System Benefits Charge in New York: Vision for the Future

September 20, 2010

Executive Summary

The Public Service Commission's (PSC) decision to establish a System Benefits Charge (SBC) program over a decade ago has lead to one of the nation's most vibrant energy efficiency and renewable energy markets in the country. However, the energy challenges that we face today - from an aging infrastructure, to carbon constraints, and concerns over petroleum dependency and price volatility are tremendous and the imperative to transform our energy system has never been greater. This paper establishes a framework to facilitate discussions about the next generation of SBC investments and the crucial role that the SBC can serve in propelling New York toward a clean-energy economy and a reliable, affordable, energy system that is protective of the environment. The paper summarizes the history and accomplishments of the program, and describes how New York can strategically leverage the SBC to advance its energy objectives within the current policy and economic climate.

With heightened awareness of the State's and nation's energy challenges and the dire need for economic growth, the Commission's consideration of the re-authorization of SBC is occurring at a pivotal time and provides enormous opportunities for New York State.

Over the past few years, we have witnessed significant and exciting changes in the energy landscape on many fronts including increased policy development activity at the national and state level, increased private investment and public-private partnerships in clean energy[1], new market participants, and increased consumer demand for clean energy.

On the State policy level, the PSC's leadership in advancing the 45 x 15 clean-energy strategies (*i.e.,* adoption of the 15 x 15 energy-efficiency goal and the 30 x 15 renewable-energy goal) and the adoption in Executive Order 24 of the 80 x 50 greenhouse gas reduction goal represent landmark energy and environmental policy decisions. Collectively, these changes warrant major strategic adjustments in the focus of future SBC investments.

New York must capitalize on this unique convergence of energy policy interest and economic impetus and use the State's many innovation assets to achieve a vibrant, clean-energy economy. Our success will be determined by the directed use of SBC funds to catalyze a climate that pushes past the status quo and supports new energy solutions and new economic opportunities.

The next phase of SBC can make long-lasting and significant contributions to New York's energy and economic future by catalyzing innovation: *innovation* that drives smart, strategic investment in the transmission and distribution system*; innovation* that advances building design and retrofits and makes buildings "smarter"; *innovation* that advances electrification of the transportation sector; *innovation* that develops the State's indigenous renewable resources, particularly off-shore wind*; innovation* that reduces electricity use and load in crucial New York sectors, such as information technology and industrial manufacturing; and *innovation* that applies behavioral, market, and load research to maximize system and ratepayer benefits.

[1] Clean energy is defined here to include energy efficiency, renewable energy, and low-carbon technologies

A Renewed Vision for SBC (2011-2016)

Working within the overarching PSC mission[2], the broad SBC policy goals, and the allocation of non-SBC funding sources, NYSERDA proposes the following mission and goals for the future SBC. Future *SBC investments will focus on critical technology, market development needs and infrastructure innovation opportunities.* Given the State's economic climate, future SBC programs will seek to deliver substantial economic development *co-benefits* by helping to grow a clean-energy economy in New York.

Proposed SBC Mission: 2011-2016

Test, develop, and introduce new technologies, strategies, and practices that build the Statewide market infrastructure to reliably deliver clean energy to New Yorkers.

Proposed Modifications to
Overarching SBC Policy Goals: 2011 - 2016

IMPROVE NEW YORK'S ENERGY SYSTEM RELIABILITY AND SECURITY by enabling increased energy efficiency and renewable energy, reducing peak energy demand, and supporting innovative transmission and distribution technologies that have broad application.

REDUCE THE ENERGY COST BURDEN ON NEW YORKERS by developing and enabling services that moderate the effect of energy cost increases and volatility.

MITIGATE ENVIRONMENTAL AND HEALTH IMPACTS of energy production and use by developing an energy efficiency and renewable energy market infrastructure and enabling greater levels of efficiency and renewable resource development.

CREATE ECONOMIC OPPORTUNITY AND PROMOTE ECONOMIC WELL BEING by supporting emerging energy technologies, growing New York clean energy businesses, and helping to meet future energy needs through greater efficiency and innovation.

The future SBC scope will include programs and activities that achieve the following outcomes:

- Build market infrastructure to help achieve EEPS & RPS program goals.
- Serve as a "feeder" program to develop and prove out emerging technologies, strategies, and practices that can be implemented in the near-term to achieve EEPS and RPS goals (*i.e.,* create the first few stepping stones for next-generation program successes).
- Stimulate technology and business development, creating and expanding options for a clean-energy economy in New York State, over the mid- to long-term (*i.e.,* supporting the necessary research, development and commercialization activities that will enable New York to move toward a reliable and low-carbon energy system).
- Spur decisions, actions, and investments that result in clean-energy achievements distinct from incentive-based programs (*e.g.,* behavioral or energy information strategies; codes & standards).

[2] Public Service Commission Mission: "Ensure safe, secure, and reliable access to electric, gas, steam, telecommunications, and water service for NYS's residential and business consumers, at just and reasonable rates. The Department seeks to stimulate innovation, strategic infrastructure investment, consumer awareness, competitive markets where feasible, and the use of resources in an efficient and environmentally sound manner."

- Catalyze strategic infrastructure investments within a clean-energy system (*e.g.,* grid-of-the-future, load management/demand response, transportation electrification) and explore strategies to optimize use of assets to provide "System Benefits."

While the historical SBC program included considerable funding for energy-efficiency resource acquisition, resource acquisition will ***not*** be the focus of the future SBC Technology and Market Development category proposed here. Current SBC energy efficiency resource acquisition programs are proposed to be transitioned with their funding and energy savings goals to the EEPS program category.

SBC History

As part of its 1996 decision to transition to a more competitive electric industry, the PSC established a System Benefits Charge to fund public policy initiatives not expected to be adequately addressed by competitive electricity markets.[3] The Commission's decisions to introduce competitive options for energy consumers and subsequent decisions to maintain policy and financial support for energy efficiency, load management, renewable energy, and other advanced-energy technology development and demonstration programs has provided New York with one of the nation's most robust energy markets.

Past SBC Structure and Goals

Since 1998, the SBC program has been structured to foster market transformation – through a variety of energy efficiency; load management; low-income; and research, development and demonstration programs, including clearly defined energy-related environmental initiatives. A list of NYSERDA-administered programs funded through the SBC is provided in Appendix A.

- **SBC I:** July 1, 1998, to June 30, 2001, with a funding level of approximately $78 million per year.[4] The PSC specified that NYSERDA-administered SBC funds be used to support four categories of activities: (1) energy-efficiency programs and services; (2) public-benefit research, development, and demonstration projects related to energy service, generation or energy storage, the environment, and renewables; (3) low-income energy efficiency and energy management pilot programs; and (4) environmental protection programs, including programs designed to monitor and mitigate environmental impacts of electric industry restructuring.[5]

- **SBC II:** July 1, 2001 through June 30, 2006, with a funding level of approximately $150 million per year. An Operating Plan was developed that allocated SBC funding for: energy-efficiency programs (58%), research and development programs (27%), and low-income energy-affordability programs (15%). The Order specified the inclusion of peak-load reduction as a means to expand customer energy options and promote system reliability and outreach and education programs within the energy efficiency programs and services program category. To provide more comprehensive and attractive financing packages to customers to promote fuel-switching, where

[3] Cases 94-E-0952 et al., In the Matter of Competitive Opportunities Regarding Electric Service, Opinion 96-12 (issued May 20, 1996).

[4] Approximately $60 million of the $234.3 million were retained by the utilities to continue certain PSC-approved programs and fulfill certain commitments.

[5] Ultimately, the PSC approved a NYSERDA-proposed SBC Operating Plan that transmitted $174.5 million of the total funds to NYSERDA to implement energy-efficiency programs (69%), research and development programs (17%); low-income programs (13%). Approximately 1% of the funds were allocated for environmental disclosure. The approved plan allowed NYSERDA to use approximately 5% of each budget for program administration and estimated total evaluation costs at $400,000.

doing so might reduce electricity demand and lower peak demand, NYSERDA was authorized to include non-electric energy efficiency measures within its energy -efficiency program offerings. [6]

SBC III: July 1, 2006 through June 30, 2011, with a funding level approximately $175 million per year. The Order initially allocated SBC III funding as follows: peak-load, energy-efficiency, and outreach and education programs (54%), research and development programs (23%), and low-income energy- affordability programs (24%), and was reflected in a NYSERDA proposed SBC Operating Plan (2006-2011) dated March 2, 2006.[7] The SBC III Order provided the following changes or clarifications: (1) supported the use of SBC funds for transmission and distribution research that relates to broad energy efficiency or reliability benefits of a statewide nature that is not utility specific; (2) clarified that it was appropriate to use SBC funds to develop an infrastructure of support services to encourage renewable resources and that the RPS program did not supplant this SBC function; (3) clarified that demand-response programs should be targeted primarily to areas where demand is either growing or reaching capacity limits; and (4) required the consolidation and simplification of programs.

SBC Accomplishments

The SBC portfolio has yielded significant economic and environmental benefits to New Yorkers. The SBC program has helped build and maintain the State's momentum in: developing competitive markets for energy efficiency and demand management; developing a nascent clean-energy infrastructure in New York State; expanding the State's capacity for innovation; and providing energy assistance to low-income households. A sample of program achievements is summarized below. Unless otherwise noted, the listed achievements are cumulative from program inception through December 31, 2009 and are adapted from Table ES-4 and Table 2-10 of the March 2010 SBC Program Evaluation and Status Report. (See http://www.nyserda.org/pdfs/sbc_annualprogramsevaluation_statusreport_end2009.pdf). Examples of programmatic success stories are included in Appendix B.

The SBC Program serves many different New York entities. Energy performance has been improved in more than 45,000 new or existing homes, 71,000 multi-family housing units, and 17,800 new or existing commercial, industrial, and institutional facilities. More than 115,000 low-income customers have received energy-efficiency assistance.

The SBC Program saves energy and reduces load. Installed energy-efficiency measures reduce electricity consumption by 3,820 GWh per year and reduce peak demand by 824 MW. Renewable generation installations have reduced load by 10 MW and an additional 590 MW of callable load reduction is available to improve system reliability, when needed.

The SBC Program reduces energy costs and is cost effective. Customers participating in the SBC program save nearly $680 million in annual energy costs. The benefit-cost ratio, based on the total resource cost test for the resource acquisition portion of the SBCIII portfolio is 1.8.

The SBC Program diversifies electricity generation. Installation of 865 photovoltaic and 15 small-wind systems produce 106 GWh per year of clean electricity. Nearly 162 GWh per year of electricity is generated from 49 operational Distributed Generation-Combined Heat and Power (DG-CHP) systems.

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[6] Case 07-M-0548, Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard, *Order Continuing and Expanding the System Benefits Charge for Public Benefit Programs (*issued January 26, 2001) pages 7-9.

