

STATE ENERGY PLANNING BOARD



2009 State Energy Plan Volume I

GOVERNOR DAVID A. PATERSON

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Acronyms and Abbreviations

AASHTO: American Association of State Highway and Transportation Officials

AAU: Association of American Universities

Ag&Mkts: New York State Department of Agriculture and Markets

AMI: Advanced Metering Infrastructure

ARRA: American Recovery and Reinvestment Act

ASHRAE: American Society of Heating, Refrigerating, and Air-Conditioning Engineers

Board: Energy Planning Board

BOCES: Board of Cooperative Educational Services

BOMA: Building Owners and Managers Association

Btu: British Thermal Unit

CAFE: Corporate Average Fuel Economy

CCS: Carbon Capture and Sequestration

CHP: Combined Heat and Power

CNSE: The College of Nanoscale Science and Engineering

CPB: New York State Consumer Protection Board

CO₂: Carbon Dioxide

CONEG: Coalition of Northeast Governors

CUNY: City University of New York

DASNY: Dormitory Authority of the State of New York

DEC: New York State Department of Environmental Conservation

DER: Distributed Energy Resources

DG: Distributed Generation

DHCR: New York State Division of Housing and Community Renewal

DOB: New York State Division of Budget

DOE: United States Department of Energy

DOH: New York State Department of Health

DOS: New York State Department of State

DOT: New York State Department of Transportation

DPS: New York State Department of Public Service

EAG: Evaluation Advisory Group

Energy Code: Energy Conservation Construction Code

ECWG: Energy Coordinating Working Group

EEPS: Energy Efficiency Portfolio Standard

EIA: United States Energy Information Administration

EISA: Energy Independence and Security Act

EM&V: Evaluation, Monitoring, and Verification

EPA: United States Environmental Protection Agency

ESCO: Energy Service Company

ESD: Empire State Development Corporation

FERC: Federal Energy Regulatory Commission

FHWA: Federal Highway Administration

GHG: Greenhouse Gas

GSIP: Green Strategic Investment Program

GWh: Gigawatt Hour

HVAC: Heating, Ventilation and Air Conditioning

ICC: International Code Council

IECC: International Energy Conservation Code

ITS: Intelligent Transportation Systems

kW: Kilowatt

kWh: Kilowatt Hour

LEED: Leadership in Energy and Environmental Design

LEV: Low Emission Vehicles

LIHEAP: Low Income Home Energy Assistance Program

LIPA: Long Island Power Authority

LNG: Liquefied Natural Gas

MARCO: Mid-Atlantic Regional Council on the Ocean

MDth: Thousand Dekatherms

MMBtu: Million British thermal units; million Btu

MMS: Minerals Management Service

MPO: Metropolitan Planning Organization

MTA: Metropolitan Transportation Authority

MW: Megawatt

MWh: Megawatt Hour

NACAA: National Association of Clean Air Agencies

NARUC: National Association of Regulatory Utility Commissioners

NEMAG: Northeast and Mid-Atlantic States Governors

NESCAUM: Northeast States for Coordinated Air Use Management

NO_x: Nitrogen Oxides

NY BEST: New York Battery and Energy Storage Technology Consortium

NYC EDC: New York City Economic Development Corporation

NYISO: New York Independent System Operator

NYP&A: New York Power Authority

NYSDOL: New York State Department of Labor

NYSERDA: New York State Energy Research and Development Authority

NYSTAR: New York State Foundation for Science, Technology and Innovation

OGS: Office of General Services

ORPS: New York State Office of Real Property Services

OTDA: New York State Office of Temporary and Disability Assistance

PANYNJ: Port Authority of New York and New Jersey

PHEV: Plug-in Hybrid Electric Vehicle

Plan: State Energy Plan

PPA: Power Purchase Agreement

PSC: Public Service Commission

PSL: Public Service Law

PV or Solar-PV: Solar Photovoltaic

REBNY: Real Estate Board of New York

REC: Renewable Energy Credit

RFP: Request for Proposals

RFS: Renewable Fuel Standard

RGGI: Regional Greenhouse Gas Initiative

RNA: Reliability Needs Assessment

RPS: Renewable Portfolio Standard

SAFETEA-LU: The Federal Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users

SBC: System Benefits Charge

SEQRA: State Environmental Quality Review Act

SGEIS: Supplemental Generic Environmental Impact Statement

SO₂: Sulfur Dioxide

STARS: New York State Transmission Assessment and Reliability Study

STEP[®]: Saratoga Technology + Energy Park[®]

SUNY: State University of New York

T&F: New York State Tax & Finance

TBtu: Trillion Btu

TIP: Transportation Improvement Program

TOD: Transit Oriented Development

TWY: New York State Thruway Authority

UNFCCC: United Nations Framework Convention on Climate Change

USDOT: United States Department of Transportation

VMT: Vehicle Miles Traveled

WAP: Weatherization Assistance Program

Executive Summary

The 2009 New York State Energy Plan (Plan or Energy Plan) sets forth a vision for a robust and innovative clean energy economy that will stimulate investment, create jobs and meet the energy needs of residents and businesses over its 10-year planning horizon. To that end, the Plan provides the framework within which the State will reliably meet its future energy needs in a cost-effective and sustainable manner, establishes policy objectives to guide State agencies and authorities as they address energy-related issues and sets forth strategies and recommendations to achieve these objectives.

The Plan's strategies and recommendations have been designed to meet five policy objectives:

- Assure that New York has reliable energy and transportation systems;
- Support energy and transportation systems that enable the State to significantly reduce greenhouse gas (GHG) emissions, both to do the State's part in responding to the dangers posed by climate change and to position the State to compete in a national and global carbon-constrained economy;
- Address affordability concerns of residents and businesses caused by rising energy bills, and improve the State's economic competitiveness;
- Reduce health and environmental risks associated with the production and use of energy across all sectors; and
- Improve the State's energy independence and fuel diversity by developing in-state energy supply resources.

Five strategies are outlined in the Plan, which simultaneously achieve these multiple policy objectives. The strategies are: (1) produce, deliver and use energy more efficiently; (2) support development of in-state energy supplies; (3) invest in energy and transportation infrastructure; (4) stimulate innovation in a clean energy economy; and (5) engage others in achieving the State's policy objectives.

Strategy 1: Produce, Deliver, and Use Energy More Efficiently

The Plan has identified energy efficiency as the priority resource for meeting its multiple objectives. New York has been among the nation's leaders in implementing market-based programs to help ensure that energy efficiency is recognized as a cost-effective alternative to supply-side energy resources. Investing in end-use energy efficiency, across all sources of energy and across all energy-using sectors, is the most economical approach to expanding the State's clean energy economy. In the short-run, investments in energy efficiency reduce energy use and bills for participating customers. In the long-run, a significant reduction in electricity demand has been shown to put downward pressure on wholesale electricity prices, reduce price volatility, and reduce emissions of carbon dioxide (CO₂) and other air pollutants. Energy efficiency improvements in the transportation sector will reduce dependence on foreign oil and will reduce emissions, which is of critical importance in congested areas of the State with poor air quality. Energy efficiency investments have also been shown to increase employment opportunities in the State. Additionally, promoting energy efficiency in low income communities, and making energy efficiency

upgrades to affordable housing, can reduce energy-related economic burdens on low income New Yorkers. Finally, improving overall electric system efficiency in a cost-effective manner will also mitigate unavoidable price increases associated with replacement of aging infrastructure, and reduce environmental impacts.

This strategy will be furthered by a number of recommendations summarized below. A full discussion is found in Chapter 2.

- Implement programs to achieve the State’s goal of reducing electricity use by 15 percent below 2015 forecasts.
- Implement alternative financing programs to fund energy efficiency retrofits.
- Improve coordination of all end-use energy efficiency programs administered by the State and local governments and utilities, and consistently measure and report results.
- Update the State’s Energy Code and improve training and compliance initiatives.
- Enact efficiency standards for products for which the federal government does not preempt the states.
- Ensure energy efficiency programs reach low income customers who are particularly vulnerable to rising energy prices.
- Increase the efficiency of the State’s electric system through expanded demand response programs deployment of “Smart Grid” technologies, and real time pricing rate structures.
- Improve energy efficiency in public buildings.
- Improve consumer awareness of energy use and costs through the use of energy benchmarking programs and energy disclosure requirements in real estate transactions.
- Reduce Vehicle Miles Traveled (VMT) by expanding alternative transportation options.
- Work with the federal government to strengthen Corporate Average Fuel Economy (CAFE) standards, and change transportation funding formulae to encourage energy efficiency.
- Supplement Truth in Heating law requirements to ensure that prospective purchasers of buildings are provided relevant information regarding key energy efficiency attributes of buildings.

Strategy 2: Support Development of In-State Energy Supplies

Production and use of in-state energy resources – renewable resources and natural gas – can increase the reliability and security of our energy systems, reduce energy costs and contribute to meeting climate change, public health and environmental objectives. Additionally, by focusing energy investments on in-state opportunities, New York can reduce the amount of dollars “exported” out of the State to pay for energy resources. Increased use of renewable resources should not be limited to power generation: many applications of renewable resources – e.g., solar thermal installations and biofuel blends – have the potential to provide substantial energy and environmental benefits.

This strategy will be furthered by a number of recommendations summarized below. A full discussion is found in Chapter 3.

- Implement programs to increase the proportion of renewable generation to 30 percent of electricity demand by 2015.
- Create a tracking and trading system for Renewable Energy Credits (RECs) to foster the voluntary market for renewable energy purchases.
- Encourage bilateral contracts as a mechanism to attract private investment in renewable resources.
- Encourage deployment of Distributed Generation (DG) through improved net metering laws.
- Expand funding and implementation support for environmentally beneficial distributed energy resources such as solar thermal and geothermal heat pumps.
- Encourage development and use of sustainable biomass to displace heating oil and gasoline.
- Encourage development of the Marcellus Shale natural gas formation with environmental safeguards that are protective of water supplies and natural resources.

Strategy 3: Invest in Energy and Transportation Infrastructure

New York's massive energy and transportation infrastructure is in constant need of maintenance and repair to keep the State from backsliding on its high standards of infrastructure reliability. Infrastructure investments are also necessary to support the State's transition to a clean energy economy, and will be driven by strategic longer-term needs, including the need to reduce GHG emissions. The key will be to guide infrastructure investment in a manner that is responsive to environmental concerns, consistent with the long-range GHG reduction goal of 80 percent by 2050 ('80 by 50'), and improves the economic welfare of the State's residents and businesses.

In the case of electricity infrastructure, the State's delivery systems may be able to take advantage of cost-effective Smart Grid technology to increase system efficiency and prepare the State for the deployment of advanced appliances and electric vehicles. Transmission upgrades may also allow the State to fully exploit the potential benefits of upstate wind, additional Canadian imports and new nuclear capacity, all of which can help meet the multiple policy objectives of the Plan. Electricity infrastructure investments must be developed in light of the need to minimize impacts on host communities, particularly environmental justice communities. In the case of natural gas, enhanced pipeline delivery capacity is needed in the downstate area to maintain reliability while allowing for conversions or repowering of power plants from oil to natural gas and accommodating growing core demand. In the case of transportation, investments can be used strategically to reduce vehicle congestion, expand mass transit and encourage more efficient transportation systems.

This strategy will be furthered by a number of recommendations summarized below. A full discussion is found in Chapter 4.

- Develop a Climate Action Plan in accordance with Executive Order 24 to identify strategies, actions and infrastructure needs to reduce GHG emissions by 80 percent by 2050.

- Enact a fuel neutral power plant siting law that provides for early and meaningful public participation with ample intervenor funding, early identification of environmental justice concerns and a time limit for a decision.
- Enact Carbon Capture and Sequestration legislation that will provide a siting process to guide the demonstration of this new and promising technology.
- Encourage repowering of existing facilities where justified by reliability, economic and environmental benefits.
- Support the upgrade and replacement of aging transmission and distribution infrastructure to maintain electric system reliability.
- Identify opportunities to utilize existing rights-of-way for new transmission projects.

Strategy 4: Stimulate Innovation in the Clean Energy Economy

The importance of innovation in the energy and transportation sectors is underscored by the challenge posed by climate change, a challenge which will push New York and the nation inexorably toward a low carbon, clean energy future. Fostering innovation in these sectors will also drive economic growth. The Governor addressed this subject in his recent New Economy jobs plan,¹ which discussed the need and benefit of economic development focused on increasing the State's capacity for innovation.

Policies that encourage innovation at each stage of the clean energy product and business cycle will position the State to not only meet its own energy policy objectives, but to export knowledge and energy technologies to the rest of the world. New technologies for generating, storing, transmitting, and using energy, along with a well-trained workforce to support the design, installation and maintenance of those technologies, will become critical to successful reduction of GHG emissions, in this State and throughout the world.

In the transition to a clean energy economy, it will be critical to provide continued assistance to retain the existing industrial base in New York.

This strategy will be furthered by a number of recommendations summarized below. A full discussion is found in Chapter 5.

- Foster collaboration among academia, research and development organizations, national laboratories, and private businesses and industry to accelerate the commercialization of emerging clean energy technologies by New York-based firms.
- Foster regional clusters of clean energy businesses and institutions.
- Target the State's economic development programs to attract clean technology industries.

¹ Governor David A. Paterson. *Bold Steps to the New Economy: A Jobs Plan for the People of New York*. June 2009. http://www.ny.gov/governor/press/pdf/press_0608091.pdf

- Continue providing support through the State’s low-cost power programs to retain New York’s commercial and industrial base, and encourage firms to reduce energy use and costs through energy efficiency improvements.
- Increase local demand for clean energy technologies through the State’s clean energy programs.
- Expand clean energy job training programs and tailor programs to meet industry needs and create “pathways out of poverty;” develop a formal means to coordinate all agencies involved in workforce training, from basic skills training to clean energy jobs training.

Strategy 5: Engage Others in Achieving the State’s Policy Objectives

Local governments, and the communities they serve, must play a critical role in the overall effort to meet the State’s energy policy objectives, as the success of many energy programs depends on sustained commitments by local governments. Energy-conscious local planning and land use policy decisions, particularly zoning ordinances, locally sponsored efficiency initiatives, even locally developed renewables projects, should be some of the building blocks in the State’s effort to build a clean energy economy. The State has a responsibility to collaborate with and support local governments and local communities in these efforts.

Looking beyond its borders, the State’s ability to achieve those same policy objectives depends heavily on establishing mutually beneficial working relationships with our neighboring states and nearby Canadian provinces. Significant challenges – and problems – need to be addressed to, among other things, maintain our fuel diversity, maximize the development of renewable resources, minimize future power plant air emissions, and enhance interstate and international power transmission while protecting environmental resources. Offshore siting of a variety of energy supply and storage facilities offers much promise; however, such siting will require multi-state collaboration. In similar fashion, the prospect of securing hydro power from Canada increases the likelihood that we will be able to reduce GHG emissions 80 percent by 2050 in New York State; however, realizing this potential requires sustained negotiations with Quebec and neighboring power systems.

Finally, State success depends on federal policies, regulatory programs and funding. Fortunately, the Obama Administration has advanced policy goals consistent with the State’s own priorities. However, given the likelihood of federal adoption of policies to limit GHG emissions, the State’s interests need to be represented in the national debate on policy implementation. Moreover, given the joint jurisdictional issues involved with offshore permitting of major energy facilities, the State must proactively seek to coordinate its review of projects with concerned federal agencies.

This strategy will be furthered by a number of recommendations summarized below. A full discussion is found in Chapter 6.

- Amend the City, Town, Village, and General Municipal Laws to incorporate energy considerations in Comprehensive Plans.
- Develop Tax Increment Financing reform legislation to encourage the redevelopment of distressed communities and revitalize downtown areas.
- Encourage local adoption of Smart Growth policies and strategies, and the adoption of local Climate Action Plans by providing State technical assistance and funding opportunities to local governments.

- Encourage development and growth along existing mass transportation routes, i.e., Transit Oriented Development (TOD).
- Provide and enhance mechanisms for early, fair and meaningful public involvement with transparency in energy-related decisions.
- Develop energy facility siting and permitting criteria that assess disproportionate health risks and environmental impacts on potential environmental justice areas.
- Work with multi-state collaborations to advance regional energy initiatives, e.g., Regional Greenhouse Gas Initiative (RGGI), Mid-Atlantic Regional Council on the Ocean (MARCO), Great Lakes Wind Collaborative.
- Partner with the State's Congressional Delegation to advance New York's clean energy agenda at the federal level.

Preface

The 2009 State Energy Plan

Governor David A. Paterson created the State Energy Planning Board in April 2008 by Executive Order 2 and tasked the Board with preparing a State Energy Plan (Plan or Energy Plan).² The Executive Order requires a 10-year planning horizon and specifies issues and analyses that must be included in the Plan. These requirements have been met through the development of nine policy Issue Briefs which address: Siting New Energy Infrastructure; Energy Infrastructure; Environmental Impact and Regulation of Energy Systems; Environmental Justice; Energy Costs and Economic Development; Transportation; Climate Change; Regional Collaboration; and Health, Energy Production and Energy Use. The Executive Order also requires assessments of the State's energy resources and efficiency markets, including: Energy Efficiency; Renewable Energy; Electricity; Natural Gas; Petroleum; and Coal. Energy demand and price forecasts have also been prepared over the 2009-2018 planning horizon and are reported in the Plan. These Issue Briefs and Assessments offer more detailed discussions of issues addressed in this Plan and serve as the basis for the findings and recommendations.

In accordance with the Executive Order, the Plan analyzes a broad range of matters related to the State's energy systems, including the reliability of delivery networks for electricity, natural gas and petroleum products and the interrelated effects of energy production and use on the State's economy, environment and transportation system. The Plan also addresses the impact of energy production and use on public health, particularly for the State's most vulnerable populations.

The Plan provides the Governor's vision for a robust and innovative clean energy economy that will stimulate investment, create jobs, protect public health and the environment and meet the energy needs of businesses and residents over the planning horizon. To that end, the Plan:

- provides the framework within which the State will reliably meet its future energy needs, in a cost-effective and environmentally conscious manner over the planning period; and
- establishes broad policy objectives to guide State agencies and authorities as they deal with energy-related issues and sets out strategies and programmatic and policy recommendations consistent with these objectives.

Leading up to these strategies and recommendations, the Plan:

- highlights areas of New York's energy sector and transportation systems that are in need of additional public and private investment;
- reviews existing energy and energy-related economic development, environmental, public health, and transportation programs administered by the State's agencies and authorities and utilities; and

² Executive Order 2. 2008. http://www.ny.gov/governor/executive_orders/xeorders/eo_2.html

- provides in-depth information about the State's energy and transportation systems, as well as the effects of these sectors on the environment and public health.

Planning Process

The Energy Planning Board (Board) established the Energy Coordinating Working Group (ECWG), comprised of staff members from planning agencies and the New York Power Authority (NYPA) and Long Island Power Authority (LIPA), to assist in the planning process, provide the analyses necessary to develop the Plan's findings and recommendations, and prepare the draft and final Plans. The ECWG issued a Draft Scope for the Plan on May 30, 2008 identifying the issues to be addressed, and the schedule and process by which the Plan would be prepared. This followed more than 70 stakeholder meetings held throughout the State soliciting input and comment on developing a Work Scope. The ECWG also received written comments on the draft Scope from over 65 stakeholders. The public input and comments proved useful in preparing the final Work Scope. The Website, www.nysenergyplan.com, was created by the Board to facilitate communications with stakeholders.

The Board has held four public meetings since May 2008. The meetings were webcast and archival videos of the meetings are available at www.nysenergyplan.com. At its December 11, 2008 meeting, the Board modified the Executive Order's schedule for completing the Plan. The modified schedule included the publication of an Interim Report from the ECWG to the Energy Planning Board on March 31, 2009, with the draft Plan being released in August 2009 and the final Plan released by the end of 2009.

The Interim Report was released in accordance with the modified schedule in March 2009 and 45 sets of written comments were received in response to it. The Board met to hear a summary of recurring themes from those comments on June 19, 2009, and at that meeting authorized the continued preparation and release of the draft Plan in August 2009.

Following the release of the draft Plan in August 2009, nine public hearings were held throughout August and September 2009 to receive comments on the draft Plan. Written comments were also accepted via the Energy Planning Board Website (www.nysenergyplan.com), and both oral and written comments were taken into consideration as this final Plan was developed.

In September 2009, Governor Paterson signed legislation that statutorily establishes the State Energy Planning Board and calls on that Board to complete an energy plan on or before March 15, 2013.³ That Board is also directed to adopt new plans at least every four years thereafter and provide biennial reports on the plan's implementation. As such, the State Energy Planning Board that was created by Executive Order 2 shall exist until such time as the statutorily created State Energy Planning Board begins its planning process in preparation for the 2013 energy plan.

The State agencies and authorities that are members of the State Energy Planning Board each have defined missions that are meant to support the public interest. Because energy decisions made by these agencies and authorities can have a wide range of impacts on the economy, environment, public safety, public health, energy supply and cost, mobility and the quality and reliability of services, it is critical to ensure that such decisions are not made in a vacuum. Through their cooperation in completing the Plan, the planning agencies and authorities have developed strategies that meet multiple objectives simultaneously. Individual Board members may disagree with one or more of the Plan's recommendations, but the suite of strategies and recommendations found within this Plan are supported

³ Chapter 433 of the Laws of 2009.

by the majority of the State Energy Planning Board, and per Executive Order 2, are meant to guide all State agency actions over the planning horizon unless otherwise restricted by law.

System Modeling

The Plan and its supporting Issue Briefs and Assessments required substantial energy system modeling and related quantitative analysis. The electricity and natural gas systems modeling provided the analytical underpinnings of many of the Plan's findings and recommendations. The modeling offered a basis for understanding how the systems work and interrelate, identifying where investment and infrastructure support are needed, and understanding how system needs and characteristics may change depending on various assumed future scenarios.

The electricity and natural gas system modeling has been a collaborative effort of the planning agency staff, in particular New York State Energy Research and Development Authority (NYSERDA), Department of Public Service (DPS) and Department of Environmental Conservation (DEC). In addition, LIPA and NYPA have taken an active role in helping design and assess model scenarios and simulations. The New York Independent System Operator (NYISO) has been generous in its support of the modeling efforts and has assisted the planning agency staff in data collection, modeling and analysis.

The electricity system modeling solves for the optimal system dispatch (including imports and exports), new capacity, retirements, and repowering, given the specified demand, system characteristics, reserve margins, and environmental constraints. Two "Reference" cases were developed for the electricity modeling, which differ only in the electricity demand forecasts used as model input, for use as points of comparison for alternative policy directions. The "Starting Point" case is based on the electricity demand forecast used by the NYISO in its 2009 Reliability Needs Assessment (RNA). From 2009 to 2018, electricity demand under this case is assumed to increase at an average rate of 0.8 percent per year, or a total increase of 7.3 percent. The NYISO used moderately risk-averse assumptions which were widely vetted among market participants and considered to be appropriate for its baseline analysis of system reliability. The RNA forecast assumes that approximately 27 percent of the '15 by 15' policy goal is achieved through the Energy Efficiency Portfolio Standard (EEPS) (based on the level of authorized funding at the time the forecast was developed). The "SEP Policy Reference" case is also based on the electricity demand forecast developed by the NYISO, but assumes full achievement of the '15 by 15' policy goal; that is, electricity demand is assumed to be reduced by 2015 to a level that is 15 percent lower than the forecasted level without the policy goal. From 2009 to 2018, electricity demand under the SEP Policy Reference case is assumed to decrease by 1.8 percent.

The natural gas system modeling is designed to evaluate both the adequacy of natural gas supply and the ability of the natural gas pipeline system to provide the quantities of gas at the locations and times required by the electricity system, while simultaneously meeting the needs of residential, commercial and industrial customers. The natural gas system "Reference" case is built off the "Starting Point" electricity modeling reference case to provide a conservative evaluation of the natural gas system. The natural gas system modeling evaluates the adequacy of the gas supply system on an aggregated annual basis as well as on individual peak days (generally occurring in winter) when the greatest volumes of gas are required. The scope of the modeling also includes four sensitivity scenarios, each of which assumed demand for natural gas to be significantly higher than the natural gas Reference Case due to increased needs in the electricity generation sector.

Organization

The Plan consists of this document and the sixteen supporting Issue Briefs and Assessments. These supporting documents are available on the Energy Planning Board Website at www.nysenergyplan.com.

This Volume contains seven Chapters and an Appendix. Chapter 1 identifies the fundamental policy objectives against which potential strategies were evaluated for consistency and effectiveness. Chapter 1 also describes the five key strategies that emerged as those the State will pursue to achieve its policy objectives. Chapters 2 through 6 address, in detail, each of the five strategies and related recommendations, as well as the underlying issues that must be addressed for the State to achieve its policy objectives over the planning period. Chapter 7 contains the implementation plan that will be pursued during the planning period to follow through on the Plan's recommendations.

1 *New York's Energy Policy*

An energy plan by nature focuses on reliably meeting projected future energy demands, while balancing and advancing other public policy objectives. But no credible plan can be developed in a vacuum and over the past two years, the State confronted a number of “facts on the ground” which by necessity informed the planning process. These facts include:

- The State is in an economic recession and has lost over 200,000 jobs since August 2008, bringing New York's unemployment rate to a 17-year high.
- Many New Yorkers have experienced hardships caused by the extreme volatility in the prices of energy.
- At the national level, the federal government is catching up to New York and other states in recognizing the extraordinary challenges posed by climate change and the urgent need to reduce GHG emissions.
- There is greater interest at the federal level in improving the country's energy security, particularly through development and deployment of clean energy producing technologies.
- Finally, 85 percent of New York's population (based on 2000 U.S. Census data) lives in areas of the State that have not been designated as in attainment of one or more of the national health-based air quality standards.

Clearly defined objectives emerge from these considerations. Section 1.1 identifies these objectives and explains what they mean and why they are important to the State. Strategies for achieving these objectives are formed based on the modeling analyses and findings of the Issue Briefs and Assessments. Section 1.2 introduces the Plan's strategies and describes how they are meant to achieve and balance the State's multiple objectives. Chapters 2 through 6 go into additional detail on each of the strategies and discuss what the State has been doing in these areas, what challenges or barriers currently exist, and finally the recommendations that are intended to overcome those barriers. Chapter 7 contains the implementation plan for the recommendations.

1.1 **Planning Objectives**

The Plan supports development of a clean energy economy – one that uses energy efficiently, is increasingly powered by low carbon energy resources with lower environmental and health risks, relies increasingly on modern infrastructure, fosters technology innovation, creates and sustains jobs, encourages smart transportation alternatives and adopts community planning strategies. Investing in the State's clean energy economy and taking immediate steps to mitigate the effects of climate change will drive future policy decisions and will continue to position New York as a leader nationally and globally. As such, actions to implement the State's clean energy economy goals, such as the need for new infrastructure development, may be driven by other longer term objectives that are not normally considered in energy system planning.

Given traditional and current policy drivers, the Energy Plan is guided by the following key objectives:

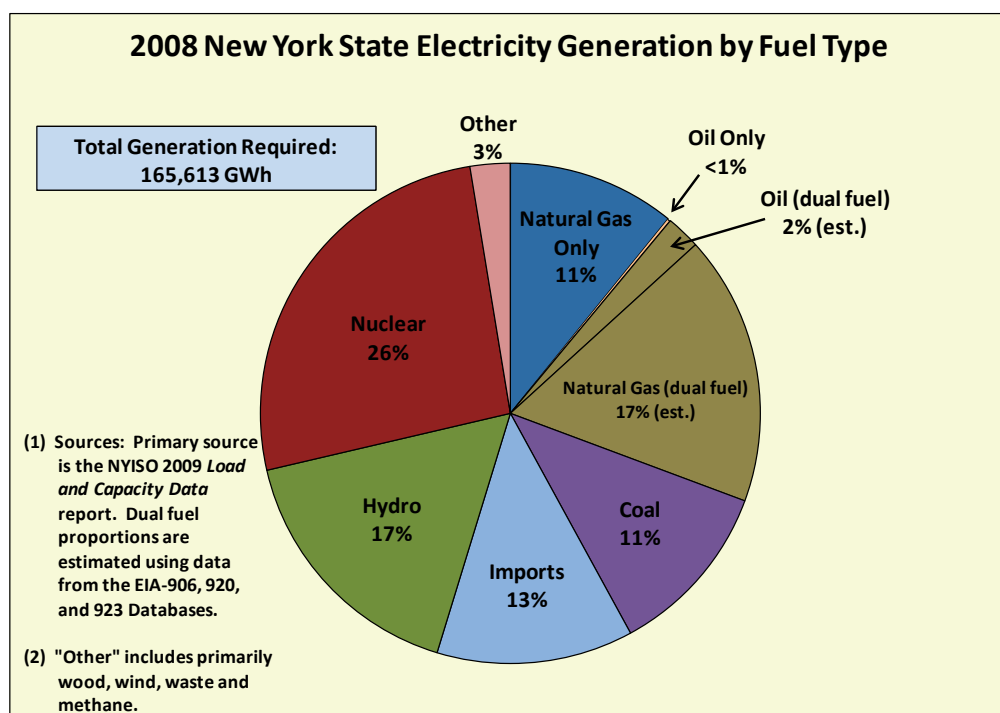
- **Maintain Reliability:** Assure that New York has reliable energy and transportation systems.
- **Reduce GHG Emissions:** Support energy and transportation systems that enable the State to significantly reduce GHG emissions, both to do the State's part in responding to the dangers posed by climate change and to position the State to compete in a national and global carbon-constrained economy.
- **Stabilize Energy Costs and Improve Economic Competitiveness:** Address affordability concerns of residents and businesses caused by rising energy bills, and improve the State's economic competitiveness.
- **Reduce Public Health and Environmental Risks:** Reduce health and environmental risks associated with the production and use of energy across all sectors.
- **Improve Energy Independence:** Improve the State's energy independence and diversity by developing in-state supplies of clean energy.

1.1.1 Maintain Reliability

New York's businesses and residents depend on reliable energy and transportation systems. For all energy systems, reliability is contingent on adequate supplies of fuel, as well as a robust delivery infrastructure. Investments made in these systems help ensure that the systems remain resilient, flexible and adaptable to accommodate new technologies. The ability to construct new, and maintain existing delivery infrastructure, is key to maintaining reliability. Uncertainty with regard to infrastructure siting and interconnection, cost recovery and jurisdictional issues all discourage needed infrastructure development and increase costs for New York's citizens.

Electric system reliability is strengthened by a diversified fuel supply for generation. Figure 1 shows the State's annual generation mix in 2008, consisting primarily of nuclear power, natural gas, hydropower, coal, oil, and imports. Adding to the State's renewable mix can provide further diversity. Reliability is strengthened by regular upgrades to delivery infrastructure. In addition, there is a continuing need for comprehensive and effective reliability standards for the operation of the State's bulk power system, developed by the New York State Reliability Council and implemented by the NYISO.

Reliability of supply for heating fuels is crucial during the coldest winter months. The petroleum industry maintains inventories of various heating fuels such as home heating oil, propane and kerosene fuel at levels based on historic normal demand trends and market expectations. Weather conditions, economic events or disruptions in the supply chain can adversely affect the ability of the industry to meet demand during critical times. Petroleum products, while a small portion of the electric system power supply mix, are also essential for maintaining the reliability of the electric power system. Oil is used as a backup fuel for large power plants during periods of high natural gas demand or for price arbitrage; residual oil is used during periods of high natural gas demand in the winter months and distillate oil is used during the summer peak period.

Figure 1. New York's Electricity Generation Mix

Today, the movement of people and goods depends on a secure and reliable infrastructure and flow of liquid petroleum products, such as motor gasoline, highway diesel fuel and ethanol. Nationwide, the petroleum supply industry maintains adequate inventories to cover eight weeks of normal demand. An extended supply disruption would likely impose significant economic costs to businesses and residents, as was the case in 2005 when hurricanes Rita and Katrina made landfall near the U.S. Gulf Coast refining center, resulting in the closure of almost 30 percent of U.S. refining capacity.

1.1.2 Reduce Greenhouse Gas Emissions

There is scientific consensus that the increase in GHG concentrations in the atmosphere is driving changes in the Earth's climate. The combustion of fossil fuels transforms organic carbon into CO₂, a heat-trapping GHG. Released into the atmosphere, CO₂ retains heat, which alters the Earth's energy balance, warms the planet and changes its climate. The science is sufficient to predict that continued, unabated combustion of fossil fuels will contribute to dramatic changes in our climate. Climate change threatens human societies and natural biodiversity because it is expected to significantly alter the ecosystems that supported the development of human civilization.

In New York, average temperatures are rising. Spring bloom occurs a week earlier on average than 30 years ago, and there is an observable northward shift both of plant hardiness zones and of the occurrence of certain wildlife and plant species. While future climate change may marginally help a few areas of New York's economy, such as increasing yields and crop variety in certain types of agriculture and decreasing winter heating needs, it will impose significant economic burdens. For instance, its global impacts on agriculture as a whole are likely to increase consumer food costs. Health care and public health expenditures will increase if warmer temperatures increase the incidence of heat-related illness and mortality and vector-borne disease. Protecting or replacing existing communities and infrastructure as the sea level rises will be costly. In an increasingly interconnected world, New York's economy may also be

burdened by climate change impacts that destabilize ecosystems, agriculture and economies outside of New York's borders.

Scientific evidence suggests that limiting the global average temperature increase to approximately 3.6°F (2°C) above pre-industrial temperatures may minimize the likelihood of the most severe climate impacts and is consistent with the United Nations Framework Convention on Climate Change (UNFCCC) goal of avoiding dangerous climate change. To keep warming within these limits, the UNFCCC concludes that emissions of GHGs from developed nations must be reduced by 80 to 95 percent from year 1990 levels by the year 2050. Recognizing this need, Governor Paterson issued Executive Order 24 that sets a State goal to reduce GHG emissions in New York 80 percent below 1990 levels by the year 2050. The Executive Order also establishes a Climate Action Council that is charged with preparing a draft Climate Action Plan by September 30, 2010. The Climate Action Plan will identify possible strategies for meeting the '80 by 50' goal.

With nearly all of New York's CO₂ emitted in the generation and use of energy, the relationship between climate change and energy planning is inescapable. A central challenge for New York is enabling a transition to an energy system with very low GHG emissions in time to do the State's part to prevent the most severe impacts of climate change, while maintaining the State's reliable energy systems, meeting other environmental goals and increasing the State's economic competitiveness.

1.1.3 Stabilize Energy Costs and Improve Economic Competitiveness

Energy expenses are driven by price and use. Consumers generally have little control over energy prices, which vary throughout the State and are influenced by, among other factors, world markets, the availability of fuels, electric generation resources, electric and gas transmission and distribution facilities, transportation infrastructure, and regulatory requirements. In contrast, consumers have greater control over their energy use, which is governed by their energy and transportation choices, including technology, efficiency practices and building efficiency. Although consumers may be unable to control the price they pay for energy, through control of their energy usage, consumers may ultimately affect their energy expenses.

Energy costs affect consumers' energy bills and what they pay for goods and services. High energy costs can have a negative impact on household budgets, particularly for families on a limited income who pay a higher proportion of their household income for energy. The State and federal government offer a number of programs to help consumers lower their energy bills, ranging from direct bill assistance through the Low Income Home Energy Assistance Program (LIHEAP) to targeted energy efficiency programs.

Energy costs also can have a significant impact on the economic competitiveness of the State, especially for energy intensive businesses currently located within the State and those considering an expansion or looking to locate in New York. New York's relatively high energy prices are attributable to the State's heavy reliance on fossil fuels from out of State, relatively low dependence on coal (which is currently a less expensive fuel), electricity system constraints, natural gas and petroleum product transmission and pipeline system constraints, the State's geographic location away from major supplies of energy, and State and local taxes and fees. In order to address these high costs and stimulate economic development, several State agencies and authorities offer a myriad of economic development and energy assistance programs – described in the Energy Costs and Economic Development Issue Brief – to reduce energy use and energy bills to enhance the economic competitiveness of the State.

1.1.4 Reduce Public Health and Environmental Risks

Combustion of carbon-based fuels, whether for electricity generation, transportation or heating, results in the emission of contaminants such as nitrogen oxides (NO_x), sulfur dioxide (SO₂), particulate matter, carbon monoxide, polycyclic aromatic hydrocarbons, volatile organic compounds and metals, as well as several GHGs including CO₂. These individual contaminants are associated with a number of adverse health effects, including cardiovascular disease, respiratory effects, infections, asthma exacerbation, cancer, central nervous system effects, liver effects, kidney effects, and mortality. The likelihood of health effects depends on multiple factors, including the amount, frequency, and duration of exposure, the toxicity of the contaminant, and an individual's health status. Emissions of acid deposition precursors (NO_x and SO₂) from sources in New York and upwind continue to degrade the State's forests and water bodies and impair visibility. The severity of these impacts is dependent upon a number of factors; however, in general, a decrease in emissions of contaminants will reduce the likelihood of negative health and environmental impacts. This can be accomplished through a shift to cleaner carbon-based fuels (e.g., natural gas and low sulfur diesel) or non-carbon-based energy sources across all energy sectors.

Environmental justice is the assurance of fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Through Governor Paterson's Environmental Justice Interagency Task Force, and other policies, the State has efforts underway that focus on improving both the human and physical environment, with an emphasis on low income communities and communities of color.⁴ These efforts also work on addressing disproportionate health and environmental burdens that may exist in those communities. Continued study of the areas with disproportionately high rates of poverty, unemployment, traffic, and power generation and industrial facilities is important in helping to unburden communities with high rates of health problems, such as asthma incidences and lead poisoning.

1.1.5 Improve Energy Independence

New York spends approximately \$65 billion annually on energy, of which 53 percent or close to \$35 billion leaves the State to pay for energy imports. This reliance on outside sources of energy creates economic opportunities in exporting regions at the expense of New York. It also reduces New York's control over energy supply disruptions caused by market forces or infrastructure issues outside the State. By investing in measures that reduce energy use and supporting in-state energy resource development, New York will reduce the outflow of dollars to pay for energy imports. This will help to stimulate the economy and create local jobs.

Most of the in-state energy available to New York is from low carbon natural gas and biomass or carbon-free renewable sources, such as wind, hydropower, and solar, that, if developed, will help to achieve climate and public health improvements while increasing energy security.

⁴ Department of Environmental Conservation (DEC). *Environmental Justice Interagency Task Force*. 2009. <http://www.dec.ny.gov/public/47153.html>

1.2 Clean Energy Strategies

The energy strategies that will simultaneously achieve New York's multiple objectives are:

1. Produce, deliver and use all forms of energy more efficiently in the electricity, transportation and buildings sectors.
2. Support development of in-state energy supplies, including clean renewables such as wind, solar, geothermal, bioenergy, hydropower, and hydrokinetic capacity (tides, currents, and waves), as well as natural gas.
3. Invest in energy and transportation infrastructure to support the State's multiple objectives.
4. Stimulate innovation in the clean energy economy through research and development partnerships with academia and public and private partners, by creating demand for clean energy products and training the workforce, and by supporting existing and attracting new industries that will compete in a clean energy economy.
5. Engage others in achieving the State's policy objectives and bolster stakeholder participation in energy-related decision making.

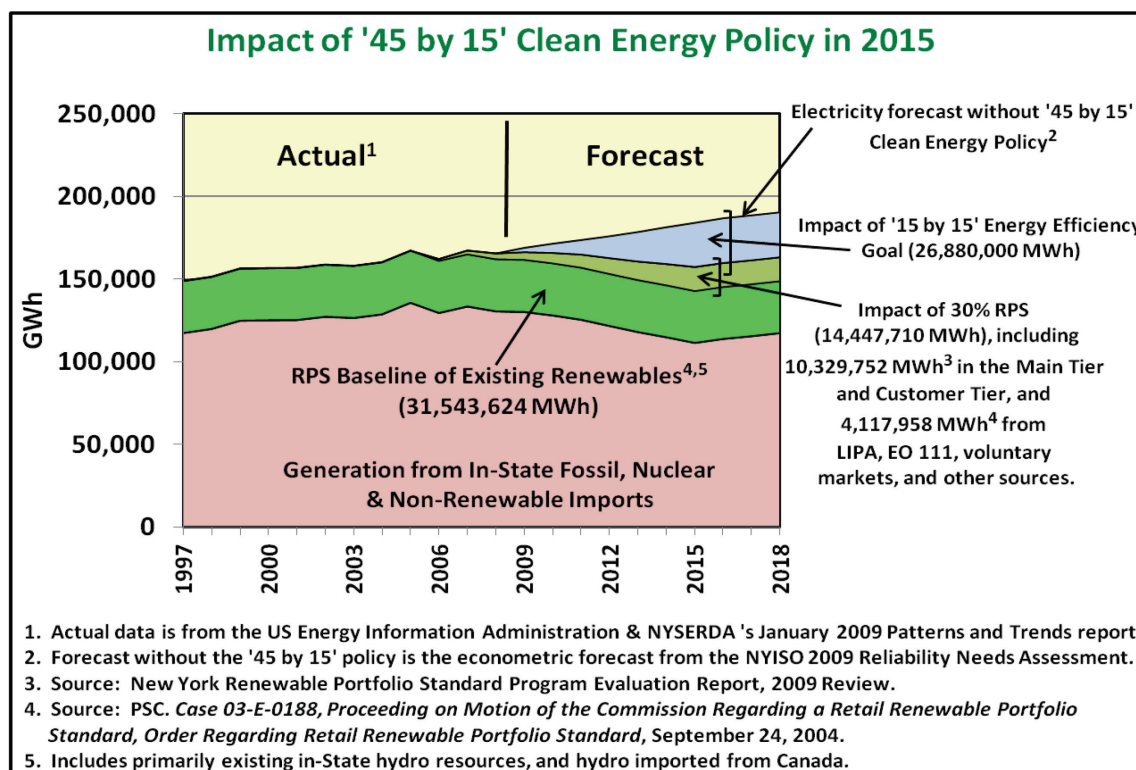
In summary, the State plans to meet its energy needs through balanced and deliberate investment in energy efficiency in all its forms, greater use of in-state resources, and expansion of the State's energy systems and infrastructure. Recommendations for specific programs, regulatory or legislative actions to support these strategies are found in Chapters 2 through 6 and an implementation plan for those recommendations is found in Chapter 7.

The '45 by 15' Clean Energy Policy, announced by Governor Paterson in his 2009 State of the State Address, provides the foundation for implementing the five energy strategies. The '45 by 15' policy challenges the State to meet 45 percent of its electricity needs by 2015 through increased energy efficiency and renewable energy.⁵ As illustrated in Figure 2, the '45 by 15' Clean Energy Policy proposes to reduce electricity end-use in 2015 by 15 percent below forecasted levels, while simultaneously meeting 30 percent of the State's electricity supply needs through renewable resources. Achievement of these policy goals will require, by 2015, the reduction of nearly 27 million Megawatt Hours (MWh) through energy efficiency programs and the addition of over 14 million MWh of renewable resources.⁶

⁵ Governor David A. Paterson. *Our Time to Lead: State of the State Address*. 2009. http://www.state.ny.us/governor/keydocs/speech_0107091.html

⁶ PSC. Case 03-E-0188, *Proceeding on Motion of the Commission Regarding a Retail Renewable Portfolio Standard, Order Regarding Retail Renewable Portfolio Standard*, September 24, 2004.

Figure 2. Impact of '45 by 15' Clean Energy Policy in 2015



1.2.1 Produce, Deliver, and Use Energy More Efficiently

Investing in end-use energy efficiency is the most economical approach to expanding the State's clean energy economy. In the short-run, investments in energy efficiency reduce energy use and bills for participating customers. In the long-run, a significant reduction in electricity demand has been shown to put downward pressure on wholesale electricity prices, reduce price volatility, and reduce emissions of CO₂ and other air pollutants; energy efficiency investments have also been shown to increase employment opportunities in the State.⁷ Additionally, promoting energy efficiency in low income communities, and making energy efficiency upgrades to affordable housing, can reduce energy-related economic burdens on low income New Yorkers.⁸

End-use energy efficiency is an important part of Governor Paterson's goal for the State to meet 45 percent of its electricity needs through improved energy efficiency and clean renewable energy by 2015 ('45 by 15'). The efficiency portion of that goal is 15 of the total 45 percent (also known as '15 by 15') and the State has a number of programs that are designed to work toward that goal and help New Yorkers

⁷ See the Energy Efficiency Assessment for a more detailed discussion on the impacts of energy efficiency programs.

⁸ Energy expenditures as a proportion of total household expenditures decrease as income increases. U.S. Bureau of Labor Statistics. *Household Spending on Energy*. Monthly Labor Review, Vol. 129 No. 6. 2006. <http://www.bls.gov/opub/mlr/2006/06/precis.htm>

invest in energy efficiency measures.⁹ Modeling analyses have shown that full achievement of '15 by 15' in the SEP Policy Reference case results in decreasing average wholesale electricity prices by 10 percent over the planning horizon, when compared to the Starting Point case.

