EXHIBIT BH-3

NEW YORK ENERGY $MART[SM] PROGRAM

EVALUATION AND STATUS REPORT

YEAR ENDING DECEMBER 31, 2006

REPORT TO THE SYSTEM BENEFITS CHARGE ADVISORY GROUP

FINAL REPORT

MARCH 2007

New York Energy $mart[SM]
PUBLIC SERVICE COMMISSION — NYSERDA

NEW YORK STATE
ENERGY RESEARCH AND
DEVELOPMENT AUTHORITY

NYSERDA

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Executive Summary

This report presents evaluation results for the **New York Energy $mart[SM]** public benefits program (Program) for activities completed through year-end 2006.[1] The report was prepared jointly by staff of the New York State Energy Research and Development Authority (NYSERDA) and a team of third-party evaluation assistance and specialty contractors acting under the terms and conditions of a Memorandum of Understanding (MOU)[2] between NYSERDA, the New York State Department of Public Service (DPS), and the New York State Public Service Commission (PSC). This report was reviewed before being finalized by the System Benefits Charge Advisory Group[3] (Advisory Group), which serves as the Independent Program Evaluator in accordance with the MOU. The report is tendered to the PSC by the Advisory Group in fulfillment of its responsibilities under the terms of the MOU.

On December 21, 2005, the PSC ordered[4] New York's public benefits program funding extended for five years, from July 1, 2006 through June 31, 2011 and increased funding from approximately $150 million to $175 million annually ($896 million over the five-year period). The continuation and expansion of the Program is designed to help maintain momentum for the State's efforts to develop competitive markets for energy efficiency; demand management (including peak load reduction); outreach and education services; research, development, and demonstration; low-income services; and to provide direct economic and environmental benefits to New Yorkers. The extended program will continue to address market barriers to the competitive procurement of these services. By mid-2011, SBC funds will have provided over $1.85 billion to support a full range of programs to help the State meet its energy challenges.[5]

The report builds on the evaluation framework and model used to guide prior evaluation efforts, described below under Evaluation Approaches, and constitutes the most comprehensive assessment to date of the **New York Energy $mart[SM]** Program. The content and format of this report has changed from previous annual reports. In an effort to comprehensively monitor program performance, NYSERDA expanded the scope of its quarterly reporting and streamlined its annual reporting to avoid redundancy. While this

[1] Previous annual reports dated September 2000, January 2002, May 2003, May 2004, May 2005, and May 2006 presented cumulative results from the Program's inception on July 1, 1998. The most recent annual and quarterly reports are available on NYSERDA's website at www.nyserda.org and by request.

[2] Memorandum of Understanding between the New York State Public Service Commission, New York State Department of Public Service, and New York State Energy Research and Development Authority, March 11, 1998, revised December 6, 2001.

[3] The Advisory Group consists of 24 individuals representing varied interests, including utilities, business and environmental groups, energy services companies, community organizations, professional and trade associations, and national energy efficiency and energy research and development (R&D) organizations

[4] Case 05-M-0090, In the Matter of the System Benefits Charge III, Order Continuing the System Benefits Charge (SBC) and the SBC-Funded Public Benefit Programs, issued and effective December 21, 2005.

[5] In addition to NYSERDA's **New York Energy $mart[SM]** Program, funded through the SBC, the New York Power Authority (NYPA) and Long Island Power Authority (LIPA) each offer complementary public benefits programs of their own. The three authorities coordinate program design and service delivery wherever practicable to maximize the use of public funds for the programs and to ensure a coordinated statewide effort to meet public policy goals. The results of the NYPA and LIPA programs are not included in this report.

report documents program progress through the quarter ending December 31, 2006[6], NYSERDA has provided program descriptions, and expanded program accomplishments and progress for the full year, to enable the reader to compare annual results to the previous reports. Individual evaluation contractor reports to NYSERDA that detail the activities undertaken to develop this report are available upon request. Future quarterly reports will document work completed within the reporting period.

Program Administration

NYSERDA has instituted numerous policies to ensure that the Program is administered in an open, fair, and equitable manner. Ninety-seven percent (97%) of projects are competitively selected. The remaining 3% of projects involve contracts less than $25,000 each, unsolicited proposals that are deemed to support the Program's goals, and sole-source contracts with unique, specially-skilled contractors.

Contract awards are recommended to NYSERDA management for consideration and approval by expert panels that review all competitive proposals. The panels consist of technical experts, and external members are drawn from government and industry. Panels are required to have more external reviewers than internal NYSERDA reviewers. The panels provide feedback on the contents and composition of each program solicitation to ensure that solicitations reach the widest possible audience of potential proposers. All solicitations are published in the New York State *Contract Reporter*.

The evaluation function is overseen by NYSERDA and conducted by a team of independent evaluation contractors. All contractors were selected through competitive solicitation with a member of the Advisory Group and DPS serving on each review panel. The Advisory Group and DPS help allocate the evaluation budget, identify evaluation activities to be conducted, and establish timelines for evaluation activities. Evaluation analyses and reports are reviewed by the Advisory Group and DPS before being finalized and submitted to the PSC for approval. The Advisory Group is independent of NYSERDA; its members are selected by DPS and NYSERDA, it corresponds directly with the PSC, and members of the group participate in selection of evaluation contractors, receive evaluation reports, when requested, directly from evaluation contractors, and have independent access to those contractors.

New York Energy $mart^{SM} Budget and Spending Status

As shown in Table ES-1, the Program has a thirteen-year budget of approximately $1.87 billion. The budget is primarily allocated among four major program areas:

- Commercial/Industrial initiatives account for the largest share, 34% of the thirteen-year **New York Energy $mart^{SM}** Program budget, or $635.9 million.
- Research and Development, including environmental monitoring and evaluation, accounts for 21% of the thirteen-year budget, or $392.8 million.
- Residential initiatives account for 16.2% of the thirteen-year budget, or $302.1 million.
- Funding for Low-Income initiatives accounts for 17% of the total thirteen-year budget, or $318.6 million over this time period.

[6] The report for the quarter ending September 30, 2006 is available on NYSERDA's website.

In addition to these major program areas, the thirteen-year Program also funds an environmental disclosure program ($1.9 million), program administration ($128.2 million), program evaluation ($34.4 million), and includes a cost recovery fee ($25.4 million), a mandatory payment into the general fund assessed by New York State for state support functions. Table ES-2 shows the financial status of the programs as of December 31, 2006.

Table ES-1. New York Energy $mart[SM] Program Budget ($ million)

	Budget			% of Program Area Budget	% of Total Budget
	SBC I & SBC II[1,2]	SBC III[3]	Total Budget		
Program Areas					
Commercial and Industrial	359.2	276.7	635.9	37.8%	34.0%
Residential	167.1	135.0	302.1	18.0%	16.2%
Low Income	128.4	190.2	318.6	19.0%	17.0%
Research and Development	210.8	182.0	392.8	23.4%	21.0%
General Awareness[4] (Marketing)	16.0	15.0	31.0	1.8%	1.7%
Program Areas Total	**$881.5**	**$798.9**	**$1,680.4**	**100.0%**	**89.8%**
Other Costs					
Program Administration	65.5	62.7	128.2	-	6.9%
Metrics and Evaluation	16.5	17.9	34.4	-	1.8%
Environmental Disclosure	1.9	0	1.9	-	0.1%
NYS Cost Recovery Fee[5]	9.0	16.4	25.4	-	1.4%
Other Costs Total	**$ 92.9**	**$97.1**	**$189.9**	**-**	**10.2%**
Total New York Energy $mart[SM]	**$ 974.3**	**$ 896.0**	**$1,870.3**	**-**	**100.0%**

[1] Included with SBC II funding an additional $12.6 million from interest and unspent utility funds (distribution: Residential: $11.5 million; Program Administration: $0.88 million; and Metrics & Evaluation: $0.25 million).
[2] SBC I: July 1, 1998 through June 30, 2001; SBC II: July 1, 2001 through June 30, 2006.

[3] SBC III: July 1, 2006 through June 30, 2011.

[4] General Awareness previously included in Residential Program Area.

[5] The New York State Cost Recovery Fee is assessed for services to public authorities. The fee is determined by the New York State Division of Budget and imposed and collected by the Department of Taxation and Finance.

Totals may not sum due to rounding.

Source: NYSERDA

Table ES-2. Financial Status of New York Energy $mart[SM] Program ($ million)

	Total 13-Year Budget	Funds Spent			Encumbered Funds[4] % of Budget Encumbered	Committed Funds[5] % of Budget Committed
		SBC I & SBC II [1,2]	SBC III[3]	Total Spent % of Budget Spent		
Program Areas						
Commercial and Industrial	635.9	247.1	18.3	265.5 41.8%	368.3 57.9%	399.5 62.8%
Residential	302.1	165.4	12.1	177.6 58.8%	196.6 65.1%	206.3 68.3%
Low-Income	318.6	86.6	15.3	101.9 32.0%	139.3 43.7%	145.6 45.7%
Research and Development	392.8	105.9	11.7	117.6 29.9%	177.8 45.3%	201.5 51.3%
General Awareness[6] (Marketing)	31.0	15.9	0.8	16.7 53.9%	19.3 62.3%	19.3 62.3%
Program Areas Total	**$1,680.4**	**$620.9**	**$58.3**	**$679.2 40.4%**	**$898.5 53.6%**	**$972.3 57.9%**
Other Costs						
Program Administration	128.2	59.8	5.8	65.6 51.2%	65.6 51.2%	65.6 51.2%
Metrics and Evaluation	34.4	14.5	1.0	15.5 45.1%	17.5 50.9%	22.5 65.4%
Environmental Disclosure	1.9	0.8	0.1	0.9 47.4%	1.1 57.9%	1.1 57.9%
NYS Cost Recovery Fee[7]	25.4	9.2	1.2	10.4 40.9%	10.4 40.9%	10.4 40.9%
Other Costs Total	**$189.9**	**$84.3**	**$8.1**	**$92.4 48.7%**	**$94.6 49.8%**	**$99.6 52.4%**
Total New York Energy Smart[SM]	**$1,870.3**	**$705.2**	**$66.4**	**$771.6 41.3%**	**$993.3 53.1%**	**1,071.9 57.3%**

[1] Included with SBC II funding is $12.6 million from interest and unspent utility funds (distribution: Residential: $11.5 million; Program Administration: $0.88 million; and Metrics & Evaluation: $0.25 million) approved by DPS staff as part of SBCII reconciliation request.

[2] SBC I: July 1, 1998 through June 30, 2001; SBC II: July 1, 2001 through June 30, 2006.

[3] SBC III: July 1, 2006 through June 30, 2011.

[4] Encumbered funds associated with signed contracts and purchase orders.

[5] Committed funds associated with encumbered funds and pending contracts.

[6] General Awareness previously included in Residential Progarm Area.

[7] The New York State Cost Recovery Fee is assessed for services to public authorities. The fee is determined by the New York State Division of Budget and imposed and collected by the Department of Taxation and Finance.

Totals may not sum due to rounding.

Source: NYSERDA

Portfolio Level Findings

Progress Toward Goals

This section presents the cumulative progress of the **New York Energy $mart[SM]** Program toward meeting the four overarching public policy goals set forth and recently revised by the PSC.[7] Overall, the Program is making good progress toward achieving its long term goals. The stated goals and progress made through December 31, 2006 are shown in Table ES-3. Substantial additional program-specific and sector-level accomplishments have been documented in NYSERDA and independent evaluation contractor reports and are contributing to the development of sustainable progress toward these important overarching public policy goals.

Table ES-3. New York Energy $mart[SM] Program Goals and Progress through December 31, 2006

Public Policy Goal	Progress as of December 31, 2006
Improve New York's energy system reliability and security by reducing energy demand and increasing energy efficiency, supporting innovative transmission and distribution technologies that have broad application, and enabling fuel diversity, including renewable resources.	The **New York Energy $mart[SM]** Program has improved system-wide reliability and peak demand reduction, enabling 618 MW of callable load reduction and installing efficiency measures that permanently reduce peak demand by another 495 MW.
	The **New York Energy $mart[SM]** Program has led to the installation of energy efficiency measures saving more than 2,360 GWh per year.
	The **New York Energy $mart[SM]** Program has led to the installation of wind and photovoltaic technologies which provide more than 100 GWh of clean electricity generation per year.
	With funding from **New York Energy $mart[SM]**, the U.S. Department of Energy and private sources, the world's first in-grid underground superconducting cable was installed and began operations on July 20, 2006 in the National Grid utility system. Superconducting cables can carry three to five times more power than conventional cables of the same size and can meet increasing power demands in urban areas by retrofitting old underground cables, eliminating the need to acquire new rights-of-way.
Reduce the energy cost burden of New Yorkers by offering energy users, particularly the State's lowest income households, services that moderate the effects of energy price increases and volatility and provide access to cost-effective energy efficiency options.	The **New York Energy $mart[SM]** Program has saved participating customers nearly $340 million in annual energy costs in 2006.
	Approximately 60,000 eligible New York low-income customers received direct assistance through the **New York Energy $mart[SM]** programs, resulting in $220/year in average customer energy bill savings for this under served population.
	Approximately 2,200 small business customers have been served through the Smart Equipment Choices Program.
	Approximately 3,000 multi-family units will participate in time-sensitive electricity rate pilot projects.
	The **New York Energy $mart[SM]** portfolio has achieved a benefit-cost ratio of 2.4 under the most conservative Total Market Effects Test scenario.

[7] Case 94-E-0952 *et al.*, In the Matter of Competitive Opportunities Regarding Electric Service, *Staff Proposal for the Extension of the System Benefits Charge (SBC) and the SBC-funded Public Benefits Program*, August 30, 2005.

Mitigate the environmental and health impacts of energy use by increasing energy efficiency, encouraging the development of support services for renewable energy resources, and optimizing the energy performance of buildings and products.	The annual reduction of emissions resulting from **New York Energy $mart[SM]** Programs' energy savings is 2,060 tons of nitrogen oxide (NOX), 3,800 tons of sulfur dioxide (SO_2), and 1.6 million tons of carbon dioxide (CO_2).
	Between 2002 and 2006, the number of PV and small wind installers participating in the **New York Energy $mart[SM]** Program has increased from 30 to 102. The Program has supported more than 1,680 attendees at PV and small wind training events, and helped 27 installers in the PV program become certified by the North American Board of Certified Energy Practitioners (NABCEP).
	The **New York Energy $mart[SM]** Program has helped optimize energy performance in approximately 650 new commercial buildings, more than 8,500 new homes, and more than 13,800 existing homes. Additionally, more than 8,500 energy efficiency projects have been completed in commercial/industrial buildings.
Create economic opportunity and promote economic well-being by supporting emerging energy technologies, fostering competition, improving productivity, stimulating the growth of New York energy businesses, and helping to meet future energy needs through efficiency and innovation.	Averaged over a 19-year analysis period, the **New York Energy $mart[SM]** Program creates and sustains on average more than 8,600 jobs, increases labor income by $182 million per year, increases total output by $456 million per year, and increases value added by $211 million per year.
	The **New York Energy $mart[SM]** Program activities were instrumental in EPA revising its ENERGY STAR computer specifications to incorporate 80 PLUS® criteria for active power efficiency thresholds.[8]
	Under the Environmental Product development program, total product sales grew from $13 million in 2004 to $28 million in 2005.

Summary of Program Benefits

Table ES-4 provides a summary of quantifiable benefits achieved by the **New York Energy $mart[SM]** portfolio of programs for the past three years.

Table ES-4. Cumulative Program Benefits from Installed Measures

Benefits	Through Year-End 2004	Through Year-End 2005	Through Year-End 2006
Electricity Savings from Energy Efficiency and On-Site Generation (Annual GWh)	1,400	1,950	2,360
Peak Demand Reduction (MW)	860	1,040	1,113
Permanent Measures (MW)	325	445	495
Curtailable	535	595	618
Annual Energy Bill Savings to Participating Customers ($ Million)	$195	$275	$340
Net savings for gas and oil (Annual MMBtu)	2,600,000	4,000,000	4,049,000
Renewable Energy Generation (Annual GWh)	102	103	105
Jobs Created and Retained per Year[1]	2,500	3,100	3,700
NO_x Emissions Reductions (Annual Tons)	1,280	1,750	2,060

[8] 80 PLUS is a national upstream buy-down program that encourages market transformation groups and computer manufacturers to get more energy-efficient power supplies into PCs and desktop-derived servers.

Benefits	Through Year-End 2004	Through Year-End 2005	Through Year-End 2006
SO_2 Emissions Reductions (Annual Tons)	2,320	3,170	3,800
CO_2 Emissions Reductions (Annual Tons)	1,000,000	1,400,000	1,600,000
Equivalent number of cars removed from NY roadways.	200,000	275,000	320,000

[1] Figures in this row represent the average number of jobs created and retained through year end. Results from 2004 and 2005 have been restated based on new analysis conducted in 2006.

Cost Effectiveness of Programs

For deployment and market transformation programs for which energy and demand savings are estimated, an economic benefit/cost analysis is used that monetizes savings and compares them to costs. Benefit/cost results for the deployment programs are summarized below and presented in more detail in Section 2. For R&D programs, such as next-generation technologies, distributed generation, new product development, and strategic reliability technologies, the economic benefit/cost methodology is inappropriate because these programs are designed to accomplish a range of objectives, many of which cannot be monetized in the early program years.

Benefit cost ratios for deployment programs are shown in Table ES-5. Two different tests were used to calculate B/C ratios:

1. Total Market Effects Test (TMET) compares quantifiable life-cycle benefits from program participants and spillover effects against both NYSERDA and customer costs incurred in achieving those benefits.

2. Program-Efficiency Test (PET) compares the same quantifiable life-cycle benefits against only NYSERDA's costs. This test can also be called the program administrator test.

Scenario 1 includes only resource benefits. Scenario 2 adds non-energy impacts to Scenario 1. Scenario 3 adds market price effects to Scenario 2. Scenario 4 adds macroeconomic impacts to Scenario 3.

Table ES-5. Benefit Cost Ratios for the New York Energy $mart[SM] Portfolio

	Resource Benefits (Scenario 1)	Plus Non-Energy Impacts (Scenario 2)	Plus Price Effects (Scenario 3)	Plus Macroeconomic Impacts (Scenario 4)
Total Market Effects Test[1]	2.4	3.1	3.2	3.3
Program Efficiency Test	8.8	11.4	11.9	12.4

[1] The method of estimating measure costs for retrofit/early replacement programs was modified in this year's analysis resulting in higher measure costs, and therefore, lower benefit cost ratios for the total resource cost test.

Macroeconomic Impact Analysis

Previous economic evaluations of the **New York Energy $mart[SM]** Programs focused on tracking program costs and identifying direct benefits to program participants reported as energy bill savings.

However, expenditures made by NYSERDA and program participants have substantial macroeconomic impacts that go far beyond direct benefits. Purchases of goods and services through the Program initiate a ripple effect as spending and re-spending influence various sectors of New York's economy and, in turn, affect the level and distribution of employment and income in the State. A macroeconomic impact analysis[9] of the programs was previously conducted and reported in detail in previous annual reports. The analysis was updated for this report and the results are presented in Table ES-6. Averaged over a 19-year analysis period, the Program is expected to create and sustain on average more than 8,600 jobs, increase labor income by $321 million per year, increase total output by $456 million per year, and increase value added by $211 million per year. To date, the Program has created and or sustained 3,700 jobs.

Table ES-6. Summary of Macroeconomic Impacts of the New York Energy $mart[SM] Program (Constant 2006$)

Economic Variable	Program Implementation Years (1999-2012)	Years Following Program Implementation (2013-2027)	Annual Average over 29-year Analysis Period (1999-2027)
	2006 Update	2006 Update	2006 Update
Net Job Growth	7,807	9,362	8,612
Labor Income	$361 Million	$283 Million	$321 Million
Total Output	$573 Million	$346 Million	$456 Million
Value Added	$271 Million	$154 Million	$211 Million

Evaluation Approaches

The findings in this report are compiled based on the cumulative work of NYSERDA and its evaluation contractor teams over the past several years; however, they also incorporate findings from recent evaluations conducted this year as follows:

- Measurement and Verification (M&V) work on Peak Load Management, Enhanced Commercial/Industrial Performance Program (ECIPP), FlexTech Technical Assistance, and EmPower New York.
- Market Characterization, Assessment and Causality (MCAC) work on Enhanced Commercial/Industrial Performance Program, Small Commercial Lighting, High Performance New Buildings (New Construction Program – NCP), FlexTech Technical Assistance, and Market Support (residential ENERGY STAR focused).
- Process Evaluation work on High Performance New Buildings, EmPower New York, and a portfolio-level evaluation review.
- Program Theory and Logic work on the **New York Energy $mart[SM]** Loan Fund and Financing Program, **New York Energy $mart[SM]** Focus, High Performance New Buildings, FlexTech Technical Assistance, all Residential and Low-Income programs, Public Benefit Power Transmission

[9] The input-output model used the IMPLAN Pro software system (Version 2.0) developed by the Minnesota IMPLAN Group

and Distribution Research, Electric Transportation, Industrial Process and Productivity Improvement, and Next Generation and Emerging Technologies.

- A peer-review assessment of the Distributed Generation/Combined Heat and Power and Environmental Monitoring, Evaluation and Protection programs.

Commercial/Industrial Programs

Commercial/Industrial (C/I) Programs identify opportunities to improve energy efficiency and load management and try to effect changes in energy decision making by building owners and operators. The C/I Programs have been streamlined to target diverse market actors, including architects and engineers who work primarily with large buildings and projects, and contractors and distributors whose primary focus is small buildings. C/I Programs address the efficient use of electricity, petroleum, and natural gas and seek to provide customers with comprehensive, attractive incentives and financing packages. Programs in the C/I area are discussed in detail in Section 3.

Commercial/Industrial Program Findings

Significant progress is being made as the C/I portfolio transitions to the new, streamlined set of programs. Several near-term goals were set for the first year of the third **New York Energy $mart^{SM}** Program funding cycle. These goals established levels to reach, by June 30, 2007, for energy and peak demand savings as well as several other key metrics of program success. Overall, the C/I portfolio is performing well in terms of the energy savings and peak demand reduction goals. In the first six months of the one-year measurement period, the C/I portfolio has exceeded its goal for energy savings (123%) and nearly reached the half-way point (47%) for the peak demand reduction goal.

As reported in Section 2, overall, NYSERDA's M&V and MCAC contractor teams have found that savings for the C/I sector should be adjusted as follows:

- Electricity savings were adjusted downward by 4%.
- Peak demand savings were adjusted downward by 5%.
- Other fuel savings were adjusted upward by 14%.

These adjustments include changes in program-reported savings due to database reviews and field work to measure and verify savings, as well as survey research and other activities to quantify freeridership and spillover. For most of the largest energy-saving programs (including ECIPP, High Performance New Buildings, and FlexTech Technical Assistance) spillover outweighs any freeridership that is occurring.

Across the programs, twelve additional near-term goals were added, besides energy savings such as the number of customers receiving assistance, funds leveraged, allies participating, and percentage of target markets affected by programs. Overall, the programs are also performing well with respect to these other goals. Progress on more than half of the goals is at 50% or greater. In fact, two of the goals have already been exceeded. Specifically, the Business Partners Program has exceeded its goal to sign up 300 business partners (737 partners to date), and the Loan Fund and Financing Program has exceeded its goal to leverage $12 million in loans ($12.7 million to date). The results of each program's progress toward its stated goals are shown in table format in the subsequent sections.

Other key findings from evaluation research include the following:

- Participant surveys found that NYSERDA programs are being cited more often as an important factor in the decision to install energy efficiency measures and equipment in C/I facilities. Respondents are citing NYSERDA unaided, making these findings especially significant.

- End-use customers continue to gain more experience, education, and trust in energy efficiency measures, equipment, and services. Historically, these were lacking among end-use customers and were often cited as reasons for not taking action on energy-efficient purchases or services.

- Even customers who have not participated directly in NYSERDA program offerings have shown increasing levels of familiarity with energy-efficient measures and equipment.

- Surveys indicate high levels of awareness of **New York Energy $mart^{SM}** C/I Programs, with 88% of end-use customers and 81% of contractors reporting awareness of at least one program offering.

- Respondents were more familiar with NYSERDA programs in general, and were less aware of specific program offerings. This indicates that NYSERDA is achieving a greater degree of brand recognition than are the numerous individual program names.

- Survey results indicate that NYSERDA is becoming a trusted source for information and support in the adoption of energy-efficient practices. Respondents report that NYSERDA brings credibility to the various services offered through its programs and contractors.

- C/I customers who participated in **New York Energy $mart^{SM}** programs expressed high satisfaction levels of 80%-90% with project results. This suggests that they are likely to continue working with NYSERDA in the marketplace to improve efficiency.

Process evaluation surveys and interviews indicate that the NCP compares favorably to other new construction programs on most process elements examined. Findings also suggest the NCP could increase savings "per building" and market transformation by placing greater emphasis on its whole building and LEED® certification components.

Residential and Low-Income Programs

Residential energy efficiency programs influence decisions regarding energy use by homeowners, renters, and participants in the residential energy services and new construction markets. The programs also work with the multifamily building industry to improve the efficient use of electricity, petroleum, and natural gas. Residential programs are described in Section 4.

Low-Income programs reduce the energy burden[10] on low-income households by improving the efficiency of energy use and providing energy management and aggregated energy procurement services. Initiatives in this program have also been streamlined and include: providing technical support for and installing a variety of energy-efficient electric end-use measures in low-income housing; paying a portion of the incremental cost of energy efficiency measures and electric heat conversions in publicly assisted housing; helping low-income households aggregate energy purchases; incorporating energy-efficient equipment and design specifications into State and federally assisted housing; and educating customers about the benefits of energy efficiency. Programs in the Low-Income Program area are also discussed in detail in Section 4.

[10] Energy burden is the percentage of household income used to pay for energy.

Residential and Low-Income Program Evaluation Findings

Significant progress is being made as the Residential and Low-Income portfolio transitions to the new streamlined set of programs. Several near-term goals were set for the first year of the third **New York Energy $mart**[SM] Program funding cycle. These goals established levels to reach, by June 30, 2007, for energy and peak demand savings as well as several other key metrics of program success. Overall, in the first six months of the one-year measurement period, the Residential and Low-Income portfolio has achieved 12% of its goal for energy savings, and 24% of its goal for other fuel savings. There is no goal for peak demand reduction in this sector.

As reported in Section 2, overall, NYSERDA's M&V and MCAC contractor teams have found that savings for the Residential and Low-Income sector should be adjusted as follows:

- Electricity savings were adjusted upward by 4%.
- Peak demand savings were adjusted upward by 4%.
- Other fuel savings were adjusted upward by 8%.

These adjustments include changes in program-reported savings due to database reviews and field work to measure and verify savings, as well as survey research and other activities to quantify freeridership, naturally occurring adoption, spillover, and market effects.

Across the programs, 23 additional near-term goals were set for other key metrics besides energy savings such as the number of customers receiving assistance, funds leveraged, allies participating, and outreach activities completed. Overall, the programs are making good progress with respect to these other goals. Eleven out of the 23 goals are approximately 50% or more achieved. In fact, two of the goals have already been reached or exceeded. Specifically, the Market Support Program goal to sign up four new manufacturing partners has been exceeded (40 new partners to date), and the Buying Strategies and Energy Awareness Program goal to reach 3,000 low-income individuals via seminars and workshops has been exceeded (more than 7,600 individuals reached to date). The results of each program's progress toward its stated goals are shown in table format in the subsequent sections.

Most of the new evaluation work on the Residential and Low-Income programs has consisted of updating and creating program logic models. Therefore, other key findings from secondary data and studies of participants, non-participants and other market actors shown below are largely repeated from previous major evaluation efforts:

- The ENERGY STAR label is the overarching symbol for NYSERDA's Residential Programs. New Yorkers' recognition of the ENERGY STAR label has increased steadily, from 34% in 1999 to 77% in 2005. The proportion of consumers in New York who show high understanding of the label has also increased from 35% in 1999 to 87% in 2005. In 2005, 63% of New York consumers saw television ads related to ENERGY STAR, evidence linking increased awareness and understanding directly to NYSERDA's efforts.
- The percentage of ENERGY STAR-qualified models out of all models on display in partner stores increased from 14% in 1999 to 35% in 2005 for refrigerators, from 10% to 82% for dishwashers, from 16% to 39% for clothes washers, and from 26% to 61% for room air conditioners.
- NYSERDA's program efforts from 1999 to 2005 have helped increase the market share of ENERGY STAR refrigerators among NYSERDA partners from 28% to 47%; from 48% to 76% for

dishwashers; from 24% to 41% for clothes washers; and from 45% to 76% for room air conditioners. The proportion of new single-family homes sold that are ENERGY STAR-labeled has increased from 0.3% in 2001 to 11.1% in 2006. The proportion of the home improvement market installing efficiency measures through the Home Performance with ENERGY STAR Program has increased from 0.2%-0.3% in 2001 to 2.1%-3.3% in 2005.

- NYSERDA continues to be effective in recruiting partners in appropriate markets, and in providing them with tools—such as training and marketing—to help them persuade consumers to adopt more efficient products and behaviors. Association with NYSERDA's programs and with energy efficiency has helped many of these partners differentiate their businesses from competitors.

- Nearly all parties involved in these programs, including builders, contractors, and consumers indicate a high degree of satisfaction with the programs. This year's process evaluation surveys and interviews indicate that the results of the EmPower pilot program were largely positive for the six participants. The contractors are pleased with the increased speed with which they can complete jobs by avoiding the pre-approval process under the EmPower pilot program, and believe the measures selected for direct installation without pre-approval are the appropriate ones.

- An important evaluation finding for the Assisted Multifamily Program is that 6.1% of eligible units had efficiency measures installed through the program, and an additional 8.8% had participated in the audit offered by the program. This sums to almost 15% of the eligible population of the low-income multifamily market that had participated in some aspect of the program. This is as of the end of 2005.

Research and Development Programs

NYSERDA's R&D activities are organized into five primary program areas: energy resources, transportation and power systems, environment, industry, and buildings. Projects in each of these program areas address technologies and mechanisms that affect the energy supply and meet the needs of end users. As a result, crosscutting areas such an environmental protection, waste management, energy product development, and renewable energy technologies are addressed in several programs. Programs in the R&D Program area are discussed in detail in Section 5.

Research and Development Program Evaluation Findings

Significant progress is being made as the Research & Development portfolio transitions to the new set of program offerings. As reported in Section 2, overall, NYSERDA's M&V and MCAC contractor teams have found that savings for the R&D sector should be adjusted as follows:

- Electricity savings were adjusted upward by 2%.

- Peak demand savings were adjusted downward by 29%.[11]

- Other fuel savings were adjusted downward by 5%.

[11] The Demand Response and Innovative Rate Research Program does not require that enabled demand reductions be maintained. This large downward adjustment for the R&D programs is due to M&V results indicating the portion of enabled demand reduction that has been maintained.

These adjustments include changes in program-reported savings due to database reviews and field work to measure and verify savings, as well as survey research and other activities to quantify freeridership and spillover. Most of the adjustment, however, is due to the measurement and verification work since any freeridership that exists is outweighed by spillover on all but one program.

Across the programs, numerous additional near-term goals were set, besides energy savings, such as: the number of solicitations, studies, and projects; the number of workshops; the number of companies doing business in New York; new products developed and launched; and other important knowledge creation, information dissemination, and commercialization progress metrics. Overall, the programs are also performing well with respect to these other goals. Results of each program's progress toward its stated goals are shown in table format in the subsequent sections.

Key areas of progress in the past six months include the following:

- Contracts are being negotiated with four firms intending to manufacture clean energy products in New York.
- The Power Systems Product Development Program awarded five contracts for product development.
- Performance data on 21 DG/CHP projects is now available on the Internet, allowing performance monitoring and promoting technology transfer.
- Thirteen publications (including research reports and peer-reviewed journal articles) resulted from the Environmental Monitoring, Evaluation and Protection Program activities.
- Four Technical Assistance projects were completed for water and wastewater facilities.
- Seven solicitations were issued for the Next Generation and Emerging Technologies Program, and the new Public Benefit Power Transmission and Distribution Research Program identified priority research areas and will soon release its first solicitation in the first quarter of 2007.

Evaluation Review and Recommendations

Study Purpose

For the past two years of evaluation, NYSERDA had undertaken a study of the efficiency and effectiveness of its evaluation design, planning, and implementation. The purpose of the study was to assess the results of the evaluation work from the perspective of its execution and outcomes in the context of how it was envisioned and planned. Questions to be addressed included:

- Was the evaluation process effectively created?
- Did it have the outcomes intended (including building evaluation capacity, greater integration of evaluation into program processes, and meeting stakeholder requirements)?
- Was the evaluation model an effective one and should it be changed or revised?

In addition to addressing these questions, this review provides feedback to NYSERDA and the SBC Advisory Group as they work with contractors in the next phase of evaluation work. The study also

provides insights for the larger evaluation community interested in assessing the most appropriate ways to evaluate such comprehensive, market-oriented programs like the **New York Energy $mart[SM]** portfolio.

Methodology

To address all of these research issues, the process evaluation team has undertaken two cycles of data collection. The first occurred in 2005 and included 30 interviews with NYSERDA's senior management, the Energy Analysis evaluation team, and program staffs. The interviews addressed the history of the evaluation effort, its implementation, and responses to the evaluation work done to date. The second round of data collection, leading to the results summarized in this report, occurred in 2006. Twenty-nine individual and four group interviews were conducted with NYSERDA's Energy Analysis evaluation team and program staff members, as well as with the specialty evaluation contractors and members of the SBC Advisory Group that oversees the independent evaluation effort.

Three cycles of independent, third-party monitoring and evaluation reporting on **New York Energy $mart[SM]** programs have been completed during the period assessed (these three evaluation cycles concluded in 2004, 2005 and 2006), with each cycle resulting in recommendations for improvements in the programs. The interviewers asked NYSERDA staff to reflect on these cycles and the types of evaluation efforts conducted in each, and asked program staffs to assess the degree to which they had taken action in response to the recommendations of evaluators. The review of recommendations also asked staff members to identify the reasons for their actions or inaction. A total of 174 recommendations were reviewed for the first two evaluation cycles, and 93 were reviewed for the third cycle.

Finally, to place the results of the evaluation review in context of wider practices for using evaluation in large organizations, the process evaluation team conducted a review of the literature across a wide range of fields. The goal was to provide an overview of how other energy efficiency entities and other large organizations use evaluation findings in planning, program design, and program implementation.

Summary of Results

These results are viewed in terms of NYSERDA's unique approach to evaluation. With a budget ranging from less than 0.5% to 2% for evaluation during the SBC funding cycles, NYSERDA implemented an evaluation model using teams of specialty contractors to conduct crosscutting evaluations of multiple programs. NYSERDA's evaluation structure was intended to provide independent evaluation at many levels, with the goal of aggregation to the portfolio level. This focus on the portfolio level as the ultimate evaluation objective is driven by the reporting requirements of the PSC.

While the first year of the evaluation was especially challenging for program staffs, the Energy Analysis evaluation team, and the specialty evaluation contractors, significant improvement was reported over the three years. By year three, increased evaluation capacity was seen in the improved knowledge and skills of the Energy Analysis evaluation team, and in program staffs' more positive views of evaluation's use in program planning and implementation, as well as in greater communication with the Energy Analysis evaluation team. Further evidence of increased evaluation capacity is seen in the SBC Advisory Group's reported greater clarity of its role in the evaluation, and in the specialty contractors' reports of greater knowledge of the programs and processes.

Use of the evaluation findings has also increased over the three years, with both program staff and the Energy Analysis evaluation team reporting increased awareness of evaluation in program planning and solicitation processes. While some program staff indicate they do not use the evaluation findings, others report using the findings to change programs, improve data collection or recording, prepare public presentations, and for program marketing. Reported consideration of, or action on the recommendations

resulting from the evaluations has also increased. In the earlier evaluation cycles, some action was reported on less than 50% of the recommendations; in the most recent cycle, this number had risen to 67%. While action on 100% of the recommendations is not expected, this increase may be due in part to: improvements on the part of the contractors (recommendations that reflect better knowledge of programs and are more realistic in context); program staffs' increased involvement in setting the research agenda and thus producing recommendations more closely related to timely programmatic issues; and/or some positive response bias as program staff, in this second round of interviews, perceived it important to indicate action was being taken. Also, it is important to note that NYSERDA staff have been quick to address many issues identified in the various evaluation contractor team reports – often before the draft reports were even finalized. The Public Service Commission, Department of Public Service staff, and the SBC Advisory Group are also key users of the evaluation findings.

Reporting processes, initially characterized as disjointed and time-consuming (specifically in preparation of the annual report), have improved over the three evaluation cycles. The SBC Advisory Group expressed high levels of satisfaction with both the evaluation process and its outcomes, including reports.

Based on the findings of this review, there is clear indication that NYSERDA has achieved many of its goals for the evaluation effort and there has been definite improvement in both process and outcomes from year one of the assessment period to year three. However, there are still pockets of resistance among program staff members, including lingering views of the evaluation process as not meeting their needs or not adequately measuring their programs under consideration. Unrealistic expectations on the part of program staff, as well as conflicting, multiple objectives with a highly constrained evaluation budget likely contribute to this resistance. Also, there is inconsistent support among managers for evaluation and unclear expectations among some staff members regarding the recommendations they receive from the evaluation reports. All of these factors indicate that there is still room to continue the improvements already seen over the last three years by continued effort to foster a culture that recognizes the value and relevance of evaluation for program planning and implementation. The recommendations below are intended to address some of the residual effects of the first three years of the current evaluation model (especially from the first year) and to assist NYSERDA in continuing its path of improving the process and outcomes of the evaluation.

Recommendations

- Consider development of a theory and logic model for the evaluation. Program staff, as well as specialty and oversight evaluation contractors, identified the need for a clearly articulated evaluation plan. The literature review also points to the necessity of a clearly articulated vision for process and outcomes. As part of the March 2006 Amended SBC Operating Plan, a vision was articulated, but a specific plan has not been developed, rather it is to be developed with the evaluation contractors. Development of a well-defined plan for process and outcomes will reduce uncertainty about evaluation expectations for all stakeholders and make transparent the balance between evaluation for program improvement and evaluation for stakeholder accountability in developing the goals and tasks. In this process, the following should be addressed:

    - Define the portfolio evaluation goals

    - Define the portfolio tasks and approach

    - Define tasks at the program and sector levels

- Once a theory and logic model has been developed for the evaluation, the resulting plan should be clearly communicated at all levels of the organization. General communication of an evaluation plan

could greatly reduce the uncertainty and discomfort felt by all involved in the effort. Key elements of the plan to be communicated include:

  - Expectations of the Energy Analysis evaluation team, program staff, and contractors in the model

  - Expectations for how recommendations from the evaluation are to be used

- As part of the overall evaluation plan, a discussion of potential products resulting from the evaluation should occur. This process should involve program staff and other stakeholders in identifying all audiences for the evaluation findings, resulting in a plan for dissemination approaches to meet the range of audiences identified. Communication of evaluation results has so far focused largely on meeting stakeholder requirements and the products have successfully met these requirements. There are many other audiences for the evaluation results, including potential program participants, the general public, and other energy professionals.

As part of a review of roles, NYSERDA should continue to examine the skills needed for their model of evaluation and ensure that Energy Analysis evaluation team members have the skills and direction to serve the roles defined for them. NYSERDA has continued to build evaluation knowledge and skills in the Energy Analysis evaluation team and program staff report that they are more often working with the team early in their program planning and solicitation processes. Some additional skills and knowledge are needed to ensure that capacity building continues within the Energy Analysis team and that the team members can then continue to help build capacity throughout the organization.

1

Introduction and Public Policy Context

1.1 Introduction

This report provides an update of the progress made to date implementing the **New York Energy $mart**[SM] Public Benefits Program (Program). Progress is reported for Program activities completed through December 31, 2006.[1] The report was prepared jointly by New York State Energy Research and Development Authority (NYSERDA) staff and a team of third-party evaluation assistance and specialty contractors, in accordance with the Memorandum of Understanding (MOU)[2] between NYSERDA, the New York State Department of Public Service (DPS), and the New York State Public Service Commission (PSC). This report was prepared on behalf of the System Benefits Charge Advisory Group[3] (Advisory Group), which serves as the Independent Program Evaluator as per the MOU. The Advisory Group was provided a draft report and met via teleconference to discuss the draft and review the findings of the evaluation contractors. Evaluation assistance and specialty contractors presented their work and research findings to the Advisory Group. Feedback and comments received on the draft report were incorporated into this final report. The SBC Advisory Group submits this report to the PSC in fulfillment of its responsibilities under the terms of the MOU.

