an external independent market advisor. The former oversees the implementation of various market power assessments and mitigation rules; the latter provides periodic evaluations of the state of the market. Some commenters raised concerns, for example that: ▪ Over the decade, NYISO has implemented numerous automatic mitigation policies to address market power concerns, which are particularly of concern in the downstate markets (NYC and LI). Some commenters feel that the mitigation measures are very complex and not transparent. ▪ Market monitors have become too focused on theoretical problems that do not line up with practical considerations of Market Participants (e.g., buy-side mitigation; bidding practices; a focus on the purity of market design such that there is too little consideration of whether the markets provide value to consumers as compared to generators; a reluctance to recognize that the downstate markets may not be competitive markets and without all manner of ISO price-mitigation procedures).
Transparency of prices and options, informed Market Participants	Accessibility of information to market participants Effective planning/information processes	Information about the prices in various markets and products (including LMBPs in the day-ahead and real-time markets; ancillary services; transmission congestion prices; installed capacity prices; loads; planning assumptions, etc.) is publicly available on NYISO's website. NYISO's working group and committee processes provide extensive opportunity for involvement by interested parties. Some commenters raised concerns that while the process is entirely open, it is nonetheless hard for entities with small personnel resources to dedicate the time and attention required during working group processes to meaningfully influence the outcomes of decisions.
Relatively stable and transparent market rules	Market administrator with independence but with input from market participants about design of policies and rules	NYISO is generally viewed as quite successful in terms of the stability of its market rules. Commenters submitted favorable feedback on the soundness of the fundamental design, which relied on substantial amounts of advance work ("they did their homework," as one commenter noted) and with improvements over time without being too unstable in terms of changing rules.

Part 3: Assessing NYISO as an Institution and in Executing its Responsibilities as Independent Grid Operator and Wholesale Power Market Administrator

As a final area of assessment, Part 3 examines the performance of NYISO itself in performing its functions. The prior two sections focused on outcomes to New York consumers and attributes of the structure of the market, and compared them to the objectives that drove the restructuring of New York's electric industry. This last section focuses inwardly, on NYISO's performance in its governance and administrative functions.

As mentioned previously, NYISO's responsibilities require it to manage activities that involve billions of dollars of other peoples' money. As shown in Figure 32, the dollar value of wholesale electricity market transactions administered by NYISO more than doubled over the past decade.[112] In 2000, energy, capacity and transmission congestion contract transactions together totaled approximately $5.2 billion dollars. In 2008, the same markets totaled $11 billion. This growth in transactions results from a combination of factors: an increase in the number of MWhs and MWs transacted in NYISO-administered markets; the level of clearing prices in the various markets (some of which are affected by changing fuel prices (e.g., in the energy markets)); and the change in the portion of total MWh transacted in central markets as compared to bilateral markets.

Figure 32



Note: Includes transactions in NYISO's energy, ancillary service, installed capacity and transmission congestion contract markets.
Source: NYISO Annual Reports, 2000 - 2008

Even at the lower levels of revenues flowing through NYISO's billing and collections systems toward the first half of the decade, the care and efficiency with which the organization conducts its operations are important to New York's consumers and its economy as a whole. But as these dollar levels have risen over the decade – both in absolute terms, and as a percentage of total electricity payments made by electricity customers in the state (as shown in Figure 13) – public interest and scrutiny of NYISO's own internal operations have risen.

Looking back over the past decade, there have been three periods of NYISO performance as an institution:

- a start-up phase, in which the organization performed well on external reliability and market design, but less well on business systems (e.g., pricing corrections, settlement and billing issues);
- a second phase beginning around 2005/2006, in which the organization focused on internal issues, striving for "excellence in execution," and hunkering down to address and improve upon business system challenges while still maintaining outcome-focused reliability and market functions; and

- a third phase – one that began a few years ago and is currently in effect in New York, in which the organization is expanding its attention to address important issues introduced by external forces and events. This phase has coincided with challenging conditions in NYISO's operating environment, including high natural gas prices that affected prices in New York's spot markets especially, the economic and financial crisis that affected New York and the rest of the country, a volatile political atmosphere in the state, and a growing sense of unease among the general public about whether to trust markets.

Commenters consistently viewed the NYISO as doing an excellent job in its role as grid operator. There is a reservoir of confidence that NYISO is performing well in this regard, with a strong staff and ethic of excellence in operations.[113] Market Participants tend to see the efficient delivery of reliable service as the primary purpose of the NYISO, and they generally express support that that is being achieved in practice. A statement in the 2009 State Energy Plan underscores the quality of NYISO's performance in these functions:

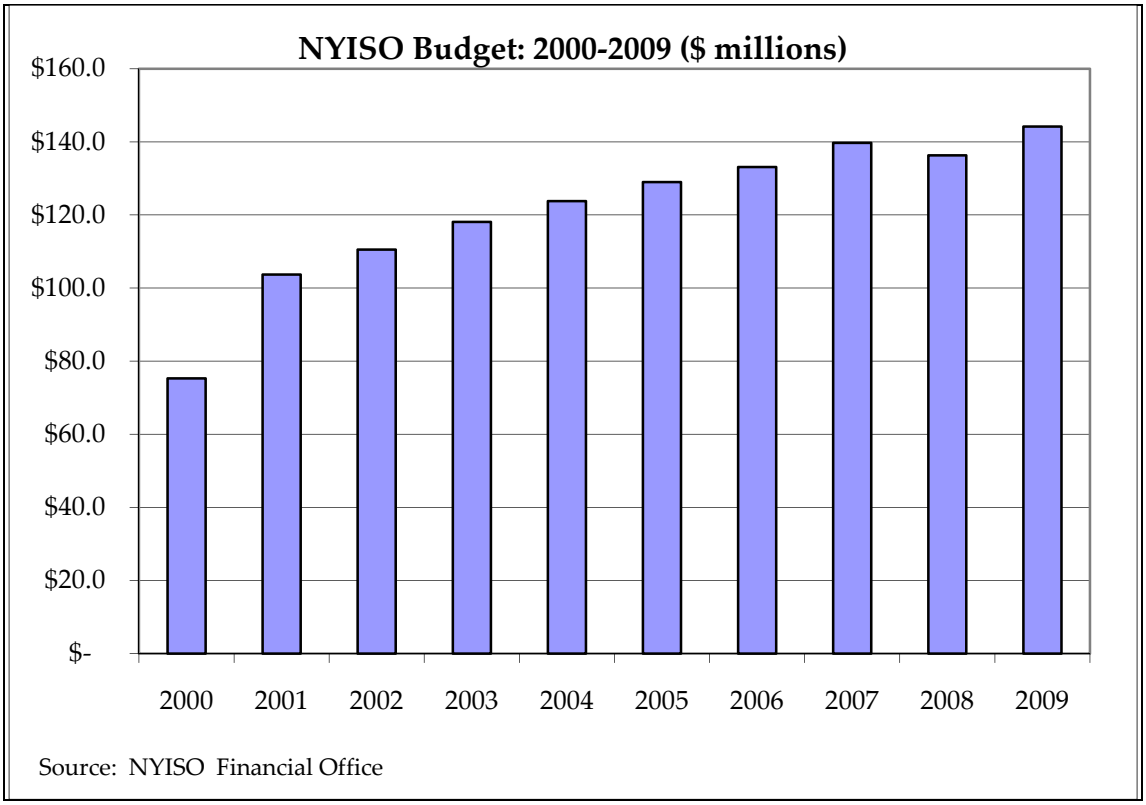
> The NYISO operates both a day-ahead market and a real-time (or balancing) energy market and produces prices for both energy and ancillary services, such as operating reserves [footnote in the original] and regulation service.[footnote in the original] Since the NYISO's inception in 1999, the software used to administer the day-ahead and real time markets has continually evolved and improved. State-of-the-art software is used to provide all wholesale electricity products in the most efficient manner possible. By making these improvements, the NYISO market became the first to optimize energy and operating reserves jointly to provide these products in the most efficient manner possible.[114]

In terms of its performance as a business entity, the predominant view expressed by commenters was that NYISO's business systems have much improved, with better response times, fewer corrections, and fewer errors than in the past. That said, there were many comments from a wide variety of stakeholders which suggest that there is still substantial room for improvement. Market Participants have not forgotten that NYISO was for a long time too slow in correcting billing and settlement errors. They know that improvements have occurred, but they think that progress needs to continue. Concerns were also raised that there are some pricing errors (as evidenced by clearing prices) that simply do not get corrected by NYISO after the fact. Finally, while NYISO has improved its response time to questions from customers, many of those same customers identify this as an area still needing much improvement.

NYISO's progress on internal administrative and business issues covers a wide range: in general, NYISO has managed to take on more administrative activities and operate a larger market (measured in terms of such things as revenues associated with market transactions, generating capacity increases, number of transmission miles, number of transmission interconnections, number of market participants, wider range of generating technologies (including intermittent wind resources) and demand-response resources, New Yorkers' total electricity use. planning processes conducted), while maintaining a degree of control over its budget. NYISO's "cost of operations" (e.g., its operating expenses, including labor, rent, and

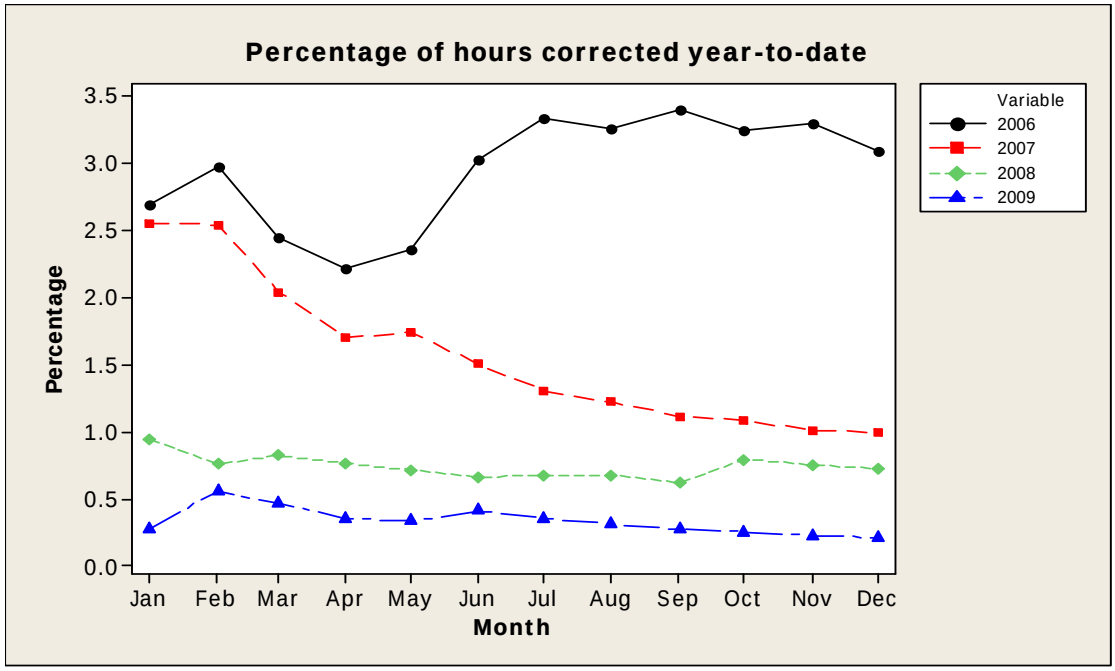
other costs) is shown in Figure 33, and to a certain degree parallels the growth in electricity market activities and assignment of responsibilities to the NYISO.

Figure 33



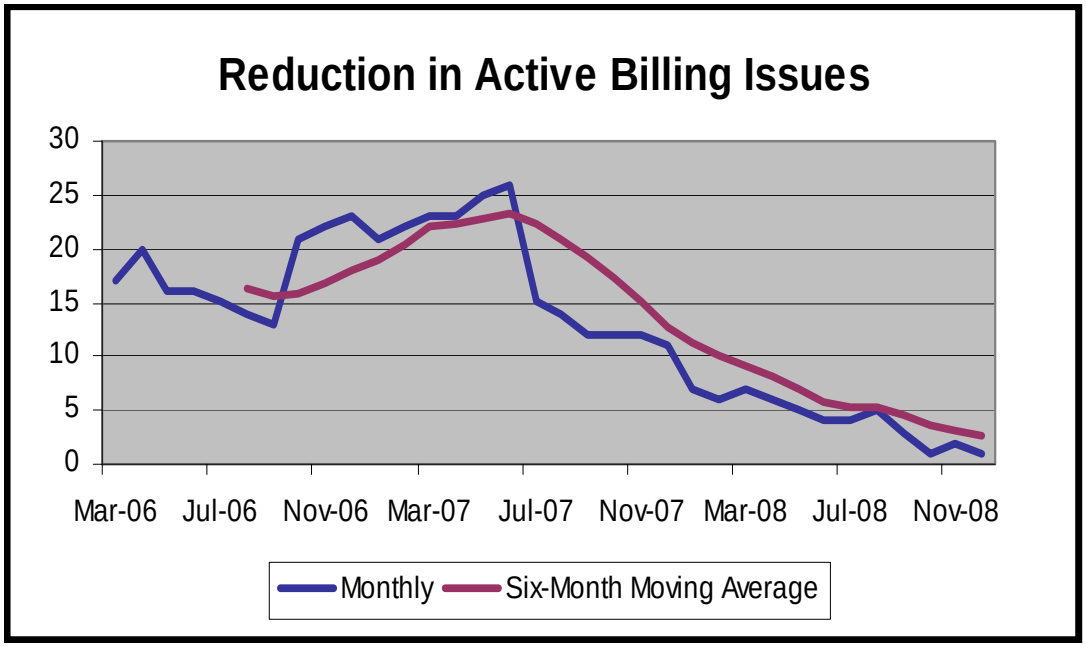
The NYISO also made progress in recent years in reducing the percentages of total hours of the year that required a correction in the electricity clearing price thereby improving market certainty. Figure 34 depicts these reductions from 2006 through 2009. Similar trends are shown in the number of active billing issues open at any time (as shown in Figure 35) and NYISO's response time to customer inquiries (as shown in Figure 36). These indicators suggest that NYISO has made important progress in "excellence in execution" after focusing its attention on these administrative and business issues in recent years.