In New York, electric efficiency can be improved enough to offset near-term projected increases in electric demand, reducing the need for additional generating capacity for reliability needs, and saving money for ratepayers. Postponing demand for the construction of new fossil-fuel fired generation would allow time to further advance the low-carbon-intensity electric generation technology necessary to reduce GHG emissions for the long-term.

In addition, increasing the efficiency of electric generation, reducing line losses associated with transmission and distribution and optimizing the operation of the electric system, can also lower electric costs, reduce emissions and defer the need to build expensive new facilities.

Energy use in the transportation system can be made more energy efficient through improvements in vehicles, the fuels that power them and through management of and investment in the transportation system to make it more efficient. The transportation, energy and emissions relationship is often described as a "three legged stool," where vehicle technology is one leg, the fuels used to power vehicles is the second leg of the stool, and transportation system activity is the third leg. Transportation system activity includes VMT, congestion and system operational efficiencies. To increase the energy efficiency of the system and to reduce its carbon footprint, all three "legs" of the stool must be addressed. Discussion on the importance of the "three-legged stool" approach and strategies to address each of the legs can be found in the Transportation Issue Brief.

1.2.2 Support Development of In-State Energy Supplies

Developing in-state energy supplies, in particular renewable energy resources and natural gas, helps to reduce the reliance on higher carbon content fossil fuels imported from outside the State and therefore improves the State's energy security. Reducing energy imports also helps to keep more money within the State for economic development purposes. Supporting in-state resources creates jobs, increases capital investment, increases tax revenues for local governments, and increases revenue for landowners.

Use of renewable in-state resources reduces the need for energy derived from fossil fuel. Less electricity generation from fossil fuel-fired generators results in lower emissions of air pollutants from those plants. This reduces the known health risks associated with carbon-intensive electricity generation and improves the State's ability to mitigate the effects of climate change. Likewise, development of in-state resources for the production of alternative transportation fuels provides the opportunity to reduce the high carbon-intensity fuels that are currently used in the transportation sector. Using renewable technologies, such as solar thermal (including passive solar) and geothermal, for heating and hot water provides similar benefits. Renewable energy, particularly solar power, may improve the reliability of the local power supply system during peak demand periods. For example, since cooling load peaks during summer days

⁹ The renewable portion of the '45 by 15' goal accounts for the remaining 30 of the 45 percent, and is a call to raise the State's Renewable Portfolio Standard to meet 30 percent of the State's electricity use with renewable energy generation by 2015.

when sunlight is plentiful, distributed solar power generation may reduce the risk of localized power disruptions.^{10,11} Biomass is a dispatchable energy source that may be used to fuel power plants whenever additional electricity is required. While these multiple benefits help justify the State's investment in renewable energy deployment programs, many of which are funded via the Renewable Portfolio Standard (RPS) surcharge on ratepayer utility bills, there are also direct ratepayer benefits.

Demand for natural gas is expected to increase over the planning horizon. Currently, New York meets less than five percent of its gas demand with in-state production. The majority of the gas to meet the State's remaining demand is produced in Canada and the Gulf of Mexico and is delivered via pipeline to New York. Increasing in-state production of natural gas will diversify the State's natural gas supply, improving the State's energy security.

1.2.3 Invest in Energy and Transportation Infrastructure

Investments in existing energy and transportation infrastructure and development of new infrastructure, as appropriate, can help to further the Plan objectives of maintaining system reliability, achieving GHG emission reductions, and controlling energy costs. Smaller periodic improvements or “state of good repair” investments prevent the need for larger, more extensive repairs and investments in the future and are essential to maintaining the reliability of the State's energy production and delivery systems for all fuels.

Transmission, distribution and end-user Smart Grid investments will optimize the electric system in order to facilitate the interconnection of renewable resources, reduce customer costs through reductions in line losses, and enable customers to use less electricity during periods of high demand and reduce their energy costs. Transmission Smart Grid investments in particular will facilitate the development of renewable generation in the areas of the State that have the greatest capability to transmit it to the areas of highest demand. These investments will also reduce the clustering of generation facilities in densely populated areas and potential environmental justice areas that may already be burdened with greater numbers of facilities and with greater disease prevalence.¹² Expanding mass transit options, in combination with using cleaner-burning fuels for cars and buses, linking land use with transportation planning, and keeping roadways and the transportation system in good working order, will lessen traffic congestion, reduce energy use, and also contribute to better air quality and public health.

1.2.4 Stimulate Innovation in the Clean Energy Economy

Policies that encourage innovation at each stage of the clean energy product and business cycle – from research, development, entrepreneurship, through value-added manufacturing, deployment and maintenance of clean energy technologies – will position the State to not only meet its own energy policy

¹⁰ Perez, R., *Satellite-Based Solar Resource Assessment: Social, Economic and Cultural Challenges and Barriers, Technological Gaps*. 2004. <http://www.asrc.cestm.albany.edu/perez/publications/Solar%20Resource%20Assessment%20and%20Modeling/Papers%20on%20Resource%20Assessment%20and%20Satellites/satellite-based%20solar%20resource%20assessment-04.pdf>

¹¹ Perez, R. and B. Collins, *Solar Energy Security: Could Dispersed PV Generation Have Made A Difference In The Massive North American Blackout?* Refocus 5(4). 2004. <http://www.sciencedirect.com>

¹² DEC currently classifies potential environmental justice areas based on location of low income and minority populations. Potential environmental justice areas are U.S. Census blocks (200 to 500 households) that, in the 2000 U.S. Census, met one or more of the following criteria: 51.1 percent or more of the population in an urban area reported themselves as members of minority groups; 33.8 percent or more of the population in a rural area reported themselves as members of minority groups; or 23.59 percent or more of the population in an urban or rural area had incomes below the federal poverty level.

objectives, but to export knowledge and energy technologies to the rest of the world. New technologies for generating, storing, transmitting and using energy, along with a well-trained workforce to support the design, installation, and maintenance of those technologies, are critical to successful reduction of GHG emissions, and will become more valuable as the changing climate increases pressure to transform energy systems worldwide.

As described more fully in Chapter 5, the State is supporting energy research and development, innovation, and commercialization of clean energy technologies through existing partnerships funded by NYSERDA and the New York State Foundation for Science, Technology and Innovation (NYSTAR).

The State is also focusing on building a workforce development system that will prepare the New York labor force for the clean energy economy. Realization of the State's clean energy goals will require a workforce with the appropriate knowledge and skills to develop and deploy the technologies that will reduce the State's energy use and its dependence on fossil fuels, along with energy-related impacts on public health and the environment.

As the State, nation and world transition to a carbon-constrained economy, it will be critical to use economic development resources to both retain the State's existing manufacturing base and attract new companies that are most likely to thrive in a clean energy economy.

1.2.5 Engage Others in Achieving the State's Policy Objectives

The opportunity exists for greater collaboration among all units of government and other stakeholders to advance nearly all aspects of the Plan. Absent greater collaboration, the State risks frustrating efforts that are driven by the Plan's policy objectives.

Local government and community decisions play a significant role in the State's ability to meet the objectives of the Plan and partnerships with these entities are critical to the success of the State's clean energy strategies. For example, local zoning can help or hinder the siting of small renewable resources; land use planning can either encourage sprawl or promote smart growth; local municipalities can work to either increase or reduce disproportionate burdens in urban and environmental justice communities; local governments can either passively or aggressively enforce the State's Energy Conservation Construction Code.

Not surprisingly, neighboring states and provinces face similar regional energy concerns and challenges, some of which are best met through regional collaboration. New York's energy systems are inextricably linked, physically, economically and environmentally with its neighboring states and Canada. By acting jointly with the State's neighbors, the State will be able to more readily achieve many of its objectives.

2 Produce, Deliver, and Use Energy More Efficiently

New York has been among the nation’s leaders in implementing market-based programs to help ensure that energy efficiency is recognized as a cost-effective alternative to additional supply-side energy resources. Energy efficiency also reduces energy bills, making New York businesses more competitive and allowing families to save money; helps the State achieve its environmental goals by reducing emissions of GHG and other pollutants affecting public health; enhances quality of life by increasing comfort, safety and productivity; creates jobs; and increases energy security by reducing exposure to supply disruptions and price volatility associated with reliance on imported fossil fuels. Beyond implementing improved technologies that use less energy, the term “energy efficiency” also encompasses strategic conservation of energy, which simply means modifying lifestyles and changing the way existing equipment is used in ways that use less energy (e.g., turning down winter thermostats, reducing use of air conditioning, carpooling, etc.).

Although the past three decades have been characterized by growing population and greater demands for energy-dependent technologies, energy use per capita in New York has remained relatively flat – about one-third lower than the national average. New York is the second most energy efficient state in the nation on a per capita basis. New York’s relatively low energy use per capita is due in part to its past investments in energy efficiency programs, its highly energy-efficient urban transportation system, and its concentration of multi-family housing. As discussed below, the State can become significantly more energy efficient by building on its past successes.

This Chapter focuses primarily on improving efficiency at the point of end-use for all forms of energy and for all energy consuming sectors of the economy. In addition, with respect to electricity, this Chapter highlights the increased efficiencies that can be achieved upstream, along the entire process path of generation, transmission and distribution. Overall, by producing, delivering, and using energy more efficiently, the amount of energy required to enjoy the same quality of life can be minimized.

2.1 End-Use Efficiency

2.1.1 The History of State Support

New York has a decades-long history of supporting efficiency improvements. Annual funding committed to efficiency programs by New York’s utilities and energy authorities began with a modest \$25 million in 1984 and has risen to over \$750 million for 2009. From the mid-1990s through 2008, most State support has been channeled through NYSERDA, NYPA, LIPA and the Division of Housing and Community Renewal (DHCR). Beyond reducing the amount of energy used by customers who install energy efficiency measures, New York’s energy efficiency programs are designed to transform markets by changing the products, services, and delivery mechanisms available for improved efficiency and changing consumer behavior. Programs directed at upstream market participants – including distributors, contractors, trade associations, and manufacturers – seek to induce structural changes in the marketplace that will result in accelerated adoption of energy efficient technologies and practices. Programs are

designed to promote permanent changes, including in consumer behavior, that result in the availability and adoption of innovative energy efficiency products and services.

Programs administered by NYSERDA have achieved more than 3,000 Gigawatt Hours (GWh) in annual electricity reductions;¹³ NYPA and LIPA have contributed nearly 2,000 GWh in annual electricity reductions. These energy reductions have saved consumers billions of dollars in electricity and fuel costs. Other State agencies also administer successful energy efficiency programs, including DHCR, which has administered the State's federally funded weatherization program since 1977. During that time it has overseen installation of insulation and other efficiency improvements in 500,000 low income homes – resulting in substantial savings of all fuels. Additionally, the Dormitory Authority of the State of New York (DASNY) and the Office of General Services (OGS) have committed to green building standards for all new construction they manage.

The State's efficiency programs produce other economic benefits. Expenditures and annual savings produced by energy efficiency programs set off a ripple effect of spending that influences many sectors of New York's economy. Energy efficiency programs have already provided and will continue to provide net macroeconomic benefits to New York in the form of increased employment, labor income, and Gross State Output. A more detailed discussion of these benefits can be found in the Energy Efficiency Assessment.

2.1.2 Potential for Additional Efficiency Savings

The State can realize additional cost-effective energy efficiency potential that would provide substantial benefits to both suppliers and consumers. Governor Paterson's reaffirmation of the State's '15 by 15' goal to reduce electricity use 15 percent below 2015 forecast levels has provided the major impetus for the State's electricity efficiency initiatives. Similar potential exists for other energy sources as well.

A 2008 report concluded that opportunities for electricity end-use efficiency are extensive and inexpensive compared with available supply options.¹⁴ Results of the study estimate the State's achievable potential through 2015 to be about 26,000 GWh, representing a reduction of approximately 14 percent from the forecast of electricity demand in 2015.^{15,16} In addition, improved building codes and appliance standards, likely to be implemented prior to 2015, could provide a reduction of an additional 11,000 GWh (5.7 percent) from forecasted electricity use.¹⁷ Programs that would capture this achievable potential would cost \$7.2 billion in 2008 dollars over seven years, or an approximate average annual program portfolio budget of \$1.0 billion. Net benefits to the New York economy would total \$12.8 billion, including \$20.8 billion in total statewide benefits and \$8.0 billion in societal costs. The benefit-

¹³ NYSERDA. *New York Energy SmartSM Program Evaluation and Status Report: Year ending December 31, 2008*. 2009.

¹⁴ Optimal Energy, Inc., *Achievable Electric Energy Efficiency Potential in New York State*. 2008.

¹⁵ All savings and forecast energy values in the 2008 Optimal Study are at the "point of purchase" as opposed to "at meter." Point of purchase savings correspond to avoided costs at the entrance to the utility service territories and include savings in transmission line losses. Customer meter level savings also reflect a reduction in distribution level losses commensurate with reduced system deliveries.

¹⁶ The 2008 Optimal Study relies on adjusted 2015 zonal load forecasts provided by the NYISO which were adjusted to reflect a baseline that does not include impacts from future ratepayer-funded efficiency programs, but does assume naturally occurring efficiency gains in the market and recently passed or highly likely codes and standards.

¹⁷ This reflects changes to residential and commercial building codes, as well as federal appliance and equipment standards that have either already passed (but not yet taken effect), or are considered highly likely to take effect during the next 10 years.

cost ratio of the electric efficiency measures is estimated to be 2.60, which means that the New York economy would capture approximately \$2.60 in benefits for every dollar invested in efficiency.¹⁸

Similarly, there is significant potential to reduce demand for natural gas through energy efficiency improvements. A 2006 study estimated the program potential, with five years of program delivery and five years of post market effects, would be 1.5 percent of projected natural gas consumption. This potential reduction could occur through several approaches, such as increasing efficiencies of domestic heating equipment, promoting ENERGY STAR[®] home construction, promoting low income weatherization, and providing incentives for installation of energy-efficient food service and food processing equipment.¹⁹ In 2008, a limited update of the 2006 study showed that spending \$80 million per year for 10 years would result in savings on the order of 28,000 MDth (thousand Dekatherms) or 15 percent of the likely achievable potential at the end of the 10 years. Estimated savings by sector were 6,697 MDth in the residential sector, 1,520 MDth in the low income weatherization area, and 19,979 MDth in the commercial and industrial areas.

A significant level of efficiency potential likely exists with regard to No. 2 oil, i.e., home heating oil, or distillate fuel. The most important fact to consider is the magnitude of the State's consumption of No. 2 oil. Approximately one-third of New York households (an estimated 2.3 million households) use fuel oil to heat their homes. Based on federal 2007 estimates, New York's residential and commercial sectors consume more distillate fuel than these sectors in any other state, accounting for 24 percent and 22 percent of national residential and commercial consumption, respectively.²⁰ Overall, New York is ranked third out of the 50 states in total distillate fuel use, with only Texas and California consuming more distillate fuel than New York. While New York has not conducted a comprehensive energy efficiency potential study for fuel oil, general conclusions can be drawn from a study conducted by Vermont in 2007.²¹ The Vermont study estimated the achievable cost-effective efficiency savings potential for fuel oil across all sectors to be 14 percent of the forecasted fuel oil use in 2016. Estimated potential oil savings by sector were 10.2 percent in both the residential and industrial sectors and 24.2 percent in the commercial sector. Those results, coupled with the high level of oil consumption in all sectors in New York, suggest that the potential for energy efficiency associated with use of No. 2 oil is very high.²²

With respect to energy use in the transportation sector, New Yorkers consume less gasoline per capita than any other state. Auto trips, as a percentage of all travel in New York, is significantly lower than the national average. Use of public transportation systems and rail has grown over the last few years. Yet in 2006, 7.2 billion gallons of motor fuel were purchased in the State. Over one quadrillion British Thermal Units (Btu) were consumed by on-road vehicles, resulting in 88.7 million metric tons of CO₂ emissions. There are many ways this consumption can be reduced and have the transportation system operate more efficiently. These include keeping the entire system well-maintained, eliminating bottlenecks, providing

¹⁸ Optimal Energy, Inc., *Achievable Electric Energy Efficiency Potential in New York State*. 2008.

¹⁹ Optimal Energy, Inc. *Natural Gas Energy Efficiency Resource Development Potential in New York*. 2006.

²⁰ U.S. Energy Information Administration (EIA). *State Energy Data System, Table F4a, Distillate Fuel Oil Consumption Estimates by Sector*. 2007. http://www.eia.doe.gov/emeu/states/sep_fuel/html/pdf/fuel_use_df.pdf

²¹ Vermont Department of Public Service (prepared by GDS Associates, Inc.). *Vermont Energy Efficiency Potential Study for Oil, Propane, Kerosene and Wood Fuels*. 2007. <http://publicservice.vermont.gov/pub/other/allfuelstudyfinalreport.pdf>

²² Energy efficiency potential studies also have not been conducted in New York for other home heating fuels, such as propane and wood. It is reasonable to assume that the energy potential for these fuels is similar to that identified for natural gas and home heating oil.

alternatives to driving alone and encouraging freight to be shipped and delivered in the most efficient manner. See the Transportation Issue Brief for an in-depth discussion of transportation efficiency.

2.1.3 Realizing Potential Savings

Realizing these potential efficiency savings, across fuels and across end-use sectors, is the challenge the State faces over the planning period. Certain important strategies – including key legislative initiatives – will cut across all energy consuming sectors and all energy sources. More specific programs, including those overseen by the Public Service Commission (PSC), will target those energy sources the State has historically regulated – namely, electricity and natural gas – across all end-use sectors. In addition, NYSERDA administered programs, funded under RGGI and various federal statutes, will, at least in part, target users of petroleum products and will reach the transportation sector. DHCR will continue to oversee a much expanded weatherization program as a result of additional funding from the American Recovery and Reinvestment Act (ARRA). Additionally, NYPA and LIPA will continue, and likely expand, their efficiency programs currently targeted to electricity use.

The State's portfolio of programs includes those that target the residential sector, commercial and industrial customers, and governmental customers, with special attention to assist low income customers. Though the programs may vary in their cost-effectiveness, it is critical to have a diverse program portfolio to reach all customers. Programs that assist low income customers will be particularly important in a carbon-constrained economy and a number of those programs are already providing assistance. Low-income programs include: the EmPower New YorkSM, which provides electric use reduction and home performance measures free of charge to eligible low income participants; the Weatherization Assistance Program (WAP), which assists income-eligible families and individuals in investing in energy efficiency measures to help reduce their monthly energy expenditures; and LIHEAP, which provides financial assistance to eligible households to help pay for their home heating costs.²³

Cross-cutting Initiatives

Program Coordination. The State of New York will continue to develop and implement energy efficiency programs through entities including NYSERDA, NYPA, LIPA, DHCR, and Department of State (DOS) and through PSC oversight of utilities. Current annual expenditures on these initiatives are expected to exceed \$750 million. NYSERDA administers the System Benefits Charge (SBC) program of approximately \$175 million. NYPA plans to spend approximately \$135 million and LIPA expects average spending of more than \$90 million. The expected PSC authorization of utility and NYSERDA spending is \$330 million on electricity efficiency programs. In addition, the PSC has authorized a total of \$130 million for gas efficiency programs. In June 2009, the U.S. Department of Energy (DOE) approved New York's Weatherization Plan and awarded New York an initial approximately \$158 million of the total \$394 million in ARRA funding for the State's WAP.²⁴ Furthermore, energy efficiency initiatives will also continue to be developed by local governments, notably the City of New York. Contemporaneous initiatives have the potential to deliver a comprehensive portfolio of programs, including those tailored to specific customer sectors and local circumstances. However, without coordination, it is likely that multiple initiatives will confuse customers and contractors, result in inefficient use of ratepayer and taxpayer funding, and produce less than optimal results. Accordingly,

²³ Additional information on energy efficiency and assistance programs for low income households can be found at *Heat Smart, New York*. <http://www.heatsmartny.com>

²⁴ The Weatherization Plan was developed by DHCR, the agency that administers the State's longstanding WAP. DHCR. *Weatherization Recovery Act Funding Plan*. 2009. <http://nysdhcr.gov/Programs/WeatherizationAssistance>

energy efficiency programs should be carefully coordinated to eliminate or minimize overlap, conflicts and customer confusion. Similarly, energy efficiency programs by all administrators should be periodically evaluated and funding re-directed to its most effective use.

There is, as well, an overarching need to rigorous evaluation, monitoring and verification (EM&V) of all electricity and natural gas programs, and all program results. It is not just a matter of making sure the many hundreds of millions of dollars annually the State directs to efficiency are well spent. In order for energy savings through efficiency to be fully accounted for in reliability planning, robust EM&V practices are critical. Electric and gas system planners, the NYISO, the PSC, energy firms and others, must all satisfy themselves that the State can in fact rely on efficiency to carry the load the State has assigned to it. Only by instituting a sustained, well-funded EM&V effort – and only by building a consistent EM&V component into every efficiency program – will the State and all interested stakeholders be in a position to reach that necessary level of confidence. As part of its EEPS proceeding, the PSC in June 2008 called for the creation of an Evaluation Advisory Group (EAG) to advise on evaluation standards and protocols.²⁵ While this group is working to standardize EM&V activities, additional coordination opportunities exist.

Recommendations

- All State agencies and authorities and utilities that administer energy efficiency programs must consistently measure and report results of efficiency programs, including energy savings, peak demand reductions, and load shifting, using similar techniques, metrics, and reporting formats. Agencies and Authorities must use those results to optimize program support going forward. Program results should be summarized and made available to the public on an annual basis.
 - Expand the existing statewide EAG to include additional State agencies involved in energy efficiency programs.
 - Develop standard measurement and reporting for statewide energy efficiency achievements.
 - Release specific energy program achievement data including detailed evaluation reports on an on-going basis.
- Mitigate short-term impacts of rising energy costs on New York's low income populations.
 - Expand and enhance low income efficiency programs. These programs should include both implementation of energy efficiency measures and providing education on how to use energy more efficiently.

Energy Conservation Construction Code. Among the most significant steps New York can take to realize additional energy efficiency savings are to adopt an up-to-date version of the State's building energy code (formally known as the Energy Conservation Construction Code, hereinafter referred to simply as the "Energy Code"), amend the Energy Code's enabling legislation to extend the Energy

²⁵ PSC. *Case 07-M-0548: Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard, Order Establishing Energy Efficiency Standard and Approving Program.* Issued June 23, 2008.

Code’s reach to more renovation activity, simplify and regularize its amendment/updating process, and upgrade Energy Code training and compliance initiatives.²⁶

Building energy codes and equipment and appliance standards set minimum efficiency and performance levels, effectively setting a floor or baseline. Over time, with education, enforcement, and technology advances, the stringency of these codes and standards can be increased. Full compliance with building energy codes and equipment and appliance efficiency standards would produce significant annual and cumulative energy savings for New Yorkers beyond what would otherwise occur. As shown in Table 1, a recent study by Optimal Energy, Inc. estimated the potential for substantial energy savings that could be achieved through an enhancement of New York’s building codes and appliance standards.²⁷ Additional benefits include improved building stock, lower demands on New York’s electricity and gas delivery infrastructures, and lower GHG and other harmful emissions.

Savings from improvements to the Energy Code, together with savings from improvement to equipment and appliance efficiency standards, have the potential to achieve about one third of New York’s ‘15 by 15’ electricity reduction target. Such improvements have the potential to produce major savings for all fuel types used in New York. Successful implementation of enhanced Energy Code and enhanced equipment and appliance efficiency standards can be achieved at relatively low-cost, resulting in large benefits in terms of energy and cost savings to consumers. The federal government has retained exclusive authority to promulgate efficiency standards for most appliances and equipment, leaving relatively little room for State action. However, the State can still promulgate efficiency standards for certain items, such as consumer audio and video electronics. There are also general product categories that are not currently covered by the federal standards or State law, such as bottled water dispensers, hot tubs, and swimming pool pumps.

Table 1. Estimated Savings from Codes and Standards

Type of Energy Savings	Codes Savings in 2015	Standards Savings in 2015	Total Savings in 2015
Electricity Savings (GWh)	2,158	7,202	9,360
Peak Demand Savings (MW)	469	1,572	2,041
Other Heating Fuels (Billion Btu)	4,960	1,792	6,752

Source: Optimal Energy. *Achievable Electric Energy Efficiency Potential in New York State*. 2008.

A critical strategy to realize these potential savings is to improve the performance of new buildings by strengthening the Energy Code, which establishes minimum requirements for energy-efficient buildings through prescriptive and performance-related standards, making possible the use of new materials and innovative techniques that conserve energy. Implementation of proposed changes to the Energy Code, discussed in detail in the Energy Efficiency Assessment, is an important interim step to making New

²⁶ Also related, the Mechanical Code addresses maintaining “healthful indoor air quality” and those standards must be maintained.

²⁷ Optimal Energy. *Achievable Electric Energy Efficiency Potential in New York State*. 2008.

York's building stock more energy efficient. In addition, it is also important to assure that code compliance and enforcement deliver on these potential savings.

New York's efforts will be greatly enhanced as a result of the recent approval of \$4.4 million in funding from ARRA, which provides the State with new opportunities to further enhance the current Energy Code, address current challenges to maximizing the energy saving opportunities, expand active training and enforcement programs, and measure the rates of compliance.

With respect to the Energy Code, an eligibility requirement of the ARRA State Energy Program funds is that the State must certify to DOE that the Governor will pursue necessary energy-related initiatives.²⁸ To comply, the State will implement: (1) a building energy code for residential buildings that achieves equivalent or greater energy savings than the 2009 edition of the International Energy Conservation Code (2009 IECC), (2) a building energy code for commercial buildings throughout the State that achieves equivalent or greater energy savings than the 2007 edition of the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) Standard 90.1 (2007 ASHRAE 90.1), and (3) a plan for achieving and maintaining compliance with those codes in not less than 90 percent of new and renovated building space by the end of 2016. The plan must include active training and enforcement programs and provisions for measurement of the rate of compliance each year. The DOS Codes Division has concluded its work on the Codes of New York State, including the Required Regulatory Impact Statements. DOS expects that the earliest the revised codes can be enacted, considering all necessary notification and comment requirements, is in early Fall of 2010.

However, to be fully compliant with ARRA requirements and to achieve greater efficiency savings, amendments are necessary to strengthen the underlying State Energy Law. On an annual basis, building renovation activity in New York, as measured in square feet, far exceeds new building construction. Under Article 11 of the Energy Law, the Energy Code applies to renovations only if renovations involve replacement of 50 percent or more of a "building subsystem."²⁹ This high threshold for Energy Code applicability to renovations (referred to as the "Fifty Percent Rule") reduces New York's opportunity to use the Energy Code to achieve improved energy efficiency in existing buildings. The Energy Code should be applicable to renovations of residential buildings and commercial buildings to the same extent that the 2009 IECC and the 2007 ASHRAE 90.1, respectively, are applicable to such renovations. In addition, the Energy Code currently exempts certain historic "properties," rather than historic "buildings," from the Energy Code's requirements. Under this law, renovation of non-historic buildings or construction of new buildings located on "historic properties" would not be subject to the Energy Code. The Energy Code should exempt historic residential *buildings* and historic commercial *buildings* to the same extent that such buildings are exempt from the 2009 IECC and the 2007 ASHRAE 90.1, respectively. Further, the ability to amend the Energy Code should no longer be contingent on obtaining a ten-year payback study to confirm that the cost of compliance with the amended code will be paid back through energy savings in 10 years or less. This 10-year payback requirement delays the timely adoption of new energy conservation measures. National model energy codes: (1) do not include a Fifty Percent Rule, (2) exempt historic *buildings*, and not historic *properties*, and (3) contain no ten-year payback study requirements. In addition, provisions of the Energy Law that provide the Energy Code to be updated from time to time should be strengthened to require updating no less frequently than every three years.

²⁸ NYSERDA received approximately \$123 million from the DOE for the State Energy Program. Approximately \$5 million of the \$123 million will be used for technical assistance and compliance support related to the Energy Code.

²⁹ A "building subsystem" is defined by Energy Law §11-102(9) as "a building assembly made up of various components which serve a specific function, including but not limited to exterior walls, roof and ceiling, floor, lighting, piping, duct work, and equipment."

Although the Energy Code is adopted at the State level, it is enforced at the local level. In most situations, the local government (city, town or village) responsible for enforcing the State Uniform Fire Prevention and Building Code (Uniform Code) is also responsible for enforcing the Energy Code. Educational expertise and available manpower vary across the State, with some municipalities being severely understaffed.

Code enforcement personnel responsible for enforcing the Uniform Code are required to take a 114-hour basic training course prior to, or within one year following, commencement of employment, and to take 24 hours of annual in-service training each year thereafter. However, only a small portion of the currently required training courses relate to the Energy Code. A plan to achieve compliance with the Energy Code in at least 90 percent of new and renovated building space within eight years, as conditioned by ARRA, should include a significant increase in the amount of Energy Code-related instruction that code enforcement personnel will be required to receive.

The ability of the State to achieve the 90 percent compliance rate contemplated by ARRA will be greatly enhanced if all participants in the building and building-related industries receive training in the new Energy Code. Ideally, State-provided instruction would be made available not only to code enforcement personnel, but also to design professionals, builders, and others in the building and building-related industries. Consistent with the provisions of ARRA, DOS, in partnership with NYSERDA, plans to offer a range of energy code training opportunities across the State and on the Web.

DOS has recently adopted an amendment to its regulations which requires local governments that administer and enforce the Uniform Code to file annual reports with DOS detailing their code enforcement activities.³⁰ Since local governments that administer and enforce the Uniform Code are also required to administer and enforce the Energy Code, the reporting form requests information regarding the local government's efforts in enforcing the Energy Code. This reporting program is expected to be useful for measuring compliance with the Energy Code.

Article 11 of the Energy Law allows municipalities to adopt and enforce a local energy conservation construction code more stringent than the Energy Code. Such programs are referred to as "Stretch Codes," or "beyond code" programs. Currently, a program is in development with NYSERDA for a stretch code for existing homes. For new residential construction, the International Code Council's (ICC's) ICC-700-2008 is in strong consideration due to its seamless fit with the ICC based uniform codes. Alternatively, an ENERGY STAR program is acceptable as a "Stretch program" because it possesses a proven track record. ENERGY STAR has been in use in New York State for approximately 15 years.³¹ A number of Long Island towns have adopted ENERGY STAR standards as mandated minimums for new residential construction.

³⁰ 19 NYCRR §1203.4. Effective January 1, 2007.

³¹ Note that ENERGY STAR is not a code; it is a performance standard that raises the energy efficiency level of a structure beyond code levels. The Energy Code must still be used to show compliance, since ENERGY STAR does not contain all provisions of the Energy Code.

Recommendations

- Improve the Energy Code.
 - Amend Article 11 of the Energy Law to: (1) provide that the Energy Code applies to renovations of residential buildings and commercial buildings to the same extent that the 2009 IECC and the 2007 ASHRAE 90.1, respectively, apply to such renovations, (2) clarify that historic *buildings*, rather than historic *properties*, are exempt, (3) eliminate the 10-year payback requirement, and (4) require the State Fire Prevention and Building Code Council (the Code Council) to amend the Energy Code so that it equals or exceeds the 2009 IECC for residential buildings and equals or exceeds the 2007 ASHRAE 90.1 for commercial buildings.
 - Update the Energy Code every three years in response to updates to the IECC for residential buildings and ASHRAE 90.1 for commercial buildings.
 - Implement the Code compliance plan required by ARRA, including Code training and enhanced Code enforcement resources.
 - Implement a “Stretch Code” for municipalities wishing to implement “beyond code” programs.
- Enact energy efficiency standards for products.
 - Collaborate with other states to influence federal enactment of national standards.
 - Promulgate regulations to implement standards from 2005 legislation.
 - Adopt standards for other products not covered by national standards.

Delivery of Information to Consumers. Achievement of the State’s energy efficiency goals is dependent upon action by consumers to invest in energy efficiency equipment and infrastructure. Enhancing the energy use/cost information provided to consumers, particularly at the time of a purchase decision, will facilitate informed decisions that may have a prolonged effect on energy consumption and bills, and provide a powerful incentive for producers and sellers to make sure that their products satisfy consumer expectations regarding energy efficiency. Although New York has made considerable progress in increasing consumer awareness and understanding of the benefits of energy efficiency, the design and delivery of such information can be improved in several ways.

State-supported outreach, education and marketing efforts regarding energy efficiency should be tailored to promote consumer action. Thus, information provided to consumers should incorporate state-of-the-art behavioral marketing theory and practice. Delivery of this information should also optimize use of diverse delivery vehicles including the Internet, mass media, and community-based organizations. Special attention should be given to communities that are generally considered “hard to reach” by virtue of their economic and demographic characteristics or geographic location, as well as to consumers for whom English is not the primary language. Additionally, where practical, outreach should be targeted to commercial and industrial customers and community clusters such as housing developments, to maximize

program impact.³² As part of its EEPS proceeding, the PSC in June 2008 directed that an Advisory Group be established to coordinate the efficiency-related outreach, education and marketing efforts conducted by State agencies, NYSERDA and utility administrators of energy efficiency programs.³³ This Outreach, Education and Marketing Advisory Group is also working to integrate the efforts of these entities with a statewide customer outreach, education and marketing initiative.

In recognition of the fact that one of the most critical energy-related purchase decisions concerns the purchase of a home or lease of an apartment, the information provided to consumers concerning the energy consumption and efficiency of a residence should be enhanced. The State's Truth in Heating Law,³⁴ which requires sellers of residential properties and lessors of residential structures to provide certain information regarding energy use upon request of a prospective purchaser or tenant, should be strengthened to: expand the information that must be disclosed and require that information regarding the energy use of a residential structure be provided to prospective tenants and purchasers before a contract to rent or purchase is signed. These changes would help ensure that consumers have the opportunity to consider information regarding the energy use of a potential residence, before making a purchase decision, thus providing a powerful incentive for building owners to invest in energy efficiency. In addition, the law might be modified to extend the disclosure requirements to commercial structures.

Similarly, energy "benchmarking," which entails the public issuance of a building's energy consumption, indexed against buildings of comparable size and use, would provide information regarding a building's energy use to building owners and managers, prospective tenants and prospective purchasers, thereby increasing the incentive for building owners and managers to reduce energy consumption. Such information would be of particular benefit in the commercial office building sector for a number of reasons, including: the proportion of electricity consumed in this sector in New York is far above the national average; commercial customers are generally less responsive to energy price changes than other customers; and building owners have a relatively small incentive to invest in energy efficiency where tenants pay the energy bill. Mayor Bloomberg has proposed legislation that would require annual benchmarking of energy use in buildings 50,000 square feet and larger as part of a package of legislation to improve energy efficiency in New York City.

Consistent with these initiatives, redesigning electric rates to vary by time of use for all electricity users, and providing cost/use information to users on a real time basis would enable customers to make informed decisions about when and how they can reduce their electricity use. This topic is addressed in greater detail below in the Electric System Efficiency discussion.

Recommendations

- Assure that efficiency outreach, educational and marketing efforts conducted by State agencies and authority administrators and utilities reflect best practices in terms of design and delivery, are geared to diverse audiences, and are provided in languages other than English.
 - Identify best practices nationwide and implement statewide.

³² In his 2009 State of the State, Governor Paterson called for the creation of an energy efficiency clearinghouse to streamline access to the State's energy efficiency programs for schools, hospitals, and local governments. The clearinghouse Website (<http://www.nyserda.org/clearinghouse/>) can serve as a model for other targeted outreach efforts.

³³ PSC. *Case 07-M-0548: Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard, Order Establishing Energy Efficiency Standard and Approving Program*. Issued June 23, 2008, p. 43.

³⁴ New York State Energy Law, Article 17 §103.

- Utilize the EAG to integrate efficiency program activity and streamline communication to consumers.
- Use targeted outreach to deliver energy efficiency programs and services to commercial and industrial customers, residential and low income communities, to improve program performance and reduce administrative costs. Education, outreach and marketing for energy programs should be tailored, e.g., foreign language advertising, to target vulnerable populations and potential environmental justice areas.
 - Identify and partner with community-based organizations to reach diverse groups with tailored messages.
 - Target industry marketing programs to support the State's Clean Energy Business Growth and high priority segments.
 - Target underserved markets.
 - Maintain the Energy Efficiency Clearinghouse Website and expand as appropriate.
- Supplement Truth in Heating law requirements to ensure that prospective purchasers of residential and commercial buildings, as well as lessees responsible for payment of utility bills, are provided relevant information regarding the key energy efficiency attributes of the building.
- Explore energy use benchmarking programs under which a building's energy use indexed against comparable buildings is publicly disclosed.

Reducing Financial Barriers to Energy Efficiency Investment. One of the most significant barriers to adoption of cost-effective energy efficiency measures is lack of capital, or reluctance to commit capital, on the part of consumers. The need for upfront capital to make a substantial investment in energy efficiency is an issue of particular concern in difficult and uncertain economic circumstances. Although this concern is addressed, in part, by energy efficiency programs that provide substantial discounts on the cost of efficiency measures, as well as financing offered through NYSERDA and others, alternative financing programs to fund energy efficiency projects should be implemented. The Green Jobs – Green New York Act, recently signed into law by Governor Paterson, will help to address this concern. This law directs NYSERDA to establish a revolving loan fund to finance the cost of qualified energy efficiency services for residential and non-residential customers. Initial funding will come from a portion of the proceeds of RGGI, and will support loans of up to \$13,000 for residential structures with four or fewer dwelling units and \$26,000 for non-residential structures. Another promising approach is exemplified by legislation that Governor Paterson submitted and signed into law in 2009 that allows municipalities to provide loans to businesses and residents to install distributed energy resources and make energy efficiency improvements; the loans would be paid back through assessments on the real property where the loan was applied.³⁵ This legislation in effect expanded earlier legislation that allowed Binghamton, Bedford, and solid waste districts to administer similar programs.³⁶

Another mechanism to address the financial barriers to efficiency investments is on-bill financing or on-bill recovery, under which utilities or third-parties provide upfront financing for efficiency measures that

³⁵ Chapter 497 of the Laws of 2009.

³⁶ Chapter 336 (Bedford), Chapter 344 (Binghamton) and Chapter 409 (solid waste districts) of the Laws of 2009.

are repaid by the customer through the savings in their monthly energy bills. The PSC has been evaluating the legal, technical and policy issues associated with on-bill financing programs.

Recommendation

- Identify and implement alternative financing programs to fund energy efficiency projects, exploring all available innovative financing mechanisms, including use of a performance management approach where the beneficiary of the efficiency services repays the lender from energy savings for money loaned. Private and other governmental sources of funding should be explored.
 - Implement revolving loan fund from Green Jobs – Green New York Program.
 - Evaluate the need for, value and feasibility of on-bill financing or recovery and implement such programs as appropriate.

State Government Buildings. The State must lead by example, and make sure that the State's own buildings are energy efficient. Executive Order 111, originally issued in 2001, requires State agencies to reduce energy use by 35 percent below 1990 levels by 2010. While many agencies have dramatically reduced their energy use to comply with the Order, the program is not administered and savings are not measured in a consistent manner across the agencies, thereby making it difficult to evaluate progress toward the goal. Additionally, State entities report upward pressure on their energy use as a result of the expansion of air conditioned spaces, increased load from computers and office equipment, and increased numbers of customers and clients. Improvements in the process, scope and metrics of the Order would help to ensure that accurate and meaningful movement toward meeting energy efficiency goals are in place. Furthermore, agencies now have another tool to make efficiency improvements in their buildings at no cost to the State. 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 ARRA.³⁷

In addition, pursuant to the State Green Building Construction Act, OGS, starting in August of 2010, will be required to construct and renovate State-owned buildings according to the green construction requirements. These requirements will be established by OGS through regulations.

Recommendation

- Reduce energy use in State Buildings.
 - Amend Executive Order 111, which places requirements on State agencies pertaining to energy efficiency and renewable energy, to ensure efficient and consistent administration and measurement of savings.
 - Encourage agencies to work with NYPA to take advantage of its efficiency financing programs in order to meet the goals of Executive Order 111.

³⁷ Chapter 380 of the Laws of 2009, amending Article 8 of the Public Buildings Law.

Initiatives by Energy Source

Electricity. The need for infrastructure to produce and deliver electricity is driven by end-use demand. From 1997 to 2007, New York's electricity sales increased 1.2 percent annually. Results of the Starting Point case, which assumed reaching only 27 percent of the '15 by 15' goal, show that from 2009 to 2018, electricity demand increases at an average rate of 0.8 percent per year, or a total increase of 7.3 percent. In dramatic contrast, results of the SEP Policy Reference case, based on full achievement of the '15 by 15' goal, show a reduction in demand over the planning period, as well as a reduction in output from New York's gas-fired combined cycle generating plants and a reduction in electricity imports.

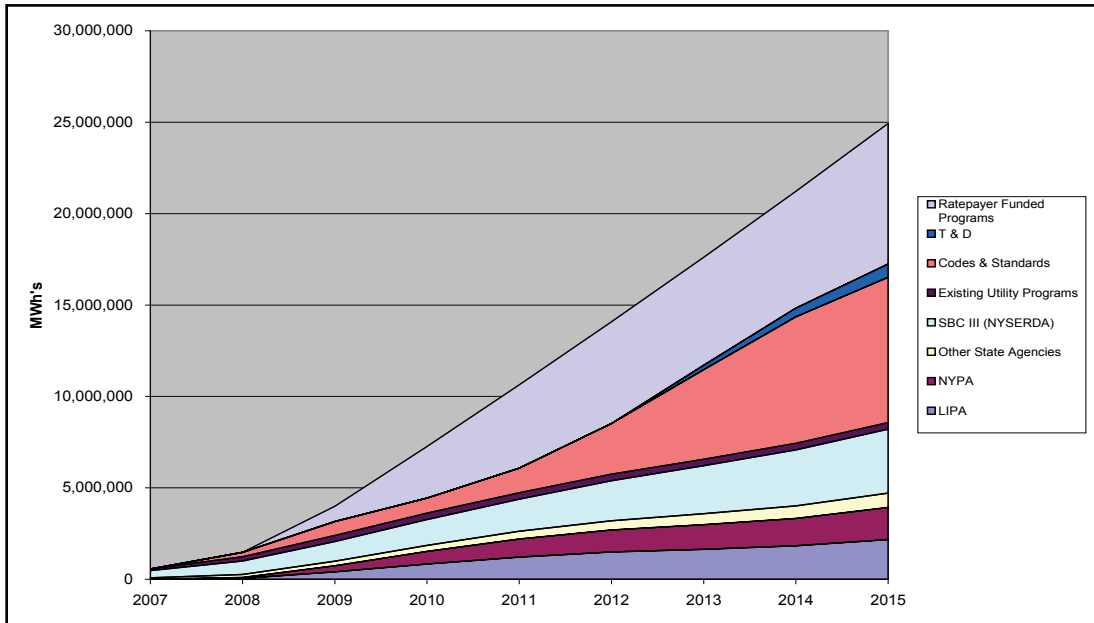
In light of these benefits, the State has taken steps to fully fund electricity targeted efficiency programs in an effort to meet Governor Paterson's '15 by 15' goal. Achieving this goal will require the cooperative efforts of many different entities, including all State agencies and authorities.

Figure 3 projects energy use reductions by major program categories that will be needed to meet the '15 by 15' goal, assuming continuation of existing programs, implementation of new programs, and the contribution of enhanced codes and standards. The area marked as "Ratepayer Funded Programs" is the portion of the '15 by 15' goal to be met by new PSC authorized programs to be administered primarily by utilities and NYSERDA. The other large wedge on the chart, "Codes and Standards," underscores the importance of enhancing efficiency standards for electrical equipment and appliances and for assuring compliance with the Energy Code. The ongoing programs of NYSERDA, as well as expanded programs by NYPA and LIPA, are projected to make up most of the balance. It is significant to note that even with the considerable achievements made to date in the State's end-user efficiency programs, achieving the '15 by 15' goal will require nearly a five-fold increase in annual energy savings by 2015.

Achieving the '15 by 15' policy goal is expected to reduce the net retail cost of electricity paid by all ratepayers by 2015.³⁸ Figure 4 and Figure 5 show the results of an analysis of the net impacts of the '15 by 15' policy on statewide average retail electricity prices in selected years. As shown in Figure 4, in 2015, the statewide average retail price of electricity is projected to be 0.4 to 0.9 cents per kilowatt hour (kWh) lower, on a net basis, than if the '15 by 15' policy were not implemented. Figure 5 indicates that this estimated reduction in net price per kWh is equivalent to aggregate annual bill savings to ratepayers of \$600 million to \$1.4 billion in 2015.