The Advisory Group and DPS were actively involved in selecting the evaluation contractors who were retained through NYSERDA's competitive solicitation process and in developing the scopes of work for the evaluation activities, including apportioning the evaluation budget among the contractors and identifying the programs to be included in the evaluation. All evaluation contract awards were made through NYSERDA's competitive solicitation process whereby proposals were submitted in response to a Request for Proposals (RFP) that was developed and reviewed by a Technical Evaluation Panel (TEP). The Advisory Group and DPS were represented on all TEPs that were convened to review proposals and recommend contract awards. Advisory Group members had the opportunity to review and comment on individual evaluation contractor work plans and meet with the members of each contractor's team as they deemed necessary and appropriate. This report builds upon the evaluation framework and model used to

[1] Previous annual reports were issued in September 2000, January 2002, May 2003, May 2004, May 2005, and May 2006. Each report presents cumulative results from the Program's inception on July 1, 1998. The most recent report is available at www.nyserda.org and by request.

[2] Memorandum of Understanding between the New York State Public Service Commission, New York State Department of Public Service, and New York State Energy Research and Development Authority, March 11, 1998, revised December 6, 2001.

[3] The Advisory Group consists of 24 individuals representing varied interests, including utilities, business and environmental groups, energy service companies, community organizations, professional and trade associations, and national energy efficiency and energy research and development (R&D) organizations.

guide prior evaluation efforts and reports results for work completed from the program's inception through December 31, 2006.

1.2 Public Policy Context

The System Benefits Charge (SBC) Program administered by NYSERDA as the **New York Energy $mart**[SM] Program, was initiated in 1998 by order of the PSC[4] and has included three funding cycles.[5] The **New York Energy $mart**[SM] Program (Program) portfolio consists of numerous initiatives promoting energy efficiency, including both permanent efficiency reductions as well as peak demand management, facilitating renewable energy infrastructure development, providing energy services to low income New Yorkers, and conducting research, development, and demonstration of promising new products and technologies. The Program provides a myriad of services, and includes the dissemination of information to increase consumer energy awareness, marketing of programs and services, provision of financial incentives to spur customer and market investment in energy efficiency and demand management, development and testing of new products, commercializing new technologies, and gathering data and information.

The **New York Energy $mart**[SM] Program is currently in its third funding cycle, each of which is described below.

First Funding Cycle (1998 – 2001)

- June 1998 through June 2001. During this three-year period, NYSERDA's administration of the Program was begun with emphasis on designing programs, conducting outreach, and offering technical and financial assistance to customers and market allies to fully deploy programs. Programs were offered to all customers paying the SBC. During this period, NYSERDA administered approximately $58 million a year in SBC funding.

Second Funding Cycle (2001 – 2006)

- July 2001 through December 2002. During this five-year period, NYSERDA was provided approximately $147 million per year to continue and expand upon its current program offerings. Also during this period, the **New York Energy $mart**[SM] Program's implementation activities were greatly accelerated as committed program funding more than doubled in the first 18-month period, going from less than $300 million to more than $600 million. The rapid increase in program funding commitments was a direct result of program design, outreach, and marketing efforts introduced by NYSERDA during the first three years of the Program. NYSERDA's early efforts were designed to create a market capacity and capability to deliver energy efficiency and related services. Once created, Program activities could be readily accelerated, as partnerships were created with market allies, marketing and general awareness campaigns had succeeded in stimulating demand for services, and the market infrastructure was in place to deliver such services.

[4] Case 94-E-1052, *et al*., In the Matter of Competitive Opportunities Regarding Electric Service, Opinion 98-3, issued January 30, 1998.

[5] The most recent cycle was initiated with the New York State Public Service Commission in Case 05-M-0900, In the Matter of the System Benefits Charge III, *Order Continuing the System Benefits Charge (SBC) and the SBC-funded Public Benefit Programs*, issued and effective December 21, 2005.

- January 2003 through December 2004. As the **New York Energy $mart[SM]** Program evolved, NYSERDA selectively modified its funding commitments across the many programs offered. For example, funding modifications were required because some energy efficiency product markets, such as residential room air conditioners, were being transformed, and product incentive offerings as a result, could be reduced. Also, because the market and demand for energy efficiency services in New York is extensive, the Program needed to accept fewer service applications to preserve funds through the funding period ending June 2006, when the second funding cycle for the **New York Energy $mart[SM]** Program ended.

- January 2005 through June 2006. NYSERDA continued to assess gaps and opportunities with respect to energy efficiency, low-income services, and R&D programs as a means to assist policy makers in deciding the future of funding for energy-related public benefits programs in the State.

Third Funding Cycle (2006 –2011)

- July 2006 through June 2011. The PSC extended the **New York Energy $mart[SM]** Program for another five years, increasing funding from approximately $150 million to $175 million annually (with NYSERDA administering approximately $173.2 million annually and the balance provided to certain utilities for their utility-run programs). The continuation and expansion of the Program is designed to help maintain momentum for the State's efforts to develop competitive markets for energy efficiency; demand management (including peak load reduction); outreach and education services; research, development, and demonstration; low-income services; and to provide direct economic and environmental benefits to New Yorkers. The extended program will continue to address market barriers to the competitive procurement of these services.

1.3 Design and Conduct of the New York Energy $mart[SM] Program

In order to successfully pursue these diverse activities, NYSERDA employs differing strategies. Representative strategies are presented in broad outline below. Many programs use a combination of these strategies. Discussions of individual activities are presented throughout this evaluation report.

- Market transformation programs promote energy efficiency by developing markets and permanently changing energy-related decisions by consumers, retailers, and manufacturers. Creating an energy efficiency "ethic" is critical if New Yorkers are to improve energy efficiency without sacrificing energy services – making decisions based on life-cycle economic benefits and costs, and sustainable environmental stewardship. Market transformation programs also promote the development of the energy-efficiency supply infrastructure through training, certification, marketing and other means.

- Energy efficiency programs identify energy savings opportunities and install energy-efficient products and technologies in single and multifamily homes, commercial buildings, and industrial plants.

- Load-management programs allow energy users to shift and reduce energy use from on-peak to off-peak periods – thereby reducing customers' energy use and bills, and improving the reliability of the electric system.[6]

- Low-income services make energy more affordable for low-income households by installing energy efficiency improvements and by disseminating energy information to homeowners, building owners and operators, and contractors.

- Research, Development and Demonstration (RD&D) programs develop alternative energy resources and technologies, deploy distributed generation and combined heat and power systems, develop and test new technologies and products, and collect and evaluate data for use in environmental analysis and in support of policy decision making. RD&D programs emphasize innovation and support projects and activities that provide opportunities for breakthroughs that might significantly improve existing technologies, products, and markets.

Different methods and protocols must be applied in evaluating each of the program offerings because their purposes and services are designed to meet different goals. Among the methods and protocols used and reported herein are measurement and verification (M&V); program theory and logic modeling; process evaluation; market characterization, assessment, and causality; benefit-cost and value-cost analyses; and, macroeconomic impact analysis.

1.4 Organization of the Report

This annual report describes how the **New York Energy $mart**[SM] Program is contributing to meeting its public policy goals.

This report is divided into the following sections:

Executive Summary

Section 1 - Introduction and Public Policy Context

Section 2 – Portfolio-Level Reporting

Section 3 – Commercial and Industrial Programs

Section 4 – Residential and Low-Income Programs

Section 5 - Research and Development Programs

[6] Reducing peak demand by shifting and reducing energy use from on-peak to off-peak periods increases energy productivity but may not reduce energy use or improve energy efficiency. If the electric load is shifted to an off-peak period and the same overall amount of energy is used, costs to consumers may be less, thus improving energy productivity, but the total quantity of energy used will be unchanged.

2

Portfolio-Level Reporting

The **New York Energy $mart**[SM] Program is a portfolio of numerous program initiatives that have individually and collectively helped the State make strides toward achieving its energy policy goals. This section presents findings and results for the portfolio of **New York Energy $mart**[SM] programs. The evaluations of individual program initiatives are presented separately in Sections 3, 4 and 5.

2.1 Budget and Spending Status

This financial overview of the **New York Energy $mart Program**[SM] presents budget and funding status from 1998 through December 31, 2006. The thirteen year budget is approximately $1.87 billion, of which $1.68 billion is allocated to four major program areas – Commercial/Industrial, Residential, Low-Income, and Research and Development (R&D) – and a general awareness campaign. The budgets for these program areas are presented in Table 2-1 along with the costs for program administration, program evaluation, the Environment Disclosure Program[1], and the New York State Cost Recovery Fee[2]. Figure 2-1 and Figure 2-2 present graphic representations of ratepayer System Benefits Charge (SBC) contributions.

[1] This program provides electricity commodity suppliers with data for informing customers about the fuel mix and associated environmental impacts of their electricity sources.

[2] The New York State Cost Recovery Fee is assessed for services to public authorities. The fee is determined by the New York State Division of Budget and imposed and collected by the Department of Taxation and Finance.

Table 2-1. New York Energy $mart[SM] Program Budget ($ million)

	Budget			% of Program Area Budget	% of Total Budget
	SBC I & SBC II [1,2]	**SBC III [3]**	**Total Budget**		
Program Areas					
Commercial/Industrial	359.2	276.7	635.9	37.8%	34.0%
Residential	167.1	135.0	302.1	18.0%	16.2%
Low-Income	128.4	190.2	318.6	19.0%	17.0%
Research and Development	210.8	182.0	392.8	23.4%	21.0%
General Awareness[4] (Marketing)	16.0	15.0	31.0	1.8%	1.7%
Program Areas Total	**$881.5**	**$798.9**	**$1,680.4**	**100.0%**	**89.8%**
Other Costs					
Program Administration	65.5	62.7	128.2	-	6.9%
Metrics and Evaluation	16.5	17.9	34.4	-	1.8%
Environmental Disclosure	1.9	0	1.9	-	0.1%
NYS Cost Recovery Fee[5]	9.0	16.4	25.4	-	1.4%
Other Costs Total	**$ 92.9**	**$97.1**	**$189.9**	**-**	**10.2%**
Total New York Energy $mart[SM]	**$ 974.3**	**$ 896.0**	**$1,870.3**	**-**	**100.0%**

[1] Included with SBC II funding an additional $12.6 million from interest and unspent utility funds (distribution: Residential: $11.5 million; Program Administration: $0.88 million; and Metrics & Evaluation: $0.25 million).

[2] SBC I: July 1, 1998 through June 30, 2001; SBC II: July 1, 2001 through June 30, 2006.

[3] SBC III: July 1, 2006 through June 30, 2011.

[4] General Awareness previously included in Residential Program Area.

[5] The New York State Cost Recovery Fee is assessed for services to public authorities. The fee is determined by the New York State Division of Budget and imposed and collected by the Department of Taxation and Finance.

Totals may not sum exactly due to rounding.

Source: NYSERDA

Figure 2-1. New York Energy $mart[SM] Ratepayer Contributions by Utility[3] Service Area

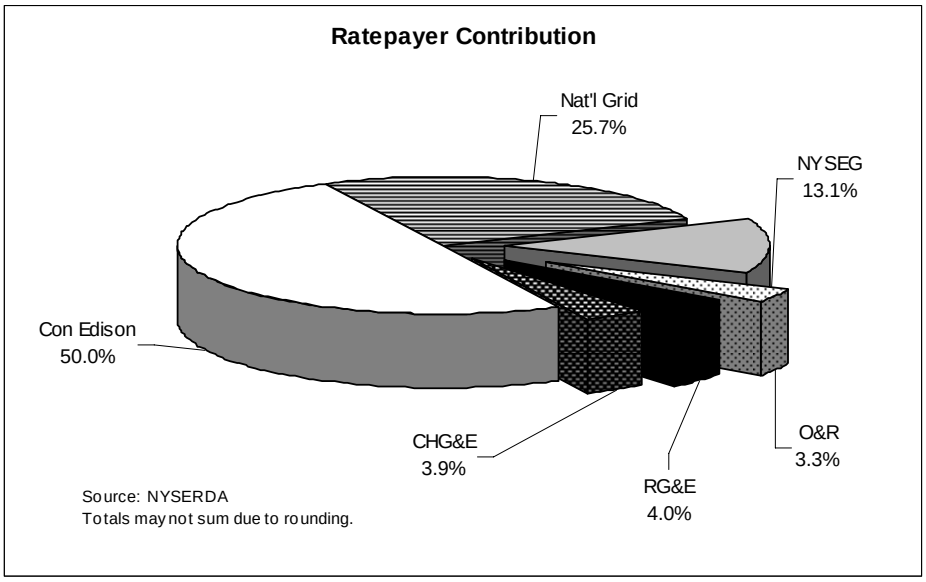
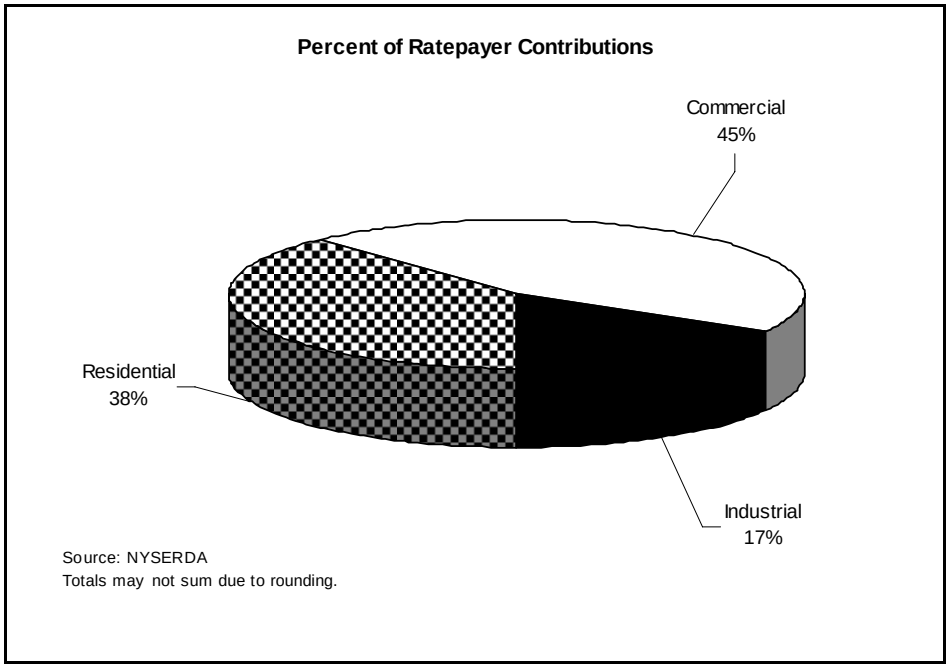


Figure 2-2. New York Energy $mart[SM] Ratepayer Contributions by Sector



[3] The utility service areas: Central Hudson Gas and Electric, Inc. (CHG&E), Consolidated Edison Company of New York, Inc. (Con Edison), National Grid (Nat'l Grid), New York State Electric and Gas Corporation (NYSEG), Orange and Rockland Utilities, Inc. (O&R), Rochester Gas and Electric Corporation (RG&E).

2.1.1 Financial Status and Funding Allocation

The funding status of **New York Energy $mart℠** through year-end 2006 is shown in Table 2-2. The percentage of funds spent relative to the thirteen-year budget for each program area is: Commercial/ Industrial 41.8%; Residential 58.8%; Low-Income 32.0%; and R&D 29.9%. Figure 2-3 provides historical information on program funding and spending.

Table 2-2. Financial Status of New York Energy $mart℠ Program ($ million)

	Total 13-Year Budget	Funds Spent			Encumbered Funds[4] % of Budget Encumbered	Committed Funds[5] % of Budget Committed
		SBC I & SBC II [1,2]	SBC III [3]	Total Spent and % of Budget		
Program Areas						
Commercial/Industrial	635.9	247.1	18.3	265.5 41.8%	368.3 57.9%	399.5 62.8%
Residential[5]	302.1	165.4	12.1	177.6 58.8%	196.6 65.1%	206.3 68.3%
Low-Income	318.6	86.6	15.3	101.9 32.0%	139.3 43.7%	145.6 45.7%
Research and Development	392.8	105.9	11.7	117.6 29.9%	177.8 45.3%	201.5 51.3%
General Awareness[6] (Marketing)	31.0	15.9	0.8	16.7 53.9%	19.3 62.3%	19.3 62.3%
Program Areas Total	**$1,680.4**	**$620.9**	**$58.3**	**$679.2 40.4%**	**$898.5 53.6%**	**$972.3 57.9%**
Other Costs						
Program Administration	128.2	59.8	5.8	65.6 51.2%	65.6 51.2%	65.6 51.2%
Metrics and Evaluation	34.4	14.5	1.0	15.5 45.1%	17.5 50.9%	22.5 65.4%
Environmental Disclosure	1.9	0.8	0.1	0.9 47.4%	1.1 57.9%	1.1 57.9%
NYS Cost Recovery Fee	25.4	9.2	1.2	10.4 40.9%	10.4 40.9%	10.4 40.9%
Other Costs Total	**$189.9**	**$84.3**	**$8.1**	**$92.4 48.7%**	**$94.6 49.8%**	**$99.6 52.4%**
Total New York Energy Smart℠	**$1,870.3**	**$705.2**	**$66.4**	**$771.6 41.3%**	**$993.3 53.1%**	**1,071.9 57.3%**

[1] Included with SBC II funding an additional $12.6 million from interest and unspent utility funds (distribution: Residential: $11.5 million; Program Administration: $0.88 million; and Metrics & Evaluation: $0.25 million).

[2] SBC I: July 1, 1998 through June 30, 2001; SBC II: July 1, 2001 through June 30, 2006.

[3] SBC III: July 1, 2006 through June 30, 2011.

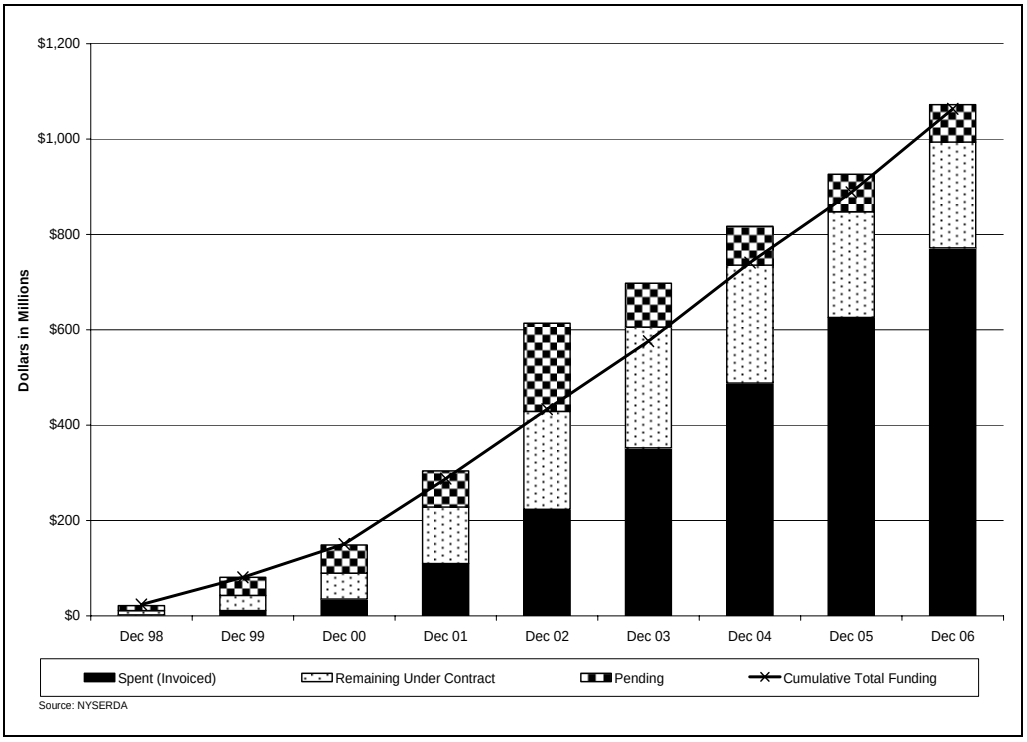
[4] Encumbered funds associated with signed contracts and purchase orders.

[5] Committed funds associated with encumbered funds and pending contracts.

[6] General Awareness previously included in Residential Progarm Area.

Totals may not sum exactly due to rounding. Source: NYSERDA

Figure 2-3. New York Energy $mart[SM] Program Funding History and Activity December 1998 through December 2006



2.1.2 Program Areas

Commercial/Industrial Program Area

Table 2-3 presents detailed budget and funding information for the Commercial/Industrial programs. Figure 2-4 and Figure 2-5 show C/I program spending by utility service area and sector, respectively.

Table 2-3. Commercial/Industrial Programs – Financial Status ($ million)

Program	Budget			Funds Spent			Encumbered Funds[3] % of Budget Encumbered	Committed Funds[4] % of Budget Committed
	SBC I & SBC II [1]	SBC III [2]	Total Budget	SBC I & SBC II [1]	SBC III [2]	Total Funds Spent		
Peak Load Management	42.7	40.0	82.7	35.1	3.4	38.5 46.6%	55.3 66.9%	56.6 68.4%
Enhanced Commercial/ Industrial Performance	150.5	96.1	246.6	100.3	4.5	104.8 42.5%	146.1 59.2%	148.9 60.4%
New York Energy $mart[SM] Business Partners	22.6	18.8	41.3	19.7	1.2	20.9 50.6%	24.5 59.3%	24.7% 59.8%
Loan Fund and Financing	10.5	10.5	21.0	12.3	1.5	13.8 65.7%	17.4 82.9%	17.4 82.9%
Energy Smart Focus	8.0	11.9	19.9	3.6	0.8	4.4 22.1%	5.1 25.6%	5.1 25.6%

High Performance New Buildings	80.8	70.0	150.8	53.1	5.7	58.8 39.0%	89.2 59.2%	114.4 75.9%
FlexTech Technical Assistance	37.0	29.5	66.5	20.4	1.1	21.5 32.3%	25.7 38.6%	27.4 41.2%
Other	7.1	0.0	7.1	2.6	0.1	2.7 38.0%	5.0 70.4%	5.0 70.4%
Total Commercial & Industrial	**359.2**	**276.7**	**635.9**	**247.1**	**18.3**	**265.5 41.8%**	**368.3 57.9%**	**399.5 62.8%**

[1] SBC I: July 1, 1998 through June 30, 2001; SBC II: July 1, 2001 through June 30, 2006.

[2] SBC III: July 1, 2006 through June 30, 2011.

[3] Encumbered funds associated with signed contracts and purchase orders.

[4] Committed funds associated with encumbered funds and pending contracts.

Totals may not sum exactly due to rounding.

Source: NYSERDA

Figure 2-4. C/I Funds Spent by Utility Service Area

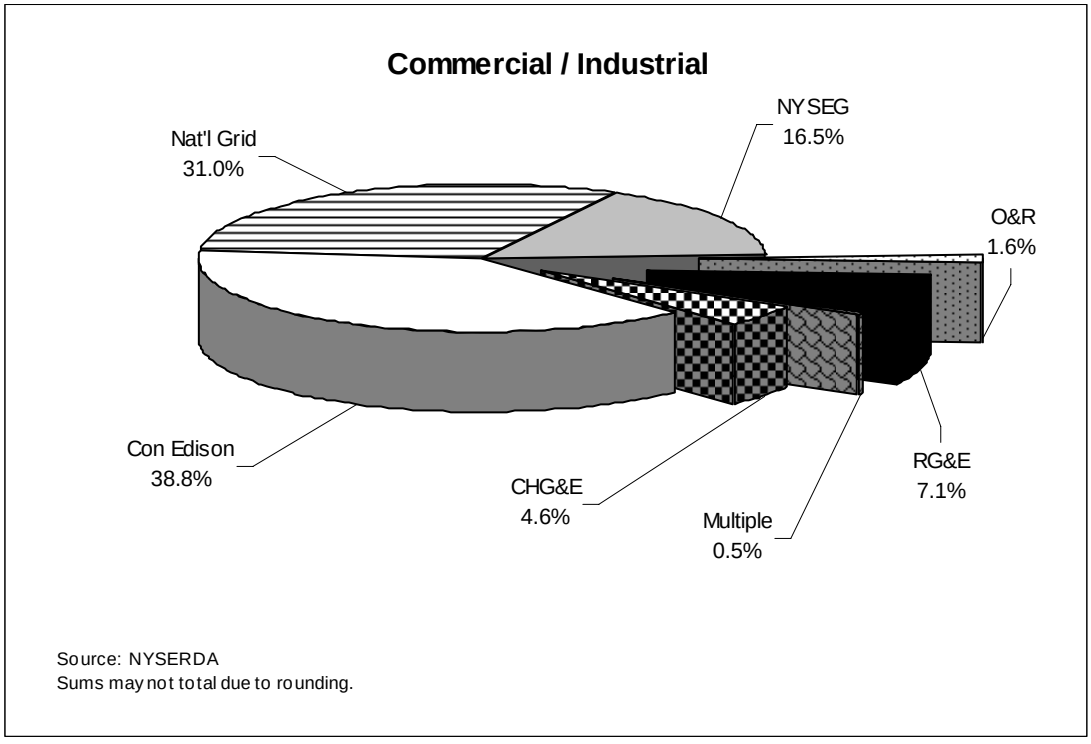
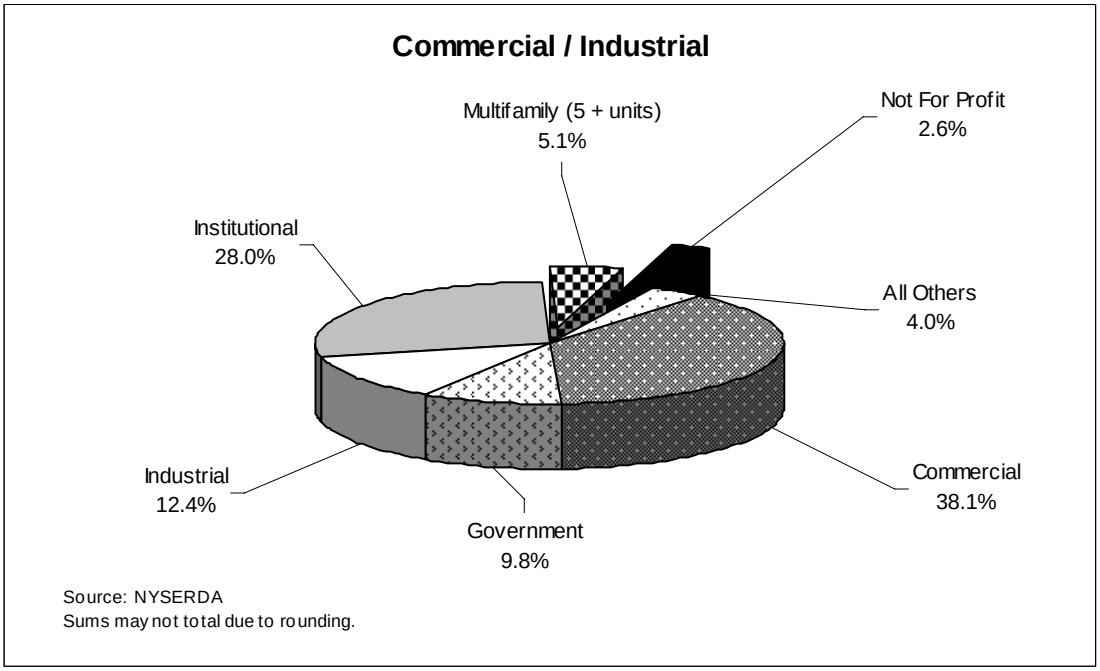


Figure 2-5. C/I Funds Spent by Sector



Residential and Low-Income Program Areas

Table 2-4 presents detailed budget and funding information for the Residential and Low-Income programs. Figure 2-6 and Figure 2-7 show Residential program spending by utility service area and housing type, respectively. Figure 2-8 and Figure 2-9 provide the same information for the Low-Income programs.

Table 2-4. Residential and Low-Income Programs - Financial Status ($ million)

Program	Budget			Funds Spent			Encumbered Funds[4] % of Budget Encumbered	Committed Funds[5] % of Budget Committed
	SBC I & SBC II [1, 2]	SBC III [3]	Total Budget	SBC I & SBC II [1, 2]	SBC III [3]	Total Funds Spent		
Residential Programs								
Single Family Home Performance	49.3	58.3	107.6	47.4	4.7	52.1 48.4%	54.8 50.9%	56.1 52.1%
Multifamily Building Performance	17.8	20.0	37.8	18.3	2.6	20.9 55.3%	28.9 76.5%	30.8 81.5%
Market Support Residential	95.2	49.0	144.2	96.5	4.2	100.7 69.8%	107.9 74.8%	113.3 78.6%
Communities and Education	4.9	7.8	12.6	3.2	0.7	3.9 31.0%	5.0 39.7%	6.0 47.6%
Subtotal Residential	**167.1**	**135.0**	**302.1**	**165.4**	**12.1**	**177.6 58.8%**	**196.6 65.1%**	**206.3 68.3%**
Low-Income Programs								
Single Family Home Performance	27.5	54.0	81.5	27.7	4.6	32.3 39.6%	34.5 42.3%	34.5 42.3%
Multifamily Building Performance	76.2	75.0	151.2	35.5	6.2	41.7 27.6%	76.1 50.3%	78.1 51.7%
EmPower New York	8.8	49.5	58.3	8.8	4.2	13.0 22.3%	13.4 23.0%	17.2 29.5%
Buying Strtegies & Energy Awareness	6.1	11.7	17.7	4.7	0.3	5.0 28.2%	5.4 30.5%	5.8 32.8%
Other	9.9	0.0	9.9	9.9	0.0	9.9 100.0%	9.9 100.0%	9.9 100.0%
Subtotal Low-Income	**128.4**	**190.2**	**318.6**	**86.6**	**15.3**	**101.9 32.0%**	**139.3 43.7%**	**145.6 45.7%**
TOTAL Residential and Low Income	**295.5**	**325.2**	**620.7**	**252.0**	**27.5**	**279.5 45.0%**	**336.0 54.1%**	**351.9 56.7%**

[1] Included with SBC II Residential funding an additional $11.5 million from interest and unspent utility funds.

[2] SBC I: July 1, 1998 through June 30, 2001; SBC II: July 1, 2001 through June 30, 2006.

[3] SBC III: July 1, 2006 through June 30, 2011.

[4] Encumbered funds associated with signed contracts and purchase orders.

[5] Committed funds associated with encumbered funds and pending contracts.

Totals may not sum exactly due to rounding.

Source: NYSERDA

Figure 2-6. Residential Funds Spent by Utility Service Area

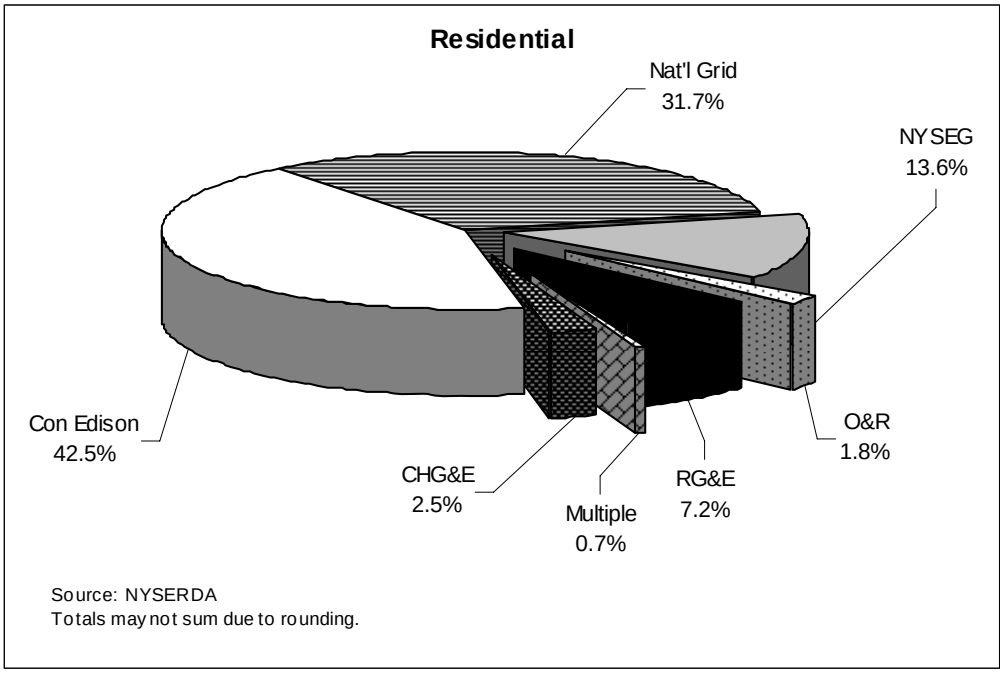


Figure 2-7. Residential Funds Spent by Housing Type

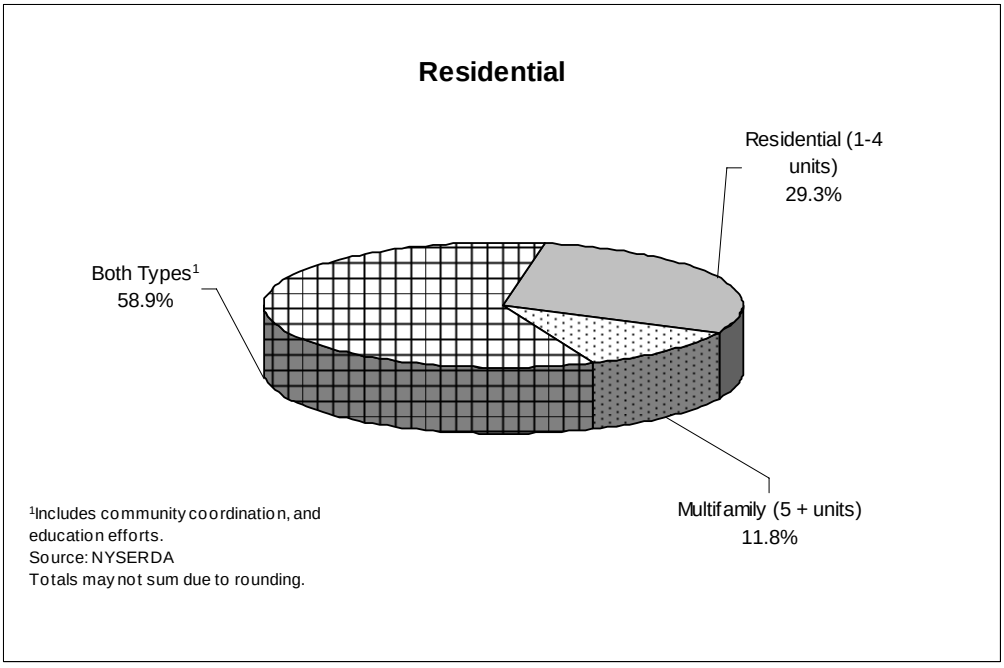


Figure 2-8. Low-Income Funds Spent by Utility Service Area

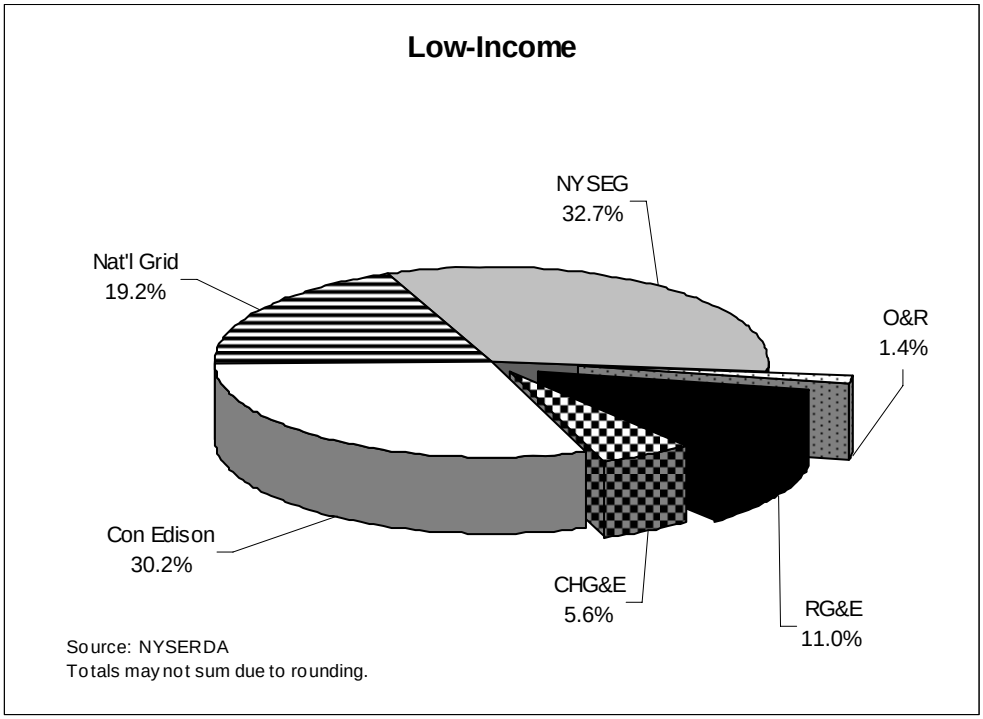
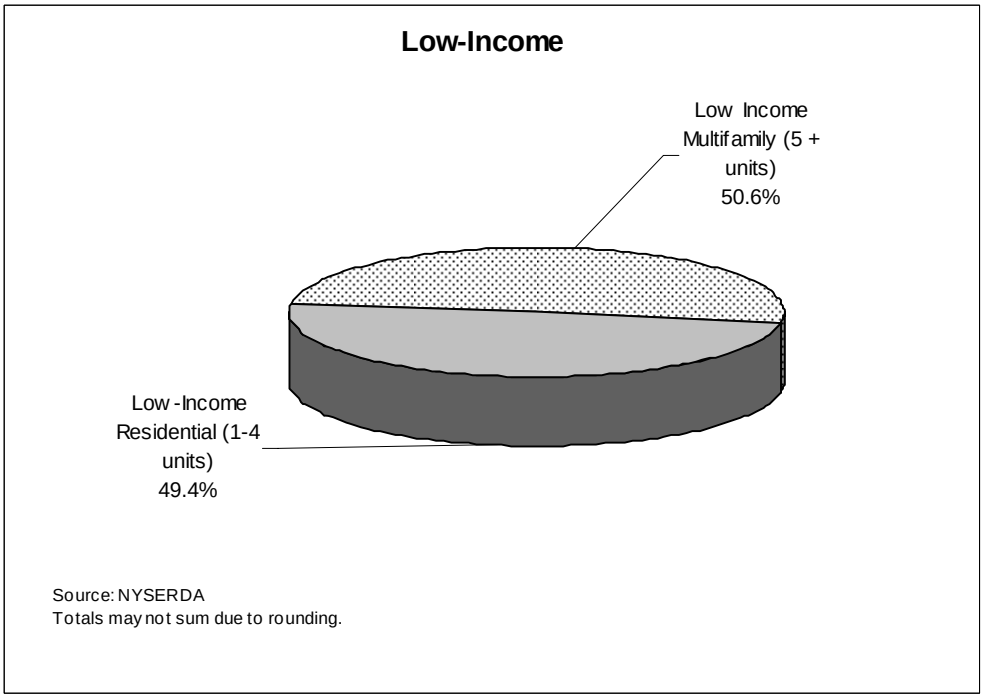


Figure 2-9. Low-Income Funds Spent by Housing Type



Research, Development and Demonstration Program Area

Table 2-5 presents detailed budget and funding information for the Research, Development and Demonstration (RD&D or R&D) programs. Figure 2-10 and Figure 2-11 show R&D Program spending by utility service area and technology.

