

***Energy Costs and Economic
Development Issue Brief
New York State Energy Plan 2009***

December 2009

1 Overview

This Issue Brief examines why energy costs are a primary concern for New York in its ability to retain and attract business and create jobs in a competitive global economy, and how the State is addressing these challenges through a portfolio of economic development programs. The importance of the State's economic development and energy programs is underscored by the recent economic downturn in the State and around the world. The turmoil in financial markets, steep declines in manufacturing output, business investment and start-ups, and the steady increase in jobless rates have posed historic economic challenges for the nation and the State. The State's commitment to economic development and energy programs and building the clean energy sector must be both resilient and adaptive over the next decade to compete in global markets and help ensure economic growth and continued prosperity for its businesses and its citizens.

In response to these competitive challenges and to address the priorities of business and industry, New York has implemented aggressive economic development and energy programs that provide resources designed to stimulate economic expansion. These programs are moving the State toward a clean energy economy through research and development (R&D) of new technologies in energy and transportation, promotion of energy efficiency, and by providing incentives for manufacturers to build facilities and create clean energy jobs.

New York's agencies and authorities offer a portfolio of economic development and energy assistance programs to stimulate economic development, reduce energy costs for commercial and industrial customers, and advance the development of the clean energy economy. Programs include low-cost energy supply; infrastructure and project development; clean energy development and energy efficiency; workforce development; and research and development. These programs are offered by the New York Power Authority (NYPA); Long Island Power Authority (LIPA); New York State Energy and Research Development Authority (NYSERDA); Empire State Development (ESD); the Public Service Commission (PSC); the State's investor-owned utilities; and the New York State Foundation for Science, Technology, and Innovation (NYSTAR). These programs and resources leverage the private sector's manufacturing plant and equipment investments; ensure delivery of reliable electric and gas services; promote energy efficiency; and advance new technologies through R&D to the commercialization stage. The flexibility of these initiatives and programs enables effective response to changing business conditions and market trends to maintain New York's competitive edge.

Historically, energy costs in New York have been relatively high compared with other states, for a variety of reasons. The State's reliance on fossil fuels from outside the State, constraints in the electric transmission system, and its geographic location near the end of the natural gas pipeline system are all factors that contribute to volatility and upward pressure on prices to end-users.

A key component of the State's strategy to lower energy costs for all consumers is the focus on energy efficiency and development of renewable energy resources. Governor Paterson's '45 by 15' goal includes cutting energy usage by 15 percent and increasing the renewable generation target from 25 to 30 percent by the year 2015, thereby reducing the need for new fossil fuel generation plants and lowering emission

levels. The development of new energy efficiency and renewable energy technologies will drive the expansion of the clean energy economy in the future. These technologies, such as renewable generation sources; emerging Smart Grid applications; new modes of transportation; and state-of-the art environmental control equipment require substantial financial commitments to advance from the research stage to commercialization. A commitment to R&D is critical over the long term to achieve the goals of robust economic development with low-cost energy supplies in a carbon-constrained world economy.

The State's economic development programs are not static, and are modified as markets change in the nation and around the world. New York's future success in building and expanding its clean energy economy will depend in large part on the ability to address energy costs and help businesses to invest in the State and thrive in global markets.

2 New York State Economic Overview

2.1 New York and the Global Economy

New York is a major center for international commerce and is one of the leading states in attracting foreign investment. The industries representing overseas interests include finance and banking, retail, transportation, distribution and manufacturing. New York's share of investment by foreign affiliates in property, plant and equipment reached \$68.6 billion in 2006, ranking the State third after California and Texas.¹

New York companies exported shipments of merchandise that totaled \$81.4 billion in 2008, ranking the State as the third largest exporter in the nation. The State's exports increased by \$35.7 billion in the period 2004 through 2008.² A total of 25,281 companies exported goods from New York in 2006; 94 percent of these companies were small and medium-sized businesses with fewer than 500 employees. The State's top export category is miscellaneous manufactures; other large categories include computers and electronic products, primary metal products and machinery.³

In 2006, export-related jobs in New York linked to manufacturing totaled nearly 3 percent of private sector employment. Approximately 20 percent of all manufacturing workers depend on export markets.⁴ The State's largest export markets in 2008 were Canada (\$16.3 billion), Switzerland (\$7.9 billion), Israel (\$5.7 billion), United Kingdom (\$5.5 billion), and Hong Kong (\$3.7 billion).

2.2 State Assets

New York has a very large and diverse economy. The U.S. Bureau of Economic Analysis reported that New York's Gross State Product (GSP) in 2008 was over \$1.1 trillion.⁵ Viewed from several perspectives, New York has a depth of productive assets rarely seen elsewhere in the country:

- **Corporate Headquarters:** New York is ranked second in the nation in number of Fortune 500 companies' headquarters at 55.⁶

¹The major investing countries include: United Kingdom with a \$15.8 billion investment in New York; Canada with \$10.0 billion; Japan with \$8.6 billion; Germany with \$7.8 billion; France with \$6.3 billion; Switzerland with \$3.4 billion and Netherlands with \$3.2 billion. U.S. Bureau of Economic Analysis. *Gross Property, Plant and Equipment of Majority Owned NonBank U.S. Affiliates, State by Country of Ultimate Beneficial Owner*. 2006. <http://www.bea.gov/international/di1fdiop.htm>

² International Trade Administration. *New York: Exports, Jobs, and Foreign Investment*. 2009. http://ita.doc.gov/td/industry/otea/state_reports/newyork.html#Markets

³ International Trade Administration. 2009.

⁴ International Trade Administration. 2009.

⁵ U.S. Bureau of Economic Analysis. *Current-Dollar GDP by State: 2005-2008, Table 4*. 2009. http://www.bea.gov/newsreleases/regional/gdp_state/2009/xls/gsp0609.xls.

- **Higher Education:** New York is ranked first in the nation in number of first-tier universities.⁷
- **High Technology:** New York ranks third in the nation in high technology employment and payroll, with over 300,000 employed and a \$24.4 billion payroll. With over 17,500 entities, New York ranks fourth in the number of high-tech establishments.⁸ The best represented high-tech sectors in the State include manufacturing, communications services, software services and engineering and technical services.

New York's economy employs nearly 11 million people. The majority of the private employers in the State are small businesses having 100 or fewer employees. Approximately one-half of the workforce in the State is employed by small businesses, and one-half by larger firms. However, companies with more than 100 employees represent 1.76 percent of employers and employ about 50 percent of all workers.⁹

2.3 New York's Business Profile

New York's largest business sectors are wholesale and retail trade, transportation and utilities (accounting for approximately 1.9 million jobs), education and health services (approximately 1.9 million jobs), and professional and business services (approximately 1.6 million jobs). The next tier of industry sectors includes financial activities, leisure and hospitality, government, information, trade, construction and manufacturing and agriculture.¹⁰

New York uses an industry cluster framework to assess the state of its economy and guide economic development and workforce policy. Industry clusters focus on economic activity that is traded, i.e., not intended solely for local use. The three largest clusters are travel and tourism, front office, and financial services (approximately 1.2 million, 1 million, and 680,000 jobs, respectively). Clusters expected to grow the most from 2007 to 2012 include back office (15 percent), information technology (11 percent), and biomedical (10 percent).¹¹

As shown in Table 1, the manufacturing industries in New York consist of approximately 19,800 private sector establishments providing work for 576,700 individuals, representing nearly 7 percent of the total employment in the State. The manufacturing sector in the State, including chemicals, paper and forest products, metals, and food processing, is energy intensive; as a result, securing reasonably priced energy supplies are a primary concern for these industries in maintaining competitiveness in global markets. As discussed later in this Issue Brief, New York has focused on reducing energy costs for manufacturers through a variety of energy and economic development assistance programs in order to retain and attract the high paying jobs in this sector.

⁶ Fortune Magazine. *Our Annual Ranking of America's Largest Corporations: Top 50 Headquarters*. 2008. <http://money.cnn.com/magazines/fortune/fortune500/2009/snapshots/387.html/NY.html>

⁷ NYSTAR. *New York State Ranks High In Entrepreneurial Universities: Empire State Has More Universities in First Tier Than Any Other State*. 2004. <http://www.nystar.state.ny.us/pr/04/press22-04.htm>. This press release cites rankings from *Entrepreneur Magazine*, 2004.

⁸ American Electronics Association. *Cyberstates 2008*. 2008. <http://www.aeanet.org/cyberstates>

⁹ Economic Modeling Specialists, Inc. *Strategic Advantage Model for New York State*. 2008.

¹⁰ Economic Modeling Specialists, Inc. 2008.

¹¹ Economic Modeling Specialists, Inc. 2008.

Table 1. Manufacturing Compared to All Other New York Employers

Manufacturing Compared to All Other New York Employers				
Industry Name	Firms	Total Employees	Firms (Percent of Total)	Employees (Percent of Total)
Health Care & Social Assistance	49,565	1,300,654	8.8%	15.3%
Educational Services	9,614	931,641	1.7%	11.0%
Retail Trade	72,091	904,722	12.8%	10.7%
Manufacturing	19,792	576,665	3.5%	6.8%
Accommodation & Food Services	38,622	542,521	6.9%	6.4%
Professional, Scientific, Technical Services	58,714	541,687	10.4%	6.4%
Finance & Insurance	29,084	535,649	5.2%	6.3%
Public Administration	3,746	489,638	0.7%	5.8%
Administrative & Support & Waste Mgmt	25,106	443,996	4.5%	5.2%
Wholesale Trade	37,460	354,116	6.6%	4.2%
Transport & Warehousing	12,548	352,855	2.2%	4.2%
Construction	45,834	333,896	8.1%	3.9%
Other Services (not including Public Administration)	61,924	318,378	11.0%	3.8%
Information	10,899	279,903	1.9%	3.3%
Real Estate & Rental and Leasing	33,324	202,990	5.9%	2.4%
Arts, Entertainment, & Recreation	10,369	143,570	1.8%	1.7%
Management of Companies	2,960	123,063	0.5%	1.5%
Utilities	449	42,776	0.1%	0.5%
Unclassified-Miscellaneous	38,660	39,364	6.9%	0.5%
Agric-Forest-Fish	2,213	23,259	0.4%	0.3%
Mining	364	5,224	0.1%	0.1%
Total of All Industries:	563,338	8,486,569	100.0%	100.0%

Source: NYSDOL. 2005.

Companies establishing or expanding operations in the State require access to qualified labor pools and training programs for workers with technology – specific skills at all stages of the product value chain, including financial services, design and manufacture, sales and distribution, construction and installation, and operations and maintenance. ESD collaborates with the New York State Department of Labor (NYSDOL) to provide new or expanding businesses with incentives and assistance for workforce development. NYSERDA partners with organizations throughout the State, including educational institutions, trade unions and trade organizations, to provide training and certifications for jobs in the clean energy sector, e.g., construction, electrical work, heating, ventilation, and controls.

As summarized in Table 2, there are over 1,000 manufacturing companies having more than 100 employees and nearly 12,000 New York manufacturers having fewer than 10 workers.

Table 2. New York Manufacturers by Size of Firm

NYS Manufacturing by Size of Firm	
Number of Workers	Number of Firms
1 to 4	8,174
5 to 10	3,946
11 to 20	2,750
21 to 30	1,367
31 to 40	792
41 to 50	516
51 to 60	368
61 to 70	256
71 to 80	227
81 to 90	165
91 to 100	135
101 to 500	981
501 to 1000	76
Over 1000	39

Source: NYSDOL, 2005.

New York manufacturing provides two broad categories of products: products meant for other manufacturers to use as inputs, such as vehicle parts, and products that are market-ready for sale immediately, such as packaged or frozen foods. The manufacturing firms span a wide range of sizes and product areas due to the type of industry, the costs required to establish a firm in terms of inputs, such as land, labor, machinery, capital, and energy, operational costs and the demand for the firm's product. As shown in Table 3, manufacturing in New York is noted for pharmaceuticals and associated chemicals, computers and other electronic products, and a wide variety of precision fabricated metal products, followed by food processing and machinery manufacturing.