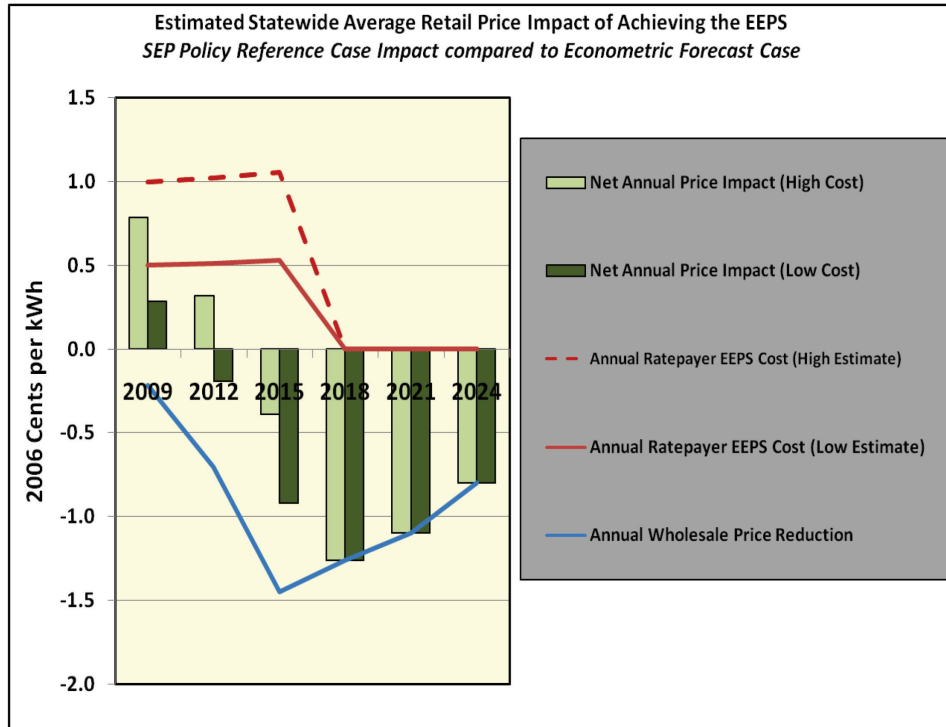
³⁸ Pursuing the '15 by 15' policy goal impacts average retail electricity prices in two opposing ways. First, the average retail price is expected to increase because the annual cost of implementing and administering energy efficiency programs is added to customer bills, while utility fixed costs will be spread across a smaller amount of energy sales. Second, the commodity portion of the electricity price is expected to decrease as a result of the price reduction effect of lower overall demand for electricity. Both types of price impacts affect all ratepayers, assuming that energy efficiency program costs are averaged across all customer classes and locations. This analysis does not include the additional bill savings that accrue to program participants who install energy-saving equipment and thereby benefit as a result of reduced volume of electricity purchased over time. The price reduction (or "market price effect") impact of achieving the '15 by 15' policy goal is extracted directly from Integrated Planning Model modeling results by comparing the Statewide average electricity prices in the SEP Policy Reference Case, which assumes full achievement of the '15 by 15' policy goal, to the Higher Demand Case, based on NYISO's econometric forecast, which includes no downward adjustments for implementation of the '15 by 15' policy goal. The lower average electricity prices in the SEP Policy Reference Case are directly attributable to achievement of the '15 by 15' policy goal, due to the reduction in the need for electricity generated by the most inefficient and expensive fossil fuel-fired units, as well as by reducing imports of electricity from outside New York. Because the annual costs to ratepayers of all the programs needed to achieve the '15 by 15' policy goal are not yet known with a high degree of certainty, "low" and "high" estimates are used to bound the analysis. The low estimate is based on a three-year historical average (2006 through 2008) of NYSERDA's energy efficiency programs funded through the System Benefits Charge. The high estimate assumes that the future cost of energy efficiency programs on a cents per kWh basis is double the cost of programs implemented to date. The expected system load reduction due to improved Codes and Standards is assumed to be achievable with no incremental cost to ratepayers.

Figure 3. Achieving New York's '15 by 15' goal



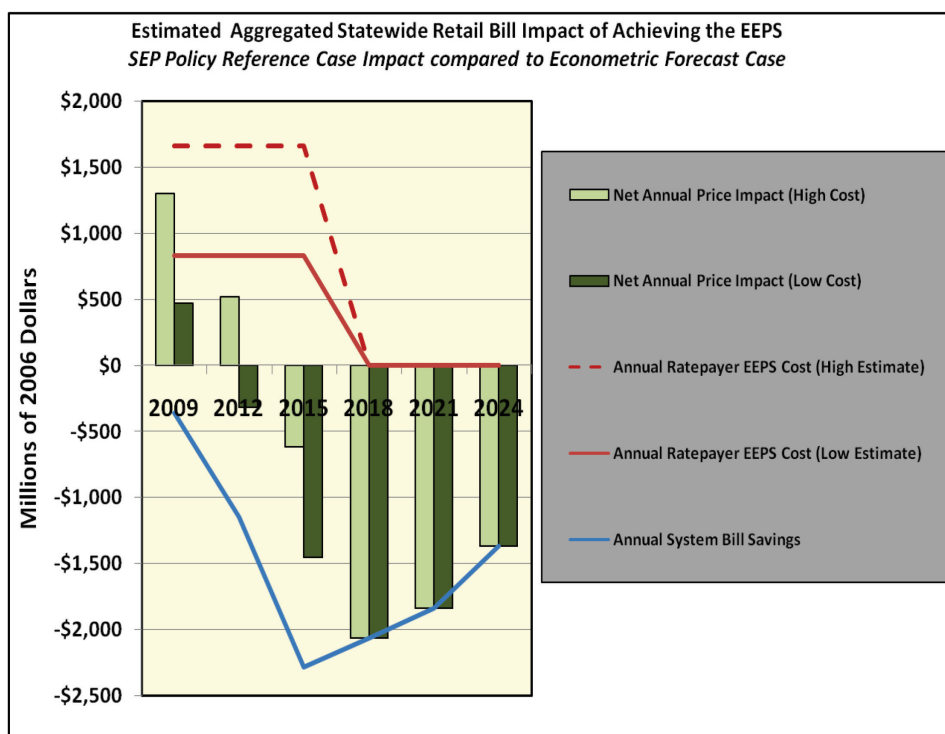
Source: NYSERDA

Figure 4. Estimated Statewide Average Retail Price Impact of Achieving the EEPS



Source: NYSERDA

Figure 5. Estimated Aggregated Statewide Retail Bill Impact of Achieving the EEPS



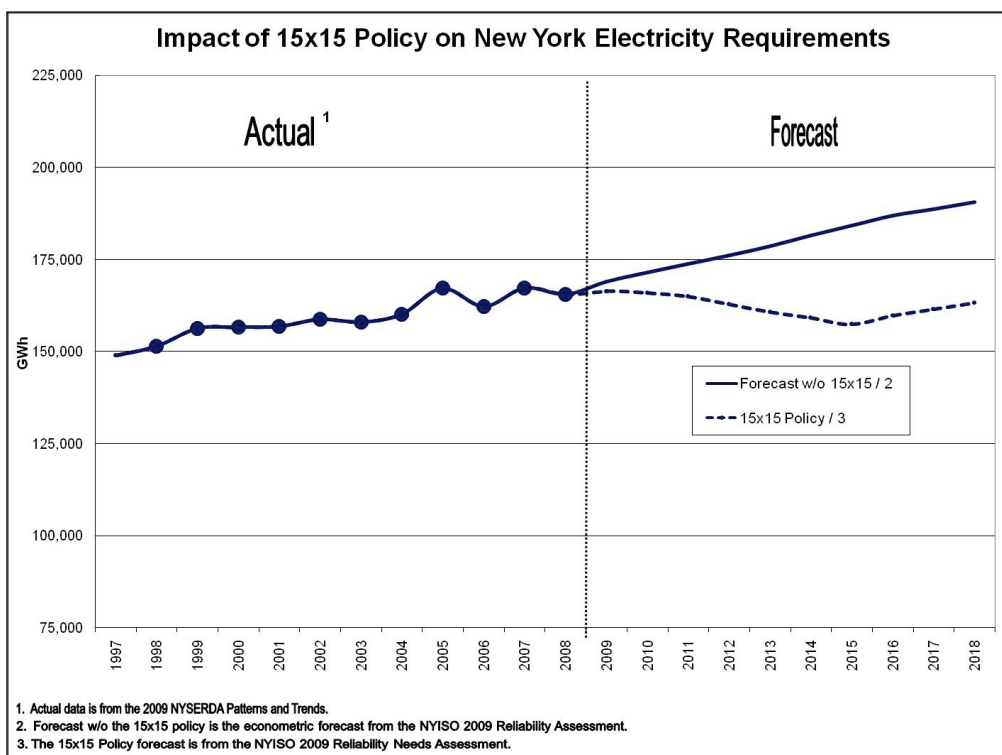
Source: NYSERDA

The EEPS proceeding was initiated by the PSC in May 2007 as part of the overall effort to reduce New York’s electricity use by 15 percent from forecasted 2015 levels.³⁹ Subsequently, the PSC established and approved efficiency targets for the State’s investor-owned electric utilities and NYSERDA.⁴⁰ Figure 6 shows the expected impact of the ‘15 by 15’ policy on New York’s total electricity needs, compared to forecasted total electricity needs without the policy.

³⁹ PSC. *Case 07-M-0548: Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard, Order Instituting Proceeding*. Issued May 16, 2007.

⁴⁰ Implementation of EEPS programs will be the responsibility of NYSERDA, the utilities, and third party program administrators.

Figure 6. Impact of 15 Percent Reduction in Electricity Use



Source: NYSERDA, NYISO

In June 2008, the first EEPS programs were approved.⁴¹ As of December 2009, approximately \$397 million through 2014 was approved for NYSERDA to expand and enhance a number of existing programs, including a lighting program, low income program and programs to encourage high-performance energy-efficient buildings, improving industrial processes and expanding the number of service providers available to facilitate more informed decision-making with respect to energy efficiency, energy procurement, and project financing. An additional \$520 million through 2011 was authorized for investor-owned utility programs that could be implemented quickly and build internal energy efficiency program administration capabilities within the companies. The electricity programs include a residential heating, ventilation and air conditioning (HVAC) program, and a small business direct install program for retrofits of various types of existing equipment with high-efficiency equipment. The approved natural gas program is a residential efficient gas equipment program focusing on providing incentives for installation of more efficient furnaces, boilers and water heaters.⁴²

⁴¹ 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. This approved funding is incremental to funding of \$175 million annually for the pre-existing SBC Program, which is used in part to support energy efficiency programs.

⁴² PSC approved “Fast Track” utility-administered electric energy efficiency programs with modifications on January 15, 2009. Utility-administered natural gas programs are being considered by the PSC. NYSERDA began implementing additional electric energy efficiency programs on March 13, 2009.

To help ensure the integrity of the energy efficiency savings through collection of accurate data on actual achievements, the PSC provided for the development of EM&V protocols, a series of screening metrics, including a total resource cost analysis, and increased evaluation budgets compared to previously approved programs. These approaches are critically necessary for electric system planning, estimation of reduced utility revenues due to lower sales levels, and evaluation of the success and cost-effectiveness of the programs.

Throughout the remainder of 2009, it is anticipated that the PSC will consider additional programs to be operated through 2011 as proposed by EEPS Program Administrators. The PSC will institute a comprehensive review of the programs included in its EEPS initiative in advance of the December 31, 2011 expiration of the initiative's initial phase to inform its decisions regarding funding beyond 2011. Levels of funding and program selection will depend heavily on the results of the EM&V initiatives the PSC has been putting in place.

The State is also undertaking several other initiatives to drive further improvements in the efficient use and delivery of energy, including continued implementation of revenue decoupling mechanisms for all the State's major energy utilities to remove potential disincentives to utility promotion and implementation of efficiency programs, and preparing for the deployment of Advanced Metering Infrastructure (AMI) in a cost-effective manner – as discussed in the Electric System Efficiency section of this Chapter.

Recommendation

- Implement Energy Efficiency programs to reduce State electricity demand from projected levels.
 - Continue implementation of efficiency programs to meet '15 by 15' goal.
 - Ensure appropriate contribution of NYPA and LIPA to State efficiency goals.

Natural Gas. Outside the electricity sector (which accounts for 34 percent of natural gas use in the State), natural gas is used primarily in the residential and commercial sectors for heating, hot water and appliances. End-use efficiency through improvements in products and weatherization can significantly reduce natural gas demand. A reduction in natural gas demand through efficiency can reduce strain on natural gas infrastructure, and because a portion of the electricity system is dependent on natural gas, it can also improve electric system reliability due to reduced risk of fuel supply disruptions.

As discussed in the Energy Demand and Price Forecasts Assessment, it is anticipated that residential and commercial natural gas demand will increase over the planning horizon at annual rates of 0.12 percent and 1.25 percent, respectively. The projected increases are primarily driven by economic growth and increases in the number of customers, but some conversions from heating oil to natural gas are also expected. It is also anticipated that the overall trend of natural gas use *per residence* will decline because appliances and equipment that use natural gas are expected to become more efficient over time in response to federal regulation, and, unlike for electricity, there are relatively few new natural gas products for residential customers coming to market.

There is significant potential to reduce demand for natural gas through energy efficiency improvements. A natural gas efficiency potential assessment update was conducted in 2006, estimated that the maximum achievable potential over a 10-year period of 18 percent of projected natural gas consumption.⁴³

While the potential for reducing natural gas use through efficiency programs is significant, efficiency programs in other energy sectors could affect the overall demand for natural gas. For example, many electricity efficiency programs, including NYSERDA's EmPower New YorkSM and Assisted Home Performance with ENERGY STAR[®] programs, encourage switching electric appliances, such as clothes dryers and hot water heaters, to gas-fired appliances. Further, utility-sponsored programs promote switching from electricity and oil to natural gas. A growing market also exists for combined heat and power (CHP) technologies, which enable customers – primarily commercial and industrial – to use natural gas on their premises to generate electricity and use the waste heat for space and water heating. Building efficiency could also be improved through the installation of environmentally beneficial DG/CHP resources located at customer sites. These resources enhance energy efficiency, particularly in commercial buildings, because the electricity by-product of CHP can be directly used. State action to facilitate implementation for DG, including additional technical and financial support, financial incentives for low carbon DG resources, and removal of any barriers to interconnection of DG to the electric grid, would result in energy and cost reductions, improved energy security and reliability and reductions in air emissions.⁴⁴ While these initiatives would tend to increase natural gas consumption, the increase could be at least partially offset by a reduction in natural gas use for central station electricity generation. Also, overall efficiency could be improved. For example, burning natural gas directly in a water heater (which typically operates at between 60 percent and 80 percent efficiency) is more efficient than burning natural gas at a power plant (with a maximum efficiency of 60 percent), and shipping the electricity over power lines (with line losses of 8-10 percent) to power an electric water heater (with an efficiency of 90-95 percent), resulting in a net efficiency of approximately 50 percent.

In May 2009, the PSC established targets for natural gas efficiency programs as part of the EEPS proceeding in order to establish a comprehensive approach to gas efficiency, including a transition from the interim and “fast track” programs.⁴⁵ Combined with reductions anticipated from other sources, the natural gas reduction targets will result in a nearly 15 percent reduction in estimated gas use by 2020, independent of any fluctuations in use caused by fuel switching or other economic factors.

⁴³ The original study, Optimal Energy, Inc. *Natural Gas Energy Efficiency Resource Development Potential in New York*. 2006, estimated the potential natural gas savings based on \$80 million per year for five years and five years post market effects. The Optimal Energy, Inc. *New York State Natural Gas Efficiency Program Assessment Update*. 2008, changed the length of the \$80 million per year program scenario funding from five to 10 years (from \$400 million to \$800 million) and applied a modified discount rate. All other assumptions used in the 2006 study were preserved including budget allocation based on sector spending, 50 percent of the residential budget allocated to low income consumers, and the proposed programs which attempted to balance short-term resource acquisition efforts and long-term market transformation benefits.

⁴⁴ While DG/CHP is not necessarily renewable, a recommendation regarding DG/CHP is grouped with renewables in Chapter 3.

⁴⁵ PSC. *Case 07-M-0548 Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard, Order Establishing Targets and Standards for Natural Gas Efficiency Programs*. Issued May 19, 2009.

Natural gas efficiency programs previously approved on an individual basis outside of the scope of the EEPS proceeding vary in design and duration and are expected to result in natural gas savings of approximately 2,400,000 million Btu (MMBtu) in 2009 with annual funding of approximately \$62.7 million.⁴⁶

Earlier in the EEPS proceeding, natural gas utilities established energy efficiency programs that provide rebates to consumers for purchasing high-efficiency equipment such as furnaces, water heaters, clothes washers, solar hot water technology, and hot water conservation measures. The programs also provide marketing training for contractors and sponsor discounted sales of low-flow showerheads, faucet aerators, and tank wraps.⁴⁷ Also, in April 2009, EEPS programs for residential gas efficiency equipment programs, designed to promote the installation of efficient, cost-effective, furnaces, boilers and other equipment, were approved. These programs are funded at approximately \$10.6 million per year through 2011, and are designed to reduce annual natural gas consumption by approximately 533,000 MMBtu per year.⁴⁸

In total, the EEPS gas efficiency target represents a 14.7 percent reduction in estimated gas usage by 2020, independent of any fluctuations in usage caused by switching or other economic factors, representing an average annual reduction of gas usage of 3.8 billion cubic feet by 2020, enough gas to heat about 39,000 average-sized homes. This target is aggressive in comparison with the gas efficiency potential study identified above, which estimated a maximum achievable potential of 18 percent of projected consumption over 10 years. New York's goal is expected to be achieved as a result of changes to codes and standards, a continuation and expansion of programs administered by State authorities and DHCR, as well as through programs authorized by PSC approved funding totaling \$130 million annually. Now that programs for natural gas efficiency are underway, it is critical that these programs be coordinated with the State's other efficiency initiatives to help ensure maximum benefits without duplication of efforts.

Oil and Other Fuels. Adoption of ultra-low sulfur heating oil for residential, commercial, and industrial heating applications could yield energy efficiency improvements, lower emissions, and reduced system maintenance costs. Reducing the sulfur content of heating oil offers clear benefits including: reduced fouling of heat exchangers and reduced rates of efficiency degradation; reduced emissions of fine particulates; and stimulation of the market for ultra-high efficiency condensing appliances. In these appliances, low sulfur oil produces a condensate that is less corrosive. This allows the use of more compact appliances and use of more common materials of construction, both of which reduce the cost of achieving high efficiency levels. In these condensing appliances ultra-low sulfur fuel also leads to reduced maintenance requirements and longer life. Finally, the use of ultra-low sulfur heating oil will reduce the number of homeowner service calls due to the "clean burn" and subsequent reduction in plugging and soot build up of the heating systems.

⁴⁶ PSC. *Case 07-M-0548, supra, Report on Natural Gas Efficiency Goals, Working Group IV*. Submitted October 17, 2008.

⁴⁷ PSC. *Case 08-E-1003 Petition of Orange and Rockland Utilities, Inc. for Approval of an Energy Efficiency Portfolio Standard (EEPS) "Fast Track" Utility-Administered Electric Energy Efficiency Programs with Modifications, et al.* Issued January 16, 2009.

⁴⁸ PSC. *Case 08-G-1016 Petition of KeySpan Energy of New York for Approval of an Energy Efficiency Portfolio Standard (EEPS) "Fast Track" Utility-Administered Gas Energy Efficiency Program with Modifications, et al.* Issued April 9, 2009.

NYSERDA is designing a set of new programs under RGGI to increase the energy efficiency of homes and businesses that use fuel oil for space and water heating.⁴⁹ The programs are being designed to support activities that are not currently funded by existing programs. These RGGI programs will create an “all fuels, all sectors” approach to New York efficiency activities and capture additional efficiencies and energy bill savings opportunities.

Using energy more efficiently in the transportation sector will reduce the State’s reliance on petroleum. This should be accomplished through reduced usage and a transition to cleaner, less carbon intensive vehicles and fuels. Reductions in petroleum use can be accomplished by reducing the number of miles driven by single occupant vehicles. On the passenger side, this requires the availability of other “green” transportation choices such as reliable public transportation, intercity passenger rail options, carpooling and ride-sharing services, and education and outreach programs to inform the public of their transportation choices and the effect those choices have on air quality. On the freight side, increasing options for freight rail services and improving intermodal connections can reduce the growth in VMT.

Many of these strategies and improvements will help the State achieve the goal set by the Governor’s Renewable Energy Task Force Report, namely to reduce VMT by 10 percent statewide from projected levels within 10 years.⁵⁰ The State supports local government policies and actions that will reduce congestion and VMT where such measures are found to be cost-effective and supported locally. To assess the State’s progress in reducing VMT, the New York State Department of Transportation (DOT) should track statewide VMT levels, data limitations, discrepancies and trends and continue to estimate GHG emissions, energy usage and other emissions as part of adoption and approval of transportation plans, programs and projects.

Innovation in the transportation system can also result in the system becoming more energy efficient. New York has been active in the use of innovative technology in the transportation sector and intends to support additional deployment. Maximization of investment in the Intelligent Transportation Systems (ITS) has energy efficiency benefits. ITS encompasses a broad range of wireless and wire line communications-based information and electronic technologies that can be used to improve safety and efficiency in many ways. As one example, ITS can be used to provide real-time information to travelers, allowing them to make more efficient route choices, and hence use less gasoline, by avoiding congested or closed roadway. They can also be used for communicating to emergency responders and the public, where incidents, accidents and traffic jams have occurred, allowing the responders to get to the scene more quickly and advising the public to take alternate routes.

To reduce GHG emissions from vehicles, the State has promulgated Greenhouse Gas Exhaust Emission Standards revising New York’s existing low emission vehicles (LEV) program to adopt California’s GHG emission regulations.⁵¹ President Obama has now endorsed these standards as a model for a federal program. This year the Obama Administration proposed rules to require passenger cars to reach a 39 mpg fuel economy standard by 2016 and 30 mpg for light trucks and sport utility vehicles. This results in an overall fuel efficiency standard of 35.5 mpg. Nationally, the transportation sector contributes nearly a

⁴⁹ In New York, the RGGI Program has been implemented through two complementary programs: DEC has established New York’s CO₂ Budget Trading Program (6 NYCRR Part 242, 6 NYCRR Part 200, General Provisions) and NYSERDA has established the CO₂ Allowance Auction Program (21 NYCRR Part 507). The CO₂ Allowance Auction Program has established the rules through which New York will sell most of its CO₂ allowances.

⁵⁰ Renewable Energy Task Force. *Clean, Secure Energy and Economic Growth: A Commitment to Renewable Energy and Enhanced Energy Independence*. 2008.

⁵¹ 6 NYCRR Subpart 218-8.

third of the United States' GHG emissions. There is a need to reduce these emissions to slow the rate of climate change caused by human activity. Given the urgency and recognizing the historic next steps taken by the Administration, New York believes that a more aggressive standard and timetable can be achieved for future CAFE standards. A standard that is equivalent to the "Technology Exhaustion" alternative for light duty trucks and the "Total Costs Equal Total Benefits" alternative for passenger cars is economically and technologically feasible (as described in the Environmental Impact Statement on CAFE standards prepared by National Highway Traffic Safety Administration). This would produce a fuel economy standard of 43.3 mpg for passenger cars and 34.7 mpg for light trucks.

While there are many opportunities for the State to use energy more efficiently in the transportation system, providing sufficient resources to accomplish many of the strategies and programs is challenging. Identified funding is not enough to maintain the system in a state-of-good repair, let alone to enhance its energy efficiency. DOT produced a comprehensive needs study in 2007 that showed that transportation investments are less than half of what is needed.⁵² New and innovative funding mechanisms should be explored.

Recommendations

- Expand green transportation choices to users of the transportation system (residents and businesses). This includes enhanced public transportation service and carpooling/ride-matching services for commuters and intercity rail, as well as waterborne services, for shippers. In this way, the State will help meet the statewide goal of reducing VMT 10 percent below projected levels by 2020.
 - Identify available green transportation choices and promote them.
 - Identify opportunities to expand green transportation choices.
 - State agencies will include systematic consideration of transportation choices, energy use, energy conservation, and climate change as part of their State Environmental Quality Review Act (SEQRA) reviews when they are lead agencies.
 - Endorse Smart Growth and GHG emission reductions as key principles in Transportation Plans and Transportation Improvement Programs (TIPs).
- Support federal action to encourage energy efficiency and GHG reductions from the transportation sector.
 - Work with New York Congressional Delegation and transportation organizations to develop new funding formulas within the next Surface Transportation funding bill that provide incentives to states to reduce energy use.
 - Work with the federal government to strengthen the recently proposed CAFE standards.

End-Use Efficiency Programs Beyond 2015. The State's policy to achieve 15 percent savings by 2015 is only an interim goal. As shown in detail in the Energy Efficiency Assessment, modeling shows that if

⁵² DOT. *Multimodal Investment Needs and Goals for the Future (20 Year Needs Assessment)*. 2008. <https://www.nysdot.gov/programs/repository/multimodal%20investment%20needs.pdf>

these policies and programs are not continued beyond 2015, then electricity demand will increase between 2015 and 2018. The PSC expects to conduct a comprehensive review of progress to date from ratepayer funded energy efficiency programs to position itself to reauthorize program funding as appropriate beyond 2011. All entities responsible for energy efficiency initiatives should conduct a similar review of progress, and the potential for additional efficiency gains in the future. That review will determine, among other things, the extent to which improvements in existing codes and standards, as well as the implementation of new codes and standards, have created downward pressure on the growth of energy use in New York. It will also reveal the extent to which market prices, alternative financing mechanisms, efficiency benefits, and market transformation efforts have reduced the need for future ratepayer support for energy efficiency programs. Similarly, the State needs to evaluate the progress made regarding energy efficiency in the natural gas and fuel oil sectors, and modify programs going forward. A comprehensive examination of program costs and benefits will inform the degree to which these programs are the best tools to reach the State's efficiency potential beyond 2015.

2.2 Electric System Efficiency

Making our electric system more efficient will help to ensure a high level of reliability, help mitigate upward pressure on electricity prices, and allow time to develop the low-carbon-intensity electricity infrastructure necessary to meet long-term GHG reduction goals. Actions taken by the State to date – ranging from the design of its competitive wholesale electricity market to the expansion of energy efficiency programs for end-users – have encouraged the efficient production, delivery, and use of electricity.

2.2.1 Progress to Date

The efficiency of electricity production and delivery in New York has been improving in recent years and several ongoing initiatives are expected to continue that progress. First, New York's competitive electricity market structure, established in 1999 and administered by the NYISO, provides an economic incentive to power plant operators to run as efficiently as possible. Under this structure, power plants and demand side resources⁵³ are dispatched by the NYISO in order of lowest to highest bid cost.⁵⁴ All dispatched units are paid the market clearing price, which is based upon the marginal bid of the last plant dispatched.⁵⁵ Under this arrangement, suppliers, absent market power, have every incentive to bid into the market their marginal costs of production, because if they bid below it they may run at a loss and if they bid above it they may not be selected for dispatch and will neither run nor be paid. More efficient, i.e., lower heat rate,⁵⁶ resources are attracted to competitive markets where they can profit by competing against less efficient producers, an incentive that does not exist in non-market regions. The market structure also encourages plants to run more consistently. Average plant availability in New York increased from 87.5 percent in the 1992 to 1999 timeframe to 94.4 percent in the 2000 to 2007 timeframe.

⁵³ Demand side resources refer to customer loads that can respond to short term price signals by coming off line.

⁵⁴ See the Electricity Assessment: Resources and Markets and the Energy Infrastructure Issue Brief for additional information.

⁵⁵ The marginal cost is the cost to produce the next increment of output. The generating unit that produces that increment is called the marginal unit (or the unit on the margin) at that point in time.

⁵⁶ Heat rate is a measure of a generator's efficiency in terms of power output for a given heat input. The lower the heat rate or less heat input that is required for a unit of power output, the more efficient a power plant is.

2.2.2 Potential for Additional Efficiencies

Power Production

The gross heat rate of New York's power plant fleet has been trending downward since the late 1990s, indicating a continuing improvement in the overall efficiency of the State's electric generation. The NYISO has calculated that since 1999, New York's gross heat rate has improved 21 percent.⁵⁷ In general, new plants use technologies that are more efficient than those used in older power plants. As older facilities retire and newer, more efficient plants come on line, the average heat rate of the power plant fleet in New York is expected to improve. The State's markets and its commitment to continually improve them will facilitate this substitution.

Transmission and Distribution

Improving efficiency in the delivery of electricity from generation facilities to end-users in a cost-effective manner by reducing transmission and distribution system losses will also mitigate prices and environmental impacts. In June 2008, the PSC commenced a proceeding to reduce system losses and increase power transfer capability.⁵⁸ The proceeding is: examining how generation and existing equipment can be better utilized in efficient system operations; identifying actions the utilities could take to minimize their own use of energy; determining what programs the utilities could offer customers to reduce their reactive power uses; and determining what equipment could be installed on the transmission and distribution system to assist in efficient system operations. Commission staff, all the utilities (including LIPA and NYPA), and the NYISO are collaborating in this proceeding.

Demand Response. The existing electric grid is structured such that electricity flows from centralized power plants to local sub-stations via the grid's transmission system and then from those sub-stations through the grid's distribution system to the end-user when it is demanded. This infrastructure, i.e., power plants and transmission and distribution systems, must be sized to meet the peak demand of the system, even though this peak may only occur for a few hours every year. As shown in Figure 7, the State needs nearly 34,000 megawatts (MW) of generating capacity to meet peak demand, even though hourly demand exceeds 25,000 MWh (approximately 74 percent of system peak) in only about five percent of the hours in a typical year.

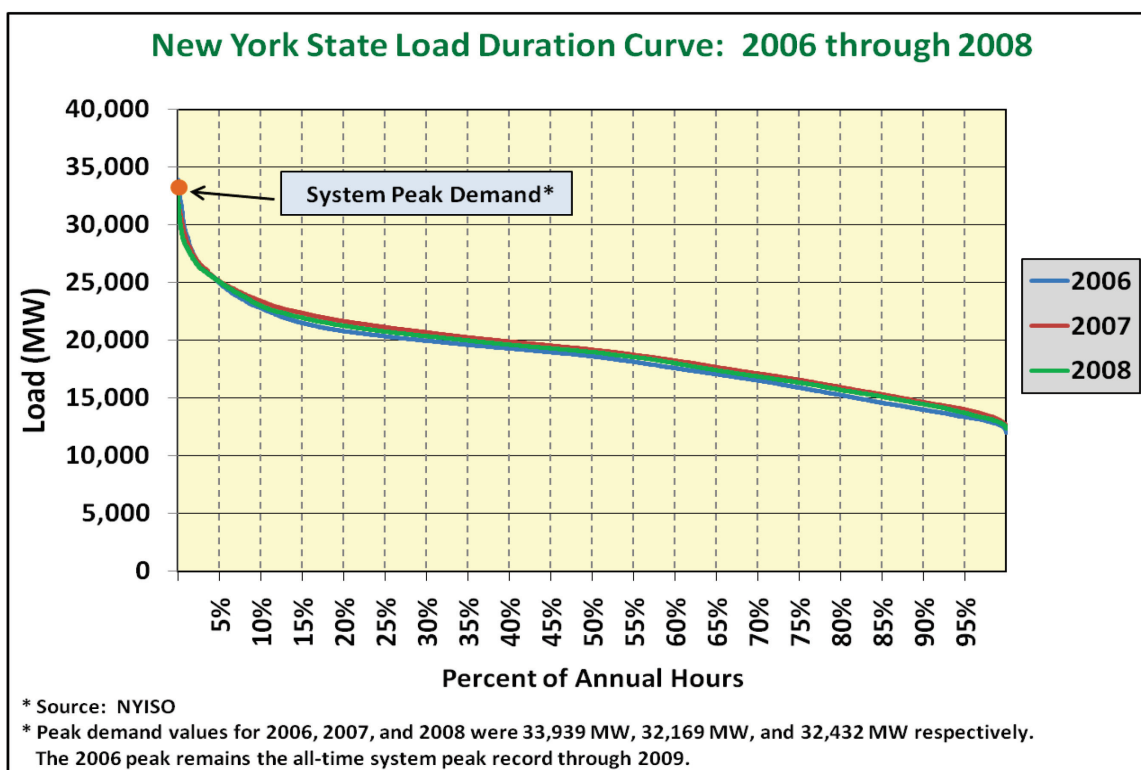
Additionally, during periods of high peak demand, it is often the least efficient, most polluting and most costly plants (peaking units) that must be dispatched.

⁵⁷ NYISO. *New York State Power Plant Emissions 1999 – 2008*. 2009.

http://www.nyiso.com/public/webdocs/newsroom/press_releases/2009/Briefing_Paper_Power_Plant_Emission_Rates_04212009.pdf

⁵⁸ PSC. *Case 08-E-0751 Proceeding on Motion of the Commission to Identify the Sources of Electric System Losses and Means of Reducing Them, Order Clarifying Scope of Proceeding*. Issued July 17, 2008.

Figure 7. Load Duration Curves for New York Average Load 2006 - 2008



Source: NYISO

There are a number of demand response programs in New York which can moderate or shave peak loads. These programs reduce the need for new infrastructure, discipline market prices, help ensure reliability, and promote the efficiency of the system. Programs supported by NYSERDA and the PSC have achieved a total of 1,285 MW (710 MW permanent, 575 MW callable) of load reductions statewide. The NYISO's demand response programs have been successful in reducing peak load by as much as 900 MW during reserve shortages. The impacts of demand response efforts can be profound and can influence both the need for new infrastructure and the need to call upon the least efficient and most polluting peaking units. Demand response programs are discussed in more detail in the Electricity Assessment: Resources and Markets.

More recently, in February 2009, the PSC instituted a proceeding to focus on demand response efforts in New York City stemming from continued peak demand growth and the necessary infrastructure investment needed to meet it, along with the desire to reduce emissions from peaking facilities used to meet peak loads.⁵⁹ The proceeding is examining a wide range of demand response issues including an assessment of the total potential cost-effective demand response, the ability to focus programs on system or network peaks (and related impact on potential environmental justice areas), the integration of competitive providers into the programs, funding sources, integration with energy efficiency programs

⁵⁹ PSC. *Case 09-E-0115: Proceeding on Motion of the Commission to Consider Demand Response Initiatives, Order Instituting Proceeding*. Issued February 17, 2009.

and NYPA demand response programs, and evaluation and measurement methods. Technical conferences are underway and pilot programs are being explored.

Recommendation

- Encourage demand response.
 - As appropriate, direct implementation of cost-effective approaches and technologies that facilitate demand response to achieve reliability and other public policy objectives.

Smart Grid. As described in detail in the Electricity Assessment: Resources and Markets, “Smart Grid” encompasses the use of advanced/enhanced technology and two-way communications to improve the operations and the efficiency of the entire electric grid from generation to end-use consumption. Such an approach, theoretically, would enable active participation of consumers, enable the grid to accommodate all generation and storage options, enable new products, services and markets, provide improved power quality for the digital economy, optimize asset utilization and operational efficiency, and anticipate and respond to system disturbances. Currently, the electric grid in New York, as well as most other large power systems in the world, uses modern and extensive technology to control electricity flow and operations. Increased use of Smart Grid technology in New York could, however, result in significant improvements. Anticipated improvements include enhancing operator decision-making to avoid and manage events similar to the 2003 Northeast Blackout and the 2006 Long Island City outages; reduction of power system losses; provision of greater demand response options and results; mitigation of fault duty issues (thereby enhancing DG); improvement of Consolidated Edison Company of New York, Inc.’s (Con Edison) secondary network monitoring; and automation of distribution system operation.⁶⁰ Further, Smart Grid would likely result in increased dynamic reactive compensation and power flow control in key parts of the system to maintain proper voltages and to increase power flow transfers – or at least reduce power transfer degradations – due to system demands and conditions, and also reduce effects of system disturbances.⁶¹

Several initiatives to expand the use of advanced technology and implement Smart Grid elements are underway in New York. Specifically, the PSC approved investment of ratepayer funds for investor-owned utilities for Smart Grid project proposals that may be eligible for competitive grants from DOE pursuant to ARRA.⁶² In addition, the State is pursuing Smart Grid through an integrated approach and strategy through its work with utilities and on various task forces and consortiums. The State facilitated the creation of the Smart Grid Consortium, which is a partnership of the utilities, leaders in academia and industry, NYSTAR, NYSEDA, the PSC, NYPA, and LIPA. The group is coordinating the deployment of Smart Grid projects throughout the State, and leveraging federal ARRA money. The Consortium has expressed support for ARRA Smart Grid applications of its members, which totaled over \$800 million. In October 2009, DOE informed Con Edison and the NYISO that they had been selected by DOE for “award negotiations,” indicating the likelihood of both companies receiving a grant under the Smart Grid Investment Grant Program. The awards are anticipated to total \$173.5 million from DOE, with total

⁶⁰ Distribution Automation involves the remote monitoring, coordination, and operation of various distribution equipment, e.g., automatic sectionalizing switches.

⁶¹ These systems are generally referred to as Flexible AC Transmission Systems, which covers a number of system-types that can control voltage and transmission capacity, e.g., Static VAR Compensator, Static Synchronous Compensator and those that can control flows, e.g., Unified Power Flow Controller, Interline Power Flow Controller, and Variable Frequency Transformer.

⁶² PSC. *Case 09-E-0310: In the Matter of the American Recovery and Reinvestment Act of 2009 – Utility Filings for New York Economic Stimulus Funds, Order Authorizing Recovery of Costs Associated with Stimulus Projects.* Issued July 27, 2009.

project value, including cost sharing, of more than \$348 million. Then in November 2009, DOE informed Con Edison, LIPA, and NYPA that they had been selected for award negotiations for their regional Smart Grid demonstration projects, with potential DOE funding totaling over \$58.5 million.

Rate design, based on rates that vary by time of use, coupled with advanced metering, may yield end-use efficiency gains and may improve electric system efficiency by reducing peak loads. As explained above, enhancing the information provided to electricity consumers in advance of or at the time of use would facilitate informed decision-making and help reduce customer energy bills. Providing electricity pricing information to consumers at the time consumption decisions are being made, and charging consumers accordingly, would enhance economic efficiency, assist consumers in managing their energy use and controlling their bills and could help reduce system peaks.

The PSC has taken action in this regard, including the requirement that the State's largest commercial and industrial customers, generally those with electricity demand exceeding 500 kilowatts (kW), have interval meters to encourage control of daily electric load and discourage use at peak hours. Currently, more than 2,200 customers, representing more than 15 percent of peak load, are now billed on day-ahead hourly prices.

In contrast, the vast majority of residential and small commercial electricity customers are informed of the applicable price of electricity only upon receipt of a monthly bill, up to 30 days after-the-fact. Moreover, that unit price represents an average throughout the billing period and does not reflect the customer's pattern of energy use throughout the month. These customers also generally receive very little information about their consumption behavior and how changes in usage patterns can reduce their energy bills. Finally, these customers do not know when the electricity system is peaking and is using the most expensive units to meet that load. As noted, they receive a bill every month with an average price per kilowatt-hour. If these customers instead received a real-time price signal that reflected the high cost of generation during peak periods, they may be inclined to reduce their energy use during those periods.

LIPA is in the final stages of installing smart meters on approximately 200 residential and commercial customers in two different neighborhoods to determine how smart meters can be integrated into the system. The project will also evaluate how customers can interact with various in-home displays or web-based information tools that will give those customers substantial knowledge on how and when they use their electricity. LIPA's Trustees have recently authorized an AMI pilot rate that will allow LIPA to offer modified time of use rating periods to participating smart meter customers in an effort to evaluate alternative time periods and price differentials that would motivate these customers to reduce their energy usage and overall annual electric bills.

Recommendations

- Consistent with addressing cyber-security and physical security risks, support investments in Smart Grid and the efforts of the Smart Grid Consortium to identify opportunities for accelerating advancements and investments in Smart Grid technologies; greater use of distributed resources; advanced meters and pricing mechanisms; and leveraging of federal Smart Grid funding to support greater system reliability and efficiency, and to reduce electricity costs to customers.
 - Work with the Smart Grid Consortium to develop action plans.
 - The PSC should consider approving Smart Grid investments where they are shown to benefit ratepayers and achieve the State's multiple planning objectives.

- Use electricity price signals to help level load and reduce generation requirements.
 - Study potential requirement that electricity be priced on a time of use basis for all customers. Issues that should be considered in making that determination include: the practical hardships and difficulties related to implementing time of use rates for residential customers, and possible means to mitigate any such hardships; and alternative rate regimes, based on voluntary participation of residential customers.
 - Implement rate structures and metering requirements for non-residential customers that encourage shifting use of electricity to off-peak hours.

Energy Storage. Energy storage is also a tool to improve system efficiency. Electricity markets are unique among major commodity markets in that they require instantaneous matching of supply and demand. Other energy commodities, such as natural gas and oil, can effectively be stored in large quantities, providing a buffer between supply and demand. Without an effective means of storage, the electric grid has traditionally maintained excess capacity in generation and transmission. Although it is difficult to store electricity directly, electric energy can be stored in other forms, such as chemical and mechanical energy, and efficiently converted back to electricity as needed. Bulk electricity storage capable of providing hundreds of megawatts of power for several hours and distributed energy storage capable of injecting/absorbing up to several megawatts for seconds or minutes have the potential to provide economic benefits, while improving the stability and reliability of the grid, especially if applied during peak load periods.

Existing and emerging energy storage technologies include pumped hydroelectric generation, compressed air energy systems, batteries (including those used for plug-in electric vehicles), capacitors, and flywheels. Multiple activities to support these technologies are underway. For instance, NYSERDA is involved in an effort to evaluate plug-in hybrid electric vehicles (PHEVs), looking at both the performance and behavior of the vehicles and the potential electric grid impacts that increased penetration levels could have. Related to this effort, in his 2009 State of the State Address, Governor Paterson announced the creation of the New York Battery and Energy Storage Technology (NY BEST) Consortium, which is intended to progress academic research into commercialization of energy storage technologies, with particular focus on applications in the transportation sector. In addition, NYSERDA is supporting a 1 MW flywheel energy storage demonstration project with Beacon Power. The company is also developing a 20 MW application of the flywheel technology to be deployed in Stephentown. Another utility scale energy storage demonstration project initially supported by NYSERDA has been selected by DOE to enter into award negotiations for ARRA funding. New York State Electric and Gas Corporation was notified in November 2009 that its planned 150 MW compressed air energy storage facility had been selected to receive ARRA funding totaling greater than \$29.5 million.

Energy storage technologies optimize the electric system in a number of ways. They could store renewable energy generated off peak for when it is needed. They also provide very rapid frequency and regulation support, responding to signals from the NYISO much faster than traditional load following fossil generation. If storage devices are connected to renewable energy resources, there would be zero emissions.

Recommendation

- Encourage energy storage deployments.
 - Define energy storage technologies under Public Service Law (PSL), Section 2(2-b), in order to exempt energy storage facilities up to 80 MW from the jurisdiction of the PSC. This would reduce the time and cost of permitting and encourage the development of these technologies.

3 Support Development of In-State Energy Supplies

Accelerating the strategic development of New York’s energy resources, both in the renewable energy and natural gas areas, will play a key role in achieving the Plan’s policy objectives. Production and use of in-state energy resources can increase the reliability and security of energy systems, reduce energy costs, and contribute to meeting climate change and environmental objectives. To the extent that renewable resources and natural gas are able to displace the use of higher emitting fossil fuels, relying more heavily on these in-state resources will also reduce public health and environmental risks posed by all sectors that produce and use energy. Additionally, by focusing energy investments on in-state opportunities, New York can reduce the amount of dollars “exported” out of the State to pay for energy resources. By re-directing those dollars back into the State economy, New York can increase its economic competitiveness with other states that are less dependent on energy supply imports to support their local economies.

3.1 Renewable Energy

When compared with carbon-intensive fossil fuel resources, renewable resources generally have significantly lower negative impacts on public health and the environment, and contribute less to climate change. However, while the cost of renewable technologies varies, the levelized cost of renewable energy technologies is generally higher than that of fossil-fuel technologies.⁶³ This difference is reflected by the price premium that is paid for renewable electricity under the RPS Program. The price premium, expected to range from approximately \$16 to \$32 per MWh, is the incremental price New York must pay in order to make renewable generation competitive in a marketplace where price is primarily driven by fossil-fueled resources. The price disparity between renewable resources and fossil-fueled resources exists in part because the full externality cost of fossil fuel use is not built into its price. These “external” costs include the negative public health and environmental impacts that result from the combustion of fossil fuels. For example, there will likely be increased societal costs associated with the effects of climate change, such as property damage from increased storm activity or moving large populations in newly-inundated areas from floods or rises in sea-levels, and these costs are not currently fully reflected in the price of energy. As a consequence of this disparity, there has not been widespread private investment in and deployment of renewable resources. Therefore, market intervention (typically in the form of regulatory mandates and publicly funded financial incentives) is necessary to reduce the cost disparity to a level that encourages this investment – at least until environmental and other externalities are reflected in the prices of fossil fuels. New York is relying on both regulatory mandates, such as the RGGI program as well as financial incentives for the accelerated development of renewable energy technologies.⁶⁴

⁶³ “Levelized cost” is the net present value of the cost per unit of energy output over the life of the project. It accounts for the upfront capital costs and the marginal costs of operation.