Table 2-5. Research & Development Programs – Financial Status ($ million)

Program	Budget			Funds Spent			Encumbered Funds[3] % of Budget Encumbered	Committed Funds[4] % of Budget Committed
	SBC I & SBC II [1]	SBC III[2]	Total Budget	SBC I & SBC II[1]	SBC III [2]	Total Funds Spent % Funds Spent		
Public Benefit Power Transmission and Distribution	0.0	10.0	10.0	0.0	0.0	0.0	0.0	0.0
Clean Energy Infrastructure	43.7	33.8	77.5	19.0	4.6	23.6 30.5%	33.6 43.4%	38.0 49.0%
Distributed Energy Resources: Products and Demonstrations	74.1	72.5	146.6	31.9	4.1	36.1 24.6%	69.6 47.5%	84.0 57.3%
Demand Response and Innovative Research	0.0	10.0	10.0	0.0	0.0	0.0	0.0	0.0
Electric Transportation	0.0	5.0	5.0	0.0	0.0	0.0	0.4 8.0%	1.0 20.0%
Environmental, Monitoring, Evaluation, and Protection	21.5	17.5	39.0	17.7	1.0	18.7 47.9%	21.9 56.2%	24.3 62.3%
Industrial and Municipal Process Efficiency	0.0	15.0	15.0	0.0	0.0	0.0	0.2 1.3%	1.7 11.3%
Next Generation and Emerging Technologies	29.6	18.3	47.8	18.3	1.4	19.6 41.0%	22.8 47.7%	24.6 51.5%
Wholesale Renewable Energy Market	36.1	0.0	36.1	16.5	0.6	17.1 47.4%	23.6 65.4%	25.1 69.5%
Other	5.8	0.0	5.8	2.5	<0.1	2.5 43.1%	2.9 50.0%	2.9 50.0%
TOTAL Research & Development	**210.8**	**182.0**	**392.8**	**105.9**	**11.7**	**117.6 29.9%**	**175.1 44.6%**	**201.5 51.3%**

[1] SBC I: July 1, 1998 through June 30, 2001; SBC II: July 1, 2001 through June 30, 2006.

[2] SBC III: July 1, 2006 through June 30, 2011.

[3] Encumbered funds associated with signed contracts and purchase orders.

[4] Committed funds associated with encumbered funds and pending contracts.

Totals may not sum due to rounding.

Source: NYSERDA

Figure 2-10. R&D Funds Spent by Utility Service Area

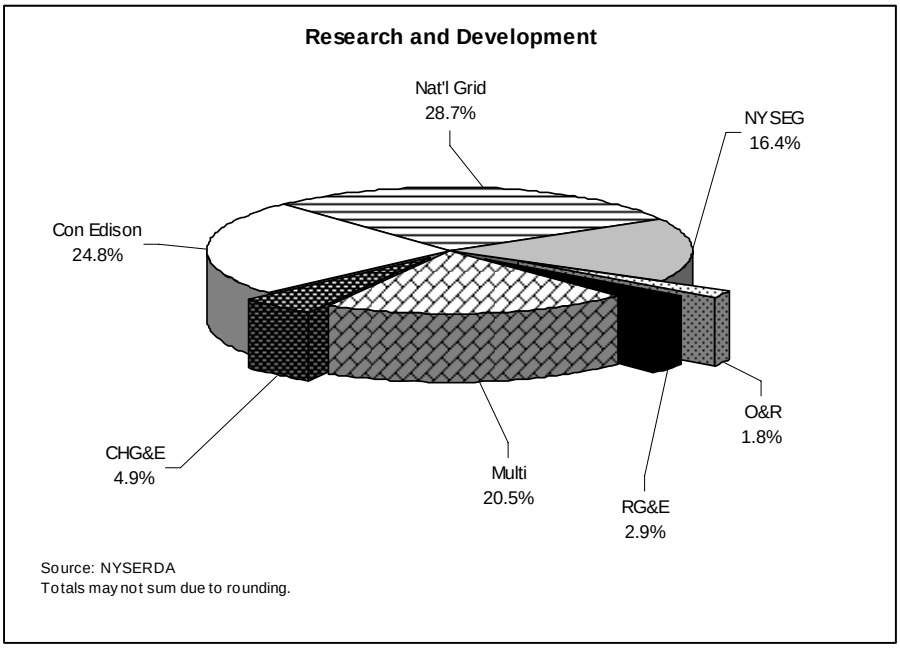
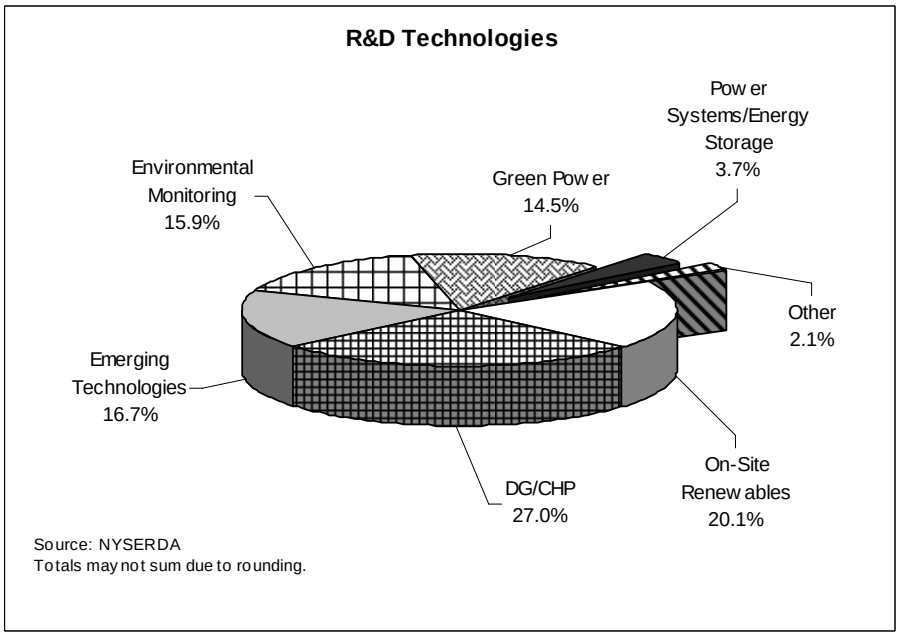


Figure 2-11. R&D Funds Spent by Technology



2.2 Portfolio Level Findings

This section discusses portfolio level findings related to progress toward overarching public policy goals, energy savings achievements, and economic analyses including macroeconomic impacts, market price effects, and overall cost-effectiveness. These findings are compiled based on the cumulative work of NYSERDA and its evaluation contractor teams over the past several years. Evaluation activities completed this year include:

- Measurement and Verification (M&V) work on FlexTech Technical Assistance, as well as database reviews for Peak Load Management, the Enhanced Commercial/Industrial Performance Program, the Small Commercial Lighting Program, High Performance New Buildings, Single Family Home Performance, EmPower New York, End Use Renewables, and DG/CHP.

- Market Characterization, Assessment and Causality (MCAC) work on Enhanced Commercial/Industrial Performance Program, High Performance New Buildings, and FlexTech Technical Assistance.

- Process Evaluation work on High Performance New Buildings, EmPower New York, and a portfolio-level evaluation review.

- Program Theory and Logic work on High Performance New Buildings, FlexTech Technical Assistance, all Residential and Low-Income programs (except Market Support, Buying Strategies and Energy Awareness), and Value/Cost analyses on DG/CHP and Environmental Monitoring, Evaluation and Protection.

- A peer review assessment of the Distributed Generation/Combined Heat and Power Program and the Environmental Monitoring, Evaluation and Protection Program.

NYSERDA expects to complete the following evaluation activities for inclusion in the next report (first quarter 2007):

- Measurement and Verification (M&V) work on Peak Load Management, Enhanced Commercial/Industrial Performance, the Small Commercial Lighting Program, Home Performance with ENERGY STAR, EmPower New York, and Enabling Technologies.

- Market Characterization, Assessment and Causality (MCAC) work on non-participant market effects/spillover, the Market Support Program (residential ENERGY STAR focused), and Non-Energy Impacts.

- Process Evaluation work on End Use Renewables, the Assisted Multifamily Program, and EmPower New York.

- Program Theory and Logic work on: the **New York Energy $mart^{SM}** Focus Program, Business Partners, and the **New York Energy $mart^{SM}** Loan Fund; General Awareness efforts, Market Support, and Low-Income Buying Strategies; and R&D programs including Public Benefit Power Transmission and Distribution and Next Generation and Enabling Technologies.

2.2.1 Progress Toward Goals

This section presents the cumulative progress of the **New York Energy $mart[SM]** Program toward meeting the four overarching public policy goals set forth and recently revised by the PSC.[4] Overall, the Program is making good progress toward achieving the long term goals. The goals and progress through December 31, 2006 are shown in Table 2-6. Substantial additional program-specific and sector-level accomplishments have been documented within NYSERDA and independent evaluation contractor reports and are contributing to the development of sustainable progress being made toward these important overarching public policy goals.

Table 2-6. New York Energy $mart[SM] Goals and Progress through December 31, 2006

Public Policy Goal	Progress as of December 31, 2006
Improve New York's energy system reliability and security by reducing energy demand and increasing energy efficiency, supporting innovative transmission and distribution technologies that have broad application, and enabling fuel diversity, including renewable resources.	The **New York Energy $mart[SM]** Program has improved system-wide reliability and peak demand reduction, enabling 618 MW of callable load reduction and installing efficiency measures that permanently reduce peak demand by another 495 MW.
	The **New York Energy $mart[SM]** Program has led to the installation of energy efficiency measures saving more than 2,360 GWh per year.
	The **New York Energy $mart[SM]** Program has led to the installation of wind and photovoltaic technologies which provide more than 100 GWh of clean electricity generation per year.
	With funding from **New York Energy $mart[SM]**, the U.S. Department of Energy and private sources, the world's first in-grid underground superconducting cable was installed and began operations on July 20, 2006 in the National Grid utility system. Superconducting cables can carry three to five times more power than conventional cables of the same size and can meet increasing power demands in urban areas by retrofitting old underground cables, eliminating the need to acquire new rights-of-way.
Reduce the energy cost burden of New Yorkers by offering energy users, particularly the State's lowest income households, services that moderate the effects of energy price increases and volatility and provide access to cost-effective energy efficiency options.	The **New York Energy $mart[SM]** Program has saved participating customers nearly $340 million in annual energy costs.
	Approximately 60,000 eligible New York low-income customers received direct assistance through the **New York Energy $mart[SM]** programs, resulting in $220/year in average customer energy bill savings for this under served population.
	Approximately 2,200 small business customers have been served through the Smart Equipment Choices Program.
	Approximately 3,000 multi-family units will participate in time-sensitive electricity rate pilot projects.
	The **New York Energy $mart[SM]** portfolio has achieved a benefit-cost ratio of 2.4 under the most conservative Total Market Effects Test scenario.
Mitigate the environmental and health impacts of energy use by increasing energy efficiency, encouraging the development of support services for renewable energy resources, and optimizing the energy performance of buildings and products.	The annual reduction of emissions resulting from **New York Energy $mart[SM]** Programs' energy savings is 2,060 tons of nitrogen oxide (NOX), 3,800 tons of sulfur dioxide (SO_2), and 1.6 million tons of carbon dioxide (CO_2).
	Between 2002 and 2006, the number of PV and small wind installers participating in the **New York Energy $mart[SM]** Program has increased from 30 to 102. The Program has supported more than 1,680 attendees at PV and small wind training events, and helped 27 installers in the PV program become certified

[4] Case 94-E-0952 *et al.*, In the Matter of Competitive Opportunities Regarding Electric Service, *Staff Proposal for the Extension of the System Benefits Charge (SBC) and the SBC-funded Public Benefits Program*, August 30, 2005.

Public Policy Goal	Progress as of December 31, 2006
	by the North American Board of Certified Energy Practitioners (NABCEP).
	The **New York Energy $mart**[SM] Program has helped optimize energy performance in approximately 650 new commercial buildings, more than 8,500 new homes, and more than 13,800 existing homes. Additionally, more than 8,500 energy efficiency projects have been completed in commercial/industrial buildings.
Create economic opportunity and promote economic well-being by supporting emerging energy technologies, fostering competition, improving productivity, stimulating the growth of New York energy businesses, and helping to meet future energy needs through efficiency and innovation.	Averaged over a 19-year analysis period, the **New York Energy $mart**[SM] Program creates and sustains on average more than 8,600 jobs, increases labor income by $182 million per year, increases total output by $456 million per year, and increases value added by $211 million per year.
	The **New York Energy $mart**[SM] Program activities were instrumental in EPA revising its ENERGY STAR computer specifications to incorporate 80 PLUS® criteria for active power efficiency thresholds.[5]
	Under the Environmental Product development program, total product sales grew from $13 million in 2004 to $28 million in 2005.

2.2.2 Reported and Achieved Energy, Demand and Fuel Savings

The energy, peak demand, and fuel savings from the **New York Energy $mart**[SM] Program portfolio from 1998 through December 2006 are presented in Table 2-7. The table shows both program-reported savings and savings after adjustments were applied for field-verified realization rates, freeridership, and spillover. The purpose of the adjustments that are applied to the program-reported savings is as follows:

- Realization rates are developed by the Measurement and Verification contractor to account for differences in program reported savings and the performance of actual installations.
- Freeridership adjustments are developed by the MCAC contractor to subtract any program reported savings that would have happened in the absence of the program due to naturally-occurring adoption.
- Spillover adjustments, also developed by the MCAC contractor, add to program reported savings when participants or non-participants implement energy-saving measures due to the program's influence, but do not apply to participate in the program.

During 2006 the **New York Energy $mart**[SM] programs contributed 410 GWh in electricity savings, which represents a 17% increase in savings beyond those achieved by the end of 2005. Achieved permanent peak demand reduction increased by 77 MW or 7% from 2005. Achieved non-electric savings decreased by 150,000 MMBtu or 4%.

Also shown in Table 2-7 is the estimated overlap in savings across programs. Overlapping savings are expected – for example, overlap occurs when a customer first participates in the Technical Assistance (TA) Program to obtain a detailed energy audit of a facility and then participates in the Enhanced Commercial/Industrial Performance Program (ECIPP) to access incentives for the implementation of recommended measures. Database searches were performed to locate savings claimed for the same customer(s) for the same measure(s). When identified, overlap factors were developed to account for the same savings claimed under more than one program. Since both technical assistance and incentives for measures are equally vital to convincing customers to take action, and there was no reliable way of

[5] 80 PLUS is a national upstream buy-down program that encourages market transformation groups and computer manufacturers to get more energy-efficient power supplies into PCs and desktop-derived servers.

allocating the savings to one program or the other, the adjustments are made only at the sector level. In the case of the Distributed Generation/Combined Heat and Power (DG/CHP) Program, where R&D savings overlap with programs in the Commercial/Industrial sector, savings were removed from the portfolio and are shown in the table as "Cross-Sector Overlap Removed."

The reductions in energy use translate into:

- $340 million in annual energy bill savings (electric, oil and natural gas) in 2006 for New York consumers,
- 2,060 tons of annual nitrogen oxide (NO_x) emission reductions,
- 3,800 tons of annual sulfur dioxide (SO_2) emission reductions, and
- 1.6 million tons of annual carbon dioxide (CO_2) emission reductions which are equivalent to removing 320,000 automobiles from New York's roadways.

Table 2-7. Reported and Adjusted Cumulative Annual Energy, Demand, and Fuel Savings through December 2006[6]

Program	Energy Savings (GWh)			Peak Demand Reduction (MW)			Fuel Savings (MMBtu)[7]		
	Reported GWh	Adjusted GWh	*% of Reported*	Reported MW	Adjusted MW	*% of Reported*	Reported MMBtu	Adjusted MMBtu	*% of Reported*
Peak Load Management: Callable	-	-	-	488.1	470.5	96%	-	-	-
Peak Load Management: Permanent	113.5	118.0	104%	52.3	54.5	104%	-	-	-
Enhanced Commercial/ Industrial Performance	845.9	836.3	99%	182.8	142.0	78%	6,593	4,615	70%
New York Energy $mart[SM] Business Partners[8]	51.7	60.7	117%	11.0	13.3	120%	-	-	-
New York Energy $mart[SM] Loan Fund and Financing	65.5	51.3	78%	11.7	15.0	128%	111,590	139,621	125%
New York Energy $mart[SM] Focus	0	0	0	0	0	0	-	-	-

[6] Subtotals, totals and percentages may not calculate exactly due to rounding.

[7] Depending on the program and measure, non-electric savings are developed from either engineering calculations or deemed values for installations of energy efficiency measures. All fossil fuel savings are included in Table 2-7.

[8] Savings for the Commercial HVAC portion of the program have been reduced as of 4th Quarter 2006. This approach was taken due to the known short-term nature of savings from advanced diagnostics and commissioning, which were part of the program.

Program	Energy Savings (GWh)			Peak Demand Reduction (MW)			Fuel Savings (MMBtu)[7]		
	Reported GWh	**Adjusted GWh**	***% of Reported***	**Reported MW**	**Adjusted MW**	***% of Reported***	**Reported MMBtu**	**Adjusted MMBtu**	***% of Reported***
High Performance New Buildings	193.6	250.3	129%	41.4	53.5	129%	-	-	-
Flex Tech Technical Assistance: Permanent	612.0	697.6	114%	114	130.0	114%	2,513,073	2,864,903	114%
Flex Tech Technical Assistance: Curtailable	-	-	-	8.9	10.2	114%	-	-	-
Overlap Removed[9]	-	141.9	-	-	26.1	-	-	-	-
Subtotal Commercial/ Industrial	1,882.3	1,872.2	96%	910.2	862.9	95%	2,631,256	3,009,140	114%
Single Family Home Performance (excluding Assisted Home Performance)	15.9	18.4	116%	2.0	2.5	124%	858,955	987,109	115%
Single Family Home Performance: Assisted Home Performance	4.9	5.5	113%	0.7	0.8	120%	216,256	242,207	112%
Multifamily Building Performance (Excluding Assisted Multifamily Program)	14.7	15.1	103%	2.4	3.3	138%	-	-	-
Multifamily Building Performance: Assisted Multifamily Program	28.4	23.1	81%	1.7	1.8	106%	167,303	140,541	84%
Market Support Program[10]	287.7	303.8	106%	71.5	72.8	102%	341,920	341,920	100%
EmPower New York	27.9	27.9	100%	3.3	3.3	100%	66,891	66,891	100%
Subtotal Residential and Low-Income	379.5	393.9	104%	81.6	84.5	104%	1,651,325	1,778,668	108%

[9] Sector level savings have been adjusted to remove overlap between complementary programs, as such, the 'Achieved Savings' columns will not sum to the sector total.

[10] Savings numbers for the ENERGY STAR Products program have been developed by the MCAC Team.

Program	Energy Savings (GWh)			Peak Demand Reduction (MW)			Fuel Savings (MMBtu)[7]		
	Reported GWh	**Adjusted GWh**	***% of Reported***	**Reported MW**	**Adjusted MW**	***% of Reported***	**Reported MMBtu**	**Adjusted MMBtu**	***% of Reported***
DG-CHP Demonstration Program	93.5	96.7	103%	18.8	21.1	112%	-777,721[11]	-738,327	95%
Demand Response and Innovative Rate Research	-	-	-	208.1	137.2	66%[12]	-	-	-
Renewable Energy Production	104.4	104.6	100%	8.8	8.4	96%	-	-	-
Subtotal R&D	197.9	201.3	102%	235.7	166.7	71%	-777,721	-738,327	95%
Cross Sector Overlap Removed	-	7.7	-	-	1.5	-	-	-	-
NYE$ Portfolio	**2,459.7**	**2,459.7**	**100%**	**1,227.5**	**1,112.6**	**91%**	**3,504,860**	**4,049,481**	**116%**

2.2.3 Economic Analysis

This section discusses the macroeconomic impacts of the **New York Energy $mart^{SM}** Program, as well as the cost effectiveness analysis of the deployment programs.

Macroeconomic Impact Analysis

Expenditures made by NYSERDA and participants within the **New York Energy $mart^{SM}** Program have substantial macroeconomic impacts that go beyond direct benefits to participants. Purchases of goods and services through the program set off a ripple effect of spending and re-spending that influences many sectors of the New York economy, and the level and distribution of employment and income in the State.

The macroeconomic impact analysis of the **New York Energy $mart^{SM}** Program undertaken for this report was designed to quantify the net impacts of the programs by comparing the impacts of Program expenditures and energy savings to the impacts that would have resulted had the programs not been implemented and the money not been paid by ratepayers into the System Benefits Charge (SBC) fund. The Base Case provides a frame of reference with which to compare the impacts of the **New York Energy $mart^{SM}** Program. The Base Case estimates the impacts that the SBC funds would have had on the New York economy, had they been retained by the customers of the participating utilities in the absence of the program. The components of the Base Case include: (1) increased disposable income available to residential consumers; (2) increased retained earnings available to businesses; and (3) increased purchases of electricity, natural gas, and oil due to the absence of the energy savings provided

[11] Because the electricity saved by the DG/CHP projects replaces electricity formerly purchased from the grid, the program has reduced fuel used at central generating stations, for a net decrease statewide due to greater efficiency of the DG/CHP systems at sites where imported fuel is used. The fuel avoided at the central generating plant is determined from the electricity generated by the DG/CHP installations. Furthermore, at additional projects such as waste water treatment plants, electricity generation is powered fully or partially by digester gas produced on site. Such fuel switching achieves natural gas conservation above and beyond what is achieved through efficiency alone.

[12] The Demand Response and Innovative Rate Research Program does not require that enabled demand reductions be maintained. This large adjustment is based on M&V results and indicates the portion of the enabled MW reduction that was maintained.

by the program. The Program Case estimates the impact on the New York economy of SBC funds allocated to the portfolio of **New York Energy $mart[SM]** Program expenditures. The net macroeconomic impacts are expressed in terms of annual employment[13], labor income[14], total industry output[15], and value added[16]. Note that the macroeconomic results reported in this section are limited to the impacts that are most directly associated with the Program expenditures and the annual energy savings due to those expenditures. The analysis does not capture the more indirect and long-term potential impacts that may result from more widespread market transformation (*i.e*; permanent adoption of new energy efficiency measures as the status quo in the marketplace).

Material changes from the previous analyses are as follows.

1. The program implementation period has been changed from eight years to 13 years due to the extension of the **New York Energy $mart[SM]** Program though June 30, 2011.

2. The average life of measures installed under the **New York Energy $mart[SM]** Program was changed from 10 to 15 years.

3. The index for apportioning jobs created during the year of program implementation and the out years, is now based on the program's cumulative annual energy savings and annual spending, instead of solely on spending as was the case in previous analyses.

The last two changes were made based on available program data in an effort to improve the accuracy and usefulness of the results of this year's macroeconomic analysis.

Results of Analysis

Results of the macroeconomic analysis, encompassing 14 years of program implementation (1999-2012)[17] and fifteen years[18] following program implementation (2013-2027), indicate that the **New York Energy $mart[SM]** Program can reasonably be expected to provide net macroeconomic benefits to New York in the form of increased employment, labor income, total output, and value added. Table 2-8 indicates that the **New York Energy $mart[SM]** Program, averaged over the 29-year analysis period, is expected to create and sustain an average of over 8,600 jobs compared to the number of jobs that would have existed in the absence of the program. In addition, the program increases labor income by $321 million per year, increases total output by $456 million per year, and increases value added by $211 million per year.

[13] Employment includes total wage and salary employees as well as self-employed jobs in a region. It includes both full-time and part-time workers and is measured in annual average jobs.

[14] Labor income includes both employee compensation and proprietor income.

[15] Total industry output is the value of total sales revenue, which includes both final and intermediate goods and services. It can be measured as the total value of purchases by intermediate and final consumers.

[16] Value added includes the components of Labor Income (employee compensation and proprietor income) plus property income (interest, rental income, royalties, dividends, and profits) and indirect business taxes (primarily sales and excise taxes).

[17] Although the SBC funding period ends on June 30, 2011, not all funds are expected to be fully expended by this point. Therefore, the program implementation period was extended through 2012 based on a projection of when funds would be completely spent for installed equipment.

[18] A fifteen-year period was selected to represent the average life of measures installed under the **New York Energy $mart[SM]** Program.

Table 2-8. Summary of Macroeconomic Impacts of the New York Energy $mart[SM] Program (Constant 2006$)

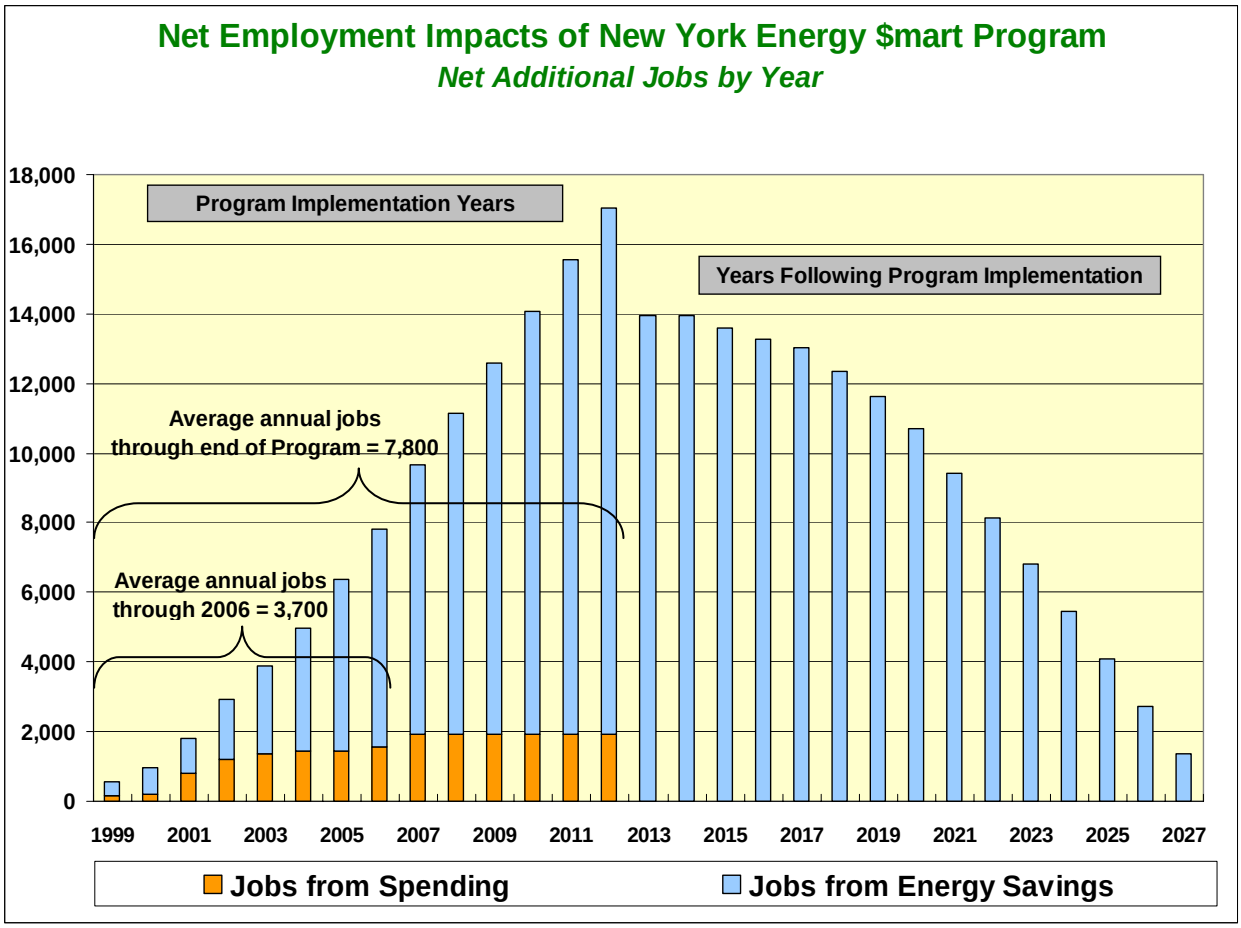
Economic Variable	Program Implementation Years (1999-2012)	Years Following Program Implementation (2013-2027)	Annual Average over 29-year Analysis Period (1999-2027)
Net Job Growth	7,807	9,362	8,612
Labor Income	$361 Million	$283 Million	$321 Million
Total Output	$573 Million	$346 Million	$456 Million
Value Added	$271 Million	$154 Million	$211 Million

Employment Results

Results of the analysis indicate that the **New York Energy $mart[SM]** Program provides substantial net macroeconomic benefits to New York in the form of increased employment, both during the program implementation years (1999-2012) and throughout the years following implementation (2013-2027), during which the energy efficiency measures implemented by the program continue to accrue annual energy savings. As shown in Table 2-8 the program is estimated to create and sustain an average of over 8,600 jobs over the 29-year analysis period, compared to the estimated number of jobs that would have existed in the absence of the program. Figure 2-12 shows net jobs created and sustained by individual year, and shows that the program is estimated to result in an average net gain of approximately 7,800 jobs during the program implementation years, and an average of more than 9,300 jobs per year throughout the years following implementation.[19] On average, more than 8,600 net jobs are created over the 29 years of program implementation. These are jobs that are estimated to exist, net of jobs that are lost in certain sectors as a result of the program. Note that the annual average employment results are not additive; the values reported represent the number of jobs created and sustained over each of the specified periods: (1) the 14 program implementation years (1999-2012); (2) the 15 years following program implementation (2013-2027); or (3) the annual average over the entire 29-year analysis period (1999-2027).

[19] 82% of all jobs created during the program implementation years are due to energy bill savings, while 18% of jobs created are due to spending. In years following program implementation, all jobs created are due to energy savings.

Figure 2-12. 2006 Update – Net Employment Impacts by Year



Labor Income Results

Labor income includes both employee compensation and proprietor income. Results indicate that the **New York Energy $mart**[SM] Program also provides substantial net macroeconomic benefits to New York in the form of increased labor income. Table 2-8 shows that the Program is estimated to result in an average net gain of $321 million in labor income in each year over the 29-year analysis period. The program is estimated to provide a net gain in labor income of $361 million per year during the program implementation years (1999-2012) and $283 million throughout the years following implementation (2013-2027).

Total Output and Value Added Results

Total industry output is the value of total sales revenue, which includes both final and intermediate goods and services. It can be measured as the total value of purchases by intermediate and final consumers. Value added includes the components of Labor Income (employee compensation and proprietor income) plus property income (interest, rental income, royalties, dividends, and profits) and indirect business taxes (primarily sales and excise taxes). Table 2-8 shows that the program is estimated to result in an average net gain of $456 million in total output and $211 million in value added in each year over the 29-year analysis period. During the program implementation years (1999-2012), the program is estimated to provide a net gain in total output of $573 million per year and a net gain in value added of $271 million

per year. Throughout the years following implementation (2013-2027), the program is estimated to result in a net gain in total output of $346 million per year and a net gain in value added of $154 million per year.

Benefit Cost Analysis of Deployment Programs

This section presents an overview of the benefit cost analysis of the **New York Energy $mart^{SM}** Program[20] for measures installed through year-end 2006. Four types of benefits were considered in the analysis:

1. Resource benefits, including benefits associated with reduced electricity generation and capacity (avoided costs), as well as reduced use of natural gas, oil, propane, and water.
2. Participant non-energy impacts, including monetized values for benefits such as comfort, safety, and productivity. These benefits accrue to participants and include spillover effects.
3. Energy and capacity market price effects including benefits accruing to all electricity customers by lowering the price of energy and capacity.
4. Macroeconomic value added. These benefits result primarily from lower energy bills and consumer spending of these bill savings. Value added includes the components of labor income (employee compensation and proprietor income) plus property income (interest, rental income, royalties, dividends, and profits) and indirect business taxes (primarily sales and excise taxes).

The monetized value of environmental benefits, such as reductions in emissions of sulfur dioxide, nitrogen oxides, and carbon dioxide, were not included as a benefit in the benefit cost analysis. With respect to sulfur dioxide and nitrogen oxides, since there are statewide regulatory emission caps as well as emission trading markets, emission credits may likely be sold in the marketplace, allowing generators to reduce operating costs (*e.g.*, through less stringent pollution controls) or expand generation (*e.g.*, to meet economic growth) without exceeding their caps. The net effect will be statewide emissions meeting the caps for sulfur dioxide and nitrogen oxides.

All costs incurred in years prior to 2006 were adjusted and are reported in year 2006 dollars. A discount rate of 3% was used to discount future benefits and costs and to compound past benefits and costs

A summary of the various benefits are presented in Table 2-9. Shown are the present values of resource benefits, non-energy impacts, market price effects, and macroeconomic benefits.

[20] A more detailed benefit cost analysis will be available in the 2007 1st Quarterly Report.

Table 2-9. Summary of Benefits ($ million)

	Through 2003	2004	2005	2006	Total
Present Value of Resource Benefits (2006$)	$1,901	$930	$664	$913	**$4,408**
Present Value of Non-Energy Impacts (2006$)	-	-	-	-	**$1,315**
Present value of 3-years of Market Price Effects (2006$)	$860	$214	$171	$220	**$1,465**
Present Value of Incremental Macroeconomic Benefits (2006$)	$431	$213	$245	$279	**$1,168**

A summary of costs is presented in Table 2-10. The cumulative measure cost is $1.65 billion, made up of $.3 billion of program incentives and $1.4 billion of participant co-funding. Program Implementation costs are $.2 billion. Implementation costs include a 9% administration and evaluation charge on all program spending, including spending on incentives.

Table 2-10. Summary of Costs Through 2006 ($ million)

	Incremental installed cost (full cost for retrofit)	Incentives	Participant Contribution	Program Implementation
Portfolio Total (2006$)	$1,650	$292	$1,447	$209

The calculation of the non-energy impacts (NEIs) are shown in Table 2-11. The impacts were estimated as a percentage of customer electricity and natural gas bill savings. The present value of the electricity bill savings is $2.36 billion, the natural gas bill savings is $925 million, and the present value of the non-energy impacts is $1.3 billion.

Table 2-11. Non-energy Impacts as a Percent of Bill Savings ($ million)

	Electric Retail Benefits	Natural Gas Retail Benefits	NEI %	NEI Value
Portfolio Total (2006$)	$ 2,363	$ 925	40%	$1,315

The energy market price effect results from lower average market clearing price for electricity due to kWh's saved by the **New York Energy $mart**[SM] Program. Lower prices result because the most expensive units are backed out due to lower energy requirements. The per kWh effect was estimated to be 0.0115 cents per kWh. The capacity market price effect results from reduction in the price of capacity due to reduced demand. The effect, derived from the New York Independent System Operator Demand Curve, was estimated to be approximately $600 per kW-year for each kW reduction in the Con Edison Service area. For "Rest of State," the capacity cost reduction was estimated to be approximately $180 per kW-year for each kW reduction. The cost estimates were weighted by region, resulting in a cost of $277 per kW-year.

Benefit cost ratios for deployment programs are shown in Table 2-12 and are reported in a manner that is consistent with all past annual evaluation status reports. Two different tests were used to calculate B/C ratios:

1. Total Market Effects Test (TMET) compares quantifiable life-cycle benefits from program participants and spillover effects against both NYSERDA and customer costs incurred in achieving those benefits.

2. Program-Efficiency Test (PET) compares the same quantifiable life-cycle benefits against only NYSERDA's costs. This test can also be called the program administrator test.

Scenario 1 includes only resource benefits. Scenario 2 adds non-energy impacts to Scenario 1. Scenario 3 adds market price effects to Scenario 2. Scenario 4 adds macroeconomic impacts to Scenario 3.

Table 2-12. Benefit Cost Ratios for the New York Energy $mart[SM] Portfolio

	Resource Benefits (Scenario 1)	Plus Non-Energy Impacts (Scenario 2)	Plus Price Effects (Scenario 3)	Plus Macroeconomic Impacts (Scenario 4)
Total Market Effects Test[1]	2.4	3.1	3.2	3.3
Program Efficiency Test	8.8	11.4	11.9	12.4

[1] The method of estimating measure costs for retrofit/early replacement programs was modified in this year's analysis resulting in higher measure costs, and therefore, lower benefit cost ratios for the total market effects test.

2.3 Portfolio Process Evaluation

2.3.1 Solicitations Released

During 2006, 49 solicitations were issued to competitively select contractors for program design and implementation services. In total, 461 proposals were received, 164 (36%) of which were approved for funding. Information on solicitations released in 2006 is shown in Table 2-13.

Table 2-13. Solicitations Released Through Year-End 2006[1]

Solicitation Number	Solicitation Name	Solicitation Release Date	Solicitation Closing Date
PON 949	Renewable Energy Business Development	2/13/06	5/3/06
PON 954	Energy Efficient Displays and Digital Signage	2/6/06	3/21/06
PON 998	Industrial Process and Productivity Improvement	4/3/06	6/8/06
PON 998A	Industrial Process and Productivity Improvement	4/3/06	10/5/06
PON 955	Peak Load Reduction Program	1/2/06	6/30/06
RFP 958	Contractor Services for Establishing NYS Appliance Standards	1/23/06	2/16/06
PON 984	Commercial/Industrial Performance Program	1/30/06	6/30/06
PON 1042	Power Systems Technologies	6/19/06	8/22/06
PON 1043	Distributed Generation as Combined Heat and Power	6/19/06	8/22/06
RFP 1032	Reference Design Guidebook	6/5/06	7/13/06
PON 989	Consumer Education Through Local TV	4/7/06	5/30/06

Solicitation Number	Solicitation Name	Solicitation Release Date	Solicitation Closing Date
RFP 1026	General Awareness and Education	5/1/06	6/12/06
PON 996	EMEP Outreach Assistance	4/24/06	5/24/06
PON 1001	Synthesis of Electricity Generation Impacts to Wildlife	4/10/06	5/4/06
PON 1035	New Construction Program Incentives	5/29/06	3/31/07
PON 1045	Technical Assistance	5/22/06	11/30/06
RFP 1030	New York Energy $mart Energy Audit Program	6/26/06	8/16/06
RFP 986	Marketing Strategy, Planning, Partner Support and PR	5/15/06	7/5/06
RFP 1011	Program Implementer for Multifamily Building Performance Program	5/22/06	6/22/06
PON 1031	Advanced Sensors & Controls for Energy Management, Power Quality, & Electricity System Reliability	7/31/06	9/25/06
PON 1040	Waste & Wastewater Technologies	8/7/006	10/3/06
PON 1062	Advanced Building Envelopes and Energy Systems	8/23/06	10/18/06
PON 1079	Daylighting Technical Consulting, Training, and Demonstration	9/18/06	11/13/06
PON 1087	Heating and Cooling	9/11/06	11/9/06
RFP 1057	New Construction Program Technical Assistance and Support Services	9/18/06	10/16/06
RFP 1007	Low Income Forum on Energy Implementation Support	7/3/06	8/9/06
RFP 1020	Products Program	7/10/06	8/23/06
RFP 1017	Homes Implementation	8/11/06	9/13/06
RFP 988	Hotline and Fulfillment	9/4/06	10/11/06
RFP 1005	Quality Assurance Services for NYSERDA Residential Programs	9/18/06	10/26/06
RFP 1012	New York Energy $mart℠ Communities Services and Support Contractor	9/18/06	11/1/06
RFP 1061	New York Energy $mart℠ Impact Assessment	8/7/06	9/5/06
RFP 1063	Process Assessment and Evaluation Management for the New York Energy $mart℠ Program	8/7/06	9/6/06
RFP 1065	Market Characterization and Assessment Evaluation Contractor for the New York Energy $mart℠ Program	8/7/06	9/7/06
RFP 1086	Data Collection Contractor for the New York Energy $mart℠ Program	9/25/06	10/19/06
PON 1085	Solar Thermal Evaluation	11/20/06	2/5/07
PON 1105	Next Generation Emerging Technologies	11/6/06	1/22/07
PON 1105A	Next Generation Emerging Technologies	11/6/06	6/7/07
RFP 1068	Lighting Incubator	11/13/06	1/25/07
RFP 1111	Natural Gas & Petroleum Exploration, Production, Efficiency, and Emissions Reduction	11/13/06	12/28/06
RFP 1111A	Natural Gas & Petroleum Exploration, Production, Efficiency, and	11/13/06	8/7/07

Solicitation Number	Solicitation Name	Solicitation Release Date	Solicitation Closing Date
	Emissions Reduction		
PON 1097	Peak Load Reduction Program	10/30/06	3/31/08
PON 1101	Enhanced Commercial/Industrial Performance Program	11/20/06	3/31/07
RFP 1051	Flexible Technical Assistance	10/30/06	12/11/06
RFP 1046	Technical Assistance	12/11/07	5/31/07
PON 1110	NYC Marketing & Education Through Local TV	11/13/06	12/21/06
RFP 1114	**New York Energy $mart^{SM}** Communities Program	11/13/06	1/8/07
RFP 980	Outreach and Training Support for **New York Energy $mart^{SM}** Loan Fund in Con Edison Service Territory	12/25/06	2/7/07
PON 1122	Innovation in Lighting: New Products, Demonstrations, and Testing	12/18/06	2/26/07

[1] Requests for Proposals (RFPs) are solicitations used for identifying and procuring projects that represent a specific area of interest and include a statement of work with a high degree of specificity describing the work contemplated and the evaluation criteria to be used. A single award with no cost-sharing is usually the norm. Program Opportunity Notices (PONs) are solicitations used for identifying and procuring projects that demonstrate technical, economic, and environmental characteristics in particular technology areas. Multiple awards are usually made and cost-sharing is the norm.

2.3.2 Evaluation Review and Recommendations

This summary, developed by the Research Into Action Process Evaluation team, presents a review of the evaluation process from June 2003 through October 2006.