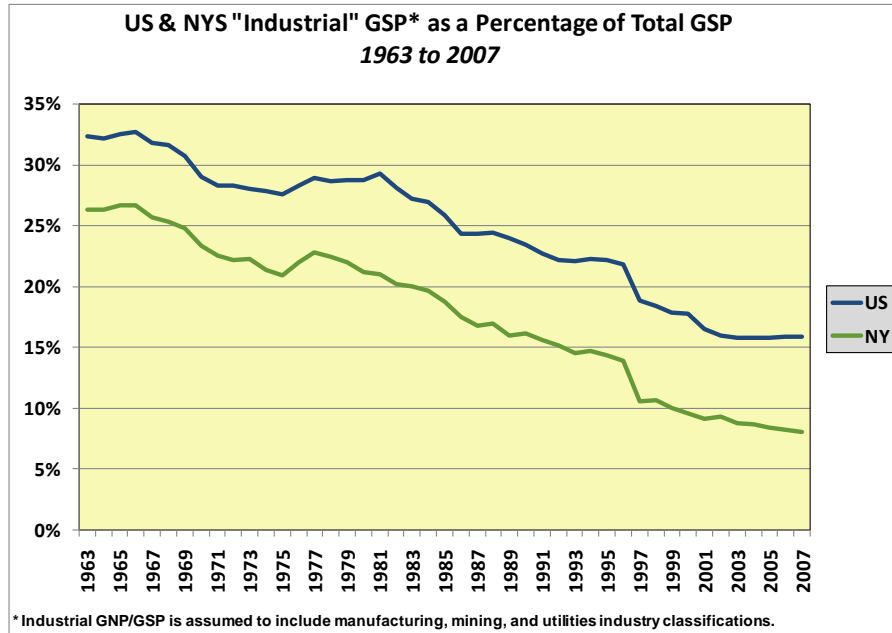
Table 3. New York Firms by Type of Manufacturing Industry

Type of Manufacturing Industry	New York Firms	New York Employees
Computer & Electronic Product Manufacturing	1,081	73,917
Fabricated Metal Product Manufacturing	2,456	56,682
Chemical Manufacturing	627	55,745
Food Manufacturing	1,974	51,170
Machinery Manufacturing	1,254	50,689
Medical/Lab Equip, Jewelry, Sports, Toys, etc	2,432	41,064
Transportation Equipment Manufacturing	452	36,380
Printing & Related Support Activities	2,275	36,066
Apparel Manufacturing	2,034	32,739
Plastics & Rubber Products Manufacturing	563	25,710
Paper Manufacturing	374	20,975
Furniture & Related Product Manufacturing	1,180	18,296
Nonmetallic Mineral Product Manufacturing	697	17,573
Electrical Equip, Appliance, & Component Mfg	363	15,151
Primary Metal Manufacturing	198	12,675
Wood Production for Lumber, Millwork, Plywood	563	9,789
Beverage & Tobacco Product Manufacturing	205	6,335
Textile Mills for Basic Fiber, Yarns, Fabrics	402	5,938
Textile Product Mills for Carpets, Rugs, Drapes	386	5,663
Leather & Allied Product Manufacturing	144	2,194
Petroleum & Coal Products Manufacturing	132	1,915

Source: NYSDOL. 2005.

The economic trends in recent years at both the national and New York levels show a decline in the industrial sector's share of the Gross National Product (GNP) and Gross State Product (GSP). Figure 1 shows the U.S. industrial sector's share of GNP declining from over 30 percent in 1963 to approximately 16 percent in 2007. New York showed a similar decline in the same period, with the industrial share of GSP declining from approximately 25 percent in 1963 to under 10 percent in 2007.

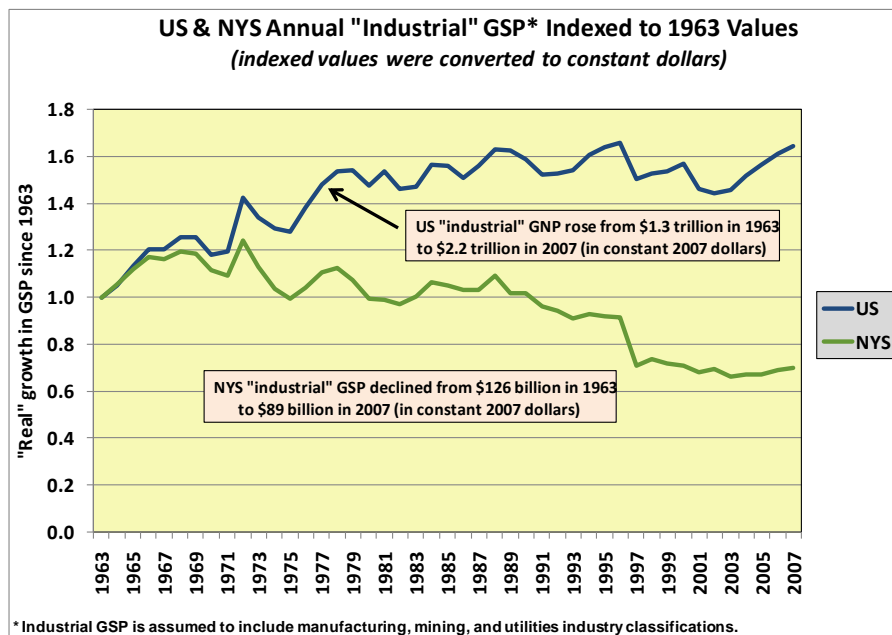
Figure 1. New York Industrial GSP as a Percentage of Total GSP, 1963-2007.



Source: EIA.

Depicted in Figure 2, the trends since the 1960s show that the annual Industrial Gross National Product at the national level rose to over \$1.6 trillion in 2007, despite this sector's declining share of total GNP. However, New York has deviated from the national trend with the State Industrial Gross Product showing a decline in value since the early 1990s.

Figure 2. U.S. and New York Annual Industrial GSP Indexed to 1963 Values



Source: EIA.

2.4 New York's Transportation Profile

The State's economy and its rate of growth are highly reliant on the condition of the transportation infrastructure. The costs of transportation are reflected in the price of goods and services purchased in the State, and the ability to transport goods using roads, rail, air and through ports is essential for businesses to remain competitive in the marketplace. Similar to managing the costs of electric and gas utility services, commercial and industrial customers seek to use reliable and affordable transportation facilities and services.

The investments in new transportation projects and maintenance of existing energy infrastructure positions the State to meet the challenges of the global economy. New York has more than 500 airports and landing facilities and direct flights to over 150 cities worldwide. The State has thousands of miles of rivers, 33 deep-river ports, and ready access to the Great Lakes, St. Lawrence Seaway and the world's oceans. New York's roadways span 112,000 miles and its interstate highways cross 1,500 miles. The State has more than 4,000 miles of freight and passenger railways. The transportation systems, Northeast crossroads location and shared border with Canada give New York-based businesses a competitive edge.

The State relies on petroleum for the majority of its transportation needs. NYSERDA reported in 2007 that the transportation sector is responsible for 70 percent of the State's petroleum use and 37 percent of greenhouse gas emissions from fuel combustion. The State imported 88 percent of its petroleum in 2007 from foreign sources.¹² The upstate and downstate regions of New York demonstrate different characteristics in transportation infrastructure and usage patterns. Upstate New York relies heavily on motor vehicles and roads for transport, while downstate residents rely heavily on public transportation.

In February 2009, Governor Paterson announced that the State plans to immediately use over \$1.1 billion in stimulus funds received from the 2009 American Recovery and Reinvestment Act (ARRA) to repair highways and bridges, and over \$1.25 billion for investment in mass transit.¹³ The State's transportation infrastructure, including roads, rail, airports and ports are essential components of the State's economic development strategy to provide reliable service and reasonable energy costs for business and industry.

2.5 Recent Economic Trends

The economic downturn in the nation and in the State that accelerated in 2008 and continues into 2009 has resulted in rising unemployment and a deterioration of general business conditions in the State. The slowdown has resulted in reduced demand for New York's goods and services, including financial services, leisure and hospitality, information services and manufactured goods.¹⁴ Conditions for manufacturers in the State continued to deteriorate, and employment levels are expected to decline for the remainder of the year.¹⁵

¹² NYSERDA. *Patterns and Trends - New York State Energy Profiles: 1993-2007*. 2009. http://www.nysERDA.org/energy_information/patterns%20&%20trends%201993-2007.pdf

¹³ Governor's Office. *Governor Paterson Announces American Recovery and Reinvestment Act Includes At Least \$24.6 Billion In Funding For New York*. February 14, 2009. http://www.state.ny.us/governor/press/press_0214091.html

¹⁴ Federal Reserve Bank of New York. *Employment in the New York-New Jersey Region: 2008 Review and Outlook*. 2008. http://www.newyorkfed.org/research/current_issues/ci14-7.pdf

¹⁵ The Federal Reserve Bank of New York's *Empire State Manufacturing Survey*. Released January 2009. http://www.newyorkfed.org/survey/empire/Empire2009/empiresurvey_20090115.html

In January 2009, NYSDOL reported that the State's unemployment rate increased from 6 percent in November 2008 to 7 percent in December 2008, its highest level since June 1994.¹⁶ Industries with the largest job losses from December 2007 through December 2008 included trade, transportation, business services, manufacturing and financial activities.¹⁷

Governor Paterson instituted measures in 2009 to close the State's projected budget gaps and has provided funding for statewide economic development to stimulate business investment and the creation of jobs. In addition, the State is slated to receive approximately \$25 billion in ARRA funding over the next two years, including funding for "shovel-ready" infrastructure projects. New York is positioned to implement projects in the areas of energy development and transmission, energy efficiency, transportation, housing, and health services to reverse the decline and stimulate economic growth.

¹⁶ The December 2008 unemployment total is 671,500 unemployed workers. The one month rise in the unemployment rate is unprecedented, since data collection began in 1976.

¹⁷ Department of Labor (NYSDOL). *State Loses More Than 100,000 Private Sector Jobs In Last Three Months*. January 22, 2009. http://www.labor.state.ny.us/pressreleases/2009/Jan22_2009.htm

3 Comparison of New York's Energy Prices

Energy costs are a substantial expense for commercial and industrial customers that can impact decisions on location, expansion and the creation of jobs. The State's historic approach in crafting policies and programs has sought to balance the goal of economic development with the need to provide reliable supplies of affordable energy while improving environmental quality. New policy initiatives will require the same rigorous analyses and coordination that the State has applied to previous policies and programs, including benefit-cost studies and monitoring of impacts on end-users, and economic development in the State.

This section compares New York's retail energy prices to prices paid in selected states that compete with New York in attracting business. To the extent possible, the analysis includes component analyses of retail energy prices for the eleven states studied. These states include: two New England states (Massachusetts and Connecticut); two Mid-Atlantic states (Pennsylvania and New Jersey); one Midwestern state (Ohio); three Southeastern states (North Carolina, South Carolina, and Florida); and one South Central state (Texas). Two West Coast states (California and Washington) are also included to present a wider perspective.

This analysis of the various fuel types considers property taxes and state and federal income taxes, where applicable, as components of distribution costs. Data are not available to estimate the specific amounts of these types of taxes for electricity, natural gas, and petroleum products. As a result, the tax components shown for these fuels reflect only taxes that can be isolated and are specifically added to the retail price of fuel; local sales tax is not included due to the variability between localities within states.