Figure 34
Percentage of NYISO Hourly Prices That Were Corrected After the Fact: (2006-2009)



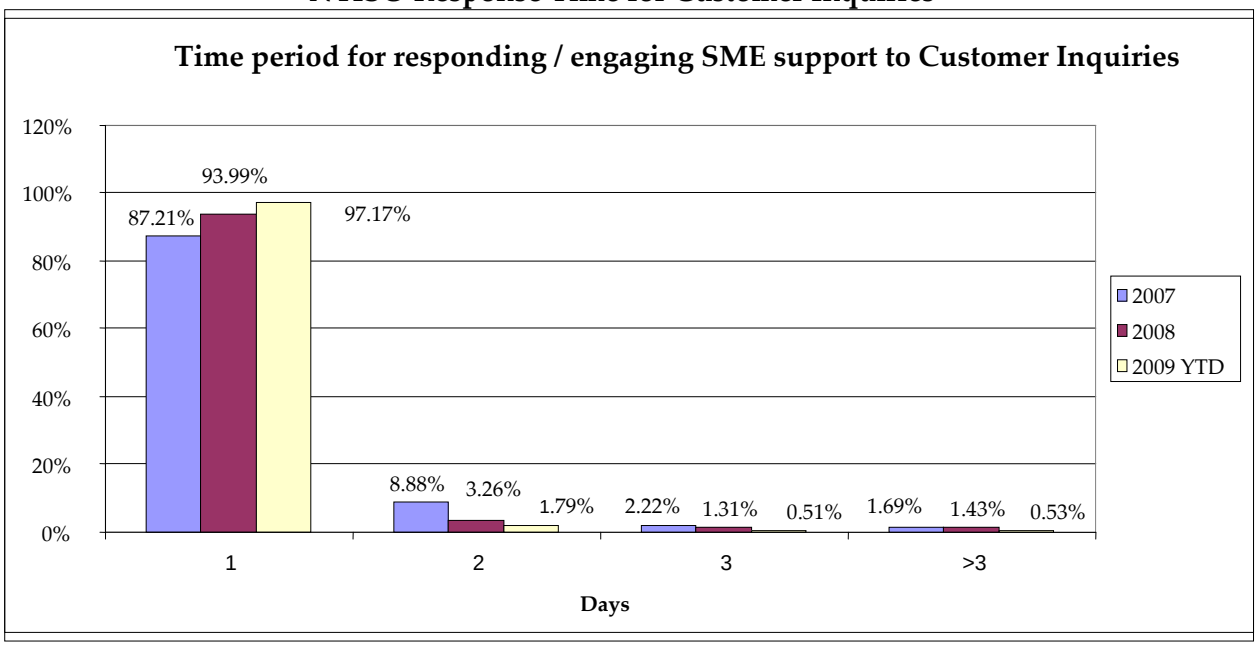
Source: Wayne Bailey, NYISO, "NYISO Excellence in Execution: A Report on Results," Management Committee Meeting, August 26, 2009.

Figure 35
NYISO Active Billing Issues: March 2006-November 2008



Source: Wayne Bailey, NYISO, "NYISO Excellence in Execution: A Report on Results," Management Committee Meeting, August 26, 2009.

Figure 36
NYISO Response Time for Customer Inquiries



Source: Wayne Bailey, NYISO, "NYISO Excellence in Execution: A Report on Results," Management Committee Meeting, August 26, 2009.

Despite this progress, NYISO still has a ways to go with of many of its constituencies in engendering confidence in NYISO as an enterprise. Based on comments from a wide range of Market Participants and other observers in order to prepare this 10-year assessment, it is clear that there is room for improvement in various aspects of NYISO as an enterprise. For example:

- While most commenters discussed favorably the value of NYISO's shared governance process, many pointed to several examples of instances where commenters perceived that NYISO had not been entirely forthcoming in bringing important issues and concerns to the Market Participants for joint resolution in a timely manner. Recent examples that were mentioned by many commenters were: a view that NYISO reacted too slowly in highlighting the Lake Erie loop flow problem (although it was noted by many that the issue received priority attention with the arrival of the new NYISO CEO starting in mid-2008); and a sense that NYISO management waited too long to bring to Market Participants the NYISO proposal to build a new operations center.
- While most commenters appreciate that NYISO's shared governance model allows for adoption of decisions without as much acrimony and administrative appeals (e.g., filings of complaints at FERC, and then with further appeals to the courts) than occurs in neighboring regions, many commenters also find the issue resolution process extremely time-consuming and at times inefficient. Groups with relatively low staffing resources find it particularly difficult to participate in a meaningful way in working groups and then experience push back in Management Committee voting processes

when they raise new issues or concerns. As a suggestion to enhance the efficiency of decision making, a surprisingly wide range of commenters felt that it may be helpful for the NYISO Board to resolve issues more frequently than it does today, rather than continuing to allow a controversial issue to be discussed, negotiated, mediated, and so on.

- Some would like to see signs of greater transparency in Board and senior NYISO management decision-making and to open the Board up to assure greater inclusion of customer perspectives and greater accountability. Such steps include provision of more readily available information about Board minutes and actions, organization charts, information about the metrics used for compensation, and so forth. While no one literally equates the NYISO to a public utility or agency, there is still a strong desire among Market Participants and other stakeholders to see the NYISO Board adopt some of the more transparent disclosures common to public agencies and shareholder-owned enterprises.
- There are somewhat predictable ways in which stakeholders on one side of the market (e.g., buyers; sellers) think that the NYISO leans more heavily towards the interests of other players in the market. This seems inevitable in a system that requires balancing interests in favor of fair rules that to which one side or the other sometimes objects. That said, a broadly (but not unanimously) shared view is that the balance of decisions is not supporting one of the hoped-for outcomes when New York established its wholesale market: that is, that consumers would not underwrite so much of the risk of investment. Examples mentioned include: NYISO's imposition of buyer mitigation in New York City even though FERC had not raised buyer-side market power as a concern; a market rule that puts 80 percent of the cost of NYISO operations on buyers of power, and only 20 percent on generators; insufficient speed in addressing billing and settlement issues that end up imposing costs on consumers (especially in situations where the NYISO may lack the authority to issue refunds in its markets); a tendency of the NYISO and its advisors to talk about "the market" in a way that suggests that the market is more important than the consumers it serves; and insufficient attention given for too many years on addressing seams issues that might produce savings in New York markets (something that the NYISO is addressing as a priority at present).

The overall impression given by the comments made by a wide range of stakeholders is that there is a strong desire for NYISO to inspire greater confidence among Market Participants and other observers, and that NYISO leadership adequately appreciates and acts on the important "public trust" functions given to it as the independent grid operator and administrator of New York State's wholesale electricity market. New Yorkers may rely more on market forces to provide electricity than they did a decade ago, but that does not mean that stakeholders 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.

This seems to have created a heightened interest among many stakeholders for NYISO leadership to demonstrate that it understands its role in serving New York consumers. While many electric industry stakeholders in New York certainly recognize that the members of the

NYISO Board and management are neither officials of a public agency nor stewards of a shareholder-owned corporation, these same stakeholders point to the need for the organization's decision makers to signal that they understand and act with respect for the organization's unique role as a particularly important caretaker in the provision of a public service in the State of New York. Implicitly, these commenters seem to suggest that while they appreciate the importance and value of having an *independent* system operator, they also want the organization to exercise its role in a judicious, transparent and accountable, rather than a detached, way.

To conclude on a positive note, there is much respect for the high-quality job that NYISO is doing in a highly technical business and critically important function to keep the lights on. Comments received for this assessment identified both the progress that NYISO has made in its performance as a business enterprise over the past decade, as well as the areas for further improvement going forward.

LOOKING AHEAD

In substantial ways, many of the concerns that led to the restructuring of New York's electricity market and to the establishment of NYISO (summarized in Tables 1 and 5) have been realized in this first decade of NYISO operations. New Yorkers have had reliable bulk power, and NYISO has played no small part in ensuring that outcome. Market forces have been introduced deep into the wholesale market, leading to power production efficiencies and investment in relatively efficient generating units. Structural changes that have occurred have reinforced the competitiveness of the market. Many public policy goals of New York State – including increased energy from renewable power projects, lower air emissions from power plants, greater reliance on demand-side measures to assure an efficient market with lower costs than otherwise would occur, assuring that consumers have retail customer choice, and ensuring that utilities recover their stranded costs – have seen positive outcomes in the past decade. More than anything else, the area where New Yorkers' hopes have not been realized is in the reduction of retail electricity *prices* in the State relative to the U.S. average. Nevertheless, New Yorkers annually spend less on electricity service as a percentage of their personal income and as a percentage of gross state product than does the average American.

It is hard to know what prices would have looked like today if the industry had not introduced competition a decade or more ago, but there are strong reasons to suggest that electricity rates would have been no lower – and might have been much higher – without the electric system elements in place today in New York.

There are areas for NYISO to focus on in the future, to help support the State's goals for reliable, affordable and clean energy:

- There is support among many Market Participants for NYISO's currently and relatively aggressive efforts to "broaden the markets." This includes efforts to: widen the geographic focus of regional planning exercises in order to encompass planning for possible infrastructure additions between NYISO and neighboring areas (e.g., New England, PJM, and Eastern Canada); identify ways to further enhance the alignment of market rules across theses regions; establish ways to support planning for, siting and permitting of, and cost-recovery mechanisms for transmission capacity between regions; and address congestion pricing at the borders to address uneconomic and other loop flows. As part of this, NYISO should continue to look for ways to spread administrative and general costs across a wider region, through cost-allocation, cost-sharing and other mechanisms that lead to administrative efficiencies. Such options may include consolidation or merger(s) with neighboring RTOs, or at least priority attention to alignment of market rules and planning for transmission issues (including facility enhancements and/or transmission pricing policies) at the boundaries of current RTOs.
- There is weaker support among Market Participants and other stakeholders for the range of activities that NYISO has identified as priorities for "deepening the markets." To the extent that this focuses on issues relating to better integration of new resources (e.g., demand response, and non-dispatchable resources like wind and solar power) or

products (e.g., plug-in hybrid electric vehicles), there seems to be strong support. To the extent that "deepening the markets" suggests a more active role in advocating for dynamic pricing for the residential market, there is much less support (in light of the State's current statute that prohibits such pricing approaches for this segment of customers).

- NYISO will serve New York well if it continues to focus on its unique role as a technical entity – excelling at keeping the lights on; identifying ways to pull savings out of the system's operations; helping to ensure that demand-side resources have a role in wholesale markets; pursuing appropriate initiatives that support the State's environmental objectives (including such things as the NYISO's work on integration of wind resources); and providing planning support to the State as directed in New York's new energy planning law.
- As part of this mission as a technical enterprise, NYISO should continue to sharpen its ability to "execute with excellence" and to administer its tariff responsibilities without error. FERC had indicated its intention to require NYISO, along with the other independent grid operators, to measure the performance of its markets using a common set of operational and financial metrics that include reliability, markets, and organizational effectiveness issues. NYISO, in collaboration with other RTOs that have been working with FERC, has identified a range of potential performance metrics[115] (see Table 8, below), and has begun to receive comments from Market Participants[116] about other metrics that would be important to include to assure a well-rounded assessment tied to the original goals of the market. Many of these metrics are similar to, but also add to those used in this assessment. Tracking of RTOs' activities along these lines would provide greater transparency of their business execution and the performance of their administration of reliability standards, transmission tariffs and market rules.

Table 8
Potential Performance Metrics for RTOs – In Discussion at FERC
(In Draft as of January 20, 2010)

Reliability metrics	Compliance with regional reliability standards
	Dispatch reliability
	Operational planning – load forecast accuracy
	Long-term reliability planning – transmission
	Long-term reliability planning – generation
	Transmission outage coordination
Market pricing	Generation availability
	Congestion management
	Demand response
	Renewables
Organizational effectiveness	Administrative costs
	Customer satisfaction/value
	Billing controls
Other information	Infrastructure investment – interconnection/ transmission process metrics
	Special protection schemes
	Wind forecasting accuracy
	Unscheduled flows
	System lambda
	Fuel diversity
	Back-up facility
	Energy market price convergence

Source: Mary McGarvey, "ISO/RTO Metrics Initiative," Presentation to the NYISO Management Committee, January 20, 2010.

FOOTNOTES

[1] Susan Tierney, "Decoding Developments in Today's Electric Industry: Ten Points in a Prism," October 2007, Executive Summary, paper prepared for the Electric Power Supply Association, October 2007.

[2] Stephen Whitley, President's Report to the Management Committee, January 20, 2010.

[3] Energy Information Administration ("EIA"), http://www.eia.doe.gov/cneaf/electricity/page/capacity/existingunits 2008.xls (accessed 1/4/2010).

[4] American Wind Energy Association ("AWEA"), http://www.awea.org/projects/ (accessed 1/25/2010).

[5] Stephen Whitley, "Foundation to the Future: *Infrastructure, Innovation, Investment," Opening remarks at NYISO's Annual Symposium, April 30, 2009.*

[6] These are the Cross Sound Cable (linking Long Island and Connecticut); the Neptune Project (connecting Long Island and New Jersey); and the Linden Variable Frequency Transformer (connecting New Jersey and New York City).

[7] See: New York Public Service Commission ("NY PSC"), Opinion No. 96-12, Case 94-E-0952 et al., In the Matter of Competitive Opportunities Regarding Electric Service, Opinion and Order Regarding Competitive Opportunities for Electric Service (May 20, 1996), pages 1-2 (hereinafter "Competitive Opportunities Order").

[8] The author, Susan F. Tierney, is a Managing Principal at Analysis Group in Boston. An expert on energy policy, regulation and economics, she has had a longtime focus on the electric and gas industries. A consultant for 15 years, she previously served as the Assistant Secretary for Policy at the U.S. Department of Energy, the Secretary for Environmental Affairs in Massachusetts, Commissioner at the Massachusetts Department of Public Utilities, and executive director of the Massachusetts Energy Facilities Siting Council. She taught at the University of California at Irvine, and earned her Ph.D. and Masters degrees in regional planning at Cornell University in New York State. She currently teaches part time at the Massachusetts Institute of Technology. In addition to authoring many articles and reports, she serves on a number of boards of directors and advisory committees, including the National Commission on Energy Policy.