Study Purpose

The purpose of the study was to assess the results of the evaluation work from the perspective of its execution and outcomes in the context of how it was envisioned and planned. Questions that were addressed included:

- Was the evaluation process effectively created?
- Did it have the outcomes intended (including building evaluation capacity, greater integration of evaluation into program processes, and meeting stakeholder requirements)?
- Was the evaluation model an effective one and should it be changed or revised?

In addition to addressing these questions, this review provides feedback to NYSERDA and the SBC Advisory Group as they work with contractors in the next phase of evaluation work to be undertaken. The study also provides insights for the larger evaluation community interested in assessing the most appropriate ways to evaluate such comprehensive, market-oriented programs like the **New York Energy $mart^{SM}** portfolio.

Methodology

To address all of these research issues, the process evaluation team has undertaken two cycles of data collection. The first occurred in 2005 and included 30 interviews with NYSERDA's senior management, the Energy Analysis evaluation team, and program staffs. The interviews addressed the history of the evaluation effort, its implementation, and responses to the evaluation work done to date. The second

round of data collection, leading to the results summarized in this report, occurred in 2006. Twenty-nine individual and four group interviews were conducted with NYSERDA's Energy Analysis evaluation team and program staff members, as well as with the specialty evaluation contractors and members of the SBC Advisory Group that oversees the independent evaluation effort.

Three cycles of independent, third-party monitoring and evaluation reporting on **New York Energy $mart**[SM] programs have been completed during the period assessed (these three evaluation cycles concluded in 2004, 2005 and 2006), with each cycle resulting in recommendations for improvements in the programs. The interviewers asked NYSERDA staff to reflect on these cycles and the types of evaluation efforts conducted in each, and asked program staffs to assess the degree to which they had taken action in response to the recommendations of evaluators. The review of recommendations also asked staff members to identify the reasons for their actions or inaction. A total of 174 recommendations were reviewed for the first two evaluation cycles, and 93 were reviewed for the third cycle.

Finally, to place the results of the evaluation review in context of wider practices for using evaluation in large organizations, the process evaluation team conducted a review of the literature across a wide range of fields. The goal was to provide an overview of how other energy efficiency entities and other large organizations use evaluation findings in planning, program design, and program implementation.

Summary of Results

These results are viewed in terms of NYSERDA's unique approach to evaluation. With a budget ranging from less than 0.5% to 2% for evaluation during the SBC funding cycles, NYSERDA implemented an evaluation model using teams of specialty contractors to conduct crosscutting evaluations of multiple programs. NYSERDA's evaluation structure was intended to provide independent evaluation at many levels, with the goal of aggregation to the portfolio level. This focus on the portfolio level as the ultimate evaluation objective is driven by the reporting requirements of the PSC.

While the first year of the evaluation was especially challenging for program staffs, the Energy Analysis evaluation team, and the specialty evaluation contractors, significant improvement was reported over the three years. By year three, increased evaluation capacity was seen in the improved knowledge and skills of the Energy Analysis evaluation team, and in program staffs' more positive views of evaluation's use in program planning and implementation, as well as in greater communication with the Energy Analysis evaluation team. Further evidence of increased evaluation capacity is seen in the SBC Advisory Group's reported greater clarity of its role in the evaluation, and in the specialty contractors' reports of greater knowledge of the programs and processes.

Use of the evaluation findings has also increased over the three years, with both program staff and the Energy Analysis evaluation team reporting increased awareness of evaluation in program planning and solicitation processes. While some program staff indicate they do not use the evaluation findings, others report using the findings to change programs, improve data collection or recording, prepare public presentations, and for program marketing. Reported consideration of, or action on the recommendations resulting from the evaluations has also increased. In the earlier evaluation cycles, some action was reported on less than 50% of the recommendations; in the most recent cycle, this number had risen to 67%. While action on 100% of the recommendations is not expected, this increase may be due in part to: improvements on the part of the contractors (recommendations that reflect better knowledge of programs and are more realistic in context); program staffs' increased involvement in setting the research agenda and thus producing recommendations more closely related to timely programmatic issues; and/or some positive response bias as program staff, in this second round of interviews, perceived it important to indicate action was being taken. Also, it is important to note that NYSERDA staff have been quick to address many issues identified in the various evaluation contractor team reports – often before the draft

reports were even finalized. The Public Service Commission, Department of Public Service staff, and the SBC Advisory Group are also key users of the evaluation findings.

Reporting processes, initially characterized as disjointed and time-consuming (specifically in preparation of the annual report), have improved over the three evaluation cycles. The SBC Advisory Group expressed high levels of satisfaction with both the evaluation process and its outcomes, including reports.

Based on the findings of this review, there is clear indication that NYSERDA has achieved many of its goals for the evaluation effort and there has been definite improvement in both process and outcomes from year one of the assessment period to year three. However, there are still pockets of resistance among program staff members, including lingering views of the evaluation process as not meeting their needs or not adequately measuring their programs under consideration. Unrealistic expectations on the part of program staff, as well as conflicting, multiple objectives with a highly constrained evaluation budget likely contribute to this resistance. Also, there is inconsistent support among managers for evaluation and unclear expectations among some staff members regarding the recommendations they receive from the evaluation reports. All of these factors indicate that there is still room to continue the improvements already seen over the last three years by continued effort to foster a culture that recognizes the value and relevance of evaluation for program planning and implementation. The recommendations below are intended to address some of the residual effects of the first three years of the current evaluation model (especially from the first year) and to assist NYSERDA in continuing its path of improving the process and outcomes of the evaluation.

Recommendations

- Consider development of a theory and logic model for the evaluation. Program staff, as well as specialty and oversight evaluation contractors, identified the need for a clearly articulated evaluation plan. The literature review also points to the necessity of a clearly articulated vision for process and outcomes. As part of the March 2006 Amended SBC III Operating Plan, a vision was articulated, but a specific plan has not been developed, rather it is to be developed with the evaluation contractors. Development of a well-defined plan for process and outcomes will reduce uncertainty about evaluation expectations for all stakeholders and make transparent the balance between evaluation for program improvement and evaluation for stakeholder accountability in developing the goals and tasks. In this process, the following should be addressed:

    - Define the portfolio evaluation goals

    - Define the portfolio tasks and approach

    - Define tasks at the program and sector levels

- Once a theory and logic model has been developed for the evaluation, the resulting plan should be clearly communicated at all levels of the organization. General communication of an evaluation plan could greatly reduce the uncertainty and discomfort felt by all involved in the effort. Key elements of the plan to be communicated include:

    - Expectations of the Energy Analysis evaluation team, program staff, and contractors in the model

    - Expectations for how recommendations from the evaluation are to be used

- As part of the overall evaluation plan, a discussion of potential products resulting from the evaluation should occur. This process should involve program staff and other stakeholders in identifying all audiences for the evaluation findings, resulting in a plan for dissemination approaches to meet the range of audiences identified. Communication of evaluation results has so far focused largely on meeting stakeholder requirements and the products have successfully met these requirements. There are many other audiences for the evaluation results, including potential program participants, the general public, and other energy professionals.

- As part of a review of roles, NYSERDA should continue to examine the skills needed for their model of evaluation and ensure that Energy Analysis evaluation team members have the skills and direction to serve the roles defined for them. NYSERDA has continued to build evaluation knowledge and skills in the Energy Analysis evaluation team and program staff report that they are more often working with the team early in their program planning and solicitation processes. Some additional skills and knowledge are needed to ensure that capacity building continues within the Energy Analysis team and that the team members can then continue to help build capacity throughout the organization.

3

Commercial/Industrial Programs

3.1 Overview of Commercial/Industrial Programs

New York's commercial and industrial sectors account for nearly 50 percent of the State's primary energy use and have a significant impact on the State's economy, environment, and demand for electricity. NYSERDA's programs target commercial and industrial sectors, covering new and existing schools, hospitals, office buildings, government buildings, commercial establishments, not-for-profit facilities and industrial plants. The Energy Efficiency, Peak Load Management, and Outreach and Education programs promote competitive markets for energy efficiency services, engender widespread adoption of high-efficiency technologies, and result in increasing customer participation in peak demand response initiatives.

A number of the programs have been specifically designed for electric resource acquisition. Deployment programs offering technical assistance and financial incentives are also part of the program portfolio. NYSERDA helps the energy service companies (ESCOs) and curtailment service providers to incorporate real-time pricing opportunities into their business models. To help improve the reliability of the State's electric system, the programs include aggressive electric-system and peak-load reduction initiatives. These initiatives reduce the risk of energy supply disruptions and price volatility by implementing long-term energy efficiency improvements that have impact during system peaks and by improving load management capabilities of commercial and industrial facilities.

Market intervention and development strategies for commercial and industrial customers are designed to induce lasting structural and behavioral changes in the marketplace that result in increasing adoption of energy-efficient technologies and practices. Long-lasting, sustainable changes are achieved by reducing barriers to adoption of energy efficiency measures to the point where further public-funded interventions are no longer appropriate. Market development initiatives, including financial incentives for increasingly efficient products, increase the availability, promotion, retail stocking practices, and sales of energy-efficient products and services in end-use markets and sectors by changing the behavior of upstream market participants, including retailers, dealers, vendors, distributors, contractors, installers, trade associations, and manufacturers.

Specific program offerings are briefly described below:

Peak Load Management Program. The Peak Load Management Program (PLMP) works to improve New York's energy system reliability and security by reducing energy demand. Formerly known as the Peak Load Reduction Program (PLRP), in 2006 the program was renamed to reflect an increasing focus on enhanced building automation and dynamic retail pricing strategies. PLMP encourages measures for

demand management by offering financial incentives to allow participation in dynamic retail pricing, commodity purchase, and managing financial risk. The program provides incentives for equipment and technical solutions that enable significant demand reduction (MW) resources and requires participation in New York Independent System Operator demand response programs. In addition the incentives for load curtailment and shifting (LC/S), distributed generation (DG), and interval meters (IM), are also given for permanent demand reductions that are coincident with the electric system peak.

Enhanced Commercial/Industrial Performance Program. The Enhanced Commercial and Industrial Performance Program (ECIPP) serves commercial and industrial businesses, healthcare facilities, and State and local governments. It provides information and incentives to improve existing building loads, non-building loads, and process equipment. Building off the successful Commercial and Industrial Performance Program (CIPP) and Smart Equipment Choices (SEC), ECIPP is a consolidation of the two programs that simplifies customer access to incentives by having a single point of entry into NYSERDA and by providing to customers a streamlined and simplified process to the marketplace. ECIPP has three tiers of incentives, and adds a custom project incentive path serving industrial process opportunities, system approaches, and unique applications. Allowing customers, ESCOs, and contractors access to multiple incentive strategies to support their energy projects will enable the New York ESCO community to continue to grow the market for energy efficiency in existing buildings, process equipment and non-building leads.

New York Energy $mart^{SM} Business Partners. The **New York Energy $mart^{SM}** Business Partners Program is a consolidation of the Small Commercial Lighting Program (SCLP), Premium Efficiency Motors (PEM) Program, the Commercial HVAC Program, and the Innovative Opportunities Program. This new program focuses on market development. **New York Energy $mart^{SM}** business partners are allies that agree to work with NYSERDA to promote energy-efficient products and services. In exchange, business partners gain access to special training, tools, guidelines, and performance incentives. NYSERDA works with its business partners to help them differentiate their business in a highly competitive marketplace, while assuring that appropriate quality control mechanisms are in place. The strategy of partnering with businesses helps to strengthen the market infrastructure leading to increased energy-efficient product and service availability and demand. Thus, business partner efforts will also help to increase activity in NYSERDA's customer-targeted programs.

New York Energy $mart^{SM} Loan Fund and Financing Program. The **New York Energy $mart^{SM}** Loan Fund and Financing Program expands the availability of low-interest capital to help implement energy-efficiency projects and process improvements. Lenders enroll in the program by signing participation agreements and agreeing to reduce the interest rates on energy-related loans in exchange for a lump sum subsidy paid by NYSERDA. The Program's ongoing training of the financial sector includes tools to allow lenders to calculate the cash flow advantages their customers will gain from making energy-efficiency improvements. While the Loan Fund has met the needs of customers who do not avail themselves of other NYSERDA programs, the reduced-interest financing will also continue to be available to program participants.

Energy Smart Focus Program. Energy Smart Focus provides services to facilitate and encourage sector-specific energy efficiency improvements and practices. The program is a marketing and information transfer effort that will use existing core **New York Energy $mart^{SM}** programs and services to sponsor deployment, demonstration, research, and development projects in conjunction with sector customized strategies. Such strategies include benchmarking, targeted marketing materials and messages, training, partnerships with trade associations, and integration with regional and national efforts.

High Performance New Buildings Program. The High Performance New Buildings Program (formerly operating as the New Construction Program) was established to encourage energy-efficient design and

building practices among architects and engineers and to urge them to inform building owners about the long-term advantages of building to higher energy efficiency standards. The program aims to create long-term changes in design practices by integrating energy efficiency and green building concepts into new building designs. The program offers a performance-based approach in which incentives are determined by total electricity savings and are tiered to reward progressively better designs. Through design team incentives and recognition, the program promotes green building projects and projects planned for Leadership in Energy and Environmental Design (LEED) certification.

FlexTech Technical Assistance Program. The FlexTech Technical Assistance Program is a consolidation of services previously offered under the FlexTech, Technical Assistance, and the Energy Audit Programs. The Program provides customers with objective and customized information to facilitate wiser energy efficiency, energy procurement, and financing decisions. The Program is available to all commercial and industrial customers. Cost-shared technical assistance is provided for detailed energy efficiency studies from energy engineers and experts. Small customers are eligible for quick walk-through energy audits, with the cost share reimbursed upon implementation of recommendations. Participants may use NYSERDA-contracted or customer-selected consultants.

3.2 Commercial/Industrial Evaluation Activities

The Commercial/Industrial (C/I) program evaluation activities conducted in the past year are shown in Table 3-1. The table includes only new evaluation activities conducted in 2006. However, findings from earlier evaluations are also discussed in Section 3 to the extent that they contribute to the cumulative assessment of these programs.

Table 3-1. 2006 C/I Program Evaluation Activities

Program Name	Predecessor Program (if applicable)	Theory & Logic	Measurement and Verification (M&V)	Market Characteriza-tion, Assessment and Causality (MCAC)	Process Evaluation
Peak Load Management	Peak Load Reduction Program (PLRP) Enabling Technology	-	Database review	-	-
Enhanced Commercial and Industrial Performance Program	C/I Performance Program (CIPP) Smart Equipment Choices (SEC)	-	Database review	Update	-
New York Energy $mart[SM] Business Partners Program	Premium-Efficiency Motors Commercial HVAC Small Commercial Lighting (SCLP) Innovative Opportunities	-	Database review for SCLP Motor management implementation rate	-	-
New York Energy $mart[SM] Loan Fund and Financing	**New York Energy $mart**[SM] Loan Fund	-	-	-	-

Program Name	Predecessor Program (if applicable)	Theory & Logic	Measurement and Verification (M&V)	Market Characterization, Assessment and Causality (MCAC)	Process Evaluation
New York Energy $mart[SM] Focus	Energy Smart Schools Program	-	-	-	-
High Performance New Buildings	New Construction Program	Full	Database review	Update	Update
Flex Tech Technical Assistance	Technical Assistance, FlexTech, & Energy Audit Programs	Full	Update	Update	-

3.3 Key Commercial/Industrial Evaluation Findings

Significant progress is being made as the C/I portfolio transitions to the new, streamlined set of programs. This section summarizes key evaluation findings from the latest set of evaluation activities, and from the cumulative body of work conducted by NYSERDA and its evaluation contractors over the past several years.

3.3.1 Energy, Peak Demand and Fuel Savings

NYSERDA's Measurement and Verification (M&V) contractor assessed the energy and peak demand savings reported for the C/I programs. Methods used in this assessment included on-site verification of equipment installation and functionality, and review of NYSERDA's files for reasonableness and accuracy of recorded energy and demand savings. Based on this review, the M&V contractor adjusted the savings reported by NYSERDA. In turn, the MCAC contractor further adjusted these figures to account for freeridership and spillover. Tables 3-2 through 3-4 summarize the estimated electricity savings, peak demand reduction and other fuel savings for each of the C/I sector programs. Note that individual program savings are not adjusted for program overlaps. To avoid double counting in the total, sector-level savings estimate, the amount of overlap among the individual program savings estimates is subtracted at the bottom of the table.

As reported earlier in Section 2, overall, NYSERDA's M&V and MCAC contractor teams have found that savings for the C/I sector should be adjusted as follows:

- Electricity savings were adjusted downward by 4%.
- Peak demand savings were adjusted downward by 5%.
- Other fuel savings were adjusted upward by 14%.

These adjustments include changes in program reported savings due to database reviews and field work to measure and verify savings, as well as survey research and other activities to quantify freeridership and spillover. For most of the largest energy-saving programs (including ECIPP, High Performance New Buildings, and FlexTech Technical Assistance) spillover outweighs any freeridership that is occurring.

Several near-term goals were set for the first year of the third **New York Energy $mart**[SM] Program funding cycle. These goals established levels to reach, by June 30, 2007, for energy and peak demand savings as well as several other key metrics of program success. Overall, the C/I portfolio is performing well in terms of the energy savings and peak demand reduction goals. In the first six months of the one-year measurement period, the C/I portfolio has exceeded its goal for energy savings (123%) and reached the half-way point (47%) for the peak demand reduction goal. Table 3-2 shows progress for each applicable program toward the one-year goal for electricity savings. Table 3-3 shows progress for each program toward the one-year goal for peak demand reductions. There was no goal for other fuel savings.

Table 3-2. C/I Program Electricity Savings through December 31, 2006 and Progress toward One-Year Goal

Program	Energy Savings (GWh)			
	Savings Achieved through		One-Year Goal through June 30, 2007	Progress Toward One-Year Goal (% achieved)
	June 30, 2006	Dec. 31, 2006		
Peak Load Management: Permanent	96.5	118.0	19.0	113%
(ConEdison)	(74.9)	(77.9)	(9.0)	(33%)
Enhanced Commercial and Industrial Performance Program	730.6	836.3	24.0	440%
(ConEdison)	(224.1)	(241.7)	(n/a)	(n/a)
Business Partners Program	54.1	60.7a	10.0	65%
(ConEdison)	(4.3)	(6.1)a	(n/a)	(n/a)
Loan Fund and Financing	49.6	51.3	n/a	n/a
(ConEdison)	(0.5)	(9.8)	(n/a)	(n/a)
Focus Program	0	0	5.0	0%
(ConEdison)	(0)	(0)	(n/a)	(n/a)
High Performance New Buildings	223.2	250.3	35	78%
(ConEdison)	(48.2)	(54.1)	(n/a)	(n/a)
Flex Tech Technical Assistance	644.1	697.6	70	76%
(ConEdison)	(115.2)	(124.8)	(n/a)	(n/a)
Overlap Removed	**126.7**	**141.9**	**n/a**	**n/a**
ConEdison C/I Total	**467.3**	**514.4**	**n/a**	**n/a**
Statewide C/I Total	**1,671.5**	**1,872.2**	**163.0**	**123%**

Note: n/a means not applicable (*i.e.*, a goal has not been set for this program).

a Savings for the Commercial HVAC portion of the program have been reduced as of 4th Quarter 2006. This approach was taken due to the known short-term nature of savings from advanced diagnostics and commissioning, which were part of the program.

Table 3-3. C/I Program Peak Demand Savings through December 31, 2006 and Progress toward One-Year Goal

Program	Peak Demand Reductions (MW)			
	Savings Achieved through		One-Year Goal through June 30, 2007	Progress Toward One-Year Goal (% achieved)
	June 30, 2006	Dec. 31, 2006		
Peak Load Management: Callable (ConEdison)	461 (203.3)	470.5 (217.6)	53 (28)	18% (51%)
Peak Load Management: Permanent (ConEdison)	44.7 (31.1)	54.5 (38.3)	13 (8.0)	75% (90%)
Enhanced Commercial and Industrial Performance Program (ConEdison)	132.5 (54.7)	142.0 (58.8)	12.0 (n/a)	79% (n/a)
Business Partners Program (ConEdison)	11.8 (1.0)	13.3 (1.2)	2.5 (n/a)	59% (n/a)
Loan Fund and Financing (ConEdison)	14.3 (0.5)	15.0 (1.5)	n/a (n/a)	n/a (n/a)
Focus Program (ConEdison)	0 (0)	0 (0)	1.0 (n/a)	0% (n/a)
High Performance New Buildings (ConEdison)	45.5 (15.9)	53.5 (18.8)	4.0 (n/a)	201% (n/a)
Flex Tech Technical Assistance (ConEdison)	120.9 (30.6)	130.0 (20.5)	14.0 (n/a)	65% (n/a)
Flex Tech Technical Assistance: Callable	10.2	10.2	n/a	n/a
Overlap Removed	**24.5**	**26.1**	**n/a**	**n/a**
ConEdison C/I Total	**337.1**	**356.6**	**n/a**	**n/a**
Statewide C/I Total	**816.5**	**862.9**	**99.5**	**51%**

Note: n/a means not applicable (*i.e.*, a goal has not been set for this program).

Table 3-4. C/I Program Fuel Savings through December 31, 2006

Program	Fuel Savings (MMBtu)	
	Savings Achieved through	
	June 30, 2006	Dec. 31, 2006
Enhanced Commercial and Industrial Performance Program (ConEdison)	3,252 (495)	4,615 (703)
Loan Fund and Financing (ConEdison)	137,239 (4,941)	139,621 (7,966)
Flex Tech Technical Assistance[1] (ConEdison)	3,164,000 (800,846)	2,864,903 (725,141)
ConEdison C/I Total	**806,282**	**733,810**
Statewide C/I Total	**3,304,491**	**3,009,140**

Note: There were no one-year goals for fuel savings.

[1] The methodology to assess impacts focuses on developing samples based on electricity savings, rather than fuel, resulting in a less than optimal sample for fuel-savings projects and fluctuation over time in the impacts.

3.3.2 Summary of Other Key Program Impacts

Across the programs, twelve additional logic model-driven near-term goals were set for other key metrics besides energy savings such as the number of customers receiving assistance, funds leveraged, allies participating, and percentage of target markets affected by programs. Overall, the programs are also performing well with respect to these other goals. In fact, two of the goals have already been exceeded. The results of each program's progress toward its stated goals are shown in table format in the subsequent sections.

Other key findings from studies of participants, non-participants and other market actors include the following:

- Participant surveys found that NYSERDA programs are being cited more often as an important factor in the decision to install energy efficiency measures and equipment in C/I facilities. Respondents are citing NYSERDA unaided, making these findings especially significant.
- End-use customers continue to gain more experience, education, and trust in energy efficiency measures, equipment, and services. Historically, these were lacking among end-use customers and were often cited as reasons for not taking action on energy-efficient purchases or services.
- Even customers who have not participated directly in NYSERDA program offerings have shown increasing levels of familiarity with energy-efficient measures and equipment.
- Surveys indicate high levels of awareness of **New York Energy $mart**^{SM} C/I Programs, with 88% of end-use customers and 81% of contractors reporting awareness of at least one program offering.
- Respondents were more familiar with NYSERDA programs in general, and were less aware of specific program offerings. This indicates that NYSERDA is achieving a greater degree of brand recognition than are the numerous individual program names.

- Survey results indicate that NYSERDA is becoming a trusted source for information and support in the adoption of energy-efficient practices. Respondents report that NYSERDA brings credibility to the various services offered through its programs and contractors. This year's evaluations of the Technical Assistance and Commercial/Industrial Performance Programs reaffirmed NYSERDA's trust and credibility in the market.

- Survey results for key C/I programs indicate that end use customers and contractors credit the programs with having an impact on decision making regarding incorporation of high-efficiency measures.

- C/I customers who participated in **New York Energy $mart**[SM] programs expressed high satisfaction levels of 80%-90% with project results. This suggests that they are likely to continue working with NYSERDA in the marketplace to improve efficiency.

- Process evaluation surveys and interviews indicate that the New Construction Program (NCP) compares favorably to other new construction programs on most process elements examined. Findings also suggest the NCP could increase savings "per building" and encourage market transformation by placing even greater emphasis on personal outreach to the design community and upon its whole building and LEED® certification components.

3.4 Peak Load Management Program

3.4.1 Program Description

The main goal of the Peak Load Management Program (PLMP) is to improve New York's energy system reliability and security by reducing energy demand. Formerly known as the Peak Load Reduction Program (PLRP), in 2006 the program was renamed to reflect the program's increasing focus on enhanced building automation and dynamic retail pricing strategies.

PLMP encourages measures for demand management by offering financial incentives to allow participation in dynamic retail pricing, commodity purchase, and managing financial risk. The program provides incentives for equipment and technical solutions that enable significant demand reduction (MW) resources and requires participation in NYISO demand response programs. In addition the incentives for load curtailment and shifting (LC/S) and distributed generation for Demand Response (DR), and interval meter (IM), incentives are also given for permanent demand reductions that are coincident with the system peak.

PLMP targets commercial, industrial, and institutional customers and mission critical facilities such as data centers, communications facilities, government locations, and academic research facilities that are interested in participating in reliability and dynamic pricing. The program is offered statewide, with marketing emphasis in areas of demonstrated need, *e.g.*, where electricity demand is growing and where local power needs are nearing capacity.

The 13-year program budget is $82.7 million.

3.4.2 Recent Program Accomplishments

Two near-term, annual goals have been set for the PLMP. These goals and progress for the first six months are shown in Table 3-5.

Table 3-5. Peak Load Management Program – Near-Term Goals and Achievements

Activity	Program Goals (July 1, 2006 through June 30, 2007)	Achieved July 1, 2006 through December 31, 2006
Customers receiving assistance	145	47
Demand reductions (MW)	66	8.5

In November 8-9, 2006, NYSERDA sponsored the Peak Load Management Association's Fall 2006 conference focusing on demand response technologies, services, and practices. Conference attendees included representatives of international and regional Independent System Operators, New York utilities, demand response providers, and large energy users.

3.4.3 Long-Term Program Accomplishments

This section highlights key indicators of market progress. All values reported are cumulative since program inception. Table 3-6 presents a sample of key logic model-driven indicators of program success, as tracked by the evaluation and program activities. An earlier study assessed market indicators for other elements of the Peak Load Reduction Program (including Load Curtailment/Shifting, Dispatchable Emergency Generation Initiative, and Permanent Demand Reduction Efforts). These earlier findings were presented in the May 2004 ***New York Energy $mart^{SM}*** *Program Evaluation and Status Report* (Volume 2).

Table 3-6. PLMP – Key Market Indicators and Program Cumulative Progress

Topic	Indicator	Value (2004)
Awareness and Knowledge	Change in awareness of demand response, the NYSERDA and NYISO programs, and related benefits	IM providers felt 88% of participating customers were slightly or somewhat familiar with IM and IM services 77% of IM providers felt their familiarity with IM and IM services had increased in the past five years
	Change in knowledge of the benefits of demand response for NYSERDA and NYISO programs	67% of IM providers felt customer awareness of the capabilities and benefits of IM and IM services had increased significantly or somewhat over the past five years
Availability of Services	Increase in services and availability	IM providers and PLRP staff felt there was a modest increase in IM and IM services
Change in Practices	Change in behavior	29% of IM participants made equipment changes, and 43% made operating changes after the installation of the IM equipment
	Change in participation in NYSERDA and NYISO programs	50% of IM participants said they were participating in the NYISO demand response program The IM program increased (from 14% to 50%) participation in NYISO demand response programs for IM program participants

3.4.4 Program Impact Evaluation

This section presents cumulative annual energy savings for the program from inception through December 31, 2006.

Gross Savings

The objective of the M&V evaluation review is to verify the estimate of the program's cumulative savings. Based on Nexant's review, as of December 31, 2006, the program has resulted in the energy savings and demand reductions shown in Table 3-7.

Net Savings

The final step to determining net energy savings is attribution analysis. Attribution analysis determines, through various methods, whether the gross savings estimate from the M&V activities should be adjusted downward or upward for freeridership or spillover. Adjustments for freeridership and spillover, and the ultimate program net-to-gross ratio and net savings are shown in Table 3-7.

Table 3-7. PLMP Cumulative Annual Energy and Peak Demand Savings (through December 2006)

	Program Reported Savings	M&V Realiza-tion rate	Adjusted Gross Savings	Freerider-ship	Spillover	Net-to-Gross Ratio[1]	Net Savings
LC/S & DEGI (Demand Response Measures) MW	242.4	1.02	247.2	24%	25%	0.95	234.9
PDRE (MW)	43.7	1.02	44.5	25%	37%	1.03	45.9
Cooling Recom-missoning (MW)	8.6	1.0	8.6	0%	0%	1.0	8.6
IM (MW)	245.7	0.88	216.2	10%	22%	1.09	235.7
Total MW	**540.3**	-	**516.5**	-	-	-	**525**
PDRE (MWh)	88,784	1.02	90,560	25%	37%	1.03	93,276
Cooling Recom-missoning (MWh)	24,700	1.0	24,700	0%	0%	1.0	24,700
Total MWh	**113,484**	-	**115,260**	-	-	-	**117,977**

[1] Net-to-Gross Ratio = (1-Freeridership) * (1+Spillover).

3.5 Enhanced Commercial and Industrial Performance Program

3.5.1 Program Description

The ECIPP serves commercial and industrial businesses, healthcare facilities, and state and local governments. It provides information and incentives to improve existing building loads, non-building loads, and process equipment. Building off the successful CIPP and SEC Program, ECIPP is a consolidation of the two programs that simplifies customer access to incentives by having a single point of entry into NYSERDA and by providing to customers a streamlined and simplified process to the marketplace.

When separate programs, CIPP and SEC focused on different customers. CIPP provided incentives to ESCOs and other contractors to promote energy efficiency-related capital improvement projects. NYSERDA provides financial incentives on a performance-basis through the ESCO's measurement and

verification activities. A main objective of the CIPP program was to help build a robust ESCO and energy efficiency service industry in New York. Overall ESCO activity in New York has increased during the past eight years. Recent evaluation studies report increased ESCO activity and improved quality of work and a significant increase in the familiarity of energy efficient products. The SEC program provided financial incentive awards to defray part of the incremental capital cost to purchase and install energy-efficient equipment. The goal of SEC was to produce permanent improvement in standard equipment specifications and drive cost-effective demand reduction by encouraging the purchase and installation of energy-efficient equipment, particularly for small renovation and equipment-replacement projects. Both CIPP and SEC achieved success in New York.

ECIPP has three tiers of incentives and adds a custom project incentive path serving industrial process opportunities, system approaches, and unique applications. It improves the performance-based incentive structure used in CIPP by adding increased incentives to better support permanent peak-demand-reduction measures. To help alleviate the growing electric load downstate, the ECIPP has an increased presence in New York City. Allowing customers, ESCOs, and contractors multiple incentive strategies to support their energy projects will enable the New York ESCO community to continue to grow that market. Customers have the option of using ESCOs or applying directly and receiving incentives from NYSERDA.

By providing a structured approach to the existing buildings market, NYSERDA can provide customers sustainable performance improvement strategies. With the single-entry point to ECIPP, NYSERDA can strengthen links to other **New York Energy $mart** efforts, such as Technical Assistance, Loan Fund and Financing, and Energy Smart Business Partners.

The thirteen-year program budget is $246.6 million.

3.5.2 Recent Program Accomplishments

Near-term, annual goals have been set for the ECIPP Program. These goals and progress for the first six months are shown in Table 3-8.

Table 3-8. Enhanced Commercial and Industrial Performance Program – Near-Term Goals and Achievements

Activity	Program Goals (July 1, 2006 through June 30, 2007)	Achieved July 1, 2006 through December 31, 2006
Leveraged Funds ($ million)	$80	$75.0 million for CIPP
Customer projects	680	353

3.5.3 Long-Term Program Accomplishments

This section highlights key program outputs and market progress. All values reported are cumulative since program inception. Table 3-9 presents the key outputs for ECIPP through December 31, 2006. Table 3-10 presents a sample of key logic model-driven indicators of program success, especially those related to market progress, as tracked by the evaluation and program activities. Together, these tables indicate the most important ways that program progress is being measured, and report how those values are changing due to program activities.

Table 3-9. Enhanced Commercial and Industrial Performance Program – Key Program Outputs

Output	Value (Cumulative through December 2006)
CIPP	
Number of CIPP applications received and approved	1,200
Number of projects completed	980 installed and 810 with completed M&V
Dollar value of incentives paid and total project cost	$83 million for incentives and $683 million in total project cost
SEC	
Number of SEC projects completed	3,244
Dollar value of incentives for completed projects	$8.6 million
Average project incentive	$2,640

Table 3-10. Enhanced Commercial and Industrial Performance Program – Key Market Indicators and Program Cumulative Progress

Topic	Indicator	Initial Value (year)
Awareness and Knowledge	Customer familiarity with energy-efficient measures and equipment	97% of participants (n=31) were extremely or somewhat familiar with energy-efficient measures and equipment compared to 68% of non-participants (n=120) (2004) 37% of participants (n=31) said their familiarity increased significantly during the past five years compared to 22% of non-participants (n=120) (2004)
	Customer becomes aware of CIPP	31% of participating end-use customers learned about CIPP through an ESCO or electrical contractor, followed by equipment vendors (9%) and program marketing materials (7%) (2006)
	Contractor (ESCO) familiarity with energy-efficient measures and equipment	80% of participants (n=46) were extremely familiar with energy efficiency measures, equipment, and services, compared to only 11% of non-participants (n=51) (2004) 46% of participants (n=46) believe their familiarity increased significantly in the past five years, compared to only 21% of non-participants (n=51) (2004)
Availability of Services	Customer and contractor perception of availability	55% of customers and 41% of ESCOs participating in CIPP said availability of energy efficiency measures is becoming less of a barrier (2004)
	Level and quality of ESCO activity in New York	Nearly half of the participating and non-participating contractors reporting higher ESCO activity and improved quality of work by ESCOs (2004)
Change in practices	Increased marketing and promotion of energy efficiency measures	More than 60% of participating ESCOs (n=46) were significantly or somewhat increasing their marketing of energy-efficient measures, compared to only 38% of the non-participant Contractor group (n=51) (2004)
Perceived Value to the Customer	Role of energy efficiency in decision making	74% of SEC participants said the role of energy efficiency in the selection of equipment has increased over the past five years compared to 65% of non-participants (2004)
	Satisfaction with energy efficiency measures	Nearly all SEC participants were either extremely (65%) or somewhat (31%) satisfied with the measures installed through the program (2004)
Decision-Making	Criteria for deciding to undertake a project	90% of respondents indicated that payback was considered as part of the decision-making process and as a “make or break” criterion (2006)
Market Penetration	CIPP market penetration in terms of total project cost	1999 – 2000 = ~1% 2001 - 2004 = ~2%

3.5.4 Program Impact Evaluation

This section presents cumulative annual energy savings for the program from inception through December 31, 2006. Savings estimates and adjustments are shown in Table 3-11.

Gross Savings

The objective of the M&V evaluation review is to verify the estimate of the program's cumulative savings. Based on Nexant's review, as of December 31, 2006, the program has resulted in the energy savings and demand reductions shown in Table 3-11.

Net Savings

The final step to determining net energy savings is attribution analysis. Attribution analysis determines, through various methods, whether the gross savings estimate from the M&V activities should be adjusted downward or upward for free ridership or spillover. Adjustments for free ridership and spillover, and the ultimate program net-to-gross ratio and net savings are shown in Table 3-11.

Table 3-11. ECIPP Cumulative Annual Energy and Peak Demand Savings (Through December 2006)

	Program Reported Savings	Realiza-tion Rate	Adjusted Gross Savings	Freerider-ship	Spillover	Net-to-Gross Ratio	Net Savings
Commercial/Industrial Performance Program							
MWh/year	724,649	1.01	731,900	31%	44%	1.04a	757,427
MW	157.2	0.77	121.0	31%	44%	1.04a	125.3
Smart Equipment Choices							
MWh/year	121,288	0.94	112,640	51%	45%	0.7b	78,848
MW On-Peak	25.5	0.93	23.9	51%	45%	0.7b	16.7
MMBtu/year	6,593	1.0	6,593	51%	45%	0.7b	4,615
Enhanced Commercial/Industrial Performance Program (ECIPP) - Total							
MWh/year	845,937	N/A	844,540	N/A	N/A	N/A	836,275
MW On-Peak	182.8	N/A	144.9	N/A	N/A	N/A	142.0
MMBtu/year	6,593	N/A	6,593	N/A	N/A	N/A	4,615

a Net-to-Gross Ratio = 1-Freeridership+Spillover (a weighted average of the NTG ratios estimated in the previous MCAC analysis and this current analysis is shown here).

b Net-to-Gross Ratio = (1-Freeridership) * (1+Spillover).

Non-Energy Impacts

The Summit Blue MCAC team evaluated non-energy impacts for both the CIPP and SEC programs. Key results are presented in Table 3-12. Non-energy impacts (NEIs) are expressed as a percentage of energy savings.

Table 3-12. ECIPP NEI Results

Results from Direct Query Approach (year of study)	Percentage of Energy Savings
Commercial/Industrial Performance Program (2005)	46%
Smart Equipment Choices Program (2004)	42-45%

3.6 New York Energy $mart[SM] Business Partners

3.6.1 Program Description

The **New York Energy $mart[SM]** Business Partners Program is a consolidation of four prior programs. These programs are described below.

- Small Commercial Lighting Program: Promoting effective, energy-efficient lighting - "The Right Light" - in commercial and industrial spaces up to 25,000 square feet by partnering with lighting practitioners. The program has provided training, field support, project incentives and demonstration awards to participating lighting practitioner allies, including contractors, distributors, manufacturer representatives, lighting designers, architects and engineers.

- Premium Efficiency Motors Program: Working with suppliers and providers of motors and motor repair services to promote sales of NEMA Premium® motors, quality motor repairs, and motor management services. Motor management includes motor assessments, planning for future repair and replacement, and consideration of drives. The Program has worked with vendors to present the case for a motor management program to their customers, to conduct motor assessments, and to facilitate implementation of motor management plans and policies whenever possible.

- Commercial HVAC Program: Program activities have focused in two areas. First, NYSERDA has provided training, workshops, outreach events, information and support to HVAC contractors, distributors and commercial building owners to increase the market share of energy-efficient unitary HVAC units and to work with market participants to become more successful in selling related energy-efficient products and maintenance services. Second, NYSERDA offered study incentives, conducted outreach meetings and provided technical training for service providers with a particular focus on the downstate metropolitan region surrounding New York City to increase demand for retro-commissioning (RCx) services in existing commercial buildings.

- Innovative Opportunities Program: Competitively selected projects on emerging and under-used technologies to increase market adoption and penetration. Past projects have focused on technologies such as light-emitting-diode-powered (LED) traffic signals, efficient commercial refrigeration equipment, ENERGY STAR® transformers, and computer power management.

New York Energy $mart[SM] business partners are allies who agree to work with NYSERDA to promote energy-efficient products and services. In exchange, business partners gain access to special training, tools, guidelines, and performance incentives. NYSERDA works with its business partners to help them differentiate their business in a highly competitive marketplace, while assuring that appropriate quality control mechanisms are in place. This involves creating a brand identity that conveys the theme that mid-market businesses are vital to the growth of the energy efficiency industry and important to the economy of the State.

The Business Partners Program activities, such as training, tools and field support, help improve the awareness of and familiarity with targeted technologies and services. The strategy of partnering with businesses helps to strengthen the market infrastructure leading to increased product and service availability and demand. Additionally, business partner efforts will also help to increase activity in NYSERDA's customer-targeted programs.

The thirteen-year program budget is $41.3 million.

3.6.2 Recent Program Accomplishments

Several near-term, annual goals have been set for the **New York Energy $mart[SM]** Business Partners Program. These goals and progress for the first six months are shown in Table 3-13. The former SCLP, PEM and Commercial HVAC programs have all built strong ally networks and encouraged mid-market actors to use customer incentives and other sales tools to maximize customer participation and project implementation.

Table 3-13. New York Energy $mart[SM] Business Partners Program – Near-Term Goals and Achievements

Activity	Program Goals (July 1, 2006 through June 30, 2007)	Achieved July 1, 2006 through December 31, 2006
Business Partners (signed up)	300	737
Demand Reductions (MW)	2.5	1.9
Energy Savings (GWh)	10	8.3

NYSERDA is in the process of developing solicitations to hire contractors to implement the various program elements. Other program highlights from the last six months include:

- NYSERDA's motor management activities have generated interest across the country. Program administrators at one California utility recently requested information on NYSERDA's program approach with the intent of possibly using NYSERDA's model for developing a new program.

