

## SECTION 1.2

# STATE ENERGY PLAN FINDINGS AND CONCLUSIONS

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## INTRODUCTION

In conformance with the Planning Board's direction, and in compliance with Article 6 of State Energy Law, the State Energy Plan contains five Issue Reports and six Assessment Reports. The Planning Board directed agencies' staffs to address these issues in the Energy Plan at its July 17, 2001 meeting, following a review of public comments and of the matters discussed during the staffs outreach meetings with interested parties. Broadly defined, these issues are:

1. Promoting Energy Industry Competition
2. Energy and Economic Development
3. Energy and the Environment
4. Energy and Transportation
5. Preserving Energy-Related Public Benefits Programs

Promoting Energy Industry Competition. The Energy Industry Competition report assesses the status and effects of energy industry competition on the development of energy markets, energy prices, energy facility planning and siting, and the interrelationships existing among major energy sources, including electricity, natural gas, and petroleum products.

Energy and the Environment. The Energy and the Environment report addresses the interactions between energy use and environmental quality, particularly with regard to current trends in environmental regulation, acid rain, greenhouse gas emissions, and non-air impacts.

Energy and Transportation. The Energy and Transportation report addresses the interactions between energy use and transportation, particularly with regard to transportation system use and management, technology, and efficiency. This report explores the interrelationship between a modern, effective, safe, and environmentally

sound transportation system and enhancing the efficient use of energy in the transportation sector.

Energy and Economic Development. The Energy and Economic Development report addresses the interactions between energy use, costs, and economic development, including the State's competitiveness in attracting and retaining jobs. This report also discusses the factors that influence New York's energy prices and rates, including taxes, delivery costs and infrastructure maintenance, and the effects of energy costs on the competitiveness of New York's industries and businesses.

Preserve Public Benefits for New York's Energy Consumers. This report addresses the role of market-based and needs-based public benefits programs in an era of energy industry restructuring and greater competitiveness in energy choices, particularly with regard to government-coordinated efforts to serve small commercial, residential, and low-income consumers.

In addition to the Issue Reports, the Energy Plan contains several Assessment Reports (20-year forecasts of energy demand and prices, and assessments of available energy supplies, including energy efficiency, renewable energy, electricity, natural gas, petroleum, and coal). The Assessment Reports identify emerging trends related to energy supply, price, and demand. The Energy Plan also contains a statement of the State's energy policies, long-range planning objectives and strategies, and recommendations for administrative and legislative actions to implement the State's energy policies, objectives, and strategies. A Final Environmental Impact Statement is integrated into the Energy Plan (Section 4) and the response to comments received on the Draft Energy Plan is provided under separate cover.

The Issue Reports are presented in the State Energy Plan as Sections 2.1 through 2.5, respectively. Following are the key findings from these Issue Reports.

## **ISSUE REPORT FINDINGS AND CONCLUSIONS**

### **Promoting Energy Industry Competition**

- The findings of the 1998 State Energy Plan related to the introduction of competition in the electricity and natural gas industries remain valid today.

- The State must remain vigilant and flexible and must resolve energy issues as they arise, in order for the competitive energy markets in New York State to reach their true potential and for New Yorkers to realize the full benefits of restructuring.
- The State's administrative approach to restructuring its energy industries was premised on input from stakeholders and experts, and designed to provide flexibility to make adjustments as barriers to effective competition are revealed and competitive markets develop. This approach has served New York State well.
- The primary barrier to achieving effective wholesale competition in the energy industries is the lack of adequate resources (electricity generation capacity, electricity and natural gas delivery infrastructure, and demand reduction techniques) in certain areas where they are needed.
- The Article X Power Plant Siting Process in New York State has benefitted the State while protecting the environment.
- The natural gas delivery system, built to serve the winter peak needs of residential, commercial, and industrial customers, is now fully used during peak periods. The competitive electricity generation market is moving toward a greater dependency on natural gas. Such a greater dependency on natural gas suggests a need to expand the natural gas infrastructure; use resources that will reduce our dependency on natural gas, such as greater use of renewable energy resources and advanced coal technologies; implement further electricity demand reduction techniques; and continue safe operation of nuclear power plants.
- The U.S. Congress can assist New York by repealing the mandatory purchase of power from qualified generating facilities required of utilities under the PURPA and by establishing national mandatory reliability rules for the bulk power system (while allowing states to continue to set more rigorous standards when it is in the public interest).