[7] On November 8, 2006, NYSERDA petitioned the PSC to reallocate and carry-forward certain SBC II funds. On June 5, 2007, the PSC granted NYSERDA's petition and directed NYSERDA to update its operating plan accordingly. This reallocation of funds yielded the following funding allocation among program categories: peak load, energy efficiency, and outreach and education programs (52%), research and development programs (27%), and low-income energy affordability programs (22%).

The SBC Program stimulates the economy. Through 2008, the SBC program has led to the creation of 4,900 net jobs. For every dollar spent on R&D product development there is $4.90 of added value, resulting in an increase in gross state product. Private investment in energy technologies has been fostered (*e.g.,* through year-end 2009, $362.6 million has been invested in CHP projects, 85% of which has been private funds).

The SBC Program mitigates environmental impacts of energy use. Annual reduction of emissions attributable to energy savings associated with the SBC program include: 3,030 tons of nitrogen oxide, 5,710 tons of sulfur dioxide, and 2.3 million tons of carbon dioxide.

SBC Lessons and Experiences

NYSERDA's experience in administering SBC programs, including recommendations received from SBC Evaluation contractors and a variety of program reviews over the past decade, have helped shape and inform the focus and vision of the future SBC program proposed in this paper. A summary of some of the relevant lessons, experiences, and recommendations for consideration are provided below.

Technology commercialization requires both technology development and business development. A policy and business framework must be created in New York to enable the commercialization and adoption of new energy technologies. Commercialization assistance will need to go beyond traditional R&D grants, including the creation of new mechanisms to facilitate collaboration, networking, and productive partnerships; assistance to access capital; and the creation of an "innovation ecosystem" or technology clusters including developers, entrepreneurs, service providers, and the financiers – all critical to getting new energy technologies to market and maximizing clean-energy related economic development benefits in New York State.

Demonstration programs can accelerate market adoption of new technology and prepare the market for deployment program success. Technology demonstration and evaluation in the field in New York is needed to characterize the risks of new technology in our market environment. This often enables continued private-sector financing to further commercialize a product. Once the value proposition of a new technology is defined, larger-scale/multi-site demonstrations and training of service contractors on new technology can further accelerate the introduction of emerging technology and prepare for larger-scale market penetration (*i.e.,* early adoption) and deployment program success.

Market transformation is best delivered through the supply chain. Experience has shown that where there is an established relationship, manufacturers will respond to retailers' expression of a market need and, conversely, retailers will put a manufacturer's product on the shelf. Mid-market commercial participants (vendors, contractors, distributors and designers) respond to efforts that establish quality and efficiency guidelines, as well as training, ongoing field and market support, and targeted incentives. Differing motivations among various sectors of the commercial building market necessitate that strategies be aligned with the business model of each sector.

Investment in workforce development infrastructure must begin early and grow beyond "green collar" jobs. It takes years to develop a trained workforce, necessitating a very early start on emerging technologies. Third-party certification is preferable, shifting the burden of maintaining currency and relevancy onto a third party. Workforce development efforts should be expanded to address the need for qualified engineering service businesses, the development of business skills for technically trained contractors so they can successfully expand their businesses, and the development of a talent pool in New York that can create, launch, and run the next generation of CleanTech companies.

Consumer marketing must be simple, focused and adaptable to regional needs. NYSERDA is striving to coordinate a holistic clean energy message that employs a consistent brand; minimizes confusion between

multiple program offerings; adjusts marketing budget and effort to match demand and local supply infrastructure; uses behavioral levers more effectively; and recognizes the uniqueness of the New York City market.

Expanded opportunities for system benefits can best be created by increasing collaboration and cooperation. The exchange of information and cooperation with investor-owned utilities has facilitated collaboration in program delivery and has resulted in some early program successes in Smart Grid technology. Enhanced collaboration with utilities will be particularly important as new technologies are incorporated and grid modernization investments are made in support of continued reliability; customer service; and renewable energy, efficiency, and carbon reduction goals.

Organizational "nimbleness" and improved customer satisfaction can best be achieved through streamlining and automation of administrative and contracting processes. Improved administrative systems, processes, and tools will achieve administrative efficiencies that will allow NYSERDA to adapt to changing demands and to improve customer satisfaction.

Context for Future SBC Initiatives

SBC programs have established a platform of proven and successful energy technologies and the necessary market infrastructure upon which the EEPS and RPS have advanced aggressive clean-energy targets and programs. Continued support to foster technologies and business models for "smart grids" allowing for "flexible load," new electric transportation options, and more renewable energy sources will help New York achieve its energy goals and maintain a strong economic position in an increasingly carbon-constrained economy.

Recent Policy Developments

The Federal and State energy policy landscape has changed significantly over recent years as New York and the nation have come to a clearer recognition of our energy dependencies and the associated economic, environmental, and security implications. The policy initiatives that form the back-drop and framing for SBC extension discussions are well developed in the 2009 *State Energy Plan. (The State Energy Plan* policy objectives and strategies are summarized in the text box below.) A brief listing of these energy policies and other major initiatives that are increasing clean-energy options and beginning to tackle climate change include:

- "45 x 15" Clean Energy Goal (2009)
- Renewable Portfolio Standard (*instituted* in 2004, *revised* in 2010)
- Energy Efficiency Portfolio Standard (*instituted 2007*)
- Capital Access Programs
    - Green Jobs – Green New York (*enacted 2009*)
    - Municipal Sustainable Energy Loan Program (*enacted* 2009)
- Green Residential Buildings (*enacted* 2008)
- American Recovery and Reinvestment Act [ARRA] (*enacted 2009*)
- Regional Greenhouse Gas Initiative (RGGI) and other Climate Change Strategies; and
- Pending National HomeStar legislation and potential national renewable energy standard/Federal Climate initiatives

2009 State Energy Plan

State Energy Plan 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 globally-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.
- Improve the State's energy independence and fuel diversity by developing in-state energy supply resources.

State Energy Plan Strategies

- Produce, deliver, and use energy more efficiently
- Support development of in-state energy supplies
- Invest in energy and transportation infrastructure
- Stimulate innovation in a clean-energy economy
- Engage others in achieving the State's policy objectives

Additional New York State Energy Funding Resources

Several of these recent policy initiatives and programs have provided new sources of funding to help achieve the State's energy policy goals. Some of these resources are currently available to NYSERDA and have bolstered investments in energy efficiency, renewable energy, and, to a lesser degree, energy R&D. However it is worth noting that the vast majority of NYSERDA funding (approximately 85%) is focused on expanding market adoption of commercially available technology – primarily through acquisition-type programs funded through EEPS, RPS, federal stimulus funding, and more recently RGGI.[8] The proposed future SBC programs address gaps in available funding. As we look ahead, SBC still appears to be the primary funding source to support technology development, clean energy market and business development, and innovation and infrastructure that are forerunners to EEPS and RPS success. All these SBC investments are vital to New York's energy and economic future, and critical to maximizing benefits to the electric and gas ratepayers in New York State.

Challenges and Opportunities

Collectively, the policy initiatives listed above have placed New York on an aggressive track for achieving some of the most laudable energy and environmental goals in the nation – whether "15 by 15", "45 by 15", or "80 by 50." With the advent of these energy policy initiatives (EEPS, RPS, RGGI, etc.), the opportunity exists to refocus SBC efforts to serve and support the long-term success of these initiatives without duplicating their unique value. The EEPS and RPS initiatives accelerate market penetration of energy efficiency and renewable resources using existing, proven programs and technologies. The future SBC should "feed" new technologies and services into these initiatives to ensure a continuous stream of lasting clean-energy benefits.

Challenges that can be addressed by the new SBC focus are presented below. Some of these challenges have more near-term consequences, while others require a longer-term stream of investment.

[8] "Toward a Clean Energy Future, A Three-Year Strategic Outlook 2010-2013," NYSERDA, 2010. [See table 2.2. for more detailed budgets and funding levels across the NYSERDA portfolio.]

Energy Infrastructure Needs. As stated in the State Energy Plan, New York's energy infrastructure requires constant investment to maintain high infrastructure reliability. Infrastructure investments also support operational complexities that will be introduced by new clean-energy technologies and new uses of the electric transmission and distribution system – such as electric vehicle infrastructure and increased electrification of industrial processes. These investments also will be driven by longer-term needs, including the need to reduce GHG emissions. The need to replace aging infrastructure and reduce air emissions will require substantial infrastructure investment resulting in a continued upward pressure on the cost of electric service. In cooperation with the utilities and the NY Smart Grid Consortium, future SBC programs will seek to identify and demonstrate new and innovative strategies to better manage infrastructure investments as the State continues its transition to a clean energy system.

Rising Cost of Supplying Energy. Currently, New York spends approximately $65 billion annually on energy, of which 53 percent or close to $35 billion requires energy imports. Future SBC programs will explore new approaches to achieve greater levels of strategically located energy efficiency and in-state energy resource development. This will ultimately help reduce the outflow of dollars to pay for energy imports, while providing some insurance against price volatility and energy-supply security. At the consumer level, strategies that help consumers better respond to price will also be needed (*e.g.,* new load-management technologies, building-design technologies, and smart-grid applications).

An Economy in Transition. The U.S. has recently experienced the greatest economic downturn since the Great Depression. From the standpoint of energy consumers in New York, the current economic crisis presents real challenges today, as evidenced by record high numbers of New Yorkers unable to pay their utility bills. This economic crisis has also underscored the need to diversify our economy. Many economists believe that energy technology will be at the heart of the next industrial revolution, and that those economies that embrace innovation will thrive in the 21st century. New York possesses significant energy innovation assets which can and must be built upon to enable the State to prosper. These significant economic conditions – both the need to control energy cost and the need to create new economic opportunity in New York State – must be considered in designing future SBC programs.

Unprecedented Need for Energy Innovation. The re-engineering of the nation's energy industry to accommodate a highly carbon-constrained future, such as that required for an 80% greenhouse gas emission reduction goal, would require unprecedented levels of innovation in technology and policy, new business models, new public-private partnerships to manage risk, and the mobilization of huge amounts of capital. New York has a long history of innovation in energy dating back to the days of Thomas Edison, and is poised to be a major player in emerging clean energy markets.

Strategies to Accelerate Energy Innovation

Much of the success of the SBC program can be attributable to a portfolio approach that included a comprehensive set of clean-energy programs supporting both near-term and longer-term investments. SBC investments have supported each stage of the innovation chain: from the early stages of scientific research and analysis, to technology development and demonstration, to business and market development, to market adoption and expansion and, finally, to the adoption of new standard practices.

The following table illustrates the specific role that future SBC initiatives could play in advancing clean-energy technologies and practices while furthering the State's ultimate energy-policy goals. NYSERDA recognizes the critical role the electric utilities can serve as a 'test bed' for new technologies. A key strategy of the overall SBC program will be to develop an 'open innovation' partnership with the electric utilities to accelerate the pace of 'green' technology development and deployment in New York State.