- The Small Commercial Lighting Program launched its The Right Light[TM] marketing campaign to end users in Syracuse, the Capital District, and Westchester County.

- Under the power management program efforts, NYSERDA has worked with the New York Power Authority and the Vermont Energy Investment Corporation (VEIC) (contractor for LIPA) to assist them in launching Computer Power Management programs. This program is now a statewide effort.

- A major milestone was recently reached for the 80 PLUS power supply activities when HP—the world's largest PC vendor—announced that it plans to offer customers an 80 PLUS certified power supply option on its 7000 and 5000 Series of business PCs as early as January 2007. When the Program first launched in the fall of 2004, it had only one sponsor, one certified power supply and little interest from the major computer manufacturers in participating. Today, there are 87 power supplies from 22 manufacturers certified 80 PLUS. In addition to HP, there are 14 other participating computer manufacturers currently offering qualified computer models to customers. This is a direct result of the commitment by New York and other regions to support purchasing of 80 PLUS compliant products.

- Between July and December 2006, NYSERDA's Business Partners program implementation contractor conducted group information sessions on the **New York Energy $mart** Offices Project at four sites around the State that included 18 state universities, community colleges, and private colleges. From those group sessions, 11 colleges signed up to participate in the on-site data collection and analysis. In addition, three other colleges are participating in the 2006 program for a total of 14.

- Based on the success of the Capital District Commercial Kitchens pilot, the program was extended to the New York metropolitan market in early November 2006.

- In total 20 retro-commissioning projects were completed representing 10.5 million square feet, resulting in six projects submitted directly to the Technical Assistance Program, and an additional six projects funded under the Building Performance Program for full scale retro-commissioning investigation and implementation.

3.6.3 Long-Term Program Accomplishments

This section highlights key program outputs and market progress. All values reported are cumulative since program inception. Table 3-14 presents the key outputs for the program through December 31, 2006. Table 3-15 presents a sample of key logic model-driven indicators of program success, especially those related to market progress, as tracked by the evaluation and program activities. Together, these tables indicate the most important ways that program progress is being measured, and report how those values are changing due to program activities.

Table 3-14. New York Energy $martSM Business Partners Program – Key Program Outputs

Outputs	Value (Cumulative through December 2006)
Small Commercial Lighting	
Number of participating allies	711
Dollar value of incentives awarded	$454,525
Number of completed projects	695
Square footage of projects completed	5,354,746
Total persons trained on effective, energy-efficient lighting	1,496
Number of individuals at SCLP ally companies that have taken the National Council on Qualifications for Lighting Professions (NCQLP) certification exam	11
Premium-Efficiency Motors	
Number of motors incented under the former Premium-Efficiency Motor vendor incentive program	11,004
Number of participating vendors (vendors who have participated in at least one customer ride along visit)	26
Number of vendor motor management training sessions held and number of people attending training sessions	7 sessions with 26 attendees
Number of completed customer motor inventories using MotorMaster and number of motors inventoried	65 completed inventories representing 6,749 motors
Number of written motor management plans developed by customers	1
Commercial HVAC	
Number of participating vendors	26
Number of commissioning and retrocommissioning providers trained	289 Commissioning and 134 Retrocommissioning
Number of HVAC contractors and distributors trained	292 (93 DCV, 89 Advanced Diagnostics, 110 Spec and Sell)
Number of unitary HVAC RTUs tested with advanced diagnostics	1,240

Table 3-15. New York Energy $mart℠ Business Partners Program – Key Market Indicators and Program Cumulative Progress

Topic	Indicator	Value (2004 unless noted)
Small Commercial Lighting		
Awareness and Knowledge	Allies are aware of the benefits of effective-energy-efficient lighting	95% indicated that they were either "extremely familiar" or "somewhat familiar" with effective, energy-efficient lighting applications 74% of allies said their familiarity had either "increased significantly" or "increased somewhat" over the past two years Active allies were more likely than inactive allies to say familiarity increased (79% for active vs. 64% for inactive)
	Customer awareness of the benefits of effective-energy-efficient lighting	55% of allies reported that small commercial customers were either "extremely aware" or "somewhat aware" of the benefits 54% of allies indicated that small commercial customers' awareness of the benefits of effective, energy-efficient lighting applications had increased over the past two years, 42% indicated that customer awareness stayed the same
Market Share and Sales	Promotion by market actors of effective, energy-efficient lighting	55% of inactive trade ally survey respondents and 69% of the active allies indicated that their promotion had "increased significantly" or "increased somewhat" over the past two years
Premium-Efficiency Motors		
Awareness and Knowledge	Awareness of the NEMA Premium efficiency standard	57% of active participating vendors and 43% of inactive vendors were very familiar
	Increase in end-use customer familiarity with NEMA Premium efficiency standard	In 2004, 42% were extremely familiar or familiar (the percentage who were "extremely familiar" increased by 22 percentage points (to 27.8%) over the past two years) In 2005, 60% were extremely familiar
Availability of Services	Number of vendors actively promoting NEMA Premium motors	Nearly 66% of active participating vendors' sales staff informs customers of NEMA motors most or all of the time, while only 23% of inactive participating vendors do
	Stocking of NEMA Premium motors by participating vendors	40% of participating vendors said stock increased since joining the program
Market Share and Sales	Estimated sales of integral motors and NEMA Premium motors, and market share of NEMA Premium motors in New York	~67,700 total motors sold ~14,825 NEMA Premium motors sold ~22% market share NEMA Premium
Incremental Cost	Average price difference (per HP) between EPACT and NEMA motors	$12.91 (2004) $18.05 (2005)

Topic	Indicator	Value (2004 unless noted)
Commercial HVAC		
Awareness and Knowledge	Customer awareness of various HVAC applications (Contractor's view) *Percentage of respondents giving a 4 or 5 on a 5-point scale (5=extremely aware)*	Advanced Diagnostics = 0% Demand Control Ventilation =0% Dual-Enthalpy Economizers = 13% ENERGY STAR HVAC Equipment =16% Commissioning = 13% Retrocommissioning = 9%
	Change in customer awareness of various HVAC applications (Contractor's view) *Percentage of respondents giving a 4 or 5 on a 5-point scale (5=increased significantly)*	Advanced Diagnostics = 20% Demand Control Ventilation =41% Dual-Enthalpy Economizers = 9% ENERGY STAR HVAC Equipment =58% Commissioning = 57% Retrocommissioning = 74%
	Service provider familiarity with various HVAC applications *Across all types of providers, mean on a 1-to-5 scale (where 1=no/low awareness and 5=high awareness)*	Advanced Diagnostics = 3.77 Demand Control Ventilation = 4.01 Dual-Enthalpy Economizers = 3.89 ENERGY STAR HVAC Equipment = 4.18 Commissioning/Retrocommissioning = 3.17
	Change in service provider awareness of various HVAC applications *Across all types of providers, mean on a 1-to-5 scale (where 1=no change in the past two years and 5=significant change)*	Advanced Diagnostics = 3.62 Demand Control Ventilation = 3.77 Dual-Enthalpy Economizers = 3.37 ENERGY STAR HVAC Equipment = 3.86 Commissioning/Retrocommissioning = 3.53
Availability of Services	Increased market interest in HVAC services/applications	81% of program allies surveyed indicated that the market for their HVAC application had increased over the past two years
Market Share and Sales	Prevalence of commissioning in newly constructed facilities	Respondents indicate that 29% of newly constructed facilities are commissioned each year. This equates to approximately 21.3 million square feet commissioned per year.
	Percentage of commissioning projects in the state done by participating allies (as estimated via survey responses and secondary data sources)	Program participants active in commissioning likely worked on 38% of new whole building commissioning projects in the State during the past several years
	Sales HVAC packaged units	Participating allies sold approximately 7,000 packaged HVAC units in the past year. This accounts for only 5.4% of the estimated shipments to New York.
	Change in market for various HVAC applications over past two years *Percentage of allies reporting market increased significantly or somewhat*	Advanced Diagnostics = 74% Demand Control Ventilation =91% High Efficiency HVAC Sales = 88% Commissioning and Retrocommissioning = 82%

3.6.4 Program Impact Evaluation

This section presents cumulative annual energy savings for the program elements from inception through December 31, 2006.

Gross Savings

The objective of the M&V evaluation review is to verify the estimate of the program's cumulative savings. Based on Nexant's review, as of December 31, 2006, the program has resulted in the energy savings and demand reductions shown in Table 3-16. Note that the realization rate shown is applicable to the entire program period.

Net Savings

The final step to determining net energy savings is attribution analysis. Attribution analysis determines, through various methods, whether the gross savings estimate from the M&V activities should be adjusted downward or upward for freeridership or spillover. Adjustments for free ridership and spillover, and the ultimate program net-to-gross ratio and net savings are shown in Table 3-16. Adjustments for freeridership and spillover were not estimated for the Hospitality Lighting Program. For Commercial HVAC, the savings estimates were determined by the MCAC team based on market research.

Table 3-16. New York Energy $mart[SM] Business Partners Cumulative Annual Energy and Peak Demand Savings (through December 2006)

	Program-Reported Savings	Realization Rate	Adjusted Gross Savings	Freeridership	Spillover	Net-to-Gross Ratio[1]	Net Savings
Small Commercial Lighting							
MWh/year	33,541	1.0	33,541	39%	79%	1.09	36,559
MW On-Peak	8.3	1.0	8.3	39%	79%	1.09	9.0
Premium-Efficiency Motors[2]							
MWh/year	9,689	1.0	9,689	67%	168%	0.88	8,822
MW On-Peak	1.8	1.0	1.8	67%	113%	0.70	1.3
Commercial HVAC[3]							
MWh/ year	6,767	N/A	6,767	N/A	N/A	N/A	6,767
MW On-Peak	2.0	N/A	2.0	N/A	N/A	N/A	2.0

Hospitality Lighting							
MWh/ year	8,505	Not Evaluated	8,505	Not Evaluated	Not Evaluated	Not Evaluated	8,505
MW On-Peak	0.9	Not Evaluated	0.9	Not Evaluated	Not Evaluated	Not Evaluated	0.9
Total Business Partners							
MWh/ year	58,497	N/A	58,497	N/A	N/A	N/A	60,653
MW On-Peak	13.0	N/A	13.0	N/A	N/A	N/A	13.3

[1] Net-to-Gross Ratio = (1-Freeridership) * (1+Spillover).

[2] Savings from the prior motor incentive program have been held constant since last year. Savings achieved in 2006 from the new motor management program and the STAC 100 Motors program, in the amount of 296,202 kWh and 48 kW, have been added in the Net Savings column.

[3] Savings for the Commercial HVAC portion of the program have been reduced as of 4th Quarter 2006. This approach was taken due to the known short-term nature of savings from advanced diagnostics and commissioning, which were part of the program.

Non-Energy Impacts

Past non-energy impacts studies by the MCAC team have focused on the Small Commercial Lighting Program and Commercial HVAC. Results are shown in Table 3-17.

Table 3-17. Business Partners NEI Results

Results from Direct Query Approach (year of study)	Percentage of Energy Savings
Small Commercial Lighting Program (2005)	51%
Commercial HVAC Program (2004)	25-55%

3.7 New York Energy $mart[SM] Loan Fund and Financing Program

3.7.1 Program Description

The **New York Energy $mart[SM]** Loan Fund and Financing Program expands the availability of low-interest capital to help implement energy-efficiency projects and process improvements. Lenders enroll in the program by signing participation agreements and agreeing to reduce the interest rates on energy-related loans in exchange for a lump sum subsidy paid by NYSERDA. Interest rate reductions range from 4% in most of the State to 6.5% in parts of the Con Edison utility area. The Loan Fund has been an implementation tool for many types of projects, allowing reduced interest rate financing for cutting edge technologies. The Program has been especially beneficial in encouraging lender financing of photovoltaic and wind turbine projects, and in promoting green building measures in new construction. These types of activities will continue to be promoted.

The Program's ongoing training of the financial sector includes tools to allow lenders to calculate the cash flow advantages their customers will gain from making energy-efficiency improvements. Going forward, NYSERDA will work with ENERGY STAR® to develop new or modify existing ENERGY STAR tools to meet this goal. While the Loan Fund has met the needs of customers who do not avail themselves of

other NYSERDA programs, the reduced-interest financing will also continue to be available to customers participating in other NYSERDA programs.

NYSERDA has worked with over 100 lenders and leasing companies across the State to increase the availability of low-interest capital for energy efficient equipment and process improvements through the New York Energy $mart℠ Loan Fund program.

The thirteen-year program budget is $21.0 million.

3.7.2 Recent Program Accomplishments

Several near-term, annual goals have been set for the Loan Fund Program. These goals and progress for the first six months are shown in Table 3-18.

Table 3-18. New York Energy $mart℠ Loan Fund and Financing Program – Near-Term Goals and Achievements for Commercial/Industrial Projects

Activity	Program Goals (July 1, 2006 through June 30, 2007)	Achieved July 1, 2006 through December 31, 2006
Customers receiving assistance (closed loans)	100	39
Participating lenders (signed participation agreements)	25	14
Leveraged loan amount	$12,000,000	$12,693,552

Other highlights from the past six months include:

- An RFP for a Loan Fund support contractor was issued in December 2006 to obtain a contractor to continue NYSERDA's efforts to provide outreach and training, and support lenders participating in the program.

3.7.3 Long-Term Program Accomplishments

This section highlights key program outputs as identified through the logic model development work and associated market progress. All values reported are cumulative since program inception. Table 3-19 presents the key outputs for Loan Fund and Financing Program through December 31, 2006. Table 3-20 presents a sample of key logic model-driven indicators of program success, especially those related to market progress, as tracked by the evaluation and program activities. Together, these tables indicate the most important ways that program progress is being measured.

Table 3-19. Loan Fund and Financing Program – Key Program Outputs for Commercial/Industrial Projects

Outputs	Value (Cumulative through December 2006)
Number of loans closed	388
Value of loans closed	$85,104,504
Average loan value	$219,342

Outputs	Value (Cumulative through December 2006)
Number of lenders with signed participation agreements	109
Number of lenders actively processing loans	109
Number of lenders with multiple loans	95
Number of lenders with statewide coverage	24

Table 3-20. Loan Fund and Financing Program Key Program – Key Market Indicators and Program Cumulative Progress

Topic	Indicator	Value (2005)
Awareness and Knowledge	Increasing awareness among lenders about the financial benefits of energy efficiency	85% of lenders surveyed have at least some familiarity with energy efficiency, compared to only 62% for renewable energy Of those lenders claiming some knowledge, about two-thirds have become more familiar with the technologies and related economics over the past five years
	Awareness of the Loan Fund among contractors and vendors	More than half of borrowers (51% of commercial and 85% of residential) report that their contractor or vendor had either referred them to the Loan Fund or was aware of the program.
	Lenders are able to speak accurately about the economic benefits of energy efficiency and renewable energy investments	35% of lenders consider it important (4 or 5 on a 5-point scale where 5 is the highest) that they understand "the technologies and economics related to energy efficiency equipment and measures" before making loans for new construction or renovation projects that incorporate high efficiency. Lenders have similar views on renewable energy projects.
	Lenders include energy savings within cash flow analysis when reviewing loans	11 out of the 21 commercial lenders surveyed "always" or "often" include energy costs in the cash flow analysis for new construction and renovation projects
Perceptions and Practices	Value of energy efficiency investments is based on principles similar to other business investments (*e.g.*, ROI, payback)	75% of commercial borrowers say they evaluate energy efficiency investments on the same basis as other business investments
	Property owners perceive that renewable energy technology or efficiency products will provide adequate payback	39% of commercial borrowers and 10% of residential borrowers were confident that high efficiency equipment would pay back quickly enough without a financial incentive
	Lenders have confidence that new renewable energy technology or efficiency products will be improve ability of borrower to repay loan	Lenders were evenly split on the importance of reduced energy costs improving borrowers' ability to repay loans and only 7% consider it "extremely important"

3.7.4 Program Impact Evaluation

This section presents cumulative annual energy savings for the program from inception through December 31, 2006.

Gross Savings

The objective of the M&V evaluation review is to verify the estimate of the program's cumulative savings. Based on Nexant's review, as of December 31, 2006, the program has resulted in the energy savings and demand reductions shown in Table 3-21. Note that the realization rate shown is applicable to the entire program period.

Net Savings

The final step to determining net energy savings is attribution analysis. Attribution analysis determines, through various methods, whether the gross savings estimate from the M&V activities should be adjusted downward or upward for freeridership or spillover. Adjustments for freeridership and spillover, and the ultimate program net-to-gross ratio and net savings are shown in Table 3-21.

Table 3-21. Loan Fund Cumulative Annual Energy and Peak Demand Savings (Through December 2006)

	Program-Reported Savings	Realization Rate	Adjusted Gross Savings	Freeridership	Spillover	Net-to-Gross Ratio[1]	Net Savings
MWh/year	65,549	0.85	55,717	27%	19%	0.92	51,260
MW	11.8	1.39	16.3	27%	19%	0.92	15.0
MMBtu	111,590	1.36	151,762	27%	19%	0.92	139,621

[1] Net-to-Gross Ratio = 1-Freeridership+Spillover.

3.8 Energy Smart Focus Program

3.8.1 Program Description

Energy Smart Focus is a sector-specific effort to facilitate and encourage greater energy efficiency awareness and energy efficiency market penetration to the targeted sectors. The program is a marketing and information transfer effort that will use existing core New York Energy Smart programs and services to sponsor deployment, demonstration, research, and development projects in conjunction with sector customized strategies, including:

- Outreach and one-on-one interactions
- Targeted marketing materials and messages
- Training
- Partnerships with trade associations
- Integration with regional and national efforts
- Benchmarking

Efforts will center on each sectors' core mission, and increasing productivity while improving energy efficiency and reducing demand. Strategies will vary by sector, and will be developed to leverage non-energy benefits such as environmental benefits, indoor air quality, productivity and maintenance savings, which often drive energy efficiency decisions. These efforts will be augmented by sector-independent web support services.

The 5-year program budget is $19.9 million.

3.8.2 Recent Program Accomplishments

Near-term, annual goals have been set for the Energy Smart Focus Program. These goals and progress for the first six months are shown in Table 3-22.

Table 3-22. Energy Smart Focus Program – Near-Term Goals and Achievements

Activity	Program Goals (July 1, 2006 through June 30, 2007)	Achieved July 1, 2006 through December 31, 2006
Participants Receiving Assistance	2,000	550a

a Participants of the Comprehensive Energy Strategies (Energy Smart Schools) Program, a precursor to the institutional sector of the Energy Smart Focus Program, were provided assistance and are thus represented in this table.

Program Highlights

This new initiative will provide services to facilitate and encourage sector-specific energy efficiency improvements and practices.

- An internal team developed the program, refined the program goals, and identified individual sector needs.

- The internal NYSERDA team allocated funding to each sector of the program as follows: Institutions - $4.0 million; Industrial Manufacturing - $2.0 million; Commercial Real Estate - $2.5 million; Municipal Water/Wastewater $ 1.0 million; Hospitality - $1.0 million; Healthcare - $1.0 million; Colleges and Universities - $ 1.0 million; and other sector Support Services - $0.5 million.

- An RFP was released to selected contractors to service: the hospitality sector; the institutional sector, including K-12 schools, State government facilities; commercial real estate; industrial manufacturing, and municipal water and wastewater facilities. Twenty-four proposals were received.

3.8.3 Program Impact Evaluation

To date, direct energy impacts have not been tracked for the Comprehensive Energy Strategies (Energy Smart Schools) Program, a precursor to the institutional sector of the Energy Smart Focus Program. It is anticipated that the evaluation team will attempt to quantify the direct impacts for the Energy Smart Focus Program and data will be provided as it becomes available.

3.9 High Performance New Buildings Program

3.9.1 Program Description

The New Construction Program (NCP) was established to encourage energy-efficient design and building practices among architects and engineers and to urge them to inform building owners about the long-term advantages of building to higher energy standards. The program was renamed the High Performance New Buildings Program in 2006.[1] The name change to High Performance New Buildings reflects greater emphasis on whole building approaches to energy efficiency and green concepts. A revised program logic diagram is included at the end of Section 3.

The program objective is to create long-term changes in design practices by mainstreaming energy efficiency and green building concepts. The program is structured upon a performance-based approach in which incentives are determined by total building performance and are tiered to reward progressively more efficient designs. Through design team incentives and recognition, the program promotes Green building projects and projects planned for LEED® certification. Enhancements under the High Performance New Buildings Program include prescriptive and fast-track approaches using detailed custom analysis tools to ensure that smaller, simpler projects can be reviewed and incentives quickly awarded.

This mature and multi-faceted program addresses a complex and technically sophisticated market segment. The NYSERDA program staff has been working within the design and new construction community since 1999, and the program has evolved to better meet the unique needs of this market segment.

The 13-year program budget is $150.8 million.

3.9.2 Recent Program Accomplishments

Several near-term, annual goals have been set for the High Performance New Buildings Program. These goals and the progress for the first six months are shown in Table 3-23.

Table 3-23. High Performance New Buildings Program – Near-Term Goals and Achievements

Activity	Program Goals (July 1, 2006 through June 30, 2007)	Achieved July 1, 2006 through December 31, 2006
Customers receiving assistance (completed projects)	140	43
Construction market affected (sq.ft.)	14,000,000	12,000,000
Participating A&E firms	180	160

[1] Within this section, the old program name (NCP) is used when discussing evaluations that occurred prior to the name change.

3.9.3 Long-Term Program Accomplishments

This section highlights key program outputs as identified through the logic model development work and associated market progress. All values reported are cumulative since program inception. Table 3-24 presents the key outputs for High Performance New Buildings through December 31, 2006. Table 3-25 presents a sample of key logic model-driven indicators of program success, especially those related to market progress, as tracked by the evaluation and program activities. Together, these tables indicate the most important ways that program progress is being measured, and report how those values are changing due to program activities.

Table 3-24. High Performance New Buildings Program – Key Program Outputs

Outputs	Value (Cumulative through December 2006)
Number of buildings participating	1,357 active projects (913 with encumbered dollars)
Square footage affected	Nearly 138 million
Number of completed projects	670
Number of projects receiving TA studies	879
Number of projects receiving commissioning	182

Table 3-25. High Performance New Buildings Program – Key Market Indicators and Program Cumulative Progress

Topic	Indicator	Initial Value (2003, unless noted)	Most Recent (2006, unless noted)
Availability of Services	Number of unique A&E firms participating	526	750
Awareness and Knowledge	Awareness of NYSERDA among *non-participating* A&E firms and owners	A&Es: 58%	A&Es: 81% Owners: 73%
	A&E firm familiarity with energy efficiency measures and designs	Participant: 88% (n=44) Non-participant: 89% (n=85)	Participant: 92% (n=48) Non-participant: 74% (n=30)
	Building owner familiarity with energy efficiency measures and designs	Participant: 92% (n=26) Non-participant: 61% (2004)	Participant: 85% (n=48) Non-participant: 73% (n=30)
Value of Program Services	Importance of technical assistance for achieving savings according to participating designers and owners	Designers: 38% critically important or important (n=40) Owners: 76% critically important or important (n=31)	Designers: 67% critically important or important (n=48) Owners: 88% critically important or important (n=48)
	Importance of incentives for achieving savings according to participating designers and owners	Designers: 70% said incentives were important or critically important (n=44) Owners: 80% said incentives were important or critically important (n=32)	Designers: 98% said incentives were helpful or critical (n= 48) Owners: 90% said incentives were helpful or critical (n= 48)

Topic	Indicator	Initial Value (2003, unless noted)	Most Recent (2006, unless noted)
Market Penetration	Percentage of New York market participating in the program.	0.4-2% (2000)	Approximately 12% (2005)
	Percentage of New York A&E community participating	18% of the ~2,900 A&Es working on non-residential projects over the past 2 years have participated	30% of the ~2,500 A&Es working on non-residential projects over the past 2 years have participated
	Percentage of top architecture and engineering firms, by dollar value and number of projects, participating in the program	50% of architects by dollar value 60% of architects by number of projects 40% of engineers by dollar value and number of projects	80% of architects by dollar value 40% of architects by number of projects 60% of engineers by dollar value 50% of engineers by number of projects

3.9.4 Program Impact Evaluation

This section presents cumulative annual energy savings for the program from inception through December 31, 2006.

Gross Savings

The objective of the M&V evaluation review is to verify the estimate of the program's cumulative savings. Based on Nexant's review, as of December 31, 2006, the program has resulted in the energy savings and demand reductions shown in Table 3-26. The realization rate of 1.06 is applicable to the entire program period, and indicates that the program records were slightly under-estimating the actual energy savings. These results are from the M&V analysis conducted in 2005.

Net Savings

The final step to determining net energy savings is attribution analysis. Attribution analysis determines, through various methods, whether the gross savings estimate from the M&V activities should be adjusted downward or upward for freeridership or spillover. Adjustments for freeridership and spillover, and the ultimate program net-to-gross ratio and net savings are shown in Table 3-26. The net-to-gross ratio for the High Performance New Buildings Program is 1.22, meaning that freeridership that is occurring is outweighed by spillover. These findings are from attribution analyses conducted in 2005.

Table 3-26. High Performance New Buildings Cumulative Annual Energy and Peak Demand Savings (through December 2006)

	Program-Reported Savings	Realization Rate	Adjusted Gross Savings	Freeridership	Spillover	Net-to-Gross Ratio[1]	Net Savings
MWh/year	193,586	1.06	205,201	40%	85%	1.22	250,345
MW	41.4	1.06	43.9	40%	85%	1.22	53.5

[1] Net-to-Gross Ratio = 1-Freeridership+Spillover (a weighted average of the NTG ratios estimated in the previous MCAC analysis and this current analysis is shown here).

Non-Energy Impacts

The MCAC team last evaluated non-energy impacts (NEIs) for the New Construction Program in 2005. The study found that customers valued NEIs at 40% of the value of the energy savings achieved in their new buildings. This value is similar to the value of NEIs found in an earlier study on the NCP.

3.9.5 Process Evaluation

A best practices study, the third in a series of process evaluation reports for the NCP, was conducted by Research Into Action. The prior reports, completed in 2004 and 2005, showed the NCP was a valuable and effective program focused on acquiring energy savings within a market transformation framework. The program and project managers currently report that several factors, including the threat of insufficient power supplies in New York, have changed their emphasis to resource acquisition and demand reduction, with market transformation as an important but secondary goal. The managers requested this best practices review of other notable new construction programs throughout the country to compare various approaches and to uncover useful insights and ideas that might benefit the program. The following topics were addressed in this study:

- Balancing resource acquisition with market transformation
- Emphasizing LEED® or green projects
- Alternative program delivery models
- Reaching the right decision-makers
- Conducting successful scoping meetings
- Benchmarking and monitoring usage over time
- Coordinating with other programs

After working with the program managers to identify nine other exemplary new construction programs,[2] evaluators gathered and analyzed information from best practices literature, program materials, and interviews with program managers. Results of this best practices study are provided below.

[2] Programs include those from National Grid, NSTAR, Northeast Utilities, California, the Energy Trust of Oregon, MidAmerican, Xcel Energy, New Jersey, and Wisconsin.

Adjust Strategies for Greater Savings and Longer Term Market Transformation

Nationally, new construction programs are changing their strategies so that they can attract projects earlier and achieve greater "per project" savings. These approaches also support longer-term goals to transform the market. While the NCP already encourages whole building design and LEED® certification, it should consider a greater emphasis on:

- Building personal strategic relationships with owners and design firms: These outreach efforts include targeted education and training, including having a designated educational arm supporting existing "cutting edge" training through organizations such as the New Buildings Institute (NBI) offering lunch and learn presentations at A& E firms; identifying and maintaining relationships with the largest market players; and having a strong and consistent presence at professional meetings such as the American Institute of Architects (AIA) and American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE). In some cases, specific market sectors with high potential for savings, such as hospitals or schools, might be targeted. These outreach efforts are intentional, coordinated, and wherever possible, personal. Targeted marketing materials are important tools to support person-to-person outreach strategies but cannot substitute for them.

- Increased leveraging of market trends and opportunities: One of the key market effects of new construction programs is the development of more stringent energy codes (e.g., California, MidAmerican, and Xcel) which in turn provides programs the opportunity to push for higher levels of efficiency.

- Other clear market trends reflect a greater concern for the environment. LEED® is an example of an environmentally-oriented market opportunity that some programs like the NCP and the Energy Trust have used to increase interest in and allegiance to the programs' efficiency goals. NYSERDA has been very aggressive in promoting LEED certified buildings with over 120 such projects in the pipeline. Global warming is another environmental issue that new construction programs can leverage. Architecture2030 has developed the 2030 Challenge to promote carbon-neutral buildings to help reduce greenhouse gas emissions to acceptable levels. Energy efficiency is at the center of these efforts. Key organizations have endorsed this challenge including the AIA, the U.S. Conference of Mayors, and ASHRAE.

- As suggested above, innovative training opportunities may also push the market; National Grid believes attendance at NBI's trainings has significantly affected the view of architects participating in their programs, moving them to the point of wanting to try more robust energy efficiency strategies.

- Making service delivery as efficient as possible: Moving to a less complex delivery model that relies on one or two program management consultants can result in less burden on program managers, more efficient, consistent and higher quality service delivery, and more time for program managers to focus on key program improvement strategies and critical projects. While the NCP is continuously working on improving its processes, its current delivery model for the NCP requires considerable effort to attract, recruit, and manage qualified firms. The program managers should further investigate the "single contractor" approach used by the programs at the Energy Trust of Oregon, MidAmerican, and Xcel to see if this program delivery model could be useful for improving its service delivery.

- Getting projects off to a good start: Effective project screening and scoping meetings need to be orchestrated events with everyone understanding and "buying into" the process. While the NCP program is an "open" solicitation that serves all program applicants regardless of their project

complexities, the program should consider using enhanced screening to help match program services with the project scope. It should also consider developing a "how-to" manual and sponsoring training (e.g., from the Weidt Group that implements MidAmerican's program) to fine tune scoping meeting skills, so that these meetings are as consistent and effective as possible.

Leverage Experience of Other Leading Programs Nationally

Leading commercial new construction programs across the country have much to offer each other in terms of specific experience and lessons learned but have limited exposure to one another. The program managers and staff should consider the following strategies to leverage the experience of other leading programs:

- Continue its review of materials from other programs, such as application packages, program manuals, marketing materials, and software, to see how these approaches might complement and improve the program's own efforts.

- Communicating with program managers identified in this study, along with others that might be recommended, to assess how communication of lessons learned and best practices might best be promulgated among the interested parties.

- NCP managers should consider initiating a forum with leading new construction program managers and implementation contractors nationwide that would allow attendees to present and discuss what they have learned. This might be accomplished through an existing national meeting structure, such as the ACEEE Summer Study for Efficiency in Buildings, Greenbuild, NEEP, NBI or other venues in which NYSERDA staff have already participated.

3.10 FlexTech Technical Assistance Program

3.10.1 Program Description

The FlexTech Technical Assistance Program is a consolidation of services previously offered under the FlexTech, Technical Assistance, and the Energy Audit Programs. This change is part of a continuous stream of evolutionary revisions the program has undergone for the past eight years.

The purpose of the Program is to provide customers with objective and customized information to facilitate wiser energy efficiency, energy procurement, and financing decisions. The Program is available to all commercial and industrial sectors. The Program strives to increase productivity and economic competitiveness by identifying and encouraging the implementation of cost-effective energy-efficiency measures. Studies also include operations management, energy procurement, and on-site Combined Heat and Power (CHP). Cost-shared assistance is provided for detailed studies from energy engineers and experts. Small customers are eligible for quick walk-through energy audits, with the cost share reimbursed upon implementation of recommendations. Participants may use NYSERDA-contracted or customer-selected consultants.

The thirteen-year program budget is $66.5 million.

3.10.2 Recent Program Accomplishments

Several near-term, annual goals have been set for the FlexTech Technical Assistance Program. These goals and progress for the first six months are shown in Table 3-27.

Table 3-27. FlexTech Program – Near-Term Goals and Achievements

Activity	Program Goals (July 1, 2006 through June 30, 2007)	Achieved July 1, 2006 through December 31, 2006
Customers receiving assistance (approved proposals)	540	220

Program Highlights

- An RFP was issued for supplemental FlexTech contractors in the Con Edison territory. Eleven new contractors were selected and awarded three year contracts. The new FlexTech contractors will provide additional coverage and market outreach to Con Edison customers.
- The Audit Program, which provides walk-though audits for smaller customers, was bid to select contractors for the next five years. The Audit Program is comprised of four geographical regions. The RFP adjusted the regions to provide increased coverage in Con Edison territory. A new contract was awarded for each region.
- CHP and Renewable Generation Technical Assistance Program were merged with the traditional energy efficiency Technical Assistance Program.
- An on-line application process was created for FlexTech and Audit programs.

3.10.3 Long-Term Program Accomplishments

This section highlights key program outputs as identified through the program logic modeling work and associated market progress. All values reported are cumulative since program inception. Table 3-28 presents the key outputs for the FlexTech Technical Assistance Program through December 31, 2006. Table 3-29 presents a sample of key logic model-driven indicators of program success, especially those related to market progress, as tracked by the evaluation and program activities. Together, these tables indicate the most important ways that program progress is being measured, and report how those values are changing due to program activities.

Table 3-28. FlexTech Program – Key Program Outputs

Outputs	Value (Cumulative through December 2006)
Customers receiving assistance (approved proposals)	3,540
Number of studies completed	3,290
Total funds committed	$27,400,000
Customer cofunding of studies	$27,000,000
Participating allies (ESCOs and engineering firms)	280

Table 3-29. FlexTech Program – Key Market Indicators and Program Cumulative Progress

Topic	Indicator	Value (2004, unless noted)
Awareness and Knowledge	Customer familiarity with energy efficiency measures and equipment	90% of participating customers (n=67) and 68% of non-participants (n=120) said they were extremely or somewhat familiar
	Change in customer familiarity with energy efficiency measures and equipment over time	54% of participating customers (n=67) and 22% of non-participants (n=120) said their familiarity had increased significantly over the past five years
	Contractor familiarity with energy efficiency measures, equipment and services	77% of participating contractors (n=40) and 11% of the non-participants (n=55) said they were extremely familiar
	Change in contractor familiarity with energy efficiency measures and equipment over time	48% of participating contractors (n= 40) and 21% of the non-participants (n=53) said their familiarity had increased significantly over the past five years
Availability of Services	Change in level of technical service provider (TSP) activity in New York over time	55% of participating contractors (n=38) and 43% of non-participating contractors (n=55) said TSP activity has increased over the past five years
	Change in quality of TSP activity in New York over time	46% of participating contractors (n=40) said the quality of TSP activity has increased over the past five years

Topic	Indicator	Value (2004, unless noted)
Change in Practices	Contractor promotion/marketing of energy efficiency measures, equipment and services	74% of participating contractors (n=38) are significantly or somewhat increasing their marketing of energy-efficient measures, compared to only 38% of non-participating contractors (n=50)
	Difference in efficiency level of participating and non-participating projects	Participating contractors said that a typical TA project was 25% more energy efficient than a standard design, non-participating project (responses ranged from 1-50% more efficient, however)
Participant Motivations and Decision-Making Criteria	End-use customer decision-making practices	66% of respondents sent the report to higher-level staff for a final decision regarding implementation, whereas 6% of the respondents were the ultimate decision makers (2006)
	Criteria for deciding to undertake a project	90% of respondents indicated that payback was considered in the decision-making process and 71% of respondents indicated that the up-front cost relative to the available budget was considered. In addition, 58% of respondents characterized payback as a "make or break" criterion when deciding to undertake a project (2006)

3.10.4 Program Impact Evaluation

This section presents cumulative annual energy savings for the program from inception through December 31, 2006.

Gross Savings

The objective of the M&V evaluation review is to verify the estimate of the program's cumulative savings. Based on Nexant's review, as of December 31, 2006, the program has resulted in the energy savings and demand reductions shown in Table 3-30. Note that the realization rate shown is applicable to the entire program period.

Net Savings

The final step to determining net energy savings is attribution analysis. Attribution analysis determines, through various methods, whether the gross savings estimate from the M&V activities should be adjusted downward or upward for freeridership or spillover. Adjustments for freeridership and spillover, and the ultimate program net-to-gross ratio and net savings are shown in Table 3-30.

Table 3-30. FlexTech Program Cumulative Annual Energy and Peak Demand Savings (through December 2006)

	Program-Reported Savings	Realization Rate	Adjusted Gross Savings	Freerider-ship	Spillover	Net-to-Gross Ratio[1]	Net Savings
MWh/ year	611,962	1.0	611,962	25%	48%	1.14	697,637
MW	114.0	1.0	114.0	25%	48%	1.14	130.0
MW Enabled	9.0	1.0	9.0	25%	48%	1.14	10.2
MMBtu	2,513,073	1.0	2,513,073	25%	48%	1.14	2,864,903

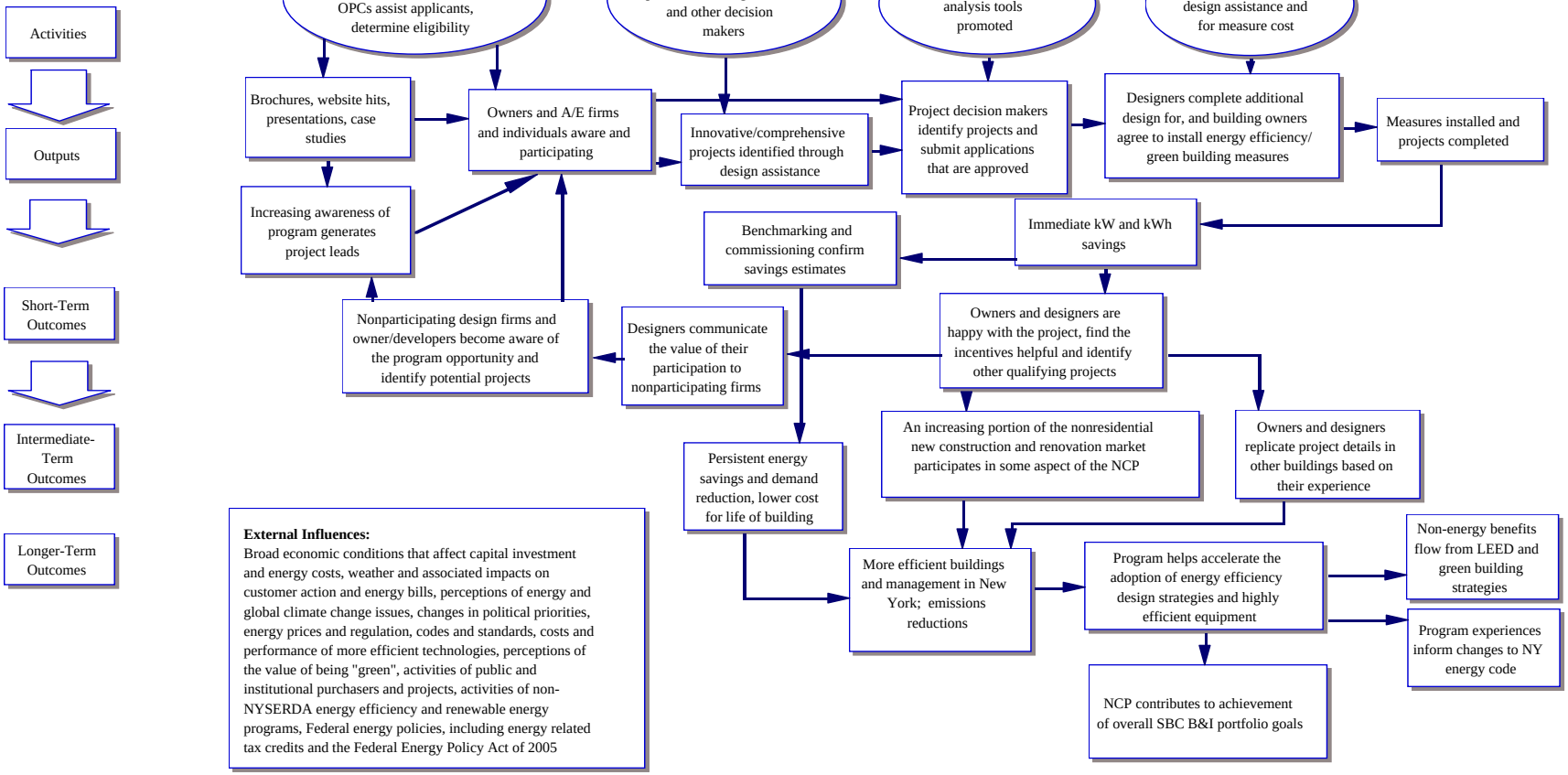
[1] Net-to-Gross Ratio = 1-Freeridership+Spillover (a weighted average of the NTG ratios estimated in the previous MCAC analysis and this current analysis is shown here).