⁶⁴ RGGI requires electricity generators to purchase CO₂ allowances for every ton of CO₂ they emit. The price of these allowances is built into the marginal operating costs of the plant, and then passed on in their offering price. In this way, the harmful effects of carbon dioxide emissions are being partially accounted for in the price of electricity.

Government mandates, e.g., emissions cap and trade programs, renewable fuels standards and financial incentives, that are designed to reduce this disparity are sometimes criticized for having short-term impacts of raising the price of energy. These arguments, however, fail to consider the broader and longer-lasting economic benefits, in addition to environmental and energy security benefits, associated with the development of renewable resources. The direct economic benefits of renewable energy include the creation of short-term (engineering, design and construction) and long-term (administration, operation and maintenance) jobs, increased local capital investment, increased tax revenues for local governments, and increased revenue for landowners. Direct economic benefits lead to additional indirect economic benefits through the macroeconomic “ripple” effects of injecting incremental income into the State economy over the life of various projects, which may be 20 years or more.

As discussed in the next section, the potential exists for renewable energy to meet a large percentage of society’s energy needs, but achieving the full potential in the near-term given current economic and technical realities, would come at an extraordinary cost. As renewable energy programs are designed, targets that are designed to take advantage of the energy, environmental and economic development opportunities must also consider the cost of other resources that are available to meet short-term goals. Over time, the cost of deploying renewable technologies continues to decrease as demand for renewables grows and technologies become more advanced.

3.1.1 In-State Potential and Development Progress

New York’s renewable potential exists in all of the primary energy-consuming sectors of the economy: the electric generation sector, the transportation sector, the residential, commercial, and industrial sectors, and the agriculture sector. New York currently meets approximately 11 percent of its primary energy needs with renewable energy resources. However, the available technical/practical potential, which takes into consideration technical and some social constraints on the “pure” technical potential, but not economic constraints, indicates that approximately 40 percent of all New York’s energy needs over all sectors could be met with renewables by 2018.⁶⁵ This accounts for only hydropower, wind, biomass, and solar-PV resources. It does not include the potential of solar thermal, geothermal, and hydrokinetic energy sources. This “outer-bound” forecast leaves New York with substantial room to expand its use of renewable energy resources. This expansion could technically occur, but there would be a significant cost associated with the implementation of these resources. The solar and wind resources represent approximately 60 percent of the technical/practical potential and an even larger percentage of the overall cost. If the full technical/practical potential for solar and wind resources were installed at current prices, the cost to New York would be approximately \$300 billion dollars.⁶⁶

In the electric generation sector, the most significant existing developed resources are hydropower, biomass (biogenic waste⁶⁷ and wood) and biogas, and wind. As of 2007, in-state hydropower supplied 25,253 GWh (15 percent of total demand), biomass and biogas supplied 1,942 GWh (approximately 1

⁶⁵ Technical/practical potential includes consideration of manufacturing and materials limitations and land use constraints, e.g., the prohibition of the development of renewable energy projects in State parks, but does not consider economic costs, certain social constraints, or system operation, transmission, or distribution limitations.

⁶⁶ The \$300 billion dollar estimate is based on the following approximate installation cost assumptions: solar-PV costs \$8,000 per kW; onshore wind costs \$2,000 per kW, and offshore costs \$3,300 per kW. The State incentive level required to drive the adoption of this technology would not need to equal the entire \$300 billion, but would be a significant percentage (as much as 1/3 depending on federal incentives). DOE has aggressive goals for solar-PV cost reductions. If solar-PV costs were to see rapid reductions to \$3,000 per kW, during the planning period, the total cost would amount to approximately \$150 billion dollars.

⁶⁷ Biogenic waste is the organic portion of the waste stream.

percent of total demand), wind supplied 873 GWh (less than 1 percent of total demand), for a combined total of 28,068 GWh (17 percent of total demand).⁶⁸ The technical/practical potential of hydropower, biomass, wind, and solar-PV is estimated at 31,000 GWh, 9,400 GWh, 48,000 GWh, and 53,000 GWh, respectively, by 2018. This would amount to 141,400 GWh annually – enough to supply well over 75 percent of New York’s projected electricity generation needs by 2018 (assuming full achievement of ‘15 by 15’).

In the transportation sector, biomass has been predominantly used for the production of biofuels, such as ethanol and biodiesel. The State has the installed capacity to produce approximately 175 million gallons of ethanol and 7.5 million gallons of biodiesel annually, which could displace approximately two percent of the petroleum demand in the transportation sector. However, as referenced in the Renewable Energy Assessment, a significant portion of the biomass feedstock that is currently used in the production of biofuels is imported from other states. DOE estimates the State’s potential for ethanol production from in-state available biomass feedstocks at nearly 475 million gallons annually today, increasing to 585 million gallons in 2012 or four percent of the petroleum demand in the transportation sector.⁶⁹ These estimates, however, may be overly optimistic given the State’s desire to harness biomass in a responsible and sustainable manner. For example, some forms of ethanol require more energy inputs (farming, transport of feedstock, refining, etc.) than the resulting energy output from the fuel. Taking this into account, a comprehensive assessment of the in-state biomass potential, including estimates of the current and very near-term feedstock potential in New York using current practices and technology, is currently underway in the development of the Renewable Fuels Roadmap and Sustainable Biomass Feedstock Study (“Biofuels Roadmap”) for New York.⁷⁰ The Biofuels Roadmap is expected to be released in early 2010 and will assist policy makers in the development of comprehensive bioenergy policies. In addition, the Climate Action Plan is evaluating the potential for using New York biomass for liquid fuels production, as well as electricity generation and space heating by conventional and emerging technologies.

Biomass has been the leading in-state renewable resource consumed in the residential, commercial and industrial sectors as measured by primary energy input. It is typically used in these sectors as a heating fuel in the form of wood. Currently the State uses 99 trillion Btus (TBtu) of wood and 13 TBtu of biogenic waste annually (eight percent of primary energy demand for these sectors, excluding electricity use) and has the technical/practical potential to develop 350 TBtu and 14 TBtu annually by 2018, respectively (23 percent of primary energy demand for these sectors, excluding electricity use). Biodiesel blends are also used in these sectors as a heating fuel, and are not included in these potential assessments.

Conventional heating technologies used for biomass combustion, such as wood stoves and hydronic heaters or wood boilers, can be relatively inefficient (with thermal efficiencies between approximately 40

⁶⁸ The RPS goal considers the renewable portion of the electricity used, not produced, in-state. Therefore, renewable electricity imports can count toward the 25 percent goal. The technical/practical potential figures represent renewable generation in-state. Additional information on technical/practical potential can be found in the Renewable Energy Assessment.

⁶⁹ DOE, Alternative Fuels and Advanced Vehicles Data Center. *State Assessment for Biomass Resources: New York Potential Biofuel Production*. 2008. <http://www.afdc.energy.gov/afdc/sabre/sabre.php?mode=prod>

⁷⁰ In 2008, the Governor’s Renewable Energy Task Force issued a report calling for the development of a Renewable Fuels Roadmap and Sustainable Biomass Feedstock Study for New York. It is intended to inform the State and the public of the economic and environmental impacts of biofuels.

and 70 percent)⁷¹ compared to new high-efficiency technologies, such as two-stage gasification boilers, which can achieve thermal efficiencies of over 80 percent.⁷² New York is embracing this next generation of wood boiler systems, with four manufacturers currently located upstate, and expansion of the industry within New York is anticipated. The State also has a significant wood pellet manufacturing industry, including two of the region's largest manufacturers. Expansion within the State's wood pellet industry is also expected, as New York currently has a capacity of 350,000 tons per year of pellets and an additional 200,000 tons of capacity is planned to become available within the next two years.^{73,74}

In order to create a viable and sustainable high-performance bioheating industry and market, the State should undertake a five-tier market transformation effort which may include:

- Addressing the low-efficiency bioheating systems currently in the marketplace.
- Establishing a regulatory floor for new high-efficiency systems.
- Setting a voluntary standard for the best new systems.
- Continuing to assist New York manufacturers in developing new high-efficiency technologies.
- Ensuring that New York has a skilled workforce to deliver these products and services.

The State is preparing a step-by-step guidebook to lower the information and cost barriers that developers of small-scale biomass electricity projects may face, including codes, siting and permitting issues, land, water, air, noise/visual concerns, and information on financial assessment and economic incentives. This guidebook is expected to be released in Spring 2010.

Comprehensive assessments of the total potential to displace conventional heating sources with solar thermal energy have not been conducted for New York. However, a recent assessment of solar domestic hot water systems within the State indicated that solar thermal energy could potentially provide over half of the energy required for water heating in a typical home in New York that has adequate access to

⁷¹ State of New York Office of the Attorney General. *Smoke Gets in Your Lungs: Outdoor Wood Boilers in New York State*. 2008.

<http://www.oag.state.ny.us/bureaus/environmental/pdfs/Smoke%20Gets%20in%20Your%20Lungs%20Revised%20March%202008.pdf>

⁷² NYSERDA. *Biomass Combustion in Europe: Overview on Technologies and Regulations*. 2008.

<http://www.nyserda.org/programs/Environment/EMEP/Report%202008-03%20-%20Biomass%20Combustion%20in%20Europe-complete-after%20corrections.pdf>

⁷³ NYSERDA Communication with New York State pellet manufacturers. October 2009.

⁷⁴ A total of 550,000 tons of wood pellets is equivalent to 8.5 Tbtu, which represents 13 percent of the State's residential wood consumption in 2007. NYSERDA has provided support for research addressing both biomass combustion technologies and fuel standards. A full list of NYSERDA projects can be found at:

http://www.nyserda.org/programs/Research_Development/biomasscasestudies.asp

sunlight.⁷⁵ Similarly, while specific data on geothermal potential in New York is unavailable at this time, it is assumed that the potential for space and water heating is significant.⁷⁶

Farm-based renewable energy technologies and applications focus on the ability to turn farm wastes into energy resources, mostly through the use of “digester” technologies. By converting wastes into usable gas, farms can either use this gas on-site by producing electricity for farm operations or can deliver gas to the natural gas pipeline system. Biofuels may also play a more significant role in rural communities, and by creating distribution systems for local use of fuels, farms may play a key role in growing suitable energy crops, aid in the conversion of such crops into usable fuels, and then have local communities and on-farm use of such fuels serve as primary markets. The creation of such “closed loop” energy systems, if ultimately feasible, may help to significantly reduce the amount of fossil fuels needed to power New York’s agriculture sector.

While New York has significant renewable energy potential in its electric generation, transportation, residential, commercial, industrial, and agriculture sectors, barriers exist to the full realization of this potential. Most significantly, the cost of development of the resources is not accounted for in the estimate of technical/practical potential. The vast majority of costs associated with renewable development are the upfront costs of deploying the technologies, since operating costs are low, e.g., wind, water, and solar are free fuels. While the benefits and potential of renewable development are significant, the primary challenge is overcoming the upfront investment that is required for deployment.

3.1.2 Renewable Policies

Public policies to support renewable energy development are primarily aimed at overcoming the economic barriers to widespread use of these technologies. While some policy approaches, such as tax credits and net metering, are meant to provide general support for specific renewable technologies, other approaches are meant to develop markets for broader use of renewable technologies generally, such as the RPS Program which seeks to achieve a targeted level of renewable energy use. Decision makers must carefully balance setting appropriately ambitious targets for incentive and deployment programs with the cost of achieving such targets. Well-designed programs will use public funds to leverage maximum private investment to achieve the State’s policy targets, and must therefore account for the full spectrum of benefits to be realized from such activities.

As is noted in markets generally, New York’s experience in renewable energy development to date has shown that the most cost-effective projects are developed first. Today’s higher cost renewable energy projects become more cost competitive as the technologies advance and as the cost of fossil fuels rise; as such they will be easier and less costly to deploy in the future. Renewable energy policies should be regularly reviewed to determine if changes are necessary to respond to changing market conditions. Similarly, renewable energy targets should be increased as the economics of the various technologies and market conditions improve.

⁷⁵ NYSERDA. *Solar Domestic Hot Water Technologies Assessment: Final Report 08-09*. 2008. <http://www.nysERDA.org/publications/Report%2008-09%20Solar%20Domestic%20Hot%20Water%20-%20web.pdf>

⁷⁶ ‘Geothermal’ refers to two different uses of the Earth’s thermal properties: supporting the generation of electricity and the transfer of heat to or from a building. Geothermal power is the generation of electric power from heat stored below the Earth’s surface in the form of hot water, hot rocks, or lava. New York does not currently generate electricity from geothermal resources. A geothermal heat pump, or ground-source heat pump, is an electrically-driven heat pump that uses the nearly constant temperature of the Earth, instead of outside air, to heat or cool a building’s air or water supply.

Each renewable energy technology offers unique challenges and benefits, and policies can take these into consideration. Large-scale wind power is generally more cost competitive than other renewable resources, but in New York its greatest output tends to be during periods of the day when demand is low. Biomass generation can be used as a base load resource, but unlike wind, water and solar, the fuel must be sustainably managed and harvested. Solar-PV systems can be more easily deployed in densely populated areas than other renewables and its output closely matches with peak demand, but solar-PV, which is more often deployed as small scale installations in New York, is among the highest cost renewable technologies. While some technologies may appear to provide greater benefits for their costs, it is important to focus policies on developing multiple technologies simultaneously, as the portfolio of technologies can offer complementary benefits, such as the complementary relationship between wind resources which peak during the night, and solar-PV that peaks during the day.

Federal Policies

Sustained and adequately funded federal government policies and programs are an essential component of renewable energy technology development. With a foundation of sound federal policy, New York will be able to best craft policies and programs that target the in-state energy, environment and economic development opportunities that can provide sufficient incentive for successful realization of benefits from a variety of technologies and applications.

Development of renewables is supported at the federal level through a number of policy tools. In 2007 the federal government provided \$3.97 billion in tax expenditures to support renewable energy, which made up approximately 81 percent of all federal support for renewable energy technology.⁷⁷ The two major types of federal financial support for wind energy are the Production Tax Credit and accelerated depreciation through the Modified Accelerated Cost Recovery System. The Production Tax Credit provides for a \$19 per MWh tax credit which, when monetized, for example, at a 35 percent marginal tax bracket, is worth \$6.65 per MWh. The federal government in 2008 extended the 30 percent Solar Investment Tax Credit for eight years and removed the \$2,000 cap on costs eligible for the credit, sending an important signal of support to the solar-PV marketplace.

The Energy Independence and Security Act of 2007 (EISA)⁷⁸ created a number of new programs to support renewable fuels. The EISA accelerated the schedule for effectuating the Renewable Fuel Standard (RFS) first enacted in the Energy Policy Act of 2005. The RFS now mandates the sale of nine billion gallons of renewable fuels in 2008 and 36 billion gallons of renewable fuels in 2022 – 21 billion gallons of which must be cellulosic ethanol or other advanced biofuels.

The American Recovery and Reinvestment Act of 2009, like EISA, provides funding for energy efficiency and renewable energy projects, including on-site renewable energy technology that generates electricity for government buildings and renewable energy capital projects. As of the end of November 2009, New York based entities and projects had been selected for over \$1.36 billion in ARRA clean energy awards.

Potential national renewable energy portfolio standard, carbon cap-and-trade, and climate change legislation could provide further support for renewable energy development in New York in addition to the policies mentioned above.

⁷⁷ U.S. Energy Information Administration. *Federal Financial Interventions and Subsidies in Energy Markets, Table ES-1*. 2007. <http://www.eia.doe.gov/oiaf/servicerpt/subsidy2/pdf/execsum.pdf>

⁷⁸ Public Law 110 – 140.

Current State Renewable Policy

To encourage development of renewable generation in-state, New York adopted its RPS in 2004 (2004 Order).⁷⁹ This remains the State's primary policy initiative to promote the development of renewable resources. The RPS goal set forth in 2004 was to increase the amount of electricity delivered to New York consumers that was generated from renewable resources to 25 percent by 2013.

The 2004 RPS Order anticipated achieving the RPS goal through a number of State initiatives (taking into account the existing large scale hydropower and other renewable resources that counted toward the goal), including the RPS Program administered by NYSERDA, Executive Order 111, and the voluntary green power market.⁸⁰ The RPS Program creates an incentive for renewable energy investments by providing an additional source of revenue to the owners of the renewable energy systems beyond the market price of electricity. Coupled with federal and State tax incentives, the RPS Program helps to overcome the economic barriers to renewable deployment in New York.

Main Tier Program. The RPS Program is divided into a Main Tier and a Customer-Sited Tier. The RPS Program Main Tier is directed towards development of medium- to large-scale electric generation facilities where the electrical output of the systems is delivered into the wholesale power market. NYSERDA acts as the Program's central administrator and pays production incentives for the RECs under long-term contracts with the renewable generators. The long-term contracts are awarded through a competitive bidding process that takes into consideration a proposal's bid price and potential economic benefits to the State. Though this Central Procurement model is not common among states that have an RPS program, it has the advantage of providing a large bidder pool that stimulates competition and drives down bid prices. As a result, total program cost to ratepayers is minimized.

As of November 2009, four Main Tier solicitations had been offered since program inception. Results from the latest solicitation had not been released at that time, but the first three solicitations had resulted in contracts with 26 new in-state generation facilities for approximately 1,100 MW of nameplate capacity.⁸¹ This renewable capacity is expected to produce approximately 2.8 million MWh of electricity per year, enough clean energy to supply over 440,000 average homes. The majority of this capacity is from wind generation facilities, though hydroelectric and biomass facilities also contribute to this number.

Distributed Generation. To target the development of smaller, "behind-the meter" resources that produce electricity primarily for use on site, the RPS Program includes a Customer-Sited Tier. Programs under the Customer-Sited Tier target specific technologies including solar-PV, small wind, anaerobic digesters, and fuel cells and offer fixed financial incentives for each technology. As of March 2009, Customer-Sited Tier facilities had an estimated total annual production from installed capacity of 4,490 MWh.⁸²

The RPS Program is not the State's only initiative supporting development of renewables. Since 2006, LIPA has procured RECs and energy from a wide variety of resources, including customer-based solar-PV systems, onshore wind projects, fuel cells, biofuels, conventional and pumped hydropower, and

⁷⁹ PSC. *Case 03-E-0188, Proceeding on Motion of the Commission Regarding a Retail Renewable Portfolio Standard, Order Regarding Retail Renewable Portfolio Standard Policy*. 2004.

⁸⁰ Additional information on the RPS goal and expected contributions can be found in the Renewable Energy Assessment.

⁸¹ Two out-of-state generation facilities have also won contracts. The capacity of those facilities totals 37 MW, and the facilities are expected to produce 0.15 million MWh annually.

⁸² NYSERDA. *RPS Program Progress Report*. March 2009.

landfill gas. LIPA also has incentive programs for solar-PV installations which have resulted in the installation of 11.7 MW of capacity.

Bilateral Contracts

Main Tier RPS contracts anticipate the sale of project power into the wholesale marketplace. In contrast, power purchase agreements (PPAs) are contracts between energy suppliers and utilities (or other buyers) that specify the terms and conditions under which electricity will be generated and purchased. LIPA and NYPA are using PPAs offered through a competitive bidding process to acquire significant quantities of renewable power from private developers.

LIPA has issued a Request for Proposals (RFP) calling for 50 MW of utility-scale solar-PV whose output would be purchased by LIPA under a PPA.⁸³ Negotiations with a short list of developers resulting from the RFP process, development efforts, and environmental reviews are currently underway. It is anticipated that these solar projects will be installed on parking lots, commercial building rooftops, and federal property in 2010 and 2011. Pursuing a similar path, NYPA has issued a Request for Expressions of Interest that would call for NYPA's purchase of up to 100 MW of solar-PV systems supported by PPAs.⁸⁴

LIPA and NYPA are also considering the use of PPAs in collaboration with other governmental entities and utilities to support the development of offshore wind projects. One of these collaboratives, The Long Island-New York City Offshore Wind Project (consisting of LIPA, Con Edison, NYPA, NYSERDA, New York City Economic Development Corporation, the Metropolitan Transportation Authority (MTA), and the Port Authority of New York and New Jersey), is in the early stages of evaluating a proposed 350 MW project located in the Atlantic Ocean approximately 13 miles off the Rockaway Peninsula.⁸⁵ The Great Lakes Offshore Wind Project is engaged in a similar effort looking at the potential for development of 120 MW to 500 MW in the Great Lakes.⁸⁶ This Project's feasibility study is addressing wind project siting and permitting issues and evaluating transmission and infrastructure limitations, consistent with a recommendation of the Governor's Renewable Energy Task Force.

Net Metering

Net metering allows customers with solar-PV, wind, or anaerobic digester systems to get credit for the electricity sent back into the electric grid from their DG systems when those systems are producing more power than the customers require. In essence, the electric meter is allowed to run backwards. New York's current net metering law covers systems located in investor-owned utility service territories allows for the participation of residential and non-residential customers. For residential net metering, the statute limits the system's size to 25 kW, while for non-residential net metering, the statute limits system size to

⁸³ LIPA. *Governor Paterson Announces Plans for State's Largest Solar Energy Project*. 2008. http://www.lipower.org/newscenter/pr/2008/042208_gov.html

⁸⁴ NYPA. *Request for Expressions of Interest to Support the Preparation of a Request for Proposals for a 100 MW Solar Power Initiative in New York State*. 2009.

⁸⁵ The Long Island-New York City Offshore Wind Project issued a Request for Information on June 30, 2009 and plans to issue an RFP toward the end of 2009. More information on this collaborative can be found at <http://www.linycoffshorewind.com/>

⁸⁶ NYPA. *NYPA President Kessel Calls for Proposals to Develop the First Fresh Water Wind Energy Initiative in the Nation*. 2009. <http://www.nypa.gov/press/2009/091201.htm>

the lesser of 2 MW or the customer's peak demand. Farm-based wind and anaerobic digestion systems are limited to 500 kW.⁸⁷

On Long Island, LIPA has a net metering policy that applies to solar-PV and wind. Residential systems are limited at 27.5 kW, non-residential systems with a demand less than 27.5 kW are limited to the lesser of 27.5 kW or 110 percent of peak demand, and non-residential systems with a demand greater than 27.5 kW are limited to the lesser of 2 MW or peak demand. Additionally, farm-based solar-PV systems are limited to 27.5 kW and wind systems are limited to 500 kW.⁸⁸

Non-Electric Renewable Incentives

Incentive programs aimed at non-electric renewables are currently being developed. For instance, the RGGI program's "all fuels, all sectors" approach targets solar thermal deployment.⁸⁹ One program being considered targets the residential sector and would provide incentives for the installation of solar thermal water heaters that replace fossil-fuel domestic hot water systems. Roll-out of this program could begin in early 2010.⁹⁰

A Geothermal Heat Pump Systems program has been authorized under the State's EEPS Program. A recent PSC Order allocated a total of \$2.3 million over three years in support of this NYSERDA-administered program.⁹¹ The program will provide incentives for installing systems for heating, cooling, and summer hot water heating. This program is also expected to be rolled out in early 2010.

⁸⁷ Chapter 355 of the Laws of 2009 expands New York's net metering law by adding residential micro-CHP systems to the list of currently eligible technologies that can be net metered.

⁸⁸ LIPA. *Tariff for Electric Service*. <http://www.lipower.org/pdfs/lipatariff.pdf>

⁸⁹ RGGI is the nation's first mandatory, market-based effort to reduce emissions of greenhouse gases over time. Under RGGI, New York, along with nine Northeastern and Mid-Atlantic states, has placed a cap on carbon dioxide (CO₂) emissions from electricity generators. CO₂ emission allowances are sold to fossil fuel generators in quarterly auctions. To the degree that the requirement to purchase CO₂ allowances increases the market clearing price for wholesale electricity, RGGI is expected to make renewable electric generation more competitive with fossil-fueled generation. Proceeds from the auctions will be used to fund programs that target greenhouse gas emissions reductions.

⁹⁰ More information on the RGGI program can be found at <http://www.nyserda.org/RGGI/>

⁹¹ PSC. *Case 08-E-1132: Petition of NYSERDA for Approval of an Energy Efficiency Portfolio Standard – Energy Efficiency Program, Order Approving Electric Energy Efficiency Programs with Modifications*. Issued June 24, 2009.

State Tax Credits

New York has a personal income tax credit for the residential use of bioheat (heating oil that contains biofuel).⁹² The tax credit is equivalent to \$0.01/gallon for each percent of biodiesel and is provided up to the first 20 percent of biodiesel that is blended with conventional fuel and thus the tax credit is capped at \$0.20/gallon. This tax credit encourages the use of biodiesel, which has no sulfur and burns cleaner and more efficiently than petroleum-based fuel. Since New York is the largest consumer of heating oil in the country, biodiesel could become an important in-state renewable resource, given that most biodiesel is soybean-based, and soybeans are a plentiful crop in New York (more than 5 million bushels are produced annually on about 144,000 acres).

Personal income tax credits are available for residential solar-PV, solar thermal, and proton exchange membrane fuel cell systems. This tax credit is equivalent to 25 percent for solar systems and 20 percent for fuel cells. The credit is capped at \$5,000 for the cost of solar systems and \$1,500 for the cost of fuel cells. New York exempts residential solar thermal and solar-PV systems from sales tax.⁹³ This includes both the purchase and installation costs. This exemption does not apply to solar thermal pool systems or other like applications.

3.1.3 Expanded State Renewable Policy Goal

When the PSC adopted the 25 percent RPS goal, New York's existing renewable generation (including net imports) was expected to account for 17.3 percent of forecasted demand in 2013. Thus, the incremental new renewable generation required to meet the 2013 goal represented 7.75 percent of forecasted demand. In 2008, the PSC adopted the EEPS, which set a goal to reduce electricity use by 15 percent below forecasted levels in 2015. As a result of this EEPS, a lower amount of new renewable generation (4.8 percent) is required to meet the 25 percent RPS goal.

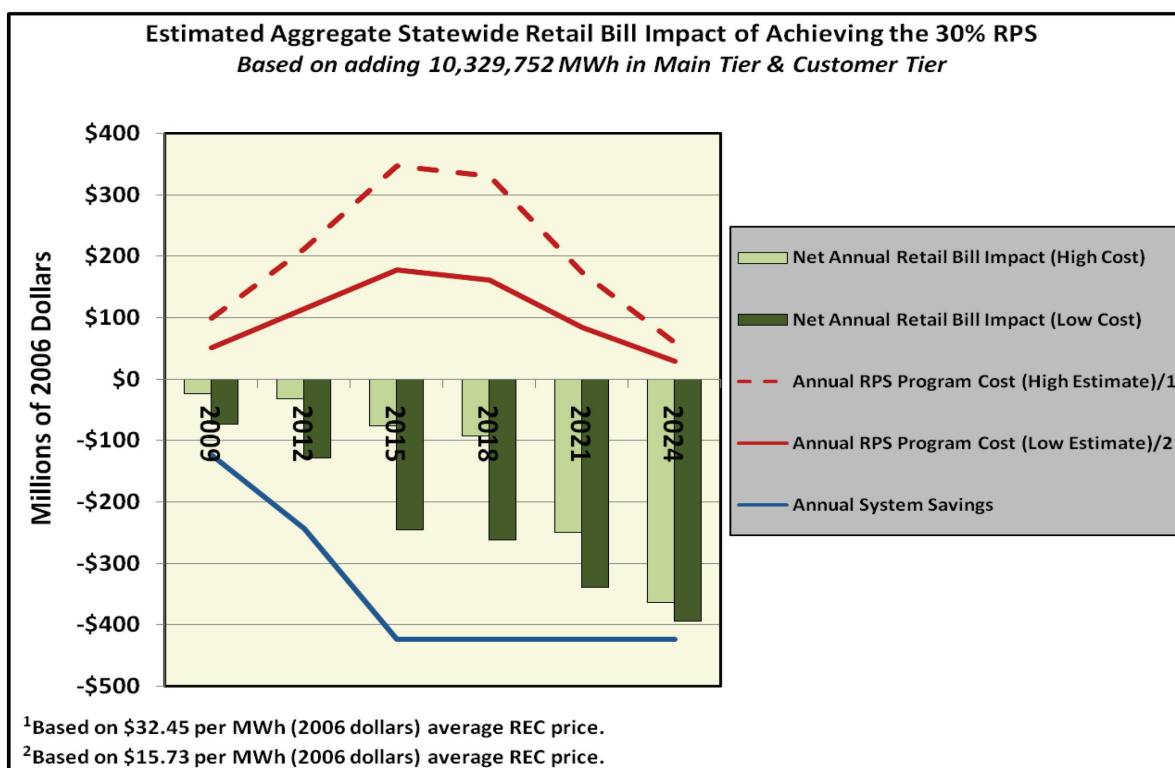
In his 2009 State of the State Address, Governor Paterson announced that he would pursue policies that would achieve a '45 by 15' clean energy goal. This will require an increase of the RPS policy goal to 30 percent by the year 2015 and full realization of the State's '15 by 15' efficiency goal. This raises the incremental RPS goal, excluding existing major hydroelectric resources, to 9.3 percent of the forecasted demand in 2015, nearly doubling the incremental RPS target. The PSC is currently reviewing the RPS funding level in light of achieving the new 30 percent goal.⁹⁴ A decision from the PSC may come as early as December 2009.

Electricity sector modeling indicates that achieving the goal of a 30 percent RPS is expected to reduce the net retail price of electricity paid by all ratepayers. In 2018, the average statewide retail price of electricity is projected to be 0.06 to 0.16 cents per kWh lower than it would otherwise be if the 30 percent RPS did not exist. Figure 8 indicates that this estimated reduction in net price per kWh is equivalent to aggregate annual bill savings to ratepayers of \$93 to \$262 million.

⁹² NY CLS Tax, Article 22 § 606 (mm).

⁹³ NY CLS Tax, Article 28 § 1115 (ee).

⁹⁴ PSC. *Case 03-E-0188, supra, Staff Mid Course Report*. Issued October 26, 2009. At the time of publication, the PSC had not rendered a decision on revising the program.

Figure 8. Estimated Aggregate Statewide Retail Bill Impact of Achieving 30 Percent RPS

Source: NYSERDA

The reduction in wholesale prices assumes the achievement of the ‘45 by 15’ policy initiative, which would require the addition of 10,329,752 MWh of Main Tier and Customer Tier renewable resource generation by 2015.⁹⁵ The majority of renewable resources that have been (and are expected to be) deployed under the Main Tier are wind plants. Given that these units have no fuel costs, they often bid their power into the NYISO’s electricity markets at or near zero dollars per MWh. Since New York’s competitive wholesale electricity market dispatches units from lowest to highest marginal costs, when wind units are generating power, they displace more expensive fossil fuel-fired units otherwise required at the time. As a result, adding renewable energy generation in-state has the effect of reducing the average wholesale price of electricity.

In addition to reducing the price of electricity, meeting the 30 percent target will result in both environmental and macroeconomic benefits. Direct macroeconomic benefits in the form of jobs in construction and operation of new facilities, payments to the State and localities, payments for fuel and land leases, and in-state purchase of materials and services, are projected to exceed \$6.0 billion over the 20-year life of the facilities. The indirect “ripple” effects of injecting the incremental expenditures and income into the State’s economy increase the total expected macroeconomic benefits to approximately \$12.5 billion.⁹⁶ Based on the projected reduction in electricity prices shown in Figure 8, benefit-cost ratios for meeting the 30 percent target are estimated to range from 3.6 to 4.0, if only environmental and price

⁹⁵ See Electricity Assessment: Modeling for detailed discussion of modeling structure, assumptions, and results.

⁹⁶ KEMA Inc (prepared for NYSERDA). *New York Main Tier RPS: Impact and Process Evaluation*. 2009.

reduction benefits are included; and to range from 4.9 to 5.3 if macroeconomic benefits are added to environmental and price reduction benefits.⁹⁷

3.1.4 Challenges and Recommendations

Expand and Improve the RPS to Meet the Governor's 30 Percent by 2015 Goal

The RPS Program is the primary mechanism for increasing renewable energy capacity in New York. By the end of 2009, it is likely that all of the currently allocated funding for the Program will be committed. Therefore, the first challenge to achieving the Governor's goal will be to extend funding authorization for new Main Tier solicitations. It is critical that the primary funding source for the State's program be replenished. New York's RPS Program needs to demonstrate a sustained commitment to renewable development. It must promote market certainty and must be designed to enable timely response to changing market conditions.

Additionally, market certainty and expansion of renewable market opportunity can be realized by providing a stable marketplace in which developers can sell RECs in the voluntary market, which, like other commodities, requires using modern technologies to track and account for transactions. Currently, New York has no such REC tracking system.

Electric transmission and distribution system upgrades or expansions will likely be needed to support continued large-scale renewable development of various technologies. For large-scale wind energy development, there exists large undeveloped wind resources in some parts of the State, but insufficient bulk transmission⁹⁸ system capacity exists to move all the energy output throughout the State. This potential "bottlenecking" of renewable resources could thwart steady progress towards the State's renewable energy goals and the attendant benefits. Further, in certain instances the operation of one renewable energy facility may displace output from other renewable energy facilities when both facilities need "space" on the same transmission lines. On a local level, installation of large solar projects within particular local electric networks may require upgrades to help ensure that power surges or other reliability concerns are not created as a result. See Chapter 4 for further discussion and recommendations on infrastructure needs.

As noted above, the vast majority of large-scale renewable projects participating in the RPS Program to date are wind projects, most of which are located in northern and western New York where wind resources are greatest. While these projects are providing benefits to the State and helping meet the RPS goal, they are located far from the major load areas of the State, which are also areas of the State in non-attainment of federal air quality standards. As such, it would be advantageous to target efforts to develop resources closer to or in these areas. Examples of such targeted efforts include development of offshore wind resources, which can readily provide electric energy to the New York City and Long Island population centers, and the continued research and ultimate market development of tidal, current and other hydrokinetic resources. As with "conventional" renewable energy development, ensuring the appropriate transmission line interconnections to bring such marine-based energy onshore will become an essential component of such development. In addition to these large-scale renewable projects, a targeted

⁹⁷ PSC. *Case 03-E-1088, Proceeding on Motion of the Commission Regarding a Retail Renewable Portfolio Standard Policy, Comments of the New York State Energy Research and Development Authority: State Administrative Procedures Act (SAPA) 03-E-0188SP22*. Submitted November 23, 2009.

⁹⁸ Bulk transmission is a functional or voltage classification relating to the higher voltage portion of the transmission system.

deployment program for solar-DG technologies downstate could help to alleviate some of the concerns with geographical distribution of RPS Program resources.

The current RPS Program has provided good value for the investment to date, both in the cost-effectiveness of the Main Tier Program and the ability to provide diversity of investment – with the attendant market development benefits – in the Customer-Sited Tier. As noted above, the Plan’s modeling has shown that achieving the 30 percent goal will result in a net reduction in wholesale electricity prices, and will provide substantial benefits to the State in avoided air emissions and transitioning to a lower-carbon energy system. Additionally, continuation of the RPS has been recommended in both the Governor’s Renewable Energy Task Force Report and the RPS Program Evaluation Report.

Recommendations

- Encourage in-state renewable energy development through the RPS.
 - Expand the RPS Program to adopt the Governor’s goal to meet 30 percent of the State’s electricity needs with renewable resources by 2015, taking into consideration the voluntary market and other renewable energy initiatives of the State’s energy authorities and agencies.
 - Enhance certainty in the renewable energy market by scheduling regular solicitations for Main Tier procurements. Consider more flexible solicitation schedules, other than the standard 10-year contracts, to accommodate changing market conditions.
 - Create a tracking and trading system for RECs to foster development of a robust voluntary market for REC purchases and to help ensure integrity in measuring compliance with the RPS.
 - Continue to provide RPS incentives for environmentally beneficial, renewable DG resources, including CHP, with specific targets determined by the PSC, funded through the Customer-Sited Tier and identify opportunities for targeted DG deployment that may serve to reduce the need for peaking power plants in load pockets.
 - Examine the transmission system to identify and evaluate bulk transmission system upgrades or expansions needed to allow for reliable delivery of the energy output from renewable energy systems.

Complement the RPS Program with Bilateral Contracts

While much progress has been made toward the existing RPS goal, additional mechanisms for attracting in-state renewable energy development can be further utilized. For instance, PPAs could be enhanced to continue progress in achieving renewable energy goals, while working to minimize ratepayer impacts.

Recommendations

- Encourage the State’s power authorities to procure diverse renewable electricity resource development, including solar, onshore and offshore wind, hydrokinetic and sustainably managed biomass.
 - NYPA and LIPA will report on the status of renewable energy projects in progress.

- NYPA and LIPA will report on the total energy production capacity provided by renewable energy initiative projects including the electric capacity installed using renewable energy and purchased attributes by NYPA or on behalf of customers.
- Investigate options for cost recovery mechanisms for renewable energy projects that minimize ratepayer impacts.
- LIPA and NYPA will pursue development of large-scale solar projects as expeditiously as possible. Based on the experience of these initiatives, LIPA and NYPA should consider achievable targets for subsequent PPAs.
- LIPA will develop a Renewable Resource Center as part of the Smart Grid Corridor with smart meters installations for residential, commercial, and industrial customers.
- Encourage LIPA and NYPA to continue with issuing an RFP for the private development of offshore wind resources (in the waters off of Long Island and in the Great Lakes) in a manner protective of natural resources.
 - Provide annual reports on the status of offshore wind projects.
 - Provide financial and technical support through other available State and federal resources.
 - NYPA will complete the Request for Proposal process for offshore wind projects in the Great Lakes.
 - The Long Island-New York City Offshore Wind Collaborative will issue a Request for Proposal for development of an offshore wind facility off the Rockaway Peninsula.

Facilitate the Deployment of Distributed Renewables

A number of policy approaches have been adopted in New York to overcome the cost, technical, and regulatory challenges associated with deploying renewable resources. Some of the approaches are not fully accomplishing their intended purpose and can be improved. For instance, net metering provides an incentive to end-users to install solar-PV, anaerobic digesters, and wind energy systems. However, the peak demand limit on non-residential installations is presenting a new set of challenges. First, not all non-residential customers have a demand meter, making it difficult to determine the customer's peak demand. This has led to disagreements between customers and utilities over determinations of peak demand and thus the size of eligible systems that can be net metered. Second, depending on a customer's load profile, a system limited by their peak demand could result in a system that is insufficient to meet the customer's full energy requirements. Additionally, the PSC has standard interconnection requirements that are intended to guide the interconnection of renewable systems to the grid. However, the interconnection requirements provide some level of discretion to the utilities, which reportedly have created challenges to deployment of distributed resources.

There are numerous public buildings in the State that could be host sites for distributed renewable systems. The State Asset Maximization Commission identified these sites as an opportunity for a public-

private partnership to increase deployment of distributed renewables and reduce energy costs at State facilities, and/or potentially present opportunities for lease revenue to the State.⁹⁹

Recommendations

- Facilitate the interconnection of DG resources to the electric grid.
 - Amend the net metering law to provide greater flexibility to non-residential customers to size systems to meet a greater percentage of their energy requirements, while ensuring that system reliability is not negatively impacted.
 - Examine the protocols used by the NYISO and utilities for connecting DG sources to the grid to assure fairness and efficiency.
- Assess the potential for siting renewable energy projects, including wind, solar, geothermal, hydrokinetic and hydropower on those State-owned lands and waterways where such development would not require a constitutional amendment.
 - Inventory and analyze opportunities for renewable energy development on State-owned lands and waterways.
 - Develop a process for installing renewable energy technologies on State facilities, particularly those that are energy intensive, and have open space and/or compatible roofing. Renewable energy deployment in State Parks should be limited to appropriately scaled installations that are compatible with maintaining natural, historic, and recreational resources.

Target the Deployment of Non-Electric Generating Resources

The State's financial incentive programs have predominantly focused on the development and deployment of renewable technologies that generate electricity. While the electric generation sector accounts for the majority (40 percent) of primary energy consumption in the State, it is also critical to support the non-electric primary energy sectors. The transportation sector accounts for approximately 40 percent of New York's CO₂ emissions. To date, most of the financial incentives and regulatory programs affecting this sector have been at the federal level. This has resulted in an unsteady stream of funding for clean transportation initiatives and has resulted in most of the biomass feedstock for in-state biofuels production being supplied from out-of-state. A New York-specific strategy could help target incentives for the preferred feedstocks that provide New York with the most environmental and economic benefits.

Today the transportation sector relies heavily on petroleum, but technological advances will facilitate a shift away from this dependency through improved efficiency and the use of renewable fuels. Hybrid technologies have already greatly improved the fuel economy of vehicles, and the next stage of hybrid technology – PHEVs – show tremendous promise. PHEVs, which use batteries that can be recharged via electricity from the grid, provide greater fuel economy – often greater than 100 miles per gallon – and could therefore dramatically reduce fuel use and emissions from vehicles. If coupled with Smart Grid

⁹⁹ New York State Commission of State Asset Maximization, *Final Report*. June 2009.
http://nysamcommission.org/pdf/SAM_FINAL_REPORT.pdf

technologies, PHEVs can also be integrated with the electricity grid and “called on” when plugged in to provide power back to the grid if necessary. Currently, PHEV technology is still developing and wide-scale deployment is not expected over the early years of the planning horizon. However, government actions, including research and development support and government purchases, can increase deployment. For example, in LIPA’s proposed 2010 budget, there is funding allocated for incentives for the purchase of PHEVs. Hybrid technologies coupled with the use of renewable fuels would provide even greater environmental benefits.

Building upon existing facilities and vehicles, the public sector fleets offer an opportunity to be "test-beds" for alternative fuels and vehicle technologies. Due to the myriad operating conditions public fleets experience, alternative fuel technologies can be tested under a wide range of weather and other conditions. These fleets also provide markets for potential "niche" fuels and technologies. This could include continuation and expansion of New York's leadership role in compressed natural gas vehicles (both light duty and heavy duty), as well as expanding the use of biofuels and electric vehicle technologies. New York can work with other states and with transportation and energy associations to influence vehicle manufacturers to produce alternative fuel vehicles of all types (light duty and heavy duty). Having a variety of vehicle types to meet their needs will allow public and private sector fleets to expand their use of these vehicles

Technologies such as solar thermal and geothermal heat pumps can significantly reduce fossil fuel energy use in buildings. Given the State’s heavy reliance on oil for space heating and hot water, these technologies have the potential to drastically reduce CO₂ emissions and other pollutant emissions from the buildings sector. While these technologies are relatively mature and have been deployed widely in other parts of the world, penetration has not occurred on a wide scale in New York. In addition to the financial incentives, greater deployment of these technologies will require increased public awareness and a trained workforce (workforce needs and recommendations are identified in Chapter 5).

Recommendations

- Increase use of alternative fuels.
 - Determine the optimal fuel(s) for a substantial replacement of petroleum, considering environmental, economic and energy benefits.
 - Provide financial incentives for alternative fuel infrastructure development.
 - Encourage public and private fleets to purchase alternative fuel vehicles through incentives and mandates.
 - Educate end users on the economic and environmental benefits of alternative fuels.
 - Work with New York Congressional Delegation and transportation organizations to support federal and State tax incentives for fleet and private individual alternative fuel vehicle purchases, including infrastructure development.
 - Where practicable, adopt a regional low carbon fuel standard.
- Support bioenergy production from sustainably managed feedstocks.
 - Complete the Biofuels Roadmap.

- Analyze bioenergy options and identify strategies for promoting the most sustainable/highest value use of biomass as part of the Climate Action Plan.
 - Establish a wood boiler change out program to remove the high emitting and poor performing systems from the marketplace.
 - Develop regional performance standards to accelerate the market introduction of new high-performance bioheating systems.
 - Work with U.S. Environmental Protection Agency (EPA) and DOE to develop ENERGY STAR standards for the top tier of high-performance bioheating systems for residential and commercial applications.
 - Provide financial and technical support to accelerate the market introduction of the top tier of bioheating systems - consistent with ENERGY STAR standards developed with EPA and DOE.
 - Work with New York manufacturers to develop their capacity to deliver high performance bioheating systems.
 - Provide training to ensure that New York State has a skilled workforce to deliver services and products.
- Extend the tax credit for bioheat beyond the current expiration date of 2011.
 - Expand funding and implementation support for environmentally beneficial distributed energy resources (DER). Technical and financial support for DER should include solar thermal, geothermal heat pumps, and other resources that are economical and result in energy and cost reductions, improved energy security and reliability, and reductions in air emissions. Furthermore, the State should design programs to increase public awareness of the benefits of using DER.
 - Evaluate and provide appropriate funding mechanisms for existing renewable technologies.
 - Ensure funding of next generation technology development and infrastructure.