Table 1. Accelerating Energy Innovation through the SBC	
Stage in the Energy Innovation Chain	***Proposed SBC Focus and Investment Strategy***
Scientific Research and Market Analysis	**Support Energy-Related Environmental Research and Market Assessment to Better Understand Impacts of Energy Options** • Assess, monitor, and seek to mitigate environmental impacts in NYS of existing and emerging energy technologies. • Support targeted market and load research to assess energy-efficiency and distributed energy resources and to assess options for improving asset utilization and reducing system cost.
Technology Development and Demonstration	**Accelerate the Development of New and Improved Clean-Energy Technologies** • Develop and test new technologies in key areas: smart grid (including vehicle-to-grid, building-to-grid), renewable power (central power and customer sited), zero-energy buildings and deep retrofits, high-impact industrial technologies, new combined heat and power systems. • Facilitate industry-university-utility partnerships and leverage private capital to benefit New York and build the State's capacity for innovation. • Harness the market 'pull' leverage of the utility sector to catalyze new business opportunities and prove out new technologies. • Leverage research that is taking place at the national level to provide value to New York. • Seek market feedback from NYSERDA and utility deployment programs. • Include pilots and large-scale pre-deployment demonstrations of emerging technology to accelerate product market entry of renewable resource, smart-grid, and energy- efficiency technology.
Business and Market Development	**Develop the Supply Chain; Increase the Number of Service Providers for a Clean-Energy Economy; Build Market Demand** • Include upstream market transformation (*i.e.,* activities to develop the infrastructure of contractors, vendors and service providers to deliver new clean energy products and services to the market). • Support clean-energy business development & clean-energy manufacturing growth. • Support workforce development and certification to provide the capacity to achieve NY's energy goals through the proper design, installation, and maintenance of energy efficiency and renewable energy systems, equipment and measures. Increase consumer awareness and educate communities involved in energy decision-making. • Support K-12 energy education and college-level energy activities. • Capitalize on new behavioral research.
Market Adoption and Expansion	**Accelerate and Increase Penetration of New and High-Potential Clean Energy Technologies and Practices** • Focus on key opportunity markets and sectors not currently addressed in other state programs (e.g. combined heat and power, peak-load reduction, etc.). • Address market barriers and institutional impediments to adoption, including those affecting the low-income sector. • Explore new strategies, including innovative energy-information systems and financing options.
Standard Practice	**Push New Standard Practices, Codes and Standards, Enabling Compliance** • Elevate standard energy-use practices to new levels of efficiency and optimization.

Potential Future SBC Investments

Several examples of the kinds of thematic and, in some cases game-changing, initiatives that might be included under the future SBC framework are listed here and further described below. The degree to which each initiative can be pursued will depend upon the level of funding available for SBC investments. Allocation of funding to specific program areas will be based on a variety of factors addressing needs, benefits and opportunities, and will depend on the total funding available for future SBC programs.

Prioritization Criteria

Criteria for prioritizing the program budgets include the following:

- Potential benefit to utility systems and ratepayers, over the near and long-term;
- Potential environmental and economic development impacts;
- Ability to make measurable progress, within available funding resources, on the targeted outcomes identified in this paper:
    - Build market infrastructure to help achieve EEPS and RPS goals
    - Develop and prove out emerging technologies and strategies to achieve EEPS and RPS goals
    - Stimulate clean energy technology and business development in New York State
    - Spur decisions, actions and investments that result in clean-energy achievements distinct from incentive-based programs
    - Catalyze strategic and effective electric grid infrastructure investments
- Need for public co-investment; and
- Need for gap filling within NYSERDA's overall funding portfolio to achieve State Energy Goals.

As described throughout this paper, the future SBC program is not intended to be a resource acquisition program but appropriate consideration will be given to the ability of the selected portfolio of future SBC technology and market development programs, in combination with a post-2012 optimization of the EEPS portfolio, to provide up to 13 percent of the original "SBC energy efficiency wedge" (see discussion on Page 20).

It is anticipated that if the commission approves the renewal of the SBC program, specific funding will be allocated by program and presented in an SBC Operating Plan that will be developed by NYSERDA and submitted to the Department of Public Service for approval. At the sub-program level, funding determinations for specific projects will be made through NYSERDA's competitive solicitation process. This process includes establishing specific evaluation criteria in the solicitation and evaluating and ranking proposals, using both internal NYSERDA experts and external experts, including staff from the Department of Public Service. As programs proceed, NYSERDA's ongoing program evaluations and routine input from stakeholders will provide necessary feedback to make any refinements in budget allocations.

Potential Future SBC Initiatives

Each initiative is depicted as a green oval on Figure 1, to show the positioning of the initiative in the context of New York's strategic advancement toward a Clean-Energy Grid.

- **Accelerate Transition to a Smart Grid**
- **Accelerate Transition to an Electric Vehicle Infrastructure**
- **Catalyze Clean-Tech Power Generation**
- **Expand High-Value Combined Heat and Power Applications**
- **Increase Information Technology (IT) Energy Productivity**

- **Enable Advanced High-Performance Buildings**
- **Foster Industrial Process Innovation**
- **Behavioral Approaches to Accelerate Clean Energy Adoption**
- **Improve Energy Codes and Standards**

*The listed **initiatives are not meant to present a comprehensive SBC portfolio**, but rather to illustrate opportunities and needs that could be addressed within the SBC to advance State energy goals and provide benefits to the users of New York's electric and gas system.*

In addition to these initiatives, it is anticipated that key foundational programs, including those that support environmental assessment, market research and analysis, as well as business, market and workforce development efforts would need to be supported. These program areas which are crucial to the success of New York's emerging clean energy market economy and the achievement of the PSC's and New York State's energy goals are highlighted in Table 1, above, and briefly described below.

- **Targeted Energy-Related Environmental Research** provides data and information regarding the environmental impacts of current and emerging energy options. The knowledge obtained through these programs is used to inform decision-making at the State and national policy levels in energy-related environmental areas of importance to New York. Such research is also critical to ensuring that new energy technologies impose the minimum burden on the environment in New York State.

- **Market Analysis** provides critical early-stage information and insights on new technologies and specific market sectors. The resulting information is used to help guide future investment decisions and to assist in the identification of market and institutional barriers to technology and product adoption that need to be overcome to achieve broader participation in programs and achieve energy policy goals.

- **Business Development** supports a range of clean energy business innovation and manufacturing initiatives designed to help convert ideas and inventions into viable ventures in New York that can ultimately deliver products to the New York marketplace.

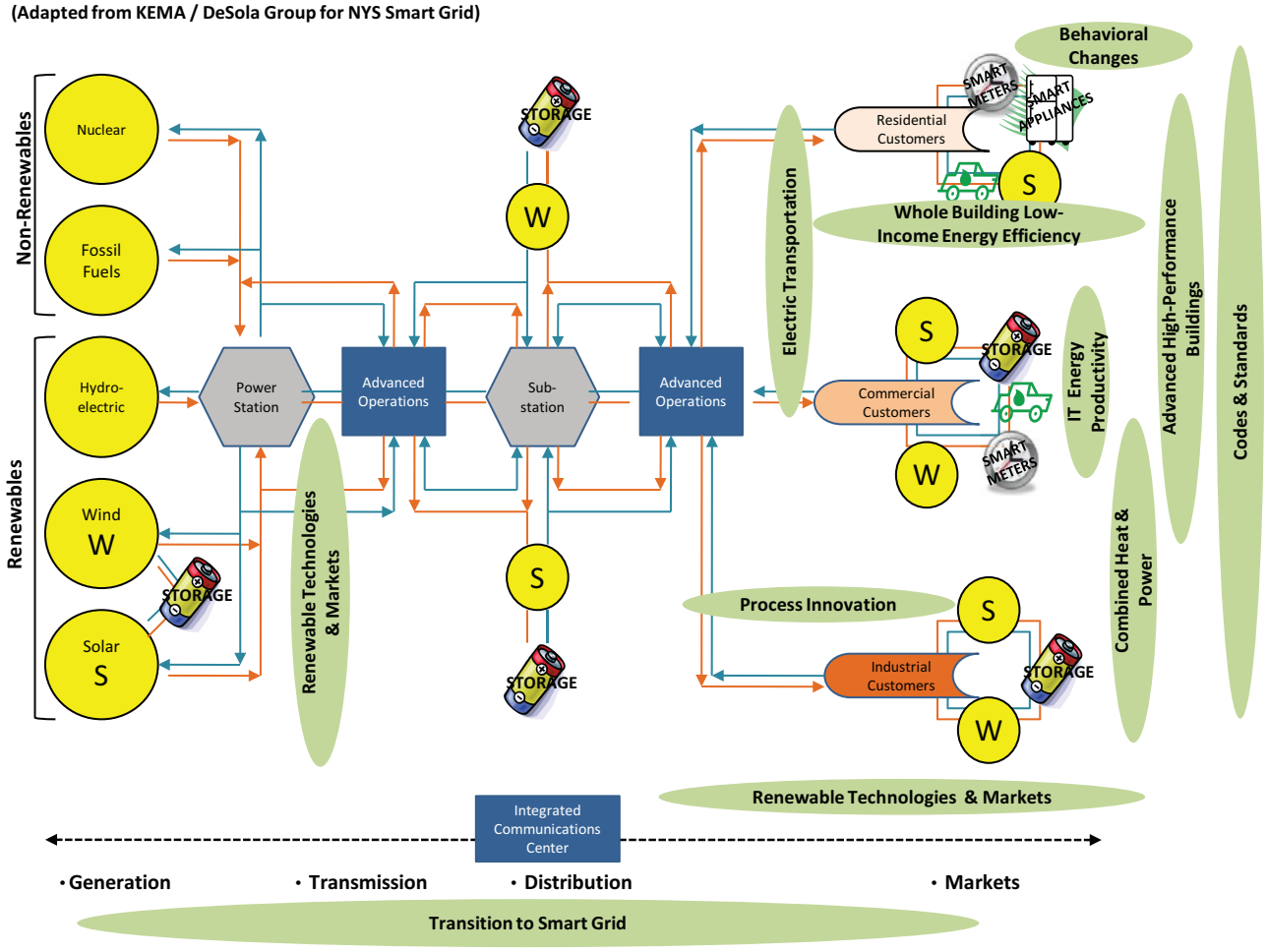
- **Market Development** includes activities that develop clean energy products and service supply chains and create consumer demand through education, behavioral, financing, marketing, and outreach approaches.

- **Workforce Development** provides the certification and training programs essential to ensuring that New York has the capacity to properly design and install the energy efficiency measures and renewable energy systems that will be needed to allow NY to meet its energy efficiency and renewable energy goals.