### **Energy and Economic Development**

- Businesses need secure and reliable energy supplies that are reasonably priced to expand operations and grow in the State. Policies promoting greater energy supply certainty will lead to greater private sector investment in New York.
- Low-cost power programs have been successful to date in retaining and expanding employment opportunities in the State. Developing joint State and utility economic development programs has been successful in supporting economic development.

- Power for Jobs has been successful in retaining and creating jobs in New York while keeping energy costs down. There should be an additional authorization for another phase to provide for those customers whose initial allocations are expiring and for which there are few market alternatives.
- Offering electricity discounts as a means of retaining or attracting jobs is an important economic development tool.
- Efforts should continue to be made to forge State and private business partnerships to grow New York's economy in an environmentally-sound manner.
- Energy prices need to be brought more in-line with other states to compete more effectively for economic opportunities.

### **Energy and the Environment**

- The generation and use of energy results in impacts on the environment, including the release of pollutants into the air and impacts on aquatic resources.
- Since the 1998 State Energy Plan was released, the State has made significant gains in reducing the environmental impacts associated with energy generation and consumption. Emission standards on new motor vehicles have been strengthened, as have the requirements on electricity generating plants and other stationary sources of air pollution. The impacts of energy generation on the State's aquatic resources are analyzed and addressed through existing regulatory programs. New electricity generating plants are required to use much less water than existing facilities, and the impacts on fish and other aquatic organisms must be minimized to the greatest extent possible.
- The State has become a national leader in developing new technologies to reduce emissions from diesel-powered trucks and buses, and has created a market for clean-burning low sulfur fuels. These programs will help ensure that New York, already one of the most energy-efficient states in the nation, produces and consumes energy with the lowest-possible impacts on the environment.
- New York has made great progress in meeting its air quality goals, currently meeting the National Ambient Air Quality Standards for five of the six federal criteria pollutants. The New York City metropolitan area has not yet attained the current National Ambient Air Quality Standard for ozone (one-hour), and is not likely to be designated as meeting the pending standards for ozone (eight-hour) or fine-particulates (PM<sub>2.5</sub>). Meeting these standards will require additional emission reductions from all sectors.

- New York has adopted the most stringent tailpipe emission standards for new motor vehicles in the nation, and continues to develop new strategies to reduce emissions from mobile sources, such as cars and trucks.
- The State has made significant progress in reducing emissions that cause acid deposition and will soon adopt stringent new standards on power plants to further reduce these emissions. Scientific data indicate that many water bodies and forested regions in the State are still adversely impacted by acidic deposition and that there is a need for additional national efforts to address these impacts.
- Public transportation has the potential to significantly reduce the impacts of energy used in the transportation sector, particularly through the decrease in single occupant vehicles on the State's roadways.
- MTBE, added to gasoline to meet federal oxygenate requirements, has negatively impacted surface and ground waters in New York and across the nation. The State has enacted a legislative ban on MTBE beginning in 2004.
- Environmental Justice has become a significant issue in the siting of new power plants and other facilities. The State is working to develop a comprehensive policy on how Environmental Justice issues will be addressed.

### **Energy and Transportation**

- New York has the most energy-efficient transportation sector in the United States due to its high-per-capita-use of transit. One-third of all national transit trips are in New York. The use of public transportation is experiencing unprecedented growth, averaging approximately 5% annually.
- Statewide, vehicle miles traveled (VMT) and congestion (especially urban congestion) continue to increase, but VMT should grow at a slower rate in the future. Transportation system management, technology improvements, and capital construction projects are underway to reduce the growth in congestion. Freight truck traffic increases are of concern.
- Bicycle and pedestrian initiatives, passenger ferry service, intermodal passenger and freight capabilities, and high-speed rail efforts are important measures to increase the energy efficiency of New York's transportation sector.
- New York has made a significant commitment in alternative-fueled vehicle (AFV) technology. More than 1,400 State-owned AFVs and over 50 commercial compressed natural gas stations are in use. Executive Order 111 requires State agency purchase of light-duty vehicles to be 100% AFV by 2010.