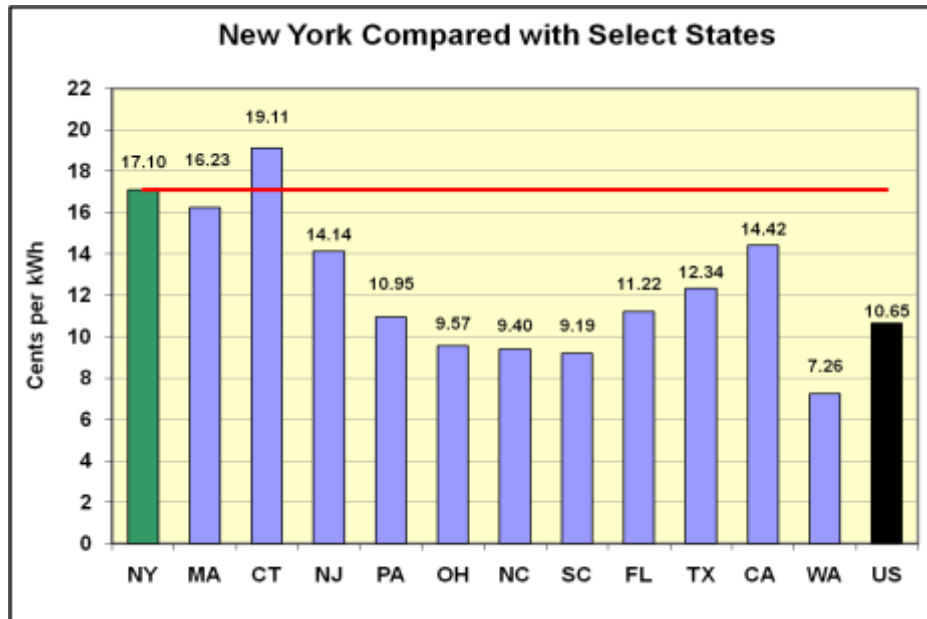
In addition to the comparison of energy prices across selected states, typical bill data for selected New York energy using groups is also provided. Energy prices in New York are high compared with other states due to New York's heavy reliance on fossil fuels, electricity system and natural gas pipeline system constraints, and its geographic location away from major supplies of energy. State and local taxes and fees also contribute to higher energy prices.

To overcome New York's relatively higher energy costs, various programs and policies, particularly those discussed in the Energy Efficiency Assessment, have been implemented to help energy users to reduce their energy costs. Lower energy costs that result from the State's policies and programs include additional economic development benefits in the form of increased consumer purchasing power, business investment, and job creation.

3.1 Electricity

Average Electricity Prices. As shown in Figure 3, New York had the second highest residential retail electricity price in 2007 of the states examined, and 61 percent above the national average.

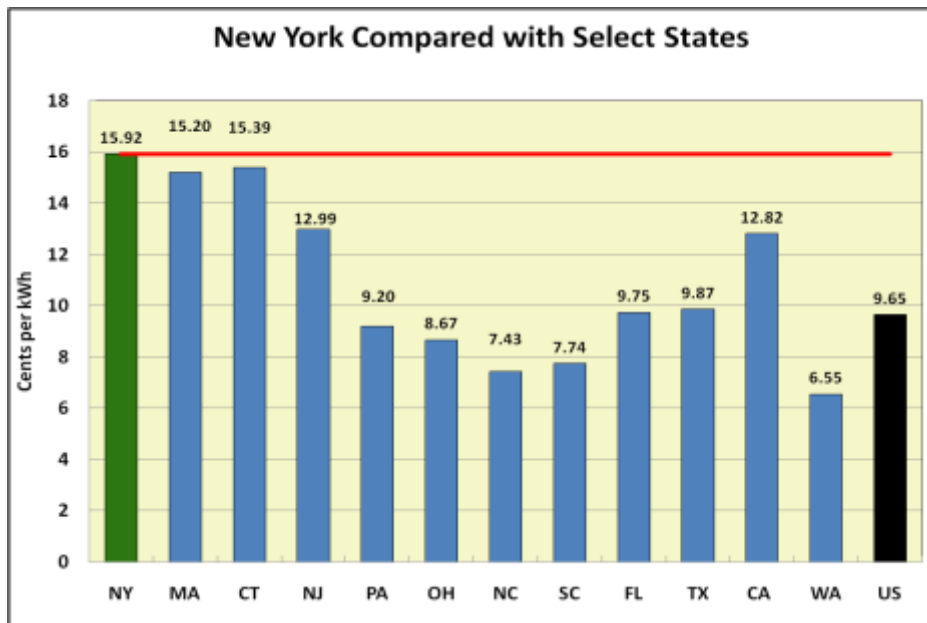
Figure 3. 2007 Average Residential Electricity Price



Source: NYSERDA.

Figure 4 shows that New York had the highest average commercial electricity price of the selected states in 2007, and this price was 65 percent above the national average.

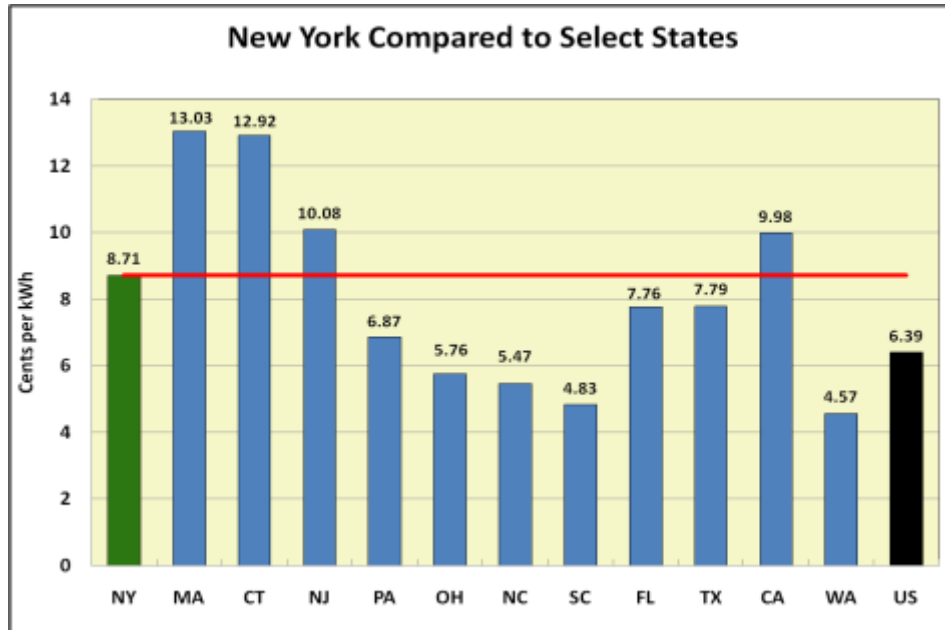
Figure 4. 2007 Average Commercial Electricity Price



Source: NYSERDA.

New York's industrial electricity retail price was 36 percent above the national average in 2007 but lower than three competing Northeastern States, as shown in Figure 5.

Figure 5. 2007 Average Industrial Electricity Price



Source: NYSERDA.

Residential Electricity Use and Expenditures per Housing Unit. As shown in Figure 6, New York's average residential electricity use per housing unit is compared with the U.S. average, while Figure 7 similarly compares New York's average residential electricity expenditure per housing unit with the national average. Compared to the U.S. average in 2006, the average housing unit occupant in New York paid approximately 62 percent more per kilowatt hour, but used 43 percent less electricity, and paid a total bill that was seven percent less than the national average.¹⁸

¹⁸ It is not reasonable to compare New York's commercial or industrial electricity expenditures with a national average since there is no true consistency with the size and the level of energy intensity among commercial and industrial businesses.

Figure 6. Residential Electricity Use per Housing Unit

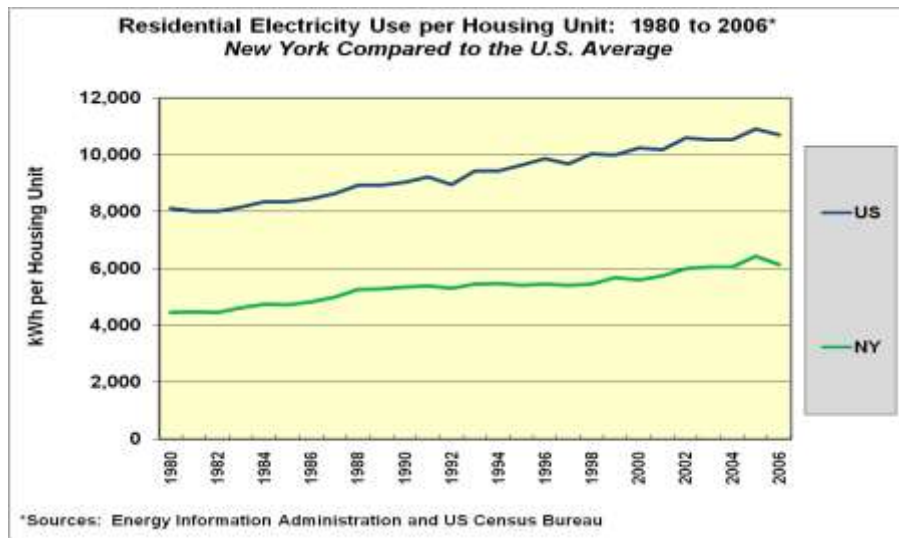
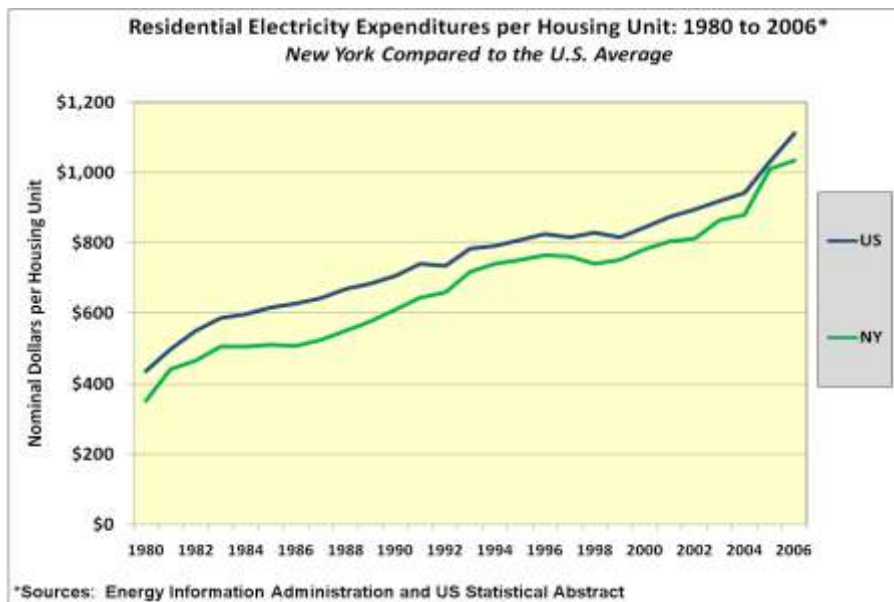
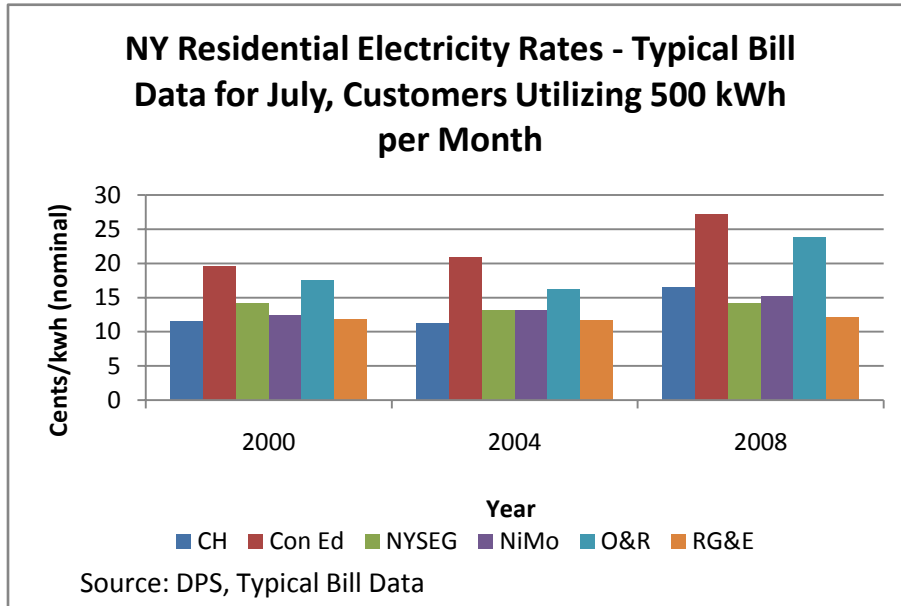