Figure 1

Proposed SBC Initiatives and the Grid of the Future

(Adapted from KEMA / DeSola Group for NYS Smart Grid)



ACCELERATE TRANSITION TO A SMART GRID

The electric transmission and distribution system represents an enabling structure that must be upgraded to ensure the highest levels of efficiency, reliability, security, and resiliency for all consumers while simultaneously lowering the carbon intensity of the electric-power sector. The long-term realization of a low-carbon economy imposes significant challenges as intermittent resources, including large-scale wind and rooftop solar systems, are connected to both ends of the grid infrastructure. To support New York's transition to a 21st century grid infrastructure, potential initiatives could include the development and demonstration of innovative technologies and strategies that improve the performance of the electric power delivery system.

A broad array of initiatives including engineering studies, product development, and demonstration projects are needed. Grid–based projects could be supported that: 1) promote a diverse supply of low-carbon electric-power generation; 2) enhance transmission and distribution reliability, efficiency, and control; and 3) enable end-use customers to manage energy consumption and cost. All critical aspects of technology commercialization including technical, business, and regulatory innovation would be addressed. The program would engage the DPS and utilities in a collaborative dialogue and use the NYS Smart Grid Consortium to identify societal benefits resulting from SBC smart-grid investments.

New York's innovation assets in this area include: a number of clean-energy incubators throughout the State, five DOE Energy Frontier Research Centers, and the New York Battery and Energy Storage Technology (NY-BEST) Consortium. The NYS Smart Grid Consortium was established to bring together key stakeholders from government, industry, utilities, and academia and to provide a high-level forum for developing a statewide smart-grid vision and roadmap. The program would coordinate all of these assets to accelerate the pace of technology commercialization and introduction in New York State. The program would be designed to help New York utilities make strategic investments in the electric infrastructure.

ACCELERATE TRANSITION TO AN ELECTRIC TRANSPORTATION SECTOR

Grid-powered vehicles (GPVs) soon will become commercially available in the U.S. and are expected to gain a sizeable market share by 2020. Electrification of the transportation sector could pose problems if this additional load is unmanaged and on-peak. Alternatively, unique aspects of electric-vehicle charging offer the potential for this new load to improve grid reliability, provide ratepayer cost reductions, and contribute to New York State's greenhouse gas reduction targets.

To realize the full potential of GPVs, certain technical, regulatory, business model, and consumer behavioral issues must be addressed during the transition period. Future SBC investment could employ a multi-faceted approach to: (1) develop and demonstrate vehicle-to-grid and vehicle-to-infrastructure communication technology and various financial transaction models that engage mid-stream entities such as demand response providers to aggregate customer load; (2) develop and demonstrate approaches such as stationary energy storage, mini–grid, and smart-grid load-management devices that mitigate adverse impacts to the distribution system; (3) support, where necessary, GPV technology and component development with original equipment manufacturers (OEMs) and businesses to assure continued performance improvement; (4) advance behavioral research and analysis of regulatory issues that provide policymakers with useful and credible information to address barriers to adoption; and (5) support pre-deployment demonstration programs that verify performance and benefits. All of this would be done to ensure that the integrity of the New York electricity system is maintained.

These programs could influence a successful transition to an electrified transportation sector. Considering the five-year vehicle product development cycle and typical 15- year life, it will be necessary to make key decisions and investments during the 2011 to 2016 time period if GPVs are to make a significant contribution to New York's long-term energy efficiency, grid reliability, load management, and carbon reduction goals.

CATALYZE CLEAN-TECH POWER GENERATION

New York has achieved great success in supporting the development of renewable energy technologies and the operation of renewable generating resources to meet near-term RPS goals; however, the State's longer term renewable generation and greenhouse gas reduction goals only are achievable through the development of a pipeline of continuously improving renewable resource options – with better price and performance. Such a pipeline could be established via a suite of programs that provide technology development, commercialization, and early deployment concurrent with a program of resource assessment and site development.

The latter category could develop an inventory of sites, renewable fuel supplies, technologies, and businesses that together would build the capacity to produce clean energy across several frontiers. Depending on the funding level, considerable emphasis could be placed on the development of off-shore wind energy. Off-shore wind energy is expected to become a viable option for delivering utility-scale renewable electric generation to densely populated downstate regions of New York where the cost of electricity is highest. A multi-faceted program could prime the State for off-shore wind development activity in the second half of the decade. Off-shore activities would involve collaboration/integration and scoping with State agencies, federal authorities (*e.g.,* Department of

Interior, Department of Energy), the wind industry, universities, and various program elements at NYSERDA (*e.g.,* environmental research). Other potential activities include:

- Characterizing operating environments including the development of modeling/predictive tools
- Developing fuel growth and management practices
- Conducting various site-specific assessments (*e.g.,* geophysical, meteorological, biological) including permitting and erection of meteorological measurement devices
- Developing and deploying scientifically acceptable research and investigative processes
- Demonstrating, testing and validating technology
- Conducting assessments of the supply chain and serviceability capabilities

The other program elements would enable significant improvements in the performance of current technologies, develop advanced next-generation technologies, and help grow clean energy businesses in New York. Examples of these programs include: (1) Establishing technology innovation consortia and proof-of-concept centers to accelerate market readiness and advance early-stage technologies to the point of private investment; (2) Developing seed/investment capital and finance programs to accelerate the commercialization and market investment and introduction of new technology in New York[9]; and (3) Conducting research to understand the environmental performance characteristics of new clean-energy technologies to provide a framework for siting and allow new technologies to enter the market.

EXPAND HIGH-VALUE COMBINED HEAT AND POWER (CHP) APPLICATIONS

Customer-sited CHP are valuable resources capable of providing both system and customer benefits including: higher energy efficiency through use of waste thermal energy; permanent demand reduction; avoided line losses; deferred transmission and distribution upgrades; reliability and security; faster, easier siting than central station power plants; and improved system-wide environmental performance, particularly relative to peak-load emissions. CHP can have simple payback periods in the range of 5 to 10 years, and does not represent a technology choice lock-in that persists for an unreasonable length of time.

The penetration of CHP systems in New York is greater than elsewhere in the nation, but falls short of the potential identified in NYSERDA-sponsored assessments.[10] New York's CHP potential provides an opportunity to: (1) avoid up to 8,500 MW of marginal central generation and expanded distribution capacity investment needed for load growth and ultimately borne by all ratepayers; (2) expand on previous successes that have established vital marketplace precedents and moved some CHP projects to deployment programs; and (3) broaden the marketplace of CHP with proven customer and societal benefits. There is a continued need to demonstrate elegant solutions to institutional barriers and inform stakeholders regarding validated best practices.

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[9] There are two key stages in the deployment of new energy technologies where capital is scarce. The first occurs before the risk profile of a new technology becomes attractive to early-stage venture capital investors. "Seed capital" at this stage helps a new technology venture to complete necessary development, recruit professional management, and begin to approach customers and strategic partners. The second stage occurs when the technology is demonstrated but requires substantial facilities-related investment to achieve the scale necessary for economic operation. Government risk-sharing of the project financing required at this stage can reduce the inherent uncertainty of engineering and financing a first-of-its-kind facility.

[10] The NYSERDA-sponsored assessments show 26,000 total sites, 16,000 of which are Downstate. Nationwide, based on 2006 data, CHP represents 9% of the installed generation capacity, and both US DOE and US EPA are striving to dramatically increase this amount for various reasons including but not limited to as a means of reducing greenhouse gas emissions. Specifically, in August 2009 USDOE set a goal to increase CHP nationwide to 20% of installed capacity by the year 2030.

Initiatives that could advance high-performance CHP in New York include: (1) standardization and simplification of small-scale CHP systems by supporting a large number of demonstration projects employing high-performance pre-packaged CHP modules; (2) R&D demonstrations that advance the state-of-the-technology; and (3) strategic CHP deployment that maximizes site-owner and system benefits.

INCREASE INFORMATION TECHNOLOGY (IT) ENERGY PRODUCTIVITY

Information technology is a high-potential energy-efficiency market due to its high use of electricity, significant load growth, and economic impact. New York has the second highest concentration of data centers in the nation. Data center energy consumption is projected to double in the next three to five years[11]. In commercial buildings, IT energy use can often exceed that of lighting.

Future IT energy productivity initiatives of value to New York could: (1) expand beyond Enterprise IT to include desktop computing and IT systems that support small- to medium-sized facilities; (2) engage leading IT stakeholders to understand market needs and influence the development of equipment standards and next generation IT technologies; (3) update and expand the characterization of the New York IT market, including evaluation of the energy, reliability, and economic benefits of: cloud computing (*i.e.,* the off-site outsourcing of IT operations) and locating new Enterprise IT capacity in upstate New York; (4) develop and demonstrate cutting-edge technologies and techniques to achieve greater IT energy efficiency; (5) transition emerging technologies and techniques from R&D to deployment in partner data centers; and (6) support, develop, and promote training for IT professionals.

In addition, the initiative could support IT energy master planning to: (1) optimize existing assets; develop an organization/operation-specific energy productivity metric (*i.e.,* energy use per unit of useful work); (2) create cross-functional teams comprised of managerial, financial, facilities, business development and IT staff; and (3) apply LEAN principles used in the manufacturing sector to reduce computing waste such as unneeded redundancy, zombie (unproductive) and under-used servers, data duplication, dead applications, downtime, and overcooling.

ENABLE ADVANCED HIGH-PERFORMANCE BUILDINGS

New York's buildings are responsible for more than 70% of the State's electricity consumption, 40% of the State's total energy consumption (electricity and fossil fuel), and an equivalent fraction of carbon emissions. The development and demonstration of energy-efficiency technology to optimize the energy use in the buildings sector could include initiatives that focus on advanced construction and retrofit systems and practices, as well as initiatives that demonstrate smart, automated energy management and information systems.

Advanced construction and retrofit efforts might focus on: (1) advanced building materials, techniques, and systems; (2) new approaches to traditionally under-served types of buildings (e.g. mixed-use buildings, low-rise multifamily, etc.); and (3) emerging renewable energy technologies (daylighting, solar thermal, advanced photovoltaics, geothermal, biofuels, advanced distribution systems, and energy storage). An advanced building initiative might include a component that focuses on ways to improve the supply and delivery characteristics of the marketplace -- from what manufacturers produce to levels of product that distributors and retailers stock, to the technologies and practices builders and contractors support, to the processes owners and their design teams use. The effort might include increasing consumer demand through consumer education; creating market

[11] U.S. EPA, "Report to Congress on Server and Data Center energy Efficiency – Public Law 109-431," dated August 2, 2007.

awareness through high-profile demonstrations; targeted strategies that address sectoral needs, including those of the low-income sector; establishing specific means to access new and advanced building technologies for consumers and building owners; and growing the necessary infrastructure of contractors, installers, and maintenance personnel through pilots of new business models, and through training, certification, and other workforce development means.