Non-Energy Impacts

The MCAC team last evaluated NEIs for the Technical Assistance Program in 2004. The study found that customers valued NEIs at 37-55% of the value of the energy savings achieved in their new buildings.

High Performance New Buildings Program Logic Model

Inputs:
SBC III funds, Con-Ed System-wide Funding, staff resources and experience implementing SBC I and II programs, credibility and existing relationships, awareness of NYSERDA among market actors, expertise of sector-specialist firms, best practices learned elsewhere, LEED® and ENERGY STAR®.



4

Residential and Low-Income Programs

4.1 Overview of the Residential and Low-Income Programs

4.1.1 Residential Programs

The residential energy efficiency programs are designed to influence decisions regarding electricity use and to reduce households' energy bills. The programs also address petroleum and natural gas use when included as part of a comprehensive energy service package. Evaluations of the following residential programs are discussed in this section:

Single Family Home Performance Program. This program, which addresses one- to four-unit homes, includes the Home Performance with ENERGY STAR® Initiative (HPwES) for existing homes, and the New York ENERGY STAR Labeled Homes Initiative (NYESLH) for newly constructed homes. On the supply side, these initiatives support market development through recruitment, training and incentives for builders and contractors, in order to encourage them to offer energy efficient options. On the demand side, these initiatives market the benefits of energy efficiency to residential consumers in order to increase demand for efficient products and services. Both HPwES and NYESLH have low-income components providing additional incentives for low-income households.

Multifamily Building Performance Program. The Multifamily Building Performance Program provides a single point of entry for multifamily building owners and developers interested in improving the energy efficiency of new and existing buildings. The ENERGY STAR Multifamily Building Initiative (EMP) – the track for new buildings (and complete gut-rehabilitation projects) – concentrates on providing technical assistance to mid-stream market participants and incorporates renewable technologies, advanced metering technologies, real-time pricing strategies, and combined heat and power systems, especially for electrically heated buildings with base domestic hot water loads. The Multifamily Building Performance Initiative – the track for existing buildings – develops market-based business opportunities for building auditors, financial packagers, designers, architects, and construction inspectors in order to enhance the energy services infrastructure. The Multifamily Building Performance Initiative also has a low-income component, providing technical and financial assistance to low-income building owners and their tenants to make energy efficiency improvements, thus reducing energy bills and providing increased health and safety benefits to building occupants.

Market Support Program. The **New York Energy $mart℠** Market Support Program provides support services to the building performance and low-income programs by increasing the availability of energy-efficient products and by increasing consumer demand. There are three major components to the Market Support Program: 1) the ENERGY STAR® Products Initiative, which seeks to increase the availability

and sales of residential ENERGY STAR appliances, lighting and home electronics products; 2) the Program Marketing Initiative, which provides marketing for the Single Family Home Performance Program, the Multifamily Building Performance Program, the summer and winter tips campaigns, and leveraged campaigns such as "Change a Light, Change the World" as well as marketing assistance to mid-stream partners; and 3) the GetEnergySmart.org website, which provides consumers with information about programs, names of contractors and retailers, and energy efficiency tips, provides potential program partners with participation information, and serves as a communication tool with current partners.

Communities and Education Program. The Communities and Education Program offers market infrastructure development for both short-term program support and long-term market development for residential energy efficiency, with the aim of helping to develop an energy-conscious society. The two major components are the Energy Smart Students (ESS) Initiative and the **New York Energy $mart** Communities (NYE$C). ESS provides energy efficiency curricula for teachers of students in grades K-12. ESS is part of NYSERDA's effort to offer comprehensive services to K-12 schools, including educational curriculum support, facilities improvements, and transportation efficiency improvements. ESS offers teacher workshops to introduce hands-on, project-based lessons aligned with the New York State teaching standards. NYE$C facilitates bringing organizations and agencies together to develop and support local projects that serve as demonstrations of energy efficiency and renewable technologies and show how these projects create economic, social, and environmental benefits. NYE$C also provides face-to-face education to the community on various energy topics and **New York Energy Smart**[SM] programs. Finally, NYE$C has primary responsibility for recruiting mid-stream partners for **New York Energy Smart**[SM] residential programs.

4.1.2 Low-Income Programs

The low-income programs are designed to reduce the energy burden of low-income households by improving energy efficiency and providing energy management and aggregated energy procurement services. Evaluations of the following low-income programs are discussed in this section:

EmPower New York[SM]**.** The EmPower New York[SM] program provides energy efficiency services to utility customers earning less than 60% of the state median income and households enrolled in utility low-income payment assistance programs, targeting both owners and tenants of one- to four-family homes and multifamily buildings with fewer than 100 units. The program coordinates with the delivery of federal weatherization services through New York State Division of Housing and Community Renewal (DHCR).

Buying Strategies and Energy Awareness Program. The Buying Strategies and Energy Awareness Program consists of four initiatives: 1) the Buying Strategies Initiative, which assists the Office of Temporary and Disability Assistance to negotiate discounts on purchases of home heating oil by the Low-Income Home Energy Assistance Program, and also includes a preventive maintenance component for oil-fired heating systems; 2) the Targeted Marketing and Outreach Initiative, which seeks to increase participation in all NYSERDA, State, Federal, utility and community-based low-income energy efficiency and energy assistance programs by targeting hard-to-reach (HTR) customers such as the elderly, the low-income population, and the non-English speaking population; 3) Low-Income Forum on Energy (LIFE), which provides a forum – large statewide conferences, smaller regional meetings, and steering committee meetings – where energy industry professionals, policy makers, agencies serving the low-income population, and energy program implementers can discuss energy issues relevant to the low-income sector; and 4) contributions of funding to the Energy Smart Students (ESS) Initiative (described above).

4.2 Residential and Low-Income Evaluation Activities

The Residential and Low-Income program evaluation activities conducted in the past year are shown in Table 4-1. The table includes only new evaluation activities conducted in 2006. However, findings from earlier evaluations are also discussed in Section 4 to the extent that they contribute to the cumulative assessment of these programs.

Table 4-1. 2006 Residential and Low-Income Program Evaluation Activities

Program Name	Predecessor Program (if applicable)	Theory & Logic	Measurement and Verification (M&V)	Market Characterization, Assessment and Causality (MCAC)	Process Evaluation
Single Family Home Performance Program	Home Performance with ENERGY STAR ENERGY STAR Homes Program	Full	Database review	-	-
Multifamily Building Performance Program	Residential Comprehensive Energy Management (CEM) Program Residential Technical Assistance Program (ResTech) Assisted Multifamily Program (AMP)	Full	-	-	-
Market Support Program	Keep Cool, Stay Cool! ENERGY STAR Products and Marketing Program	-	-	-	-
Communities and Education Program	**New York Energy $mart^{SM}** Communities Energy Smart Students Program	Full	-	-	-
EmPower New York		Full	Database review	-	Partial
Buying Strategies and Energy Awareness Program	Low-Income Buying Strategies Program Low Income Energy Program Awareness Low-Income Forum on Energy	-	-	-	-

4.3 Residential and Low-Income Evaluation Findings

Significant progress is being made as the Residential and Low-Income portfolio transitions to the new, streamlined set of programs. This section summarizes key evaluation findings from the latest set of

evaluation activities, and from the cumulative body of work conducted by NYSERDA and its evaluation contractors over the past several years.

4.3.1 Energy, Peak Demand and Fuel Savings

NYSERDA's M&V contractor assessed the energy and peak demand savings reported for its Residential and Low-Income programs. Methods used in this assessment included on-site verification of equipment installation and functionality, and review of NYSERDA's files for reasonableness and accuracy. Based on this review, the M&V contractor adjusted the savings reported by NYSERDA. In turn, the MCAC contractor further adjusted these figures to account for freeridership and spillover. Table 4-2 through Table 4-4 summarize the estimated electricity savings, peak demand reductions, and fuel savings for each Residential and Low-Income program. Savings for the low-income program elements are broken out in the footnotes to each table.

As reported earlier in Section 2, overall, NYSERDA's M&V and MCAC contractor teams have found that savings for the Residential and Low-Income sector should be adjusted as follows:

- Electricity savings were adjusted upward by 4%.
- Peak demand savings were adjusted upward by 4%.
- Other fuel savings were adjusted upward by 8%.

These adjustments include changes in program-reported savings due to database reviews and field work to measure and verify savings, as well as survey research and other activities to quantify freeridership, naturally occurring adoption, spillover and market effects.

Several near-term goals were set for the first year of the third **New York Energy $mart^{SM}** Program funding cycle. These goals established levels to reach, by June 30, 2007, for energy and peak demand savings as well as several other key metrics of program success. Overall, in the first six months of the one-year measurement period, the Residential and Low-Income portfolio has achieved 15% of its goal for electricity savings, and 20% of its goal for fuel savings. There is no goal for peak demand reduction in this sector. Progress toward the one-year goal is shown for each applicable program in Table 4-2 and Table 4-4. A few key programs appear to be either progressing somewhat more slowly than planned or have not yet reported progress toward goals. Reasons for this slower progress are as follows:

- The Multifamily Building Performance Program for Existing Buildings has reached 16% of the electricity savings goal and 8% of the other fuel savings goal. This program is undergoing a significant change, combining the three former programs into one streamlined program offering. This emphasis on program development, coupled with a transition to a new implementation contractor, have slowed intake somewhat. However, staff reports that the program is still expected to reach its one-year goals within the next six months.
- The Multifamily Building Performance Program for New Buildings has not yet reported any electricity or other fuel savings. This is a completely new program launched in November 2006. Development of program rules and design has been the major emphasis in 2006, although the program did have approximately seven applications in the design phase by the end of December.
- The Market Support Program has not updated its electricity savings since December 31, 2005. Over the past several years, the savings for this market transformation program have typically been estimated by NYSERDA's Market Characterization, Assessment, and Causality (MCAC) evaluation

contractor team based on sales and shipment data, primary research such as consumer and retailer surveys, and other sources. The MCAC team is in the process of updating the savings for this program and progress will be presented in the first quarter of 2007. The program is expected to meet its one-year goal.

Table 4-2. Residential and Low-Income Program Electricity Savings through December 31, 2006 and Progress toward One-Year Goals

Program	Energy Savings (GWh)			
	Savings Achieved through		One-Year Goal through June 30, 2007	Progress Toward One-Year Goal (% achieved)
	June 30, 2006	Dec. 31, 2006		
Single Family Home Performance Program: Existing Homes[1]	13.5	14.6	5.3	20%
(ConEdison)	(0.2)	(0.3)	(n/a)	(n/a)
Single Family Home Performance Program: New Homes	7.3	9.3	1.8	108%
(ConEdison)	(0.7)	(0.7)	(n/a)	(n/a)
Multifamily Building Performance Program: Existing Buildings[2]	31.0	38.2	45.1	16%
(ConEdison)	(30.2)	(37.3)	(n/a)	(n/a)
Multifamily Building Performance Program: New Buildings	0	0	4.8	0%
(ConEdison)	(0)	(0)	(n/a)	(n/a)
Market Support Program	303.8	303.8	30	0%
(ConEdison)	(69.9)	(69.9)	(n/a)	(n/a)
EmPower New York	23.2	27.9	10.2	46%
(ConEdison)	(2.0)	(2.3)	(n/a)	(n/a)
ConEdison Residential & Low-Income Total	**103.0**	**110.4**	**n/a**	**n/a**
Statewide Residential & Low-Income Total	**378.9**	**393.8**	**97.2**	**15%**

[1] Savings for the low-income Assisted Home Performance Program are included in this row. They represent 5.5 GWh of these savings.

[2] Savings for the low-income Assisted Multifamily Program are included in this row. They represent 23.1 GWh of these savings.

Table 4-3. Residential and Low-Income Program Peak Demand Reductions through December 31, 2006

Program	Demand Reductions (MW)	
	Savings Achieved through	
	June 30, 2006	Dec. 31, 2006
Single Family Home Performance Program: Existing Homes[1] (ConEdison)	2.0 (0.0)	2.2 (0.0)
Single Family Home Performance Program: New Homes (ConEdison)	0.9 (0.2)	1.1 (0.1)
Multifamily Building Performance Program: Existing Buildings[2] (ConEdison)	3.9 (3.8)	5.0 (4.9)
Multifamily Building Performance Program: New Buildings (ConEdison)	n/a (n/a)	0 (0)
Market Support Program (ConEdison)	72.8 (16.7)	72.8 (16.7)
EmPower New York (ConEdison)	2.5 (0.0)	3.3 (0.0)
ConEdison Residential & Low-Income Total	**20.8**	**21.9**
Statewide Residential & Low-Income Total	**82.2**	**84.4**

Note: No goals were set for peak demand reduction.

[1] Savings for the low-income Assisted Home Performance Program are included in this row. They represent 0.8 MW of these savings.

[2] Savings for the low-income Assisted Multifamily Program are included in this row. They represent 1.8 MW of these savings.

Table 4-4. Residential and Low-Income Program Fuel Savings through December 31, 2006 and Progress toward One-Year Goals

Program	Fuel Savings (MMBtu)			
	Savings Achieved through		One-Year Goal through June 30, 2007	Progress Toward One-Year Goal (% achieved)
	June 30, 2006	Dec. 31, 2006		
Single Family Home Performance Program: Existing Homes[1] (ConEdison)	523,821 (9,900)	642,458 (12,142)	239,800 (n/a)	49% (n/a)
Single Family Home Performance Program: New Homes (ConEdison)	508,247a (40,660)	586,858 (41,080)	103,700 (n/a)	76% (n/a)
Multifamily Building Performance Program: Existing Buildings[2] (ConEdison)	43,932 (12,581)	140,541 (53,687)	1,202,900 (n/a)	8% (n/a)

Multifamily Building Performance Program: New Buildings (ConEdison)	n/a (n/a)	0 (0)	129,800 (n/a)	0% (n/a)
Market Support Program (ConEdison)	341,920 (58,126)	341,920 (58,126)	n/a	n/a
EmPower New York (ConEdison)	59,341 (0)	66,891 (0)	21,700 (n/a)	35% (n/a)
ConEdison Residential & Low-Income Total	**121,267**	**165,036**	**n/a**	**n/a**
Statewide Residential & Low-Income Total	**1,477,261**	**1,778,688**	**1,697,900**	**18%**

[1] Savings for the low-income Assisted Home Performance Program are included in this row. They represent 242,207 MMBtu of these savings.

[2] Savings for the low-income Assisted Multifamily Program are included in this row. They represent 140,541 MMBtu of these savings.

a This value does not match an earlier published value due to changes made to the program tracking database in response to evaluation completed by the M&V contractor.

4.3.2 Summary of Other Key Program Impacts

Across the programs, 22 additional near-term goals were set for other key metrics besides energy savings, such as the number of customers receiving assistance, funds leveraged, allies participating, and outreach activities completed. Overall, the programs are making progress with respect to these other goals. Nine out of the 22 goals are approximately 50% or more achieved. In fact, three of the goals have already been reached or exceeded. The results of each program's progress toward its stated goals are shown in table format in the subsequent sections.

Most of the new evaluation work on the Residential and Low-Income programs has consisted of updating and creating program logic models. Therefore, other key findings from secondary data and studies of participants, non-participants and other market actors shown below are largely repeated from previous major evaluation efforts:

- The ENERGY STAR label is the overarching symbol for NYSERDA's Residential Programs. New Yorkers' recognition of the ENERGY STAR label has increased steadily, from 34% in 1999 to 77% in 2005. The proportion of consumers in New York who show high understanding of the label has also increased from 35% in 1999 to 87% in 2005. In 2005, 63% of New York consumers saw television ads related to ENERGY STAR - evidence linking increased awareness and understanding directly to NYSERDA's efforts.

- The percentage of ENERGY STAR-qualified models out of all models on display in partner stores increased from 14% in 1999 to 35% in 2005 for refrigerators, from 10% to 82% for dishwashers, from 16% to 39% for clothes washers, and from 26% to 61% for room air conditioners.

- NYSERDA's program efforts from 1999 to 2005 have helped increase the market share of ENERGY STAR refrigerators among NYSERDA partners from 28% to 47%; from 48% to 76% for dishwashers; from 24% to 41% for clothes washers; and from 45% to 76% for room air conditioners. The proportion of new single-family homes sold that are ENERGY STAR-labeled has increased from 0.3% in 2001 to 11.1% in 2006. The proportion of the home improvement market installing efficiency measures through the HPwES Program has increased from 0.2%-0.3% in 2001 to 2.1%-3.3% in 2005.

- NYSERDA continues to be effective in recruiting partners in appropriate markets, and in providing them with tools—such as training and marketing—to help them persuade consumers to adopt more efficient products and behaviors. Association with NYSERDA's programs and with energy efficiency has helped many of these partners differentiate their businesses from competitors.

- Nearly all parties involved in these programs, including builders, contractors and consumers, indicate a high degree of satisfaction with the programs. This year's process evaluation surveys and interviews indicate that the results of the EmPower program pilot were largely positive for the six participants. The contractors are pleased with the increased speed with which they can complete jobs by avoiding the pre-approval process under the EmPower pilot program, and believe the measures selected for direct installation without pre-approval are the appropriate ones.

- An important evaluation finding for the Assisted Multifamily Program is that 6.1% of eligible units had efficiency measures installed through the program, and an additional 8.8% had participated in the audit offered by the program. This sums to almost 15% of the eligible population of the low-income multifamily market that had participated in some aspect of the program. This is as of the end of 2005.

4.3.3 Low-Income Customers Served

In total, more than 60,000 low-income customers have been served by the **New York Energy $mart**[SM] Program. Approximately one-half of the customers served are in the ConEdison utility area where the low-income population is concentrated in larger multi-family buildings. Table 4-5 shows the distribution of low-income customers served by program and utility service area.

Table 4-5. Number of Low-Income Customers Served by Program and Utility Area

Utility Service Area	Assisted Multifamily Program	EmPower	Weatherization Network Initiative	Assisted Home Performance	Direct Install	Total
Central Hudson Gas & Electric	712	128	120	27	766	1,753
ConEdison	3,630	203	1,785	27	24,933	30,578
National Grid	4,075	4,781	2,281	2,275	0	13,412
NYSEG	636	4,553	928	2,275	0	8,392
Orange & Rockland	0	1	72	27	561	661
Rochester Gas & Electric	4,563	185	507	561	0	5,816
Total	13,616	9,851	5,693	5,192	26,260	60,612

4.4 Single Family Home Performance Program

4.4.1 Program Description

The Single Family Home Performance Program addresses one- to four-unit homes through the New York ENERGY STAR® Labeled Homes Initiative (NYESLH) for newly constructed homes, and the Home Performance with ENERGY STAR Initiative for existing homes. Both of these efforts are market-based.

On the supply side, these initiatives use recruitment, training and incentives to encourage builders and contractors to offer energy efficient options. On the demand side, the initiatives market the benefits of energy efficiency to residential consumers to increase demand for products and services that make homes more efficient.

NYESLH provides technical assistance and financial incentives to one- to four-family home builders to encourage the adoption of energy-efficient design features and the selection and installation of more energy-efficient equipment in new construction and substantial renovation projects. Participating builders construct New York ENERGY STAR labeled homes that use approximately 30% less energy than homes built to the current energy code. In addition, the program is an enhanced version of the EPA's ENERGY STAR Labeled Homes Program, because in order to earn the New York ENERGY STAR home label, these homes must include a qualified ventilation system; electrical savings measures (either ENERGY STAR lighting or appliances) that produce annual electricity savings of 600 kWh, compared to standard efficiency measures; and have their performance verified by a certified Home Energy Rating System Rater (HERS) who acts as the independent third party, ensuring that these homes meet program performance criteria.

The Home Performance with ENERGY STAR (HPwES) Initiative is designed to enhance the current market capacity for delivering comprehensive energy efficiency services to existing one- to four-family residences. The program seeks to create a "one-stop shopping" experience for consumers looking to make energy efficiency improvements to their homes. This is accomplished by requiring the participating contractor who provides the comprehensive home assessment to have the capability to prepare a scope of work and install the energy efficiency measures. The program also fosters consumer protection by offering training, a robust quality assurance/quality control (QA/QC) process and a one-year warranty, and by requiring certification and accreditation for participating contractors.

Energy efficiency improvements covered by HPwES include building shell measures such as air sealing and insulation, electric measures like ENERGY STAR refrigerators, heating measures such as boilers and furnaces, cooling measures such as ENERGY STAR room or central air conditioners, and certain renewable energy technologies. Eligible homeowners can elect to receive financing from the **New York Energy $mart**[SM] Loan Fund or the New York ENERGY STAR financing option.

Integrated with these market-based efforts is the Low-Income Single Family Initiative, which includes the Assisted Home Performance with ENERGY STAR effort and the Assisted New York ENERGY STAR Labeled Homes effort. This initiative provides additional incentives for low-income households, in some cases up to 50% of the approved work scope. In addition, participants can use the New York Energy Smart Loan Fund to further offset costs. The "Assisted" components of the Single Family Performance Program are available to residents with up to 80% of the state's median incomes (as compared to the 60% of state median income criterion used for participation in the federally funded Weatherization Assistance Program). Logic models for ENERGY STAR Homes and Home Performance can be found at the end of Section 4.

The 13-year program budget is $189.1 million. This budget includes $81.5 million for the low-income program element.

4.4.2 Recent Program Accomplishments

Several near-term, annual goals have been set for the Single Family Home Performance Program. These goals and progress for the first six months are shown in Table 4-6.

Table 4-6. Single Family Home Performance Program – Near-Term Goals and Achievements

Activity	Program Goals (July 1, 2006 through June 30, 2007)	Achieved July 1, 2006 through December 31, 2006
New York ENERGY STAR Labeled Homes Initiative		
New ENERGY STAR Labeled Homes built	2,150	1,082
New low-income ENERGY STAR Labeled Homes built	800	1
Home Performance with ENERGY STAR Initiative		
Existing homes served (receiving treatment)	3,225	1,270
Existing low-income homes served (receiving treatment)	2,100	691

4.4.3 Long-Term Program Accomplishments

This section highlights key program outputs as identified through the logic model development work and related market progress. All values reported are cumulative since program inception. Table 4-7 presents the key outputs for Single Family Performance Buildings through December 31, 2006. Table 4-8 presents a sample of key logic model-driven indicators of program success, especially those related to market progress, as tracked by the evaluation and program activities. Together, these tables indicate the most important ways that program progress is being measured, and report how those values are changing due to program activities.

Table 4-7. Single Family Home Performance Program – Key Program Outputs

Outputs	Value (Cumulative through December 2006)
New York ENERGY STAR Labeled Homes Initiative	
Number of completed projects by type	8,568 projects completed including: ▪ 7,717 Single-family labeled homes ▪ 240 Assisted NYESLHs ▪ 444 Model homes ▪ 167 Display homes
Number of "active" participating builders (built at least one home)	297
Dollar value of incentives paid	$11.45 million
Home Performance with ENERGY STAR Initiative	
Number of homes treated	13,804
Number of participating BPI-certified contractors and firms	449 BPI-certified technicians 127 Participating BPI-accredited firms
Dollar value of incentives paid	$7.98 million in participating contractor incentives

Table 4-8. Single Family Home Performance Program – Key Market Indicators and Program Cumulative Progress

Topic	Indicator	Initial Value (2003, unless noted)	Most Recent (2005, unless noted)
New York ENERGY STAR Labeled Homes Initiative			
Awareness and Knowledge	Consumer awareness of the ENERGY STAR label for new homes	59% of participating home buyers (those who purchased a NYESLH) were aware of the ENERGY STAR label for homes 52% of non-participating home buyers are aware of the label	92% of participating home buyers were aware of the ENERGY STAR label for homes
	Builder familiarity with energy efficiency measures and equipment	82% of participating builders reported that their familiarity had increased significantly (29%) or somewhat (53%) as a result of the program (2004 IDC survey)	85% of the participating builders reported that their familiarity had increased significantly (31%) or somewhat (54%) in the last few years 65% of the non-participating builders reported increasing familiarity
Availability of Services	Availability of New York ENERGY STAR homes	73% of NYESLH purchasers in 2002-2003 reported that NYESLHs were very or somewhat available	72% of NYESLH purchasers in 2004-2005 reported that NYESLHs were very or somewhat available

Topic	Indicator	Initial Value (2003, unless noted)	Most Recent (2005, unless noted)
	Energy efficiency measures showing changes in availability	Not Available	Builders reported that efficient lighting (93% of participating builders), water heaters (92%), central ACs (86%), and furnaces/boilers (83%) had all shown substantial increases in availability during the last few years
	Availability of HERS raters	Not Available	Fewer than half of the non-participating (36%) and participating (43%) builders stated that HERS raters were very or somewhat available
Market Share and Sales	Market penetration of New York ENERGY STAR Homes (including single and 2-4 family markets)	0.3% in 2001 3% in 2002 7.8% in 2003	11.1% in 2004 and 2006
Home Performance with ENERGY STAR Initiative			
Awareness and Knowledge	Homeowner familiarity with energy efficiency measures and equipment	Not Available	81% of the participating home owners reported that their familiarity had increased either significantly or somewhat during the last few years More than half of these participants said "all" or "most" of the increase was due to their participation in the HPwES Program
	Contractor familiarity with energy efficiency measures and equipment	Not Available	89% of the contractors said their familiarity had increased significantly or somewhat during the last few years 87% said "all" or "most" of this increase was due to their participation in the HPwES Program
	Homeowner awareness of BPI	Not Available	38% of participants had heard of the BPI
Perceived Value	Homeowner views on the importance of BPI certification	Not Available	Among those who had heard of the BPI, 82% considered BPI certification very or somewhat important in their selection of a contractor
	Contractors viewing BPI as a selling point	Not Available	36% view BPI as a strong selling point and 30% see it as a moderate selling point
	Homeowner satisfaction with the HPwES program contractors	Not Available	75% of the participating homeowners were very or somewhat satisfied with their contractors

Topic	Indicator	Initial Value (2003, unless noted)	Most Recent (2005, unless noted)
Availability of Services	Contractor promotion of HPwES Program	Not Available	89% of the participating contractors indicated that they were very (53%) or somewhat (36%) actively promoting the HPwES Program
	Participating contractor views on availability of energy efficiency measures and equipment	58% reported that energy-efficient measures and equipment are very available	82% reported that energy-efficient measures and equipment are very available
Market Share and Sales	Penetration of the HPwES Program in the home remodeling market	0.2-0.3% in 2001 0.7-1.1% in 2002 1.7-2.7% in 2003	1.7-2.7% in 2004 2.1-3.3% in 2005

4.4.4 Program Impact Evaluation

This section presents cumulative annual energy savings for the program from inception through December 31, 2006.

Gross Savings

The objective of the Measurement and Verification (M&V) evaluation review is to verify the estimate of the program's cumulative savings. Based on Nexant's review, as of December 31, 2006, the program has resulted in the energy savings and demand reductions shown in Table 4-9. Note that the realization rate shown is applicable to the entire program period.

Net Savings

The final step in determining net energy savings is attribution analysis. Attribution analysis determines, through various methods, whether the gross savings estimate from the M&V activities should be adjusted downward or upward for freeridership or spillover. Adjustments for freeridership and spillover, and the ultimate program net-to-gross ratio and net savings are shown in Table 4-9.

Table 4-9. Single Family Home Performance Program Cumulative Annual Energy and Peak Demand Savings (Through December 2006)

	Program-Reported Savings	Realization Rate	Adjusted Gross Savings	Freeridership	Spillover	Net-to-Gross Ratio[1]	Net Savings
New York ENERGY STAR Labeled Homes Initiative							
MWh/year	7,835	1.01	7,914	28%	47.6%	1.17	9,259
MW On-Peak	0.8	1.11	0.9	28%	47.6%	1.17	1.1
MMBtu	501,588	1.0	501,588	28%	47.6%	1.17	586,858
Home Performance with ENERGY STAR							
MWh/year	12,909	1.01	13,031	26%	41%	1.12	14,595
MW On-Peak	1.9	1.07	2.0	26%	41%	1.12	2.2
MMBtu	573,623	1.0	573,623	26%	41%	1.12	642,458
Single Family Home Performance Program – Total							
MWh/year	20,737	N/A	20,945	N/A	N/A	N/A	23,854
MW On-Peak	2.7	N/A	2.9	N/A	N/A	N/A	3.3
MMBtu	1,075,211	N/A	1,075,211	N/A	N/A	N/A	1,229,316

[1] Net-to-Gross Ratio = 1-Freeridership+Spillover (a weighted average of the NTG ratios estimated in the previous MCAC analysis and this current analysis is shown here).

Non-Energy Impacts

The MCAC team examined non-energy impacts (NEIs) for ENERGY STAR Labeled Homes in 2005, and NEIs for Home Performance were last studied in 2003. Results from the most recent evaluations are shown in Table 4-10.

Table 4-10. Single Family Home Performance NEI Results

Results from Direct Query Approach (year of study)	Percentage of Energy Savings
ENERGY STAR New Homes (2005)	51%
Home Performance with ENERGY STAR (2003)	50%

4.5 Multifamily Building Performance Program

4.5.1 Program Description

The Multifamily Building Performance Program has two tracks: one for new construction (and complete gut-rehabilitation projects) named the ENERGY STAR Multifamily Building Program (EMP); and one for existing buildings named the Multifamily Building Performance Initiative.

Before 2007, construction of new multifamily buildings was addressed through what was then the New Construction Program (now the High Performance New Buildings Program). Because multifamily buildings differ from non-residential buildings, and because market penetration for multifamily buildings was lower than for other building types, NYSERDA has now moved new multifamily building construction to the residential program portfolio. The EMP initiative provides technical assistance to mid-stream market participants, addressing renewable technologies, advanced metering technologies, real-time pricing strategies, and combined heat and power systems, especially for electrically heated buildings with base domestic hot water loads. Training regarding the rationale for energy efficiency measures is also provided for engineers, architects, building owners, building maintenance staff, and tenants.

The Multifamily Building Performance Initiative, for existing buildings, focuses on enhancing the energy services infrastructure. This involves developing market-based business opportunities for building auditors, financial packagers, designers, architects, and construction inspectors. It consolidates several previous multifamily initiatives in order to provide "one-stop shopping" and allow multifamily building owners and developers to find appropriate NYSERDA services more easily. The previous initiatives now incorporated into the Multifamily Building Performance Initiative include the following:

- The Residential Technical Assistance (ResTech) Program, which improved the operation of multifamily housing by identifying and encouraging the implementation of cost-effective energy-efficiency measures that also enhance health, safety, and comfort. Activities supported included: feasibility studies, computer-assisted building modeling, energy-efficiency technical training, and commissioning.
- The Residential Comprehensive Energy Management (CEM) Program, which promoted the acquisition and installation of energy management and advanced metering systems. This program helped position residential customers to take advantage of retail competition, while enabling program implementers to access customers' energy-use data.
- The **New York Energy $mart**[SM] Loan Fund (Loan Fund) program, which supported the implementation of energy efficiency measures within multifamily buildings. The multifamily component of the Loan Fund provided reduced-interest financing for energy-efficiency measures and related facility improvements. Lending institutions and borrowers in the commercial, industrial, institutional, municipal, multifamily, and residential markets (including building owners and tenants) were all targeted by the program. The Loan Fund provided interest reductions on loan amounts up to $5 million for multifamily homes for up to five years.

Both initiatives in the Multifamily Building Performance Program have low-income components. The low-income component of EMP (for new buildings) provides financial assistance during the design and construction phase to help owners complete the construction process, provides training and education to building owners and managers, and monitors energy savings.

The low-income component of Multifamily Building Performance Initiative (for existing buildings) provides technical and financial assistance to building owners and tenants to make energy efficiency improvements, thus reducing energy bills and providing increased health and safety benefits to building occupants. The low-income component of the Multifamily Building Performance Initiative incorporates many of the features of a previous program, the Assisted Multifamily Program (AMP). The Multifamily Building Performance logic model can be found at the end of Section 4.

The thirteen-year program budget is $189 million. The majority of the budget ($151.2 million) is allocated to the low-income program elements.

4.5.2 Recent Program Accomplishments

Several near-term, annual goals have been set for the Multifamily Building Performance Program. These goals and progress for the first six months are shown in Table 4-11.

Table 4-11. Multifamily Building Performance Program – Near-Term Goals and Achievements

Activity	Program Goals (July 1, 2006 through June 30, 2007)	Achieved July 1, 2006 through December 31, 2006
Number of existing multifamily units receiving energy efficiency services (completed projects)	7,800	6,803
Number of new multifamily units receiving energy efficiency services	1500	0
Tenant energy savings per unit per year	$250	$214

4.5.3 Long-Term Program Accomplishments

This section highlights key program outputs as identified through the logic model development work and associated market progress. All values reported are cumulative since program inception. Program highlights include the following:

- Since its inception, there have been 79 existing multifamily properties comprising 13,616 individual units that have received efficiency services.

Table 4-12 presents a sample of key logic model-driven indicators of program success, especially those related to market progress, as tracked by the evaluation and program activities

Table 4-12. Multifamily Building Performance Program – Key Market Indicators and Program Cumulative Progress

Topic	Indicator	Initial Value (2004, unless noted)
Awareness and Knowledge	Building owner/manager familiarity with advanced metering	61% of participants (n=36) are somewhat or extremely familiar compared to only 30% of non-participants (n=18)
	Change in building owner/manager familiarity with advanced metering over time	65% of participants (n=36) reported that familiarity has increased somewhat or significantly in the past two years compared to approximately 20% of non-participants
	Promotion of advanced meters	91% of metering providers said promotion of advanced metering services has increased significantly or somewhat (n=15)
Market barriers	Change in market barriers to advanced metering (according to contractors, consultants, manufacturers, and participating building owners/managers)	Decreasing barriers: Lack of experience, high cost of meters, uncertainty about savings, uncertainty about performance, availability of meters Increasing or unchanged barriers: Tenant resistance, regulatory barriers, real time pricing availability

Topic	Indicator	Initial Value (2004, unless noted)
Satisfaction	Building owner/manager satisfaction with advanced meters	88% are extremely or somewhat satisfied with program-installed meters (n=15)
Demand, Market Share/Sales, and Market Penetration	Demand for advanced meters	67% of metering providers indicated that demand for advanced metering services has increased somewhat to significantly over the past two years (n=16) 91% of metering providers believe demand will continue to increase somewhat or significantly over the next two years (n=16)
	Percentage of eligible low-income units participating (projects with installed measures, installation underway, and audits complete)	14.8% (2005 results) 6.1% had audits and installed measures (2005 results) 8.8% had an audit only (2005 results)

4.5.4 Program Impact Evaluation

The objective of the Measurement and Verification (M&V) evaluation review is to verify the estimate of the program's cumulative savings. Based on Nexant's review, as of December 31, 2006, the program has resulted in the energy savings and demand reductions shown in Table 4-13. Note that the realization rate shown is applicable to the entire program period.

Net Savings

The final step in determining net energy savings is attribution analysis. Attribution analysis determines, through various methods, whether the gross savings estimate from the M&V activities should be adjusted downward or upward for freeridership or spillover. Adjustments for freeridership and spillover, and the ultimate program net-to-gross ratio and net savings are shown in Table 4-13.

Table 4-13. Multifamily Building Performance Program Cumulative Annual Energy and Peak Demand Savings (Through December 2006)

	Program-Reported Savings	Realization Rate	Adjusted Gross Savings	Free-ridership	Spillover	Net-to-Gross Ratio[1]	Net Savings
Assisted Multifamily Program (AMP)							
MWh/year	28,362	0.97	27,511	27%	15%	0.84	23,109
MW On-Peak	1.7	1.26	2.1	27%	15%	0.84	1.8
MMBtu	167,303	1.0	167,303	27%	15%	0.84	140,541
Comprehensive Energy Management (CEM) Program							
MWh/year	3,192	0.97	3,096	2%	18%	1.16	3,592
MW On-Peak	0.8	1.77	1.4	2%	18%	1.16	1.6
Low Income Direct Installation							
MWh/year	11,494	1.0	11,494	0%	0%	1.0	11,494
MW On-Peak	1.6	1.0	1.6	0%	0%	1.0	1.6
Multifamily Building Performance Program – Total							
MWh/year	43,048	N/A	42,101	N/A	N/A	N/A	38,209
MW On-Peak	4.1	N/A	5.1	N/A	N/A	N/A	5.0
MMBtu	167,303	N/A	167,303	N/A	N/A	N/A	140,541

[1] Net-to-Gross Ratio = (1-Freeridership) * (1+Spillover).

Non-Energy Impacts

The MCAC team has examined non-energy impacts for both elements of the combined Multifamily Building Performance Program. The Assisted Multifamily Program was studied in 2003, while the Comprehensive Energy Management Program was the focus of an evaluation in 2004. Results are shown in Table 4-14.

Table 4-14. Multifamily Building Performance NEI Results

Results from Direct Query Approach (year of study)	Percentage of Energy Savings
Assisted Multifamily Program (2003)	54%
Comprehensive Energy Management Program (2004)	22-55%

4.6 Market Support Program

4.6.1 Program Description

The **New York Energy $mart**[SM] Market Support Program provides support services to the building performance and low-income programs by increasing the availability of energy-efficient products, and by providing residential program outreach and marketing services to recruit midstream participants and build consumer demand. The three initiatives involved in this program are the ENERGY STAR Products Initiative, the Program Marketing Initiative, and the GetEnergySmart.org website.

The ENERGY STAR Products Initiative, established in 1999, seeks to increase sales of residential ENERGY STAR appliances, lighting and home electronics products. This initiative works on both the supply and demand sides of the market. Its goals are: 1) to increase the supply of products through partnerships with retailers, manufacturers and distributors, and 2) to create demand for ENERGY STAR products through consumer awareness and understanding of the ENERGY STAR label.

The Program Marketing initiative provides marketing assistance to mid-stream partners, develops and distributes brochures and advertising aimed at consumers, and places advertising. This initiative also performs market research and leverages regional and national initiatives that meet program needs. Program Marketing provides support for the following **New York Energy $mart**[SM] residential efforts: Single Family Home Performance Program, Multifamily Building Performance Program, summer and winter energy-saving tips campaigns, and leveraged campaigns such as the "Change a Light, Change the World" campaign.

The GetEnergySmart.org website was initially developed to provide consumers with an on-line tool to assess the energy efficiency of their homes, as well as to provide recommendations on how to improve this efficiency. As the website evolved, it also came to provide consumers with program and partner information and energy efficiency tips, and to provide potential program partners with participation information. On-line marketing campaigns and e-mail newsletters were increasingly used to bring consumers to the website. The website has become an essential communication, marketing and education tool for residential programs.

The thirteen-year program budget is $144.2 million.

4.6.2 Recent Program Accomplishments

Several near-term, annual goals have been set for the Market Support Program. These goals and progress for the first six months are shown in Table 4-15.

Table 4-15. Market Support Program – Near-Term Goals and Achievements

Activity	Program Goals (July 1, 2006 through June 30, 2007)	Achieved July 1, 2006 through December 31, 2006
New manufacturing partners signed up	4	40
New retail partners (independent) signed up	20	10
New retail partners (big box, mass merchandisers) signed up	1+	1
ENERGY STAR market share increase on targeted products (on average, across products)	5%	3%
Annual energy savings	30 GWh	Not available

Additional program highlights include:

- Acting on a recommendation of the Process Evaluation and MCAC team, the Program increased its recruiting efforts for lighting partners in additional distribution channels. For example, Wegman's Food Markets Inc. became a partner in December 2006, bringing 51 stores into the Program in an area spanning from Buffalo to Binghamton.

- The continued collaboration with the New York State Department of Environmental Conservation on CFL mercury disposal has produced an educational brochure on proper disposal methods for CFLs. Planning for a public training is underway for spring of 2007.

- The Program launched the HVAC Supplier pilot initiative in December 2006 targeting HVAC suppliers who stock ENERGY STAR HVAC equipment. The initiative will be closely tied to the Home Performance with ENERGY STAR Program to ensure that proper installation techniques are being used by partners.

4.6.3 Long-Term Program Accomplishments

This section highlights key program outputs as identified through the logic model development work and associated market progress. Table 4-16 presents the key outputs for the Market Support Program through December 31, 2006. Table 4-17 presents a sample of key logic model-driven indicators of program success, especially those related to market progress, as tracked by the evaluation and program activities. Together, these tables indicate the most important ways that program progress is being measured, and report how those values are changing due to program activities.