Figure 7. Residential Electricity Expenditures per Housing Unit



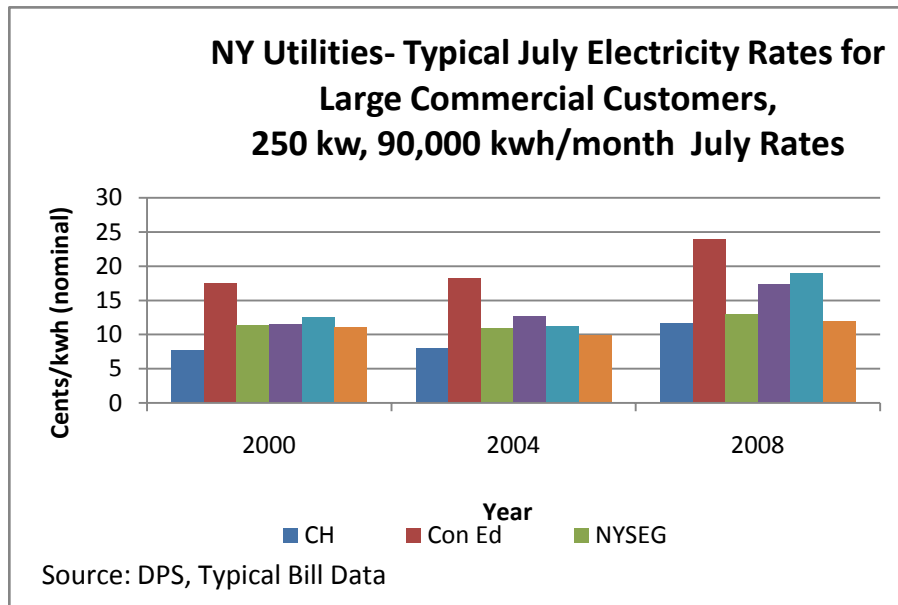
Typical July Electricity Rates by Utility. Typical residential electricity rates for a residential customer using 500 kWh per month are shown in Figure 8. Regional differences are evident, in that rates for residential customers of the downstate utilities are the highest in the State, largely attributable to higher operating and labor costs and higher costs of distribution in congested areas.

Figure 8. Typical July Residential Electricity Rates by Utilities



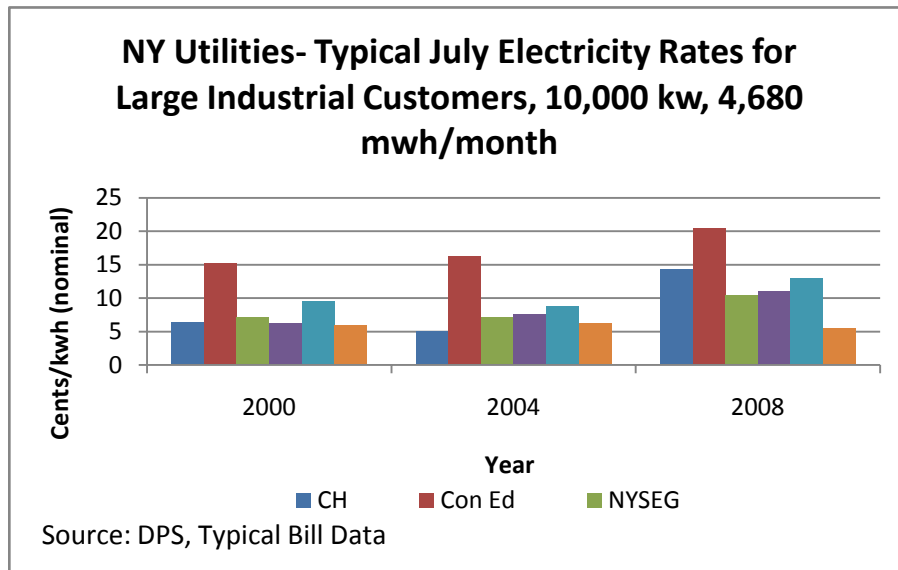
The typical electricity rates for large commercial customers are shown in Figure 9. In 2008, average rates increased substantially for customers in some regions of the State after having been fairly stable the previous six years.

Figure 9. Typical July Electricity Rates for Large Commercial Customers



The average electricity rates for the State's large industrial customers are shown in Figure 10.

Figure 10. Typical July Electricity Rates for Large Industrial Customers



3.2 Natural Gas

Natural Gas Prices for Selected States. Figure 11 shows the average 2007 residential natural gas price for the selected states. Of the 12 states examined with regard to average natural gas price for the residential sector, New York ranked seventh highest with a residential price approximately 19 percent above the national average.

Figure 11. 2007 Residential Natural Gas Price for Selected States



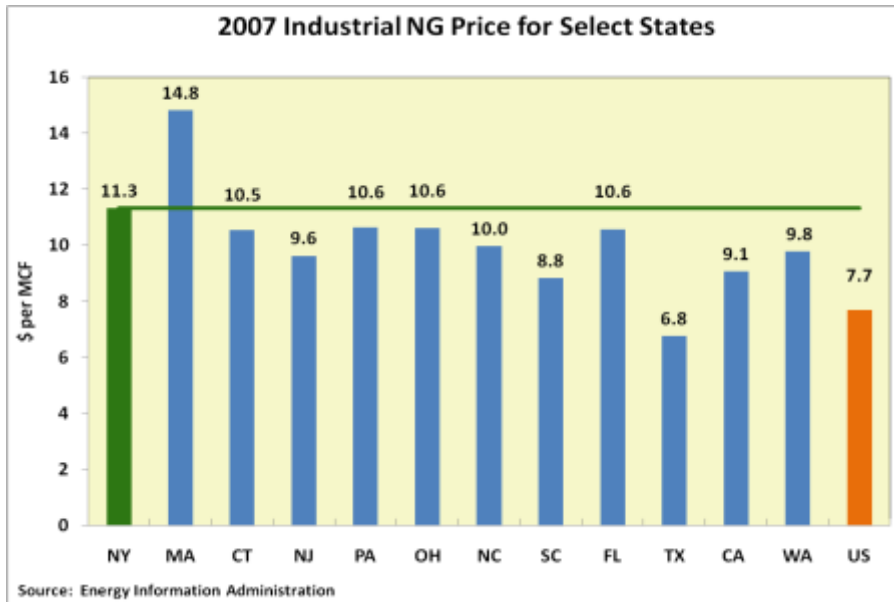
New York's commercial natural gas price comparison is shown in Figure 12. New York ranked third lowest in this category among the group of states examined, but still remained four percent above the national average.

Figure 12. 2007 Commercial Natural Gas Price for Select States



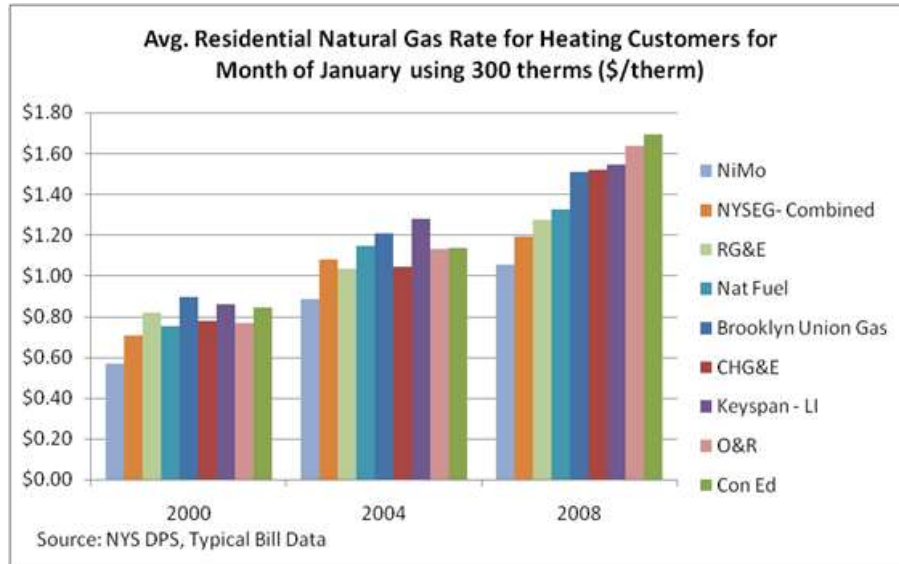
Figure 13 shows that New York's 2007 industrial natural gas price was 48 percent above the national average.

Figure 13. 2007 Industrial Natural Gas Price for Select States



Average Residential Natural Gas Rate for Heating Customers. Average natural gas rates for residential heating customers using 300 therms are shown in Figure 14. Although rates increased in all regions of the State, downstate customers typically paid the higher rates.

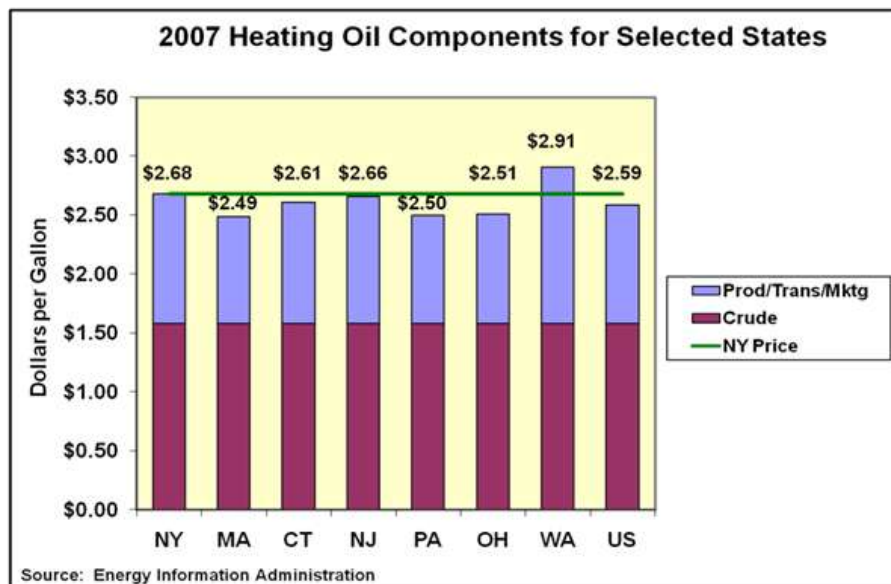
Figure 14. Average Residential Natural Gas Rate for Heating Customers



3.3 Home Heating Oil

New York’s average price for home heating oil in 2007 was \$2.68 per gallon, which was, with the exception of Washington, two to 19 cents higher than the other states studied; Washington’s price was 23 cents higher than New York’s price in 2007.

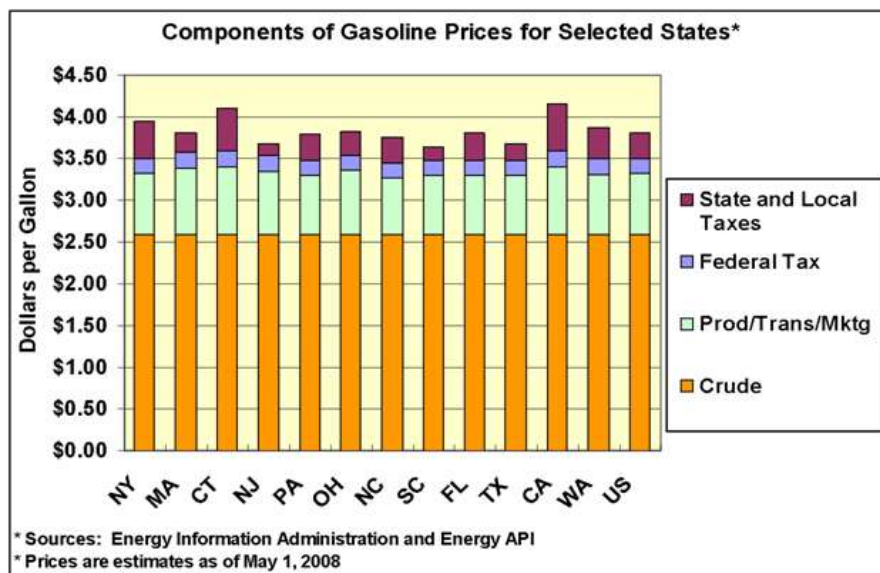
Figure 15. 2007 Heating Oil Components for Selected States



3.4 Gasoline

Gasoline prices vary from state to state primarily due to regional differences in costs of doing business and differences in state tax policies. Refiner acquisition costs of crude oil are identical for all states because crude oil commodity prices are determined by world markets. Similarly, the federal tax of 18.4 cents per gallon is the same for all states. New York had the third highest price of the states examined, with only California and Connecticut showing a higher price. State and local taxes on gasoline are among the highest in the nation in California, Connecticut, and New York. Gasoline prices for the selected states, as of May 2008, are depicted in Figure 16.