Similarly, automating and improving the performance of the existing building stock will require development and demonstration of emerging and new technologies, as well as market transformation, through supply-chain development, training, education, and awareness of existing technologies and their applications. As the Smart Grid evolves, operators of "smart" buildings will achieve further energy savings and provide a resource for electric-grid management. An initiative focused on automating existing building stock could include large scale demonstrations by "building type." For example, residential building demonstrations might include energy information displays, smart plug-load control, and network-enabled load control, offering consumers the ability to manage their energy use and engage in time-sensitive rates.[12] Similar approaches could be applied to multi-family buildings and small to mid-sized commercial and institutional buildings with the additional opportunity to aggregate a large number of smaller loads for demand management. Large commercial building demonstrations might include energy management systems, improvements in load interaction and adaptive controls, and energy "dashboards" allowing building operators to optimize building performance and control load thereby facilitating participation in mandatory hourly pricing and demand response programs. Emerging technologies such as wireless network controls, self-configuring networks and self-powering (scavenging) sensors offer the potential to transform existing buildings to "smart" buildings.

This initiative would demonstrate performance of advanced building practices and renewable energy technologies, increase their acceptance, and create a path to their broader adoption and dissemination through the State's EEPS and RPS programs, expanding cost-effective options for program administrators, and improving the depth of energy savings, while continually striving toward the longer -term goal of zero-energy buildings.

FOSTER INDUSTRIAL PROCESS INNOVATION

The ability of New York firms to profit in manufacturing is crucial for creating good wage-earning jobs and for the mass production of clean technologies, which will require new processes and techniques. A successful manufacturing sector can also be a contributor to improved system load factor. EEPS has greatly increased program and funding availability to implement modern, efficient manufacturing processes in New York State, but new ideas for industrial manufacturing product and process improvements, as well as the adoption of industrial innovation must be supported to overcome the risk aversion of industrial decision makers and their consulting engineers.

An industrial process innovation initiative would strive to: (1) catalyze new approaches for improving manufacturing processes with the goal of minimizing time and resources spent in the idea stage; and (2) support projects that demonstrate classes of innovative technologies to connect industrial sites and engineering consultants to the state-of-the-art processes and technologies. The initiative would support demonstrations of electrotechnology and process heat and natural gas efficiency technologies.

The demonstration efforts would be combined with an aggressive technology transfer component that includes testimonials from sites and consulting engineers to help establish credibility and persuade the industrial customer base to adopt innovation and new processes. The potential for spillover and sector penetration is maximized by incorporating external testimonials and peer-to-peer teaching among customer staff, management, and

[12] Pilot programs deploying energy information displays (direct feedback) have shown on average to reduce energy use by 7%.

engineering consultants. These experiences increase the comfort of risk-averse plant owners and provide education and experience verification for engineering consultants. Further advancements can be made by partnering the technology demonstration program with a consultant training and an internship program.

BEHAVIORAL APPROACHES TO ACCELERATE CLEAN-ENERGY ADOPTION

Systematic development and application of behavioral science research is an untapped asset that could increase the effectiveness of rate-payer-funded programs in achieving of New York's ambitious energy-efficiency and renewable-energy goals. Methodologies and approaches from the behavioral sciences have been shown to be effective in optimizing program design and motivating individual and organizational change. Permanent changes in the ways we use energy can be fully realized as energy users become more informed and adopt new habits, including purchasing and operations behaviors based on a variety of motivators. Both primary and secondary market research, can be used to characterize attitudes, behaviors, and decision- making motivations of targeted customer segments, allowing program administrators to use this information to frame behavioral initiatives.

Future SBC programs could include pilots and larger-scale demonstrations that incorporate behavioral insights and use innovative technologies, messages, and strategies to test and validate new ways to motivate consumers and operators to reduce energy use in their homes, buildings, and communities. Behavioral initiatives could include: the exploration of various incentive structures that front-load efficiency savings and delay costs to overcome first cost and time inconsistency biases; benchmarking and rating protocols that compare energy use against optimal levels to provide regular feedback on performance and address the status quo and single action bias; devices that provide easy-to-understand data and normative and injunctive feedback on how energy is being used and the impact on costs; equipment that allows customers to monitor and control consumption on a continuous basis; social "norming" of energy use to a peer groups' energy use; customized framing and consumer education of the benefits of smart energy use to illustrate the value proposition of the desired behavior; and bundling of measures in different ways based on target populations such as low-income residents to overcome single-action bias and choice overload. Behavior-based demonstrations and research would also address differences in response by different demographic sectors, enabling the implementation of strategies targeted at seniors, low-income communities, ethnic communities, high-income communities, and other demographic groups found throughout the State.

Tools and strategies developed and proven through a behavioral science initiative could be incorporated into program administrator efforts (both NYSERDA and utility programs) and have the potential to reduce total ratepayer investment needed to achieve a given unit of energy saved.

IMPROVE ENERGY CODES AND STANDARDS

Implementing strong equipment standards and energy codes, and achieving the highest possible compliance, is one of the most cost-effective means to achieve lasting energy savings in buildings. Potential statewide energy savings of 9,360 GWh are possible by the year 2017. For equipment standards, to capture savings in the New York market for categories not covered by Federal standards, the State should continue to advance its own standards. Increased resources would potentially accelerate the savings. For the Energy Code, while adoption and training of code officials are responsibilities already handled by the State, several additional opportunities can increase effectiveness and help the State achieve its ambitious clean energy and greenhouse gas reduction goals. Increasing compliance with the Energy Code will require ongoing education of the entire building community. Conducting assessments of compliance to determine the energy savings captured through increased education and enforcement would help to focus training efforts on those areas where compliance is lacking. Strengthening energy codes to help achieve the energy goals will require innovative strategies like a greater reliance on

performance-based codes, or even outcome-based codes. New ideas and tools can be tested in pilot and voluntary efforts. Voluntary, "stretch code" and adoption of design and operations standards will be encouraged.

Advances in energy-code requirements will make proven, cost-effective technologies and construction techniques standard practice across New York. This raising of the "floor" will increase interest in going beyond the code to the next generation of new technologies and construction techniques. The market adoption and expansion of these newer technologies and techniques will then become the focus of future incentive and market transformation efforts.

WHOLE-BUILDING ENERGY EFFICIENCY FOR LOWER-INCOME HOUSEHOLDS

Approximately 2.9 million households in New York have incomes at or below 80% of the State median income. To date, fewer than 17% of these households have received energy efficiency services through the Weatherization Assistance Program or NYSERDA programs. Although the American Recovery and Reinvestment Act provided supplemental funding to this sector, the impact is limited in both duration and numbers.

More than half of New York State households heat with utility gas, about one-third heat with fuel oil, less than 10% heat with electricity, and the remainder with propane, wood, solar heating and other sources. Utility bills often impose a financial hardship on these lower-income households, forcing many to make tradeoffs between heat, electricity and other basic necessities. The energy burden (percentage of income designated towards energy needs) for the low-income population of New York averages 28%, which is higher than the national low-income energy burden of 22%.[13]

Funding for NYSERDA's EmPower New York℠ (EmPower) program, the Assisted Home Performance with ENERGY STAR® (AHPwES) program, and the Affordable Housing component of the Multifamily Performance Program has been provided through the SBC, and more recently, through the Energy Efficiency Portfolio Standard. NYSERDA's experience with these programs has demonstrated average electric savings per household of less than a 25% or roughly $200 in annual bill savings. Heating improvements provide more substantial savings, typically ranging from $400 to $700 annually. However, due in part to restrictions on the use of EEPS funds for strictly electric and gas measures, and the lack of adequate funds targeted to other heating fuels, resources are not available to provide energy efficiency services to many households in need. Furthermore, pre-screening surveys of households referred to EmPower New York℠ found that 18 percent of the households report using electric space heaters in addition to their primary heating source, while four percent report using kerosene space heaters. Homes unable to receive energy efficiency services will likely continue using space heaters, adding to electric bills, or potentially exposing the household to safety issues related to indoor, unvented kerosene heaters.

In short, these lower-income households need additional assistance to permanently reduce their heating load, enabling them to better meet their energy burden. The inability of lower income households to pay their utility bills doesn't eliminate the cost. The cost of unpaid utility bills, which may include use of space heaters in poorly insulated and drafty homes or as an alternative to purchasing fuel oil, is simply transferred to other ratepayers. Improving the energy efficiency of lower-income households through whole building programs is the most beneficial way to meet this need and serves the interests of ratepayers by attempting to reduce the generalized cost of unpaid utility bills. Investment in residential energy efficiency, regardless of the fuel source, reduces the pressure on electric and gas bills, improves electric and gas system reliability by reducing the demand for electricity, and reduces carbon loadings and other pollutants in urban areas by assuring more efficient burning of fossil fuels.

[13] "Energy Smart Low-Income Energy Affordability Program, Evaluation and Status Report, July 1998 through June 2002", page 2-7, NYSERDA.

Assuming the continuation of EEPS funding for low-income gas and electric measures only, a two-track initiative could serve both the immediate and the longer-term needs of lower-income households. Track one would, in the near–term, work in concert with EEPS electric and gas measure funding to serve lower-income households with an all-fuels approach, as has been done in previous years through EmPower, AHPwES and MPP. The second track of the initiative would explore partnerships and cooperative strategies with the oil industry and others to share in the financial support for whole-house energy efficiency programs. Initially, these collaborations will focus on the lower-income sector due the critical needs of this sector and the generalized cost to ratepayers from unpaid utility bills, but the ultimate goal will be to expand the collaboration to include all households. Success with the second track will allow the phase-out of track one.

Approach to Evaluation of Future SBC Technology and Market Development Program

Impact, market, and process evaluation will be conducted on proposed 2011-2016 SBC programs. The approach to these evaluation activities will be adapted from their current application on SBC III and EEPS programs to meet the needs of the next generation of SBC programs. Evaluation of research, emerging technologies, and early market development activities requires different methods than standard energy efficiency deployment programs. However, where applicable, evaluation protocols developed for the EEPS programs will be employed in order to ensure a high level of rigor and reliability of results, especially where energy impacts are being quantified and expected to contribute toward achievement of the State's 15x15 goal. Evaluation techniques will assess program effectiveness and achievements for each targeted technology or initiative along the innovation chain. Program evaluation will be based on logic models developed in the early stages, and will assess near-term, intermediate, and long-term progress toward goals.