[9] The specific source documents and information are noted in footnotes here. In preparation for this assessment, the author examined the original filings submitted by New York's transmission owners to the FERC to establish NYISO; the regulatory orders issued by the NY PSC during the 1990s with respect to reasons leading up to the introduction of competition into New York's electric industry; New York State energy plans (2003, 2009); NYISO annual reports, state of the market reports, white papers, and other topical reports issued by NYISO; documents published by various entities relating to NYISO and New York's electric industry (including those prepared by the NY State Reliability Council ("NY SRC"), public power organizations, generator associations in New York and Washington, scholarly documents, and others).

[10] Comments were received on a confidential basis from individuals representing Market Participants involved in NYISO markets, public officials in New York, and other industry experts and observers. The author invited comments from all Market Participants, received written comments from several parties, and conducted an interview with all parties who requested a verbal interview. She also interviewed senior members of NYISO management. In the end, comments were received from approximately four dozen parties, including representatives of New York's investor-owned transmission companies, publicly owned utilities, power plant owners and operators, consumer groups, environmental groups, energy marketers, virtual traders, state officials, and others. Many of these groups participate and/or have experience in New York's electric industry and in neighboring regional power markets as well. The author estimates that the vast majority of people interviewed had worn more than one institutional "hat" over the period covered in this report; and more than half of the people interviewed have had experience in one or more regional electricity regions and markets.

[11] The author informed those she interviewed that she would treat their comments as confidential and would not attribute specific comments to specific individuals or parties, except where formal written comments were provided to the author.

[12] NY PSC, Opinion No. 94-27, Case 94-E-0952 et al., In the Matter of Competitive Opportunities Regarding Electric Service, Opinion and Order Regarding Proposed Principles to Guide the Transition to Competition (December 22, 1994); NY PSC, Competitive Opportunities Order.

[13] Within individual utilities, units were generally dispatched on a least-cost basis to meet the needs of their own customers. If utility companies had surplus generating resources after meeting their own needs and other companies needed additional energy, then these remaining resources were offered up for dispatch to meet remaining pool-wide requirements, with the affected companies and the NYPP "sharing the savings" resulting from these shared resources.

[14] It is difficult to discern the exact budget of the New York Power Pool in the years prior to the establishment of the NYISO. This results from many things, most notably the fact that the NYPP no longer exists with an archive of publicly accessible documents. In recent years, there have been various references to a NYPP budget at a level of $14 million, $20 million or $32.5 million, but the author was not able to confirm or verify any amount. Notwithstanding these data limitations, it is important to note that any reported budget of the NYPP should not be directly compared to a budget of the NYISO. The functions of the two organizations are substantially different, and many of the costs of operating and supporting the NYPP were embedded in the costs of the utilities that made up its membership. For example, a NYPP budget did not include any of the following costs which have to be fully borne by the NYISO, with its much-more expanded functions compared to NYPP: transmission tariff administration; interconnection process administration; planning for reliability and economic standards; wholesale power market administration; fully funding various general and administration costs (such as finance, legal, regulatory, human resources, insurance, credit) which were substantially borne by utilities under the NYPP period.

[15] This observation is based on the author's review of NY PSC documents, documents on electric industry restructuring on the EIA website, and discussions with various parties involved in electric industry restructuring in New York State. See http://www.eia.doe.gov/cneaf/electricity/page/fact_sheets/new_york.html for example.

[16] The NY PSC's processes involved significant outreach and opportunities for public comment. As described in the NY PSC's order:

> "The common themes expressed by those who support competition are as follows, listed in descending order of frequency:
>
> Current utility bills are too high;
>
> Utilities are wasteful and inefficient, and their personnel receive excessive salaries;
>
> High electricity prices are causing industries to move, creating job losses;
>
> Customers would like to choose their electricity providers.
>
> Some consumers offer specific recommendations for us to consider. They are as follows, again listed in descending order of frequency:
>
> The transition should not degrade environmental quality, reduce energy efficiency, or limit the use of renewable resources;
>
> The Commission should proceed carefully as it moves toward competition, allowing sufficient time for consumer education and input;
>
> Consumer protections and low-income programs should be maintained;
>
> The benefits of competition should be available to all customers, not just large customers.
>
> On the other hand, 35% (724) of the consumer comments expressed opposition to deregulating the industry. The common themes expressed by those who oppose deregulation are as follows, in descending order of frequency:
>
> High rates are due to high taxes on utility services, not the structure of the industry;
>
> Deregulation has not worked well in other industries such as telephone and airlines;
>
> People are concerned about loss of jobs in the utility industry;
>
> There is serious concern about deterioration of system reliability, safety, and service quality;
>
> Deregulation will increase rates;
>
> Competition will benefit only large customers;
>
> High rates are due to IPP contracts, not the industry structure;
>
> High rates are due to policy mistakes of the government;

There is no study showing that deregulation will reduce costs."
NY PSC Competitive Opportunities Order, pages 10-11.

[17] Other nearby states that adopted legislation to restructure their electric industries included: New Hampshire (in May 1996); Pennsylvania (in December 1996); Rhode Island (in August 1996); Maine (in May 1997); Massachusetts (in November 1997); Connecticut (in April 1998); and New Jersey (in February 1999). EIA, Status of State Electric Industry Restructuring Activity – as of February 2003. See also: Timothy Brennan, Karen Palmer, Raymond Kopp, Alan Krupnick, Vito Stagliano, and Dallas Burtraw, *A Shock to the System: Restructuring America's Electricity Industry*, Resources for the Future, 1996; and Peter Fox-Penner, *Electric Utility Restructuring: A Guide to the Competitive Era,* Public Utility Reports, 1997.

[18] The NY PSC described its outlook in its Competitive Opportunities Order (pages 25-30):

"Our vision for the future of the electric industry in light of competitive opportunities includes the following factors: (1) effective competition in the generation and energy services sectors; (2) reduced prices resulting in improved economic development for the State as a whole; (3) increased consumer choice of supplier and service company; (4) a system operator that treats all participants fairly and ensures reliable service; (5) a provider of last resort for all consumers and the continuation of a means to fund necessary public programs; (6) ample and accurate information for consumers to use in making informed decisions; and (7) the availability of information that permits adequate oversight of the market to ensure its fair operation.

First, there should be effective competition in both the generation and energy services sectors. We expect enough players to participate so that no single provider of service dominates the market as a whole or any part of it, controls the price of electricity, or limits customer options. An effective market requires many buyers and sellers. Throughout this movement toward competition, we expect all market participants to act with the highest integrity and to engage in ethical behavior that is above reproach.

Second, competition should result in lower electric prices in New York State overall than currently. The large difference between New York's prices and the national average electric price should begin to shrink, rather than growing as it has under regulation. As a result of these lower prices, New York's competitive position will improve and economic development will be furthered, with the creation of additional jobs and increased opportunities for businesses and residents.

Third, consumers will have more opportunities to choose a producer of electricity and to decide on preferable energy service options. Consumers should be able to choose not only their suppliers, but also the terms of their service through various contract options, including the design of their rates and the length of their contracts for service. If desired, consumers should be able to purchase power from different locations, constrained only by the need for continued reliability. Energy service packages should be available that include demand side management and other service options, possibly along with meter reading and billing choices. Additionally, customers should see the emergence and proliferation of non-traditional suppliers, such as brokers, marketers, and aggregators, who will offer to act as intermediaries between customers and utilities and will be available to combine customers so that preferable pricing and service options are offered even to small customers.

Fourth, the system will be operated by an entity that is independent of all energy suppliers who are participants in the new competitive market. Along with a market exchange mechanism that will determine the price of generation, a system operator will ensure customers continue to enjoy the high level of reliability that exists today.

Fifth, all consumers will be assured of having an available provider of electricity. In this way, regardless of whether they take advantage of the new options, consumers could at least count on the safe and adequate provision of electric service at reasonable rates. Also, necessary public programs will be funded and carried out if they are not otherwise provided by the market.

Sixth, consumers will be provided reliable information about available options and will be given assistance in making wise choices about the provision of electric service. Thus, consumers will be fully educated about the new players in the competitive market and will be able to take advantage of the

available benefits. Also, consumers will be aware of the mechanisms in place to resolve individual problems if they develop under the new industry structure.

Seventh, information will be available that will permit adequate oversight of the new market for electricity and protection of consumers from abuse. This will provide an opportunity to ensure that competitors are acting in a way that is consistent with this vision….

Consistent with the foregoing vision, general goals for the future include the following:

1. Lowering Rates for Consumers: Market forces overall are expected to produce, over time, rates that will be lower than they would be under a regulated environment. As we move toward competition, our expectation is that rates overall will be reduced.

2. Increasing Customer Choice: Increased customer choice among types of services and prices to be paid should mean allowing customers throughout the State the opportunity to choose among a number of suppliers (such as generators and energy service companies (ESCOs)) of electricity and other services. Customers will also be able to choose to lower their levels of electric service in return for economic benefits.[footnote in the original]

3. Continuing Reliability of Service: In order to protect all consumers, any new system involving competition in the generation sector must have reliability of the bulk power system as a top priority, including an independent system operator (ISO) that must have the authority and means to continue to provide this reliability.[footnote in the original] An example of this is interruptible electric service, that could be tailor-made to an individual customer's desires.

4. Continuing Programs that are in the Public Interest: We have the responsibility to ensure that electric service is provided safely, cleanly, and efficiently. This responsibility may entail continuing specific measures to preserve certain programs such as energy efficiency, research and development, environmental protections, and low-income beyond what competitive markets provide.

5. Allaying Concerns About Market Power: No competitor or group of competitors should be able to exercise undue market power over other competitors either because of market power at another stage of production (vertical market power) or because of dominance at the same stage of production (horizontal market power). The clearest way to preclude vertical market power is to have divestiture of (1) generation, (2) transmission and distribution, and (3) energy services. Horizontal market power can be avoided by ensuring that a sufficient number of independent competitors participate in the market.

6. Continuing Customer Protections and the Obligation to Serve: Statutory requirements make clear that our mandate is to ensure that all New Yorkers have access to safe and reliable service at just and reasonable rates.[footnote in the original] Each customer must be able to count on at least one supplier who will continue to provide service at reasonable rates in the event that (a) the customer chooses to make no change from its current situation,(b) a new supplier fails to meet its obligations, or (c) competitive alternatives are not yet available in the area."

[19] These changes were the culmination of a series of investigations that the NY PSC began by 1993. In 1994, the NY PSC considered a number of issues related to a future regulatory regime for the provision of electric service in light of competitive opportunities, with an overall objective "to identify regulatory and ratemaking practices that will assist in the transition to a more competitive electric industry designed to increase efficiency in the provision of electricity while maintaining safety, environmental, affordability, and service quality goals." In June 1995, the NY PSC adopted principles to "form the basis for the development of a framework for movement toward a more competitive electric marketplace." See NY PSC Competitive Opportunities Order, pages 2-3. This order followed a year-long collaborative process, and an Administrative Law Judge's decision and recommendations (December 21, 1995) calling for the establishment of a proposed model for restructuring the electric industry in New York State. This order set forth the NY PSC's "vision of the future regulatory regime and the goals we expect to be achieved, and describes the strategies that should be used to accomplish the goals." NY PSC Competitive Opportunities Order, page 5.

[20] As reported by the New York State Energy Planning Board, "An integral part of establishing a competitive wholesale electricity market in New York was the separation of the ownership of transmission and distribution assets from the ownership of electric generation assets. This policy was announced in Opinion No. 96-12 of PSC Cases 94-E-0952, et. al. [footnote in the original] in which the PSC stated that generation should be separated from transmission

and distribution to prevent the exercise of vertical market power.[fn] In addition to the policy stated in Opinion No. 96-12, the PSC issued a Statement of Policy Regarding Vertical Market Power (VMP)[footnote in the original] (VMP Policy Statement) that establishes a rebuttable presumption that the ownership of generation by an affiliate of a transmission and distribution company would unacceptably exacerbate the potential for VMP. The PSC policies adopted in the mid-1990s have resulted in the divestiture of most utility owned generating facilities, the exception generally being some small hydro units and natural gas turbines and units associated with the Con Edison steam system." New York State Energy Planning Board, *"Electricity Assessment: Resources and Markets," New York State Energy Plan 2009,* December 2009, pages 16-17.

[21] The NY PSC recommended that New York adopt a "Poolco model" for the wholesale power market, with:

> "a fully functioning pool (with hourly spot market prices established) that accommodates individual retail physical bilateral contracts, [footnote in the original] to be administered by an independent system operator. As a first step, a wholesale poolco model with an independent system operator and market mechanisms would be established in such a way as to allow an orderly and rapid transition to full retail access. In making this recommendation, the following conclusions, among others, were reached:
>
> - All possible efforts to reduce electric rates should be continued, including efforts to ease the high tax burdens in the State and to reduce utility commitments under independent power producer contracts that include obligations for payments well above current wholesale prices . . . .
> - Retail competition has the potential to benefit all customers by providing greater choice among their electricity providers as well as increased pricing and reliability options. But retail access brings with it significant risks and requires considerable caution, and should be provided only if it is in the best interests of all consumers . . . .
> - Reliability of the bulk power system is critical and should not be sacrificed in any way for potential lower rates from retail access. In order to ensure reliability, effective competition at the wholesale level should be established first, with an eye toward adding retail access as rapidly as possible once a market is established and reliability is ensured. Also, during the wholesale phase, consideration could be given to the development of effective competition among energy service companies, which does not appear to exist today . . . .
> - As to strandable costs . . ., a generic decision can address the definition, method for measurement, requirements for mitigation, a preferable recovery mechanism, and a standard for recovery. The calculation, the amount to be recovered from ratepayers, and the timing of recovery should be left to individual rate cases or special proceedings that should begin during 1996 . . . . [S]trandable costs, which could be the subject of a separate recovery mechanism (outside the market), must be prudent, verifiable, and non-mitigatable…..
> - Any restructuring model should include a mechanism for recovering costs required to be spent on environmental and other public policy considerations that would not otherwise be recovered in a competitive market. A non-bypassable system benefits charge appears to be a fair way to ensure that such programs be continued. These matters should be thoroughly examined in the context of individual utility filings . . . .
> - In any model under which the production of electricity is deregulated, it must be separated from transmission and distribution systems in order to prevent onset of market power. While outright divestiture would accomplish this most effectively, it would also foreclose the Commission's access to books and records related to generation assets . . . . Utilities should make individual proposals regarding preferable corporate structures, explaining how market power will be alleviated.
> - In order to protect all customers, transmission and distribution companies will need to remain obligated to serve all customers, at least in the short term.
> - Consumer protections currently in place for both residential and non-residential customers should remain. It is premature to conclude that energy services should be deregulated, without a record supporting the existence of effective competition in the market . . . ."