Figure 16. Components of Gasoline Prices for Selected States



3.5 New York Energy and Economic Development Programs

The State’s energy and economic development programs are designed to lower energy costs and stimulate business development while advancing an emerging clean energy economy. Several State entities offer energy programs to assist energy users in all energy-consuming sectors, including NYPA, NYSERDA LIPA, PSC (primarily through the State’s investor-owned utilities), ESD and NYSTAR. The portfolio of programs offered provides energy consumers with opportunities for low-cost energy supply; leverages new investments in infrastructure and project development; fosters renewable and energy efficiency programs and improvements to environmental quality; expands the skilled workforce; and helps stimulate the growth of the clean energy economy in the State through investments in research and development for technologies ultimately produced by New York-based businesses.

3.5.1 Low-Cost Energy Supply and Economic Development

Manufacturing activity in New York continues to decline, with service sector businesses claiming a larger share of GSP. Yet, the manufacturing base in the State is highly valued for the level of investment in plant and equipment, a supply of good paying jobs, and the ability to sell products in national and international markets. As discussed in this Issue Brief, New York remains focused on maintaining and

expanding its industrial sector through a variety of economic development assistance programs, including funding for reductions in energy costs and improvements in energy efficiency.

New York Power Authority (NYPA). NYPA is the nation’s largest state-owned electric utility, with 18 generating facilities and more than 1,400 circuit-miles of electric transmission lines and its mission is to provide clean, economical and reliable energy while promoting energy efficiency and innovation for the benefit of its customers and all New Yorkers. NYPA supplies electricity to government agencies, community-owned electric systems and rural electric cooperatives (“preference” power), private utilities for resale - without markup - to residential customers (“rural and domestic” power) and to private sector businesses and non-profit institutions in return for commitments to protect jobs (electricity for economic development). NYPA-owned generation (hydropower and natural gas power plants) and market purchases supply the power. NYPA-owned generation accounts for approximately three-quarters of the power supplied to NYPA’s full portfolio of customers. Among the economic development power programs, market purchases comprise nearly half of the power supplied.

NYPA administers a portfolio of nine economic development power programs that supply electricity to private sector employers in New York. Each program provides lower priced electricity to participants but has unique features, including the source of the power supply, eligibility requirements, and service territory established by State law. For example, some use hydropower from NYPA power projects, while others rely on power purchased from the competitive market. Some are limited to regions in the vicinity of the power project that supplies the electricity and others serve customers statewide. Currently, more than 400,000 jobs across the State are linked to NYPA power programs through contractual job commitments.¹⁹

Table 4 summarizes NYPA’s power programs for economic development and shows that NYPA’s power programs provide benefits for over 700 participants across the State. Overall, more than 75 percent of the program participants are in the energy intensive manufacturing-based sector. Approximately 90 percent of manufacturing companies participating in NYPA programs are provided with low-cost hydropower, and some 80 percent of Power for Jobs customers are manufacturers. The program participants in the upstate region are concentrated in the manufacturing sector, and the downstate region has significant numbers of participants in the financial services and print and electronic media sectors.

¹⁹ The one exception is NYPA’s Power For Jobs Program that provides part power and part billing rebates, although the bill rebate option is only available to manufacturing companies.

Table 4. NYPA Power Programs for Economic Development (as of May 2009)

Program	Power Supply	Program Size	Power Availability	Service Area
Replacement Power	Niagara	445 MW (Up to 70 MW – Energy Cost Savings Benefits)	Yes	Western NY 30 mile radius of Niagara Project
Expansion Power	Niagara	250 MW	Yes	Western NY 30 mile radius of Niagara Project or Chautauqua County
Industrial Economic and Development Power	Niagara	54 MW	Yes	Municipal Electric Systems, Rural Electric Cooperatives
Preservation Power	St. Lawrence FDR	490 MW (Up to 38.6 MW – Energy Cost Savings Benefits)	Fully Allocated (GM to relinquish 12 MW)	Jefferson, St. Lawrence and Franklin Counties
World Trade Center Recovery Power	Mixed	80 MW	Fully Allocated	Lower Manhattan, Liberty and Resurgence Zones
Economic Development Power	Purchased Power	260 MW	Limited (ECSB rate moderation thru May, 2010 limited to existing customers.)	Statewide
High Load Factor Power	Purchased Power	173 MW	Limited (ECSB rate moderation thru May, 2010 limited to existing customers.)	Statewide
Municipal Development Agency Power	Purchased Power	96 MW	Limited (ECSB rate moderation thru May, 2010 limited to existing customers.)	Downstate – New York City, Westchester, Nassau and Suffolk Counties
Power for Jobs	Purchased Power	313 MW	Fully Allocated (Sunsets May, 2010. Extended benefits available to current recipients.)	Statewide

Source: NYPA.

Long Island Power Authority (LIPA). LIPA provides economic development assistance to commercial and industrial customers through discounts in rates and energy management incentives. The rate discount programs are designed to attract and retain businesses in the LIPA service territory. LIPA’s Business Attraction and Expansion Rate Discounts are available to non-retail customers who significantly expand their Long Island operations or move their business to Long Island and add electric load and new employees. To date, LIPA has assisted a total of 213 customers and provided \$26.4 million in discounts. Long Island manufacturers who participate in New York’s Industrial Effectiveness Program are eligible for manufacturing competitiveness rate discounts as an incentive to maintain operations in the area, regardless of electric load. LIPA has assisted 143 customers and provided \$45.3 million in discounts.

Companies receiving LIPA's non-zone electric discounts that are also seeking load shifting options can qualify for modified electric rates that result in permanent reductions in energy costs by shifting their electric use away from LIPA's most critical load period, i.e., summer weekdays between 3 and 10 p.m.

Public Service Commission (PSC). The PSC approves and monitors economic development programs administered by the State's investor-owned utility companies. Consolidated Edison Company of New York (Con Edison), Central Hudson Gas and Electric Corporation (CH), National Grid, National Fuel Gas Distribution Company (National Fuel), New York Electric and Gas Corporation (NYSEG), Rochester Gas and Electric Corporation (RG&E), and Orange and Rockland Utilities, Inc. (ORU) offer incentive rates to reduce energy costs for commercial and industrial customers.

Table 5. Sample of Utility Incentive Rate Programs

Sample of Utility Incentive Rates for Commercial and Industrial Customers	
Central Hudson	CH offers a reduction in rates from 10 to 25 percent for up to five years for commercial and industrial customers who move into existing facilities that have been vacant for at least six months. Working with the Hudson Valley Economic Development Corporation, CH helped attract or retain such entities as the Cervelas Data Center and Southeastern Container Manufacturing representing 145 jobs and energizing 150,000 square feet of facilities. Cadence Design, professional and technical service company received assistance from CH's program and now employs 30 people in a 17,000 square foot facility.
NYSEG	In 2008, NYSEG provided approximately \$3 million in electric rate and \$136,000 in gas rate incentives. These incentives helped attract over \$140 million in capital investments from new or expanding industries. New load of 11,000 kilowatts was added to the NYSEG system and over 3,000 jobs were created or retained. In one instance, NYSEG provided assistance to a commercial printing company in Broome County, New York for the firm's \$50 million expansion project in an aging manufacturing facility. The project created 87 new jobs and the updated facility added a 3,200 kilowatt load to NYSEG's delivery sales.
Con Edison	In New York City and Westchester County, Con Edison offers a Business Incentive Rate and Gas Manufacturing Rate to attract and retain businesses and jobs. The Business Incentive rate provides discounts of up to 39 percent on electric delivery rates for terms ranging from three to 10 years, followed by a phase-out period of three to five years. The Gas Manufacturing Rate reduces the gas delivery charge by 30 to 50 percent for a term of five years for manufacturers that occupy new or vacant premises, or negotiate a comprehensive package of incentives from State and local government.
Orange and Rockland	ORU offers an Economic Development Rate to customers locating or expanding within its territory. Customers that add 100 kW of electric use to the electric system due to new construction or expansion of operations are eligible for a ten percent discount on electric delivery rates for five years. ORU's Gas Economic Development Pilot Program extends gas delivery service in commercial areas targeted for development by local communities. In 2008, ORU extended gas delivery services in the Towns of Wallkill, Monroe and Blooming Grove at a cost of over \$800,000 to support business development for corporate headquarters, research and development facilities, and medical and educational facilities.

Empire State Development (ESD). ESD's Empire Zones Program provides a host of financial and tax incentives for developers of projects that create jobs in approved Empire Zones, including discounts on

utility delivery charges for a period of up to 10 years. In 2007, the program served 2,932 businesses in the State and resulted in \$29.6 million in utility discounts.

3.5.2 Infrastructure and Project Development

The changing global economy presents a host of challenges and opportunities for continued growth in clean tech business investment and job creation in the State. The State provides technical assistance and financial resources for infrastructure and project development, including shovel-ready sites for manufacturing facilities.

New York State Energy Research and Development Authority (NYSERDA). In 2007, NYSERDA began development of its 280-acre property in Malta, New York, as part of its economic development approach to energy innovation. The Saratoga Technology and Energy Park, now known as STEP, has been transformed into a destination for new energy business and industry, offering both office and manufacturing space. NYSERDA envisions STEP as a knowledge community with expertise in clean energy and environmental technologies that has a national and international reputation for excellence. STEP seeks to grow companies developing and producing transformational and enabling technologies — companies involved in renewable energy, transportation, power storage, and power electronics. Companies being sought for STEP reflect the interests pursued by NYSERDA's R&D program areas and NYSERDA is aggressively seeking tenants that offer jobs in light manufacturing, product assembly, and R&D.

STEP is a public-private partnership that sustains itself through private capital investment, lease and utility connection fees, and State and local budget appropriations. STEP currently consists of the 23,000 square foot NYSERDA Business Center and a 108,000 square foot building designed for research, development, and light manufacturing related to clean energy and environmental technologies. A third building, Hudson Valley Community College's Training and Education Center for Semiconductor Manufacturing and Renewable Technologies (TEC-SMART), is also expected to be operational in January 2010. This 43,000 square foot facility is a workforce training initiative with laboratories and classrooms geared to train future workers in photovoltaic, wind, geothermal, and clean room technologies.

Complementing STEP is the adjacent 1,400-acre Luther Forest Technology Campus (LFTC), which has been approved for development of four microchip fabrication (chip fab) facilities. Full development of LFTC will have a significant synergistic effect on NYSERDA's ability to realize its plans for STEP. GLOBALFOUNDRIES has commenced construction of its chip fab, which is expected to be operational in 2012 and to employ over 1,400 people.

Empire State Development (ESD). ESD is the State's lead economic development agency and focuses on the attraction and retention of businesses, including companies that develop and manufacture clean energy technologies and products that create jobs while sustaining the environment and reducing pollution levels. Using program resources, including grants, loans, loan guarantees and tax incentives for infrastructure development, acquisition of land, buildings and equipment, industrial manufacturing productivity and workforce development, ESD expands the State's ability to further develop a clean energy economy. ESD's assistance leverages private sector investment through construction and enhancement of development-ready sites and industrial parks, and infrastructure improvements. Recent examples of New York's successful efforts to attract new economic activity in the clean energy sector include Globe Specialty Metals in Niagara Falls, SpectraWatt, Inc. in Dutchess County, and Governor Paterson's announced support for the New York Oxy-Coal Alliance's project in Jamestown. In response to an economic development package offered by ESD and NYPA, Globe Specialty Metals has agreed to a capital investment of approximately \$60 million in western New York, while the New York Oxy-Coal

Alliance will use \$6 million in economic development assistance to bring its project to the development stage to test commercial viability.