- Progress in reducing the transportation sector's energy use and air emissions is ongoing and will continue in the future through measures such as Commuter Choice, Ozone Action Days, and traffic signal coordination. Quantitative build and no-build energy and emissions analyses of transportation plans and programs would facilitate continued energy and environmental benefits.
- Energy efficiency can be enhanced by actions at the federal level. Reauthorizing federal surface transportation legislation can substantially affect New York's status as the most transportation-energy-efficient state by providing for transportation programs that enhance energy efficiency and reduce emissions.
- Fuel economy standards for vehicles have the potential to be the most significant action to conserve energy in the transportation sector. Fuel economy standards for passenger cars have been frozen since 1985 and for light duty trucks since 1996. Generally, fuel economy, has worsened between 1990 and 2000.

### **Preserving Energy-Related Public Benefits Programs**

- Government interventions to assist in energy market development are necessary to align public and private interests, particularly in situations where markets are not allocating resources efficiently or fairly.
- Energy customer protections must be continued with the same vigor as they have been afforded in the past. This becomes increasingly important as energy markets become more competitive and customer choice in service providers increases.
- Public benefits programs have contributed to energy and cost savings for residential, low-income, small business, and municipal and institutional customers. These programs also provide environmental benefits, including cleaner air and water, for all of New York's energy customers.
- Opportunities to further coordination among State agencies that have roles in sponsoring and providing low-income energy assistance and other public benefits programs are beneficial to program participants and should be fostered.
- Public benefits programs directed toward research and development have significantly contributed to developing, demonstrating, and providing strategic energy technologies, including the advancement of renewable energy technologies, while encouraging and promoting environmental safeguards and protection.

## **ENERGY SUPPLY ASSESSMENTS FINDINGS AND CONCLUSIONS**

In addition to the Issue Reports, a number of critical energy supply assessments are included, as required by Article 6 of the Energy Law. These include supply assessments for:

1. Energy Demand and Price Forecasts
2. Energy Efficiency
3. Renewable Energy Resources
4. Electricity
5. Natural Gas
6. Petroleum
7. Coal

Following are the key findings of these Issue Reports.

### **Energy Demand and Price Forecasts**

- Demand and nominal prices for most fuels are forecast to increase at different rates over the forecast period; however, real prices (accounting for inflation) decline for most fuels over the forecast period.
- New York's aggregate demand for petroleum products is projected to rise moderately over the forecast period, with increases projected for motor gasoline and decreases for residential heating oil. Increased world demand is expected to exert upward pressure on prices, even given stable supplies. Over the forecast period, demand for motor gasoline is projected to increase 22.4%. Year 2000 prices were unusually high, \$1.59 per gallon, so real prices are expected to drop 11.4% from this level, to \$1.41 per gallon in 2021. Propane use rises 16.7% over the forecast period.
- Natural gas supply availability, being predominately domestic, is expected to be fairly stable. Natural gas prices rose sharply in 2000. This increase was due to tight natural gas supplies, both in production and storage. A result of this price increase was greater U.S. exploration and drilling, increases in inventory levels, and hence, lower real prices over the forecast period. Demand growth will be strong in New York, with 37.9% growth over the forecast period. This is

primarily due to a 61.0% increase in natural gas demand for electric power generation. Real natural gas prices are expected to decrease an average of 0.52% annually, from \$6.95 per dekatherm in 2001 to \$6.23 per dekatherm in 2021.

- Total electricity use in New York is expected to grow 22.9% over the forecast period, while prices in real terms decline. Real electricity prices are forecast to decline 10.1% over the forecast period due to increased competition among suppliers and lower fuel prices. Peak megawatt demand is forecast to grow at a slightly slower rate than total electricity requirements (21.1% versus 22.9%) over the forecast period.
- Coal demand is expected to decline, by a total of 19.5%, over the forecast period. Customer coal prices decline over the forecast period along with mine-mouth coal prices. Productivity increases continue to result from technology enhancements, economies of scale, and better mine design. As a result, real utility coal prices are forecast to decline 14.4% over the forecast period.