NY PSC, Competitive Opportunities Order, pages 12-15.

[22] New York regulators commented at the time on the fact that their work was carried out in parallel with changes at the federal level: "Our decision to further competitive opportunities in electric markets in large measure mirrors similar efforts at the federal level. The Federal Energy Regulatory Commission (FERC) recently issued two final rules in major rulemakings addressing open access and stranded costs at the wholesale level [footnote in the original] and the Open Access Same-Time Information System.[footnote in the original] FERC's efforts should generally assist the transition to a more competitive marketplace through the filing by utilities of non-discriminatory open access transmission service tariffs, the transparent provision of information on wholesale power transactions, and the required separation of wholesale marketing and transmission operation functions." NY PSC, Competitive Opportunities Order, page 33.

[23] After several years of investigation and relying in part on new authorities established under the federal Energy Policy Act of 1992, FERC adopted Order 888 in June of 1996, along with several companion regulations, requiring that jurisdictional electric transmission providers provide "open access" transmission service to others on comparable terms and conditions to the service they provide for their own customers. This policy was intended to support competition and economic efficiencies in the provision of wholesale electric service. See Order 888: 75 FERC 61,080, Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities, Order No. 888, 61 Fed. Reg. 21,540, FERC Stats. & Regs. 31,036 (1996); order on reh'g, Order No. 888-A, 78 Fed. Reg. 61,220 (1997), FERC Stats. & Regs. 31,048 (1997); order on reh'g, Order No. 888-B, 81 FERC 61,248 (1997); and order on reh'g, Order No. 888-C, 82 FERC 61,046 (1998). See also, 83 FERC 61,352, In the Matter of Central Hudson Gas & Electric Corporation, et al., Order Conditionally Authorizing Establishment of Independent System Operator, Dockets Nos. ER97-1523-000 and OA97-470-000, June 30, 1998.

[24] Order 888 set out eleven principles to determine whether a proposal to form an "ISO would conform to the federal regulators' requirements and support its goals for promoting the establishment and operations of competitive wholesale markets for the benefit of customers." Summarizing Order 888 (pages 280-286), these principles were that:

1. The ISO's governance should be structured in a fair and non-discriminatory manner.
2. An ISO and its employees should have no financial interest in the economic performance of any power market participant. An ISO should adopt and enforce strict conflict of interest standards.
3. An ISO should provide open access to the transmission system and all services under its control at non-pancaked rates pursuant to a single, unbundled, grid-wide tariff that applies to all eligible users in a non-discriminatory manner.
4. An ISO should have the primary responsibility in ensuring short-term reliability of grid operations. Its role in this responsibility should be well-defined and comply with the applicable standards set by North American Electric Reliability Council and the regional reliability council.
5. An ISO should have control over the operation of interconnected transmission facilities within its region.
6. An ISO should identify constraints on the system and be able to take operational actions to relieve those constraints within the trading rules established by the governing body. These rules should promote efficient trading.
7. The ISO should have appropriate incentives for efficient management and administration and should procure the services needed for such management and administration in an open competitive market.
8. An ISO's transmission and ancillary services pricing policies should promote the efficient use of and investment in generation, transmission and consumption. An ISO or an RTG [Regional Transmission Group] of which the ISO is a member should conduct such studies as may be necessary to identify operational problems or appropriate expansions.
9. An ISO should make transmission system information publicly available on a timely basis via an electronic information network consistent with the Commission's requirements.
10. An ISO should develop mechanisms to coordinate with neighboring control areas.
11. An ISO should establish an alternative dispute resolution process to resolve disputes in the first instance.

See also the subsequent orders issued by the FERC in determining that NYISO would comply with these requirements. See also, 83 FERC 61,352 (In the Matter of Central Hudson Gas & Electric Corporation, et al., Order Conditionally Authorizing Establishment of Independent System Operator), Dockets Nos. ER97-1523-000 and OA97-470-000, June 30, 1998.

[25] On January 31, 1997, a filing was submitted jointly by CHG&E, ConEd, LILCo, NYSEG, NIMO, O&R, RG&E, and the NYPP. This initial filing was supplemented in May and December of 1997. See FERC Docket Nos. ER97-1523-000 and OA97-470-000, Order Conditionally Authorizing Establishment of Independent System Operator, June 30, 1998.

[26] The three NYISO standing committees composed of Market Participants would be the Management Committee, an Operating Committee, and a Business Issues Committee – with voting in the committees weighted by formula that reflect various constituencies in the state's electric market.

[27] 83 FERC 61,352, FERC Docket Nos. ER97-1523-000 and OA97-470-000, page 4.

[28] 83 FERC 61,352, Order Conditionally Authorizing Establishment of Independent System Operators, In the Matter of Central Hudson Gas & Electric Corporation, Consolidated Edison Company of New York, Inc., Long Island Lighting Company. New York State Electric & Gas Corporation, Niagara Mohawk Power Corporation, Orange and Rockland Utilities, Inc., Rochester Gas and Electric Corporation, and the New York Power Pool, FERC Docket Nos. ER97-1523-000 and OA97-470-000, June 30, 1998; and 86 FERC 61, 062, Order Conditionally Accepting Tariff and Market Rules, Approved Market-Based Rates and Establishing Hearing and Settlement Judge Procedures, In the Matter of Central Hudson Gas & Electric Corporation, Consolidated Edison Company of New York, Inc., Long Island Lighting Company. New York State Electric & Gas Corporation, Niagara Mohawk Power Corporation, Orange and Rockland Utilities, Inc., Rochester Gas and Electric Corporation, and the New York Power Pool, FERC Docket Nos. ER97-1523-000 and OA97-470-000, January 27, 1999.

[29] Bid-based energy markets actually commenced in November 1999.

[30] NYISO, "NYISO 2000: Annual Report of the New York Independent System Operator, Inc.," 2000, page 9.

[31] See the listing of NY PSC proceedings (from 1976 through 1994) in footnote 1 on page 5 of NY PSC, Opinion No. 94-27, Case 94-E-0952, In the Matter of Competitive Opportunities Regarding Electricity Service, Opinion and Order Regarding the Proposed Principles to Guide the Transition to Competition (December 22, 1994).

[32] See NY PSC Competitive Opportunities Order, page 1.

[33] NYISO, Gold Book, 2009, page 21.

[34] NYISO, Gold Book, 2009, page 21.

[35] NYISO, Gold Book, 2009, page 21.

[36] NY PSC, http://www.dps.state.ny.us/Electric_RA_Migration _08_00.htm, (accessed 1/26/10).

[37] NY PSC, http://www.dps.state.ny.us/Electric_RA_Migration_ 08_05.htm, (accessed 1/26/10).

[38] NYISO, Gold Book, 2009, page 21.

[39] NYISO, Gold Book, 2009, page 21.

[40] NYISO, Gold Book, 2007, page 2. From 2000 through 2006, the reserve requirement was 18%.

[41] NY PSC, http://www.dps.state.ny.us/Electric_Migration_Web_Report _Aug09.pdf, (accessed 1/26/10).

[42] Stephen Whitley, "Foundation to the Future: Infrastructure, Innovation, Investment," Opening remarks at the NYISO Annual Symposium, April 30, 2009; AWEA, Year End 2009 Market Report, January 2010, page 4.

[43] David Patton, NYISO State of the Market Report, 2000 April 2001.

[44] Potomac Economics, Ltd. (Independent Market Advisor to the New York ISO), "2005 State of the Market Report, New York ISO," August 2006, pages iv-v.

[45] New York State's "Article X" power plant siting process was amended by statute in 2001 to expedite the approvals of certain power plant applications. New York State Energy Planning Board, State Energy Plan, 2002, page I-10.

[46] David Patton, NYISO State of the Market Report, 2000, April 2001, page v.

[47] David Patton, NYISO State of the Market Report, 2000, April 2001, page iii.

[48] David Patton, NYISO State of the Market Report, 2000, April 2001, pages xi-xii.

[49] See Susan Tierney, "Decoding Developments in Today's Electric Industry — Ten Points in the Prism," October 2007, page 10.

[50] As of the summer of 2000, when retail choice was very new, approximately 5 percent of non-residential customers had migrated to a supplier other than their local utility. By the summer of 2005, 56 percent of large non-residential customers (and 74 percent of total large non-residential sales) had migrated under retail choice. As of the summer of 2009, 53 percent of large non-residential customers were buying commodity supply from a competitive supplier, with 77 percent of total class sales from such suppliers. See NY PSC, http://www.dps.state.ny.us/Electric-Gas_RA_Archives.html; http://www.dps.state.ny.us/ Electric_Migration_Web_Report_Aug09.pdf (accessed 1/26/10).

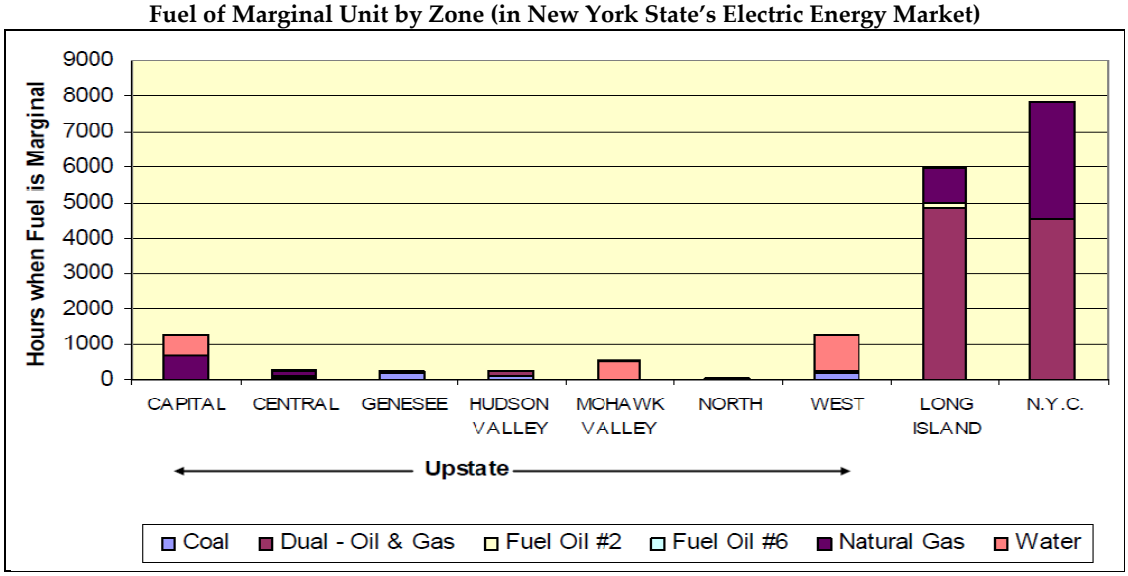
[51] See Table 4.

[52] The NY PSC determined that "electric utilities should maintain balanced commodity supply portfolios – characterized as neither 0% nor 100% hedged – for serving residential and small commercial and industrial" (collectively, mass market) customers. [Footnote in the original, referencing NY PSC, Case 00-M-0504, Development of Retail Competitive Opportunities, Statement of Policy on Further Steps Towards Competition in Retail Energy Markets (issued August 25, 2004)]. See NY PSC, Case 06-M-1017, Proceeding on Motion of the Commission as to the Policies, Practices and Procedures For Utility Commodity Supply Service to Residential and Small Commercial and Industrial Customers, Order Requiring Development of Utility-Specific Guidelines for Electric Commodity Supply Portfolios, and Instituting a Phase II to Address Longer-Term Issues (Issued and Effective April 19, 2007), page 2.

[53] S. Tierney, A. Okie, R. Mukerji, M. Swider, R. Safuto, and A. Jaggi, "Fuel Diversity in the New York Electricity Market: A New York ISO White Paper," October 2008 ("2008 Fuel Diversity Study"), Figure 2-2, citing data from EIA, 902 electric generation data base.

[54] "Single-fuel plants using natural gas alone and dual-fuel plants that mainly use natural gas (i.e., dual fuel with air-permit limitations on the amount of generation that can come from oil) make up 95% of New York City's generating capacity and 79% of Long Island's capacity. By contrast, natural gas-only plants make up 15% of the capacity in the rest of New York State, where there are also significant amounts of generating capacity that use lower-cost fuels like nuclear, hydroelectric, and coal…. In New York State as a whole, low-cost fuels (i.e., coal or hydro) set the day-ahead clearing price in the wholesale electric energy markets administered by the NYISO in approximately one-sixth of the hours of the year. By contrast, in NYC, in-zone natural gas and oil facilities are setting the price in virtually all of the hours of the year." 2008 Fuel Diversity Study, pages 3-3, 3-4. See also the figure below, which shows for each zone in New York's electric energy market the percentage of hours during which natural gas-fired power plants (and other plants) set the clearing price for electricity.

Fuel of Marginal Unit by Zone (in New York State's Electric Energy Market)

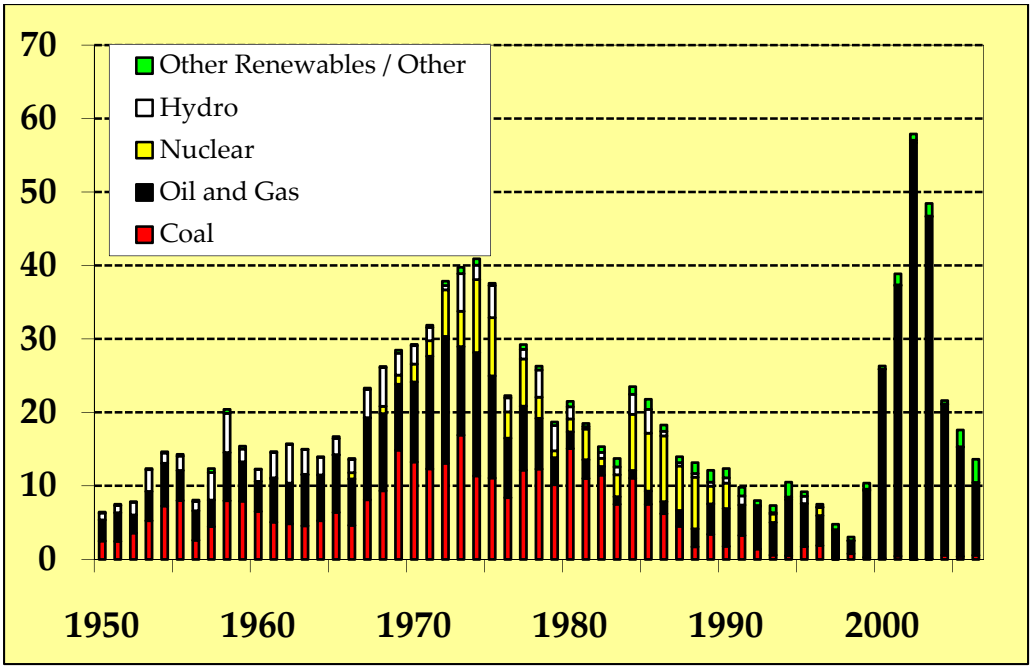


Source: 2008 Fuel Diversity Study, October 2008, Figure 3-5.