Table 4-16. Market Support Program – Key Program Outputs

Outputs	Value (Cumulative through December 2006)
Number of retailer participants	373 (store fronts)
Number of manufacturer partners	22
Dollars spent on cooperative advertising	$14.5 million

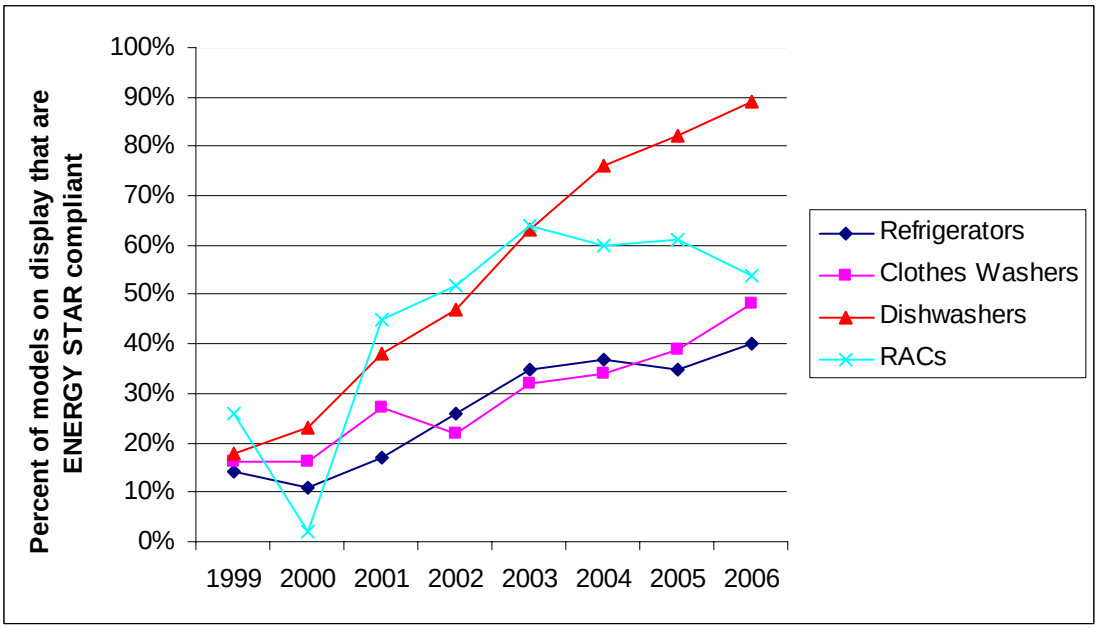
Table 4-17. Market Support Program – Key Market Indicators and Program Cumulative Progress

Topic	Indicator	Initial Value (2003, unless noted)	Most Recent
Energy Savings	Cumulative Net MWh, MW and MMBtu savings	2003 Data 122,600 MWh and 22.7 MW	2005 Data 303,839 MWh, 71.7 MW and 341,920 MMBtu
Awareness and Knowledge	NY consumer awareness of the ENERGY STAR label	1999 Data 34% (aided awareness from NYSERDA mail survey)	2005 Data 77% (unaided awareness from NYSERDA telephone survey)
	Consumer understanding of the ENERGY STAR label	1999 Data 35% 2003 Data 47%	2005 Data 87%
Product Availability	Percent of models on display at partner retailers that are ENERGY STAR qualified See Figure 4-1 for interim data points on appliances.	1999 Data Refrigerators – 14% Clothes Washers – 16% Dishwashers – 18% RACs – 26% CFL Bulbs[1] – 16% All Fixtures – 0-4%	2006 Data Refrigerators – 40% Clothes Washers – 48% Dishwashers – 89% RACs – 54% CFL Bulbs[1] – 24% All Fixtures – 0-33%
	Percent of models on display at non-partner retailers that are ENERGY STAR compliant	Not available	2006 Data CFL Bulbs[1] – 14% CFL Fixtures – 5-39%
Market Share & Sales	ENERGY STAR refrigerator market share	2001 Data 28% NY Partners 16% National Partners in NY[2]	2005 Data 47% NY Partners 52% National Partners in NY[2]
	ENERGY STAR dishwasher market share	2001 Data 48% NY Partners 15% National Partners in NY[2]	2005 Data 76% NY Partners 90% National Partners in NY[2]
	ENERGY STAR clothes washer market share	2001 Data 24% NY Partners 12% National Partners in NY[2]	2005 Data 41% NY Partners 34% National Partners in NY[2]
	ENERGY STAR RAC market share	2001 Data 45% NY Partners 21% National Partners in NY[2]	2005 Data 76% NY Partners 50% National Partners in NY[2]
Incremental Cost	Simple average incremental cost of ENERGY STAR products (% more than non-ENERGY STAR)	2004 Data Refrigerators – $465 (62%) Clothes Washers – $410 (89%) Dishwashers – $174 (47%) RACs – $44 (18%)	2005 Data Refrigerators – $413 (44%) Clothes Washers – $471 (106%) Dishwashers – $159 (37%) RACs – $37 (15%)

[1] Compared to all competing bulbs.

[2] Participating National EPA ENERGY STAR Partner Sales Data, Collected by D&R International.

Figure 4-1. Percent of Appliance Models on Display at Partner Stores that are ENERGY STAR Compliant



Note that the percentage of ENERGY STAR-labeled RACs on display declined in 2000, as shown in Figure 4-1, due to a change in Federal minimum efficiency standards. While this percentage increased after that time, it has been declining since 2003 due to the conclusion of the Keep Cool RAC Bounty Program. Although display of ENERGY STAR RACs has declined, market share of ENERGY STAR RACs remains high among New York retailers (at 76%) relative to other appliances.

4.6.4 Program Impact Evaluation

Gross Savings

The objective of the Measurement and Verification (M&V) evaluation review is to verify the estimate of the program's cumulative savings. Based on Nexant's review, as of December 31, 2006, the program has resulted in the energy savings and demand reductions shown in Table 4-18. Note that the realization rate shown is applicable to the entire program period.

Net Savings

The final step in determining net energy savings is attribution analysis. Attribution analysis determines, through various methods, whether the gross savings estimate from the M&V activities should be adjusted downward or upward for freeridership or spillover. Adjustments for freeridership and spillover, and the ultimate program net-to-gross ratio and net savings are shown in Table 4-18.

Table 4-18. Market Support Program Cumulative Annual Energy and Peak Demand Savings (Through December 2006 unless noted)

	Program-Reported Savings	Realization Rate	Adjusted Gross Savings	Free-ridership	Spillover	Net-to-Gross Ratio[1]	Net Savings
ENERGY STAR Products and Marketing (2005) [2]							
MWh/year	n/a	n/a	n/a	n/a	n/a	n/a	238,828
MW On-Peak	n/a	n/a	n/a	n/a	n/a	n/a	54.0
MMBtu	n/a	n/a	n/a	n/a	n/a	n/a	325,628
Keep Cool							
MWh/year	29,460	1.0	29,460	18%	15%	0.94	27,781
MW On-Peak	13.6	1.0	13.6	18%	15%	0.94	12.8
Bulk Purchase							
MWh/year	19,451	2.03	39,397	10%	5%	0.95	37,230
MW On-Peak	3.9	1.62	6.4	10%	5%	0.95	6.0
MMBtu	24,307	0.71	17,240	10%	5%	0.95	16,292
Market Support Program – Total							
MWh/year	n/a	n/a	n/a	n/a	n/a	n/a	303,839
MW On-Peak	n/a	n/a	n/a	n/a	n/a	n/a	72.8
MMBtu	n/a	n/a	n/a	n/a	n/a	n/a	341,920

[1] Net-to-Gross Ratio = (1-Freeridership) * (1+Spillover).

[2] Savings for ENERGY STAR products and marketing are through year-end 2005. Year-end 2006 savings are currently being estimated by the MCAC evaluation team and will be presented in the first quarter 2007 report.

Non-Energy Impacts

The MCAC team has examined non-energy impacts for CFLs and clothes washers. Results from the most recent direct query analysis on both of these measures are shown in Table 4-19.

Table 4-19. Market Support Program NEI Results

Results from Direct Query Approach (year of study)	Percentage of Energy Savings
Clothes Washers (2004)	27%
CFLs (2005)	60%

4.7 Communities and Education Program

4.7.1 Program Description

The Communities and Education Program provides face-to-face contact with New York residents on energy efficiency topics and NYSERDA programs through schools, local seminars and workshops, and events. The ultimate goal of the program is to help develop an energy-conscious society in New York with the desire and capability to create more efficient and sustainable communities. More immediate goals of the program include: 1) educating teachers, students, homeowners, renters, representatives of

community-based organizations, and community leaders on various energy topics, including energy efficiency and the relationship between energy, sustainability, and economic development in their communities; and 2) making them aware of **New York Energy $mart**[SM] programs that can be combined with local, State, and federal resources to reduce energy consumption in their communities. The two initiatives making up this program are Energy Smart Students (ESS) and **New York Energy $mart**[SM] Communities (NYE$C).

Beginning in 2004, ESS introduced energy and energy efficiency curricula to New York's K-12 teachers and students. ESS offers hands-on, project-based lessons which are aligned with the New York State Learning Standards for math, technology, language arts, science, and social studies. ESS has also introduced building sciences to vocational schools, laying the groundwork for the growth of the building performance specialists industry. EES offers one-day workshops for classroom teachers and other educators on energy literacy, science of energy, energy efficiency at home and at school, and more specialized topics, such as bio-diesel and hydrogen. Teachers attending the workshops are provided with a curriculum for grade levels K-12. The curriculum offers teachers the ability to select modules of varying lengths based on the needs of the students. ESS also sponsors an annual Energy Educator Conference to provide more intensive training to teachers willing to commit to assisting ESS with the training of other teachers. ESS offers teachers mini-grants to fund innovative energy projects in the classroom and community. The program also produces *Energy Smarts*, a bi-monthly newsletter devoted to energy education. In addition, the program participates in statewide teacher conferences and organizations, including the NYS Technology Educators Association and the Science Teachers Association of New York State.

NYE$C was developed as a partnership with the U.S. Department of Energy's Rebuild America Program. This initiative educates consumers and community leaders on the benefits of energy efficiency and renewable resources, and their ability to impact their own energy costs, using the community infrastructure to increase message reach and impact. NYE$C also provides ready access to **New York Energy $mart**[SM] programs by referring building owners and managers to appropriate program entry points. The initiative includes nine partnerships throughout New York State: Western New York, Finger Lakes Region, Central New York, Southern Tier, North Country, Capital Region, Mid-Hudson, and two partnerships in New York City. Throughout the year, the partnerships sponsor seminars and workshops, meet with community leaders, and staff the NYSERDA booth at local events, for the following purposes: to educate the public on saving energy at home and in the workplace; to provide public forums for the discussion of energy issues important to their community; and to work with planners in their communities to ensure that energy is addressed in local ordinances and growth plans. In addition, NYE$C has primary responsibility for recruiting builders, contractors, retailers, realtors, code officials, architects, engineers and others into the residential programs as mid-stream partners, thus eliminating the need for multiple program implementation contractors to recruit partners within the same regions, and reducing confusion and redundancy in the marketplace.

The thirteen-year program budget is $12.6 million.

4.7.2 Recent Program Accomplishments

Several near-term, annual goals have been set for the Communities and Education Program. These goals and progress for the first six months are shown in Table 4-20. Slow progress on the goal for recruiting seminars is due to transitioning this role from prior implementation contractors to the Energy $mart Communities coordinators.

Table 4-20. Communities and Education Program – Near-Term Goals and Achievements

Activity	Program Goals (July 1, 2006 through June 30, 2007)	Achieved July 1, 2006 through December 31, 2006
Teachers trained	1,000	308
Students reached	30,000	14,569
Community events held statewide	200	73
Recruiting seminars held statewide	100	0
Home performance contractors, technicians, builders and raters recruited for the Single Family Home Performance Program	160	36
Building analysts, designers, energy consultants, equipment installers, etc. recruited for Multifamily Building Performance Program	20	Not available

4.7.3 Long-Term Program Accomplishments

This section highlights key program outputs as identified through the logic model development work and associated market progress. All values reported are cumulative since program inception. Program highlights include the following:

- Since its inception, there have been 1,701 teachers trained on teaching about energy issues at 76 workshops. All 76 workshops received free use of space and promotional assistance from the host organization. In addition, 18 workshops received funding from utility and government.
- An estimated 180,000 students have been reached.
- 42 students participated in ten completed Energy Education Grants with a total of 2,800 students impacted and an estimate of 41,000 parents and community members reached.
- More than 800 meeting and outreach sessions have been held, attracting more than 97,000 attendees.

Table 4-21 presents the key logic model-driven outputs for the Communities and Education Program through December 31, 2006.

Table 4-21. Communities and Education Program – Key Program Outputs

Outputs	Value (Cumulative through December 2006)
Energy Smart Students Initiative	
Number of teacher conferences attended to promote ESS	25
Number of energy curricula offered	4 core workshops and 4 specialty workshops
Number of workshops	76
Number of teachers (including administrators) trained on energy education topics	1,701
Number of student-centered events attended	13
Number of energy education projects awarded through mini grants)	40

4.8 EmPower New York[SM]

4.8.1 Program Description

The EmPower New York[SM] Program is part of NYSERDA's portfolio of **New York Energy $mart[SM]** programs that serve low-income households in the state. Customers of SBC-participating utilities with incomes below 60% of state median income and households enrolled in utility low-income payment assistance programs are eligible for services. Both property owners and tenants may be served, and the program targets 1-to-4 family homes and multifamily buildings with fewer than 100 units. Priority is given to:

- Households participating in utility low-income programs
- Seniors referred by Offices for the Aging due to financial hardship
- Eligible households receiving services that are coordinated or co-funded by the Weatherization Assistance Program (WAP, run by the New York Division of Housing and Community Renewal, and funded by the U.S. Department of Energy), so as to create comprehensive work scopes that include appropriate electric reduction measures
- Eligible households in buildings not eligible for services through WAP
- Smaller buildings eligible for the Multifamily Building Performance Program that NYSERDA determines are better served through EmPower NewYork[SM]

EmPower New York[SM] prioritizes cost-effective electric efficiency measures, particularly lighting and refrigerator replacements. Home performance services, such as insulation, heating system repair and replacement, and air-sealing, are provided in situations where they offer the best means of improving energy affordability. Health and safety measures, such as carbon monoxide (CO) detectors and

emergency repairs, are also implemented as the need arises. Whenever possible, services are coordinated and cost-shared with WAP.

All customers that are referred to the program receive a package of information with educational materials, three CFL light bulbs, a water temperature thermometer, and a nightlight. These households are called "partial participants." Households expected to benefit from more comprehensive treatments receive energy audits and in-home energy education, and additional electric reduction measures (e.g., CFLs and ENERGY STAR-compliant refrigerators) or home performance measures as appropriate. These households are "full participants." There is no cost to the customer for these services and equipment. In rental situations, measures that directly benefit the eligible tenant may be installed without a landlord contribution. Additional measures generally require a 25% landlord contribution. The program also provides free workshops on energy use and financial management offered to the general public by the Cornell Cooperative Extension. Program audit and installation services are provided through a network of weatherization agencies and private energy services contractors, all of whom are accredited by the Building Performance Institute (BPI).

Effective July 2006, the Weatherization Network Initiative was merged with EmPower New York. The Weatherization Network Initiative was launched in 2003 to deliver electric reduction measures through the statewide network of weatherization agencies in coordination with the Weatherization Assistance Program. A total of 5,693 households received services through the Weatherization Network Initiative. The total cost was $7.8 million with an average cost of $670 and average annual savings of $174 per household. As services are tailored to the needs of the household, actual costs and savings can vary from the average by an order of magnitude or more. EmPower expanded the involvement of these weatherization agencies while adding private contractors to ensure cost-effective and timely services.

The combined SBC budget through June 2011 is $58.3 million. In addition, the program has leveraged non-SBC funds totaling $6,250,000 to install efficiency measures for an additional 4,489 households. Table 4-22 displays details of the budget and goals of the non-SBC funding sources.

Table 4-22. Non-SBC Funds Leveraged

Source	Budget	Unit Goal	Expended	Completions
Indian Point 2 Joint Proposal	$2,400,000	2,200	$1,915,367	1,939
Western New York Environmental Projects	$895,000	1,000	$169,663	280
National Grid Low Income Gas Customer Efficiency Program	$2,500,000	1,075	$1,995,769	959
AES Environmental Mitigation Project	$455,000	255	0	0
Total	$6,250,000.00	4,530	$4,080,799.00	3,178

4.8.2 Recent Program Accomplishments

One near-term, annual goal has been set for the EmPower New York[SM] Program. This goal and progress for the first six months are shown in Table 4-23.

Table 4-23. EmPower New York[SM] Program – Near-Term Goals and Achievements

Activity	Program Goals (July 1, 2006 through June 30, 2007)	Achieved July 1, 2006 through December 31, 2006
Households served (completed)	6,300	3,289

4.8.3 Long-Term Program Accomplishments

This section highlights key program outputs as identified through the logic model development work and associated market progress. All values reported are cumulative since program inception. Program highlights include the following:

- The EmPower New York[SM] Program including the Weatherization Network Initiative (non-SBC funding) has served 15,544 low-income households in New York.
- The energy cost for the average low-income household served by the program has been reduced by $226 per year at a cost of $1005.

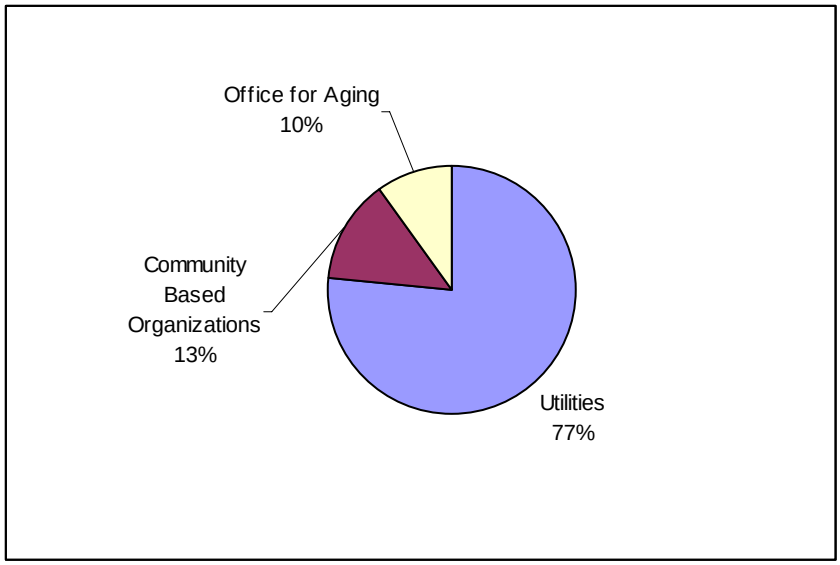
Table 4-24 presents a sample of key logic model-driven indicators of program success, especially those related to market progress, as tracked by the evaluation and program activities.

Table 4-24. EmPower New York[SM] Program – Key Market Indicators and Program Cumulative Progress (SBC-funded only)

Topic	Indicator	Most Recent (2006, unless noted)
Recruitment of Low-Income Households	Number of WAP agency referrals to program	7,313 See Figure 4-2 for more information on the source of referrals.
	Number of participants selected for comprehensive audit, education, electric reduction, and Home Performance services	18,365
	Number and types of community-based organizations working with program	34 Offices for the Aging, 8 Local Department of Social Services, 6 Housing Agencies, and 18 other Community Based Organizations
	Number of WAP agencies working with program	60
	Number of utilities working with program	6
	Number of energy services contractors working with program	75

Topic	Indicator	Most Recent (2006, unless noted)
Low-income Households and Buildings Served	Number of audits completed	16,096
	Participants receiving print and in-home education	23,336
	Participants attending energy and financial management workshops	8,030 attendees in 841 workshops
	Number of low-income buildings with energy efficient equipment installed	15,544

Figure 4-2. Referrals to EmPower by Source



4.8.4 Program Impact Evaluation

This section presents cumulative annual energy savings for the program from inception through December 31, 2006. Savings for the EmPower Program are shown in Table 4-25. M&V and attribution analysis have not been conducted on this program. Therefore, no adjustments have been made to the program reported savings.

Table 4-25. EmPower New York[SM] Program Cumulative Annual Energy and Peak Demand Savings (Through December 2006)

	Program-Reported Savings	Realization Rate	Adjusted Gross Savings	Net-to-Gross Ratio	Net Savings
MWh/year	27,933	Not Evaluated	27,933	Not Evaluated	27,933
MW On-Peak	3.3	Not Evaluated	3.3	Not Evaluated	3.3
MMBtu	66,891	Not Evaluated	66,891	Not Evaluated	66,891

4.8.5 Program Recommendations and Process Evaluation

The process evaluation team, Research Into Action, conducted a short-term analysis of NYSERDA's EmPower New York[SM] program, with a specific focus on a pilot involving six participating contractors in 2006. The results presented below are based upon program data and interviews with NYSERDA staff, program implementation management and staff from Honeywell, and interviews with representatives from six contractors who deliver services to households under the EmPower New York[SM] program.

The pilot was conducted in mid-2006 to waive the pre-approval process for selected commonly installed measures under the EmPower New York[SM] program. The purpose of the pilot was to speed up the job completion process by eliminating the pre-approval step.[1] Six contractors who expressed interest in the program change participated in the pilot and were interviewed as to their experiences; an analysis of pilot contractor activity level statistics compared to those of non-pilot contractors was also conducted.

Results of the pilot were largely positive for the six participants. They reported shorter turnaround times for jobs, due to elimination of the pre-approval step, and a strong level of support for the streamlined process. Their reports are substantiated by the data reviewed: pilot contractors completed jobs faster than non-pilot contractors. Results of the pilot were mixed from the perspective of the implementation contractor.[2] Most agencies and jobs complied with the pilot requirements; however, a few projects in the pilot did not follow procedures and this led to disputes regarding payments.

As the program continues using this approach, program staff should continue to monitor the program and note whether there are any increases in administrative costs to check work scopes after the fact or if there is an increase in disputed jobs. Staff are addressing these issues in a statewide expansion plan and planning for ways to extend the privilege selectively such that a process for ensuring compliance is established.

Based on the experiences of those involved in the pilot, there are pros and cons to the pilot approach, resulting in a mixed set of experiences. The agencies that participated reported that the approach worked better for them however, it is also clear that it took a while for some to learn the new system and one or more of the contractors did not read the guidelines carefully. The recommendations that follow are

[1] In the pre-approval step, the program implementation contractor would approve the project work scope. NYSERDA program staff felt that responsibility for work scope approval more appropriately rested with participating contractors, instead of the implementation contractor. This change also enhances the professionalism of the participating contractors who also take on responsibility for completing the energy analysis that drives measure selection using various audit software.

[2] The implementation contractor notes that its perspective has changed based on the refinements to direct installation approach and feels satisfied that this approach will be successful.

suggested by this evaluation as the Direct Installation process is expanded statewide. Program staff note that these recommendations are currently being instituted.[3]

Recommendations

1. NYSERDA should expand the program gradually to enable more contractors and agencies to become familiar with the new guidelines under the direct install approach. This expansion should include offering the direct installation approach to contractors with experience in the program who have demonstrated high quality work and knowledge of the program rules and high quality work.

2. NYSERDA should offer the direct installation approach to contractors with experience in the program who have demonstrated high quality work and knowledge of the program rules and high quality of work.

3. NYSERDA must continue to work with the implementation contractor to evolve clear guidelines for Direct Installation.

4. The implementation contractor must ensure that guidelines are clearly communicated to the contractor.

5. The implementation contractor must be clear and direct in implementing such guidelines. Over time, this clarity of procedure will reduce post-invoice conflicts.

6. Contractors must take responsibility for becoming familiar with and following the guidelines that are provided.

4.9 Buying Strategies and Energy Awareness Program

4.9.1 Program Description

The Buying Strategies and Energy Awareness Program is part of NYSERDA's portfolio of **New York Energy $mart^{SM}** programs serving low-income households in the state. The Buying Strategies and Energy Awareness Programs consist of four initiatives:

- ***Buying Strategies*** – This initiative works with the Office of Temporary and Disability Assistance (OTDA) to secure discounts on purchases of home heating oil for customers of the federally funded Low Income Home Energy Assistance Program (LIHEAP) customers.[4] The initial Buying Strategies pilot program was launched in 2003 and tested a variety of strategies for securing reduced prices for home heating oil. Using "margin over rack" and "discount off retail" buying strategies, the program has increased the buying power of LIHEAP funds for heating oil by 7 to 13 percent, saving about $50 per year per household. Based on the successes of the earlier pilot efforts, the Office of Temporary and Disability Assistance committed to a three-year phased implementation of the

[3] Program staff noted that NYSERDA is committed to offering training to its contractors in the use of TREAT, the software used by Home Performance with ENERGY STAR. Enhancing the skills and knowledge of its contractors is an important reflection of NYSERDA's commitment to a market transformation approach.

[4] Customers whom have an annual income of 60 percent or less than the State Median Income.

program. During the 2005-2006 heating season, the Buying Strategies program included 20 counties, and 200 oil vendors participated in the program. The program expanded its offerings to 39 counties during the 2006-2007 heating season (with a total of 317 participating oil vendors) and plans to reach all 62 counties in New York for the 2007-2008 heating season.

The Buying Strategies initiative includes a preventive maintenance component for oil-fired heating systems. Under LIHEAP, recipients are offered heating repair and replacement assistance for inoperable furnaces, but they are not offered preventive maintenance services. The Buying Strategies maintenance component addresses this gap by providing maintenance services, resulting in increased efficiencies for operating heating systems and reduced health risks and safety problems due to malfunctioning systems. The "Clean & Tune" service is currently available to LIHEAP customers of participating oil vendors as an incentive to offer the discount on oil purchases.

The newest component of the Buying Strategies initiative will provide technical assistance to OTDA and local Departments of Social Services in the delivery of the Heating Equipment Repair and Replacement component of New York's enhanced version of LIHEAP. At the close of December 2006, negotiations were underway with a contractor selected through RFP 1005 to provide quality assurance for the New York-specific HEAP Heating Equipment Repair and Replacement component. Subject to agreement by OTDA, the quality assurance services will begin with a several month-long pilot in up to seven counties. A plan for expansion of services statewide will then be developed with OTDA based on the lessons learned in the pilot.

- ***Targeted Marketing and Outreach*** – This initiative works to increase participation in all NYSERDA-, State-, Federal-, utility- and community-based low-income energy efficiency and energy assistance programs. The initiative targets hard-to-reach (HTR) customers such as the elderly, the low-income population, and the non-English speaking population, delivering messages specifically tailored for these groups to make sure they can make informed choices about their options for reducing energy costs. The initiative supplements existing marketing activities and distributes information through events, seminars and meetings sponsored by community-based organizations (CBOs). It also places print advertisements and articles in publications and newspapers that are specifically designed to reach low-income and other HTR populations, as well as radio advertising.

- ***Low-Income Forum on Energy (LIFE)*** – LIFE provides a forum where energy industry professionals, policy makers, low-income serving agencies, and energy program implementers can discuss issues relevant to the low-income sector. LIFE conducts large statewide conferences, smaller regional meetings and steering committee meetings to share information about emerging issues and best practices.

- ***Energy Smart Students*** – The Buying Strategies and Energy Awareness Program contributes funding to the Energy Smart Students (ESS) Program, which is described in Section 4.8 above.

The program budget is $17.7 million.

4.9.2 Recent Program Accomplishments

Several near-term, annual goals have been set for the Buying Strategies and Energy Awareness Program. These goals and progress for the first six months are shown in Table 4-26.

Table 4-26. Buying Strategies and Energy Awareness Program – Near-Term Goals and Achievements

Activity	Program Goals (July 1, 2006 through June 30, 2007)	Achieved July 1, 2006 through December 31, 2006
Funds leveraged through Buying Strategies initiative	$4 million	Not available
Additional low-income individuals reached via newsletters, weekly newspapers, etc. (readership)	1,000,000	240,000
Additional low-income individuals reached via seminars and workshops (attendees)	3,000	7,625
Additional contractors and other partners recruited in low-income districts	10	6
Additional students reached in schools serving low-income populations (number of individuals given educational materials)	20,000	9,137

4.9.3 Long-Term Program Accomplishments

This section highlights key program outputs as identified through the logic model development work and associated market progress. All values reported are cumulative since program inception. Program highlights include the following:

- Forty-four companies have signed Participation Agreements to participate in the Clean and Tune service under Buying Strategies.
- The price savings per gallon of fuel delivered through the Buying Strategies Initiative averaged $0.13, assuming an average LIHEAP grant of $400, the average out-of-pocket savings per LIHEAP client for the heating season is about $44.
- An estimated 9,137 low-income students will benefit from improved energy education as a result of workshops held by the Energy Smart Students program in the past six months.

Table 4-27 presents the key outputs for the Buying Strategies and Energy Awareness Program through December 31, 2006. Table 4-28 presents a sample of key logic model-driven indicators of program success, especially those related to market progress, as tracked by the evaluation and program activities. Together, these tables indicate the most important ways that program progress is being measured, and report how those values are changing due to program activities.

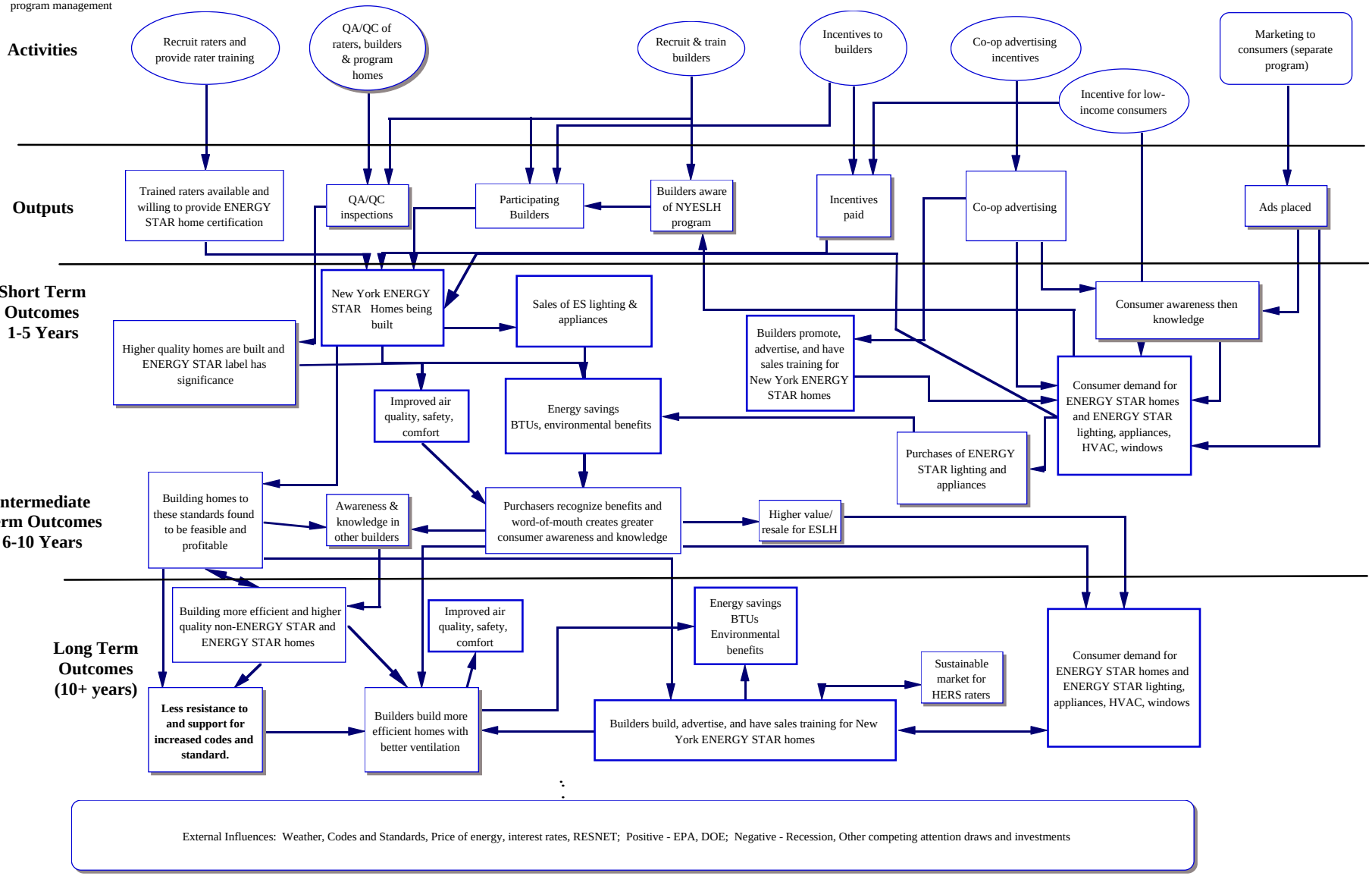
Table 4-27. Buying Strategies and Energy Awareness Program – Key Program Outputs

Outputs	Value (Cumulative through December 2006)
Buying Strategies	
Total number of participating oil vendors	317
Number of clean and tune contractors enrolled	44
Number of clean and tune services	496
Number of oil buying educational material distributed (includes materials sent out by OTDA and NYSERDA)	50,000
Low-Income Forum on Energy (LIFE)	
Numbers of LIFE Steering Committee members	24 member organizations
Number of LIFE meetings and conferences held	28 regional meetings, 5 statewide conferences
Number of attendees at LIFE meetings and conferences	1,117

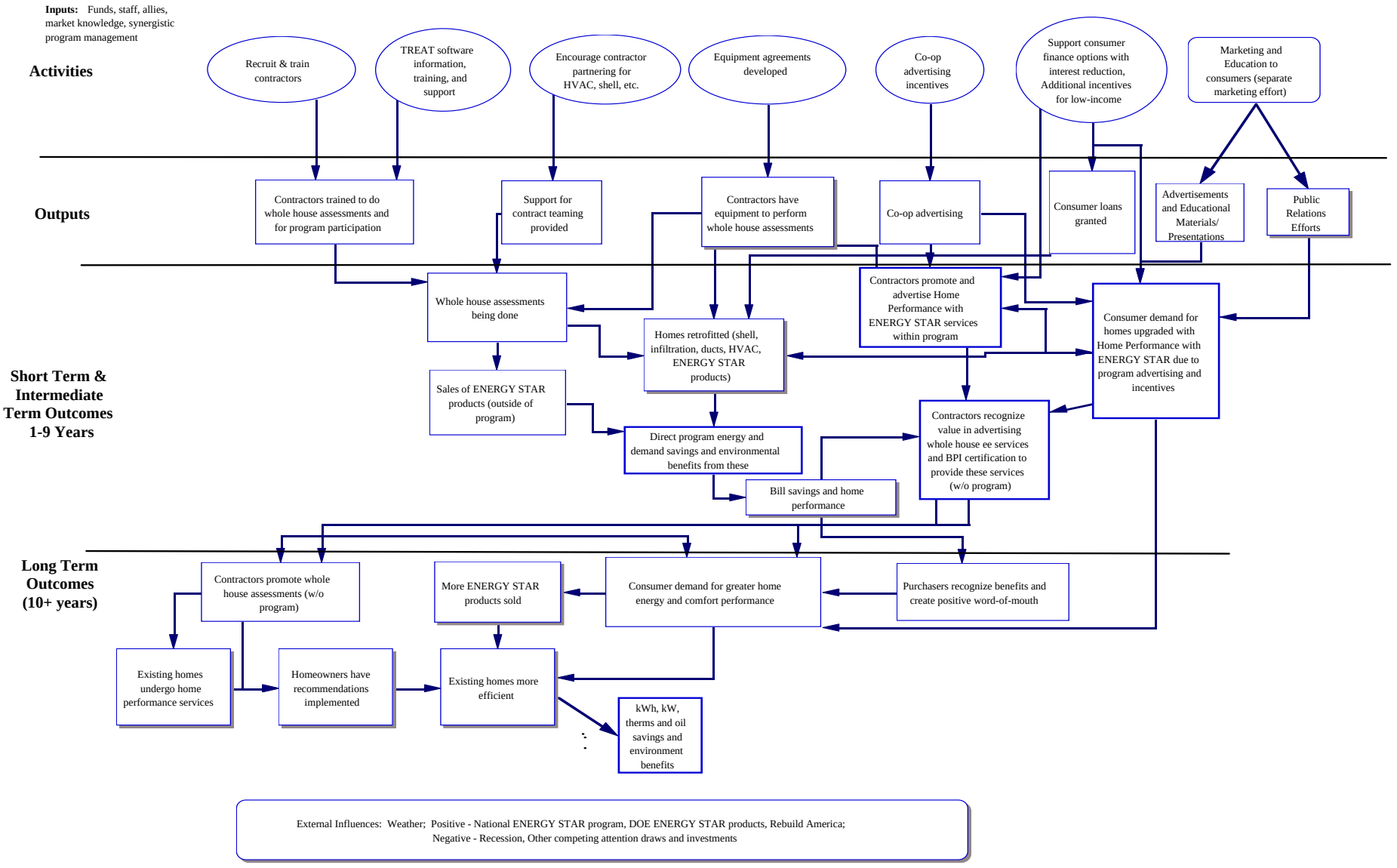
Table 4-28. Buying Strategies and Energy Awareness Program – Key Market Indicators and Program Cumulative Progress

Topic	Indicator	Initial Value (2003, unless noted)	Most Recent (2006, unless noted)
Buying Strategies			
Availability of services	Number of Clean and Tune services provided	0	496
	Number of DSS agencies working with HEAP/Oil Buying	5	39
	Number of oil dealers participating	0	317
	Number of participating heating equipment service providers by type	0	44

Home Performance with ENERGY STAR Program Logic Model

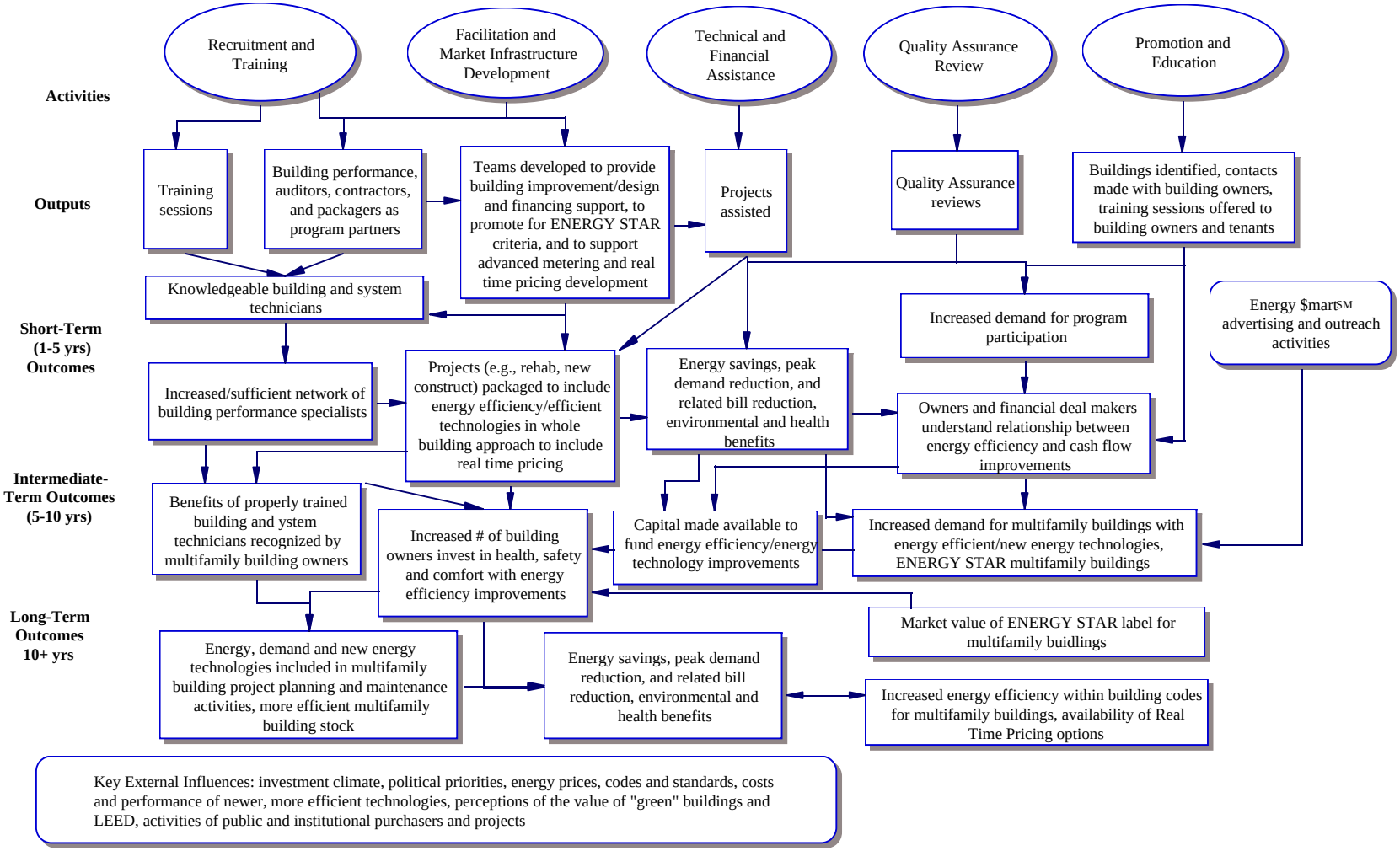


ENERGY STAR Homes Program Logic Model



Multifamily Building Performance Logic Model

Inputs: Funds, staff, allies, awareness and credibility of NYSERDA, trade ally and contractor knowledge, market knowledge



5

Research and Development Programs

5.1 Overview of the Research and Development Programs

NYSERDA's Research and Development (R&D) activities are organized into five primary program areas: energy resources, transportation and power systems, environment, industry, and buildings. Projects in each of these program areas address technologies and mechanisms that affect the energy supply and meet the needs of end users. As a result, crosscutting areas such an environmental protection, waste management, energy product development, and renewable energy technologies are addressed in several programs.