Assessing technology demonstration and ultimate transfer of technologies into more widespread deployment will be an important component of the evaluation effort. Demonstration projects lead to energy savings at a given site, but if effective, also can lead to replication and additional energy savings and market experience with the technology. Impact and market evaluation will focus on examining:

- Near-term technology development and demonstration progress and immediate energy impacts associated with those activities
- Intermediate term replication or further adoption of supported technologies and resultant, more widespread energy impacts
- Longer-term technology deployment potential and achievements, as well as associated energy impacts

Market evaluation will help determine when supported technologies have reached sufficient market penetration such that any additional support can be transferred into EEPS or other deployment programs, or rendered unnecessary if the technology ultimately becomes and is considered standard practice. Market evaluation can be enhanced, beyond its current form and function in SBC III and EEPS, to target more vertical-looking studies of specific customer segments and technologies, and assess progress along the continuum from research and product development to widespread deployment and market adoption.

Process evaluation studies will ensure the programs are implemented as efficiently and effectively as possible. These studies will be conducted in the early stages of program development to ensure that information and recommendations can feed the program improvement process, and NYSERDA can maximize program effectiveness.

Overall, the evaluation will provide data to assess progress toward achieving the program's overarching SBC policy goals addressing energy-system reliability and security, energy-cost burden reduction, environmental and health improvements, and economic well being.

Coordination and Consolidation of Current SBC and EEPS Programs

Since its inception over a decade ago, the SBC portfolio included a mixture of resource acquisition, market transformation, and research and development programs which created a strong, balanced foundation for growth of New York's energy efficiency and renewable energy markets. With the establishment of the EEPS program category within the SBC program (EEPS) in 2008, resource acquisition goals and initiatives have become the primary domain of EEPS. To complete the consolidation and alignment of programs, current SBC resource acquisition programs are proposed to be transitioned with their funding and energy savings goals to EEPS. (The EEPS proceeding assumed an annual contribution of 437 GWh from the current SBC energy efficiency programs toward "15-by-15" through 2015.) Similarly, NYSERDA proposes that EEPS programs administered by NYSERDA that support or provide a cross-program foundational service or benefit, such as workforce development will be transitioned out of EEPS to the future SBC Technology and Market Development Program. In this way, the EEPS resource acquisition programs and the future SBC Technology and Market Development Program will be strengthened and focused on distinctly separate but strategically supportive purposes.

Table 2 lists the programs, proposed to transition, in whole or part, from the current SBC to EEPS or EEPS to the future SBC Technology and Market Development Program in January 2012. In total, the EEPS-eligible components of the current SBC is estimated to be approximately $84M/yr ($73.4M electric/$10.6M gas). [14] These programs and their associated energy savings[15] are proposed to be transitioned to EEPS in January 2012. The energy savings associated with these programs at the current funding level ($84 M/yr) would account for approximately 87% of the SBC-projected electric savings estimated in the EEPS Proceeding. (See Tables 1 through 4 in Appendix C, for program-specific costs and savings target information). The balance of the "SBC energy efficiency wedge," plus other target outcomes (described on page 2 and addressed throughout this document), would be delivered through future SBC Technology and Market Development Program investments and/or mutually agreed upon adjustments to the funding allocations within the EEPS portfolio to optimize the post-January 2012 energy savings potential of the EEPS portfolio.

The EEPS Workforce Development program, a foundational effort that is key to the success of New York's emerging clean energy market economy, is proposed by NYSERDA to transition from EEPS to the SBC Technology and Market Development Program, also in January 2012. Allocation of future SBC resources to the Workforce Development program will be in accordance with previously stated SBC prioritization criteria and the PSC's stated interests.

In addition to planning for the coordination and consolidation of programs, as discussed above, the timing of the SBC and EEPS program authorizations must be carefully considered to ensure program continuity. SBC III programs are authorized and funded through June 30, 2011 but EEPS reauthorization is not anticipated until December 2011, thus a six-month lag in program authorization and funding must be addressed to allow the SBC-funded portion of the resource acquisition programs to be transitioned to EEPS with a continuity of funding to ensure that the SBC portion of the 15 x 15 target is not compromised. Given this situation, there is merit to considering an approach where SBC III is extended for an additional six months along with the authorization of the future SBC Technology and Market Development Program commencing in 2012. This approach could prevent

[14] Value is program funding which excludes administration, evaluation and State cost recovery fee.

[15] The projected energy savings are based on the methodologies used in the estimates of the contribution of SBCIII to the "jurisdictional gap" as described in the June 23, 2008 "Order Establishing Energy Efficiency Portfolio Standard and Approving Programs" and SBC evaluation protocols that were in place at the time. The savings estimates were generally based on EEPS approved programmatic $/MWh values (where available).

program and funding disruptions, minimize administrative burden, and facilitate coordinated SBC and EEPS planning and implementation.

The treatment of any remaining funds from the current SBC program would also have to be addressed as part of the transition. The treatment of such funds could be addressed in the updated SBC Operating Plan.

Table 2: SBC and EEPS Transition
SBC PROGRAMS PROPOSED TO TRANSITION TO EEPS – Effective January 2012
GENERAL AWARENESS[16]
RESIDENTIAL PROGRAMS
Single-Family Home Performance
Multifamily Building Performance
LOW-INCOME PROGRAMS
EmPower NY
Single-Family Home Performance
Multifamily Building Performance
COMMERCIAL, INDUSTRIAL, INSTITUTIONAL
Existing Facilities (excluding CHP and demand response)
High Performance New Buildings
Technical Assistance
EEPS PROGRAMS PROPOSED TO TRANSITION TO SBC – Effective January 2012
Workforce Development

Administration of Future SBC Technology and Market Development Program

NYSERDA remains committed to the management and administration of SBC programs in a manner that is fiscally prudent, efficient, economical, transparent, accountable, and customer focused. NYSERDA will continue to work with the PSC to deliver SBC Programs that are designed to help New York State meet its energy challenges.

Administrative Activities

To that end, in working with the PSC and DPS staff, NYSERDA will use an open, stakeholder-driven planning process to develop, implement and administer its various SBC Programs. NYSERDA will solicit stakeholder advice on program performance, including recommendations on whether or not programs are meeting their goals and objectives, and how programs should evolve over the term of the SBC Program. In addition, NYSERDA will continue to integrate performance measurement into our program planning beginning with the development phase, throughout implementation, and continuing post-implementation to evaluate the impacts on New York's businesses and residents.

NYSERDA will continue to use competitive solicitations to attract customers to its various SBC research, development, demonstration, and delivery programs. Over the four year period from July 1, 2006 through June 30, 2010, NYSERDA issued roughly 300 competitive solicitations and awarded approximately 12,000 contracts and purchase orders, with 97% of the contracts and purchase orders awarded on a competitive basis.

Regular reviews of internal administrative processes are routinely performed to identify opportunities for improving and enhancing operational efficiencies. As NYSERDA looks to future SBC initiatives, we intend to

[16] Facilitates consolidation of DPS-administered general awareness campaigns.

implement where possible, an electronic, paperless approval process for program contract and incentive payments and to institute a new program management database system. These new processes can reduce processing time, increase staff efficiency, and improve customer relations. Continuous improvement is an ongoing process and NYSERDA will continue to look for ways to streamline operations and improve business practices.

Partnerships are a key to the success of the SBC program. NYSERDA staff will continue to work with National Grid, Con Edison and other utilities to develop joint programs, streamline program management, and send clear, concise, coordinated messages to our customers.

In addition, NYSERDA will continue to recruit and retain a staff of highly skilled engineers, scientists, and analysts, as well as, a strong administrative team. From supporting the energy audit of a small business, to working with business start-ups or manufacturers of a next generation technologies, NYSERDA's staff will continue to serve the diverse needs of New York's energy consumers while achieving the goals and objectives of the SBC program.

Administrative Funding Level

NYSERDA is proposing an 8% average administration rate for SBC initiatives in the 2011 through 2016 period, assuming the program continues at a scale comparable to current funding.

NYSERDA's costs for program administration[17] for the current SBC and EEPS programs are currently approved at not more than 7% of funding (assessments, unexpended funds received from utility-run programs, and interest earnings on unexpended SBC funds held by NYSERDA). During SBC I (1998), NYSERDA's program administration rate was limited to 5.5%, and was increased to 7% at the beginning of SBC II (July 2001), and continued at this same rate for the SBC III renewal (2006 to 2011). As a result of some unexpended program administration funds at the end of SBC II, the program administration budget approved for SBC III is 7.48% of $926.4 million in total approved funding for the 5-year period. Since the administrative rate was set in 2001, NYSERDA has experienced substantial additional costs outside its control that have increased the cost of administering the program.

Post-Employment Health Insurance Costs (GASB45)

In fiscal year 2007-08, NYSERDA was required to implement Governmental Accounting Standards Board Statement No. 45 (GASB45) which changed the accounting for post-employment health insurance benefits provided to retirees from being recorded when the benefit payments are made to being recorded during the term of employment using an actuarial valuation. Implementation of GASB45 resulted in increased costs recorded by NYSERDA, which are allocated among all programs as a fringe benefit cost. These costs were not contemplated when the 7% program administration limit was set at the beginning of SBCII (July 2001) or SBCIII (July 2006).

The total annual cost of GASB45 has been an average of approximately $3.4 million per year, and the amount allocated to the SBC-funded programs amounts to about $1.6 million per year, or about 0.6% of program revenues. These costs will vary in the future depending upon actuarial determinations of projected future health insurance costs, changes in NYSERDA employees, and the like.

Inflationary Cost Increases

[17] Program administration costs include salary and fringe benefit costs for NYSERDA staff involved in managing programs, allocable salary and fringe benefit costs for administrative support staff, direct program management expenses (travel and other costs), and allocable overhead administrative, facility and equipment expenses. For the SBC and EEPS programs, these costs do not include the costs of independent program implementation contractors retained to assist with program implementation and monitoring.

From 2001 when the SBC program administration budget rate was set at 7%, the Consumer Price Index (CPI) rate has increased 23.75%, so the same 7% cost of administration in 2001 would equate to 8.6% today using the increase in the CPI.

More than 80% of NYSERDA's total program administration costs are salaries and fringe benefits for staff involved in the administration of the program. NYSERDA's salary costs increase consistent with cost of living increases and performance-based salary advances authorized for State Management/Confidential employees. From fiscal year (FY) 2001-02 (essentially the start of SBC II when the 7% program administration rate was set) to FY2009-10, the average salary cost per employee has increased an average of 1.6% annually; this net increase reflects salary increases, net of refilling employee attrition through generally lower salary levels. Fringe benefit and other administration costs have been increasing due to general inflation, and costs such as State-administered health insurance and pension benefits have increased higher than the general rate of inflation. For example, in FY2001-02, health insurance costs were 6.35% of payroll costs, but increased to 12.1% of payroll costs in FY2009-10; pension contributions increased from 1.0% to 6.5% of payroll costs during the same period. In total, average salary and benefit costs per employee have increased an average of 2.56% per year from FY2001-02 to FY2009-10. These increases have been partially offset by lower increases in non-personal service costs, resulting in total administrative costs per employee increasing 2.07% from FY2001-02 to FY2009-10.