GLOBE SPECIALTY METALS

In 2008, ESD and NYPA partnered to provide assistance to Globe Specialty Metals, Inc., a leading company in the production of silicon, which is used to create solar panels. Globe Specialty Metals is providing a capital investment of \$60 million for the development of metallurgical and solar-grade silicon production facilities in Niagara Falls.

An assistance package was provided to the Company that included 40 MW of low-cost hydropower for five (5) years and up to \$25 million in Empire Zones Program benefits over a ten-year period. Globe will use the low-cost NYPA power and financial assistance provided through ESD to create 500 green collar jobs and produce some 4,000 tons of silicon annually for the solar cell industry. As part of the agreement with ESD, 25 percent of Globe's solar grade silicon production will be used to attract new solar panel manufacturers to the State. The project with Globe Specialty Metals positions New York to become a leader in the solar industry.

NEW YORK OXY-COAL ALLIANCE

In June, 2008 Governor Paterson announced support for this advanced coal demonstration project in Jamestown. The Alliance includes the Jamestown Board of Public Utilities, Air Products, Dresser-Rand Group, Inc., Ecology and Environment, Inc., AES Eastern Energy, Foster Wheeler North America Corp., Shaw Power Group, Schlumberger, and Consol Energy. Research by the Alliance to progress the advanced coal technology, including carbon capture and sequestration, will use \$6 million in ESD funding to bring the project to the development stage, including the potential use of federal assistance. If commercial viability is established, New York companies will invest in plant and equipment and create new clean-tech jobs. In addition, the State will benefit from increased fuel diversity and reductions in greenhouse gas emissions.

Governor Paterson announced in early 2009 that SpectraWatt, Inc., a designer and manufacturer of silicon solar cells, will invest \$81 million to build its headquarters and manufacturing facilities at the Hudson Valley Research Park in Dutchess County, New York, and employ over 160 workers. The State's financial assistance package for the project included \$3 million from ESD and \$1.5 million from NYSERDA. As an incentive to locate in New York, ESD offered SpectraWatt a supply of 200 metric tons of solar grade silicon from Globe Specialty metals, representing approximately 20 percent of the State's option for silicon supply under its agreement with Globe to attract solar manufacturers to the State.

Investor-Owned Utilities. Pursuant to approval from the PSC, several investor-owned utility economic development programs provide financial assistance for infrastructure improvements and reduce costs for private development projects. Many of these utility efforts focus on urban revitalization, site development and customer growth with an emphasis on sustainable development and the efficient use and re-use of existing energy infrastructure. A sample of these programs that are spurring economic development successes in the State are described in Table 6.

Table 6. Examples of Investor-Owned Utility Economic Development Programs

NATIONAL GRID	
“Shovel-Ready” Infrastructure Incentive Program	Provides grants for energy infrastructure work at designated shovel-ready sites in the service territory to help fast track development of a project. National Grid has used this program funded key infrastructure improvements at over a dozen upstate industrial parks. For example, funding was provided in 2007 to bring electric service to the Riverview Commerce Park in Tonawanda. The site houses two new companies in a 50,000 sq. ft. building with over 50 employees, and the full build-out at the 106 acre site is expected to employ over 1,000 people.
Brownfield Redevelopment Assistance Program	Provides grants to fund utility-related infrastructure improvements necessary to progress the redevelopment of a brownfield site. This program played a vital role in the redevelopment of Erie County’s Spaulding Fibre complex, Buffalo Lakeside Commerce Park and the former Rome Cable site.
Urban Center and Commercial District Revitalization Program	Provides matching funds for projects to redevelop vacant and underused commercial buildings where the local community demonstrates a commitment to revitalize its business district. Approximately 50 grants have been awarded under this program at such locations as the Villages of Phoenix in Oswego County, Brasher Falls in St. Lawrence County, and Carthage in Jefferson County.
ROCHESTER GAS AND ELECTRIC CORPORATION	
Brownfield/Building Redevelopment Program	In Monroe County, this program resulted in a 65,000 square foot expansion of a former brownfield site. The project produced a \$6.5 million capital investment, helped to retain 100 jobs while creating 35 new immediate jobs with plans to add an additional 13 positions in the near term.
NEW YORK STATE ELECTRIC AND GAS CORPORATION	
Capital Investment Incentive Program	Financial assistance is provided for electric delivery related infrastructure to encourage additional capital investment to an eligible project. Through this program, NYSEG helped a wholesaler of rapid growth trees, used in reforestation and flood or erosion control projects, to expand its facility by 75,000 sq. ft. and create 55 new jobs. In addition to the \$8 million expansion project, the grower announced its intention to build its international headquarters on the site within the next two years.
Gas Infrastructure Investment Program	This program provides funding for new gas delivery facilities for manufacturing and non-retail commercial projects making a minimum capital investment of \$250,000 and increasing gas usage by at least 50 therms per hour.
NATIONAL FUEL GAS DISTRIBUTION COMPANY	
Area Development Program (ADP)	In 2006, the National Fuel received approval for a five-year ADP with an annual budget of \$750,000, to contribute grant funding for projects that increase business in undeveloped areas of the service territory or in areas where economic revitalization is required. In 2007, a total of 20 ADP grants were awarded, resulting in 1,460 new jobs, retention of 52 positions, incremental gas load increases of 98,054 mcf per year and anticipated capital investment of approximately \$141 million. Grantees include an Erie County developer of a 157,000 sq. ft. building to be used by a large commercial banking firm. The total investment in the project is projected at \$50 million and is expected to create 700 new jobs over three years in the area of finance, capital markets and banking operations. In Cheektowaga, American Axel’s \$12.9 million expansion project was facilitated by an ADP grant that enabled the company to add four new production lines and retain 32 manufacturing jobs.

3.5.3 Clean Energy – Energy Efficiency and Renewable Energy

Energy Efficiency Efforts

New York State Energy Research and Development Authority (NYSERDA). As the administrator of the **New York Energy \$martSM** Program, NYSERDA provides a comprehensive portfolio of energy efficiency programs servicing residential customers, including low-income customers, and non-residential

energy consumers, including business and industry, agriculture, institutions, municipalities, and State government. Market and workforce development, which includes training and certification, incentives, and business support are important components of NYSERDA's programs. A strong effort is made to reach beyond individual projects to improve the energy efficiency and vitality of communities by developing collaborative relationships among local organizations and agencies. In addition, NYSERDA provides critical support for the *innovate* phase of the innovate-market-regulate cycle of energy efficiency through its extensive research, development, and demonstration programs.

The **New York Energy \$martSM** Program was initiated in 1998 by the PSC and is funded by the System Benefits Charge (SBC), a centralized program established by the PSC to fund energy efficiency on behalf of the electricity ratepayers of New York. Through the administration of the **New York Energy \$martSM** program, NYSERDA designs certain programs to enhance not only energy savings opportunities, but also to improve economic development. The majority of these programs result in macroeconomic impacts through the purchase of additional goods and services or the lower energy bills that result from program participation.

Long Island Power Authority (LIPA). LIPA's Efficiency Long Island, instituted in 2009, is a 10-year, \$924 million energy efficiency initiative that offers assistance to residential, commercial and industrial customers to lower energy usage and costs. LIPA estimates that the initiative will reduce the utility's peak demand by 520 MW and achieve annual energy savings of more than 1,600 GWh by 2018 and defer or eliminate the construction of one new power plant. The program will also stimulate the local economy by providing new opportunities for Long Island contracting companies and retail stores, and the addition of green collar employees to meet market demand.

Under its Commercial Construction Programs, LIPA offers energy efficiency assistance through a prescriptive approach, a custom approach and a whole-building design approach to commercial and industrial customers. Eligible developers and non-residential building owners who install pre-qualified energy efficient equipment under LIPA's Prescriptive Approach are eligible to receive up to \$100,000 per project or \$300,000 per customer on an annual basis. The pre-qualified equipment includes fluorescent lighting, premium efficiency motors, air compressors, heat pumps and heating, ventilation and air conditioning controls. The Custom Approach provides incentives for more complex energy savings measures that exceed the New York State Energy Conservation Construction Code and for early retirement retrofits. Technical consultants retained by LIPA to design and implement efficiency components into a building project are available free of charge (up the first \$10,000 of service) to assist customers. Annual financial incentives are available up to \$200,000 per building. The Whole-Building Design Approach offers similar incentives for projects with more than 50,000 square feet, 150 tons of cooling and 75 kW of lighting load. Financial incentives are available up to \$400,000 per building or \$500,000 for a Leadership in Energy and Environmental Design (LEED) certified Green Building.

New York Power Authority (NYPA). NYPA has financed and directed energy efficiency projects across New York at 2,700 public facilities, saving tax dollars and energy use and reducing annual greenhouse gas emissions by more than 800,000 tons, and dependence on foreign oil by more than 2 million barrels a year. Those efforts have contributed savings of more than \$100 million a year for numerous State, regional and local agencies and have reduced demand by more than 200 MW, equivalent to the output of a medium-sized power plant. NYPA is expanding its investment in energy efficiency measures for program participants with an additional \$1.4 billion, including annual investments of more than \$200 million for the period 2012 through 2015. The projected energy reductions equal approximately 1.4 million megawatt-hours per year by 2015.

NYPA's strategy is to address all energy efficiency improvements within a building or facility through a single, comprehensive effort. NYPA programs offer a wide range of energy efficiency measures and include financing for 100 percent of the project cost. NYPA recovers its portion of the project finance cost by sharing the realized electric bill savings. Once repaid, program participants retain all future savings. To date, the majority of these projects have been installed in public facilities, helping to reduce taxpayer-funded energy costs. Recently-enacted legislation proposed by the Governor will: (1) confirm and expand NYPA's authority to administer programs to reduce energy usage, reduce air pollution, conserve scarce natural resources, and facilitate the use of clean energy sources; (2) provide an efficient process for public entities and customers of NYPA's low-cost power programs to access NYPA's programs, technical expertise and financing; and (3) facilitate local governments' implementation of energy conservation programs funded through the American Recovery and Reinvestment Act of 2009.

Investor-Owned Utilities. Energy efficiency measures for commercial and industrial customers are a key focus for the utility efficiency programs recently approved by the PSC. In 2008, the PSC approved the Energy Efficiency Portfolio Standard (EEPS) to ensure that additional cost-effective energy efficiency is realized. As stated by the PSC in its Order Instituting Proceeding, "...more efficient use of energy has the potential to foster economic development and job growth by encouraging in-state technology advances to deliver energy efficiency programs to consumers."²⁰ In the context of the broader State policies for the development of the clean energy industry and economy in New York, in June 2008, the Commission established an energy efficiency portfolio standard and approved programs for investor-owned utilities, NYSERDA and any other interested program administrators.²¹

In addition, the utility economic development programs will continue to provide assistance to industrial and commercial customers to decrease energy usage and improve productivity. For example, in 2009 National Grid implemented its Manufacturing Productivity Program to provide grants of up to \$40,000 to eligible small and medium sized manufacturers to help improve profitability through improvements to energy utilization in the production process. National Grid's Energy Efficiency in Empire Zones Program provides incentives for Empire Zone certified businesses to install high efficiency heating and ventilation equipment, lighting fixtures and energy management systems. In 2007, National Grid invested over \$2 million in energy efficiency and productivity programs in the upstate region that will provide electric conservation benefits totaling over 500 kW and 1.6 million kWh annually.²² National Grid also offers small businesses in its upstate service territory the option to finance a portion of energy efficiency upgrades.

RG&E works in partnership with NYSERDA to provide energy efficiency assistance to commercial and industrial customers. For example, through NYSERDA's Energy Audit Program, RG&E will provide up to 50% matching funds with a maximum award of \$10,000, to an eligible customer for energy efficiency measures. In addition, through NYSERDA's Flexible Technical Assistance Program or New Construction Program, RG&E will fund up to one-third of the cost of a feasibility study, with a maximum award of \$20,000.

²⁰ PSC. Case 07-M-0548: *Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard, Order Instituting Proceeding, page 3*. Issued May 16, 2007.