### **Energy Efficiency**

- Over the past decade, energy efficiency programs in New York have evolved in terms of their depth, breadth, and focus. The State now offers a diverse portfolio of programs that is designed to better capture available energy efficiency potential where past efforts could not.
- Since 1990, the State has spent more than \$2.9 billion on energy efficiency programs, even while total annual spending declined from a high in the early 1990s of more than \$400 million per year. Annual energy efficiency spending has been increased through 2006 due to the continuation and expansion of the State's System Benefits Charge (SBC) program, and the anticipated spending of NYPA and LIPA on public benefits programs.
- Between 1990 and 2001, the State's major energy efficiency programs have saved 57,256 GWh of electricity and have reduced summer peak demand by nearly 1,700 MW. Cumulative annual savings in 2001 were 7,095 GWh<sup>1</sup>, or about 5.2% of the 137,000 GWh of electricity sales to ultimate consumers in that year. Cumulative summer peak demand reductions in 2001 were 1,688 MW<sup>2</sup>, or about 5.4%, of the 30,982 MW peak that occurred during that summer. Natural gas and oil savings of approximately 40 TBtu have also been achieved over this period.

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<sup>1</sup>The 7,095 GWh saved in 2001 is enough electricity to power approximately one million homes for a period of one year.

<sup>2</sup>The 1,688 MW saved is equal to the demand of approximately 1.6 million homes.



- The cumulative total electricity savings over the period from 1990 to 2001 are estimated to have led to emission reductions of nearly 43,000 tons of NO<sub>x</sub>, 86,500 tons of SO<sub>2</sub><sup>3</sup>, and 25 million tons of CO<sub>2</sub><sup>4</sup>. Cumulative natural gas and oil savings add an additional 2,000 tons of NO<sub>x</sub>, 840 tons of SO<sub>2</sub>, and 2.5 million tons of CO<sub>2</sub> reductions. Approximately 15,000 jobs were created or sustained as a result of these programs. These jobs will be sustained for the life of the energy efficiency equipment installed.

### **Renewable Energy Resources**

- The State has abundant untapped renewable energy resource potential for additional wind, solar, and biomass, as well as more efficient hydropower at existing dams.
- Higher prices for renewable energy will continue to be a barrier to widespread adoption of renewable energy technologies. To foster greater investment in renewable energy-based distributed generation technologies, interconnection rules need to be monitored and periodically reevaluated with the goal of easing interconnections without compromising reliability and system protection, and stand-by rates need to be fair and equitable.
- The cost of renewable energy technologies will continue to be dependent on national and global renewable market development activities. Commercialization efforts, and hence, product prices, are currently driven by national and worldwide demand for renewable energy. As a consequence, it is important for the State to collaborate with other states, the Federal government, and private developers to support renewable energy technology and industry development.
- The State is making significant progress compared to other states in the promotion of renewable energy. By November 2001, New York had 48 megawatts of installed wind capacity, the highest capacity in any Northeastern state. The State is continuing to build a sustainable renewable energy industry by promoting growth in consumer demand, supporting consumer education, constructing and operating renewable energy facilities, and reducing regulatory barriers that might hinder greater development of renewable energy resources in the State.

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<sup>3</sup> The reduction in SO<sub>2</sub> and NO<sub>x</sub> emissions is equivalent to shutting down approximately 1,000 MW of coal-fired electricity generation for one year.

<sup>4</sup> The 25 million tons of avoided CO<sub>2</sub> emissions is equivalent to removing approximately five million cars from the road for one year.

- The State's continued support for renewable energy is necessary to increase consumer interest, advance the development of renewable energy technologies, and achieve widespread commercialization and use.