[55] NYISO, 2009 Power Trends, pages 9-10. As reported in NYISO's 2008 annual report: "If the cost of fuel used to generate electricity were the same in 2008 as it was in 2000, wholesale electricity costs would have dropped by 18% — $2.23 billion in savings on a current annual basis."

[56] Over the last 10 years, virtually all new generating capacity added in the U.S. was predominantly fueled by natural gas (including gas with dual fuel with oil) and wind. This contrasts with prior decades, when significant amounts of coal and nuclear capacity were added in the 1980s. These trends are illustrated in the following figure.

Electric Generating Capacity Additions – U.S., 1950-2006 (GW)



Source: Howard Gruenspecht, EIA, "The Electricity Capacity Challenge: A View from The Energy Information Administration for Powering the Next Decade: Key Issues for the Incoming Administration," presentation to the Technology Policy Institute, The National Press Club, September 26, 2008, page 3.

[57] At present, there is a high correlation between a state's average electricity price and the state's reliance on coal; states with much higher reliance on coal to generate electricity tend to have lower rates, as compared to states with relatively low reliance on coal. See, for example, Susan Tierney, "Decoding Developments in Today's Electric Industry — Ten Points in the Prism," October 2007, pages 3-7.

[58] See, for example, the report prepared by the American Association of Retired People, "Recommendations for Reforming NYISO to Lower Consumers' Electricity Bills, A Policy Report by AARP," December 17, 2009.

[59] This is a direct quotation from one Market Participant, but the essence of this comment was reflected in a large number of commenters' statements.

[60] David Patton has said in his reports that "In long-run equilibrium, the market should support the entry of new generation by providing sufficient net revenues (revenue in excess of production costs) to finance new entry." See the 2003 State of the Market Report New York Electricity Markets, April 2004, Executive Summary, in which he concluded in 2003 that the net revenue results for NYC and upstate NY do not raise significant long-term concerns because of a number of factors, including the "lack of shortages in 2003 reduced the net revenue substantially;" "natural gas units were not likely the most economic source of new capacity in 2003 – net revenue for CC's and other fuel types increased;" "the UCAP demand curve is phasing-in, increasing the expected capacity revenue in 2004;" and "Upstate NY has a capacity surplus, limiting the need for new gas turbines outside New York City," pages vii-viii.

[61] New York's 2009 State Energy Plan made the following comment about the forces contributing to high energy prices in New York State: "New York's relatively high energy prices are attributable to the State's heavy reliance on fossil fuels from out of State, relatively low dependence on coal (which is currently a less expensive fuel), electricity system constraints, natural gas and petroleum product transmission and pipeline system constraints, the State's geographic location away from major supplies of energy, and State and local taxes and fees." New York State Energy Planning Board, "2009 State Energy Plan Volume I," December 2009, page 4.

[62] NY PSC Staff, "Staff Report on the State of Competitive Energy Markets: Progress To Date and Future Opportunities," March 2, 2006, page 2. Further, on pages 16-17, the report states, "One of the keys to developing competitive wholesale markets in New York, in addition to the divestiture of substantially all generation assets by the utilities, was the transfer of operational control of transmission facilities to an independent system operator. This transfer of control eliminated any potential for preferential access to the transmission system, and provided an open forum for developing transparent and nondiscriminatory market rules through an open collaborative process involving all market participants, ultimately overseen by an independent board of directors. Significantly, New York's markets provide for significant savings by employing a flexible financial LBMP model in which congestion costs are quantified and can be hedged through financial products (primarily Transmission Congestion Contracts, or TCCs) as opposed to a traditional physical "contract path" model which can lead to the curtailment of economic transactions. The NYISO's LBMP markets incorporate a least-cost security-constrained model to dispatch the state's resources in the most efficient manner possible. The simultaneous co-optimization of energy, operating reserves and regulation service, both day-ahead and in real time, makes the most efficient use of available resources to meet demand at the lowest possible cost and provides transparent locational price signals. These clear price signals provide a basis for economically efficient longer-term generation, transmission, and demand response investment decisions, as well as efficient day-to-day arbitrage and transactional decision-making.[footnote in the original] The day-ahead energy market provides a robust and liquid hedge against the more volatile real-time market, and helps mitigate market power by reducing the profitability of withholding in the real-time energy market. Newly introduced Standard Market Design 2 (SMD2) enhancements provide effective scarcity pricing based on reserve deficiencies. The NYISO, the NYPSC and market participants continue to work to refine and improve these and many other market rules…."

[63] According to the 2009 New York State Energy Plan, "Along with the advent of the NYISO came a new system for pricing wholesale electricity, i.e., commodity pricing, known as Locational Based Marginal Pricing (LBMP). A LBMP consists of energy, congestion, and loss components relative to a reference location; it represents the incremental value of an additional unit of energy injected at a particular location.[footnote in the original] This system of pricing is designed to provide economically efficient price signals throughout the grid, taking all three factors into account.

Using the bids of both suppliers and demand-response resources, the NYISO software economically commits and dispatches resources at the least cost consistent with transmission and other system constraints using a uniform-price auction format. Essentially, this means that the market clearing price paid to all suppliers is based upon the marginal cost of the last unit chosen to serve load.[footnote in the original] Under this arrangement, suppliers, absent market power, have every incentive to bid into the market their marginal costs of production, because if they bid below it they may run at a loss and if they bid above it they may not be selected for dispatch and will neither run nor be paid. This results in the system being dispatched in the most efficient manner that minimizes total production costs, thus providing power to consumers at the lowest possible price. Uniform clearing price auctions are often criticized because it seems unreasonable on its face to pay a generator any higher price than that which it bid into the market and was willing to sell for on any given day. It would seem preferable to instead pay them the price that they bid. If such a design were to be instituted and generators did not change their bids, then baseload units, which generally have low marginal running costs and high fixed costs, would only be able to recover from the market the former and not the latter. Such units would not be able to survive for long, and new baseload facilities would not be built. Instead, to recover their full costs and maximize profits, generators would bid at or near what they believe the market clearing price will be. Such an imprecise process will ultimately result in a less efficient dispatch than what would result if actual marginal costs were bid, resulting in higher total production costs and higher costs to consumers. As long as markets are competitive, the uniform clearing price auction will provide the most efficient result. The upstate New York market has consistently been competitive; however, downstate generators are required to bid within strict bounds of their actual marginal costs to mitigate issues related to market power. While generators receive payment based upon their particular location, prices paid by consumers reflect a weighted average of the LBMPs within a particular area, or zone, of New York. It should also be noted that while some power supply is procured through the NYISO markets, approximately half is secured under individual bilateral contracts, i.e., contracts directly between buyers and sellers." New York's State Energy Planning Board, "Electricity Assessment: Resources and Markets," New York State Energy Plan 2009, December 2009, pages 17-18.

[64] For example, the market participants in the New England states and in the region served by the Midwest Independent Operator eventually moved toward this combination of elements.

[65] NYISO, Gold Book 2009, Table III-3a. In this table which lists summer "capability" (or the amount of capacity that can be counted on reliably during the summer peak hour), wind generating capacity is derated to 10 percent of its nameplate capacity. For the percentages of fossil capacity stated in the sentence here, wind capacity is fully counted at 100 percent of name plate. Also, "upstate" capacity is located in NYISO zones A-I; New York City is zone J; and Long Island is zone K.

[66] EIA, Utility, Non-Utility, and Combined Heat & Power Plant Database, EIA-906 and EIA-920 and EIA-923. Data for 2008, showing additions of generating units by year entered service. http://www.eia.doe.gov/cneaf/electricity/page/eia906_920.html

[67] Other factors include the re-powering of several older generating units in New York, and the addition of renewable generation that displaces electricity production at less efficient fossil-fired power plants.

[68] According to the 2000 State of the Market report, "The competitive markets implemented by the New York ISO have caused suppliers to offer 5 to 10 percent more output from existing generating unit in comparison to the prior regulated system. This additional supply is among the real benefits resulting from the competitive markets and is especially important under the prevailing tight market conditions," David Patton, NYISO State of the Market Report, 2000, April 2001, page iii. Also from that report, "Lastly, the report analyzed the changes in the quantities of energy that were offered under the prior regulated system versus the amounts offered in the NYISO's competitive wholesale markets. This analysis showed that the increased amounts of energy offered into the NYISO energy markets totaled 1000 MW to 3500 MW under various measures of the increase. This supply increase of 5 to 10 percent from existing generating units (excluding the effects of outages, new unit additions, etc.) is a result of the superior incentives provided by competitive wholesale markets. These benefits are particularly important under current conditions with supply conditions becoming increasingly tight.", Page viii.

[69] In his State of the Market Report in 2005, David Patton stated that: "We also examined the trend in forced outages in the New York markets to ascertain if generators are responding to economic incentives to increase reliability of

their units. The Equivalent Forced Outage Rate ("EFOR") is the portion of time a unit is unavailable due to forced outages, expressed as equivalent hours of full forced outage at its maximum net dependable capability. EFOR declined substantially following the implementation of the NYISO markets. This is consistent with the incentives the deregulated markets provide to maximize availability, particularly during high load conditions. EFOR was relatively high in 2000 due to the outage of n Indian Point nuclear unit. After the Indian Point outage, the EFOR has been consistently close to 4 percent – much lower than the outage rates that prevailed prior to the implementation of the NYISO markets. In 2005, the EFOR was approximately 4.5 percent." Potomac Economics, Ltd. (Independent Market Advisor to the New York ISO), "2005 State of the Market Report, New York ISO," August 2006, page xviii.

[70] These data reflect the total of generating capability in New York State, net of purchases and sales of generating capacity from/to external sources, and "special case" resources.

[71] These data are from the table in each year's report that shows "Capability By Zone and Type." Note that in 2008 and 2009, these data derated megawatts of wind projects to 10 percent of their nameplate capacity.

[72] There is one quite small exception to this: in 2000, a 7-MW facility (Auburn State Street) owned by NYSEG entered service. EIA generation unit database, 860 data. http://www.eia.doe.gov/cneaf/electricity/page/capacity/existingunits2008.xls.

[73] In 2001, a 47-MW generating unit owned by the Jamestown Board of Public Utilities entered service. Also in 2001, eleven generating units (each 47 MW in size) owned by the NYPA also entered service. In 2004, the Village of Freeport's 60.5 MW generating unit entered service. And in 2005, the NYPA's three-unit generating plant (170 MW; 170 MW; 188 MW) entered service. EIA generating unit database, 860 data. http://www.eia.doe.gov/cneaf/electricity/page/capacity/existingunits2008.xls.

[74] NYISO News Release, "NYISO: Markets Cut Power Costs $2.23 Billion," March 5, 2009.

[75] Independent Power Producers of New York, "The Policies of Power: Energy Planning for New York's Future," November 2008, page 7. http://www.ippny.org/files/pdfs/WhitepaperFinal_Nov08.pdf.

[76] The Brattle Group, Freeman, Sullivan & Company, and Global Energy Partners, LLC, "A National Assessment of Demand Response Potential," Report to the Staff of the Federal Energy Regulatory Commission, June, 2009, page 147. http://www.ferc.gov/legal/staff-reports/06-09-demand-response.pdf.

[77] New York State Energy Planning Board, "Electricity Assessment: Resources and Markets," New York State Energy Plan 2009, December 2009, page 53.

[78] "On August 14, 2003, large portions of the Midwest and Northeast United States and Ontario, Canada, experienced an electric power blackout. The outage affected an area with an estimated 50 million people and 61,800 megawatts (MW) of electric load in the states of Ohio, Michigan, Pennsylvania, New York, Vermont, Massachusetts, Connecticut, New Jersey and the Canadian province of Ontario. The blackout began a few minutes after 4:00 pm Eastern Daylight Time (16:00 EDT), and power was not restored for 4 days in some parts of the United States." U.S.-Canada Power System Outage Task Force, "Final Report on the August 14, 2003 Blackout in the United States and Canada," April 2004, page 1.

[79] These reliability functions have been further described as: balancing power generation and demand continuously; balancing reactive power supply and demand to maintain scheduled voltages; monitoring flows over transmission lines and other facilities to ensure that they do not exceed thermal limits; keeping the system in a stable condition; operating the system so that it remains in a reliable condition even if a contingency occurs, such as the loss of a key generator or transmission facility (the "N-1 criterion"); planning, designing and maintaining the system to operate reliably; and preparing for emergencies. See, U.S.-Canada Power System Outage Task Force, "Final Report on the August 14, 2003 Blackout in the United States and Canada," April 2004, pages 6-10.