While future increases in salaries, fringe benefit and non-personal service costs are difficult to predict, and most are outside of NYSERDA's control since they are controlled by State government decisions, NYSERDA has assumed a general inflationary rate of 2% annually to project future program administration costs, recognizing that the actual increases may be higher or lower in individual years and may be higher overall for the entire timeframe. NYSERDA will use its best efforts to manage controllable expenses to ensure that it does not exceed program administration budgeted funding.

While NYSERDA has been able to absorb the GASB45 and inflationary increases to administer the SBC III program within the 7.48% rate available for that purpose, it will not be possible to continue this practice into the future. Accordingly, NYSERDA is proposing the 8% average administrative rate discussed above.

NYS Cost Recovery Fee

In addition to program administration costs, NYSERDA is assessed an annual charge by the State for central governmental services under Section 2975 of the Public Authorities Law. This fee is allocated across all NYSERDA programs in proportion to each program's total expenses. For fiscal year 2009-10, NYSERDA's total assessment was $6.85 million, representing approximately 1.7% of program expenses. NYSERDA would expect this assessment to continue, and would anticipate that approximately 1.7% of funds approved for a renewal period would cover the program's share of such annual assessment

Appendix A
Historical SBC Programs

SBC Funded Programs NYSERDA Administered (1998 2011)		
SBC 1		
Program Categories	**Programs**	**Funding[18] (millions)**
Energy-Efficiency Programs - Market Transformation Programs, Energy Services Industry Programs, Technical Assistance, and Outreach Programs	Upstream Initiatives	$130.2
	Financial Assistance	
	New Construction	
	Residential Building Performance Initiatives	
	The Standard Performance Contract	
	The Financial Packaging Services	
	Technical Assistance	
	Outreach	
Research and Development Programs	Renewable Energy	$27.6
	Energy-Efficiency Research	
	Environmental Monitoring, Evaluation, and Protection	
	Strategic Energy Research	
Low-Income Programs	Weatherization	$13.9
	Aggregation	
	Publicly Assisted Housing	
	Public Awareness Campaign	
Environmental Disclosure Activities		$3
SBC 2		
Program Categories	**Programs**	**Funding[19] (millions)**
Peak-Load Reduction Programs, Efficiency Programs, Outreach and Education Programs	Peak-Load Reduction Program	$397.0
	New York Energy $mart[SM] Choices Program	
	Energy / Information Management Systems Program	
	Keep Cool Program	
	Comprehensive Management (CEM) and Demand-Control Measures Program	
	Dispatchable Emergency-Generator Program	
	Energy-Efficient Products and Services	
	Summer Electric Demand	
	Winter Heating Costs	
	ENERGY STAR ® Public Awareness	
	Infrastructure Development	
	Financing	
	Technical Assistance Program	
	New York Energy $mart[SM] Loan Fund	
	Energy Management Program	
	Municipal Water and Wastewater Initiative	
	New Construction Program	
	New York ENERGY STAR ® Homes Program	
	Standard Performance Contract	
	Energy Performance Contract Assistance Program	
	Training, Technical Assistance, Information and Outreach	

[18] Case 94-E-0952, In the Matter of Competitive Opportunities Regarding Electric Service, Order Approving System Benefits Charge Plan with Modifications and Denying Petitions for Rehearing, issued and effective July 2, 1998.
[19] June 12, 2002 SBC Operating Plan, 2001-2006

	Need More Generation	
	Consumer Choice	
R&D Programs	Strategic Energy Reliability Program	$182.0 M
	Next-Generation Efficient End-Use and Strategic Technology Program	
	End-Use Renewable Energy Market	
	Wholesale Renewable Energy Market	
	Environmental Monitoring and Analysis Program	
	Distributed Generation / Combined Heat and Power Program	
	Institutional Barriers to Competition	
Low-Income Programs	Energy-Efficiency Initiatives	$103.5M
	Community-Based Initiatives	
SBC 3		
Program Categories	**Programs**	**Funding[20] (millions)**
Peak-Load Reduction Programs, Efficiency Programs, Outreach and Education Programs	Peak-Load Management Program	$549.3
	Enhanced Commercial &Industrial Performance	
	New York Energy $mart Business Partners	
	Loan Fund and Financing	
	Energy $mart Focus	
	High-Performance New Buildings	
	Technical Assistance	
	Single-Family Home Performance	
	Multifamily Building Performance	
	Market Support	
	Communities and Education	
	General Awareness	
R&D Programs	Public Benefit Power Transmission and Distribution	$282.6
	Clean-Energy Infrastructure	
	Distributed Energy Resources: Products and Demonstration	
	Demand Response and Innovative Rate Research	
	Electric Transportation	
	Environmental Monitoring, Evaluation and Protection	
	Industrial and Municipal Process Efficiency	
	Next-Generation / Emerging Technologies	
	Regional Greenhouse Gas Initiative	
Low-Income Programs	EmPower NY[SM]	$232.0
	Single-Family Home Performance	
	Multifamily Building Performance	
	Buying Strategies and Energy Awareness	

[20] March 2008 SBC Operating Plan, 2006-2011. Funding totals include unspent SBCII funds that were carried forward.

Appendix B

Success Stories – "Research to the Market"

Hybrid-Electric Transit Buses: NYSERDA partnered with a team of New York companies (BAE Systems and Orion Bus) through a multiyear program to develop and demonstrate the world's first commercially available clean-air hybrid-electric bus. NYSERDA subsequently provided financial assistance to fleet operators to reduce the incremental cost and to increase market adoption of these energy-efficient, low-emission buses in New York State. These New York companies are now the dominant suppliers of hybrid-electric transit buses worldwide, with associated revenue in excess of $1 billion, to date. These buses reduce fuel consumption by more than 25% compared to conventional buses. More than 1,000 of these buses are now deployed in New York State. Use of these buses in all of New York's urban bus fleets could save 10 million gallons of fuel per year and cut CO_2 by 110,000 tons per year, while continuing to create green jobs in upstate New York associated with the manufacture of these clean-air buses.

Kinetic Hydropower - Verdant Power: NYSERDA's kinetic hydropower project with Verdant Power is developing a turbine that will look like an underwater windmill. The kinetic hydropower turbine can generate renewable electric power from rivers and tidal currents. Unlike wind and solar, which are intermittent and generally located far from metropolitan areas, kinetic hydro is predictable and frequently can be located near large load centers. In 2002, the project began with testing concepts; it has moved into the final stages of product commercialization with the Roosevelt Island Tidal Energy (RITE) demonstration project. The RITE project will install several hundred turbines and generate more than 10 MW of renewable power from the East River off Roosevelt Island in the heart of New York City. This will be the world's first commercial grid-connected kinetic hydro power project. NYSERDA continues to work with Verdant on product manufacturing scale-up for anticipated expanded sales of this New York-developed product in New York State and worldwide.

Energy Storage - Custom Electronics/Ioxus: Custom Electronics was a mature company with a stable but stagnant product base, manufacturing traditional technology capacitors with superior quality control and selling almost exclusively to the defense industry. Under new management, they wanted to grow. With initial NYSERDA funding, Custom Electronics explored options, then began an ambitious program to acquire talent and rapidly build the intellectual property that would allow it to launch a new high-tech product and compete in the rapidly growing market for ultracapacitors. Such technology is critical in achieving greater efficiency and performance. Development efforts resulted in product prototypes that exceeded the performance of ultracapacitors in the marketplace. The ultracapacitor generated excitement in the marketplace and with investors. Subsequently, Ioxus was spun-off to commercialize the product. Product sales have begun and new commercial market opportunities are rapidly expanding. Ioxus recently completed a $200,000 project with Raymond Corporation to develop a hybrid ultracapacitor/battery pack for Raymond's forklift product. Under a $1.5M contract, NYSERDA provided support for a new manufacturing facility and continued support with a business development project that loxus used to attract several million in venture funding.

Photovoltaics Manufacturing Cluster in the Hudson Valley: NYSERDA investments to help both early-stage and established companies develop and commercialize clean-energy technologies is catalyzing a growing cluster of businesses involved in a variety of solar-energy production technologies. Initiatives include funding a clean-energy business incubator, iCLEAN, jointly run by the College of Nanoscale Science and Engineering in Albany and the Hudson Valley Center for Innovation, to support early-stage companies and create jobs and products to serve the demand for solar technologies. With the support of NYSERDA, the New York Solar Energy Industry Association and The Solar Energy Consortium, the Hudson Valley is emerging as a significant and growing corridor for the solar-energy industry. The concentration of suppliers and a work force trained by semiconductor and display companies that are located in Hudson Valley has attracted businesses from other states, including Spectrawatt, which relocated to New York from Oregon. With NYSERDA's continued support, the Hudson Valley's solar industry is positioned to continue its extraordinary growth. These include Spectrawatt (Hopewell Junction), which recently raised more than $40 million in capital following a NYSERDA business development grant; Solartech Renewables (Kingston), which is building a 12 MW solar module manufacturing line; Prism Solar Technologies, which produces holographic solar modules in Highland; and Atlantis Energy Systems (Poughkeepsie), which operates its building-integrated photovoltaic production line in New York.

Commercial Lighting - Bi-level Motion Sensing Dimming: NYSERDA partnered with LaMar Lighting to develop and demonstrate the occu-smart® bi-level, dimming-fluorescent fixture to reduce lighting in unoccupied stairwells where illumination is required 24/7 for emergency egress. NYSERDA cofunded the development costs with LaMar Lighting and also funded the demonstration of the technology in a high-rise residential complex located on Roosevelt Island, New York, and in a commercial office building in New York City. Both installations were evaluated by the Lighting Research Center, Rensselaer Polytechnic Institute. occu-smart® replaces two electronic-ballast T12ES linear- fluorescent lamps (60 W) with two electronic-ballast T8 linear fluorescent lamps (62 W) with stand-by options controlled by ultrasonic dimming technology. The evaluation revealed that the stairwells at both sites were occupied less than 2% of the day. Installation of the occu-smart® lighting system allowed ballasts to operate at a chosen standby level of 33% light output 98% of the time, saving 53% of the energy used to illuminate the stairwells. Depending on the stand-by level selected (lamps dimmed to 33%, 10%, 5% output), savings in the order of 53% to 86% are possible.