3.2 Natural Gas

3.2.1 In-State Potential and Development Progress

With the emerging recognition of the Marcellus Shale natural gas potential, there is a renewed interest in natural gas development in-state. At this time, in-state natural gas production from about 6,700 active natural gas wells supplies about five percent of the State's requirements. The Marcellus Shale gas formation extends northeast from West Virginia, through Pennsylvania to southwestern New York, and holds great promise for future development. The Marcellus Shale's total gas in place is conservatively estimated to be approximately 168 trillion cubic feet, but the figure might be as high as 516 trillion cubic

feet.¹⁰⁰ New York's portion of total recoverable gas remains unknown; however, the State's natural gas production is expected to increase significantly over the forecast period due largely to the projected production from the Marcellus Shale formation. The State's natural gas production is expected to more than double from 55 billion cubic feet in 2007 to about 146 billion cubic feet, representing about 11 percent of the State's natural gas requirements by 2020. Although the addition of Marcellus Shale production is expected to result in a significant increase in New York production over the planning period, the natural gas model reflects a conservative Marcellus Shale natural gas production level to account for potential permitting and production difficulties related to horizontal drilling and hydraulic fracturing. If these difficulties are minimized, Marcellus production levels could potentially be much higher.

This resource presents an opportunity for the State to unlock substantial economic value while helping to achieve several of the Energy Plan's key energy policy objectives. Increased supplies of natural gas in combination with natural gas efficiency programs will place downward pressure on natural gas prices, thereby potentially lowering the cost of energy for New Yorkers. In addition, by including local supplies of natural gas, risk of supply disruptions can be reduced, thereby improving system reliability as well as augmenting the State's energy security. Further, New York-based natural gas extraction would create jobs, create wealth for upstate landowners, and increase State revenue from taxes and leases and royalties. Development of State-owned lands could provide much needed revenue relief to the State and spur economic development and job creation in economically depressed regions of the State. In pursuing this economic development opportunity, however, the State should first examine the development of mineral rights only for properties owned by the State which are located outside the Adirondack and Catskill Forest Preserves and State parklands under the jurisdiction of the Office of Parks, Recreation and Historic Preservation.

For development of the Marcellus Shale, horizontal well completions combined with hydraulic fracturing are likely to provide the best means for producing economic volumes of natural gas. While neither horizontal drilling nor hydraulic fracturing is new to natural gas development in New York, there are environmental concerns with respect to the effects of fracturing on water supplies, and disposal and contamination issues related to the chemical composition of the fluids used in the fracturing process. Additional concerns regarding drilling in the Marcellus Shale focus on the potential local impacts to communities, including increased truck traffic, noise, aesthetics, and impact on quality of life. DEC regulations govern the well permitting, drilling operations, and well site restoration when drilling is completed. To assess the potential environmental concerns related to the development of the Marcellus Shale formation in New York, DEC is reviewing horizontal drilling and hydraulic fracturing in the context of a Supplemental Generic Environmental Impact Statement (SGEIS). A draft SGEIS was released by DEC in September 2009 that proposes a number of safety measures, protection standards, and permits for drilling activities.¹⁰¹ The public comment period on the draft SGEIS is open through December 31, 2009.

¹⁰⁰ Geologists estimate that the entire Marcellus Shale formation contains between 168 and 516 Tcf of natural gas reserves and that roughly 10 percent of those reserves are economically recoverable. DEC. *Marcellus Shale—Gas Well Drilling in the Marcellus Shale*. 2009. <http://www.dec.ny.gov/energy/46288.html>

¹⁰¹ DEC. *Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas and Solution Mining Regulatory Program*. 2009. <http://www.dec.ny.gov/energy/58440.html>

3.2.2 Challenges and Recommendations

The extraction of projected economically recoverable reserves from the Marcellus Shale presents a unique challenge with regard to the construction of the pipeline facilities necessary to bring the produced gas to market. In the course of developing a conventional source of natural gas, a company would drill a well and only if that well is successful, would it submit an Article VII application to construct the associated pipeline. The technique used to tap into the Marcellus Shale may require that the gas be produced immediately once the well has been fractured and completed or the well may seal and cease to be productive. The Marcellus Shale formation has a high concentration of clay which makes it susceptible to re-closing if the gas does not flow immediately. As a result, some producers contend that the pipeline must be certified, built, and ready to accept gas before knowing for certain that the well will be a success. The existing process for siting gas pipelines under Article VII of the PSL would likely accommodate this need.

Recommendation

- Support private interest and investment in drilling in the Marcellus Shale natural gas reserves and natural gas pipeline expansions to improve supply and deliverability of natural gas to markets in New York in an environmentally acceptable manner.
 - Establish final DEC regulatory requirements for drilling and pipeline construction.
 - Coordinate regulatory requirements for drilling and pipeline expansions.
 - Study private investment in extracting natural gas in the Marcellus Shale on State-owned lands outside of the Adirondack and Catskill Forest Preserves and State parklands under the jurisdiction of the Office of Parks, Recreation and Historic Preservation.

4 Invest in Energy and Transportation Infrastructure

New York's massive energy and transportation infrastructure is in constant need of maintenance and repair to keep the State from backsliding on its high standards of infrastructure reliability. Infrastructure investments are also necessary to support the State's transition to a clean energy economy and will be driven by strategic longer-term needs, including the need to reduce GHG emissions. The key will be to guide infrastructure investment in a manner that is responsive to both environmental concerns and the economic welfare of the State's residents and businesses while preserving efficient markets.

In the case of electricity infrastructure, the State's delivery systems may be able to take advantage of cost-effective Smart Grid technology to increase system efficiency and prepare the State for the deployment of advanced appliances and electric vehicles. Transmission upgrades may also allow for fully exploiting the potential benefits of upstate wind resources, additional Canadian electricity imports, and new nuclear capacity, all of which can help meet the multiple policy objectives of the Plan. Electricity system investments will be developed and viewed within the context of the need to reduce local impact on host communities, especially potential environmental justice areas.

In the case of natural gas, enhancing pipeline delivery capacity in the downstate area would allow for conversions or repowering of power plants from oil to cleaner burning natural gas, while also meeting core gas demand needs. In the case of transportation, ongoing investments are necessary to maintain the system in good working order, and additional investments can be used strategically to reduce vehicle congestion, expand mass transit and encourage more efficient transportation systems.

4.1 Infrastructure Investment and Climate Change

While New York is making solid progress toward reducing its GHG emissions,¹⁰² and has identified specific strategies to reduce GHG emissions over the planning horizon, additional measures will be required to reduce GHG emissions by 80 percent below 1990 levels by 2050. These measures will be identified in a Climate Action Plan that will be developed pursuant to Executive Order 24. Achieving such a reduction in GHG emissions will require fundamentally transforming how we obtain and use energy, not only in the electric generation sector, but also in transportation, buildings and industry. Infrastructure investments that are made over the next 10 years will last well beyond the planning horizon, and therefore decision makers should be mindful of how such investments will impact the State's future ability to achieve GHG emission reductions.

¹⁰² New York State has taken aggressive actions to reduce CO₂ emissions. These actions, which are on-going, include adopting and funding energy efficiency and renewable energy goals; participating in the RGGI CO₂ cap and trade program; collaborating in the development of a regional low carbon fuel standard with neighboring states; promoting alternative vehicle fuels and vehicle demonstrations; developing ways to incorporate GHG emissions mitigation into SEQRA evaluations; supporting smart growth and climate smart communities development; and supporting demonstration of a carbon capture and sequestration coal-fired electricity generating project in Jamestown, New York.

For any long-term GHG reduction plan that uses low carbon electricity as a key energy carrier, it is likely that New York’s existing electricity infrastructure (generation fleet, distribution network, high voltage transmission lines, and substations) will not be fully adequate. Beginning the design and construction of the electrical system of the future now will allow for economical and efficient upgrades and additions without negatively impacting reliability.

Many transportation experts consider electricity to be the most viable low carbon fuel for light duty vehicles in the near-term. Expanding electrification of the transportation sector will help achieve GHG reduction goals by transitioning demand from high carbon-intensity liquid fuels, such as gasoline, to electricity generated from low-carbon-intensity energy sources such as hydro, wind, solar-PV or nuclear power. Electricity produced from low carbon energy sources can power vehicle batteries or light rail. New York can continue advancing this transition by promoting research and development to achieve technological breakthroughs for hybrid electric battery technology and energy storage technologies – as the State is doing with the NY BEST Consortium – along with demonstrations to support infrastructure development.

Infrastructure investments over the planning horizon also need to consider the impacts of climate change, especially from sea level rise. Energy infrastructure at risk from higher sea levels includes electric generating and natural gas facilities, and electric and gas transmission and distribution wires and pipes. In addition to the direct effects of inundation or flooding, sea water contains salt, which can corrode equipment and undermine the strength of infrastructure. Inundation of power plants can result in total loss of service capacity for an area. Flood-induced outages to one centralized facility or primary cable path can result in total loss of service over an entire area and can lead to coincident “cascade-effect” outages to other facilities. Frequent flooding of electric and gas transmission and distribution wires and pipes can accelerate their deterioration, causing more frequent and longer lasting outages with extended repair times. As areas affected by storm surge expand, outage risks increase for those facilities that were not designed to withstand such events or adequately located to avoid such damaging events. Flooding can also impair access to underground gas and electric lines and equipment. These potential risks highlight the importance of utilities implementing Smart Grid technologies to identify system vulnerabilities.

Within the time horizon of this Plan, the State Sea Level Rise Task Force and the New York City Climate Change Adaptation Task Force will examine the needs and costs associated with implementing adaptive and protective measures to address the impending sea-level rise on the energy system’s major components.

Recommendation

- Identify steps to mitigate and adapt to the impacts of climate change.
 - Develop a Climate Action Plan in accordance with Executive Order 24. The Climate Action Plan will identify additional strategies and actions, including likely major infrastructure investments, as well as the benefits and costs of each, consistent with a long-term GHG reduction goal of 80 percent below 1990 levels by 2050. It should also identify appropriate mid-term targets.

4.2 Electricity

The NYISO's *2009 Comprehensive Reliability Plan* concluded that currently proposed market-based solutions, together with implementation of planned upgrades to the bulk transmission system, would meet system reliability requirements through 2018. This means that markets and expected prices appear to be sufficient at this time to provide for generation and transmission resources to maintain reliability on a statewide basis throughout the Plan's 10-year planning horizon. The market's locational prices have provided transparent price signals, which in a competitive environment have induced investment in newer and more efficient generation, as well as new transmission and demand response resources, in the locations where the resources are most valued.

The NYISO's conclusion that no generation or new transmission is required over the planning horizon is based on a load forecast that assumes that only 27 percent of the load reductions envisioned by the State's '15 by 15' program are achieved and most of the existing resource base remains in place. Full and timely achievement of the '15 by 15' goal will likely push the reliability need date for new electric generation and transmission even further out in time, and thus underscores the importance of fully achieving the efficiency targets. However, the retirement of the existing resource base to comply with environmental regulations and GHG emission-reduction targets, among other factors, could move the reliability need date earlier. The need to replace aging infrastructure, implement Smart Grid technologies, and reduce GHG and other air emissions will require a measured approach regarding infrastructure investment over the planning horizon due to the upward pressure these combined programs would place on the cost of electric service.

4.2.1 Electricity Generation

The State has a diverse mix of electricity generation sources, including coal, nuclear, hydropower, oil, gas and renewables. Statewide, fuel diversity safeguards against fuel supply disruptions and other factors which could pose reliability risks and/or cause significantly increased price levels and volatility. It is important to continue safe operation of nuclear, coal, natural gas, oil, and hydroelectric generation resources in ways that support the State's energy, environmental and economic objectives. Over the planning horizon, there are a number of electricity generation infrastructure issues that will need to be addressed, including: (1) improving the power plant siting process to facilitate the deployment of renewable and other necessary resources, (2) reducing the climate impacts of coal, and (3) encouraging the repowering of existing facilities to improve the efficiency of the electricity system.

Market-based electricity prices have attracted new merchant generation infrastructure, primarily natural gas-fired combined-cycle plants, as well as imports from neighboring regions with surplus capacity. Since 2000, over 7,600 MW of generation has been added in New York. Most of the generation infrastructure added upstate (about 3,800 MW, primarily the Athens and Bethlehem natural gas facilities and wind facilities) are merchant plants that rely on market-based revenue streams, though wind facilities also rely on RPS contracts and federal tax credits. Most of the plants added downstate (about 3,800 MW), however, have been added by NYPA or are supported by long-term contracts with Con Edison, NYPA or LIPA.

In recent years, the market has responded to environmental regulations with significant new natural gas power generation development, particularly downstate in load pockets where there are few alternatives to meeting both demand and environmental requirements. In these areas (New York City and Long Island), many of these plants have dual fuel generation capability that allows oil to be used as a back-up fuel in the event of natural gas supply disruptions or sudden price increases. Oil combustion causes higher emissions than gas and should be limited (air permits for these plants limit the number of hours of oil

combustion), but the continued availability of these dual fuel units plays an important role in maintaining system reliability.

Power Plant Siting

It is anticipated that there will be power plant proposals by merchant generators over the planning horizon. The majority of these proposals are expected from wind developers in response to RPS solicitations and developers advancing repowering proposals. Experience has shown that the siting process for wind, as well as other generation, is left to a patchwork of local and State regulatory processes. This creates an uncertain siting process that can cause undue delay, project uncertainty, and ultimately could put New York at a disadvantage compared to other states that are competing for renewable energy investment.

The current process used to authorize the siting, construction and operation of electric generating facilities is a combination of the local land use regulatory process and State agency environmental permits processes, with an overlay of the procedures of the SEQRA. Although these processes have been utilized recently to successfully site over 1,000 MW of wind facilities and 325 MW of gas-fired generation, with another 3,000 MW of wind projects and another 1,100 MW of natural gas-fired generation currently undergoing review, there are various public and private interests that the SEQRA process and existing State and local laws do not address.

A primary interest of the State is to help ensure an efficient and timely review process for siting needed electric generation facilities that incorporates support for public participation. While the SEQRA overlay ensures that State and local decisions affecting the environment will minimize any adverse impacts associated with electric generating facilities and provides for public participation, it does not establish a decision-making schedule or provide for intervenor funding. The concern for complying with multiple State and local requirements, addressing environmental issues, and supplying intervenor funding, could be consolidated into a single proceeding before a State body, similar to the authority provided to the Siting Board in the former Article X (which expired in January 2003). This could also include a requirement that a decision be rendered within a specified period.

Although several different bills have been introduced in the State Legislature to reauthorize a comprehensive electric generating facility siting process, the key terms have not been agreed upon. The main points of disagreement revolve around the types and sizes of facilities to which the law would apply, the amount and acceptable uses of intervenor funding, and the obligation to consider environmental justice issues, and the obligation to conduct an assessment of cumulative impacts. While these issues should be resolved among interested stakeholders, the following key provisions should be included in comprehensive electric generation siting law: a one-stop siting process that combines State and local authorizations into a single approval; a time-certain framework for rendering a decision on an application; authorization to override the application of unreasonably restrictive local laws; opportunities for extensive public input; and the availability of intervenor funding for expert witnesses and consultants.

Recommendation

- Improve the siting process for generators.
 - Develop a fuel neutral power plant siting law that provides greater market certainty to developers and investors and enhances public participation with sufficient intervenor funding made available to local communities, including improved notice provisions, and addressing environmental justice issues.

Long-Term Viability of Coal

The United States relies on coal for half of its electricity needs, and New York has a significant percentage of coal in its electricity generation mix, adding to fuel diversity. Moreover, the use of coal is increasing in the developing world. It has been reported earlier this decade that China was bringing on line a coal plant every week.¹⁰³ As coal is the most carbon-intensive fossil fuel, technologies are being developed to capture and permanently store CO₂ emissions from coal plants in deep geologic formations. Carbon capture and sequestration (CCS) technology is being supported at the federal and state levels, and could be an essential component of any long-term GHG reduction strategy for the United States and the rest of the world. New York is supporting the development and demonstration of CCS by providing geologic research assistance and financial support for a proposed demonstration project in Jamestown.

The successful demonstration of CCS in New York as an operationally and economically viable means to mitigate coal generation GHG impacts may allow New York to retain coal in its generation mix in a way that is consistent with GHG reduction goals. But, perhaps more importantly, the successful demonstration of CCS could, if deployed widely, substantially mitigate climate impacts from the use of coal and other carbon-intensive fuels in the developing world.

Existing law does not directly address the siting or regulation of a CCS reservoir or captured carbon pipeline. However, there is existing law that can serve as a model for CCS siting and regulation. Article VII of the PSL, which governs the siting of new electric and gas utility transmission facilities, and provides the PSC with exclusive authority to site such facilities, can be amended to expressly include CO₂ pipelines. Article 23 of the Environmental Conservation Law authorizes the regulation by DEC of oil and gas wells and the underground storage of natural gas. The law governs the drilling of wells, the process by which developers must obtain permission from surface landowners, and the injection and storage of gas. Injection of CO₂ into geologic formations is similar to the process for injecting natural gas for storage, except that CO₂ will be stored permanently underground. In 2009, Governor Paterson submitted a bill to the legislature to provide the statutory framework for siting and regulating a CCS demonstration project that is modeled after Article 23 and amends PSL Article VII accordingly.

Recommendation

- Facilitate demonstration of CCS technology.
 - Develop legislation that addresses CO₂ pipeline siting and CO₂ injection to facilitate the demonstration of CCS technology.

Nuclear Power

Nuclear power plays a significant role in meeting New York's energy needs. Nuclear capacity – sited, built and operated appropriately – supports key State interests. The Plan's modeling results demonstrate that increasing the State's nuclear capacity will benefit the State by lowering both wholesale prices and GHG and other emissions, and it therefore may play an integral role in the State's efforts to address climate change. Despite these benefits, there are concerns over the disposal of waste from nuclear facilities. Though a federal repository sited at Yucca Mountain in Nevada has been proposed to the Nuclear Regulatory Commission by DOE, until this site is approved and constructed, reactor sites must

¹⁰³ Massachusetts Institute of Technology. *The Future of Coal – Options for a Carbon Constrained World*. 2007. <http://web.mit.edu/coal/>

hold their own spent fuel on site. Care must be taken to help ensure that this spent fuel is securely held and any potential for harm to public health or the environment is minimized.¹⁰⁴ Going forward, nuclear power generation should be encouraged within New York where safety, security, and environmental conditions favor its deployment and operation, and retained where it can be demonstrated that the safety and security of its operation can be maintained and its adverse environmental impacts minimized.

At the same time, the State recognizes that there are safety, security and environmental impact concerns related to the two active reactors at Indian Point, located along the Hudson River in northern Westchester County. New York is opposing the license renewals of Indian Point Units 2 and 3, whose current 40-year license terms are set to expire in 2013 and 2015, respectively, due to significant safety and environmental impacts associated with their operation.¹⁰⁵ These concerns include the adequacy of the evacuation plan in the event of a sudden, fast moving radiological event in an area of high population density; the risk of a terrorist attack on the spent fuel pools, which are located in buildings adjacent to the containment structures; the impact of earthquakes on the integrity of the facility, the possibility of which are better analyzed with more modern geological methods than existed when the plants were first licensed; and the impact on aquatic life from the use of 2.5 billion gallons of Hudson River water each day which is used to cool the facility and then discharged back into the Hudson River at higher temperatures. These issues must be fully evaluated and addressed in order to protect the health and safety of the communities surrounding the plant.

From a reliability perspective, Indian Point currently provides voltage support and system capacity to help ensure there is sufficient energy to supply demand in the downstate load pocket. With the issuance of this Plan, the State has begun to identify the potential impacts associated with the possible closure of Indian Point and the infrastructure needs that would be necessary to maintain system reliability standards in that event. As discussed in more detail in the Energy Infrastructure Issue Brief, modeling indicates that the retirement of the Indian Point units may present tradeoffs, including higher electricity prices and CO₂ emissions, and that achieving the State's '15 by 15' energy efficiency target reduces, but does not eliminate, the need for replacement infrastructure in the vicinity of Indian Point. As assumed in the modeling, if '15 by 15' is achieved, one possible replacement option under these circumstances would be a 700 MW combined cycle, gas-fired generating plant connected directly to the Buchanan 345 kilovolt substation. Under the Starting Point case (which assumes only 27 percent of the '15 by 15' energy efficiency target is achieved) modeling shows a need for 1,800 MW of replacement power in the vicinity of Indian Point to maintain reliability. It is unclear, however, whether new natural gas pipeline capacity would be needed for such a facility. In addition, further study may be necessary to quantify the potential impacts of closing Indian Point on: (1) the ability to transfer power to downstate load areas; (2) the transfer capability of the transmission system into the area; (3) reactive power resources in the lower Hudson Valley; and (4) overall system reliability.

Under the relicensing schedule for the Indian Point units, it is anticipated that the earliest a decision could be made is the Spring of 2010, although this time frame could be significantly extended. If Indian Point is not relicensed, then the NYISO, the PSC, and involved utilities will need to engage in a process to develop various scenarios for replacement generation as well as associated transmission and pipeline infrastructure needs.

¹⁰⁴ The DOE Secretary of Energy, Dr. Chu, has noted that there may be alternatives to this national repository. However, at this time, DOS has not withdrawn its application from Nuclear Regulatory Commission.

¹⁰⁵ On December 3, 2007, the New York State Department of Environmental Conservation and Attorney General Andrew Cuomo filed a petition with the Nuclear Regulatory Commission that opposed relicensing. The petition is available at http://www.oag.state.ny.us/media_center/2007/dec/brief.pdf.

Repowering

Repowering of existing power plants under the right circumstances can provide environmental and economic benefits. For example, NRG has proposed repowering of its Astoria facility in New York City and has estimated that the repowering would result in a reduction of annual on-site air emissions of over 75 percent for NO_x and CO and over 50 percent for particulate matter, while simultaneously increasing power output by over 70 percent. In addition, NRG estimates that the repowering would displace 1 million tons of CO₂ emissions annually. An effective siting law may help facilitate the construction of new or repowered generating units where they are economically warranted.

Recommendation

- Support the use of repowering and replacement of existing units with new facilities when such actions can be justified by their reliability, economic and environmental benefits.
 - Encourage and facilitate the repowering and replacement of existing electric generation to increase efficiency and reduce overall actual emissions and environmental impacts, particularly in potential environmental justice communities.

4.2.2 Electricity Transmission and Distribution

The State's investor owned electric utilities currently have net investment plans of over \$20 billion. The majority of this investment represents the transmission and distribution system. While the current investment is very large, longer run considerations indicate that much greater investments are needed in the future.

The Replacement and Expansion of Existing Transmission and Distribution Infrastructure

Because New York's electric infrastructure is old, significant capital investments will need to be made in the utilities' electric transmission and distribution systems to meet future electric demand and allow them to continue to provide reliable service. Replacement and improvement of existing aging infrastructure are critical, as system failures not only raise safety and reliability concerns but can also lead to increased system congestion and therefore higher emissions and costs. While these incremental investments will put upward pressure on rates, the PSC will also need to consider whether it is more effective and efficient in some cases to make investments in solar-PV or other customer-driven resources to address localized reliability issues. For New York City in particular, this should include an assessment of its uniquely designed distribution system to evaluate options for allowing the development of clean renewable, customer-driven resources in a manner that maintains reliability. The development of such clean energy in New York City is particularly beneficial given the size of its overall load and ongoing air quality issues.

In total, the investor-owned utilities project that infrastructure investment for the entire State could be over \$13 billion for the next five years (2009 through 2013) as compared with about \$8.5 billion over the prior five years (2004 through 2008). This level of capital expenditures over the next five years will put significant upward pressure on rates. There is, therefore, a strong need for the PSC to carefully scrutinize the capital expenditure plans of the investor-owned utilities and a strong need to balance the potential benefits of any new State policies and actions against their aggregate impact on the State and its ratepayers.

Major additions to the State's transmission system, while not called for to meet reliability needs, may be driven by several factors, including the expected net economic benefits in the form of lower statewide

production costs, or the need to eliminate or reduce transmission constraints on the existing system. For example, as more wind comes on line upstate, it may be beneficial to New York as a whole to invest in infrastructure that would facilitate delivery of that power to the areas of the State with higher demand.

The State's clean energy policy goals, which will increase the contribution of renewable resources in meeting electricity requirements, may also require construction of new infrastructure, irrespective of near-term reliability or economic benefits. In such circumstances, the viability of those projects should account for all relevant considerations including costs and impacts of clean energy sources on system reliability.

Multiple planning efforts are underway in New York to assess the status and needs of the electricity infrastructure. Such efforts generally have used consistent assumptions, although further coordination may be appropriate. Interregional transmission planning and participation in the proposed Eastern Interconnection Planning Collaborative is an example of such coordination. Additionally, the New York Transmission Owners have initiated a long-term transmission study, the New York State Transmission Assessment and Reliability Study (STARS) to identify a long-term pathway to: meet the growing electric power needs of New York; encourage the addition of significant renewable energy sources in New York and the surrounding areas; and address an aging infrastructure. Early results of STARS are expected by the end of the fourth quarter of 2009. DPS is monitoring each study and will evaluate the results of each and recommend PSC actions as appropriate.

Recommendation

- Systematically examine and evaluate the State's transmission and distribution infrastructure and maintain its emphasis on appropriate replacement and upgrade of aging infrastructure to maintain safe and adequate service and also increase the efficient utilization of the electric system, while minimizing, where possible, upward pressure on rates.
 - LIPA to implement a \$500 million, 20-year program to reduce electrical transmission and distribution system exposure to severe storms.
 - Complete a LIPA and National Grid assessment of the LIPA transmission and distribution assets system health review to formulate strategic goals to maintain infrastructure reliability.
 - Complete the STARS to identify the long term transmission reliability needs of the New York Control Area.
 - For needed transmission system upgrades or expansion, address cost allocation issues.

Transmission Siting

Practical experience with the implementation of PSL Article VII has revealed the need for certain amendments. While PSL Article VII requires compliance with the substantive provisions of all applicable State laws and supplants the procedural requirements associated with those laws, in practice, it is difficult for the PSC to administer compliance with the New York State Uniform Fire Prevention and Building Code due to the lack of expertise required to do so. Therefore, an amendment to PSL Article VII should be pursued to specifically indicate that State or local approvals, consents, permits, certificates or other conditions for construction and operation of an Article VII facility shall apply in connection with application of the New York State Uniform Fire Prevention and Building Code. This amendment, which would provide for the limited application of the procedural requirements associated with this law, is

appropriate since such approvals are ministerial in nature and are best left with State and local governmental entities that already administer the code and can best ensure compliance.¹⁰⁶

One of the weaknesses in Article VII is that it is difficult for intervenors to meaningfully participate in the transmission facility siting process. This weakness was recently remedied through passage of legislation.¹⁰⁷ PSL Article VII now requires that an application to construct such facilities shall be accompanied by a fee, which can be used to defray intervenor expenses associated with hiring expert witnesses and consultants. This approach is similar to the intervenor funding mechanism for applications to construct major electric generating facilities that existed under PSL Article X (expired January 2003). Intervenor funding for Article VII means there will be more meaningful participation by intervenors, particularly those without resources to actively engage in the Article VII process, intervenor funding also benefits ratepayers by contributing toward a more informed decision as to the appropriateness of the route and the facility.

Recommendation

- Amend PSL Article VII for siting of transmission lines and pipelines to indicate that State or local approvals, consents, permits, certificates or other conditions for construction and operation shall apply in connection with the State's Uniform Fire Prevention and Building Code.

Using Existing Rights-of-Way

In order to construct new infrastructure facilities, a developer will often need to obtain property interests in a right-of-way across public or private lands. Absent the right of eminent domain, this need may present challenges for a developer in terms of the cost and time required to obtain such rights-of-way through negotiations with numerous property owners. However, the use of existing rights-of-way may reduce the time and costs to the developer, and obviate the need to acquire rights to private and/or public lands.

Moreover, the use of existing rights-of-way may present several environmental advantages from the State's perspective. In evaluating the acceptability of a new transmission line, the State is required to look at various alternatives, which may include the use of linear property interests. These property interests may present viable alternatives that avoid and/or minimize environmental impacts.

The primary task in maximizing the use of rights-of-way is to identify where such rights exist. Accordingly, a study is recommended to inventory existing rights-of-way, such as existing utility corridors used for electric, gas, water and telecommunications facilities that are underused, or can be expanded to accommodate new facilities, including Smart Grid technologies, along with highways, railroads, and waterways. This study should also evaluate and assess the risks and cost implications associated with utilizing such rights-of-way. The study may build off of existing efforts to evaluate rights-of-way, such as the STARS study, referenced earlier.

It is envisioned that a study of rights-of-way will assist in developing policy initiatives to achieve the maximum use of these rights-of-way, including whether to pursue an amendment to the State's accommodation policy with the Federal Highway Administration (FHWA), which currently prohibits the linear co-location of utility facilities, other than telecommunications, within the highway right-of-way,

¹⁰⁶ A similar provision should also be explored in connection with the reenactment of PSL Article X.

¹⁰⁷ Chapter 349 of the Laws of 2009.

unless an exception is granted. This amendment could provide for the linear co-location of underground utility facilities in highway rights-of-way.

Efforts should also focus on establishing and maintaining a comprehensive database of rights-of-way. While various State agencies, such as DOT and the PSC, currently maintain databases of certain rights-of-way, these compilations are not comprehensive. Therefore, interested State agencies and property owners should cooperate in identifying these property interests, which will allow project developers and State regulators to ascertain the suitability of potential alternatives through a shared database.

Recommendation

- Investigate use of existing rights-of-way.
 - Inventory existing transportation corridor rights-of-way that could be used for new energy infrastructure facilities and existing utility corridors that are underutilized or could be re-configured to accommodate new facilities. Improve and coordinate efforts to identify and promote the use of linear property interests for use of existing and siting new electric and gas transmission facilities.

4.3 Natural Gas

New York's aggregate natural gas demand is expected to increase over the 10-year planning period, driven largely by growth in the residential and commercial sectors. Reliance of electric generation on natural gas coupled with the almost total dependence on interruptible delivery services for that supply raises reliability concerns, particularly during times of peak gas system demand. To assess the adequacy of the natural gas delivery system properly, the natural gas requirements of the electricity generation, residential, commercial, and industrial natural gas customers were considered together and compared to available pipeline delivery capacity at peak periods. Modeling of the natural gas system was performed to examine four market scenarios that stress the natural gas system (repowering of aging oil-fired units to gas combined cycle and retirement of the Indian Point facility). The modeling results show that the capacity of interstate pipelines to transport sufficient natural gas to meet peak day demand is a concern, particularly for the downstate area. Under each scenario, available pipeline capacity in the downstate area is essentially fully utilized during peak day demand periods throughout the forecast period. Additional pipeline capacity will be needed to continue to reliably meet demand.

Capacity constraints in the downstate market are of particular concern and the local distribution companies who provide service to the area have identified a need to add delivery capacity into their service territories. Planned pipeline additions for new delivery points into the downstate market, if built, would significantly relieve capacity constraints, increase reliability and reduce the volatility of spot market gas prices and the delivered price of natural gas into the market. The addition of such new delivery points would directly benefit not only natural gas ratepayers, but also downstate electric ratepayers. Methods to have all beneficiaries share the cost of the pipeline capacity additions should be explored. As noted earlier there is particular value to the electric system and its customers in the continued availability of dual fuel electric generation capability in the New York City and Long Island area.

The planning, regulatory approval, and construction processes for new pipeline and liquefied natural gas (LNG) projects can take many years. Delays can represent significant obstacles to constructing the needed natural gas infrastructure to meet growing natural gas market demand. The State can streamline the natural gas infrastructure permitting process by: (a) providing project developers rigorous, pre-

application, all-agency evaluations of State and local project siting, environmental and safety concerns; and (b) maximizing agency coordination during permitting proceedings. By providing early indications of acceptable sites, projects that can help meet projected demand while satisfying environmental and safety concerns, can be encouraged.

Analyses have been conducted to assess the ability of the natural gas system to meet the future electric generation natural gas demand. Results indicate that some electric load may not be served due to the lack of natural gas delivery capacity. Further analysis will continue to assess the magnitude and the impacts to the electric system from this unserved load. Additionally, since the models assume that all elements of the gas system are operating as designed, the vulnerability of the State from pipeline or compressor failures should be examined as part of a separate contingency analysis.

Based on the natural gas modeling runs, the natural gas system appeared to be strained with conditions such as: (1) Indian Point being retired and replaced by a combined cycle natural gas plant; (2) a significant amount of repowering of downstate dual fuel units that use residual oil as a backup; (3) a much colder than normal winter; and (4) and a combination of the three. If any of these conditions occur, alone or in combination, various elements of the natural gas system and the electric system should be monitored and, if necessary, actions should be taken to mitigate the risks. Examples of the critical elements to monitor include: the natural gas storage drawdown rate; LNG imports into New England; both electric and natural gas imports from Canada; electric generation versus demand and the possible need to shed electric load; and electric generators' ability to continue to use distillate oil backup beyond the limits of environmental permits.

Additionally, the analyses indicate that the electric system appears to be vulnerable on peak winter days due to the lack of natural gas delivery capacity.¹⁰⁸ Policies may be needed to encourage new combined cycle units to be equipped with backup distillate fuel oil capability. New combined cycle units are significantly more efficient than existing steam units, thus lowering natural gas consumption per megawatt-hour generated. Pursuing a policy for back-up fuel capability provides the State the benefit of improved generation efficiency while mitigating risk by increasing fuel diversity.

4.4 Petroleum Fuels

Petroleum fuels such as motor gasoline, home heating oil, diesel fuel, and residual fuel oil are vital to New York's economy and remain the single largest source of energy used in the State. New York is the fifth largest market for liquid fuels in the United States, and more than 90 percent of the State's supply is imported. Dependence on petroleum fuels in certain sectors – for example, transportation – exposes consumers to price volatility and potential delivery disruptions. It is critical that the infrastructure required to store, handle, blend, and dispense the wide-range of petroleum and petroleum blended fuels be adequate to meet user demand. The petroleum infrastructure includes the delivery system of trucks, barges and pipelines as well as the retail refueling outlets and large primary and secondary bulk storage facilities. This will become increasingly important as liquid fuel composition evolves to include higher percentages of biofuels, such as biodiesel, bioheating oil, and ethanol for gasoline blending. The significant construction costs, space limitations, multiple fuel types, and potential local siting

¹⁰⁸ The modeling process is based on economic dispatch and does not take into account the NYISO gas-electric coordination protocols between gas pipelines and generators that are designed to help identify possible winter and summertime natural gas curtailment conditions and establish a process for generators to seek emergency gas supplies if necessary.

considerations make it imperative that New York flag potential issues related to the adequacy of storage capacity for evolving fuel blends.

For a number of years, petroleum product distribution companies throughout the State have expressed concern over the long-term decline in the number of storage terminals and associated storage capacity. One consequence of the lower storage capacity volumes is that suppliers may not be able to respond quickly to spikes in demand that occur because of extreme cold temperatures and unexpected weather conditions. Petroleum storage terminal facilities face many of the same environmental, land use, and economic pressures that affect many other businesses. However, beginning in 2007, the amount of New York storage capacity dedicated to distillate fuels has increased. In certain parts of the State, including Long Island, the petroleum distribution industry has responded to market signals and added tank capacity to meet demand.

The Port of New York, with large petroleum storage terminals located on both the New York and New Jersey sides of the harbor, is an important component of the State's petroleum infrastructure. These deep water terminals receive a steady flow of refined petroleum products and crude oil from domestic and foreign sources. New York also receives petroleum products from several pipeline systems that connect terminals located throughout the State to the major refining centers located along the Gulf and East Coasts. Additionally, crude oil is used by refineries located in the Mid-Atlantic region to produce refined products for the northeastern United States. Once refined fuels arrive at these facilities or are produced at the regional refineries, they are distributed by pipeline, barge, and truck transport to smaller coastal and inland terminals for further distribution to customers through retail distribution channels. The continued, uninterrupted operation of this complex distribution system, with its ability to receive, store, and distribute millions of gallons of the various fuels per day, is of critical importance to New York.

Long range solutions to reduce New York's exposure to price volatility and potential delivery disruptions of liquid fuels must include a variety of strategies to reduce significantly the State's use of these fuels. Since the transportation sector accounts for approximately 80 percent of this usage, energy efficiency and fuel-switching programs will be targeted to this sector's use of petroleum-based fuels over the planning horizon.

4.5 Transportation

Keeping New York's diverse, multi-modal transportation system in good working order is vital to the State's economy and environment. The reliable flow of people and goods means less congestion, less pollution, less fuel use and improved quality of life. A transportation system in good working order also improves safety and reduces vehicle wear and tear, lost time, delivery costs and system user stress. The DOT System Performance and Asset Management Bureau has estimated that in 2007, congestion-related delays on State-owned highways cost New Yorkers \$9.6 billion.

Despite the congestion, the State's transportation infrastructure, in general, is functioning well. For example, of the 19,500 bridges in New York, only 100 are closed. This is a testament to the State's ongoing focus of "fix-it-first" to preserve the investments that have been made in the State's transportation system.

In 2006, New York received about \$19.8 billion to maintain, operate and improve its transportation system; the majority of which was self generated or derived from local sources. Typically, only 15

percent of New York's transportation funds come from federal sources.¹⁰⁹ Of that funding, 58 percent supports public transportation, and another 29 percent is being spent on the highway system. Other modes receive a comparatively small amount of this funding. Currently, the vast majority of transportation funding is programmed to maintain and operate the system. This necessary level of commitment to maintenance of the system is expected to continue, if not increase. This reality makes any substantial expansion of the system in any of its varied modes difficult to achieve.

Energy efficiency in the transportation sector can be enhanced by actions at the federal level through legislation, regulation and policy. Federal legislation related to climate change and surface transportation re-authorization can further enhance New York's status as the most transportation energy-efficient state.

Infrastructure investments should include state-of-good repair of the existing system, which favors the maintenance of existing roads and highways instead of building new ones, and strategic new transportation investments to attain the State's goals. Additional investments to support energy-efficient transportation include those that support public transportation and rail (including freight) facilities and provide effective linkages between different transportation modes. The State should also implement strategies to increase freight rail movement of goods, such as providing new intermodal facilities, rail sidings, and rail-truck transfer facilities and raising bridge clearances.

Recommendations

- Encourage federal investment in public transportation.
 - Seek more federal funding for public transportation within the next Federal Surface Transportation funding bill.
- Allow private individuals and businesses to provide direct public transportation infrastructure investments in return for State income tax credits. For example, an individual or business could sponsor the installation of a bus shelter on a transit line and a portion of the cost of that shelter could be offset by a tax credit.
- Encourage federal financial support for more energy efficient transportation infrastructure and systems.

¹⁰⁹ These figures do not include any additional infrastructure funding provided through the American Recovery and Reinvestment Act (ARRA), which is expected to be approximately \$2.35 billion for transportation projects.

5 *Stimulate Innovation in the Clean Energy Economy*

The nation is in the midst of a major economic transformation, evolving from the factory economy launched in the late 19th century and the post-World War II mass-production economy to an “Innovation Economy.” There is a move toward a global, entrepreneurial and knowledge-based economy in which the keys to success lie in the extent to which knowledge, technology, and innovation drive the creation of new, enhanced products and services. The importance of innovation in the energy and transportation sectors is underscored by the challenge posed by climate change, a challenge which will push the State, nation, and world inexorably toward a low carbon, clean energy future. The Governor has addressed this subject in his recent presentation on the New Economy Jobs Plan, which asserted that increasing the State’s capacity for innovation would be a crucial factor in future economic growth.¹¹⁰

The State needs to be proactive in realizing the promise inherent in these changes. Using the New Economy Jobs Plan as a starting point, this Chapter addresses how New York government should respond to this fundamentally changing economy. More specifically, it addresses how the State can help create and maintain an environment which stimulates innovation and advances the emerging clean energy economy.

A reasonable first step is to assess New York’s unique and preeminent strengths, coupled with specific initiatives to capitalize on them. In the case of the clean energy economy, there are at least two general strategies for the State to pursue. First, the State can support the emerging clean energy market by increasing demand for clean energy goods and services through its numerous clean energy programs, e.g., ‘45 by 15’, and through targeted workforce training. Second, the State can provide direct support in order to retain existing firms and to attract the most promising new technologies and businesses that will compete in a carbon-constrained global economy.

During the transition period, New York can ill-afford to neglect the current and future energy needs of the State’s existing commercial and industrial base. For commercial and industrial companies alike, energy costs influence decisions on locating or expanding a business in New York. The State’s economic development strategies must continue to address energy costs in order to stimulate expansion of existing businesses as well as investment in new sectors of innovation that create jobs for New Yorkers. Such strategies will need to balance the immediate pressures of energy costs on business with the long-term opportunities for energy efficiency and clean energy technologies. Ultimately, commitment to the latter will help shield businesses from energy price volatility as well as reduce medium- and long-term energy costs.

¹¹⁰ Governor David A. Paterson. *Bold Steps to the New Economy: A Jobs Plan for the People of New York*. 2009. http://www.ny.gov/governor/press/pdf/press_0608091.pdf

5.1 New York's Unique Strengths

New York has two unique strengths from which to draw in the development of a clean energy economy. First, New York is home to an enviable mix of higher education institutions – including two Ivy League institutions, seven members of the elite Association of American Universities (AAU) and over 20 major research institutions – and a number of firms in the private sector that are leaders in energy innovation. Second, the State has established public institutions, in particular NYSERDA and NYSTAR, which directly facilitate collaboration between industry and innovators located on college campuses and at research laboratories located throughout the State. NYSERDA and NYSTAR, in conjunction with other government partners including Empire State Development Corporation (ESD), the PSC, NYPA and LIPA, are well positioned to structure an economic development framework that taps into the State's academic and industrial resources and promotes commercial investment in clean energy enterprises that will serve markets in New York and around the world.

5.1.1 Our Academic/Industrial Base

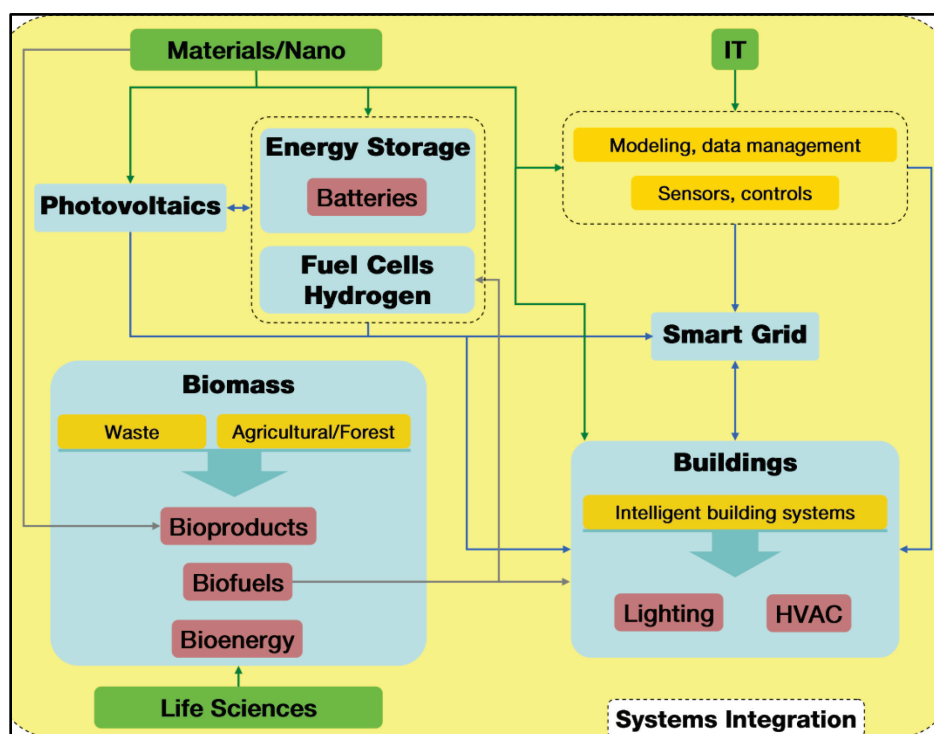
Every region of New York is home to a leading research or academic institution that has some role in developing the next generation of energy technology. There are emerging regional clusters of expertise in power systems and nanotechnology in the Capital District, solar-PV in the Hudson Valley, building technology in Troy, Syracuse and New York City, and substantial advanced transportation equipment manufacturing and development capability in several upstate regions. New York-based Fortune 500 companies and many small start-up companies are active in emerging clean energy markets.