[80] This is based on a comparison of the level of reserves that was actually required in 2009 (i.e., 16.5 percent of a peak load of 33,452 MW – or 5,520 MW reserves) with the amount of reserves that would have been required in that year if it had been 18 percent (i.e., this compares to 6,021 MW in required reserves). In 2008, the savings was even larger, since in that year, the reserve requirement was 15 percent; this meant that the required installed reserve level was

5,071 MW (15 percent of a peak load of 33,809 MW), compared to 6,086 MW (18 percent of 33,809 MW). NYISO, annual Gold Book for each year from 2000 through 2009:

	NYSRC's Installed Reserve requirement for NYISO system for the year (%):	NY Control Area Summer Peak (MW)	Amount of Additional Capacity Required for Installed Reserve (MW)	Page in NYISO Gold Book for that year
2000	18	30,200	5436	pp 2-4
2001	18	30,860	5555	pp. 2,4
2002	18	30,605	5509	pp. 2,4
2003	18	31,590	5686	pp. 2,4
2004	18	31,800	5724	pp. 2, 4
2005	18	31,960	5753	pp.2, 4
2006	18	33,295	5993	pp. 2, 4
2007	16.5	33,447	5519	pp. 2-4
2008	15	33,809	5071	pp. 7, 8,12
2009	16.5	33,452	5520	pp. 6, 11, 51

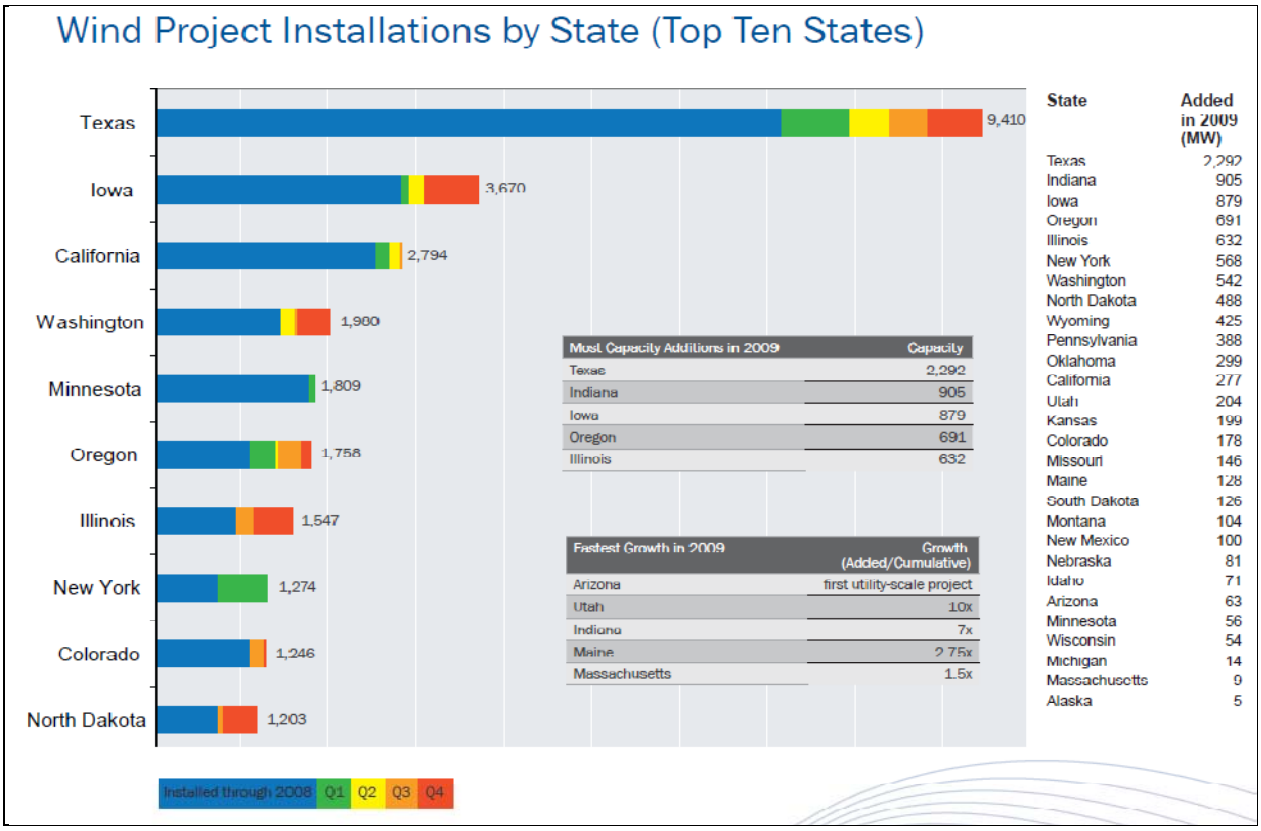
[81] The principal exceptions are three direct-current merchant transmission lines built between Long Island and neighboring regions: the Cross Sound Cable, connecting Long Island to Connecticut; and the Neptune transmission line and the Linden Variable Frequency Transformer (both connecting Long Island to New Jersey).

[82] NYISO, Gold Book, 2000, page 116; and NYISO, Gold Book, 2009, page 113.

[83] These figures are based on comparisons of the transmission mileage information in the 2009 NYISO Gold Book (page 113) with the same chart in the 2000 NYISO Gold Book (page 116):

Change in transmission line circuit miles from 2000 to 2009*	
CHGE	No change in transmission circuit mileage.
ConEd	Net reduction in mileage associated with 345 kv lines.
LIPA	Net increase of approximately 30 miles of 138 kv underground line miles, 24 miles of 150 kv DC underground line miles, and 66 miles of 500 kv DC underground miles (including Neptune's line, which is included in these figures).
NYPA	Net increase of about 22 miles of 115 kv overhead lines.
NIMO/ NGrid	Net reduction of about 30 miles of 115 kv lines, and a net increase of about 165 miles of 345 kv overhead lines.
O&R	Net reduction of 25 miles of 138 kv overhead lines.
RGE	Net increase of about 25 miles of 115 kv overhead lines.
Source: NYISO 2009 Gold Book (page 113); NYISO 2000 Gold Book (page 116).	

[84] American Wind Energy Association ("AWEA"), "AWEA Year End 2009 Market Report," January 2010. http://www.awea.org/publications/reports/4Q09.pdf.:



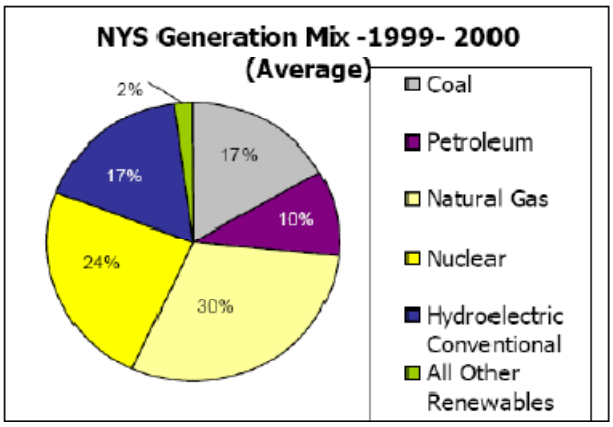
[85] AWEA, "Fair Transmission Access for Wind: A Brief Discussion of Priority Issues," http://www.awea.org/policy/documents/transmission.PDF. See also Energy Intelligence/Warlick International, "U.S. wind power strategic market report 2010," page 44: "ISO/RTO markets are generally considered more favorable to renewable energy generation because they are more competitive." (page 42,also see page 44). See also Susan Tierney, Memo to NYISO, "Wind Power Development and New York's Electricity Market," July 28, 2008.

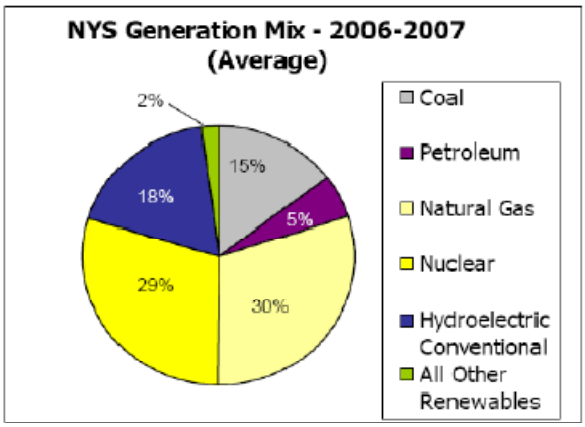
[86] Data are from Stephen Whitley, "Foundation to the Future: Infrastructure, Innovation, Investment," Opening remarks at NYISO's Annual Symposium, April 30, 2009.

[87] David Patton, "Highlights of the 2003 NYISO State of the Market Report," April 14, 2004, page 22.

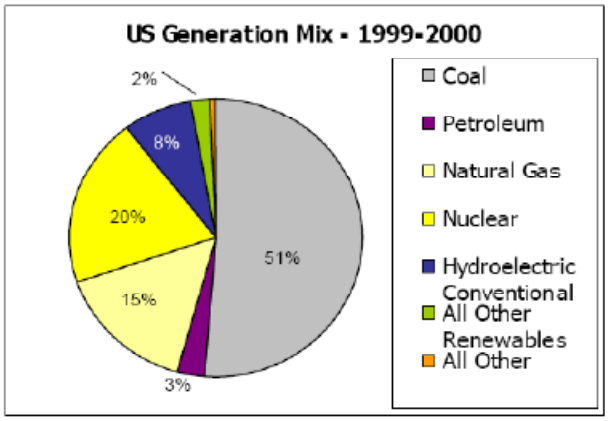
[88] As discussed in the 2008 Fuel Diversity Report, "Comparatively, the U.S.'s overall generation mix is less diverse than New York's in both periods, with a much higher percentage of power from coal (with the U.S.'s dependence on coal roughly three times that of New York's), and less power from natural gas, nuclear and conventional hydropower. Using these data to contrast the two power systems, New York's might be considered *more* balanced from a fuel diversity point of view…[as shown in the figures below for the New York State and U.S. generation mixes for 1999-2000 and 2006-2007]. In contrast, the ISO-NE's system, which is well-known for its dependence on natural gas, had 40% of its generation in 2007 fueled by natural gas. While ISO-NE's generation is the least balanced electrical region in the Northeast from a fuel-diversity point of view, its dependence on a single fuel — i.e. natural gas — is relatively moderate as compared to a large fraction of the nation. Some prime examples of generation mixes being highly reliant on a single fuel are:

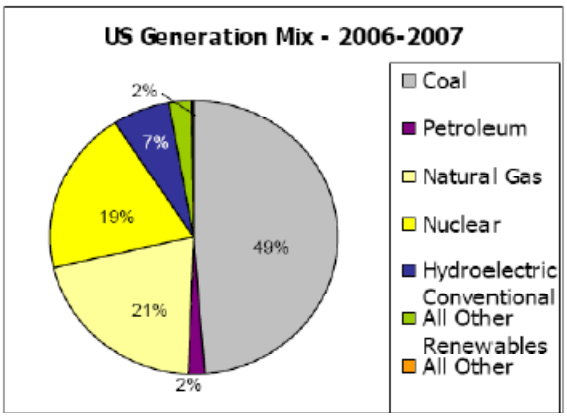
- Natural Gas: Nevada – 67 %; Alaska – 57 %; California – 55%; Texas – 49%; Louisiana and Oklahoma – 46%; Florida – 45%
- Coal: West Virginia – 98 %; Wyoming – 95 %; Indiana and North Dakota – 94%; Kentucky – 93 %; Ohio – 86 % [fn]
- Hydroelectricity: Idaho – 79 %; Washington State – 73 %; Oregon – 62 %
- Nuclear: South Carolina – 51%; Illinois – 48%."





Source: EIA, 902 Electric Generation Data





Source: EIA, 902 Electric Generation Data

Note that some parts of New York State's electric system – notably New York City and Long Island – have much less diversity in their fuel mix than does the rest of the State. New York City and Long Island rely on natural-gas-fired power plants for virtually all of their locally produced power. Source: 2008 Fuel Diversity Report, pages 2-5 and 2-6.

[89] The American Council for an Energy-Efficient Economy ("ACEEE") has ranked New York fifth among the fifty states in terms of the quality of its energy efficiency efforts and outcomes. See M. Eldgridge, M. Sciortino, L. Furrey, S. Nowak, S. Vaidyanathan, M. Neubauer, N. Kaufman, A. Chittum, and S. Black (for ACEEE), C. Sheppard, C. Chamberlin, and A. Jacobson (for Humboldt State University), and Y. Mugica and D. Bryk (for the Natural Resources Defense Council), "The 2009 State Energy Efficiency Scorecard," October 2009, Report Number E097, page iv.

[90] New York State Energy Planning Board, 2009 State Energy Plan, Volume I, December 2009, pages 11-12, 14.

[91] This is based on New York's GWh usage of 166,547 in 2008. Source: NYISO Gold Book 2009, page 11.

[92] As of December 2008, NYISO listed the following entities as active market participants: 330 Fund I, L.P.; 330 Investment Management, LLC; 3M Tonawanda; AB Energy NY, Pty.Ltd.; Absolute Energy Inc.; Accent Energy Midwest II LLC; Accent Energy Midwest LLC; Ace Energy Company, Inc.; AES Eastern Energy LP; AG Energy, L.P.; Agway Energy Services, LLC; Aleph One, Inc.; Allied Utility Network; Amber Power, LLC; Ambit Energy, LP; American Electric Power Service Corp.; American Utility Consultants; Amerinco, LLC; Amherst Utility Cooperative (AUC); Astoria Energy LLC; Astoria Generating Company L.P.; Athens Generating Company, L.P.; August Power, LLC; Automated Energy, Inc.; Automated Power Exchange (APX); Axon Energy, LLC; Bank of America, N.A.; Barclays Bank PLC; Beacon Power Corporation; Bear Energy LP; Bell Independent Power Corp.; BG Energy Merchants, LLC; BJ Energy LLC; Black Oak Energy LLC; Blue Rock Energy, Inc.; BluePoint Energy; Boralex Hydro