### **Electricity**

- New York is a national leader in restructuring its electricity industry. Consumers have benefitted with savings in their delivery service charges, and further savings will occur during the planning period. The utilities in the State have divested most of their generation facilities to third parties who now operate them in a competitive wholesale market. Further, more than 16% of customer load has switched from local utilities to new service providers. Most switching in retail service providers has occurred in the commercial and industrial sectors with considerable variability throughout the State. More progress in increasing customer choice can be expected, especially when more supplies and demand reducing options become available.
- The initial years of wholesale electricity market operations in New York coincided with periods of high fuel prices, significant transmission congestion, and tight supply conditions. Wholesale electricity prices reflected these conditions, but they have begun to moderate, although not in a uniform pattern, across the State. Average wholesale electricity prices are forecast to decline in real terms over the remainder of the decade, as are retail prices. This expectation is strongly conditioned on new demand and supply resources being added, especially at critical locations that will serve to reduce transmission congestion, and on continued expansion in natural gas resources.
- Electricity peak demand is forecast to grow at annual average rates ranging from 0.75% to 1.23%, with a mid-range value of 0.92%. The loss of load in New York City resulting from the terrorist attack on the World Trade Center is not factored into the forecast. This load is expected to be restored gradually during rebuilding efforts and completely restored once rebuilding efforts are finished. Load is projected to be fully restored sometime in the early half of the forecast period.
- Reserve margins, representing one measure of system reliability, are projected to exceed the current requirement of 18% throughout most of the planning period if a reasonable number of new resources are added and/or demand is reduced. A higher peak demand growth rate than projected, however, will require more resources, especially in the later years of the planning period.
- In the near-term, simple-cycle gas turbines and demand reduction programs will be used to address growth in peak electricity demand. Over the longer-term, demand reduction programs will continue, and renewable generation facilities and distributed generation will be added, but the bulk of the new resources will likely

come from gas-fired, combined-cycle base-load units subject to Article X of the Public Service Law. As of May 1, 2002, seven generating projects, which could add approximately 3,600 MW to the electric system, had been approved under Article X, and another 17 projects were in the regulatory review process or have been publicly announced.

- The State's transmission system is generally adequate to provide reliable electricity service, provided that the system is operated in accordance with reliability rules established by the North American Reliability Council (NERC), the Northeast Power Coordinating Council (NPCC), and the New York State Reliability Council (NYSRC). However, there are reliability limitations in the use of the transmission system for the economic transfer of power between regions of the State for economic reasons. The siting of additional generation and transmission facilities can reduce price impacts attributed to economic congestion of the transmission system. This finding is consistent with the Planning Board's recent "*Report on the Reliability of New York's Electric Transmission and Distribution Systems.*"<sup>5</sup> Some local transmission reinforcements might also be necessary in the New York City and Long Island areas.
- A Northeast regional common market offers possibilities for enhanced market efficiencies and economic benefits for New Yorkers. A regional market structure may also offer a vehicle for developing new transmission lines to increase power transfers across New York's borders. There are certain principles for common market formation that should be followed to ensure benefits are realized by New York consumers.
- The share of electricity generation fueled by natural gas could increase significantly over the planning period. This trend is consistent with other regions of the Northeast. A major force behind this trend is the decisions of merchant generators to select natural gas as the preferred fuel of choice. The choice is also influenced by environmental factors that recognize the relatively clean air emission profile of natural gas generation. This shift in primary fuel requirements for electricity could result in diminished diversity in the fuel requirements for electricity generation. Reduced fuel diversity increases risk exposure to fuel supply disruptions and price swings. This Energy Plan describes and recommends efforts to reverse or mitigate this trend.
- Air pollutant emissions from electricity generation not under a cap in the State would be expected to decrease as new resources are added to the electric system, increasingly stringent environmental regulations are imposed, and increased electricity trading among regional electricity systems takes place. The Governor's Acid Deposition Reduction Program is a major factor in reducing the

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<sup>5</sup> Report of the New York State Energy Planning Board as required by Chapter 636 of the Laws of 1999.

State's emissions. SO<sub>2</sub> emissions will be reduced to a level that is 50% less than required by the Federal Clean Air Act, and summertime NO<sub>x</sub> control benefits will exist year-round.