Together, these assets constitute areas of concentrated energy technology expertise in New York, which are highlighted in Figure 9.¹¹¹ These identified strengths stem from a review of the core competencies of New York-based universities, industries, and research institutions. That review of the State's research infrastructure identified four areas in which New York has the opportunity to be preeminent: clean energy technologies, life sciences, information technologies (IT), and advanced materials.

These strategic strengths (shaded in green in Figure 9), provide a vehicle through which the State can more easily and more precisely focus on clean energy opportunities, including bioenergy, building efficiency, energy storage, fuel cells, solar-PV, and Smart Grid. Furthermore, to New York's benefit, these energy technologies are widely viewed as critical towards achieving a long-term sustainable energy system.

¹¹¹ New York Academy of Sciences. *Innovation and Clean Technology in New York State*. 2009.

Figure 9. Core Clean Energy Capabilities and Strengths in New York



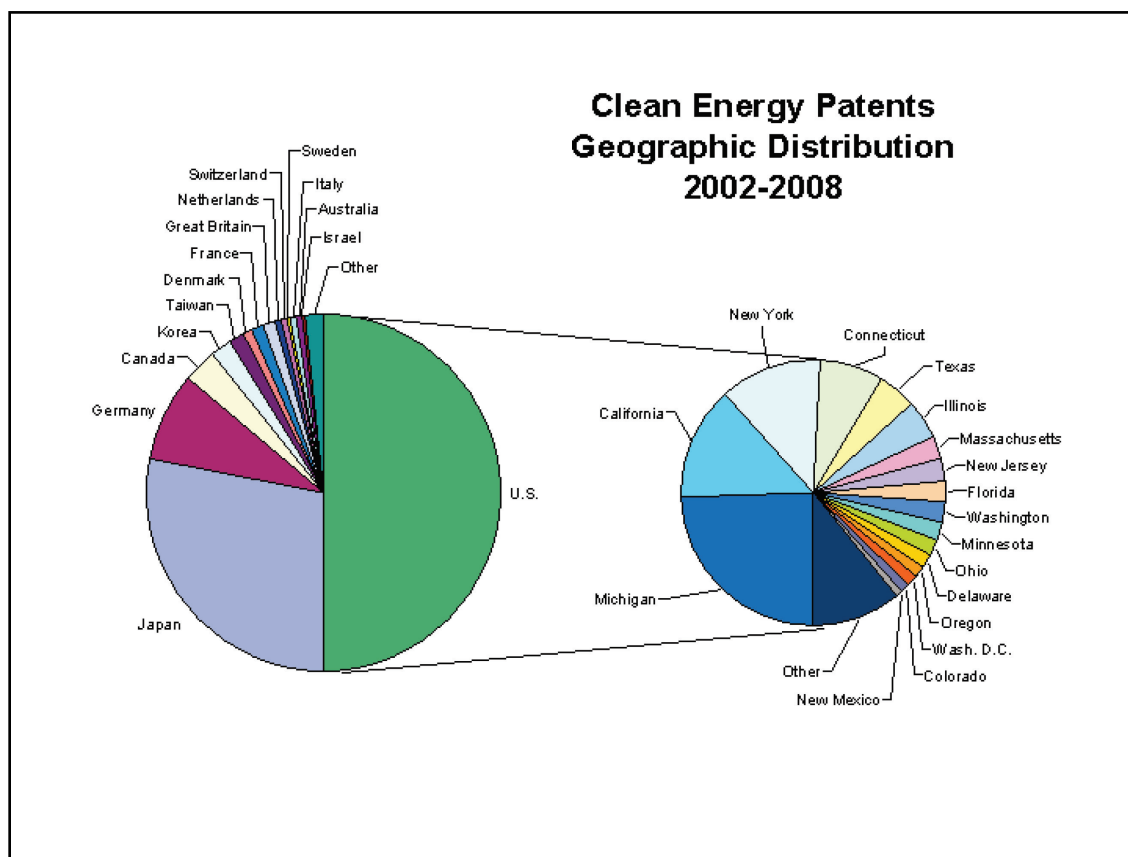
Source: New York Academy of Sciences

Markets for these technologies have grown substantially in recent years and are projected to continue to grow, and to provide New York with significant economic development opportunities.

According to the 2008 Kauffman Foundation State New Economy Index, New York is well positioned to excel in the innovation economy. New York ranked ninth on the index, with very strong rankings in science and engineering capability, patent development, and alternative energy use. As shown in Figure 10, New York is among the top three states in the country in the development of clean energy technology patents, an indicator of innovative activity occurring within the State.¹¹² This level of activity evidences a strong foundation of research and development capacity in New York. The challenge will be in harnessing this activity toward the optimal energy, environmental, and economic development outcome for the State.

¹¹² Heslin Rothenberg Farley & Mesiti P.C. *Clean Energy Patent Growth Index*. 2009.

Figure 10. Clean Energy Patents



Source: Heslin Rothenberg Farley & Mesiti, P.C.

While New York claims a nation-leading position in terms of overall innovative activity, the proportion of academic research that is funded by industry is just 4.3 percent, which is below the national average of 4.9 percent. Industrial-based research and development from New York-based corporations is only 1.1 percent of industry output, also below the national average of 2.0 percent and behind peer industrial states like Michigan (5.0 percent), Massachusetts (4.6 percent), New Jersey (3.5 percent), and California (3.5 percent). Clearly, there exists significant opportunity to enhance both industrial R&D and university-industry collaboration in New York.

The State is currently examining opportunities to promote collaboration between New York-based academia and industry to foster the creation of new and better clean energy products and services for use in New York and for export throughout the country and the world.

- As PHEVs will likely serve as a technology bridge to fully electrified vehicles and an electrified transportation sector, New York has recognized the economic opportunity associated with advancing this technology. NY BEST Consortium has been established to create in New York a nationally-recognized center for energy storage technology research and development; conduct world-class, industrially relevant, applied, and translational research and development; and support industrial activity in New York in the commercialization of advanced battery and energy storage technology. The goal is for the

NY BEST Consortium to facilitate a “cluster” of advanced battery and energy storage research and manufacturing capabilities in New York.

- Five research laboratories in New York have been awarded multimillion dollar Energy Frontier Research Centers grants by DOE. The effort will bring nearly \$100 million into New York over five years to hasten the scientific breakthroughs needed to build a new 21st century clean energy economy. The Energy Frontier Research Centers will bring together groups of leading scientists to address fundamental issues in fields ranging from solar energy and energy storage to materials sciences and superconductors. New York facilities, among 46 chosen nationwide, include State University of New York (SUNY) Stony Brook, Brookhaven National Laboratory on Long Island, Columbia University, Cornell University, and General Electric Global Research in Schenectady. New York is providing supplementary funding to these Centers in order to accelerate commercialization of technologies that emerge there.
- In the field of nanotechnology, and the applications of nanosciences in the energy arena, New York is well poised with the work at the College of Nanoscale Science and Engineering (CNSE) of the University at Albany and Cornell University to attract new business opportunities. CNSE’s Albany complex itself is a renowned state-of-the-art research facility, and has already attracted over 250 corporate partners from around the world to New York for research and development opportunities. It is anticipated that as these capabilities grow, the impact on energy systems and energy business opportunities will emerge.
- Established in 2001, the Saratoga Technology + Energy Park[®] (STEP[®]) was established to be a destination for clean energy and environmental technology companies. STEP was designed as a fully-integrated knowledge community that includes programs, services, partnerships, and amenities to support the success of companies and their employees. In addition, the park environment is designed to provide synergies and collaboration opportunities for related businesses, universities and research centers and business service providers. For example, Hudson Valley Community College is currently building a facility at STEP that will provide learning opportunities for the students on the campus, and train the workforce for the park’s tenants. STEP is the home of several new companies, including Auterra, Inc., which is developing materials to reduce the environmental impact of oil refining and coatings to improve photovoltaic performance, and GlobalFoundries, a leading-edge semiconductor manufacturing company.
- The New York Smart Grid Consortium was established as a not-for-profit corporation in July 2009 to promote statewide collaboration among key electric energy stakeholders including generators, utilities, market operators, industry, government, and universities. The goal of this collaborative effort is to implement Smart Grid technologies that improve system reliability, security, and efficiency, while concurrently facilitating increased levels of renewable resources and demand management opportunities. It is the only organization of its scale in the United States that is committed to representing all major contributors across the energy value chain.

To help foster this type of collaboration and promote further such collaborations, Governor Paterson has created the Task Force on Diversifying the New York State Economy through Industry-Higher Education Partnerships. The Task Force will examine opportunities in areas of strategic strength for New York, including energy technology. The Task Force is developing recommendations to accelerate the pace of commercialization, foster the incubation of new companies, promote growing companies, and enhance the collaborative university-industry environment in New York.

These efforts are early results of what will be an ongoing State strategy of serving as a convener for industry, academia and the private sector to come together to pursue targets of interest for the State's clean energy economy.

5.1.2 NYSERDA, NYSTAR and the Innovation Economy

New York has a unique asset in NYSERDA, in that the State has a government agency specialized in the field of energy research, development and deployment. Organized by State statute in 1975, among NYSERDA's missions is to "advance innovative energy solutions in ways that improve New York's economy and environment." NYSERDA has organized its activities along the "clean energy continuum," which is a five-stage development cycle of energy products and services. The development cycle encompasses (1) initial stages of scientific research and market analysis, through (2) technology adoption and market expansion, (3) technology demonstration and business development, (4) technology development and commercial feasibility, and ultimately leading to the final stage of (5) standard practice and code enhancement. While NYSERDA itself does not participate directly in these R&D and deployment activities, NYSERDA provides critical support at each stage of the continuum to maintain the development of energy products and services through the continuum stages.

One example of a technology that has successfully navigated the clean energy continuum is a hybrid-electric vehicle powertrain technology now being manufactured by BAE Systems Controls of Johnson City. This technology, which is used on medium and heavy duty vehicles, was initiated by research work originally targeted for liquid fuels alternatives for transportation application. In the course of such research, this specific electric powertrain technology was conceived to help conserve fuel use when a vehicle stops or applies its brakes going down a hill. NYSERDA invested State funds to support development of this technology. Ultimately, the technology was applied on a 40-passenger bus that was built by Orion Bus Industries in Oriskany. The successful application has grown into orders for more than 2,300 buses and has generated over one billion dollars in revenue. These buses expect to show 25 percent in fuel savings from standard diesel buses, and emissions reductions of 90 percent for particulate matter, 40 percent for NO_x and 25 percent for GHGs. These hybrid buses are now becoming standard in major mass transit markets in New York, San Francisco, Toronto, London, and other cities.

In addition, NYSERDA's deployment programs are structured to achieve public benefits beyond just energy savings. For example, SBC funded energy efficiency programs were designed to help foster the development of a nascent energy efficiency services industry in New York. A result of the successful response to these programs is the creation of a platform and infrastructure from which the more aggressive EEPS program can build a higher level of energy efficiency – bringing certain energy efficiency services along the continuum into standard practice. A similar creation of these business sectors has also been noted from the continuation of the RPS Program.

As energy policy develops, especially in tandem with emerging climate change policies, continued funding of new energy technologies and services along the clean energy continuum will be necessary to realize the successful achievement of policy and program goals.

Like NYSERDA, NYSTAR supports technology development, innovation and commercialization with the objective of creating economic growth in New York. A central tenet of NYSTAR's mission is the recognition that New York's world class public and private research centers are powerful economic development engines that can create high quality, high technology jobs in New York. NYSTAR's programs and initiatives provide a critical vehicle to translate cutting-edge research into economic development.

NYSTAR provides support to research centers throughout the State, including in some cases providing the physical infrastructure and/or attracting the world's best scientific talent to foster science and technology discoveries and advancements in New York. Among NYSTAR's key programs are:

- Strategically Targeted Academic Research Centers – which serve as academic research facilities and state-of-the-art facilities for cutting-edge technologies;
- Advanced Research Centers – which serve as vital research centers that will conduct research in concentrated subject areas;
- Centers for Advanced Technology – which support university-industry collaboration in research, education and technology transfer, with the goal of fostering New York businesses to gain a competitive technological edge; and
- Centers of Excellence – which focus on critical emerging technologies that are anticipated to become major high-tech growth areas. The Centers function as a network of high-tech research and economic development resources, in an effort to create a mutually-beneficial research and development environment.

Ultimately, NYSTAR's and NYSERDA's programs and research facilities are expected to attract a critical mass of nationally recognized researchers, generate significant new research funding, spur the establishment of spin-off enterprises, and increase the development and transfer of technology from the research lab to the marketplace. The collective expertise of NYSTAR and NYSERDA offers a strong platform for the development of an "Innovation Economy" in the clean energy sector in New York. To realize this energy, economic development and environmental strategy, NYSTAR and NYSERDA will help focus the State's efforts in energy innovation to achieve advances in:

- Infrastructure – The State must invest in both near-term and long-term infrastructure needs, and identify opportunities to repurpose New York's existing manufacturing infrastructure to produce advanced energy technologies and their component parts for New York, regional and national use, as well as export to worldwide markets.
- Intellectual Capital – The State must build on the existing intellectual and professional resources that reside in New York's universities and colleges, research and development organizations, and private industry, to create a clean energy innovation infrastructure that furthers the State's capability to develop, commercialize and market advanced energy technologies.
- International Perspective – The State must implement policies and programs that not only promote efficient energy use and foster demand for renewable energy products and services, but that also provide a platform for the export of New York efficiency and renewable products to meet growing global demand.
- Investment – The State must address policies and programs to facilitate access to public and private capital across the entire spectrum of the clean energy economy: from seed-stage companies to manufacturing expansion to large-scale energy projects. Where necessary and appropriate, the State may make targeted investments in order to realize strategic policies and programs.
- Innovation – The State must remain committed to continued advances in energy policies and programs in order to ensure that New York is able to capture emerging opportunities which provide energy, environmental and economic development benefits. Such enduring commitment

should result in new opportunities for New Yorkers, from jobs in the “clean energy workforce” to opportunities for engineers and scientists of all disciplines. These policies must promote an environment in which New York's individuals and companies alike can easily tap into the technical and professional skills needed to be effective in a rapidly changing energy landscape.

Recommendations

- Strengthen and expand collaboration between the intellectual and professional resources in the State's public and private institutions to support the growth of the State's clean energy sector.
 - Expand the NY BEST Consortium.
 - Foster the development of clean energy incubators and regional clean energy clusters of related industries and research entities, aiming to accelerate technology commercialization and entrepreneurship.
 - Use emerging networking technology and methods to foster collaborations among clean energy business incubators, entrepreneurs, investors, and researchers.
- Implement, where practicable, the recommendations of the Task Force on Diversifying the New York State Economy through Industry-Higher Education Partnerships, established by Executive Order 19. The Task Force will study and report on best practices and generate recommendations on fostering business incubation, growth and emerging technology commercialization.
 - Create a forum for stimulating ideas on the future of New York State's clean energy economy.
- Support the growth of clean energy technology companies in New York.
 - Increase focus of State incentives and economic development assistance on clean energy companies and component manufacturers and service businesses.
 - Enhance entrepreneurial and commercialization assistance to early-stage companies developing clean energy technologies.
- Support and enhance research and development of next-generation clean energy technologies in the energy and transportation sectors.
 - Use State funding commitments to leverage large federal funding programs, such as Energy Innovation Hubs and Energy Frontier Research Centers.
 - Ensure that any national carbon cap and trade program provides the states with flexibility to invest auction proceeds into accelerating the market introduction of next generation/emerging clean energy technology.
 - Support the development, demonstration, and testing of new clean energy technologies to help New York State achieve its RPS, EEPS, and carbon mitigation goals and simultaneously provide opportunities to create and grow clean energy businesses in New York.

- Continue the collaborative DOT and NYSERDA partnership to develop and test sustainable transportation technologies and systems.
- Expand marketing of made-in-New York clean energy products to strategic international markets.
- Demonstrate the feasibility of electrification of the transportation system across all modes of transportation by expanding the State fleet plug-in hybrid vehicle demonstration program to private sector fleets, by expanding the use of electric ground equipment, and by considering increased electrification of rail lines.

5.2 Support Clean Energy Markets

The State supports emerging markets of the clean energy economy in three key ways: (1) generating demand for the goods and services to foster sufficient in-state demand to attract firms seeking to provide those goods and services to markets worldwide, and to capture the economic development benefits from installation and use of these new products and services; (2) identifying and addressing market barriers experienced by new technologies to help foster sustained growth; and (3) targeting workforce training resources to better match skills training to market needs.

5.2.1 Generate Demand for Clean Energy Technologies

There is a growing global demand for energy efficiency technologies and services and the components and systems for renewable generation technologies. As the world economy becomes progressively more carbon-constrained, these markets will grow even more rapidly. Closer to home, New York's neighboring states with renewable targets, as well as efficiency goals, contribute to this demand. At home, the State's aggressive '45 by 15' goal will increase in-state demand significantly as compared to even one year ago. Through the aggressive funding of energy efficiency programs, the RPS Program, and similar programs sponsored by State authorities, the State has generated demand for the investment of hundreds of millions of dollars annually in the goods and services required by the clean energy economy. Fostering a robust in-state demand provides a potential base of business for firms seeking to export their goods and services.

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, the 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.

New York recognizes the importance of energy costs for businesses seeking to expand or locate in the State. For example, in 2008 ESD and NYPA provided financial assistance and low-cost power to Globe Specialty Metals, Inc. (Globe) for the company's development and operation of metallurgical and solar grade silicon production facilities in Niagara Falls, New York. Globe's manufacturing facility will produce nearly 4,000 tons of silicon annually for the solar cell industry. ESD's agreement with Globe will provide 25 percent of the company's solar grade silicon production for attraction of new solar panel

manufacturers to the State. In early 2009, ESD and NYSERDA partnered to provide financial assistance to SpectraWatt, a designer and manufacturer of silicon solar cells for the Company's \$80 million investment in a new production/headquarters facility in Dutchess County, New York. As part of the assistance package, ESD offered SpectraWatt a supply of solar grade silicon under the agency's agreement with Globe.

While the State's commitment to these initiatives has been robust, there is a concomitant obligation to periodically review these funding programs to assure that they are necessary to meet State policy objectives, to recalibrate the required level of support, and to assure that the funds are being well spent.

5.2.2 Workforce Development

In order to meet the '45 by 15' goal, New York's clean energy economy programs will create an estimated 50,000 jobs. Workforce development investment to address skill shortages in both the conventional energy and clean energy labor markets will significantly contribute toward achieving the State's energy policy objectives and minimize the inefficient use of public resources.

New York's clean energy economy will be characterized in part by high-tech, small-scale development and large- and small-scale manufacturing. It will also respond to the increased importance of energy efficiency, renewable resources and a cleaner environment by building on strong research and development facilities, advanced engineering and a highly-educated workforce. To some degree this changing economy will require a workforce with technology-specific knowledge and skills at all stages of the product value chain – from entry level skilled workers to highly skilled and credentialed workers. In addition, recent power industry literature highlights the difficulties utilities and other energy organizations face in obtaining and retaining the human resource skills needed to handle the increasing diversity and complexity of a modern electric grid. This includes serious shortages of personnel with expertise in all technical categories, including engineers, contractors, and line workers.¹¹³

In May 2009, the New York State Department of Labor (NYSDOL) released a report which addressed three key aspects of clean energy jobs in New York: (1) the characterization of the clean energy labor market; (2) the inventory of existing training programs that support the clean energy sector; and (3) the need for State level collaboration and where these efforts are already seeing success.¹¹⁴ A key finding of the report was that most "clean energy" jobs are not unique to that industry; they require similar education and job skills to those in other energy, construction, and manufacturing sectors. So while new occupational titles will emerge in the clean energy industry, the skills for the vast majority of these occupations will be similar to existing job titles, with incremental skill enhancements specific to the industry. This is an important result because it provides sufficient intelligence to immediately advance workforce strategies to support clean energy jobs in New York with public investment.

¹¹³ A recent report by Cambridge Energy Research Associates (CERA) predicts that 50 percent of today's engineers, who now on average exceed age 50, will retire by 2015 and that their loss will not be offset by a sufficient number of new entrants into the engineering field. A major New York utility has had an open senior planning position for over a year and cannot find an experienced engineer to fill the position. Also, technology changes in the power industry and the potential for "green energy" is exacerbating the need for skilled tradespersons. CERA. *Engineering Talent Squeeze -- "People Deficit" -- Likely to Cause Further Delay in Some Oil & Gas Production Projects through 2010*. 2007. <http://www.cera.com/asp/cda/public1/news/pressReleases/pressReleaseDetails.aspx?CID=9006>

¹¹⁴ NYSDOL. *New York State's Clean Energy Industry: Labor Market and Workforce Intelligence*. 2009. <http://www.labor.state.ny.us/workforcenypartners/PDFs/NYS%20Clean%20Energy%20Jobs%20Report%20FINAL%2006-09-09.pdf>

State agencies, stakeholders and partners have worked closely over the past year to build a comprehensive New York workforce development system to meet the needs of the clean energy economy. The system is based on a strategy that includes: comprehensive training initiatives, e.g., incremental skills training, certification and accreditation; pathways out of poverty; infrastructure, such as curriculum development, school start-up and accreditation, worker certification and the cost to properly equip workers with the requisite tools for the job; and marketing and outreach. Building on this and to help connect job seekers with opportunities, the State has launched a new Website to assist those seeking to enter the green jobs sector. The Website, www.greencareersny.com, is designed to make it easier for individuals, businesses, and workforce professionals to find the State's local training programs and green job opportunities.

Looking forward, the clean energy economy workforce issues the State needs to address are:

1. *Program Coordination*. The massive influx of federal dollars and the multitude of workforce training programs create the risk that funds will be spent inefficiently. Public funding is generally channeled through existing funding streams administered by different State agencies. Each funding stream has legislative and/or regulatory restrictions which preclude a single agency from providing the full-range of activities necessary to support these objectives. The State should develop a formal means to coordinate all agencies involved in workforce training, including unions, non-profits, and colleges. Under this scheme, State agencies, Local Workforce Investment Boards, and stakeholder groups will continue to collaborate, align, and leverage their resources to assure that job creation, workforce development, and pathways out of poverty initiatives are being addressed comprehensively, such that each agency's funding is being leveraged in the most effective and optimal manner.
2. *Develop a Comprehensive Training Program Inventory*. The clean energy economy requires a fresh look at the workforce training needs across all levels of the workforce and across all new technologies on the horizon including Smart Grid, renewable energy, transportation, and building efficiency. NYSERDA and the Workforce New York Training Inventory used by NYSDOL's One-Stop System to fund training are being better integrated to more easily provide a comprehensive listing of the State's clean energy training programs. Such consolidated information and efforts are essential to successful implementation of an effective workforce development strategy.
3. *Weatherization Assistance Program*. This program services many of those most in need of energy efficiency measures in their homes. Assessment of the workforce needs of the State's WAP determined that the program needed access to skilled entry-level workers. The strategy to address this workforce need incorporates a multi-agency initiative for entry-level technician training for jobs in weatherization. Specifically, DHCR, NYSERDA, NYSDOL, New York State Office of Temporary and Disability Assistance (OTDA), and DOS will collaborate to provide a continuum of training and job placement services which will give public assistance recipients and unemployed individuals direct access to these jobs.
4. *Develop the Capacity to Respond to Rapid Changes in Workforce Needs*. Markets are changing rapidly and so are their workforce requirements. The State's labor force would be well-served by a resident capacity to identify emerging trends in the labor market. NYSERDA, ESD and NYSDOL have strong capacity to assess the clean energy industry, e.g., economic modeling and occupational analysis. This capability is of critical importance to project job growth and assess the workforce needs associated with those jobs. NYSERDA, ESD, and NYSDOL should collaborate to improve the State's capacity to assess and forecast clean energy jobs and the workforce needs associated with these jobs. This includes tracking business trends in the clean

energy industry and establishing direct communication with businesses to identify their labor profile.

Recommendations

- Coordinate all agencies involved in workforce training, and partner with unions, non-profits, colleges, and Board of Cooperative Educational Services (BOCES) and technical high schools to expand the existing network of 32 clean energy workforce training sites.
 - Make clean energy training curricula standard for SUNY and City University of New York (CUNY) schools.
 - Continue the planning efforts of the New York State Sector Strategy Advisory Group initiated under the National Governors Association.
- Dedicate funding for “pathways out of poverty” programs to train unskilled workers for clean energy jobs. These programs should target residents of environmental justice communities.
 - Expand NYSDOL's Workforce NY Training Inventory used by the One-Stop System.
- Coordinate a statewide workforce strategy to address the workforce needs of the State’s clean energy industry and maximize the State’s ability to obtain federal workforce training funding.
 - Develop a statewide comprehensive strategy to assure an adequate workforce to meet energy efficiency and renewable energy goals.

5.3 Retain Firms and Attract Firms that will Thrive in the Clean Energy Economy

The State maintains a wide range of economic development programs that directly support firms that: need to maintain a competitive position for their products in existing markets, firms intent on transitioning their businesses to producing the goods or providing the services that will likely be called for in the new economy, and start up or early stage development firms offering new products or services. ESD, NYSERDA and NYPA are all authorized to provide such assistance.

5.3.1 Retaining New York’s Existing Base in a Carbon-constrained Economy

Manufacturing activity in New York continues to decline, with service sector businesses claiming a larger share of Gross State Product. Yet, the manufacturing base in the State is highly valued for the level of investment in plants and equipment, a supply of good paying jobs, and the ability to sell products in national and international markets. 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.

A portfolio of nine NYPA economic development power programs supply electricity to private sector employers in New York. Each program provides electricity at reduced cost to participants but has unique features, including the source of power and eligibility requirements. For example, some programs 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.¹¹⁵

NYPA's power programs provide benefits for over 700 participant firms 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.

The Power for Jobs program was created in 1997 as a three-year program intended to be a bridge to a competitive marketplace. The program was designed primarily to be a retention program. Now in its twelfth year, Power for Jobs has been extended on a year-by-year basis since 2004. Businesses have expressed frustration with the current program. Specifically, the short term extensions have limited their ability to reasonably predict their energy costs for planning purposes. Also, this has inhibited their ability to attract capital for on-going and new projects. The Governor and the legislature have acknowledged that Power for Jobs needs to be replaced with a longer term program that will provide price stability.

A reformed program is needed to stave-off further erosion of the State's economy and to establish a foundation for a more rapid economic recovery in the future. The reformed program should have the ability to retain and expand existing businesses, which are vital to the local economies, as well as the ability to respond to a changing marketplace by attracting emerging industries, such as solar, wind and other clean energy technologies. Criteria for the new program should be flexible and allow for the attraction of targeted industries and must be aligned with the State's economic development and energy efficiency strategies.

In addition to a new statewide program, an evaluation should be conducted on NYPA's current hydropower allocations. Hydropower is an enormously valuable resource and as current contracts expire, the process should be diligent in verifying that all businesses receiving allocations of the low-cost hydropower provide maximum benefits to the State.

To help participating customers in NYPA's low-cost power programs better manage energy costs, NYPA's authority has been expanded to finance, design, develop, construct, implement and administer energy-related projects, programs and services, including energy efficiency and renewable or other alternate energy technologies for any public entity or for any of NYPA's economic development customers, as was noted in Chapter 2. Smart investments in energy efficiency initiatives can be a significant economic development tool for New York businesses.

Recommendations

- Expand economic development programs to attract clean energy industries.
 - Use NYPA economic development power programs to attract clean energy industries, as allowed by statute.

¹¹⁵ 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.

- Extend expiring NYPA economic development power programs, including Power for Jobs, for a longer period of time, beyond the current one-year cycle of extensions. Opportunities for increasing the size of the programs should also be explored.
- Agencies and utilities will collaborate in the development and marketing of economic development programs.
- Incentivize NYPA's economic development customers to invest in cost-effective energy efficiency measures.
 - Reform NYPA's economic development power programs to condition receipt of benefits on implementation of feasible energy efficiency improvements.

5.3.2 Attracting Firms that will Thrive in Clean Energy Economy

While it is critical to retain the State's existing firms, the State must also seek to attract the high-tech businesses that will thrive in a new innovation economy. As the world becomes more carbon constrained, the demand for clean energy products such as solar-PV, batteries, and wind turbines is expected to grow. In addition, given the State's local demand for these products, these industries are poised for growth in New York. Such growth could result in a repurposing of existing manufacturing infrastructure to increase production of advanced energy technologies and their component parts for domestic use and export to worldwide markets. The State is using a number of strategies to attract clean energy businesses.

The State's \$100 million Innovation Economy Matching Grants Program is intended to help New York companies compete for federal technology development funding under ARRA. Many ARRA programs provide support for clean energy technology deployment and manufacturing. In addition, the Green Strategic Investment Program (GSIP) of the New York State Common Retirement Fund committed \$500 million over three years to environmentally-focused investment strategies that produce attractive, risk-adjusted financial returns. Under the GSIP, the Fund will actively seek opportunities to invest in renewable energy and clean technologies.

NYSERDA has established four clean energy business incubator programs providing business support to accelerate the successful development of early-stage, clean energy technology companies. Programs have been established in Buffalo, Rochester, Syracuse, and Brooklyn. NYSERDA provides a broad array of direct assistance for companies seeking to enter or expand the clean energy industry through its product development, clean energy business growth and development, and manufacturing incentive programs. For example, NYSERDA is working with Alternative Fuel Boilers of Dunkirk to develop residential and small commercial high-efficiency biomass combustion systems.

6 Engage Others in Achieving the State's Policy Objectives

Local governments, and the communities they serve, must play a critical role in the overall effort to meet the State's energy policy objectives, as the success of many energy programs depends on sustained commitments by local governments. Energy-conscious local planning and land use policy decisions, locally sponsored efficiency initiatives, and locally developed renewables projects should be some of the building blocks in the State's effort to build a clean energy economy. Moreover, siting new energy infrastructure projects will be strongly influenced by informed local participation in the regulatory process. The State has a responsibility to collaborate with and support local governments and local communities in these efforts.

Looking beyond its borders, the State's ability to achieve those same policy objectives depends heavily on establishing mutually beneficial working relationships with our neighboring states and nearby Canadian provinces. Significant challenges need to be addressed to, among other things, maintain the State's fuel diversity, maximize the development of economic renewable resources, minimize future power plant air emissions, and enhance interstate and international power transmission while protecting environmental resources.

Finally, State success obviously depends on federal policies, programs, and funding. The country and the State are at a critical juncture; it is essential looking forward that energy policy and environmental and climate change policy proceed in tandem at both the federal and State level. Fortunately, the Obama Administration has advanced policy goals consistent with the State's own priorities. However, now more than ever, the State's interests need to be forcefully represented in the national debate on policy implementation.

6.1 Local Governments and Communities

As discussed below, the roles and responsibilities of local governments and their communities impact the demand for energy, as well as the supply of energy. As appropriate, State support is described and further State action is recommended.

6.1.1 Code Enforcement

The most important local responsibility in realizing the State's energy policy objectives is enforcement of the Energy Code. Enforcement, by and large, is a local task. The State is responsible for training and the provision of supporting technical resources. There is little doubt that these efforts will require more people and money. But just as important, State and local officials responsible for Energy Code matters need to develop a shared recognition of how critically important rigorous Energy Code enforcement and verification of compliance have become in the State's quest to improve its economy and environment in the coming years.

6.1.2 Planning

Municipalities are authorized to undertake comprehensive planning through New York's General City, Town and Village Laws. Similar provisions exist in the General Municipal Law, which grants counties and regional planning councils the authority to develop county and regional comprehensive plans. While the statutes suggest a wide range of topics to be included in a comprehensive plan, they do not specifically address those related to energy. Making energy an explicit issue area will raise its visibility as an element of a community's or region's long range planning, serve as the basis for modifying local zoning and other land use regulations, and lay the foundation for increased understanding by local governments of the role they play in achieving the State's energy objectives.

Integration of energy considerations into local and regional comprehensive plans will help ensure that such plans promote development patterns and initiatives that reduce energy demand and GHG emissions, lessen environmental impacts on overburdened communities, and encourage energy efficiency. Local planning initiatives may include enhanced building codes and aggressive code enforcement programs. Through comprehensive planning that incorporates stakeholder input, adjoining communities and counties can establish regional approaches to energy-related issues, including strategies for public transportation and congestion mitigation in all overburdened communities.

Integration of clean energy goals at the local level fosters energy security through an assessment of a locality's energy assets, both in terms of natural resources and energy infrastructure. Such assessments often identify economic development opportunities, such as the development of local wind resources or achieving energy cost reduction goals through energy efficiency. These opportunities need not be centered only on meeting the locality's individual energy requirements, but also on the identification of opportunities for energy systems investments that can benefit the State as a whole. These types of projects, such as biomass facilities utilizing locally harvested fuels, may produce fuels or energy specifically for "export" to other regions of the State. Assessments of such potentials at the local level, along with stakeholder input, may help facilitate local community acceptance of such projects and identify potential solutions to State energy needs.

Comprehensive planning, at both the municipal and regional levels, serves as an effective mechanism to identify and initiate so-called "Smart Growth" reforms. Smart Growth can foster fundamental changes in the way New York approaches how and where we live, help to target the State's economic development opportunities, and direct energy investments from federal, State, and local sources. The Governor's Smart Growth Cabinet defines Smart Growth as sensible, planned, efficient growth that integrates economic development and job creation with community quality-of-life by preserving and enhancing the built and natural environments. Chief among the principles behind Smart Growth is that such planning responds to a community's own sense of how and where it wants to grow. Consistent with the State's energy policy objectives, a chief benefit of Smart Growth is the potential efficiency gains derived from communities that plan around compact, mixed-use centers that do not rely on automobile trips for all day-to-day needs.

Smart Growth encourages growth in developed areas with existing infrastructure to sustain it, particularly municipal centers, downtowns ("Main Streets"), urban cores, hamlets, historic districts, and older first-tier suburbs. Smart Growth integrates land use planning and transportation on both the local and regional level to create communities that use less energy: that is, compact, mixed-use, walkable/bikable, transit-friendly communities that rely less on automobile travel. For instance, food travels on average between 1,500 to 2,500 miles to be delivered to the consumer; this is over 25 percent farther today than it was in 1980. By buying locally grown food, so called "food miles" can be reduced, along with the release of GHG from this agriculture transportation. Considering how Smart Growth strategies could be implemented downstate, the greater New York Metro Area has infrastructure that can foster expansion of

Transit Oriented Development (TOD), providing an energy efficient development design that allows for the mixed-use community while also providing a less energy intensive local transportation system. The Tappan Zee Bridge project has explicitly incorporated a municipal outreach program supporting TOD planning by communities in the corridor in anticipation of the significant transit service enhancements that will be introduced as an integrated element of the Bridge project. The Tappan Zee Bridge project TOD outreach modules are being developed as a resource to support TOD training and outreach throughout the State. Specific to foster Smart Growth upstate, additional investments in rapid transit bus service and associated improvements are needed in transit intensive corridors.

As an indicator of State support, DOS recently announced its Lower Hudson Valley Smart Growth grant program which includes \$250,000 for a regional plan that integrates land use planning, State transportation infrastructure projects, and VMT, with the goal of reducing automobile dependence and transportation based GHG emissions.

In certain instances, the results of local energy planning initiatives inform State policy and planning efforts. As an example, in June 2009, the City of New York issued a Master Electric Transmission Plan for New York City, a comprehensive and extremely informative investigation of the City's electricity transmission and generation options over the next 10 years. In late 2009, the New York City Energy Planning Board will present the results of its more general regional energy planning process, which addresses challenges and issues specific to the downstate region. The City's energy planning effort is an outgrowth of PlaNYC, an ambitious and comprehensive sustainability plan for New York City.

Finally, on occasion, State and local agencies, as well as private parties, enter into joint studies and ongoing collaboration on energy projects of major regional interest. LIPA and Con Edison have completed a technical interconnection study to identify the resources and investment necessary to connect wind resources off Long Island that could serve both Long Island and New York City's electricity needs. This collaborative has expanded to include NYPA, NYSERDA, the MTA, and the Port Authority of New York and New Jersey under the name of the Long Island-New York City Wind Collaborative. A Request for Expressions of Interest to site and build wind resources off the coast of Long Island was released in June 2009 to begin the next phase of the development process.

Recommendation

- Facilitate consistency among multiple levels of government.
 - Revise the City, Town, Village, and General Municipal Laws to incorporate energy considerations in Comprehensive Plans. Revisions should be made to explicitly identify energy components that would engage communities in helping to meet the State's energy goals.
 - Develop Tax Increment Financing reform legislation to encourage the redevelopment of distressed communities and revitalize downtown areas as recommended by the Governor's Smart Growth Cabinet.
 - Promote land use patterns that reduce reliance on vehicle trips and establish consistency between transportation planning and land use planning.
 - Provide technical assistance and funding opportunities via State grant programs for local and regional energy planning and implementation activities that help meet State energy goals.

- Promote land use and zoning tools that support Smart Growth.
- Pursue TOD strategies and expand the DOS's current initiative working with MTA to encourage development in the Hudson Valley and Long Island along MTA transportation routes. Specifically, the State should expand the inter-agency TOD incentive package beyond the MTA's rail service area to include upstate TOD opportunities around rail and bus. Sustainable transportation features such as TOD should be incorporated into major transportation projects and TOD outreach modules should be incorporated into DOS municipal land use training.

6.1.3 Local Initiatives

Throughout New York, communities are integrating the State's energy policy objectives into municipal and regional initiatives. Recent efforts include:

- Westchester County recently completed an "Action Plan for Climate Change and Sustainable Development" that provides strategies to reduce GHG emissions associated with energy, transportation, land use, recycling and waste management, and water resources management. The county-wide action plan provides guidance on actions to be taken by various sectors within the county, including county government, municipalities, business, education, and households.
- On Long Island, the Town of Babylon has been at the forefront of innovative energy efficiency programs. In late 2008, the Town unveiled a new program, the "Long Island Green Homes Program," which provides financing to homeowners for energy efficiency improvements. Prior to this program, Babylon became the first town on Long Island to adopt ENERGY STAR standards for new homes, and subsequently established a requirement that all new commercial and industrial buildings over 4,000 sq. ft. meet the U.S. Green Building Council's LEED (Leadership in Energy and Environmental Design) certification standards. Eight other Long Island towns have followed suit by adopting ENERGY STAR standards as a mandated minimum for residential construction.¹¹⁶
- In upstate New York, the Central New York Green Team, which consists of over 50 partners within government, industry and the academic community, is actively engaged in green sector development. One such recent green initiative is the partnership between the City of Syracuse, Onondaga County and the SUNY College of Environmental Science and Forestry to develop a willow biomass-to-energy plant that initially is expected to provide power to all public facilities within the county.

The State is supporting – and will continue to support – these and similar initiatives through the promotion of the DEC's and NYSERDA's Climate Smart Communities program. To this end, the State is developing a comprehensive Climate Smart Communities guide that will provide detailed information to help communities develop and implement climate smart practices. This guide will include step-by-step guidance for planning and implementing climate smart practices, information on resources and funding, examples of successful implementation, and considerations for measuring and monitoring success. Climate Smart Communities begin by adopting a model resolution that includes a pledge to combat climate change, appointing a taskforce with designated leaders, inventorying the community's GHG

¹¹⁶ Of New York State towns reporting, the towns of Greenburg, Hempstead, Babylon, Yorktown, Southampton, Brookhaven, Riverhead, Smithtown, and Clarkstown have adopted ENERGY STAR as a mandated minimum for residential construction.

emissions, and developing a climate action plan (a strategy to put new practices in place). The program emphasizes the importance of community awareness of their contributions to GHG emissions and action in reducing GHG emissions and adapting to climate change. The comprehensive planning process can help communities integrate their climate goals in a way that aligns with their land use goals.

Programs to improve energy efficiency, such as the federal ARRA's energy efficiency programs and other existing and proposed programs, are intended to help municipalities take on a level of responsibility for achieving energy policy and climate policy goals together. A number of recent initiatives are meant to foster greater municipal participation in the programs. First, to make it easier for local governments and schools to access energy efficiency programs, Governor Paterson called for the creation of a clearinghouse to serve as a single point of access for information on all energy efficiency programs, which is now available at <http://www.nyserda.org/clearinghouse/>. Second, legislation proposed by the Governor was enacted that will expand NYPA's energy services program.¹¹⁷ The expansion will allow any municipality in the State to access NYPA's program which provides upfront capital for local governments to retrofit public buildings, install clean DG, or make other green building upgrades. Lastly, the ARRA provided \$123 million to New York through the State Energy Program and \$175 million through the Energy Efficiency and Conservation Block Grant Program, both of which will provide grant opportunities for local governments to pursue clean energy projects.¹¹⁸ Combined, these new State and federal resources enable local governments to implement shared energy priorities.

Recommendation

- Promote Climate Smart Communities.
 - Increase the number of communities participating in Climate Smart Communities.

6.1.4 Community and Citizen Participation

New York's geographic diversity, and the substantial differences in population density from one area of the State to another, present unique challenges and opportunities for energy infrastructure planning and development. Major energy projects that are designed to advance the State's clean energy economy, such as wind farms or transmission lines, may provide benefits to one community while saddling another with new burdens. The challenges extend beyond issues that pit upstate areas against downstate areas. For example, complex challenges arise when energy projects are proposed to be located in communities within New York City that are already overburdened by ongoing construction projects and traffic pollution.

One way to address – if not resolve – these problems is to assure early, meaningful local and public participation in major energy project siting proceedings. Community and citizen participation has been a part of energy policy decision-making in New York for decades; however, public outreach and meaningful participation in energy decision-making could be improved. Collaboration with local communities and stakeholders can further energy policy goals by facilitating the development of needed projects. Early consultation and communication with communities could prevent unnecessary delays by addressing community concerns and promoting transparency in energy development. Community and

¹¹⁷ Chapter 477 of the Laws of 2009.

¹¹⁸ For more information on the State Energy Program and Energy Efficiency Conservation Block Grant Program, visit NYSEDA. *Economic Recovery and Energy*. 2009. <http://www.nyserda.org/economicrecovery/default.asp>

stakeholder collaboration can also lead to creative, efficient resolution of issues regarding energy related development.

Enhancing public participation in the siting processes, for both generation and transmission facilities, has particular importance because it can advance principles of environmental justice. Environmental justice policies must account for both the substantive impact of energy decision-making – such as the location of a new power plant or oil storage tank – as well as the regulatory decision making process that is used by the government. Ensuring that adequate outreach and robust community participation provisions are incorporated into such processes is essential.

In particular, community collaboration should be a factor in energy infrastructure siting. Energy infrastructure decisions often raise environmental justice concerns, particularly with respect to electric power plant siting decisions and transmission projects. Some processes, including the expired PSL Article X siting law, incorporated some review of environmental justice issues, provided for enhanced public participation, and focused on specific potential impacts to neighborhoods such as air pollution emissions and construction impacts. Since the expiration of Article X, the SEQRA energy infrastructure approval proceeding does not adequately provide for community participation or take into account the impact of new facilities on already burdened communities. As discussed in Chapter 4, creating a siting law similar to Article X with a comprehensive assessment of the environmental and health impacts of a proposed project, along with funding for community participation in the regulatory process, will advance environmental justice.

Most essential to the collaboration with communities is the impact of energy policies and programs on public health, the environment, and a community's way of life. For example, mapping of environmental justice communities and asthma rates provides data that may better inform government and community programs. Community impact issues may be qualitative in nature, but may nonetheless support the identification of alternatives or mitigation efforts that can meet broad energy policy goals, or meet the health and environmental needs of the community. Opposition to wind energy development has identified some instances where both quantitative and qualitative analysis may be helpful to provide clarity to government decision makers, resolve public concerns, and result in a more informed process and identification of potential alternatives. Supporting and promoting these mapping and informational analyses will continue to enhance community collaboration.

Recommendation

- Address the energy-related public health and safety needs of communities.
 - Enhance mechanisms for early, fair, and meaningful public involvement in energy-related decisions (through such measures as improved public outreach and notice, alternative times and locations for public meetings, and language translation of notices and key documents).
 - Develop energy facility siting and permitting procedures to assess and consider disproportionate environmental burdens in potential environmental justice areas.
 - Incorporate procedures in the Report of the Health Outcome Data Work Group into facility siting and permitting processes.

6.2 Other States and Provinces

Increased cooperation and coordination among states in the region, and more intense efforts to resolve issues and identify opportunities with nearby Canadian provinces, are needed now more than ever. Success in these initiatives will dramatically improve the State's chances of fully satisfying its energy policy objectives, support economic growth, and help bring to fruition a clean energy economy.