Operations Inc; Boralex New York LP; BP Energy Company; Brookfi eld Energy Marketing Inc.; Bruce Power Inc.; Calpine Energy Services LP; CAM Energy Trading LLC; Cambridge Valley Enterprises LLC; Canandaigua Power Partners, LLC; Canastota Windpower LLC; Cargill Power Markets, LLC; Carr Street Generating Station LP; CBA Endeavors, LLC; CBK Group, LTD; CECONY-LSE; Centaurus Energy Master Fund, LP; Central Hudson Gas & Electric Corp.; Central Vermont Public Service Corp.; CHGE Roseton; Citadel Energy Investments Ltd.; Citadel Energy Products LLC; Citadel Energy Strategies LLC; Citigroup Energy Inc.; City of Niagara Falls; City Power Marketing, LLC; Clearview Electric, Inc.; CMT Fund IX LLC; Columbia Utilities Power, LLC; Commerce Energy, Inc.; Con Edison Solutions, Inc.; Conectiv Energy Supply, Inc.; Conservation Services Group; Consolidated Edison Co. of New York, Inc.; Consolidated Edison Energy, Inc.; Consolidated Hydro New York, Inc.; Constellation Energy Commodities Group, Inc.; Constellation NewEnergy 1123-DADRP; Constellation NewEnergy, Inc.; Core Equities, Inc.; County Energy Services, LLC; County of Erie NY; County of Niagara NY; Covanta Niagara, LP; CPower, Inc.; Credit Suisse (USA) Inc.; Credit Suisse Energy LLC; Crucible Specialty Metals; Cummins Inc; Cutone & Company Consultants, LLC; DART Premiums; David Sholk, LLC; Day Automation Systems, Inc.; DB Energy Trading LLC; DC Energy LLC; DC Energy New England, LLC; DC Energy New York, LLC; DE Shaw Plasma Power LLC; Delaware County Electric Cooperative, Inc.; Demand Direct LLC; Direct Energy Marketing Inc; Direct Energy Services, LLC; Discount Energy LLC; Dominion Energy Marketing, Inc.; Dominion Retail, Inc.; drop18 Energy; DTE Energy Trading Inc; Dynamis ETF, LLC; Dynegy Power Marketing, Inc.; East Coast Power, LLC; ECS Power Corp; Edison Mission Marketing & Trading, Inc.; E-Energy, Inc.; Emera Energy Services, Inc; Emera Energy U.S. Subsidiary No. 1, Inc.; Empire Natural Gas Corp.; Empire Power Systems LLC; Energetix, Inc.; ENERGY AMERICA, LLC; Energy Analytics, Inc.; Energy Connect, Inc.; Energy Conservation and Supply, Inc.; Energy Cooperative of New York (ECNY); Energy Curtailment Specialists, Inc.; Energy Endeavors, LLC; Energy Enterprises Inc.; Energy Investment Systems, Inc; Energy New England, LLC; Energy Plus Holdings LLC; Energy Services Provider, Inc.; Energy Solutions Group LLC; Energy Spectrum Inc.; Energy Systems North East LLC; EnerNOC, Inc.; Enerwise Global Technologies, Inc.; Engage Networks, Inc.; Entergy Nuclear Power Marketing LLC; Entergy Solutions Ltd.; Entergy Solutions Supply Ltd.; EPCOR Energy Marketing (US) Inc.; EPCOR Merchant and Capital (US) Inc.; EPIC Merchant Energy NY, L.P.; Erie Boulevard Hydropower LP; Exelon Generation Company LLC; FC Energy Services Company, LLC; First Commodities Ltd.; FirstLight Power Resources Management, LLC; Flat Rock Windpower II LLC; Flat Rock Windpower LLC; Fortis Energy Marketing & Trading, GP; Fortis Ontario Inc; FPL Energy Marketing, Inc.; FPL Energy Services, Inc.; Franklin Power LLC; Freeport Electric; Galt Power Inc.; Gateway Energy Services Corporation; Gemsys LLC; General Electric Plastics; Glacial Energy New York, Inc.; GLE Trading LLC; Glens Falls Lehigh Cement Company; Good Energy, L.P.; Grant Energy, Inc.; Grunwald Fund; Hampshire Paper Co., Inc.; Hess Corporation; HIJ Power, LLC; Horizon Power, Inc.; HQ Energy Services (US); HSBC Bank USA; Hudson Energy Services, LLC; Hudson Valley Trading Group, Inc.; Huntrise Fund of Funds LLC; IDT Energy, Inc; Indeck Energy Svs of Silver Springs; Indeck-Corinth LP; Indeck-Olean LP; Indeck-Oswego LP; Indeck-Yerkes LP; Innovative Energy Systems, Inc.; Innoventive Power LLC; Integrys Energy Services of New York, Inc.; Integrys Energy Services, Inc.; International Paper Company; ISO Trader, LLC; J Aron and Company; J. P. Morgan Ventures Energy Corporation; Jamestown Board of Public Utilities; Juice Energy, Inc; Jump Power, LLC; Kaleida Health; KeySpan - Ravenswood, Inc.; KeySpan Energy Services, Inc.; Keystone Energy Partners, LP; KeyTex Energy LLC; Koch Supply & Trading, LP; KW Control Systems Inc.; Lafarge Building Materials Inc.; LaIssez Faire Energy, Inc.; Lavand and Lodge, LLC; Lehman Brothers Commodity Services Inc.; Liberty Power Corp.; Liberty Power Holdings LLC; Liberty Power New York LLC; Lighthouse Energy Trading Co., Inc.; Lockport Energy Assoc.; Long Island Power Authority; Louis Dreyfus Energy Services L.P.; Lynx Technologies Inc.; Lyonsdale Biomass, LLC; Macquarie Cook Power, Inc.; Madison Windpower, LLC; MAG Energy Solutions Inc.; MDSP - Hess Corporation; MDSP - Excel Energy Technologies; MDSP - WPS Energy Services, Inc (ESI); Merrill Lynch Commodities, Inc.; Metering Authority - Central Hudson Gas and Electric; Metering Authority - Consolidated Edison of NY; Metering Authority - Long Island Power Authority; Metering Authority - New York Power Authority; Metering Authority - New York State Electric & Gas; Metering Authority - Niagara Mohawk; Metering Authority - Orange and Rockland Utilities; Metering Authority - Rochester Gas and Electric; MG Industries; Mirabito Gas & Electric Inc.; Mirant Energy Trading, LLC; MM Albany Energy LLC; Model City Energy LLC; Modern Innovative Energy, LLC; Monroe County NY; Morgan Stanley Capital Group, Inc.; MxEnergy Electric Inc; Nationwide Energy, LLC; New York Energy Savings Corp; New York Industrial Energy Buyers, LLC; New York Municipal Power Agency; New York Power Authority; New York State Electric & Gas Corp.; Niagara Frontier Transportation Authority; Niagara Mohawk Power Corp.; Niagara University; Nine Mile

Point Nuclear Station, LLC; Nissequogue Cogen Partners; NMPC-DADRP; Noble Altona Windpark, LLC; Noble Bliss Windpark, LLC; Noble Chateaugay Windpark, LLC; Noble Clinton Windpark I, LLC; Noble Ellenburg Windpark, LLC; Noble Wethersfi eld Windpark LLC; NOCO Electric LLC; Norbord Industries, Inc.; North American Energy, Inc.; North American Power Partners LLC; Northbrook New York LLC; Northeast Utilities Service Co.; Northern States Power Company; NorthPoint Energy Solutions Inc.; NRG Power Marketing LLC; NuEnerGen, LLC; NYSEG Solutions, Inc.; Occidental Chemical Corp.; Occidental Power Services Inc; Ocean Power LLC; Old Lane Commodities, LP; Olin Chlor - Alkali Products; Onondaga Cogeneration, LP.; Ontario Power Generation, Inc.; Orange & Rockland Utilities, Inc.; ORU-LSE; Peoples Energy Services Corp.; Pepco Energy Services; Petra Technical Consultant Group, LLC; Pine Bush Energy Trading, LLC; Pirin Solutions, Inc; Plant-E Corp.; Power Biddiing Strategies, LLC; Power City Partners, L.P.; Powerex Corporation; PP&L EnergyPlus Co. (EPLUS); PPM Energy, Inc.; Praxair Inc; Pro Energy Marketing LLC; Pro-Energy Development LLC; Project Orange Associates, L.P.; PSEG Energy Resource & Trade, LLC; Public Energy Solutions, LLC; Pure Energy Inc; R.E. Ginna Nuclear Power Plant, LLC; Rainbow Energy Marketing Corp; RBC Energy Services LP; RedGreen288, LLC; Reliable Power Management, Inc.; Reliant Energy Services, Inc.; Reliant Energy Solutions Northeast, LLC; Rensselaer Cogeneration LLC; Robison Energy, LLC; Rochester Gas & Electric Corp.; RTP Controls, Inc; S.A.C. Energy Investments, L.P.; Saracen Energy, LP; Saracen Merchant Energy, LP; Schools & Municipal Energy Cooperative (SMEC); Select Energy New York, Inc.; Select Energy, Inc.; Selkirk Cogen Partners, L.P.; Sempra Energy Solutions; Sempra Energy Solutions – DRP; Sempra Energy Trading Corp.; Seneca Energy II, LLC; Seneca Power Partners, L.P.; SESCO Enterprises LLC; Shell Energy North America (US), L.P.; Sierra Power Asset Marketing, LLC; SIG Energy, LLLP; Silverhill Ltd., GP for Power Fund LPs; Site Controls LLC; Sithe Energy Marketing, L.P.; Sithe Independence Power Partners L.P.; Sol Energy, LLC; Solios Power LLC; South Jersey Energy Company; Spark Energy, L.P.; Specialized Energy Services, Inc.; Standard Binghamton LLC; StatArb Investment LLC; State of New York; State University of New York; State University of New York at Buffalo; Stealth Energy Company, LLC; Sterling Power Partners, L.P.; Strategic Energy, LLC; Strategic Power Management, Inc.; Suez Energy Marketing NA, Inc; Suez Energy Resources NA, Inc; SUNY Potsdam; Swiftwater Energy Trading, LLC; Tallgrass Energy Partners, LLC; Tarachand Enterprises, Inc.; Telemagine, Inc.; Texas Retail Energy, LLC; The Dayton Power and Light Company; Time Warner Inc.; Tops Markets, Inc.; TransAlta Energy Marketing (U.S.) Inc.; TransCanada Power Marketing, Ltd.; Trigen-Syracuse Energy Corp.; Triton Power Company; Twin Cities Power Generation; Twin Cities Power, LLC; U.S. Energy Partners LLC; UBS AG, London Branch; University of Rochester; Upstate Energy Trading Inc; VC Marketing Inc; Velocity American Energy Master I, L.P.; Verisae, Inc; Village of Hilton; Village of Rockville Centre; Virtual Energy LLC; Virtual Energy, Incorporated; Watchtower Bible and Tract Society of New York, Inc.; West Delaware Hydro Associates L.P.; Western New York Wind Corp; Wheelabrator Westchester, L.P.; Wilman Energy, LLC; Windy Bay Power, LLC; Zone Energy; ZZ Corporation. Source: NYISO Annual Report 2008, listing at end of the report.

[93] See: NYISO Annual reports: 2000, page 11; 2001, page 30; 2002, last page; 2003, last page; 2004, page 36; 2005, pages 39-40; 2006, pages 38-41; 2007, pages 50-52; and 2008, pages 35-39. In all years but one (2001), the number of market participants was determined by counting the number of market participants listed in that year's annual report. In 2001, the number of market participants was mentioned in the text of the Annual Report.

[94] New York's State Energy Planning Board, "Electricity Assessment: Resources and Markets, New York State Energy Plan 2009," December 2009, page 4.

[95] For example, as of July 2009, residential electricity bills for customers of CHGE, NYSEG, NIMO (National Grid), O&R, and RGE included transition charges. http://www.dps.state.ny.us/typical_bills/util_ elec_res_bills_ July_2009.pdf.

[96] The NY PSC ordered increased penetration in mandatory time of use ("TOU") pricing for non-residential customers through a series of orders in Case 03-E-0641, with relatively recent orders in 2005, 2006, 2007. The orders required the state's investor-owned utilities to modify their tariffs to require certain customers to take service under mandatory rates that showed hourly prices. The NY PSC is currently evaluating the experience with such mandatory pricing plans.

[97] "[E]nough players to participate so that no single provider of service dominates the market as a whole or any part of it, controls the price of electricity, or limits customer options;…. [C]ustomers should see the emergence and

proliferation of non-traditional suppliers, such as brokers, marketers, and aggregators, who will offer to act as intermediaries between customers and utilities and will be available to combine customers so that preferable pricing and service options are offered…" NY PSC Competitive Opportunities Order, pages 26-27.

[98] "[C]ompetition should result in lower electric prices in New York State overall than currently. The large difference between New York's prices and the national average electric price should begin to shrink, rather than growing as it has under regulation…" NY PSC Competitive Opportunities Order, page 26.

[99] "[T]he system will be operated by an entity that is independent of all energy suppliers who are participants in the new competitive market. Along with a market exchange mechanism that will determine the price of generation, a system operator will ensure customers continue to enjoy the high level of reliability that exists today." NY PSC Competitive Opportunities Order, page 27.

[100] "[C]onsumers will be provided reliable information about available options and will be given assistance in making wise choices about the provision of electric service…;" "[I]nformation will be available that will permit adequate oversight of the new market for electricity and protection of consumers from abuse. This will provide an opportunity to ensure that competitors are acting in a way that is consistent with this vision…." NY PSC Competitive Opportunities Order, page 27.

[101] 89 FERC ¶ 61,285, Final Rule, 18 CFR Part 35, Docket No. RM99-2-000; Order No. 2000, Regional Transmission Organizations, December 20, 1999, ("FERC Order 2000"), page 10.

[102] FERC's policies required public utilities "(1) file open access non-discriminatory transmission tariffs containing, at a minimum, the nonprice terms and conditions set forth in the Order, and (2) functionally unbundle wholesale power services. Under functional unbundling, the public utility must: (1) take transmission services under the same tariff of general applicability as do others; (2) state separate rates for wholesale generation, transmission, and ancillary services; and (3) rely on the same electronic information network that its transmission customers rely on to obtain information about its transmission system when buying or selling power." FERC Order 2000, pages 10-11.

[103] FERC Order 2000, pages 89.

[104] FERC further identified a number of significant benefits of establishing RTOs, "(1) RTOs would improve efficiencies in the management of the transmission grid;[fn] (2) RTOs would improve grid reliability; (3) RTOs would remove opportunities for discriminatory transmission practices; (4) RTOs would result in improved market performance; and (5) RTOs would facilitate lighter-handed governmental regulation." FERC Order 2000, pages 70-71.

[105] FERC Order 2000, pages 89-90.

[106] FERC Order 2000, page 71.

[107] The NYISO website identifies a wide range of the markets administered by NYISO:

- *The electric energy markets*, which include (a) the Day-Ahead Market ("Most large electric generators require advanced notice to start. By operating a financially binding day-ahead market, the NYISO allows generators to receive operating schedules ahead of time, and provides a financial incentive for them to perform as scheduled."); (b) the Real-Time Market ("Because anticipated load, available generation, and system conditions can change from the time the day-ahead market is run, the NYISO operates a Real-Time market to efficiently and economically balance system changes."); and (c) Bilateral Transactions in the energy markets ("The NYISO supports the direct sale of energy bilaterally (between buyers and sellers). While the cost of energy of a bilateral transaction is negotiated outside the NYISO's marketplace, a bid-based system is used to make transmission service available.") The Day-Ahead and Real-Time energy markets include are location-based marginal price ("LBMP") single clearing price markets. There is also an hourly energy market. http://www.nyiso.com/public/about_nyiso/ understanding_the_markets/energy_market/index.jsp.
- *The ancillary service products and market*s: (a) "Regulation Service is the continuous balancing of resources with load to assist in maintaining scheduled interconnection frequency at 60 Hz. This is accomplished by committing on-line generators with output that is raised or lowered as necessary using Automatic Generation Control to follow moment-by-moment changes in load;" (b) "Voltage Support Service is the ability to produce or absorb

reactive power and the ability to maintain a specific voltage level under both steady-state and post-contingency operating conditions subject to the limitations of the resource's stated reactive capability." (c) "Black Start is the ability of a generating unit to go from a shutdown condition to an operating condition, and start delivering power without assistance from a power system." http://www.nyiso.com/public/markets_operations/market_data/ancillary/index.jsp.