²¹ PSC. Case 07-M-0548: *Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard, Order Establishing Energy Efficiency Portfolio Standard and Approving Programs*. Issued June 23, 2008.

²² National Grid. *Economic Development Plan Annual Report*. 2008.

Renewable Energy Efforts

The development of additional renewable energy generation sources, such as those funded through the RPS, has resulted in new supplies of clean energy from sources such as wind, hydropower, biomass and solar energy systems. The diversification of the generation portfolio with expanded supplies of renewable energy is expected, over the long-term, to result in downward pressure on electricity prices for customers through decreased reliance on imported fossil fuels, while helping to reduce pollution and greenhouse gas emissions.

New York State Energy Research and Development Authority (NYSERDA). The RPS, adopted in 2004, is the State's primary policy initiative to promote the development of renewable resources. The RPS policy goal aimed to increase the amount of electricity delivered to New York customers that is generated by renewable resources to 25 percent by 2013.²³ The "45 by 15" clean energy goal will increase the RPS policy goal to 30 percent by the year 2015. The RPS supports large-scale electric generation facilities that feed electricity directly into the statewide electric grid under its Main Tier as well as the installation of photovoltaic systems, small wind projects, fuel cells and anaerobic digesters that produce electricity for use at the installation site, i.e., home, farm, or business, under its Customer-Sited Tier.

The direct economic benefits of renewable energy include the creation of short-term (construction) and long-term (administration, operation and maintenance) jobs, increased capital investment, increased tax revenues for local governments, and increased revenue for landowners. Main Tier projects supported by the RPS program are expected to produce direct economic benefits of more than \$25 per MWh for the first three solicitations (sustained over the estimated 20-year life of the project), compared to the average price premium of less than \$18 per MWh (generally paid under 10-year contracts).²⁴ The total economic benefits of the RPS Program, which include the macroeconomic "ripple" effects of injecting incremental income into the State economy over 20 years, are estimated to be \$4.2 billion for the first three Main Tier solicitations and \$12.5 billion for the fully expanded 30 percent RPS Program by 2015.²⁵

NYSERDA is also investing in a number of initiatives to develop, test, and evaluate biofuels as potential alternatives to fossil-fuel-based transportation and heating fuels. Environmentally-sustainable biofuels can be produced locally, thus supporting energy independence, minimizing the export of dollars for fuel, and creating local economic development. These initiatives will help support the development of the Biofuels and Feedstock Sustainability Roadmap, recommended by the Renewable Energy Task Force Report.

NYSERDA's Research and Development (R&D) program has designed programs to create an entrepreneurial climate for renewable and clean business "start-ups" that will help them grow quickly from technology clusters to full-fledged companies that relocate to or remain in New York. The goals are to reduce the barriers to entry for renewable and clean energy technology business start-ups and to invest in a technically-talented workforce and technologies, enabling them to build entrepreneurial growth companies. For example, NYSEERDA's Renewable, Clean Energy and Energy Efficiency Product Manufacturing Incentive program provides up to \$1.5 million per project of financial assistance to develop facilities to manufacture renewable, clean-energy, and energy-efficient products in New York.

²³ PSC. *Case 03-E-0188, Proceeding on Motion of the Commission Regarding a Retail Renewable Portfolio Standard*. Issued September 24, 2004.

²⁴ KEMA Inc (prepared for NYSEERDA). *New York Main Tier RPS: Impact and Process Evaluation*. 2009.

²⁵ KEMA Inc. 2009.

Long Island Power Authority (LIPA). In early 2009, LIPA announced the results of a competitive solicitation for the supply of 50 MW of solar photovoltaic energy to the LIPA grid. BP Solar was selected to install 36.9 MW of solar energy at Brookhaven National Laboratories, and enXco will supply a total of 13.1 MW of solar energy from facilities constructed and operated on municipal, school and private properties across Long Island. The 50 MW of solar energy is estimated to provide enough power to sustain more than 6,500 households and reduce carbon dioxide emissions by 20,000 tons per year.

In 2009, LIPA increased funding for renewable energy programs from \$8 million in 2008 to \$14.4 million. The increased funding expands incentives for the residential Solar Pioneer program and the Solar Entrepreneur program for businesses and municipalities with solar installation of up to 100 kW. Rebates for commercial PV projects range from \$3.50 per Watt up to 10kW, \$1.50 per Watt for systems 11 to 50kW in size and \$1.00 per Watt for systems 51 to 100 Kilowatts in size. Solar projects are eligible for net metering, allowing customers to sell excess energy back to LIPA. Since 2002, LIPA has provided over \$36 million in rebates for the installation of photovoltaic systems, and over 30 Long Island-based contracting companies offer solar installation services to customers.

LIPA offers financial incentives and provides technical assistance to commercial and industrial customers for small wind generation projects, including wind resource information, siting requirements, and energy estimates. Similar to solar developments, LIPA also provides net metering for wind projects.

In response to the Governor Paterson's Renewable Energy Task Force goal to assess the development potential of new sources of off shore wind projects in the State, LIPA and Con Edison commenced a study of the potential for an offshore wind power project in an area more than ten miles from the Rockaway Peninsula in 2008. The feasibility assessment of the project will include identification of suitable locations, available wind resources, costs and financing options, market benefits, and improvements to transmission bottlenecks through the supply of this potential source of clean renewable energy.

3.5.4 Workforce Development

New York's 21st Century economy will be characterized by high-tech, small-scale development, and large and small-scale manufacturing. The new economy will respond to the increased importance of energy efficiency, renewable resources and a cleaner environment by building on strong R&D facilities, advanced engineering and a highly-educated workforce. This convergence of market forces and government policies requires a workforce with technology-specific knowledge and skills at all stages of the product value chain. These stages include labor pools for highly-trained scientists and engineers, as well as those who design and manufacture, sell and distribute, provide financial cost-benefit analysis, install, operate and maintain the new, innovative technologies that are the clean energy economy. Collectively, this labor pool is necessary to attract innovative, large-scale manufacturing facilities that will produce the current and subsequent generations of clean energy products.

New York State Energy Research and Development Authority (NYSERDA). Economic development and expanded workforce development are significant co-benefits of new investment in energy efficiency and renewable energy. Some participating contractors in NYSERDA's energy efficiency programs have grown their businesses significantly, adding both technicians and office staff. This has increased demand for a skilled workforce, and training centers have also realized benefits as they attract new students to participate in training programs.

To support the development of a highly-skilled workforce in New York, NYSERDA partners with organizations throughout the State to expand technical training programs for professionals involved in the

procurement, sales, design, installation, and maintenance of renewable and energy efficiency technologies. These efforts include support for educational institutions and trade and other organizations that now offer technical and professional development programs. These training programs are organized into: clean energy technology workforce investment; training for building, electrical, HVAC, and other trade organizations and trades unions; certification and continuing education; accredited college and university curricula; and, career development and professional training.

Department of Labor (NYSDOL). NYSDOL is a leader in workforce development through its administration of federal Workforce Investment Act (WIA) funds. WIA funds largely support the State's One-Stop Career Center system, and this system is measured against federal employment-related performance standards.²⁶ U.S. DOL recently awarded New York an incentive grant of approximately \$1.1 million for this effort. New York's One-Stop Career Center system includes 33 Local Workforce Investment Areas, and each Area is overseen by a Local Workforce Investment Board and aligned with the State's 10 economic development regions. New York's One-Stop Career Center assets include:

- **Services:** Occupational skills development and training to provide workers with the requisite knowledge, skills and abilities to increase business productivity and competitiveness in a global economy. The clean energy industry has been identified as a priority sector.
- **Partnerships:** State Workforce Investment Board, with executive level membership from key industries and State agencies.
- **Facilities:** 79 One-Stop Career Centers located across the State where services are delivered.
- **Talent Inventory:** Over 700,000 workers, equal to approximately 7 percent of the State's workforce, possessing a wide range of occupational skills across most industries in the State. NYSDOL also tracks the services provided to this customer base and their employment-related outcomes.
- **Training Inventory:** A statewide web-based inventory of occupational skills development and training programs for approximately 1,300 locations and 13,000 courses.
- **New York's Job Exchange (NYSJE):** The State's public labor exchange website to provide job-matching services to job seekers or businesses.
- **New York Apprenticeship:** A national training system that combines paid on-the-job learning and related instruction in an occupation. It currently has approximately 900 sponsors, 300 apprenticeship occupations, and 23,000 active apprentices.
- **Labor Market Information:** NYSDOL is the main source for New York labor market information. NYSDOL recently released the report *New York State's Clean Energy Industry: Labor Market and Workforce Intelligence* in May 2009 to help direct public workforce investment to support the clean energy industry.

NYSDOL also provides support for development of the clean energy industry through its Regional Industry Cluster Grants. In 2007-2009, NYSDOL awarded approximately \$4.1 million to five regions in the State for innovative workforce training initiatives in renewable energy, energy efficiency, clean technology and environmental systems. The workforce development grants require collaboration with economic development initiatives, educational institutions and the business community.

In addition, \$169.4 million in WIA funding was made available to New York under ARRA. Approximately 85 percent of the funding is allocated (by formula) to the State's 33 Local Workforce Investment Areas, while the remaining funds support program administration and State-level workforce

²⁶ For the 2007 program year (July 1, 2007 - June 30, 2008), NYSDOL achieved 121 percent of its performance standards, and served about 22 percent of the national customer base while receiving about 5.5 percent of the national funding for these programs.

initiatives, such as regional clean energy sector strategies; emerging and transitional worker training; entry-level job training for disconnected youth; State training vouchers for certificate and high skilled occupational training; lay-off aversion; and agency collaboration.

Empire State Development (ESD). ESD works in collaboration with NYSERDA and NYSDOL, and provides financial assistance for business expansion and attraction efforts in the clean energy sector that will create or attract permanent jobs in the State. ESD provides job creation grants that can be used to reimburse State and local taxes incurred related to business expansion that involves capital or working capital expenses. In addition, ESD offers workforce training grants that provide reimbursement for workforce recruitment, skills training and upgrading and productivity enhancement. Through ESD's Empire Zones Program, zone-certified companies hiring employees are eligible for wage tax credits and employment incentive credits, equal to 30 percent of the investment tax credit available for the project to help stimulate new investment and the creation of jobs. Empire Zone Benefits are available to manufacturing businesses that commit to investing and paying wages and benefits in amount ten times greater than the tax credits they earn through the programs and 20 times greater for non-manufacturing businesses.

3.5.5 Innovation

R&D advances the development of products and processes that: help commerce and industry operate more productively and economically; that bring to market cleaner equipment and technologies; and create new jobs in design and manufacturing. Environmental programs provide objective research that allows policy makers and business managers to make informed, science-based decisions that result in cleaner air and water. Providing incentives for more in-State renewable energy resources helps meet demand for energy while limiting greenhouse gas emissions, promotes economic development, and reduces electricity imports. Transportation R&D programs advance innovative technologies and processes that increase the availability of clean fuels, making it possible for clean-fuel transportation vehicles and systems to be built and operated throughout the State.

New York State Energy Research and Development Authority (NYSERDA). Conducting a multi-faceted energy and environmental R&D program has been a central responsibility at NYSERDA since its inception in 1975. NYSERDA's R&D program supports the development and commercialization of innovative energy and environmental products, technologies, and processes that improve the quality of life for New York's citizens and help New York businesses to compete and grow in the global economy. NYSERDA's R&D funds often provide essential bridge financing to enable renewable energy and energy efficiency technologies to move from applied research to direct commercial application. R&D programs stimulate the economic vitality of in-state businesses that reduce the cost of doing business in New York, as well as providing incentives to attract new renewable generation facilities and technologies to the State.

New York State Foundation for Science, Technology and Innovation (NYSTAR). NYSTAR supports technology development and commercialization with particular focus on the assistance that New York's colleges and universities provide to private sector companies in the clean energy sector. Specific initiatives include R&D and prototyping facilities at leading universities, high performance computing for modeling and simulation, and faculty recruitment. Technology disciplines supported include advanced materials and nanotechnology, environmental and energy systems, information technology, life sciences, microelectronics, imaging and sensors. Examples of Center for Advanced Technology efforts that spur economic development are shown in Table 7.