At least three important circumstances justify the importance of aggressively pursuing the State's objectives by looking beyond our borders:

- Offshore Energy Development. New York's open coastal waters off Long Island Sound, the Atlantic Ocean, and the Great Lakes are attracting increased interest for development of traditional pipeline and cable infrastructure, LNG transshipment and storage facilities, and renewable energy generation from wind, currents and tides. Meeting New York's energy policy goals will depend on adequate access to these State waters and areas further offshore. Moreover, the competing needs of multiple stakeholders, including fishing, recreation, as well as neighboring states and provinces, will have to be considered in New York's decision-making, particularly in offshore areas. New York has traditionally accessed offshore areas for energy infrastructure, mostly for fuel pipelines or electricity transmission lines, and future access to these areas for siting commercial-scale energy generation or storage projects will require considerable regional collaboration.
- Increasing Reliance on Renewables. The State has deepened its commitment to rely on renewable resources to meet its electricity needs. The State's decades-long dealings with Hydro Quebec and Ontario, Canada provide an excellent platform for expanding the State's purchases of hydropower. However, there are issues that must be resolved before this opportunity can be realized. The economics of any proposed transactions must make sense to both parties, and there is a need to resolve interstate and intrastate questions of cost recovery and cost allocation for any capital expenditure for related new transmission capacity.
- Avoiding Risks and Recognizing the Nature of the Challenges. As discussed below, the wisdom of proceeding on a regional basis for abating GHG emissions from the electric sector is being confirmed every day. A sustained regional approach to solving similar problems provides comfort that the State is not causing further deterioration in its relative economic position and is a recognition that the nature and scope of certain environmental challenges go far beyond the borders of any single state.

These issues have provided a great deal of the impetus for the following initiatives, in many instances led by New York.

6.2.1 Regional Greenhouse Gas Initiative

RGGI is a market-based cap-and-trade program established to reduce GHG emissions from electric power generation. With 10 participating Northeast and Mid-Atlantic States, including New York, RGGI is the first program of its kind in the nation serving as a model not only for a future national program to reduce CO₂ emissions, but for other regional energy initiatives. New York has participated in the successful RGGI CO₂ auction program along with neighboring RGGI states. The auction of allowances has generated additional funding for direct State investment and support to leverage private investments in the clean energy economy across all sectors, including energy efficiency in buildings, renewable energy generation, research and development, and transportation efficiency initiatives.

The success of RGGI not only demonstrates how regional cooperation can advance broad policy objectives and provide leadership on issues, but also demonstrates how markets will respond to regional actions. Such regional efforts also provide a working example of how federal policies might be developed to pursue similar national objectives.

RGGI is already serving as a transformational model. The program resolved multi-jurisdictional issues – multi-state and multi-discipline (energy and environment) – to craft a unified program to address critical energy, economic, and environmental issues. The success of RGGI has led the participating states to consider other possible areas of cooperation in advancing climate policy. The low carbon fuel standard, summarized below, is just such an initiative.

6.2.2 Northeast and Mid-Atlantic States Governors Meeting

The Northeast and Mid-Atlantic States Governors (NEMAG) meeting on clean energy cooperation was convened in New York City in September 2008 to identify activities related to clean energy projects, policies, programs, and market development that are ripe for regional governmental collaboration. The goal of the forum, hosted by Governors Paterson of New York and Patrick of Massachusetts, was to initiate an ongoing process for regional collaboration on clean energy issues identified by the states. The NEMAG proposition is that by acting as a region, the Northeast can find a means to better position the region and the individual states within the region, and to realize the energy, economic development, and environmental opportunities of clean energy policy and program implementation. The forum was reconvened in October 2009 and plans for continued discussions have been made and are anticipated to continue.

6.2.3 Mid-Atlantic Regional Council on the Ocean

Recognizing that renewable offshore energy can foster a more efficient and sustainable regional economy, improve energy security and independence in the region, and improve the quality of life for citizens, the Governors of New York, New Jersey, Delaware, Maryland, and Virginia have created a structure - MARCO - for the states to collaborate on shared challenges facing ocean ecosystems. One of four initial priority areas for collaboration is the promotion of sustainable development of the region's renewable offshore energy resources, including wind energy, through a more predictable regulatory regime that accommodates other ocean uses. In June 2009, Governor Paterson and New Jersey Governor Corzine convened a summit on ocean issues in the Mid-Atlantic region to launch this formal partnership among the states, as recommended by New York's Ocean and Great Lakes Ecosystem Conservation Council. Council activities are expected to focus initially on coordination of information and data-gathering across the region, in part to identify shared challenges in the siting of new energy development.

6.2.4 Great Lakes Wind Collaborative

The Great Lakes Wind Collaborative is a forum in which information on sustainable wind power development in the region is analyzed and shared, with a focus on offshore development in the Great Lakes. The Great Lakes region has the potential to generate \$80 billion in economic activity and 300,000 jobs for the region from wind.¹¹⁹ Furthermore, it is estimated that there is the potential for 3,000 MW in wind capacity off the shore of Lake Erie alone. In December 2009, NYPA released a Request for

¹¹⁹ Great Lakes Wind Collaborative. *Quarterly Update*. 2008. <http://www.glc.org/energy/wind/quarterly/july08.html>

Proposals to develop wind resources in Lakes Erie and Ontario to help meet the Governor's '45 by 15' clean energy program goal, consistent with the development plans of the Collaborative.

6.2.5 I-95 Coalition

New York is a member of the I-95 Coalition, a group of states through which the I-95 highway runs. The Coalition efforts include promoting and using ITS and other energy efficient transportation technologies on the highway.

6.2.6 Coalition of Northeast Governors

Governor Paterson is currently chair of the Coalition of Northeast Governors (CONEG), an association of the Governors of the eight Northeastern states, formed in 1976 to encourage intergovernmental cooperation on issues relating to the economic, environmental, and social well-being of the Northeast states. CONEG provides a forum for the governors to identify shared priorities and to develop agreements and take action on regional, state, and federal issues. Priorities include renewable energy, transportation, increasing energy efficiency of new and existing buildings, and promotion of the National Biomass Partnership. For example, CONEG is working with Congress to support energy efficient high speed rail as part of the ARRA. CONEG provides New York the opportunity to help create new intergovernmental relationships and guide regional/state/federal collaborations – of which energy will be a key policy area in the near term.

6.2.7 Other Regional Initiatives

Other less formal, but equally important, regional initiatives are underway, such as:

- New York has been engaged in discussions with Ontario and Quebec to identify feasible opportunities for importing more renewable electricity into New York. The focus to date has been on identifying technical expansions of existing transmission rights-of-way for moving more power from Canada and upstate New York to the downstate region, where supplies are tighter and prices are higher. New York is also working with Ontario and Quebec to improve energy efficient rail services.
- Based on the success of RGGI, the Northeast and Mid-Atlantic States have committed to an effort to analyze low carbon fuel supply options and develop a framework for a regional low carbon fuel standard to help ensure sustainable use of renewable fuels in the region. Development of the standard as a regional effort, rather than traditional state-by-state adoption of such environmental standards, will help to advance policy more expeditiously, and allow the region to develop a larger voice at the national level than would otherwise be experienced by state-by-state action. This effort is in collaboration with the Northeast States for Coordinated Air Use Management (NESCAUM), which is conducting a study of low carbon fuel standards for the region.
- The State participates in the Eastern Regional Interconnect Collaborative, tasked with transmission planning for the Eastern Interconnect.

Through these and other collaborative efforts, the State is well positioned to take maximum advantage of shared regional interests in pursuing its own energy priorities. Greater collaboration and planning of all the involved jurisdictions and agencies is necessary to help maximize use of the resources. New York should continue to play an integral role in this planning effort to help ensure that the State's needs are incorporated into any such planning efforts, and to assist in the process to analyze and allocate the

specific uses, combinations of uses, or areas requiring protections. Such collaboration and planning will reduce conflicts among users, provide greater certainty for private investment, and reduce conflicts between natural resource conservation and economic development.

Recommendation

- Collaborate regionally to advance the State's clean energy goals.
 - Develop a New York offshore ocean plan to identify appropriate areas for renewable energy development and transmission, in coordination with neighboring states and federal agencies.
 - Ensure continued progress in addressing regional clean energy issues through the leadership of NEMAG.
 - Advance multi-state actions through the interstate Mid-Atlantic Governors Agreement on Ocean Conservation that will improve the region's competitiveness for offshore renewable energy projects.

6.3 Participating in the National Debate and Coordinating with Federal Agencies

6.3.1 National Policy

The Obama Administration has moved aggressively on adopting new energy policies to improve the nation's energy security and help create a clean energy economy and has prompted Congress to advance energy policies that build on New York's policies and those of other leading states. Climate change legislation is advancing in Congress in recognition of the impacts of the nation's energy use on climate. Renewable energy and energy efficiency programs are being funded at unprecedented levels by the federal government, with a partnership role for the states defined in the administration of such programs. Governor Paterson's Washington D.C. office is fully engaged in the development of new federal programs with the Obama Administration and with Congress to develop national programs that coincide with and bolster New York's energy, environment, and economic development policies. New York's Congressional Delegation – in both the Senate and the House of Representatives – serve as key advocates in federal energy policy and program development, and they have been influential in advancing national policies from which New York will be able to realize significant benefit. The process to develop a national CO₂ cap-and-trade program, a combined renewable energy and energy efficiency portfolio standard program, electric transmission line siting procedures, and other essential policy initiatives, has already benefitted from the expertise of DEC, NYSERDA, DPS, and other New York State agencies. These efforts must be continued to ensure that the most effective national programs can be implemented and that they provide New York a platform upon which the State's clean energy agenda can be fully realized.

In emerging transportation policy, new CAFE standards for light duty vehicles have been adopted for the first time in decades and DOE and National Academy of Sciences are studying the potential for adopting CAFE standards for medium and heavy duty vehicles. While the new CAFE standards are a historic step in the right direction, there is room for greater achievement with fuel economy standards. Achieving a CAFE standard of 43.3 mpg for cars and 34.7 mpg for light trucks is technologically and economically feasible with existing technology.

The State is also working with other states and interested groups in the reauthorization of the Federal Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), which provides funding for highways and public transportation. SAFETEA-LU expires on September 30, 2009. Because this legislation establishes funding and priorities for surface transportation in the nation, the reauthorized SAFETEA-LU is an opportunity to help New Yorkers conserve energy, improve safety, and reduce pollution while enhancing the mobility of goods and people. In the new legislation, New York will seek to preserve and maintain essential infrastructure, increase funding for public transportation, preserve the Congestion Mitigation and Air Quality program, increase funding for system efficiency and energy efficient modes, dedicate funding for rail, and change federal funding formulae to recognize energy efficient transportation. New York will also seek extension of the federal legislation that authorizes the popular Clean Pass program on the Long Island Expressway.

These and other federal policies will likely require the State to make investments in energy systems or to match federal funding provided for energy projects. It is critical, at this juncture in time, that the federal government assume more leadership and establish national energy policies which the states have been pursuing very aggressively on their own. However, collaboration with the federal government, as these policies are developed, will need to focus on retention of state sovereignty in making energy policy and program decisions that meet federal standards. Such sovereignty issues have been an issue in the development of requirements in proposed renewable energy and energy efficiency portfolio standard programs, and decision-making authority and processes with respect to electric transmission lines. Federal policies and programs must recognize New York's unique energy infrastructure and needs, as well as the State's institutional structures and processes that continue to serve the State well. Imposition of federally-designed, one-size-fits-all energy programs might not be the most advantageous or cost-effective means to achieve federal or state goals.

Specifically, collaboration with the federal government must focus on the need for the federal government to establish national programs and standards to provide guidance to the states, energy market participants, and energy policy stakeholders to achieve national standards. The federal government must recognize, however, the essential role of the states to craft specific policies and programs to achieve federal goals and meet individual states' needs. This is particularly pertinent in light of recent proposals for building transmission infrastructure to transport low-cost Midwestern power to the east coast. Regional and in-state transmission projects should take precedence over a one-size-fits-all federal solution. The regional and in-state solutions would likely also be significantly cheaper and much easier to site. In either case, states should be given the opportunity to site their own energy projects as needs arise rather than having a federal solution imposed upon them.

6.3.2 Agency Coordination

In addition to the impact of federal action to create a clean energy economy and address climate change and fuel efficiency, the federal government has significant regulatory authority that impacts energy planning and development.

Standards and protocols for Smart Grid investments are being developed at the State and federal levels. While the State has jurisdiction over the standards and protocols applicable to distribution and end-user Smart Grid technologies, the Federal Energy Regulatory Commission (FERC) has responsibility for the standards and protocols for transmission Smart Grid technologies. The PSC has worked through the National Association of Regulatory Utility Commissioners (NARUC) in a collaborative effort with FERC to provide guidelines to DOE for its Smart Grid Demonstration Project Grant Program. These guidelines address issues including interoperability, cyber security, and stranded costs – issues which apply to

transmission and distribution systems and end-user Smart Grid investments alike. This collaborative effort may help avoid possible future uncertainty regarding applicable standards and protocols.

The offshore regulatory environment is complex, with federal and state jurisdictions and responsibilities that influence the siting and development of energy projects. For example, the Energy Policy Act of 2005 granted the Secretary of Interior the primary permitting authority for renewable energy development, e.g., wind, wave, and tidal in the Outer Continental Shelf. The FERC currently has guidance in place that allows for wave energy conversion facilities to be permitted in a stepped licensing procedure. Under the Deep Water Port Act of 1974 (33 U.S.C. 1501-1524), the U.S. Secretary of Transportation licenses the construction and operation of all oil and natural gas deep water ports, including LNG facilities, located beyond the U.S. territorial seas and off the U.S. coast.

Various other federal agencies have roles in offshore federal permitting processes that may be applicable to energy development, such as: the Army Corps of Engineers (structures in navigable waters), the Federal Aviation Administration (hazard to aviation), the Fish and Wildlife Service (Migratory Bird Treaty Act), the National Oceanic and Atmospheric Administration (Endangered Species Act, Marine Mammal Protection Act, Magnuson-Stevens Fishery Conservation and Management Act, National Marine Sanctuaries Act), the Environmental Protection Agency, the Maritime Administration, the U.S. Coast Guard, the Department of Transportation, and the Department of Energy (funding, technical assistance) and FERC (transmission).

These evolving federal initiatives and the large number of agencies and authorities involved point to the need for coordination between New York and the responsible federal agencies to make appropriately sited, economically viable offshore energy projects a reality along the Mid-Atlantic coast and the Great Lakes. There is a growing recognition of this need. For example, as a follow-up to the Northeast and Mid-Atlantic States Meeting on Clean Energy Cooperation, the U.S. Department of the Interior's Minerals Management Service (MMS) has tentatively agreed to establish a *New England-Mid-Atlantic States Joint Planning Agreement*. Among the goals of the Joint Planning Agreement would be the development of "a consistent, efficient approach to integrating state-federal activities, including resource assessment and data collection." The U.S. Offshore Wind Collaborative has drafted a letter to formally request this partnership between the states and MMS.

Recommendation

- Optimize coordination and collaboration with the federal government to ensure that New York's energy policy objectives and strategies will be advanced at the national level.
 - Work more closely with FERC to address issues of common concern for Smart Grid investments.
 - Provide regular briefings to New York Congressional Delegation on the State's energy programs and policies.

7 Implementation Plan

The Energy Plan contains many recommendations, some of which are already underway in some form and which will be continued and strengthened; some which require new action by agencies and considerations for action by the Legislature, independent authorities, boards and commissions; and some which require the initiation of new processes, procedures, or studies to inform future decisions. The following implementation plan identifies actions that will be taken over the planning horizon to advance the recommendations laid out in this Plan. The Planning Board will track the progress of these activities and report on that progress annually via the Energy Planning Website, www.nysenergyplan.com.

Acronyms Used in the Implementation Plan

AASHTO: American Association of State Highway and Transportation Officials	MPO: Metropolitan Planning Organization
Ag&Mkts: NYS Department of Agriculture and Markets	MTA: Metropolitan Transportation Authority
ASHRAE: American Society of Heating, Refrigerating, and Air-Conditioning Engineers	NACAA: National Association of Clean Air Agencies
BOMA: Building Owners and Managers Association	NARUC: National Association of Regulatory Utility Commissioners
CAFE: Corporate Average Fuel Economy	NY BEST: NY Battery and Energy Storage Technology Consortium
CPB: NYS Consumer Protection Board	NYC EDC: NYC Economic Development Corporation
CUNY: City University of New York	NYISO: NY Independent System Operator
DASNY: Dormitory Authority of the State of NY	NYPA: NY Power Authority
DEC: NYS Department of Environmental Conservation	NYSDOL: NYS Department of Labor
DHCR: NYS Division of Housing and Community Renewal	NYSERDA: NYS Energy Research and Development Authority
DOB: NYS Division of Budget	NYSTAR: NYS Foundation for Science, Technology and Innovation
DOE: U.S. Department of Energy	OGS: Office of General Services
DOH: NYS Department of Health	ORPS: NYS Office of Real Property Services
DOS: NYS Department of State	OTDA: NYS Office of Temporary and Disability Assistance
DOT: NYS Department of Transportation	PANYNJ: Port Authority of NY and NJ
DPS: NYS Department of Public Service	PSC: Public Service Commission
EEPS: Energy Efficiency Portfolio Standard	PSL: Public Service Law
EPA: U.S. Environmental Protection Agency	REBNY: Real Estate Board of NY
ESCO: Energy Service Company	RFP: Request for Proposals
ESD: Empire State Development Corporation	RGGI: Regional Greenhouse Gas Initiative
FERC: Federal Energy Regulatory Commission	RPS: Renewable Portfolio Standard
FHWA: Federal Highway Administration	SEQRA: State Environmental Quality Review Act
GHG: Greenhouse Gas	SUNY: State University of NY
ICC: International Code Council	T&F: NYS Tax & Finance
IECC: International Energy Conservation Code	TWY: NYS Thruway Authority
LIPA: Long Island Power Authority	USDOT: U.S. Department of Transportation
MMS: Minerals Management Service	

	RECOMMENDATIONS		LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION			
	ACTION ITEMS					2009	2010	2011	2013
Produce, Deliver, and Use Energy More Efficiently	Chapter 2: Produce, Deliver, and Use Energy More Efficiently								
	IMPROVE ENERGY EFFICIENCY PROGRAM COORDINATION								
	1 Consistently measure and report results of State administered efficiency programs								
	Expand the existing statewide Evaluation Advisory Group to include additional State agencies involved in energy efficiency programs	DPS	Current Evaluation Advisory Group members	NYC and Municipalities' participation	DHCR, DOS, and DASNY added to Evaluation Advisory Group; engage NYC				
	Develop standard measurement and reporting for statewide energy efficiency achievements	DPS	Current Evaluation Advisory Group members	NYC and Municipalities' participation	Standard evaluation, monitoring, and verification requirements finalized by the Evaluation Advisory Group				
	Release specific energy program achievement data including detailed evaluation reports on an on-going basis	DPS	LIPA, NYPA, and NYSERDA		Annual report	Annual report	Annual report	Annual report	
	2 Mitigate short-term impacts of rising energy costs on New York's low income populations								
	Expand and enhance low-income efficiency programs. Programs should include both implementation of energy efficiency measures and education on how to use energy more efficiently	DHCR, DPS, LIPA, and NYSERDA			Backlog of interested program participants eliminated	Annual report	Annual report	Annual report	
	IMPROVE ENERGY CODES AND STANDARDS								
	3 Improve the Energy Code								
	Eliminate pay-back requirement of measures and the 50% renovation loophole in the Energy Law	Executive Chamber	DOS and NYSERDA	State legislation	Amendments proposed by DOS in 2008 and 2009; Energy Law amendments to be in place to comply with American Recovery and Reinvestment Act				
	Update the Energy Code every three years	DOS	NYSERDA		2009 IECC for residential buildings and 2007 ASHRAE 90.1 for commercial buildings adopted	2012 Code adopted; process to adopt 2015 Code commenced	2015 Code adopted; process to adopt 2018 Code commenced		

	RECOMMENDATIONS		LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION				
	ACTION ITEMS					2009	2010	2011	2013	2014
Produce, Deliver, and Use Energy More Efficiently	Implement the Code compliance plan required by the American Recovery and Reinvestment Act		DOS	NYSERDA		Compliance plan formulated with NYSERDA		Baseline energy compliance levels for municipalities established; train code officials and design community; provide follow-up "circuit rider" training		
	Implement "Stretch Code" for municipalities wishing to implement "beyond code" programs		DOS	NYSERDA		ICC 700-2008 or ENERGY STAR reviewed for new residential construction		International Green Construction Code reviewed for Commercial Construction		
	4 Enact energy efficiency standards for products									
	Collaborate with other states to influence federal enactment of national standards		DOS	Executive Chamber and NYSERDA	Coordination of RGGI/Northeast Mid-Atlantic Governors Clean Energy Forum States	Contact made and on-going dialogue established with other states		Multiple appliances reviewed for regulation to maximize appliance efficiency	Continued review of DOE and California initiatives	
	Promulgate regulations to implement standards from 2005 legislation		DOS	Executive Chamber and NYSERDA	Coordination of Northeast Energy Efficiency Partnership and Appliance Efficiency Awareness Project	Small Consumer Product standards implemented				
	Adopt standards for other products not covered by national standards		DOS	Executive Chamber and NYSERDA	State legislation; Coordination of Northeast Energy Efficiency Partnership, the Appliance Efficiency Awareness Project	Legislation changes submitted, including funding for regulation tasks		Regulations to implement law promulgated		
	IMPROVE DELIVERY OF ENERGY EFFICIENCY PROGRAM INFORMATION									
	5 Assure that efficiency outreach, educational, and marketing efforts reflect best practices in design and delivery									
	Identify best practices nationwide and implement statewide		DPS and NYSERDA	Evaluation Advisory Group members		Best practices identified and implementation plan developed; plan shared with other program administrators		Program success measured against stated objectives; successes and failures incorporated into program reform		

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	RECOMMENDATIONS		LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION			
	ACTION ITEMS					2009 2010	2011 2013	2014 2018	
Produce, Deliver, and Use Energy More Efficiently	Utilize the Evaluation Advisory Group to integrate efficiency program activity and streamline communication to consumers		DPS	DHCR, LIPA, NYPA, and NYSERDA	Coordination with NYS investor owned utilities	Integrated outreach, education and marketing plan developed; single web portal for programs designed	Web portal implemented; marketing plan effectiveness evaluated		
	6 Use targeted outreach to deliver energy efficiency programs and services								
	Identify and partner with community-based organizations to reach diverse groups with tailored messages		DPS and NYSERDA	DEC	Coordination with NYS investor owned utilities	Community organizations identified and programs tailored to local group needs	Effectiveness of tailored programs and marketing evaluated and updated as necessary	Effectiveness of tailored programs and marketing evaluated and updated as necessary	
	Target industry marketing programs to support NY's Clean Energy Business Growth and high priority segments		DPS and NYSERDA	ESD		Target plan completed and implementation initiated	Effectiveness of targeted marketing evaluated and plan adjusted accordingly		
	Target underserved markets		NYSERDA	DEC, DHCR, and DPS	Coordination with the Environmental Justice Interagency Task Force	Complete development of Green Jobs - Green NY Rules; increase number of energy workshops and select workshop contractor; coordinate with Environmental Justice Task Force and communities	Full implementation of Environmental Justice plan promulgated		
	Maintain the Energy Efficiency Clearinghouse Website and expand as appropriate		NYSERDA	DPS		Website traffic evaluated for audience targeting; list of aggregation opportunities and agency partnerships developed	Website effectiveness evaluated and adjusted accordingly		
	7 Supplement the Truth in Heating law to provide energy efficiency information of buildings to prospective purchasers								
	Supplement Truth in Heating Law requirements		DPS	CPB	State legislation	Legislation submitted	Regulations to implement law promulgated		

	RECOMMENDATIONS		LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION				
	ACTION ITEMS					2009	2010	2011	2013	2014
Produce, Deliver, and Use Energy More Efficiently	8 Explore energy-use benchmarking programs for buildings which includes public disclosure									
	Explore statewide public disclosure of building energy use		NYSERDA	DPS, OGS, and other agencies that own buildings	Participation of EPA, NYC EDC, NYC Mayors Office, REBNY, BOMA, local governments, utilities, large municipalities, private building owners, and ESCOs	Evaluation of benchmarking policy options for New York State completed		Phased plan for moving forward developed; initial disclosure requirement established		Initial disclosure mechanisms implemented; evaluate and assess energy savings, costs of achieving savings, and impacts on property values and local tax base completed
	REDUCE FINANCIAL BARRIERS TO ENERGY EFFICIENCY INVESTMENTS									
	9 Identify and implement alternative financing programs to fund energy efficiency projects									
	Implement revolving loan fund from Green Jobs - Green NY Program		NYSERDA			Program launched				
	Evaluate the need for, value and feasibility of on-bill financing or recovery and implement as appropriate		DPS			Conclude investigation of the barriers to on-bill financing and comparison with other sources of funding		If warranted, develop implementation strategies to address barriers; expand or modify pilot programs based on ongoing evaluation		Continue to implement strategies to address barriers
	IMPROVE ENERGY EFFICIENCY OF STATE GOVERNMENT BUILDINGS									
	10 Reduce energy use in State buildings									
	Amend Executive Order 111 to improve process, scope, and metrics to help ensure progress toward consumption reduction goals		Executive Chamber	NYSERDA		Executive Order 111 amended; improved agency data collection developed				

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	RECOMMENDATIONS		LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION				
	ACTION ITEMS					2009	2010	2011	2013	2014
Produce, Deliver, and Use Energy More Efficiently	Encourage State agencies and local governments to work with NYPA to take advantage of its efficiency financing programs		NYPA	Executive Chamber		Program materials for NYPA's program developed and distributed to agencies	Annual reporting of cost savings based on program participation initiated			
	SUPPORT ENERGY EFFICIENCY POLICIES									
	11 Implement Energy Efficiency programs to reduce State electricity demand from projected levels									
	Continue implementation of efficiency programs to meet '15 by 15' goal		Executive Chamber	DPS, LIPA, NYPA, and NYSERDA	Coordination with NYS investor-owned utilities	PSC actions on all proposed EEPS programs completed	Report released on progress toward proposed goals; programs adjusted to ensure achievement of goals; efficiency programs evaluated for continuation beyond 2015			
	Ensure appropriate contribution of NYPA and LIPA to State efficiency goals		LIPA and NYPA			NYPA and LIPA report on efficiency programs and projected impact; programs adjusted to achieve statewide goals	NYPA and LIPA contributions to efficiency goals measured; programs adjusted accordingly			
	12 Expand green transportation choices and use across the State									
Identify available green transportation choices and promote them		DOT	DEC, MTA, and NYSERDA	Coordination with transit operators, local transportation agencies, and USDOT	DOT programming principles realigned; advocate at the federal level; outreach efforts to MPOs and other transportation organizations developed; Clean Air NY and "511" utilized to promote alternative options for commuters	Commuter choice and Travel Demand Management programs expanded statewide				

	RECOMMENDATIONS	LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION			
	ACTION ITEMS				2009	2010	2011	2013
Produce, Deliver, and Use Energy More Efficiently	Identify opportunities to expand green transportation choices	DOT	DEC, MTA, and NYSERDA	Coordination with NY Congressional Delegation, USDOT, AASHTO, and American Public Transportation Association	Changes in Federal guidance and Federal financial support in Surface Transportation Bill advocated for by NYS	Federal Surface Transportation bill established that supports commuter choice programs	Enhanced version of Federal surface transportation legislation developed	
	State agencies include systematic consideration of transportation choices, energy use, energy conservation, and climate change as part of their State Environmental Quality Review Act reviews	DEC	DOT		DEC provides training on SEQRA GHG guidance to other agencies and authorities; outreach to MPOs and other transportation agencies; Updated DOT guidance	Review and update, as necessary	Review and update, as necessary	
	Endorse Smart Growth and GHG emission reductions as key principles in Transportation Plans and Transportation Improvement Programs	DOT	DEC and DOS	Coordination with Smart Growth Cabinet and MPOs	GHG benefits of Transportation Improvement Programs and Long Range Plans continue to be quantified; DOT's ability to quantify GHG emissions for rural areas and statewide plans is enhanced	Updated DOT planning guidance that includes emission reduction and Smart Growth considerations		
	13 Support federal action to encourage energy efficiency and GHG reductions from the transportation sector							
	Work with NY Congressional Delegation and transportation organizations to develop new funding formulas within the next Surface Transportation funding bill that provide incentives to states to reduce energy use	DOT	DEC	Coordination with NY Congressional Delegation, AASHTO, and USDOT		Federal Surface Transportation bill established with new funding formulas that enable and encourage energy efficiency and emission reductions	Funding enhanced in Federal surface transportation legislation	

	RECOMMENDATIONS		SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION				
	ACTION ITEMS	LEAD AGENCIES			2009	2010	2011	2013	2014
Produce, Deliver, and Use Energy More Efficiently	Work with the federal government to strengthen the recently proposed CAFE standards	Executive Chamber	DOT, DEC, and NYSERDA	Coordination with AASHTO, NY Congressional Delegation, and NACAA	More aggressive standards and timetable for new CAFE Standards advocated and developed			More aggressive CAFE standards for light duty cars and trucks established	
	IMPROVE ELECTRIC SYSTEM EFFICIENCY								
	14 Encourage demand response								
	As appropriate, direct implementation of cost-effective approaches and technologies that facilitate demand response to achieve reliability and other public policy objectives	PSC	NYSERDA	Coordination of the NYISO	Con Edison implements programs per PSC Order in C.09-E-0115; collaboration continued on improvements to the NYISO demand response programs	Enhanced individual utility and the NYISO demand response programs initiated		Evaluate and develop individual utility and the NYISO demand response programs as appropriate	
	15 Support investments in Smart Grid								
	Work with the Smart Grid Consortium to develop action plans	DPS, LIPA, NYPA, NYSEDA, and NYSTAR		Coordination with DOE	Continued participation in Consortium Meetings; Smart Grid Action Plan drafted	Opportunities identified to advance Smart Grid technologies and viable options are implemented		Smart Grid technologies and programs continuously evaluated	
	The PSC should consider approving Smart Grid investments where they are shown to benefit ratepayers	PSC		Coordination with investor-owned utilities	Utility proposals for Smart Grid investments considered	Approved Smart Grid investments are deployed			
	16 Use electricity price signals to help level load and reduce generation requirements								
	Study potential requirement that electricity be priced on a time of use basis for all customers	DPS	NYSEDA	State legislation to require residential time of use pricing	Time of use electricity pricing analyzed	Upon a finding that it is in the public interest to do so, legislation submitted to allow residential requirement for time of use pricing			
	Implement rate structures and metering requirements for non-residential customers that encourage shifting use of electricity to off-peak hours	PSC			Demand thresholds reduced as deemed appropriate by the PSC	Continue to reduce demand thresholds as deemed appropriate by the PSC		Continue to reduce demand thresholds as deemed appropriate by the PSC	

	RECOMMENDATIONS	LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION				
	ACTION ITEMS				2009	2010	2011	2013	2014
	17 Encourage energy storage deployments								
	Define energy storage technologies under PSL, Section 2(2-b) as a means to facilitate permitting	Executive Chamber	DPS	State legislation	Submit legislation defining energy storage technologies				
Support Development of In State Energy Supplies	Chapter 3: Support Development of In State Energy Supplies								
	EXPAND AND IMPROVE RPS GOAL TO MEET 30 BY 15 GOAL								
	1 Encourage in-state renewable energy development through the Renewable Portfolio Standard								
	Expand the RPS Program to meet the Governor's goal to meet 30 percent of the State's electricity needs with renewable resources by 2015	PSC	NYSERDA			Addressed by the PSC as part of Mid-Course Review	Milestones developed based upon outcome of the PSC review		
	Enhance certainty in the renewable energy market by scheduling regular solicitations for Main Tier procurements	NYSERDA and PSC				PSC order on RPS solicitation schedule	Milestones developed based upon outcome of the PSC review		
	Create a tracking and trading system for Renewable Energy Credits	NYSERDA and PSC			Coordination with the NYISO	PSC addresses track and trade system as part of RPS mid-course review	Milestones developed based upon outcome of the PSC review		
	Continue to provide RPS incentives for environmentally beneficial, renewable distributed generation resources	NYSERDA and PSC				PSC addresses distributed generation systems as part of RPS mid-course review	Milestones developed based upon outcome of the PSC review		
Examine the transmission system to identify and evaluate bulk transmission system upgrades or expansions needed for reliability	NYPA and PSC			Coordination with FERC and the NYISO	DPS submits review of ongoing planning studies; appropriate actions and recommendations developed based on review	Recommendations implemented based on continued review process and reassessments			

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	RECOMMENDATIONS		LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION		
	ACTION ITEMS					2009 2010	2011 2013	2014 2018
Support Development of In State Energy Supplies	COMPLEMENT THE RPS PROGRAM WITH BILATERAL CONTRACTS							
	2 Encourage the State's power authorities to procure diverse renewable electricity resource development							
	NYPA and LIPA will report on the status of renewable energy projects in progress		LIPA and NYPA			Annual reports	Annual reports	Annual reports
	NYPA and LIPA will report on the total energy production capacity provided by renewable energy initiative projects including the electric capacity installed using renewable energy and purchased attributes by NYPA or on behalf of customers		NYPA and LIPA			Reports released annually from 2010 to 2015	Reports released annually from 2010 to 2015	Reports released annually from 2010 to 2015
	Investigate options for cost recovery mechanisms for renewable energy projects to minimize ratepayer impact		LIPA and NYPA			Report released in 2010		
	LIPA and NYPA will pursue development of large scale solar projects		LIPA and NYPA			Initial projects from LIPA's first 50 MW Solar RFP operational; contractors selected for implementation of NYPA's 100 MW solar initiative	All projects from LIPA's first 50 MW Solar RFP operational; second RFP opened depending on success of initial project; NYPA's 100 MW initiative becomes operational	Projects from a potential 3rd solar RFP reviewed or will be operational
	LIPA will develop Renewable Resource Center as part of Smart Grid Corridor with smart meters installed on residential, commercial and industrial customers		LIPA	SUNY Farmingdale and SUNY Stony Brook	Receipt of stimulus fund to help support project		Software development completed; technology installations and construction initiated	
	3 Encourage LIPA and NYPA to proceed with issuing an RFP for the private development of offshore wind resources							
	Report on status of offshore wind projects		LIPA and NYPA			Report issued	Annual reports developed on viable projects	
	Provide financial and technical support through other available State and federal resources		LIPA and NYPA	DPS, DOT, DOS, DEC, NYSERDA, ESD, T&F, and OGS		Taskforce established to identify package of incentives for projects		

	RECOMMENDATIONS		LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION				
	ACTION ITEMS					2009	2010	2011	2013	2014
Support Development of In State Energy Supplies	NYPA to continue the RFP process for offshore wind in the Great Lakes		NYPA			RFP issued and creation of a short list of potential developers constructed		If appropriate, project development begun and permit approvals obtained	Licensing, construction, and interconnection of offshore wind farm completed; offshore wind farm fully operational by end of 2015	
	The Long Island-New York City Offshore Wind Collaborative will issue a RFP for development of offshore wind facility off the Rockaway Peninsula		LIPA and NYPA	PANYNJ, MTA, and NYSEDA	Support from other members of the Long Island-New York City Offshore Wind Collaborative	RFP issued for development of the offshore Wind Farm and a short list of potential developers selected		If viable, project development begun and permit approvals obtained	If viable, licensing, construction, and interconnection of offshore wind farm completed and operational	
	FACILITATE THE DEPLOYMENT OF DISTRIBUTED RENEWABLES									
	4 Facilitate the interconnection of distributed generation resources to the electric grid									
	Amend the net metering law for non-residential customers		Executive Chamber		State legislation	Legislation submitted				
	Examine the protocols used by the NYISO and utilities for connecting distributed generation sources to the grid		DPS	DEC and NYSEDA	Coordination with the NYISO	Advocacy initiated through stakeholder process at the NYISO for changes that encourage distributed generation, where appropriate, advocacy is taken to FERC		Process improvements implemented as appropriate		
	5 Assess the potential for siting renewable energy projects on State-owned lands and waterways									
	Inventory and analyze opportunities for renewable energy development on State-owned lands and waterways		Executive Chamber	State agencies and authorities owning land in NY		Scope of work developed to implement resource characterization	Geographic Information System database including exclusions and affected lands developed	Process for installing renewable energy technologies on State facilities established		
	Develop a process for installing renewable energy technologies on State facilities		Executive Chamber	DASNY, NYPA, NYSEDA, OGS, and ORPS		Process identified	Outreach material developed and distributed			

	RECOMMENDATIONS	LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION			
	ACTION ITEMS				2009	2010	2011	2013
Support Development of In State Energy Supplies	TARGET THE DEPLOYMENT OF NON ELECTRIC GENERATING RESOURCES							
	6 Increase use of alternative fuels							
	Determine the optimal fuel(s) for a substantial replacement of petroleum, considering environmental, economic and energy benefits	DOT and NYSERDA	DEC and OGS	Coordination with transit operators, fleet owners, and Northeast Regional Transportation groups	Analysis needs identified after completion of Biofuels Roadmap; contractor and sponsors identified for analysis; State institutions continue to use their fleets and facilities as test beds of alternative fuel technology	Life-cycle analysis completed; utilization of petroleum alternative(s) increased; interstate coalition developed to foster alternative fuel technology development	Based on analytical results and market conditions, continue transition to electricity and other optimal petroleum alternative(s) in the transportation sector	
	Provide financial incentives for alternative fuel infrastructure development	DOT and NYSERDA		Coordination with Municipalities	Federal and State funds directed to support alternative fuel and electrification projects	Alternative fuel support continued; 300 biodiesel and ethanol stations and 50 new compressed natural gas stations constructed selling fuel to the public; 200 new electric charging stations deployed	Demonstration of vehicle to grid technologies in 100 sites around New York implemented	
	Encourage public and private fleets to purchase alternative fuel vehicles through incentives and mandates	DOT, Executive Chamber, and NYSERDA	OGS and state fleets	Coordination with Municipalities	New Executive Order signed for purchase of alternative fuel and vehicles by state fleets with assistance from the Clean Fuel Vehicle Council	Purchase of 500 new private fleet alternative vehicles; demonstration of plug-in hybrid technologies for state fleet vehicles completed	1,000 plug-in hybrid and electric vehicles deployed in New York	
Educate end users on the economic and environmental benefits of alternative fuels	DOT and NYSERDA	DEC		Host conferences to inform fleet managers and the public about the economic and environmental benefits of alternative fuels				

	RECOMMENDATIONS	LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION				
	ACTION ITEMS				2009	2010	2011	2013	2014
Support Development of In State Energy Supplies	Work with NY Congressional Delegation and transportation organizations to support federal and State tax incentives for fleet and private individual alternative fuel vehicle purchases, including infrastructure development	DOT and NYSERDA	DEC	Federal and State legislation; engagement of transit operators	Federal Heavy Duty Hybrid Vehicle tax credit extended past 2009; federal alternative fuel vehicle tax credit extended past 2010; NYS tax credits for alternative fuel infrastructure extended past 2010			Federal and State tax incentives aligned with conclusions of life-cycle analysis to encourage the use of optimal alternative fuels	
	Adopt where practicable a regional low carbon fuel standard	DEC and NYSERDA	Ag&Mkts	Coordinate with Northeast and Mid-Atlantic states	Northeast & Mid-Atlantic states Memorandum of Understanding complete; framework analysis for a regional low carbon fuel standard conducted; low carbon fuel options analyzed as part of the Climate Action Plan			Pending outcome of analysis, regulatory framework pursuant to Memorandum of Understanding promulgated	Pending outcome of analysis, low carbon fuel standard implemented
	7 Support bioenergy production from sustainably managed feedstocks								
	Complete Biofuels Roadmap	NYSERDA	Ag&Mkts and DEC		Based on the Roadmap, develop market transformation strategies and commercialization pathways for new technologies			Update Biofuels Roadmap; continue appropriate actions to encourage biofuels production	
	Analyze bioenergy options and identify strategies for promoting most sustainable/highest value use of biomass as part of the Climate Action Plan	DEC	Ag&Mkts and NYSERDA		Climate Action Plan's analysis of bioenergy options completed			Plan's recommendations implemented; actions to promote viable bioenergy projects in NYS initiated	Biomass use and sustainability monitored; activities for promoting biomass continued as appropriate
Establish a wood boiler change out program to remove the high emitting and poor performing systems from the marketplace	DEC and NYSERDA				Potential funding opportunities identified; program commenced consistent with funding				

	RECOMMENDATIONS	LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION				
	ACTION ITEMS				2009	2010	2011	2013	2014
Support Development of In State Energy Supplies	Develop regional performance standards to accelerate the market introduction of new high performance bioheating systems	DEC	NYSERDA	Coordinate with Northeast and Mid-Atlantic states and Northeast States for Coordinated Air Use Management	The viability of a region-wide performance standard for bioheating systems investigated; model rules developed			Regulation promulgated	
	Work with EPA and DOE to develop ENERGY STAR standards for the top-tier of high-performance bioheating systems for residential and commercial applications	NYSERDA		EPA and DOE in coordination with Northeast and Mid-Atlantic states	ENERGY STAR Standards established for bioheating systems			Standards incorporated into NYSERDA incentive programs	
	Provide financial and technical support to accelerate the market introduction of the top tier of bioheating systems - consistent with ENERGY STAR standards developed with EPA and DOE	NYSERDA				Potential funding opportunities for the top tier of bioheating systems explored; bioheat technical and financial assistance programs launched			Programs extended and assessment of progress of market transformation performed
	Work with NYS manufacturers to develop their capacity to deliver high performance bioheating systems	NYSERDA	ESD			Incentives provided for expansion of manufacturing capacity; strategic partnerships with equipment providers facilitated			NYS partners launch products to market
	Provide training to ensure that NYS has a skilled workforce to deliver services and products	NYSERDA	NYSDOL			High-performance bioheating system curriculum integrated into NYSERDA's existing network of workforce training institutions			
	8 Extend the tax credit for bioheat								
	Extend bioheat tax credit law beyond 2011	Executive Chamber		State legislation	Effect of scope and level of tax credit analyzed and screened against Biofuels Roadmap			Legislation submitted	

	RECOMMENDATIONS		LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION		
	ACTION ITEMS	2009				2010	2011	2013
Support Development of In State Energy Supplies	9 Expand funding and implementation support for environmentally beneficial distributed energy resources							
	Evaluate and provide appropriate funding mechanisms for existing renewable technologies	LIPA, NYSERDA and PSC			Effectiveness of current funding mechanisms evaluated	Implement new or change existing funding mechanisms based upon evaluation		
	Ensure funding of next generation technology development and infrastructure	NYSERDA			Effectiveness of current funding mechanisms evaluated	Implement new or change existing funding mechanisms based upon evaluation		
	ENCOURAGE DEVELOPMENT OF NATURAL GAS RESOURCES IN A RESPONSIBLE MANNER							
	10 Support private interest and investment in drilling in the Marcellus Shale natural gas reserves in an environmentally acceptable manner							
	Establish final DEC regulatory requirements for drilling and pipeline construction	DEC	DOH		DEC regulatory requirements for drilling in Marcellus Shale completed	Regulatory framework implemented	Program amendments implemented as deemed necessary	
Coordinate regulatory requirements for drilling and pipeline expansions	DEC and DPS			Report issued on number of applications in queue, number of permits issued and average length of processing				
Study the potential for private investment in extracting natural gas in the Marcellus Shale on State-owned lands	OGS	State agencies that own land with resource potential		Report on State-owned lands eligible for leasing in the Marcellus Shale formation released	Environmental assessments of tracts sought for leasing conducted	Environmental assessments continued		
Chapter 4: Invest in Energy and Transportation Infrastructure								
TAKE STEPS TO ADDRESS CLIMATE CHANGE								
1 Identify steps to mitigate and adapt to the impacts of climate change								
Develop a Climate Action Plan in accordance with Executive Order 24	Executive Chamber	Ag&Mkts, DASNY, DEC, DHCR, DOB, DOS, DOT, ESD, LIPA, MTA, NYPA, NYSERDA, and PSC	Stakeholder participation	Draft Climate Action Plan completed	Implementation of Climate Action Plan initiated	Plan implementation continued with adjustments as appropriate		