- The *New York Installed Capacity (ICAP) market*, which "is based on the obligation placed on load serving entities (LSEs) to procure ICAP to meet minimum requirements. The requirements are determined by forecasting each LSE's contribution to its transmission district peak load, plus an additional amount to cover the Installed Reserve Margin. The amount of capacity that each supplying resource is qualified to provide to the New York Control Area (NYCA) is determined by an Unforced Capacity (UCAP) methodology. NYISO ICAP auctions are designed to accommodate LSEs and suppliers' efforts to enter into UCAP transactions. They are open to all registered NYISO customers." http://www.nyiso.com/public/ markets_operations/market_data/icap/index.jsp.
- *Transmission congestion markets*: "Transmission Congestion Contracts (TCCs) enable energy buyers and sellers to hedge transmission price fluctuations. A TCC holder has the right to collect or the obligation to pay congestion rents in the Day-Ahead Market for energy associated with transmission between specified points of injection and withdrawal. The NYISO conducts periodic auctions where TCCs are bought or sold. The auctions maximize the value of TCC awards, based on the bids and transmission line and contingency constraints. An Optimal Power Flow program is used to determine the TCCs awarded in an auction." http://www.nyiso.com/public/markets_operations/market_data/tcc/index.jsp.
- *Demand-response markets,* including the Emergency Demand Response Program ("EDRP"), the ICAP Special Case Resources ("SCR") program, the Day Ahead Demand Response Program ("DADRP") and the Demand Side Ancillary Services Program ("DSASP"). "Both the EDRP and SCR program can be deployed in energy shortage situations to maintain the reliability of the bulk power grid. Both programs are designed to reduce power usage through shutting down of businesses and large power users. Companies, mostly industrial and commercial, sign up to take part in the programs. The companies are paid by the NYISO for reducing energy *consumption when asked t*o do so by the NYISO. Reductions are voluntary for EDRP participants. SCR participants are required to reduce power usage and as part of their agreement are paid in advance for agreeing to cut power usage upon request." The NYISO's DADRP "allows energy users to bid their load reductions, or "negawatts", into the Day-Ahead energy market as generators do. Offers determined to be economic are paid at the market clearing price. DADRP allows flexible loads to effectively increase the amount of supply in the market and moderate prices." The DSASP "provides retail customers that can meet telemetry and other qualification requirements with an opportunity to bid their load curtailment capability into the DAM and/or Real-Time Market to provide Operating Reserves and regulation service. Scheduled offers are paid the appropriate marketing clearing price for reserves and/or regulation." http://www.nyiso.com/public/ markets_operations/market_data/demand_response/index.jsp

[108] See, for example:

- From the 2003 NYISO State of the Market Report: "In long-run equilibrium, the market should support the entry of new generation by providing sufficient net revenues (revenue in excess of production costs) to finance new entry….These results indicate that the market in 2003 did not produce sufficient net revenue to support investment in a new gas turbine in NYC. A new gas turbine in NYC would have recovered approximately 60 to 75 percent of the net revenue require annually to support the investment….These results indicate that the market in 2003 did not produce sufficient net revenue to support investment in a new gas turbine or CC upstate." David Patton, "2003 State of the Market Report – New York Electricity Markets," April 2004, pages 36-37, 39.
- From the 2004 NYISO State of the Market Report: "Economic Incentives for New Investment:…These results indicate that the market in 2004 did not produce sufficient net revenue to support investment in a new combustion turbine in NYC. A new gas turbine in NYC would have recovered approximately 50 to 65 percent of the net revenue required annually to support the investment….These results indicate that the market in 2004 did not produce sufficient net revenue to support investment in a new CT or CC in the Capital zone. A new gas turbine in the Capital zone would have recovered approximately 20 percent of the net revenue require annually to support the investment. A new gas CC in the Capital zone would have recovered approximately 75 percent of the net revenue require annually to support the investment. The net revenue results for NYC and upstate NY do not raise significant long-term concerns because: The mild summer conditions and lack of shortages in 2004

reduced the net revenue substantially; and Upstate NY has a capacity surplus, limiting the need for new gas turbines outside NYC. These factors should result in net revenue less than need to support investment in new peaking resources outside of NYC. Despite these results, new investment is continuing in New York in response to solicitations or based on future expectations." David Patton, "2004 State of the Market Report – New York Electricity Markets," May 2005, page 43-44.

- From the 2005 State of the Market Report: "In long-run equilibrium, the market should support the entry of new generation by providing average net revenues that are sufficient to finance new entry. This may not be the case in every year since there are random factors that can cause the net revenue to be higher or lower than the equilibrium value (e.g., weather conditions, generator availability, etc.).....Despite the increased energy prices, net revenue clearly remained below the levels necessary to justify new investment in gas turbines outside New York City and in combined-cycle units in western New York. Based on market conditions in 2005, there are several locations where it might be profitable to build new capacity. Increased shortage pricing in eastern New York and higher fuel prices raised combined cycle net revenue in the Hudson Valley to levels that might exceed their investment costs. Net revenue for a new gas turbine in 2005 was close to the estimated annual cost….These results are consistent with market conditions in New York City, which was been relatively close to being capacity-deficient in 2005. Although estimated net revenues grew considerably in 2005 to levels that would likely justify new investment in some areas if the net revenues continued over the long-term, there are other factors that affect new investment. The ability to enter into forward contacts is an important factor because it allows the new investor to secure a stable stream of revenues for the project….The regulatory process is also an important factor. Expectations and risk are also important factors. Market participants must anticipate, over the life of the investment, how prices will be affected by the new capacity investment, future load growth, increasing participation in demand response, and the risk associated with changes in the market rules or regulation over the life of the project." David Patton, "2005 State of the Market Report – New York ISO," August 2006, pages viii-ix.
- From the 2006 State of the Market Report: "Regarding long-run price signals, the report shows that prices in 2006 would not support investment in new generation in most locations. These signals are correct in the short-term because there is a surplus of generation in most areas and prices are very competitive. However, investors should expect these signals to improve over the next few years as the surplus dissipates. This analysis also shows that market signals have tended to shift in favor of investment in baseload and intermediate resources that, while more costly to build, are lower cost to run and produce more electricity. Over time, the markets provide efficient incentives to invest in a diverse array of generating resources, demand response resources, and transmission. Any investments that receive regulatory support should be consistent with these signals, except to the extent that they provide benefits not reflected in market prices (e.g., environmental benefits)." D. Patton, "2006 State of the Market Report – New York Electricity Markets," May 2007, page 7.
- From the 2007 State of the Market Report: "The report shows that prices in 2007 would not support investment in new peaking generation in most locations. This is consistent with short-term conditions because there is a surplus of generation in most areas and the summer weather was relatively mild. Price signals will be affected over the next few years by increasing load, unit retirements and additions, and the introduction of new mitigation measures in the capacity market….Over time, the markets provide efficient incentives to invest in a diverse array of generating resources, demand response resources, and transmission. Currently, market conditions appear most favorable for investment in combined-cycle generation, which have constituted most of the recent entry. Depending on the entry costs for a CC (we do not have reliable estimates), it may economic to build [sic] a CC in some areas under the current market conditions." David Patton, "2007 State of the Market Report – New York Electricity Markets," May 2008, page 10.
- From the most recent State of the Market Report: "Long-Term Economic Signals…This comparison for 2008 shows that the Vernon/Greenwood load pocket within New York City is likely the only area of New York where an investment in a new combustion turbine might have been profitable....Prospective investors must consider that net revenues are likely to change in subsequent years for several reasons. First, the retirement of nearly 1 GW of New York City capacity before the Summer 2010 capability period will substantially increase net revenues from the capacity market and, to a lesser degree, the energy and reserves markets. Second, net revenues tend to rise with natural gas prices, so if natural gas prices decline from 2008 levels, it is likely to reduce net revenues. Third, clockwise loop flows around Lake Erie tend to increase energy and reserves prices in

Eastern New York, so the decline in those loop flows will contribute to lower net revenues for generators in Eastern New York." David Patton, "2008 State of the Market Report: New York ISO," September 2009, page vi.

[109] Order No. 890 required all jurisdictional transmission providers (including NYISO) to file proposals for a coordinated and regional planning process that would comply with eight planning principles and a cost-recovery principle: coordination; openness; transparency; information exchange; comparability; dispute resolution; regional participation (including regional scope, existing institutions, existing regional planning processes in various parts of the country); economic planning studies; and cost allocation relating to new projects "that do not fit under the existing structure, such as regional projects involving several transmission owners or economic projects that are identified through the study process described above, rather than through individual requests for service." Order No. 890, pages 320-321.

[110] David Patton, who serves as the independent market monitor and advisor in several regions of the U.S. (including wholesale electricity markets in Texas, New England, Midwest ISO, and New York, as well as the Regional Greenhouse Gas Initiative's carbon dioxide auction market), reported in 2009 that:

"The NYISO operates the most complete set of electricity markets in the U.S. These markets include:

- Day-Ahead and real-time markets that jointly optimize energy, operating reserves and regulation.
- A capacity market that ensures the NYISO markets produce efficient long-term economic signals to govern decisions to invest in new generation and demand response resources (and maintain existing resources); and
- A market for transmission rights that allows participants to hedge the congestion costs associated with using the transmission network;

The energy and ancillary services markets establish prices that reflect the value of energy in prices at each location on the network. They deliver significant benefits by coordinating the commitment and dispatch of generation to ensure that the lowest cost resources are started and dispatched each day to meet the systems demands at the lowest cost. The coordination that is provided by the markets is essential due to the physical characteristics of electricity and the transmission network used to deliver it to customers. This coordination affects not only the prices and production costs of electricity, but also the reliability with which it is delivered. In addition, the markets provide transparent price signals that facilitate efficient forward contracting and are a primary component of the long-term incentives that guide generation and transmission investment and retirement decisions. Relying on private investment shifts the risks and costs of poor decisions and project management from New York's consumers to the investors. Indeed, moving away from costly regulated investment was the primary impetus for the move to competitive electricity markets.

The NYISO markets are at the forefront of market design and have been a model for market development in other areas. The NYISO was the first RTO market to:

- Jointly optimize energy and operating reserves, which efficiently allocates resources to provide these products.
- Impose locational requirements in its operating reserve and capacity markets. The locational requirements play a crucial role in signaling the need for resources in transmission-constrained areas.
- Introduce capacity demand curves that reflect the value of incremental capacity to the system and provide for increased stability in market signals.
- Operating reserve demand curves that contribute to efficient prices during shortage conditions when resources are insufficient to satisfy both the energy and operating reserve needs of the system.

In addition to its leadership in these areas, the NYISO remains the only market to have:

- An optimized real-time commitment system to start gas turbines and schedule external transactions economically. Other RTOs generally rely on operators to start gas turbines.
- A mechanism that allows gas turbines to set energy prices when they are economic. Gas turbines frequently do not set prices in other areas, which distorts the energy prices.
- A real-time dispatch system that is able to optimize over multiple periods (up to one hour). The market anticipates upcoming needs and moves resources to efficiently satisfy the needs.
- A mechanism that allows demand-response resources to set energy prices when they are needed. This is essential for ensuring that price signals are efficient during shortages.

In summary, these markets provide substantial benefits to the region by ensuring that the lowest cost supplies are used to meet demand in the short-term and by establishing transparent, efficient price signals that govern investment and retirement decisions in the long-term." David Patton, "2008 State of the Market Report: New York ISO," September 2009, pages i-ii.

[111] Northeast Power Coordinating Council, "Compliance Audit Report Public Version: New York Independent System Operator, NCR07160, August 18 to August 21, 2009," September 4, 2009.

[112] Source of information: NYISO Annual reports:
2000 ($5.2 billion), page 28 of 2000 Annual Report;
2001 ($5.4 billion), page 35 of 2001 Annual Report;
2002 ($5.2 billion), page 32 of 2002 Annual Report;
2003 ($7.0 billion), page 32 of 2003 Annual Report;
2004 ($7.3 billion), page 33 of 2004 Annual Report;
2005 ($10.7 billion), page 38 2005 Annual Report;
2006 ($8.6 billion), page 37 of 2006 Annual Report;
2007 ($9.5 billion), page 8 of 2007 Annual Report;
2008 ($11 billion), page 40 of 2008 Annual Report.

[113] This appears to be consistent with NYISO own performance assessment on system reliability and market operations. See Stephen Whitley, President's Report to the Management Committee, January 20, 2010.

[114] New York State Energy Planning Board, "Electricity Assessment: Resources and Markets," New York State Energy Plan 2009, December 2009, page 18.

[115] Mary McGarvey, "ISO/RTO Metrics Initiative," Presentation to the NYISO Management Committee, January 20, 2010.

[116] See, for example, the February 5, 2010 letter from Paul Gioia (on behalf of the New York Transmission Owners) to Stephen Whitley and Mary McGarvey of the NYISO, regarding these performance metrics. The Transmission Owners' recommendations for additional metrics include: (a) "Excellence in Execution" regarding various ISO/RTO administrative functions, most notably, the billing and settlement processes; (b) "Tariff Implementation and Compliance," tracking ISO performance in correctly administering its tariff ("whether as a result of software errors or other types of errors"); (c) "Market Monitoring," indicating "ISO/RTO's effectiveness in monitoring the exercise of market power, uncovering any possible manipulation of its market rules that unfairly shifts costs or disadvantages other parties, and promptly notifying FERC and market participants of any actual or potential problem in this area;" and (d) "Elimination of Seams and Other Market Inefficiencies," to indicate "an ISO/RTO's effectiveness in eliminating barriers to the efficiency of its markets."