Table 7. Examples of Economic Development Efforts through Centers for Advanced Technology

<p>Center in Future Energy Systems Rensselaer Polytechnic Institute</p>	<p>Conducts R&D with industry in new energy systems and energy efficiency, including photovoltaics, fuel cells, cellulosic ethanol, smart lighting, and advanced materials. Since its designation in 2004, the center’s private company partners reported 9 new jobs, \$1.1 million in cost savings, \$13.4 million in funds acquired, and almost \$1 million in capital improvements.</p>
<p>Center for Advanced Technology in Nanoelectronics and Nanomaterials University at Albany</p>	<p>This center is the most advanced university-based research facility of its kind and includes a \$4.2 billion, 450,000-square-foot complex for semiconductors and nanoelectronics. Energy research, coordinated through the Energy and Environmental Technology Applications Center (E2TAC), includes organic thin-film photovoltaic cells, electric capacitors, power electronics, fuel cells, and sensors. The center is also home to an on-site energy test farm for field testing new prototypes. Through June 2008, the center’s researchers were awarded \$6.5 million in federal and private research funding and its company partners reported 1,448 new and retained jobs, \$143 million in increased/retained sales, \$62 million in cost savings, \$52 million in funds acquired, and \$641 million in capital improvements.</p>
<p>Environmental Quality Systems Center at the Center of Excellence in Environmental and Energy Systems Syracuse, New York</p>	<p>Conducts research in indoor air quality, lighting, acoustics and intelligent controls. The Center leads a consortium of 11 institutions that draw upon more than 100 researchers. Through June 2008, the center’s researchers were awarded \$66 million in federal and private research funding, filed five patent applications and were granted two new patents. Company partners also reported 16 new jobs as a result of work with the center.</p>
<p>College of Environmental Science and Forestry State University of New York</p>	<p>Work in the area of biofuels focuses on development of advanced shrub willows and enhanced cultivation techniques. Biofuels works is also being supported through Dr. Larry Walker, a renowned biologist at Cornell University, who was recruited with a NYSTAR faculty development award. Dr. Walker is developing a pilot-scale lab to optimize the individual steps in ethanol production.</p>

3.5.6 Discussion of Issues and Conclusions

The State’s energy and economic development programs are comprehensive initiatives designed to lower energy costs, stimulate robust business investment and expand the clean energy economy. In addition to direct investment by the State in its own resources and facilities, such as hydroelectric projects operated by NYPA or energy efficiency measures implemented in State buildings, the programs serve to complement the private sector’s development of generation resources, delivery of electric and gas services, promotion of demand side management and energy efficiency.

These energy and economic development programs are key assets for the State to maintain and expand during times of normal economic growth in the country. Their importance to the State in the current economic downturn is critical to retain businesses and jobs, and leverage private investment in new economic sectors. The growth in private sector investments and the State’s economy will depend on the continuity of the State’s commitment to energy assistance and economic development policies and programs. The State should continue to address policies and programs to maintain reliable supplies of reasonably priced energy for commercial and industrial customers and stimulate the growth of the clean energy economy. Areas with the most potential for realizing increased economic activity and successes are discussed below.

Transportation. In a global economy, the competitiveness of the State’s business sector will continue to thrive with transportation infrastructure that is built, operated and maintained to provide cost-effective,

reliable service to customers. The State's transportation policies should encourage fuel efficiency and maximum use of all modes, including highway, rail, air and ports in the promotion of economic development. A reduction in the use of petroleum for basic transportation needs and increasing reliance on cost-effective modes such as rail, electric and the use of alternate fuels will diminish reliance on imported petroleum, reduce congestion and improve environmental quality in New York's communities.

The State's upstate region should focus on highway improvements and expansion of public transit. Regional airports are important components for economic development and commerce, particularly in the upstate region, and these facilities should be coordinated with larger airports. In the downstate region, improvements should include strategies to reduce congestion by maximizing the amount of freight transported by rail cars. The 2009 New York State Rail Plan, announced by Governor Paterson, calls for increasing freight rail usage by 25 percent to reduce truck traffic and energy consumption, and adding at least three intermodal facilities/inland ports across the State to support the rapidly growing container segment of rail traffic. The increased use of rail will stimulate economic development through more cost-effective shipment of goods and materials, and will reduce energy usage and greenhouse gas emissions.²⁷

Electric Supply. As the commercial and industrial sector consumes roughly 58 percent of the electricity sold in New York, the high cost of electricity, owing in part to the dramatic rise and volatility in the prices of oil and natural gas, presents economic challenges to commercial and industrial customers. Although the State's energy and economic development assistance programs have provided incentives to lower costs, additional measures are required both in the near and longer-term to address energy costs.

In the short term, NYPA's economic development power programs based on hydropower and other resources should be reviewed in 2010 with the goal of restructuring and expanding benefits to more businesses. In addition, the allocation of low-cost power benefits should include the participation of ESD to ensure inclusion in statewide economic development initiatives. The Governor's Temporary Commission on the Future of New York State Power Programs for Economic Development in 2006 noted that NYPA's low-cost power leverages economic development through stimulation of capital investment, creation of jobs and payroll and other benefits.²⁸

Neighboring areas have supplies of renewable energy that could be used for economic development in the State. For example, Hydro Quebec in Canada has developed vast hydroelectric resources in the province of Quebec, and is an exporter of electric power. The State should assess the potential to secure long term supplies of this power and other available sources in the region for economic development programs to stimulate investment and create new jobs.

Over the longer term, the State should move to increase the amount of renewable generation resources in its portfolio mix. The reliance on fossil fuels for electric generation and its influence on the volatility of market prices will be reduced with a greater mix of renewable, i.e., wind, solar, hydropower. In addition, the greater use of these resources will stimulate opportunities to manufacture these technologies in New York, create thousands of new green jobs, and reduce pollution and green house emissions.

The State's Article X siting law for power generating facilities expired on December 31, 2002. The enactment of a power plant siting law will facilitate the development of power generation projects to meet

²⁷ Department of Transportation (DOT). *New York State Rail Plan*. 2009. <https://www.nysdot.gov/divisions/policy-and-strategy/planning-bureau/state-rail-plan>

²⁸ Temporary Commission on Future of New York State Power Programs for Economic Development. *A Report to Governor George E. Pataki and the Legislature from the Temporary Commission on the Future of New York State Power Programs For Economic Development*. 2006.

the State's growing demand for cleaner generation capacity. The ability to expeditiously permit and construct generating projects in response to competitive market demand is critical in keeping downward pressure on electric costs and maintaining the reliability of the grid. A new comprehensive power plant siting process will provide regulatory certainty for developers and stakeholders, robust public participation, timelines for project development and help to reduce front end expenses for the addition of new electric capacity.

Natural Gas Supply. Approximately 95 percent of New York's natural gas supply comes from the Gulf Coast region, Western Canada, Northeastern Canada, and the Appalachians. The distances from these sources result in the addition of pipeline transportation and distribution costs to the price of the commodity. New sources of potential natural gas supply for the State include the Marcellus Shale formation in West Virginia, Ohio, Pennsylvania, and the Southern Tier of New York.

The State should promote environmentally responsible development of these natural gas resources to large scale production, which would generate economic benefits, including increasing the stable supplies of indigenous fuel, lowering gas transportation costs for consumers, generating new State and local tax revenues, and increased revenues for landowners from land use agreements with natural gas companies.

Electric and Gas Transmission and Distribution. The reliable transmission and distribution of electricity and natural gas at reasonable costs is essential to the continued growth of the State's economy. Commercial and industrial customers rely on these services to generate power, manufacture goods, provide services and expand operations.

Electric Transmission and Distribution. The reliable supply of electricity is essential for the maintenance of existing companies and attraction of new business and industry to the State. New York maintains and operates its transmission and distribution system under the PSC's mandatory reliability rules to minimize the potential of service interruptions and the economic losses resulting from these outages. During the Blackout in August 2003 that originated in the Mid-West and cascaded eastward to ultimately engulf New York and the Northeast U.S., approximately 6.3 million out of a total of 7.6 million customers in New York lost electric service in an outage that lasted nearly 30 hours.²⁹

A survey of the economic losses in the Northeast region from the blackout estimated the total cost at between \$7 billion and \$10 billion dollars, including lost wages and production.³⁰ New York's manufacturing industries impacted by the blackout included pulp and paper, chemicals, steel and food processing. A study of the blackout by Case Western Reserve University together with several research entities found that nearly 11 percent of business firms surveyed in New York, Ohio, Pennsylvania, Michigan, Wisconsin and Southern Canada reported the blackout would affect their decision making with regards to either growth at their present location or relocation to another area.³¹

The PSC and the State's utilities are assessing the physical condition of the aging electric infrastructure and required investments to maintain and improve reliability of service in the future. The expenditures by utilities to upgrade infrastructure, subject to approval by the PSC, will have the potential to put upward pressure on electric prices for consumers. In addition, constraints in the transmission system, i.e., the

²⁹ PSC. *Initial Report on the August 14, 2003 Blackout*. 2004.

[http://www3.dps.state.ny.us/pscweb/WebFileRoom.nsf/Web/5FA2EC9B01FE415885256E69004D4C9E/\\$File/doc14463.pdf?OpenElement](http://www3.dps.state.ny.us/pscweb/WebFileRoom.nsf/Web/5FA2EC9B01FE415885256E69004D4C9E/$File/doc14463.pdf?OpenElement)

³⁰ ICF Consulting. *Economic Cost of the Blackout: An Issue Paper on the Northeastern Blackout*. 2004.

<http://www.solarstorms.org/ICFBlackout2003.pdf>

³¹ Electricity Consumers Resource Council. *The Economic Impacts of the August 2003 Blackout*. 2004.

east/west interface, result in costs and inefficiencies that raise prices for consumers, dampen economic development and potentially impact the timely implementation of State policy objectives, such as the RPS.

The potential investment required in electric transmission and distribution over the ten year planning horizon for this State Energy Plan is substantial, and will need to be structured in a manner that minimizes impacts on electric costs for consumers.

The maintenance and expansion of the State's electric transmission and distribution infrastructure in the future should incorporate new technologies to maintain reliability, meet demand growth, promote efficient use of electricity, and put downward pressure on electric prices. For example, the Governor's 2008 Renewable Energy Task Force Report stated that the use of advanced metering in the State could result in a 20 percent reduction in energy use and up to a 10 percent reduction in peak load on the system. Under Title XIII of the Energy Independence and Security Act of 2007, the U.S. Department of Energy is coordinating the efforts of federal and State agencies, electric utilities, equipment manufacturers, software developers, service providers, national laboratories and consumers to develop, demonstrate and deploy Smart Grid technologies.

Natural Gas Transmission and Distribution. Natural gas pipeline capacity is sized to supply firm customers, and long-term contracts with firm customers provide incentives for natural gas companies to build additional capacity. New York's economic development objectives will be enhanced by increased natural gas pipeline capacity, particularly to the southern region of the State. The ability to use stable supplies of natural gas, including supply from New York sources such as the aforementioned Marcellus Shale formation, through additional pipeline capacity for new power plants, manufacturing and commercial facilities, and residences will decrease reliance on foreign sources of oil, reduce environmental emissions and help dampen the volatility in energy prices.

Energy Efficiency. The State has implemented policies and program commitments, such as EEPS, to provide assistance to commercial and industrial customers to manage demand, reduce energy usage and promote energy efficiency. Many of these programs provide opportunities for businesses to cut energy costs in the short term. The success in meeting the State's energy efficiency goals in the "45 by 15" initiative, and providing short-term energy cost reduction benefits to commercial and industrial customers, depends in part on effective marketing and outreach through a concerted approach by State agencies administering these programs, including NYSERDA, NYPA, LIPA and the investor-owned utility companies regulated by the PSC. The PSC has established an Advisory Group on customer outreach, education and marketing as part of the EEPS proceeding, including all energy program administrators in the State, and other representatives of stakeholder interests such as ESD. The State agencies and authorities should continue to further coordinate marketing outreach efforts, with an immediate focus to engage commercial and industrial customers toward the cost-effective delivery of energy efficiency programs.