	RECOMMENDATIONS	LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION			
	ACTION ITEMS				2009	2010	2011	2013
Invest in Energy and Transportation Infrastructure	ENCOURAGE CLEANER GENERATION INVESTMENTS							
	2 Improve the siting process for generators							
	Develop a fuel neutral power plant siting law that provides greater market certainty to developers and investors and enhances public participation with sufficient intervenor funding	Executive Chamber	DPS	State legislation	Legislation submitted			
	3 Facilitate demonstration of Carbon Capture and Sequestration technology							
	Develop legislation that addresses CO ₂ pipeline siting and CO ₂ injection to facilitate the demonstration of Carbon Capture and Sequestration technology	Executive Chamber		State legislation	Legislation submitted			
	4 Support repowering							
	Encourage and facilitate the repowering and replacement of existing electric generation to increase energy efficiency and reduce overall actual emissions and environmental impacts	DEC, DPS and NYPA			DEC reasonable available control technology regulatory revisions completed with incentives to promote re-powering; feasibility of power purchase agreement for repowering projects considered	Facilities move forward with commitment for re-powering	Repowered facilities on-line	
	INVEST IN TRANSMISSION AND DISTRIBUTION INFRASTRUCTURE							
	5 Systematically examine and evaluate the State's transmission and distribution infrastructure							
	LIPA to implement a \$500 million, 20 year program to reduce electrical transmission and distribution system exposure to severe storms	LIPA				\$20 million per year for storm hardening program and \$5 million per year for rights-of-way maintenance committed		
Complete a LIPA and National Grid assessment of the LIPA transmission and distribution assets system health review to formulate strategic goals to maintain infrastructure reliability	LIPA			Final report complete	Implementation plan of strategic goals is developed; annual updates are released	Annual reports updated with new strategic goals and plans when necessary		

	RECOMMENDATIONS	LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION				
	ACTION ITEMS				2009	2010	2011	2013	2014
Invest in Energy and Transportation Infrastructure	Complete the New York State Transmission Assessment and Reliability Study to identify the long term transmission reliability needs of the New York Control Area		DPS, LIPA and NYPA	Coordination with NYS investor-owned utilities and the NYISO	Technical analysis and cost benefit assessment completed		Implementation plan for long term needs completed	Implementation plan initiated	
	For needed transmission system upgrades or expansion, address cost allocation issues	PSC		Coordination with FERC			Upgrades and expansions identified; PSC proceeding initiated; PSC decision on cost allocation		
	6 Amend Article VII for siting of transmission lines and pipeline								
	Amend PSL Article VII to indicate State or local approvals shall apply in connection with the Uniform Fire Prevention and Building Code	Executive Chamber	DPS	State legislation	Legislation submitted				
	7 Investigate use of existing rights-of-way								
	Inventory existing transportation corridor rights-of-way that could be used for new energy infrastructure facilities and existing utility corridors that are underutilized or could be re-configured to accommodate new facilities	Executive Chamber	DOT, DPS, MTA and TWY	FHWA, PANYNJ engaged in right of way discussions; coordination begun with Broadband Council; major utilities engaged in discussion and data gathering; owners of transportation rights-of-way included in coordination	Inventory and analysis of existing rights-of-ways completed; meetings with Highway Administration proceed to discuss amendment of co-location policy for limited access highways		If appropriated, FHWA and DOT accommodation policy revised; development of a comprehensive state agency database of all existing utility and transportation rights-of-way completed		
	SUPPORT TRANSPORTATION INFRASTRUCTURE INVESTMENTS								
	8 Encourage federal investment in public transportation								
Seek more federal funding for public transportation within the next Federal Surface Transportation funding bill	DOT and MTA		Coordination with NY Congressional Delegation, AASHTO and USDOT			Federal funding increased to double public transportation ridership nationwide; separate intercity passenger rail funding mechanism created by Congress			

	RECOMMENDATIONS		LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION				
	ACTION ITEMS					2009	2010	2011	2013	2014
Invest in Energy and Transportation Infrastructure	9 Allow for more private investment in public transportation									
	Allow private individuals and businesses to provide direct public transportation infrastructure investments in return for State income tax credits		Executive Chamber	DOT and MTA	State legislation	Budget implications identified and, if appropriate, legislation submitted	Pending negligible budget impact, legislation passed and enacted, tax forms developed, and guidance and policy by Taxation and Finance implemented			
Invest in Energy and Transportation Infrastructure	10 Encourage federal investment to improve the efficiency of the transportation system									
	Encourage federal financial support for more energy efficient transportation infrastructure and systems		DOT	MTA	Coordination with NY Congressional Delegation, AASHTO and USDOT		Federal Surface Transportation bill that supports maintenance of system, electrification of the system and retains Congestion Mitigation and Air Quality program and creates a similar program for GHG reduction			Enhance energy efficiency transportation infrastructure funding in subsequent transportation legislation
Stimulate Innovation in the Clean Energy Economy	Chapter 5: Stimulate Innovation in the Clean Energy Economy									
	SUPPORT CLEAN ENERGY TECHNOLOGY DEVELOPMENT									
	1 Strengthen and expand collaboration between the intellectual and professional resources in the State's public and private institutions									
Expand the New York Battery and Energy Storage Technology (NY BEST) Consortium		NYSERDA		Federal and industry co-funding	Initial research projects started; testing facilities identified and made available; Consortium Coordinator selected; strategy developed to successfully compete for a federally funded Innovation Hub	Initial round of projects completed; new projects started based on available funding; 1-2 commercial products launched by NY BEST partners			Additional commercial products launched by NY BEST partners; NY BEST established as an independent, self-sustaining organization	

	RECOMMENDATIONS	LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION							
	ACTION ITEMS				2009	2010	2011	2013	2014	2018		
Stimulate Innovation in the Clean Energy Economy	Foster the development of clean energy incubators and regional clean energy clusters of related industries and research entities, aiming to accelerate technology commercialization and entrepreneurship	NYSERDA	ESD and NYSTAR		Six clean energy incubators launched in NY focusing on unique regional strengths; support for regional clusters is expanded			The first round of companies "graduate" from the clean energy incubators with a commercial product launch; additional private capital is leveraged			Additional companies "graduate" from the clean energy incubators; additional private capital is leveraged	
	Use emerging networking technology and methods to foster collaborations among clean energy business incubators, entrepreneurs, investors, and researchers	NYSERDA	NYSTAR		A clean energy business networking platform is developed and deployed; inventory of clean energy research and technology development assets in-state is developed			Global clean energy resources are incorporated onto the network platform				
	2 Implement where practicable, the recommendations of the Task Force on Diversifying the New York State Economy through Industry-Higher Education Partnerships											
	Create a forum for stimulating ideas on the future of New York State's clean energy economy	Executive Chamber	ESD, NYSERDA and NYSTAR	Coordination with institutions of higher education, research laboratories, and companies		Forum established to identify, analyze, and implement best practices on fostering business incubation, growth, and emerging technology commercialization						
	3 Support the growth of clean energy technology companies in New York											
Increase focus of State incentives and economic development assistance on clean energy companies and component manufacturers and service businesses	ESD and NYPA	NYSERDA, NYSTAR and PSC	Coordination with Investor-owned utilities		ESD's Strategic Plan revised; coordination on use of grants, loans, tax incentives, and power allocations within existing legislative authority developed							

	RECOMMENDATIONS		LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION				
	ACTION ITEMS					2009	2010	2011	2013	2014
Stimulate Innovation in the Clean Energy Economy	Enhance entrepreneurial and commercialization assistance to early-stage companies developing clean energy technologies		NYSERDA	ESD, LIPA, NYPA, and NYSTAR		New funding structures that meet the needs of early-stage companies and sources of capital are developed; feasibility of launching a Clean Energy Seed fund to better leverage private capital is explored	Assistance provided to support clean energy business growth; track and monitor progress	Assistance provided to support clean energy business growth; track and monitor progress		
	4 Support and enhance research and development of next-generation clean energy technologies in the energy and transportation sectors									
	Use state funding commitments to leverage large federal funding programs, such as Energy Innovation Hubs and Energy Frontier Research Centers		NYSERDA	NYSTAR	DOE funding opportunities	Federal funding programs identified, programs and protocols for organizing and supporting multi-party proposals developed	Tracking and monitoring of federal cofunding into NY for energy technology development initiated			
	Ensure that any national carbon cap and trade program provides the states with flexibility to invest auction proceeds into accelerating the market introduction of next generation/emerging clean energy technology		Executive Chamber	DEC and NYSERDA	Coordination with NY Congressional Delegation to advance federal legislation	Provide recommended language to the NY Congressional Delegation	Provide recommended language to the NY Congressional Delegation			
	Support the development, demonstration, and testing of new clean energy technologies to help NYS achieve its RPS, EEPS, and carbon mitigation goals and simultaneously provide opportunities to create and grow clean energy businesses in NYS		NYSERDA	DPS	Coordination with Investor-owned utilities	An emerging technology and pre-deployment demonstration program is developed to accelerate the adoption of tested but new or improved technologies	Programs executed and new technologies introduced in the market	Programs executed and new technologies introduced in the market		
	Continue the collaborative DOT and NYSERDA partnership to develop and test sustainable transportation technologies and systems		DOT and NYSERDA			Extend the existing interagency Memorandum of Understanding; next round of project demonstrations launched	Project demonstrations continued; expanded sustainable technology introductions in the field introduced	Project demonstrations continued; expanded sustainable technology introductions in the field introduced		

	RECOMMENDATIONS		LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION				
	ACTION ITEMS					2009	2010	2011	2013	2014
Stimulate Innovation in the Clean Energy Economy	Expand marketing of made-in-New York clean energy products to strategic international markets		ESD	NYSERDA		Trade shows with optimum prospects located; comprehensive international marketing materials created and distributed to target markets	Access into key international markets targeted; attraction of international investment that supports the State's clean energy manufacturers and service companies expanded	Marketing materials and distribution reviewed and revised as international markets shift		
	Demonstrate the feasibility of electrification of the transportation system across all modes of transportation		DOT, NYSERDA, and OGS	DEC	Coordination with port operators, airport operators, rail lines, airlines, USDOT, DOE, Transportation Research Board and National Academy of Sciences; federal funding legislation	Federal support encouraged for R&D in electrification of transportation system for all modes; studies completed to identify sites and technology needed for plug-in locations; research and funding opportunities identified	Demonstration projects started; feasibility assessed; State agencies use of plug-in hybrids in light duty fleets increased	Infrastructure changes mandated to make vehicle-to-grid application a possibility; electrification encouraged by tying funding to electrifying transportation projects		
	DEVELOP THE CLEAN ENERGY WORKFORCE									
	5 Coordinate all agencies involved in workforce training, and partner with citizen groups to expand the existing network of clean energy workforce training sites									
	Make clean energy training curricula standard for SUNY and CUNY schools.		NYSDOL and NYSERDA	SUNY	Collaboration with CUNY	Pilot curricula and program established	Pilot program evaluated and expansion to other schools initiated			
	Continue planning efforts of the NYS Sector Strategy Advisory Group initiated under the National Governors Association		NYSDOL	DHCR, ESD, and NYSERDA	Coordination with Workforce Development Institute, Long Island Forum for Technology and U.S. Department of Labor	Proposal submitted to U.S. DOL to address the clean energy shortage in skilled workers and training capacity; upon proposal approval, implement initial sector strategy	Evaluate and update sector strategy			

	RECOMMENDATIONS		SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION			
	ACTION ITEMS	LEAD AGENCIES			2009	2010	2011	2013
Stimulate Innovation in the Clean Energy Economy	6 Dedicate funding for “pathways out of poverty” programs to train unskilled workers for clean energy jobs							
	Expand NYSDOL'S Workforce NY Training Inventory used by the One Stop System	NYSDOL	DHCR, DOS, NYSERDA, and OTDA		Implement Career Pathway initiatives funded under EEPS Workforce Program; programs target Community Benefit Organizations and Environmental Justice Communities		Training Inventory updated and expanded as necessary	
	7 Coordinate a statewide workforce strategy to address the workforce needs of the State's clean energy industry							
	Develop a statewide comprehensive strategy to assure an adequate workforce to meet energy efficiency and renewable energy goals	NYSDOL	DHCR, ESD, NYSERDA, and OTDA		Develop a Draft Statewide Strategy Document and implement strategy across agencies to assure that all sectors and workforce development needs are addressed		Complete Implementation of Statewide Strategy	
	ATTRACT NEW FIRMS AND TRANSITION EXISTING FIRMS THAT WILL THRIVE IN A CARBON CONSTRAINED ECONOMY							
	8 Expand economic development programs to attract clean energy industries							
	Use NYPA economic development power programs to attract clean energy industries, as allowed by statute	Executive Chamber	ESD and NYPA		Marketing plan with measurable objectives is developed		Plan implementation commenced	
	Extend expiring NYPA economic development power programs, including Power for Jobs	Executive Chamber	NYPA	State legislation	Submit legislation			
	Agencies and utilities will collaborate in the development and marketing of economic development programs	ESD	DPS, NYPA and NYSERDA	Investor-owned utilities	Agency collaborative completed to review and align economic development marketing programs for attraction and retention of clean energy companies			

	RECOMMENDATIONS		LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION				
	ACTION ITEMS					2009	2010	2011	2013	2014
Engage Others in Achieving the State's Policy Objectives	9 Incentivize NYPA's economic development customers to invest in cost-effective energy efficiency measures									
	Reform NYPA's economic development power programs to condition receipt of benefits on implementation of feasible energy efficiency improvements		Executive Chamber	NYPA	State legislation	Submit legislation				
	Chapter 6: Engage Others in Achieving the State's Policy Objectives									
	IMPROVE PLANNING									
1 Facilitate consistency among multiple levels of government										
	Revise the City, Town, Village, and General Municipal Laws to incorporate energy considerations in Comprehensive Plans		Executive Chamber	DOS	State legislation	Legislation drafted and general outreach to municipalities conducted	Legislation submitted; ongoing outreach continues to engage municipalities in energy and comprehensive planning			
	Develop Tax Increment Financing reform legislation to encourage the redevelopment of distressed communities and revitalize downtown areas		Executive Chamber		State legislation and collaboration with the Smart Growth Cabinet		Submit legislation			
	Promote land use patterns that reduce reliance on vehicle trips		DOS and DOT		Collaboration with the Smart Growth Cabinet, MPOs, regional planning councils, and county, town, and city governments	Increased Smart Growth and other planning grants devoted to regional collaboration on transportation and land use; DOT developed project development criteria favors projects with energy efficient land use and transportation components	Emphasis on prioritizing projects that promote Smart Growth and collaborative planning included in the DOT and MPO programming; regional Smart Growth cabinets established	State assistance geared toward funding for projects that integrate land use and transportation planning with the goal of Smart Growth development outcomes and patterns		

	RECOMMENDATIONS		SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION				
	ACTION ITEMS	LEAD AGENCIES			2009	2010	2011	2013	2014
Engage Others in Achieving the State's Policy Objectives	Provide technical assistance and funding opportunities via State grant programs for local and regional energy planning and implementation activities that help meet State energy goals.	DEC, DOS, DOT, NYSERDA and other agencies as applicable		Municipal action needed to prepare and adopt local plans	Realignment of existing programs initiated	Appropriate modifications to existing State programs are completed; collaborative strategy for outreach and technical assistance is initiated	Majority of adopted comprehensive plans include energy components; local implementation of projects under way		
	Promote land use and zoning tools that support Smart Growth	DOS		Municipalities would need to adopt and use these measures	Municipalities adopt and use planning and zoning tools; State planning grants and assistance promote these tools	These tools become the norm in municipal comprehensive plans and zoning ordinances	Majority of adopted comprehensive plans and zoning include one or more of these measures		
	Pursue transit oriented development strategies	DOS, DOT and MTA		Coordination with transit operators and local governments	Outreach to operators and localities initiated; pilot effort in Hudson Valley developed; changes made to local zoning	Ongoing technical assistance and education provided to municipalities through existing training programs; transit oriented training extended to upstate areas following pilot effort	Major urban areas have adopted transit oriented development through comprehensive local plans		
	ENCOURAGE LOCAL ENERGY INITIATIVES								
2 Promote Climate Smart Communities									
Increase the number of communities participating in Climate Smart Communities	DEC, DOS, NYSERDA, and PSC		Municipal action needed to prepare and adopt local plans and implement projects	5% of NY local governments have adopted the pledge, set up climate programs, and begun at least one climate-related project; progress report prepared and released	20% of NY local governments have adopted the pledge, set up climate programs, and completed projects; progress report prepared and released	40% of NY local governments have adopted the pledge, set up climate programs, and completed projects; progress report prepared and released			

	RECOMMENDATIONS	LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION						
	ACTION ITEMS				2009	2010	2011	2013	2014	2018	
Engage Others in Achieving the State's Policy Objectives	ENCOURAGE COMMUNITY AND CITIZEN PARTICIPATION IN ENERGY DECISIONS										
	3 Address the energy-related public health and safety needs of communities										
	Enhance mechanisms for early, fair and meaningful public involvement	Agencies responsible for energy permitting			Agencies have examined their permitting and guidance protocols to enhance the opportunity for public involvement	Implementation of enhanced protocols completed	Implementation reviewed for improvement to reflect additional opportunities for public involvement				
	Develop energy facility siting and permitting procedures to assess and consider disproportionate environmental burdens in potential environmental justice areas	DEC	DOH		Procedure for disproportionate environmental burden determination incorporated in permitting processes and SEQRA	Guidance and regulations for cumulative impact analysis proposed	Guidance and regulations implemented				
	Incorporate procedures in the Report of the Health Outcome Data Work Group into facility siting and permitting processes	DEC and DOH			Procedures incorporated into permitting processes and SEQRA	Further data provided to permitting processes and SEQRA proceedings					
	COLLABORATE REGIONALLY										
	4 Collaborate regionally to advance the State's clean energy goals										
	Develop a New York offshore ocean plan to identify appropriate areas for renewable energy development and transmission, in coordination with neighboring states and federal agencies	DOS	DEC, LIPA, NYPA, NYSERDA, and PSC		Collaboration on plan development with neighboring states, federal agencies, local governments and non-governmental organizations	Offshore ocean use plan initiated; use analysis, plan options and alternative scenarios assessment developed; necessary state-focused work groups initiated	NY Coastal Management Program amended to implement offshore ocean plan and initiate implementation; Great Lakes plan initiated	NY Coastal Management Program amended for Great Lakes offshore plan; plan implementation begun			
	Ensure continued progress in addressing regional clean energy issues through the leadership of the Northeast Mid-Atlantic Governors Clean Energy Forum	DOS	DEC, LIPA, NYPA, NYSERDA, and PSC		Collaboration among forum participants	Federal financial incentives, investment opportunities and regulatory actions to spur clean energy development in the Northeast and Mid-Atlantic states identified & promoted	Federal legislative and policy changes integrated into regional energy planning	First offshore project constructed in the region			

Implementation Plan

	RECOMMENDATIONS	LEAD AGENCIES	SUPPORTING AGENCIES	COLLABORATION AND OTHER ACTION NEEDED FOR PROGRESS	MILESTONES FOR COMPLETION						
	ACTION ITEMS				2009	2010	2011	2013	2014	2018	
Engage Others in Achieving the State's Policy Objectives	Advance multi-state actions through the interstate Mid-Atlantic Governors Agreement on Ocean Conservation that will improve the region's competitiveness for offshore renewable energy projects	DOS	DEC	Collaboration among states, federal agencies and other stakeholders	Multi-state work groups developed with MMS and FERC to address offshore renewable energy permitting and project siting issues; State and federal offshore planning mechanism initiated			Integrated state and federal offshore renewable energy planning regime under way; regional regulatory and permitting framework institutionalized		Next phase of regional planning effort and identification of regional regulatory obstacles and data needs initiated	
	INFLUENCE NATIONAL POLICY										
	5 Optimize coordination and collaboration with the federal government to ensure that New York's energy policy objectives and strategies will be advanced at the national level										
	Work more closely with FERC to address issues of common concern for Smart Grid investments	PSC	LIPA and NYPA	Coordination with Investor-owned utilities, the NYISO and Smart Grid Consortium	Participation in FERC NARUC Collaborative initiated						
Provide regular briefings to NY Congressional Delegation on the State's energy programs and policies	Executive Chamber	LIPA, NYPA, NYSERDA, and PSC			Periodic Delegation meetings proceed with appropriate energy planning board agencies			Periodic Delegation meetings proceed with appropriate energy planning board agencies		Periodic Delegation meetings proceed with appropriate energy planning board agencies	

A1 Stakeholder Input

The following individuals and organizations have provided input to this Energy Planning Process.

Stakeholders Submitting Comments on the Draft State Energy Plan

100 Precinct Community Council
Abel, Sharon
Acosta, Marge
Adirondack Council
Aird, A. Douglas
Allen, Michael
Alliance for Clean Energy New York (ACE NY)
Alternative Energy for Your Car and Home
(AEYCH)
Amberge, Sarah
Anaren, Inc.
Anbaric Holding, LLC
Apfel, Sarah
Applebum, Daniel
Arnold Lake Owners Association
Arnold, Matthew
Ashmead, John
Assemblymember Kevin A. Cahill
Atlantic Sea Island Group, LLC
Audubon New York
Ault, Brian
Ballou, Joseph
Bamberger, Dr. Michelle
Baran, Jayne
Barbell, Sharon
Barber Abel, Judith
Baron, Esq., Charles Bryan
Bartoc, Cristian
Bauman, Allen
Bisson, Robert F.
Blayer, Cynthia
Bobis, Daniel
Bochenek, James
Bohan, III, Joseph P.
Boilermakers Local Lodge No. 5, Zone 175
Boilermakers Zone 197
Bradham, Michael
Bradley, David
Breen, Richard
Brownlie Design
Buckley, Peter
Building and Construction Trades Council of
Nassau and Suffolk Counties
Bushwick Food Coop
Butler, Dr. Edward
Buxbum, Diane
Cafarelli, Dr. Cenie
Caldwell, Brian
Castelluccio, Louise
Cavagnaro, Roberta
Chapman Aird, Geri
Chichura, Dr. Diane
Citizens Campaign for the Environment
Citizens' Environmental Coalition
City of Long Beach
City of New York
Clean Energy
Clean Ocean Action and the American Littoral
Society
Columbia University
Consolidated Edison Company of New York,
Inc. (Con Edison) and Orange and Rockland
Utilities, Inc. (O&R)
Constellation Energy
Coronel, Linda
Couch, Debra
Cox, Pamela
Crago, Marcelle
Croton Watershed Clean Water Coalition
Cusworth, William
Cycle Planet

Stakeholders Submitting Comments on the Draft State Energy Plan (continued)

Dalton, Julia
Dammen, Darrell
Danby Land Bank Cooperative
Danis, Steven
D'Arco, Lawrence
de Aragon, Fernando
Delanoy, Dennis
DeMare, Luanne
Dent, Michael
DeVine, Cheryl
Dillmann, George
Dobson, Carol
Douglas, Mary
Dowling College (Townsend School of Business)
Doyle, Eugene
Drake, J.
Draper, NYU, SCPS, Dr. Susan
Droz, John
Durgin, Christina
E Cubed Company, LLC on behalf of Joint Supporters
EcoEnergy Solutions, LLC
Ehrman, Rhonda
Ellis, Cathy
Empire State Petroleum Association
EMPOWERTY!
Energy Saving Solution, LLC
Energy Vision
EnerNOC, Inc.
Entergy Corporation
Environmental Advocates of New York
Epstein, Susan
Evans, A.S.
Evans, Julia C.
EverPower
Ewanco, James
Falco, Bonnie
Fast, Ingo
Feldschuh, Jeremy
Fetty, Karen E.
Fischer-Harbage, Laura
Fitzgerald, Judy
Flashner, B.
Fortuna Energy, Inc.
Fowle, William
Frame, Ph.D., George W.
Frogel, Arnold M.
Full Plate Farm Collective CSA
Funk, Ilse
Garcia-Macri, Saveria
Genen, Ruth
Genesee Regional Biofuels
Gill, David R.
Giordano, John
Giordano, Vincent
Go Express
Gold, Marilyn
Goldberg, Robert
Goldsmith, Patricia
Gonzalez-Stewart, Andres
Gordon, Hayley
GRACE
Great River Craniosacral Therapy Institute
Greater Long Island Clean Cities Coalition
Greco, Claudia
GreenLogic
Grimm, Susan
Gunter, Karlene
Gunther, Robert
Haber, Arnold
Hajinlian, Arlene
Hand, David L.
Handler, Elizabeth
Harrington, Kathleen
Heckler, Wilma
Heid, Denise
Herbers, Jill
Hersh, Charles A.
Herskovits, Kathryn
Heying Beilby, Ph.D., Mary
Hiller, Catherine
Hiller, Marty
Hodes, Harold T.
Hofner, Diane
Hofstra University
Hopkins, Steve
Horn, Andrew
Hudson Valley Gateway Chamber of Commerce in Peekskill
Hunter-Durante, Debra
Hynes, Matt
IdaTech, LLC

Stakeholders Submitting Comments on the Draft State Energy Plan (continued)

Independent Power Producers of New York
(IPPNY)
Institute for Policy Integrity, New York
University of Law
International Assoc. of Heat & Frost Insulators
& Allied Workers
International Brotherhood of Electrical Workers
Invidiata, BJ
Jamaica Bay Ecowatchers
Jereski, Robert
John Hopkins Bloomberg School of Public
Health
Joyce, Alice
Jutt, David
Kaler, Bill
Katz, Ira & Ellyn
Kaufman, Craig
Kayz, Tanya
Keiser, John L.
Kelly, Ronald
Kennedy, Brian
Keramaty, Valery
Klossner, J. Scott
Kohn, MD, Joseph
Kohut, Matthew
Korth, Audrey
Kramer, Doug
Krupp, Laurie
Ksenich, Roger A.
Landau, Dr. John
Lapin, Kevin
Latella, Gail
Legislator Dave Denenberg, Nassau County
Lepore, Thomas
Lessard, Louise
Liebowitz, Terri
Lighting Research Center at RPI
Linde North America
Livsey, Richard
Loeb, Rema
LoFurno, Susan
Loughran, Mark
Lynne, Susan
Lyons, Vicki
MacInnes, Diane
Mack, Rhoda
MACNY, The Manufacturers Association
Mader, Deborah
Maisel, MD, Barry
Manas, Mark
Mania, Sharon
Marcellus Accountability Project
Marist College
Martinson, Casey
Massena Electric Department
Mendez, Nelson
Millennium Pipeline Company, LLC
Millwright and Machinery Erectors, Local
Union No. 740
Mirsakov, Alexander
Montefiore Medical Group
Moriarty, Lawrence
Morin, Tatiana
Moros, Rebecca
Moros, Sarah
Multiple Intervenors
Muratore, Dr. Joseph F.
Nakai, Yugo
Natale, Chris
National Academy of Sciences
National Federation of Independent Business
(NFIB)
National Fuel Gas Distribution Corp.
National Grid
National Photovoltaic Construction Partnership,
LLC
Natural Resources Defense Council
Nature Conservancy
Nelson, Kurt
New Fuels Alliance
New Leaders for New Schools
New York Affordable Reliable Electricity
Alliance (NY AREA)
New York Biomass Energy Alliance
New York Building Congress
New York Energy Consumers Council
New York Independent System Operator
(NYISO)
New York Interfaith Power & Light
New York Solar Energy Industries Association
(NYSEIA)

Stakeholders Submitting Comments on the Draft State Energy Plan (continued)

New York Solar Energy Society
New York State Electric and Gas (NYSEG) and
Rochester Gas & Electric (RG&E)
New York State Office of Parks, Recreation, and
Historic Preservation (OPRHP)
New York State Reliability Council
Nicholls, Alison
Northeast Gas Association
Novak, Melinda
NRG Energy, Inc.
NRG Insulated Block
Nuclear Age Peace Foundation, NY
NYC Chapter of the Surfrider Foundation
NYH20
NYS Adirondack Park Agency
NYS Metropolitan Planning Organizations
Omega Institute for Holistic Studies
Oswego Revitalization and Betterment
Corporation (ORBC)
Ouderkirk, James
Overton, Ned
Pace Energy and Climate Center (PACE)
Paone, Michael
Papa, Lisa
Parker, Deborah
Parks, Natalie
Parsons, Jeremy
Partnership for New York City
Paul Gold Real Estate
Pearl, Amanda
Perkins, Beth
Peters, Amy
Peterson, Cameron
Phillips, Dr. Steve
Piccolo, Dr. Daniel
Plug Power
Point Lobster and Fish
Popow, Dimitry
Porter Jr., Charles J.
Power for Economic Prosperity
Power, Nancy
Preiss, Eleanor
Price, John
Rannacher, Jan
Raubuck, Andrew
Reese, Douglas
Rendinaro, Allison
Renewable Energy Long Island
Rhodes, Don
Ribbs, Bette A.
Rice, Mary
Riverkeeper, Inc.
Rockaway Park Homeowners & Residents
Rockaway Waterfront Alliance (RWA)
Rockwood, Leona
Romer, Evan
Roraima Consulting, Inc.
Rosen, Terry
Rulon, Gilbert
Ruth, Aptacker
Rutledge, Marcia
Ryczak, Sandra
Saak, Jason
Safe Water Movement
Saltzman, Dolores
Sanders, Mallory
Savoia, Maria T.
Scarola, Thomas
Scenic Hudson
Schongalla, M.D., Ann
Schongalla, Nils
Schur, Michael
Scullard, Mary Ellen
Seltz, Laura
Senator Darrel J. Aubertine
Senator Joseph A. Griffo
Seneca One Realty LLC
Service Employees International Union 32BJ
(SEIU 32BJ)
Shaw, Carole
Shideler, Stephanie
Shuler, RN, Eudora F.
Siegel, Steven
Sierra Club Atlantic Chapter
Sierra Club Long Island Group
Sixdegreen, Inc.
Slote, Karen
Slutsky, MD, Jordan
Soleil, Katheryn
South Shore Audubon Society
South Yaphank Civic
Spatz, David

Stakeholders Submitting Comments on the Draft State Energy Plan (continued)

Spectra Energy
St. Regis Mohawk Tribe
Staten Island Taxpayers' Association
Staten Island Tuna Club
Stauffer, Elenna
Stivers, Frank
Stoher, Joel
Stone Quarry House
Superior Software Logic, Inc.
Sustainability Institute at Molloy College
Sustainable Otsego, Action Otsego
Sweeney, Mary
Talbot, Kyle
Temple, Michele
Tennessee Gas Pipeline
Thacker, Cheryl
The Solar Alliance
Three Parks Independent Democrats
Thurber, Caitlin
Thurmond, Judy
Tobier, Elizabeth
Tomkins, D.
Triano, Elizabeth
Trotta, Kevin
Truscinski, John
Turn Home Green
U.S. Environmental Protection Agency
Uashaunnuat, the Innu of Uashat mak Mani-
Utenam
Upper Green Side
Valentine, Jennifer
Van Hooreweghe, Kristen
Vestal Coalition
Viridian Energy and Enviromental LLC
Vote Solar Members
Vote Solar Initiative
Waldo Tribune
Wasserman, Max
Watts Architecture and Engineering
Wechter, Dorothy
West, Laura
Westchester County Board of Legislators
Wieder, Robin
Williams
WNY Sustainable Energy Association &
Climate Action Coalition
Wright, Lisa
Yale University
Yes We Can! Long Island
Yost, Wendy
Yusuf, Moe
Zack, Jake
Zerbe, Faith

Stakeholders Providing Oral Testimony at the Energy Plan Hearings

August 18, 2009, SUNY Canton

Borderlands Energy
CAMP/Clarkson University
Clarkson University
Coakley Carpet One Ace Hardware
Community Energy Services
Local 1
Massena BDC
Massena Electric Department
McClellan, Robin
National Grid
Ogensburg Bridge & Port Authority
Senator Darrel J. Aubertine
SUNY Canton
UniStar Nuclear Energy

August 21, 2009, Hunter College, Manhattan

Business Council of Westchester
Center for Working Families
Citizens Campaign for the Environment
Columbia University
Con Edison
Croton Watershed Clean Water Coalition
E Cubed Company, LLC
Emacy Systems, Inc.
Just Bulbs - The Light Bulb Store
Laborers Union
National Grid
New York Presbyterian Hospital
NYU Medical Center
Pace Energy
Sierra Club—NYC Group
Triplepoint Energy

August 24, 2009, SUNY Buffalo

Adirondack Mountain Club/Buffalo Audubon
Assemblymember Sam Hoyt
Beahan, Toby
Boilermakers Local 7
Buffalo Niagara Partnership
Buffalo Wind Action Group
Casell, Mark
Champ, Douglas
Citizens Campaign for the Environment
City of Niagara Falls
Gibson, Ellen
Hufnagel, James

August 24, 2009, SUNY Buffalo (continued)

Hughesco of Buffalo, Inc.
Joya, Christopher
Kurasz, Janet
Phillips Lytie LLP
RS Energy Solutions
Sierra Club - Adirondack
Sierra Club
University at Buffalo, Outdoor Pursuits

August 25, 2009, Broome County Forum Theatre, Binghamton

Aures, Rosemary
Bates Troy, Inc.
Broome Community College
Catskill Citizens for Safe Energy
Cayuga Onondaga BOCES
Citizens Campaign for the Environment
City of Binghamton
Earthkind Energy
ETM Solar Works
Farm Catskills
Olum's
Tioga Peace & Justice
Unshackle Upstate

September 9, 2009, SUNY Farmingdale, Long Island

American Lung Association in New York
Assemblymember Marc S. Alessi
Atlantic Sea Island Group, LLC
Barlowe, Warren
C.W. Post
Citizens Campaign for the Environment
City of Long Beach
Clean Ocean Action
Coalition of Labor for Energy & Jobs
Concerned Citizens of Montauk
Dann, Wendy
Dowling College Townsend School of Business
Empire Clean Energy Supply
Environ Energy
Green Logic
Hersh, Charles
Legislator Dave Denenberg, Nassau County
Lindroth, William
LNG Island Task Force
Long Island Solar Energy Industries Association

Stakeholders Providing Oral Testimony at the Energy Plan Hearings

September 9, 2009, SUNY Farmingdale, Long Island (continued)

National Grid
New York Solar Energy Industries Association
North Merrick Civic Association
NY AREA
Quinn, Peter
Renewable Energy Long Island
Sunation Solar Systems, LI and NY Solar Energy Industry Associations
Sustainability Institute at Malloy College
Water Film Energy, Inc.

September 10, 2009, Brooklyn College, Brooklyn

100 Precinct Community Council
American Institute of Architects, New York Chapter
Clean Ocean Action
Fisherman's Conservation Association/NY Sportfishing Federation
Hartigan, Joe
Insulators Local 12
Island Insulation Services
IUPAT DC 9
Millwrights Local 740
National Grid
New York Academy of Sciences
Natural Resources Defense Council
New York Solar Energy Industries
Pratt Center for Community Development
Rockaway Park Homeowners & Residents Association
Safe, Healthy, Affordable and Reliable Energy (SHARE)
Sierra Club Atlantic Chapter
Sierra Club New York City Group
Signorelli, John
Simansky, Victor
Stubbin, Peter
Surfrider Foundation, NYC Chapter
Sustainable South Bronx
Teamsters 456
The City University of New York
Williams Energy

September 15, 2009, Legislative Office Building, Albany

ACT Bioenergy
Action Otsego and Sustainable Otsego
Adirondack Mountain Club
Alliance for Clean Energy NY
Boilermakers Local 5 Zone 197
Business Council of NYS
Center for Working Families
Clough Harbor & Associates
Community Power Network of NYS
Conservation Services Group
Davis, Stephen
Earl B. Feiden, Inc.
Ener-G-Rotors
Environmental Advocates
Hudson Valley Community College
Independent Oil and Gas Association
Independent Power Producers of New York
International Paper
MACNY, The Manufacturers Association
Mesa Reduction Engineering & Processing
Multiple Intervenors
National Grid
NEEP
New England Wood Pellet & New York Biomass Council
NYAREA
New York Biomass Energy Alliance
New York Independent System Operator
New York Laborers
NYPIRG
NYSEG & Rochester Gas and Electric
New York Solar Energy Industry Association
Olsen, James
Pataki Cahill Group
Plug Power
RPI Lighting Research Center
Shaleshock Citizens Action Alliance
Sustainable Otsego and Arnold Lake Owners Association
The Solar Alliance
U.S. Energy Independence Consortium
Vote Solar
Warren, Barbara
Zero Pint Clean Tech, Inc.

Stakeholders Providing Oral Testimony at the Energy Plan Hearings

September 24, 2009, SUNY New Paltz,

Kingston

Assemblymember Kevin A. Cahill
Boilermakers Local 5
Catalyst Renewables
Central Hudson Gas & Electric
Earthkind Energy
Empire Advocates/Deepwater Wind
Empire State Regional Council of Carpenters
Energy
EverPower Wind Holdings
Greenspirit
Hess Corporation/Retail Energy Supply Assoc.
Hudson Valley Clean Energy, Inc.
Millwright Local 740
New York Solar Energy Society
Rockland Business Association
SunEdison and The Solar Alliance
The West Law Firm

September 26, 2009, SUNY IT, Utica

Abbene, Angelamae
Abbene, Michael
JAY-K Independent Lumber
Malcolm Pirnie
National Grid
New England Wood Pellet & NY Biomass
Council
Pataki Cahill Group/Brookfield Power
Rome Area Chamber of Commerce
Unitrac Energy Management

Stakeholders Submitting Comments on the Draft Scope

A. Page & Associates LLC
Adirondack Council
Air Products and Chemicals, Inc.
Alliance for Clean Energy New York, Inc.
American Wind Power & Hydrogen LLC
Audubon, New York
Bay Area Economics
Business Council
Capital District Transportation Authority
(CDTA)
Capital Region Energy Forum
Central Hudson Gas & Electric Corporation
Citizens Campaign for the Environment
Communities Against Regional Interconnect
Consolidated Edison of New York, Inc./Orange
& Rockland Utilities
ConsumerPowerline, Inc.
Multiple Intervenors
CPV Valley, LLC
Dave Bencic
Dormitory Authority of the State of New York
Energy Council for Citizens Power Alliance
Elizabeth Thorndike, Ph.D.
Empire Advocates
Energy Smart Park Initiative
Energy Association
EnerNOC, Inc.
Environmental Advocates of New York
Fuel Cell Energy
Healthy Planet, Inc.
Horizon Wind Energy LLC
Independent Power Producers of New York, Inc.
Innovative Energy Systems, Inc.
John Droz, Jr.
Liberty Power Holdings, LLC
National Energy Marketers Association
National Grid
National Hydrogen Association
National Wind Watch, Inc.
Neighborhood Network
Network for New Energy Choices
New York Association of Public Power
New York Aviation Management Association
New York City Economic Development
Corporation
New York Energy Consumers Council, Inc.
New York Energy Marketers Coalition
New York Interfaith Power and Light
New York Lawyers for the Public Interest
New York State Apollo Alliance
New York State Office of Temporary and
Disability Assistance
New York State Reliability Council
Northeast Gas Association
NYSEG/RG&E
Onondaga County Resource Recovery Agency
Oppenheim & MacGregor
Pace Law School Energy and Climate Center
Plug Power
Power for Economic Prosperity
Riverkeeper, Inc.
Sierra Club
Small Customer Marketer Coalition
Solar Alliance and New York Solar Industry
Association
Stamford Village Planning Board
SUNY College of Technology
The Solar Alliance
The West Firm
TransCanada Corporation
Workforce Development Institute

Stakeholders Submitting Comments on the Interim Report

Aaron Breidenbaugh, EnerNOC, Inc
Adirondack Council
Allan R. Page, The Hudson Renewable Energy
Institute, Inc.
Alliance for Clean Energy New York, Inc.
Atlantic Sea Island Group, LLC
Boilermakers Local 5
Business Council of New York State
Business Council of Westchester
Capital Region Energy Forum
Central Hudson Gas & Electric Corporation
Citizens Campaign for the Environment
Consolidated Edison and Orange and Rockland
Utilities, Inc.
David Bradley, Lake Effect Energy, LLC
Deepwater Wind LLC
Dewey & LeBoeuf
EarthKind Energy, Inc.
EcoPerspectives
Empire State Petroleum Association, Inc.
FuelCell Energy
Green Map System
Iberdrola Renewables, Inc.
Independent Power Producers of New York, Inc.
Institute for Policy Integrity
Joint Comments of Pace and Environmental
Advocates

Michael Abbene
Michael Jung, Silver Spring Networks
Millwright and Machinery
Multiple Intervenors
Multiple Intervenors Supplemental Comments
National Grid
New York Independent System Operator
New York Sierra Club Atlantic Chapter
New York State Rural Electric Cooperative
Association, Inc.
Northeast Energy Efficiency Partnerships, Inc.
Northeast Gas Association and its New York
Planning Committee
North Wind & Power
NYC Economic Development Corporation
New York State Metropolitan Planning
Organizations
New York Retail Energy Supply Association
Partnership for New York City
Power for Economic Prosperity
Rockland Business Association
Roraima Consulting, Inc.
Spectra Energy Corp
The Energy Association of New York State
The Solar Alliance

Stakeholders Submitting General Comments

Alice Sokolow, Citizens Power Alliance
Andy McEvoy
Anne Harris, Town of Lyme
Archimandrite George Schaefer, Holy Trinity
Monastery
Barry K. Miller, PE, Concerned Citizens of
Cataaugus County
Boyce Sherwin, Regional Solutions
Capital Region Energy Forum
Central Hudson Gas & Electric Corporation
Citizens Campaign for the Environment
Citizens Environmental Coalition
Cohocton Wind Watch
Cole Peterson
Colleen Green
Consolidated Edison
Cynthia Blair, Citizens Power Alliance
Dan Wing, Cohocton Wind Watch
Debra Burns, Naples Valley Bristol Hills
Association
Diane Rutigliano
Doreen Marturano
Elizabeth M. Mosher
FuelCell Energy, Inc
Glenn R. Schleede
Guarracina Family
Hall, Matilsky, and Sokolow, Cohocton Wind
Watch and Advocates for Prattsburgh
Hans Mueller
Harold Hambrose, Cape Vincent
Hilarion, ArchBishop of Sydney, Australia and
New Zealand
Independent Power Producers of New York, Inc.
J. Taranola
James M. Brbour
James White
Janet Haskins
Jennifer Anderson
Jim Sawicki
Joan Simmons, Citizens Power Alliance
Joe Visalli
John Cowley
John Malizia, Fishermen's Conservation
Association
Justine M. Meccio
Karen Anderson
Karl Burmeisters
Katie Hay
Kevin Connor
Laura-Li Loffredo
Le Moyne College Biology
Linda E. Chiofalo
Mary V. Connor
Maryann Mueller
Mary Beth Yadanza
Mass Dispensation Engine Concept
Maura Gregory
Mellany T. Hale
Michael G. Saccullo
Michael S. Carrington
N. Taranola
National Grid
New York City Energy Planning Board
P. Santiago Ortega
Pace Energy and Climate Center, Environmental
Advocated of New York, Inc. /Alliance for
Clean Energy New York, Inc.
Peter Leonard
Phil Bariteau, Naples Valley Bristol Hills
Association
Ronald D. Morrison
Ronald Gulmi
Ronald Iocono
Ruby Garzon
Schleede Critical Evaluation
Shane Nickel
Shelley Taranola
Timothy Doyle
Wayne Miller

Stakeholders Attending ECWG Stakeholder Meetings

Adirondack Council
Adirondack Energy Smart Park Coalition
Alliance for Clean Energy New York
American Lung Association
Apollo Alliance
Association for a Better Long Island
Association for Energy Affordability
Association of Towns of New York State
Babylon, Town of
Buffalo Niagara Partnership
Business Council of New York State
Citizens Campaign for the Environment
Clean Energy for Jamestown
Community Energy Services, Inc.
Consolidated Edison Company of New York
Empire State Petroleum Association
Energy Association of New York State
Environmental Advocates of New York
Hauppauge Industrial Association
Healthy Planet
IBEW Local 236
Independent Power Producers of New York
Innovative Energy Systems
Jamestown Board of Public Utilities
Long Island MidSuffolk Business Action
Long Island Oil Heat Institute
Multiple Intervenors
National Grid
Nature Conservancy
Neighborhood Network
Network for New Energy Choices
New York Association of Public Power
New York Aviation Management Association
New York Bicycling Coalition
New York City EDC
New York Energy Consumers Council
New York Farm Bureau
New York Independent System Operator
New York Lawyers for Public Interest
New York League of Conservation Voters
New York Motor Truck Association
New York Propane Gas Association
New York Public Transit Association
New York State Association of Counties
New York State Association of Service Stations
& Repair Shops
New York State Association of Town Highway
Superintendents
New York State Conference of Mayors
New York State Reliability Council
New York State Rural Electric Association
New York Thruway Authority
Niagara Frontier Transportation Authority
Northeast Gas Association
Oneida-Madison Electric Cooperative
Pace Energy
Port Authority of New York & New Jersey
Preservation League of New York State
Regional Plan Association
Renewable Energy of Long Island
Retail Energy Supply Association
Riverkeeper, Inc.
Rockville Center, Village of
Scenic Hudson
Shell Gas & Power
Sierra Club
Small Customer Marketer Coalition
Suffolk County
SUNY – Stony Brook Advanced Energy
Research & Technology Center
Taylor Biomass Energy
UPROSE
Vote Solar Initiative
Workforce Development Institute