New York ENERGY STAR® Homes: NYSERDA created the New York ENERGY STAR® Homes Program to educate, influence, and motivate home builders and buyers to construct and purchase energy-efficient homes. The primary focus of residential new construction marketing is two-fold: (1) to reach and educate builders to affect change in building practices, and (2) increase awareness and demand from consumers to increase residential energy efficiency in the long-term. Any home, low- or high end, can be built to ENERGY STAR home guidelines. When the New York ENERGY STAR Homes Program was launched in 2001, it had less than a 1% market penetration. Today, New York ENERGY STAR Homes account for 24% of the new homes (one-to four-family) being built in New York. There are currently more than 16,000 New York ENERGY STAR Homes in New York State; more than 1,300 builders and Home Energy Rating System (HERS) Raters have participated in the program since its inception. New York ENERGY STAR homes are at least 30% more energy efficient than standard homes and 15% more efficient than the national ENERGY STAR standards set forth by the U.S. EPA. The program has saved residents more than $12 million a year on energy bills, and cut electricity by 18.7 million kWh (enough to power 3,100 homes for a year), and saved 898,590 MMBtus of fossil fuel to date. Many participating builders choose to build all of their homes to the New York ENERGY STAR standards because it offers added value to buyers and helps differentiate their new homes from those of their competitors. The program is transforming the residential construction market and will continue to serve as a mechanism to build adoption of new energy-efficiency measures as ENERGY STAR standards.

Clean Energy Workforce Development: NYSERDA's workforce development initiative seeks to deliver clean-energy training along a career continuum to support emerging workers and professionals involved in the clean-energy industry. Training efforts support residential and commercial energy-efficiency programs, renewable energy, and emerging technologies. Small efforts in PV and energy efficiency training began during SBC II and expanded to a robust statewide network delivering comprehensive training coordinated among several State agencies. Partnership with Hudson Valley Community College to create the Center for Energy Efficiency Building Science (CEEBS) has grown to 12 centers, with more to be added. The training network has expanded to 38 training entities delivering training in energy efficiency and building science, solar electric and thermal, small and large wind, geothermal, fuel cells, and soon, anaerobic digester training. Workforce development funds from the System Benefits Charge, the Energy Efficiency Portfolio Standard, and Green Jobs-Green New York are being used to support this effort. New York State's training partners train thousands of workers annually. A well-trained workforce is an essential element for achieving New York's clean-energy goals.

Plug Load - Power Management Products Program: Through extensive research, NYSERDA staff identified a need for power management tools that would limit plug load from electronics products. NYSERDA sought out manufacturers that produce products to reduce plug load. NYSERDA staff worked directly with manufacturers to develop their advanced power strip technology to use low, stand-by wattage and load-sensing technology. NYSERDA worked with retailers, such as Best Buy, Wegmans, and Sears, to introduce this technology to consumers throughout New York State. In addition, NYSERDA worked with regional energy-efficiency programs in Vermont and Massachusetts to ensure use of the same criteria in the adoptation of advanced power strips for their programs. NYSERDA developed a saturation strategy designed to position advanced power strips in numerous retail segments including grocery, convenience, big-box, hardware, and independent electronics stores, where the demand for this technology is perceived to be greatest. NYSERDA's efforts have been instrumental in cultivating regional advanced power strips activity and will result in the first national advanced power strip workshop to be held in conjunction with Northeast Energy Efficiency Partnerships (NEEP) this June.

Data Center Efficiency : NYSERDA's data center initiative is increasing the energy efficiency of Data Centers by building market awareness; developing and demonstrating emerging technologies; and deploying best practices, such as server and processor efficiency, storage, server and desktop virtualization; advanced and free cooling; and power quality. NYSERDA partnered with New York facilities, including Columbia University, Mt. Sinai Hospital, Tompkins Financial, and VM Ware to develop and demonstrate cutting-edge technology. NYSERDA also co-designed and sponsored a highly successful green data center training program with ASHRAE. The workshops were attended by more than 800 professionals and addressed the need for information regarding energy efficiency in Data Centers. The rapid commercialization in data centers allows a more successful transition of energy efficiency from R&D to deployment. Through IT energy productivity improvements, data centers are able to meet their growing computing capacity needs, while reducing their annual energy costs and avoiding the capital costs and electric load growth associated with building additional data center space. The best practices demonstrated by R&D and deployed by the EEPS Industrial Process Efficiency (IPE) Program can provide as much as a 30% reduction in energy use compared to standard data center operational practices. The supported technologies and approaches are rapidly becoming best practices for energy efficiency in data centers. Deployment of these technologies in New York's data centers could save as much as 1 billion kWh and $175 million per year in energy costs, while continuing to create and retain technology jobs in New York.

Smart Grid Program: The SBC III program allocated $10 million for electric-power transmission and distribution projects that clearly demonstrate broad public benefit. The Smart Grid Program supports projects that improve the reliability, efficiency, security, and overall performance of the electric-power delivery system in New York State. The program also supports research with broad statewide energy-efficiency and reliability benefits. The program has supported more than 30 projects that have made advancements in such areas as: establishing uniform statewide diagnostics to assess system reliability; integrating advanced communication, control and monitoring technologies; power electronics; remote sensing for continuous monitoring of infrastructure; real-time monitoring of real and reactive power; and facilitating the integration and delivery of electricity from renewable generation resources. Technologies supported under the program include flow batteries, flywheels, stationary batteries, compressed-air energy storage, phasor measurement units, reactive-power correction, advanced distribution management and demand-response solutions. The program also supported several research studies to evaluate new technologies, design methodologies, and policy to aid with implementation of a smart grid in New York State. NYSERDA's establishment of a Smart Grid Program and integral relationship with the recently formed New York State Smart Grid Consortium have contributed to attracting more than $250 million in Smart Grid ARRA funding to New York State. By establishing a smart grid, future benefits to NYS include economic development benefits created by new jobs, reductions in energy prices (especially at peak), lower costs in achieving State Energy Plan goals, significantly lower energy prices and distribution infrastructure capital costs associated with accommodating the State's goals for electric vehicle penetration. Additional benefits associated with savings in utility operations, such as reduced losses and improved productivity also are realized.

Appendix C

Table 1

ELECTRIC PROGRAM COSTS & SAVINGS TARGETS*

Existing Facilities Program		**Annual**	**Total 2012 -2015**
	Savings (MWh)	151,194	616,618
	Program Cost	$ 24,000,000	$ 96,000,000
High Performance New Construction Program		**Annual**	**Total 2012 -2015**
	Savings (MWh)	62,246	253,858
	Program Cost	$ 14,000,000	$ 56,000,000
Flex Tech Program**		**Annual**	**Total 2012 -2015**
	Savings (MWh)	106,055	432,527
	Program Cost	$ 5,900,000	$ 23,600,000
Single Family Home Performance (New and Existing)		**Annual**	**Total 2012 -2015**
	Savings (MWh)	21,463	85,852
	Program Cost	$ 6,000,000	$ 24,000,000
Multi-Family Building Performance (New and Existing)		**Annual**	**Total 2012 -2015**
	Savings (MWh)	19,899	81,153
	Program Cost	$ 2,900,000	$ 11,600,000
General Awareness		**Annual**	**Total 2012 -2015**
	Savings (MWh)	n/a	n/a
	Program Cost	$ 3,000,000	$ 12,000,000
EmPower NY		**Annual**	**Total 2012 -2015**
	Savings (MWh)	11,097	45,259
	Program Cost	$ 8,900,000	$ 35,600,000
Low Income Single Family Home Performance (New and Existing)		**Annual**	**Total 2012 -2015**
	Savings (MWh)	4,706	18,824
	Program Cost	$ 3,000,000	$ 12,000,000
Low Income Multi-Family Building Performance (New and Existing)		**Annual**	**Total 2012 -2015**
	Savings (MWh)	25,412	103,640
	Program Cost	$ 5,700,000	$ 22,800,000
TOTAL ELECTRIC PROGRAMS TRANSFERRING TO EEPS		**Annual**	**Total 2012 -2015**
	Remove FlexTechSavings Overlap (MWh)**	(21,211)	(86,505)
	Savings (MWh)	380,861	1,470,072
	Program Cost	$ 73,400,000	$ 293,600,000

**The projected energy savings are based on the methodologies used in the estimates of the contribution of SBCIII to the "jurisdictional gap" as described in the June 23, 2008 "Order Establishing Energy Efficiency Portfolio Standard and Approving Programs" and SBC evaluation protocols that were in place at the time. The savings estimates were generally based on EEPS approved programmatic $/MWh values (where available)*

*** Overlap in FlexTech Program of 20% is based on results form a 9/9/08 analysis by Megdal &Associates and applied in the SBC Annual Evaluation Report.*

Table 2

GAS PROGRAM COSTS & SAVINGS TARGETS*

Low Income Single Family Home Performance (New and Existing)	Annual	Total 2012 -2015
Savings (Dekatherms)	38,679	154,717
Program Cost	$ 5,300,000	$ 21,200,000

Low Income Multi-Family Building Performance (New and Existing)	Annual	Total 2012 -2015
Savings (Dekatherms)	79,259	317,037
Program Cost	$ 5,300,000	$ 21,200,000

TOTAL GAS PROGRAMS TRANSFERRING TO EEPS	Annual	Total 2012 -2015
Savings (Dekatherms)	117,939	471,755
Program Cost	$ 10,600,000	$ 42,400,000

**The projected energy savings are based on the methodologies used in the estimates of the contribution of SBCIII to the "jurisdictional gap" as described in the June 23, 2008 "Order Establishing Energy Efficiency Portfolio Standard and Approving Programs" and SBC evaluation protocols that were in place at the time. The savings estimates were generally based on EEPS approved programmatic $/MWh values (where available)*

Table 3

FUNDS TRANSFERRING TO EEPS

	Annual	Total 2012 -2015
Electric Program Costs Transferring to EEPS	$ 73,400,000	$ 293,600,000
Administration Cost	$ 6,883,439	$ 27,533,757
Evaluation Cost	$ 4,302,150	$ 17,208,598
NYS Cost Recovery Fee	$ 1,457,401	$ 5,829,605
TOTAL ELECTRIC PROGRAM FUNDS TRANSFERRING TO EEPS	$ 86,042,990	$ 344,171,960
Gas Program Funds Transferring to EEPS	$ 10,600,000	$ 42,400,000
Administration Cost	$ 994,066	$ 3,976,265
Evaluation Cost	$ 621,291	$ 2,485,165
NYS Cost Recovery Fee*	$ 210,469	$ 841,878
TOTAL GAS PROGRAM FUNDS TRANSFERRING TO EEPS	$ 12,425,827	$ 49,703,308
TOTAL FUNDS TRANSFERRING TO EEPS	**$ 98,468,817**	**$ 393,875,268**

**This is an estimate of the cost recovery fee. The actual fee will be determined in accordance with the procedure set forth on page 24 of the NYSERDA proposal titled "System Benefits Charge in New York: Vision for Future."*

Table 4

ELECTRIC SAVINGS TARGETS AS PERCENTAGE OF "SBC WEDGE"

	Annual MWh	% of Wedge
Projected Incremental Annual MWh Savings from "SBC Wedge"	437,250	
Annual MWh Savings Target Transferring to EEPS	380,861	87%
Remaining MWh Savings Target to be achieved through SBC Technology and Market Development Program and/or EEPS Optimization	56,389	13%