- Retirement of all nuclear power plants in the State when their licenses expire would likely result in higher wholesale energy prices, greater potential emissions, reduced fuel diversity, and a need for substantial additional resources to be added to the system to replace the lost capacity as the retirements occur.
- Distributed generation facilities can provide the State with benefits by reducing wholesale electric energy prices and emissions of SO<sub>2</sub> and CO<sub>2</sub> and by improving diversity and transmission flexibility.
- The use of renewable technologies for electricity generation in New York State can provide the State with benefits, but there are costs and operational issues that must be addressed.
- Advanced coal technologies offer a means to provide fuel diversity, lower wholesale prices, and reduced emissions in relation to conventional coal-fired generation technologies, but not in relation to gas-fired generation.
- Energy trades with neighboring systems provide significant benefits for New York State. Reducing transmission constraints, both with neighboring States and within New York State, will provide increased benefits; but the costs and benefits of such efforts must be addressed on case-specific bases.
- The New York Independent System Operator's (NYISO) efforts to modify its capacity market rules is important for ensuring that adequate capacity will be built and maintained in New York State.

### **Natural Gas**

- The demand for natural gas is expected to expand significantly over the planning period, particularly in the near-term, with the greatest increase in the use of gas for power generation.
- More pipeline capacity will be needed to meet the increased demand for natural gas. Interest in expanding interstate pipeline delivery capacity to the Northeast and New York State continues to be strong. The local distribution company (LDC) systems will also have to be expanded to meet these increased needs.
- The Federal Energy Regulatory Commission (FERC) recently approved 9 natural gas pipeline projects to serve the Northeast, and another 11 projects have been proposed.

- Natural gas prices will decrease slightly in real dollars over the long-term and are expected to remain volatile.
- There is a general need to continue LDC system integrity and safety programs, as well as to continue research and development efforts to develop cost savings techniques to maintain and upgrade the existing distribution system.

### **Petroleum**

- U.S. production of crude oil continues to decline. Between 1990 and 2000, domestic production has declined 20.8%. As a consequence, both U.S. and New York State continue to increase their dependence on foreign sources of crude oil and refined petroleum products to meet consumer demand.
- In-State petroleum terminal storage capacity for distillate fuels, gasoline, and residual fuel continues to decline. The size of the decline for each fuel is: distillate, 15.9%; gasoline, 17.5%; and residual fuel, 16.0%. Reasons for this decline include land use concerns associated with storage, costs associated with properly maintaining facilities, increased insurance costs, lack of market incentives to construct new facilities, and the costs of holding large volumes of fuel.
- Lower inventory storage can result in degradation of the operational flexibility needed to satisfy consumer demand, greater supply uncertainty, and greater short-term price volatility.
- If the natural gas fueled electric generation facilities with interruptible gas contracts are unable to acquire their primary fuel and are forced to switch to distillate fuel, they will use significant quantities of distillate over a very short period of time. This could strain the ability of the petroleum infrastructure to respond to this need.
- Electricity generation facilities burning distillate fuel as a backup when natural gas is interrupted, have the potential to disrupt the delivery of electricity in cases where such facilities are being relied upon to meet peak demand and where availability of distillate fuel is limited. In addition, a sudden, large increase in petroleum use in electricity generation could potentially have negative impacts on air quality.

## Coal

- Coal is America's most abundant indigenous fossil fuel resource, accounting for 95% of the nation's fossil energy reserves. The United States has a 250-year supply of coal.
- The U.S. is second only to China among world coal producers. In 2000, over one billion tons of coal were produced in the United States, mined in 25 coal-producing states.
- Approximately two-thirds of all coal mined in the United States is transported by rail, making coal the largest single source of freight revenue for United States railroads. Coal freight in New York accounts for approximately 37% of the total tons of freight hauled by rail.
- In 2000, nearly 12.1 million tons of coal were used in the State, representing less than 1% of the nation's coal demand. While coal use represents 8% of the State's total primary fuel mix, most of the coal (80%) was used to produce electricity.
- New York has 16 coal-fired electricity generation plants located in the State, representing nearly 4,000 MW of net summer capability for the State's electricity system.
- A major consideration in the use of coal as a fuel in electricity generation is the emission of sulfur dioxide, nitrogen oxides, particulate matter, and carbon dioxide. Advanced coal technologies offer utilities options for making substantial reductions in acid rain and greenhouse gas emissions, while providing health-related benefits as the result of improved air quality.
- Development and implementation of advanced coal technologies can be a significant contributor to achieving the State's energy, economic, and environmental goals.