Public Benefit Power Transmission and Distribution Research. The new Public Benefit Power Transmission and Distribution Research Program will support transmission and distribution (T&D) research that has broad statewide benefits. Projects will provide improvements to power reliability, quality and security, and reduce the cost of energy and energy delivery. The New York State Independent System Operator (NYISO) and the New York State Reliability Council (NYSRC) are key stakeholders in the T&D research program, and NYSERDA will coordinate with both of these entities.

Clean Energy Infrastructure. The previous End-Use Renewables (EUR) Program has provided the foundation for the creation of the Clean Energy Infrastructure Program. Clean Energy Infrastructure efforts will be closely integrated with other SBC-funded efforts, such as Distributed Energy Resources, to develop and commercialize clean energy technologies. The ultimate goal of these programs is to reach a point where the value of the technology is worth the investment required by the consumer, and the market infrastructure is in a position to deliver and support the technology over the long term. This program will also complement efforts under the Renewable Portfolio Standard (RPS) by supporting training, education and market development for RPS-eligible technologies such as photovoltaics. The Clean Energy Infrastructure funds may also be used to reduce the installation and operating cost of systems not eligible for RPS funding.

Power Systems Product Development. The goal of this program is to work with New York technology companies to develop distributed generation and storage products and expand the number of marketable competitive products that reduce peak load, improve power quality, and provide improved cost-effective environmental performance. The Power Systems Product Development Program supports New York State business in all aspects of product development necessary to create and commercialize power generating products that are clean, efficient, reliable, and cost effective, as well as other products that reduce peak demand or improve end user power quality. Additionally, the program focuses on New York State specific issues such as economic development and job creation in the State; targets technologies and opportunities that are not being addressed by the market; addresses regulatory barriers to the adoption of

superior new technologies; and, emphasizes the development of economically competitive options for end users.

DG-CHP Demonstration. The DG-CHP Demonstration Program will contribute to the growth of combined heat and power and other distributed generation applications in New York. The program provides funding for site-specific feasibility studies and demonstrations and seeks to improve awareness of end-users and project developers of DG-CHP. The program also seeks to address DG-related issues such as DG permitting; Standard Interconnection Requirements (SIR); utility standby service; tariffs; technology risk; renewable fuel options such as anaerobic digester and landfill gas; and the impact of fluctuating prices of natural gas. The program uses financial incentives to encourage customer-sited DG using commercially available DG technologies such as reciprocating engines. The program will be coordinated with similar offerings from RPS Customer-Sited tier and Consolidated Edison's System Wide Demand Reduction programs.

Demand Response and Innovative Rate Research. This new initiative supports participation by small customers in the NYISO's wholesale demand response and time-sensitive retail electric pilots. Residential and small commercial loads constitute a small percentage of participants in these programs because of their relatively small loads, the high cost of aggregation, and the lack of flexible metering options and other load control technologies. The program promotes the development, demonstration, and use of end-use technologies that have flexible load capabilities, such as air conditioners and lighting that are enhanced with features that allow remote access and group control for easier load reduction in response to peak demand and price signals. Additionally, the program's time-sensitive pilots promote the development of innovative electric service rates by energy services companies. The program concentrates on the New York City metropolitan area where capacity is particularly constrained and value propositions for load reductions are most desirable.

Electric Transportation. The program supports emerging technologies from inception through field testing and pre-commercial deployment. The benefits of the electric transportation program will include peak load reduction in the New York City load pocket and permanent energy use reductions. These reductions will result in cost reductions to the subway and commuter rail systems and reduced transmission congestion in the region. Additionally, many projects are expected to reduce transportation costs and emissions from petroleum fueled vehicles.

Environmental Monitoring, Evaluation, and Protection. The Environmental Monitoring, Evaluation and Protection Program (EMEP) commenced in the late 1990s in an effort to increase understanding of the environmental impacts of electricity production. EMEP initiatives are building on past efforts and evolving to support research in three primary areas: ecosystem response to sulfur, mercury and nitrogen deposition; health and energy-related research on air quality, particulate matter, ozone and co-pollutants; and crosscutting environmental science, technology and policy projects. The program is guided by a steering committee comprised of major stakeholder groups. In addition a separate science advisory committee continues to provide technical review. The program has maintained a robust science and policy communication component to deliver program findings to policy-makers, scientists, and the public. The EMEP program closely collaborates with regional and national entities to leverage funds for pertinent research projects.

Industrial Research, Development, and Demonstration. The Industrial Research, Development, and Demonstration (IRDD) program supports feasibility studies and technology demonstrations that: (1) improve energy productivity and competitiveness of New York manufacturers (minimize cost per unit output), (2) encourage capital investment and employment growth in New York State facilities, (3) introduce New York State-manufactured goods into new markets, and (4) encourage adoption of process changes that minimize waste. Cost-shared demonstration projects reduce risk and encourage

manufacturers to adopt innovative and underutilized process alternatives. IRDD is a collaborative effort of Industrial and Environmental R&D and Energy Efficiency Services.

Municipal Water and Wastewater Efficiency. The Municipal Water and Wastewater Efficiency initiative is a collaborative effort between NYSERDA's R&D and Energy Efficiency Services programs. Since 2000, the ongoing water and wastewater initiative has supported projects that accelerate the use of energy-efficient and innovative technologies by municipal water and wastewater systems in New York through demonstrations, technology transfer, and feasibility studies. The program's latest solicitation is a sector-based initiative, under the Energy Smart Focus Program, where municipal water and wastewater is one of the five sectors selected to receive services. All activities to date have had strong technology transfer components, and municipal water and wastewater treatment is also integrated with the Enhanced Commercial/Industrial Performance program.

Next Generation and Emerging Technologies. This program emphasizes discrete and integrated end-use technologies for buildings; daylighting applications; solar thermal applications; and emerging technologies for industry and buildings not covered elsewhere in NYSERDA's **New York Energy $mart**[SM] portfolio of programs. The bulk of funds for this program are being administered through narrowly defined competitive solicitations possibly focusing on advanced building demonstrations, discrete building technologies, solar thermal applications, daylighting applications, and emerging technologies. The program emphasis is on funding developers and producers of energy-efficient technology which would be commercially available to end users. Demonstration solicitations are open to all end-use customers, particularly those with high electric loads.

5.2 R&D Program Evaluation Activities

The R&D program evaluation activities conducted this year are shown in Table 5-1. The table includes only new evaluation activities conducted in 2006. However, findings from earlier evaluations are also discussed in this section to the extent that they contribute to the cumulative assessment of these programs.

Table 5-1. 2006 R&D Program Evaluation Activities

Program Name	Predecessor Program (if applicable)	Theory & Logic	Measurement and Verification (M&V)	Market Characterization, Assessment and Causality (MCAC)	Process Evaluation
Public Benefit Power Transmission and Distribution Research		-	-	-	-
Clean Energy Infrastructure	End-Use Renewable Energy Market	-	Database review for End-Use Renewables	-	-
Power Systems Product Development		-	-	-	-

Program Name	Predecessor Program (if applicable)	Theory & Logic	Measurement and Verification (M&V)	Market Characterization, Assessment and Causality (MCAC)	Process Evaluation
DG-CHP Demonstration	Distributed Power Generation/CHP CHP Demonstrations Power Systems Technology – Product Development Strategic Energy Reliability	Value/Cost (Peer Review) Assessment	Database review for DG/CHP	-	-
Demand Response and Innovative Rate Research		-	-	-	-
Electric Transportation		-	-	-	-
Environmental Monitoring, Evaluation and Protection		Value/Cost (Peer Review) Assessment	-	-	-
Industrial Research, Development and Demonstration		-	-	-	-
Municipal Water and Wastewater Efficiency		-	-	-	-
Next Generation and Emerging Technologies	Next Generation of Energy-Efficient End-Use Technologies	-	-	-	-

5.3 R&D Program Evaluation Findings

Significant progress is being made as the Research & Development portfolio transitions to the new set of program offerings. This section summarizes key evaluation findings from the latest set of evaluation activities, and from the cumulative body of work conducted by NYSERDA and its evaluation contractors over the past several years.

5.3.1 Energy, Peak Demand and Fuel Savings and Clean Generation

NYSERDA's Measurement and Verification (M&V) contractor assessed the energy and peak demand savings and clean generation reported for its R&D programs. Methods used in this assessment included on-site verification of equipment installation and functionality, and review of NYSERDA's files for reasonableness and accuracy. Based on this review, the M&V contractor adjusted the savings reported by NYSERDA. In turn, the Market Characterization, Assessment & Causality (MCAC) contractor further adjusted these figures to account for freeridership and spillover. Table 5-2 summarizes the estimated

electricity savings and clean generation for each of the applicable R&D programs. Table 5-3 summarizes peak demand reductions. Table 5-4 shows other fuel savings for the R&D programs.

As reported earlier in Section 2, overall, NYSERDA's M&V and MCAC contractor teams have found that savings for the R&D sector should be adjusted as follows:

- Electricity savings were adjusted upward by 2%.
- Peak demand savings were adjusted downward by 29%.[1]
- Other fuel savings were adjusted downward by 5%.

These adjustments include changes in program reported savings due to database reviews and field work to measure and verify savings, as well as survey research and other activities to quantify freeridership and spillover. Most of the adjustment, however, is due to the measurement and verification work since any freeridership that exists is outweighed by spillover on all but one R&D program.

Table 5-2. R&D Program Electricity Savings through December 31, 2006 and Progress toward One-Year Goals

Program	Energy Savings (GWh)	
	Savings Achieved through	
	June 30, 2006	Dec. 31, 2006
DG-CHP Demonstration Program[1] (ConEdison)	82.7 (42.0)	96.7 (42.0)
Renewable Energy Production (ConEdison)	103.8 (0.5)	104.6 (0.5)
Overlap Removed	6.6	7.7
ConEdison R&D Total	**42.5**	**42.5**
Statewide R&D Total	**179.9**	**193.6**

[1] Because the electricity saved by the DG/CHP projects replaces electricity formerly purchased from the grid, the program has reduced fuel used at central generating stations, for a net decrease statewide due to greater efficiency of the DG/CHP systems at sites where imported fuel is used. The fuel avoided at the central generating plant is determined from the electricity generated by the DG/CHP installations. Furthermore, at additional projects such as wastewater treatment plants, electricity generation is powered fully or partially by digester gas produced on site. Such fuel switching achieves natural gas conservation above and beyond what is achieved through efficiency alone.

[1] The Demand Response and Innovative Rate Research Program does not require that enabled demand reductions be maintained. This large downward adjustment for the R&D programs is due to M&V results indicating the portion of enabled demand reduction that has been maintained.

Table 5-3. R&D Program Peak Demand Reductions through December 31, 2006 and Progress toward One-Year Goals

Program	Demand Reductions (MW)	
	Savings Achieved through	
	June 30, 2006	Dec. 31, 2006
DG-CHP Demonstration Program (ConEdison)	18.1 (8.5)	21.1 (8.5)
Demand Response and Innovative Rate Research (ConEdison)	137.2 (68.6)	137.2 (68.6)
Renewable Energy Production (ConEdison)	8.1 (0.3)	8.4 (0.3)
Overlap Removed	1.3	1.5
ConEdison R&D Total	77.4	77.4
Statewide R&D Total	162.1	165.2

Table 5-4. R&D Program Fuel Savings through December 31, 2006 and Progress toward One-Year Goals

Program	Fuel Savings (MMBtu)	
	Savings Achieved through	
	June 30, 2006	Dec. 31, 2006
DG-CHP Demonstration Program[1] (ConEdison)	-571,310 (-266,937)	-738,327 (-296,521)
ConEdison R&D Total	-266,937	-296,521
Statewide R&D Total	-571,310	-738,327

[1] Because the electricity saved by the DG/CHP projects replaces electricity formerly purchased from the grid, the program has reduced fuel used at central generating stations, for a net decrease statewide due to greater efficiency of the DG/CHP systems at sites where imported fuel is used. The fuel avoided at the central generating plant is determined from the electricity generated by the DG/CHP installations. Furthermore, at additional projects such as wastewater treatment plants, electricity generation is powered fully or partially by digester gas produced on site. Such fuel switching achieves natural gas conservation above and beyond what is achieved through efficiency alone.

5.3.2 Summary of Other Key Program Impacts

Across the programs, numerous near-term goals were set for other key metrics besides energy savings such as: the number of solicitations, studies, and projects; the number of workshops; the number of companies doing business in New York; new products developed and launched; and other important logic model-driven knowledge creation, information dissemination and commercialization progress metrics. Overall, the programs are also performing well with respect to these other goals. Results of each program's progress toward its stated goals are shown in table format in the subsequent sections.

Key areas of progress in the past six months include the following:

- Contracts are being negotiated with four firms intending to manufacture clean energy products in New York.
- The Power Systems Product Development Program awarded five contracts for product development.
- Performance data on 21 DG/CHP projects is now available on the Internet, allowing performance monitoring and promoting technology transfer.
- Thirteen publications (including research reports and peer-reviewed journal articles) resulted from the Environmental Monitoring, Evaluation and Protection Program activities.
- Four Technical Assistance projects were completed for water and wastewater facilities.
- Seven solicitations were issued for the Next Generation and Emerging Technologies Program, and the new Public Benefit Power Transmission and Distribution Research Program identified priority research areas and will release its first solicitation in the first quarter of 2007.

5.4 Public Benefit Power Transmission and Distribution Research

5.4.1 Program Description

The new Public Benefit Power Transmission and Distribution Research Program will support T&D research that is not utility specific and has broad statewide energy efficiency and reliability benefits. Projects will be selected to provide improvements to power reliability, quality and security, and reduce the cost of energy and energy delivery. Examples of such T&D projects funded through the R&D program include:

- The Albany High Temperature Superconducting (HTS) Cable Project resulted in the world's first demonstration of a superconducting cable operating underground in a live utility grid. The demonstration continues to operate as part of the National Grid system between its Riverside and Menands substations located in Albany, New York. Because HTS cables are able to carry three to five times more power than conventional cables of the same size, they offer the potential to serve the growing electricity demands in high density urban areas without the need to build more power lines. The project is on schedule to replace a 30-meter section of the existing HTS cable with a 2nd generation HTS cable capable of higher performance.
- A manufacturer of power line carrier (PLC) technology is demonstrating an application to provide real-time monitoring of a utility distribution system to identify incipient faults and avoid interruption of customer service. PLC technology allows transmission and reception of high frequency signals over power lines. The interpretation of the noise in such communications can be used to detect conditions that may precede failure of lines, transformers and other equipment. The technology has been installed on several miles of feeders serving Con Edison residential and commercial customers in Westchester County.

The NYISO and the NYSRC are key stakeholders in the T&D research program. NYSERDA will coordinate with the NYISO and the NYSRC to implement projects that provide significant statewide benefits for electric ratepayers. A T&D strategic plan was recently prepared by Electric Power Research Institute (EPRI) and identified several projects that should be initiated in cooperation with the NYISO and the NYSRC. These include:

- Developing fast simulation modeling systems to rapidly assess grid stability and anticipate and respond to power disturbances,
- Analyzing system modeling data, phasor measurements, and historical trends to develop real-time grid performance indices that can be displayed through a simplified graphical user interface,
- Monitoring of electric power frequencies to pinpoint and analyze disturbances, and
- Creating business models to promote sustainable investment in transmission and distribution infrastructure.

The five-year budget for this program is $10 million.

5.4.2 Recent Program Accomplishments

The recent program accomplishments are presented in Table 5-5.

Table 5-5. Public Benefit Power Transmission and Distribution Research Program Goals achieved from July 1, 2006 through September 30, 2006

Activity	First Year Goal through June 30, 2007	Achievements from July 1, 2006 through December 31, 2006
Strategy and coordination meeting	Identification of priority R&D areas by spring 2006	Priority areas in two tracks — Policy and Technology — have been identified. Policy aspects could include business strategies, regulatory issues, public policy, and advanced concepts. Technology aspects could include monitoring and diagnostics, data processing and analysis, optimized visualization, secure communication, and improved control and system performance.
Issue annual solicitations	Select and fund five or more projects and studies aimed at the priority R&D areas by fall 2006	Staff anticipate issuing solicitation PON 1102 in the first quarter of 2007. Current efforts are devoted to harmonizing concepts with the recently-launched M&V logic model.

5.4.3 Program Logic[2]

Problems and Barriers

New York faces a range of T&D system security, reliability and power quality issues that affect the country's entire northeast region and in some cases, much of the Eastern Interconnection. These include:

- Lack of long-term T&D planning
- Increased stress due to load growth in certain areas and potential load growth from clean technologies such as electrified vehicles

[2] The program logic is a work in progress. The final program logic will be available in the March 31, 2007 quarterly report.

- Lack of incentives for private investment

Other issues related to the above include the following:

- New York is importing more electricity and exporting less electricity. At the same time, New York has a desire to be less dependent on other States for its power.
- Power system operational issues, such as the need to improve situational awareness of operators, cut across New York's boundaries.
- An increasing need for reactive power reserves and voltage support, and a need for improved power system integrity protection.
- Shifting wholesale power transfer patterns that have resulted from industry restructuring.
- The Federal Energy Regulatory Commission (FERC) has entrusted independent system operators (ISOs)/regional transmission organizations (RTOs) such as the NYISO with significant regional planning responsibilities.[3] [4]
- The Energy Policy Act of 2005 has also made fundamental changes to the investment incentives related to many types of energy resources and the T&D infrastructure.
- The adoption of the RPS and RGGI may require changes in the transmission system due to the requirement for increased renewable power.
- In addition, the importance of maintaining high T&D system reliability will increase with the formation of the Electricity Reliability Organization (ERO), which will have legal authority.
- As the industry continues to change, research plans must be developed and implemented to address these issues and must adapt to the changing conditions.

Program Outputs

Table 5-6 identifies near-term accomplishments anticipated to come directly from program activities. Associated measurement indicators are also presented. The source for this information should come directly from program records.

[3] After transmission developers obtain approvals from the NYISO, these developers must also apply for approval from the New York State Public Service Commission under Article VII of the Public Service Law [1].

[4] Third paragraph from EPRI Plan

Table 5-6. Anticipated Near-Term Accomplishments

Anticipated Accomplishments	Indicators	Data Sources and Potential Collection Approaches
Policy, Planning and Coordination Activities		
R&D gaps identified, priorities specified, projects leveraged (i.e., identification of policy-relevant, interdisciplinary/multi-media critical research usable for New York State that takes advantage of related national research plans and programs to address regional/State needs, with research projects supported at various New York Institutions)	Planning documents created. Technical reports.	Program records
Coordination of stakeholders	Dates and locations of meetings. Names of participants and organizations represented. Topics of discussion.	Program records
Studies funded	White papers, recommendations.	Program records
Technology Development Activities		
Product development projects funded	Innovative solutions	Program records
New technologies demonstrated	Credible data on performance, cost and impacts	Program records
Technology Transfer and Information Dissemination Activities		
Information dissemination	Dates and locations of meetings. Names of participants and organizations represented. Topics of discussion.	Program records
Synthesis and translation of results into forms useful for a broad audience. Data and technical findings made accessible to the public.	Magazine articles and conference presentations. List of web site addresses to enhance technology transfer.	To be determined.

5.5 Clean Energy Infrastructure

5.5.1 Program Description

The success of the previous End-Use Renewables Program has provided the foundation for the creation of the Clean Energy Infrastructure Program. Clean Energy Infrastructure efforts will be closely integrated with other SBC-funded efforts, such as Distributed Energy Resources, to develop and commercialize clean energy technologies. The ultimate goal of these programs is to reach a point where the value of the technology is worth the investment required by the consumer, and the market infrastructure is in a position to deliver and support the technology over the long term. This program will also complement efforts under the RPS by supporting training, education and market development for RPS-eligible technologies such as photovoltaics. The Clean Energy Infrastructure funds may also be used to reduce the installation and operating cost of systems not eligible for RPS funding.

The former End-Use Renewables Program placed significant emphasis on training renewable energy professionals, establishing voluntary certification standards for photovoltaic system installers, establishing and promoting accredited training programs in New York, establishing an internship program to give students from the training programs the experience necessary to sit for the certification exam, developing a series of specialized workshops and training tools, and creating a program to integrate photovoltaic systems on schools with lesson plans that meet New York State learning standards for math, science, and technology. The Clean Energy Infrastructure Program will continue the work begun under the End-Use Renewables Program to develop a vibrant, sustainable market for renewable and clean energy technologies using the following strategies:

- Market actor education, consumer awareness and market development,
- Targeted research, analysis and education to address technical and information barriers to renewable and clean energy market development, and
- Clean energy technology business development and manufacturing.

The 13-year program budget is $77.5 million.

5.5.2 Recent Program Accomplishments

Several near-term annual goals have been set for the new Clean Energy Initiative Program. These goals and progress for the six month period ending 12/31/06 are presented in Table 5-7.

Table 5-7. Clean Energy Infrastructure Program Goals achieved from July 1, 2006 through December 31, 2006

Activity	First Year Goal through June 30, 2007	Achievements from July 1, 2006 through December 31, 2006	
Education, Consumer Awareness and Market Development			
New accredited training institutions	1	0	Workshops held: 4 KidWind Teacher Training workshops 2 small wind training 1 NABCEP[1] prep
New certification exams	1	0	
Training workshops	5	7	
Renewable Resource Applications			
Stakeholder workshops	2	0	4 solicitations were issued 2 focused on wind generation and wildlife interactions 2 promote business expansion
Competitive research solicitations	3	4	
Clean Energy Technology Manufacturing and Business Development			
Companies expanding renewable business networks	5	7	Contracts are being negotiated with 4 firms intending to manufacture clean energy products in New York.
Companies expanding manufacturing	2	4	

[1]North American Board of Certified Energy Practitioners (NABCEP).

Other program highlights include:

- A Renewable Energy Workforce Conference in November 2006, sponsored by NYSERDA, attracted 200 attendees from 30 states and four countries, to learn and share innovative workforce activities.
- A Technical workshop on wind energy's impacts on wildlife brought together national experts and stakeholders to develop siting guidelines for wind energy resources.
- Several programs provided support for local governments and communities including a wind workshop, a wind toolkit, and outreach to local organizations.

5.5.3 Long-Term Program Accomplishments

This section highlights key program outputs, as identified through earlier logic model development work, and related market progress. All values reported are cumulative since program inception. Thus, they include accomplishments of the farmer Wholesale Renewables Program, as well as from the End-Use Renewables activities both prior to and after the adoption of New York's RPS. Table 5-8 presents the key

outputs for the Clean Energy Initiative through December 31, 2006. Table 5-9 presents a sample of key logic model-driven indicators of program success, especially those related to market progress, as tracked by the evaluation and program activities. Together, these tables indicate the most important ways that program progress is being measured, and report how those values are changing due to program activities.

Table 5-8. Clean Energy Infrastructure – Key Program Outputs

Outputs	Value (Cumulative through December 2006)
Number of PV and small wind systems installed (PON 716)	438 PV/15 Wind
Dollar value of incentives paid for PV (PON 716) and small wind systems installed (PON 792)	$9,929,611 PV/ $333,712 Wind
Total cost of installed PV systems (PON 716)	$20,110,235
Average cost per kW DC of PV installed per sector	$8,601 Residential, $8,093 Commercial, $9,101 Industrial

Table 5-9. Clean Energy Infrastructure – Key Market Indicators and Program Cumulative Progress

Topic	Indicator	Data Value--2003	Data Value -- 2004	Data Value -- 2005	Data Value -- 2006
Energy Generation	Net MWh and MW generated from installed systems	1,012 MWh 0.6 MW	2,012 MWh and 1 MW	2,833 MWh and 1.3 MW	4,619 MWh 2.1 MW
Availability of Services	Number of participating installers	14	27	32	26
	Average full-time equivalents employed by PV installer firms	3.3	7.7	8.0	-
Awareness and Knowledge	Installer estimates of residential and commercial customer awareness of PV systems	Residential – 18% Commercial – 6%	Residential – 5% Commercial - 4%	Residential – 6% Commercial - 7%	-
Market Share and Sales	EUR Program installations as a percentage of total capacity of PV and small wind systems installed in New York *(Data in this row represent only SBC-funded projects. NYSERDA, NYPA and LIPA have supported other projects outside of the SBC program.)*	-	-	EUR Program has funded 29% of the total PV installed capacity on record with PSC EUR Program has funded 25% of the state's total small wind energy capacity on record with PSC	-

Topic	Indicator	Data Value--2003	Data Value -- 2004	Data Value -- 2005	Data Value -- 2006
Pricing/Cost	Average total PV system cost per watt (PON 716)	$8.26/watt (DC)	$8.31/watt (DC)	$8.43/watt (DC)	$8.52/watt (DC)
	Installer estimate of market sustainable price for PV systems	$4/watt for both residential and commercial customers	$3/watt for residential and $4/watt for commercial	-	-

5.5.4 Program Impact Evaluation

Gross Energy Generation

In 2004, Nexant, Inc. conducted a review of the savings impacts reported by NYSERDA for the former EUR Program. The objective of the review was to verify the estimate of the program's cumulative energy generation. Based on Nexant's review, as of December 31, 2006, the program has resulted in energy generation and peak demand reductions shown in Table 5-10.

Net Energy Generation

The Summit Blue MCAC team addressed attribution as part of the in-depth evaluation conducted in 2003. The 2003 evaluation involved surveys with 23 PV installers, 32 PV system owners, two PV training institutions, and others. In both 2004 and 2005, the aspects of the in-depth evaluation were revisited through an Integrated Data Collection (IDC) approach whereby surveys are administered to PV system owners at the time of project completion and PV system installers at the time of program application. Both evaluation updates, in 2004 and 2005, corroborated the original results and suggest that NYSERDA should use a net-to-gross ratio of 1.0 for the EUR Program. Net energy generation is shown in Table 5-10.

Table 5-10. Clean Energy Infrastructure Program Cumulative Annual Clean Generation (through December 2006)

	Program-Reported Savings	Realization Rate	Adjusted Gross Energy Generations	Net-to-Gross Ratio	Net Energy Generation
MWh/year	4,441	1.04	4,619	1.0	4,619
MW	2.5	0.85	2.1	1.0	2.1

Non-Energy Impacts

The MCAC team examined non-energy impacts for the EUR Program in 2003. At that time, customers valued the non-energy impacts at approximately 1.6 times the value of the displaced generation from their PV systems.

5.6 Power Systems Product Development

5.6.1 Program Description

The goal of this program is to work with New York technology companies to develop distributed generation and storage products and expand the number of marketable competitive products that reduce peak load, improve power quality, and provide improved cost-effective environmental performance.

The Power Systems Product Development Program supports New York business in all aspects of product development necessary to create and commercialize power generating products that are clean, efficient, reliable, and cost effective, as well as other products that reduce peak demand or improve end user power quality. Additionally, the program focuses on New York specific issues such as economic development and job creation in the State; targets technologies and opportunities that are not being addressed by the market; addresses regulatory barriers to the adoption of superior new technologies; and, emphasizes the development of economically competitive options for end users.

The program areas of focus include:

- Developing products with superior performance relative to decreased grid-supplied energy consumption, peak demand and improved environmental impact
- Addressing New York-specific issues such as economic development and job creation in the state
- Targeting those technologies and devices that are not currently being addressed by the market
- Reducing environmental impacts of energy production
- Providing economic development opportunities for New York power system firms
- Improving system-wide reliability and peak demand reduction
- Addressing institutional impediments including absence of applicable codes and installation standards

Activities supported under this program element include:

- Product development from concept studies to prototype production and product testing
- Technology transfer through conferences, papers and internet accessible data
- Market sector research and support addressing institutional barriers to commercialization

The five-year program budget is $25 million.

5.6.2 Recent Program Accomplishments

Several near-term, annual goals have been set for the Power Systems Product Development Program. These goals and progress for the first six month period ending 12/31/06 are shown in Table 5-11.

Table 5-11. Power Systems Product Development Program Goals achieved from July 1, 2006 through December 31, 2006

Activity	First Year Goal through June 30, 2007	Achievements from July 1, 2006 through December 31, 2006
Product development contracts awarded	10	5
New products commercially launched	1	-
Successful new product field tests and demonstrations	2	-
Projects successfully completing milestones	4	6
Assessments and studies of new technologies completed	3	1

5.6.3 Long-Term Program Accomplishments[5]

This section highlights key program outputs and program benefits since program inception through June 2006. The projects summarized here were initiated during a five year period ending June 2006.

Starting in June 2006, the Power Systems Product Development Program shifted the focus to include solar and wind product development activities previously funded from other programs. The program will emphasize ultra-clean and other renewable technologies and deemphasize fossil fuel efficiency and emission improvement technologies previously encouraged.

Key program outputs for the time period 2001 to 2006 are presented in Table 5-12.

Table 5-12. Power Systems Product Development Program – Key Program Outputs

Outputs	Value (Cumulative through December 2006)
Number of Solicitations	12
Number of proposals reviewed/Recommended for funding	248/102
Number contract actions	85
Number of unique projects	52
Funds Encumbered	$22 million
Co-funding by Project Participants	$34 million

[5] The information contained in the Long-Term Accomplishments Section was obtained from the Power Systems Program Accomplishments Packet developed by GDS Associates in 2006.

Key logic model-driven program outcomes, or indicators of program benefits, are presented in Table 5-13.

Table 5-13. Power Systems Product Development Program – Key Outcomes

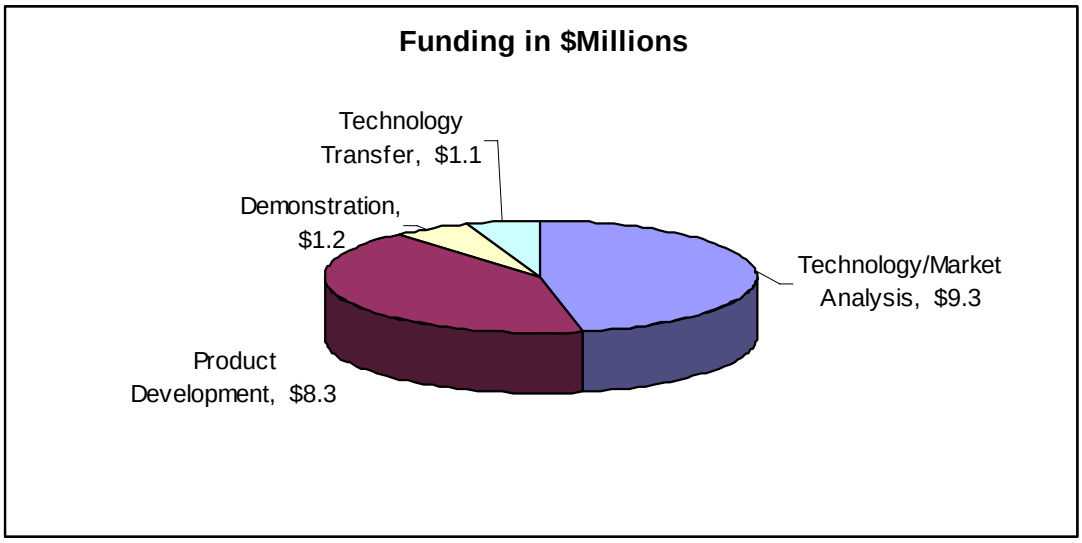
Outcomes	Value (Cumulative through December 2006)
Knowledge Creation and Dissemination	
Number of completed final reports	18
Number of published articles	86
Number of Conference Presentations	52
Field tests initiated/completed	65/63
Lab tests initiated/completed	71/69
Web sites where reports are available	TBD
Commercialization Progress	
Number of projects with recoupment provisions	20
Number of projects with enhanced business plans/ UL or other listings/patents	16/5/6
Number of New Products Developed	6
Economic Benefits	
Number of projects with sales/jobs/investments	6 projects with sales 16 projects with job creation 7 projects with known new investments

Program Portfolio

Projects funded through the program can be categorized as (1) Technology/Market Analysis Studies; (2) Product Development, (3) Demonstration, and (4) Technology Transfer. The Technology/Market Analysis Studies consists of projects that analyze market potential and technological feasibility, designed to benefit policy makers and supply-side market actors. Product Development projects are focused on a clearly defined product and benefits New York manufacturers. Product Development activities include prototype development, product testing, and development of commercialization plans. Demonstration projects consist of projects that demonstrate the performance of products that are commercially available. Technology Transfer projects provide information to the general public and other market actors and are designed to support the market infrastructure.

The cumulative encumbered funding by project type is presented in Figure 5-1.

Figure 5-1. Power System Program Funds Encumbered through 2005



The program was implemented through a total of 11 solicitations. Six solicitations having broad based eligibility in power systems, and five solicitations directly focused on alternative fuels for secure power generation and electricity storage. A total of 216 proposals were received with 88 recommended for funding with 80 completed contract actions. In many cases proposals were received for second or third phases of a product development effort, as projects were required to recompete for funding of additional phases based on progress to date. A total of 47 unique product development or individual study efforts were funded.

Technology development projects were funded at an average of $5 million per year ($4 million from the SBC and an additional $1 million from NYSERDA's Statutory program). The portfolio of SBC funded projects evaluated here has a total value of $50 million with $20 million provided via NYSERDA and $30 million provided as project cofunding primarily by contractors.

Knowledge Creation and Dissemination

Data were collected for each project in the Power Systems portfolio regarding the knowledge creation indicators. The number of field and lab tests are shown in Table 5-14 by technology area. A total of 63 field tests have been completed and 69 lab tests have been completed.

Table 5-14. Number of Field and Lab Tests Initiated and Completed

Technology Area	Field Tests Initiated	Field Tests Completed	Lab Tests Initiated	Lab Tests Completed
Emissions	0	0	8	8
Energy Storage	11	10	11	11
Engine	2	2	3	3
Fuel Cell	10	10	31	31
Hydropower	1	1		
Inverter	1	0	15	15
Motor Generator	0	0	2	0
DG Performance Testing	20	20	1	1
Remote Monitoring	20	20		
Total	65	63	71	69

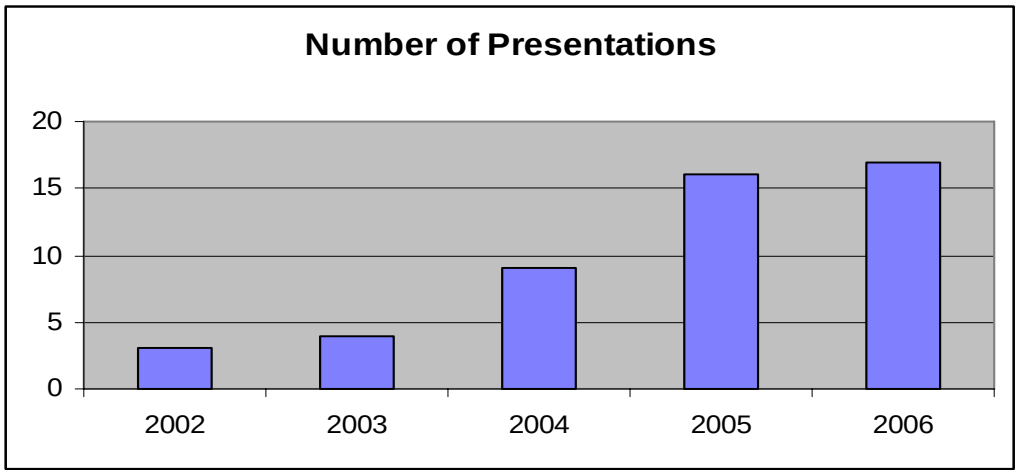
A total of 86 articles and news stories are associated with the portfolio of projects. The number of articles and stories by technology area is presented in Table 5-15. The majority of publications resulted from the hydropower projects. Articles were published in conference proceedings, print magazines, internet magazines, journals and newspapers.

In addition, final reports have been completed for 18 power systems projects. Conferences and presentations is another pathway for dissemination information. Presentations regarding NYSERDA's power systems projects have been given at various conferences and forums, including those sponsored by: the American Society of Mechanical Engineers (ASME), American Solar Energy Society, Association of State Energy Research and Technology Transfer Institutions (ASERTTI), Association of the United States Army (AUSA), CleanTech, Electrical Energy Storage Applications and Technology (EESAT), Electrical Storage Association (ESA), Mid-Atlantic Renewable Energy Fair, Midwest Renewable Energy Fair, and Next Generation Energy. The number of presentations at conferences has increased over the past five years, as shown in Figure 5-2.

Table 5-15. Number of Articles by Technology Area

Technology	Number of Articles/News Stories
Energy Storage	4
Fuel Cell	8
Hydropower	70
Inverter	1
Other	3
Grand Total	86

Figure 5-2. Conference Presentations



Commercialization Progress

The number of projects with commercialization progress by technology area is presented in Table 5-16.

Table 5-16. Number of Projects with Commercialization Progress

Technology Area	Business Plans Enhanced	UL or Other Listings	Patents
Aggregation	1		
Emissions	1		
Energy Storage	3	1	1
Engine	1		
Fuel Cell	5	3	4
Hydropower	2		
Inverter	1	1	1
Motor Generator			
MSW	1		
Remote Monitoring	1		
Total	16	5	6

Products developed include:

- 2.5 kVA inverter
- Computer controlled monitoring and control system
- Central Operation Management System (COMSYS)
- Direct Methanol Fuel Cell

- GAIA Power Tower
- DC Backup Fuel Cell System
- Motor generator component

Economic Benefits

Economic benefits include sales, jobs, and new investments. The number of projects with these benefits is shown in Table 5-17. Six projects have produced sales, 16 projects have resulted in jobs, and seven projects have resulted in new investments.

Table 5-17. Number of projects with Economic Benefits

Technology Area	Sales	Jobs	Investments
Aggregation		1	
Emissions		1	
Energy Storage	1	4	1
Engine		1	
Fuel Cell	3	5	4
Hydropower		1	1
Inverter	1	1	1
Motor Generator		1	
MSW			
Remote Monitoring	1	1	
Total	6	16	7

Examples of economic development achieved through the program's activities include:

- The fuel cell research and development resulted in the development of 320 jobs at the new headquarters R&D and manufacturing facility constructed in New York by Plug Power. There was also $217 million of cash investment from Interros and Norilsk Nickel.
- The Direct Methanol Fuel Cell project brought in $1 million dollars in capital investment from Samsung and Gillette/Duracell. Additionally this product resulted in a 6% equity investment by E.I. Dupont. The Samsung investment was to develop this technology for their portable cell phone product line.
- The 2.5 kVA Utility-Interactive Inverter study has provided subcontracts to New York vendors for manufacturing of various components such as printed circuit boards, enclosures, and Certification testing by Itertek Testing Service.
- The Energy Storage Distributed Load Leveling with Utility Control product - GAIA Power Tower has resulted in four investments in New York for a total $3 million. GHO ventures invested $2.25 million, and three separate $250,000 investments were provided by NY Community Investment Company, NJTC Venture Fund and the Small Business Technology Investment Fund of the Empire State Development Corporation.

- The Roosevelt Island Tidal Energy Project: resulted in setting up of an office at the Cooper Union in New York City.

5.7 DG-CHP Demonstration

5.7.1 Program Description

The goal of the DG-CHP Demonstration Program is to contribute to the growth of combined heat and power and other distributed generation applications in New York. The program provides funding for site-specific feasibility studies and demonstrations and seeks to improve awareness by end-users and project developers of DG-CHP. The program also seeks to address DG-related issues such as DG permitting; SIR; utility standby service; tariffs; technology risk; and renewable fuel options such as anaerobic digester and landfill gas; and impact of fluctuating prices of natural gas.

The program uses financial incentives to encourage customer-sited DG using commercially available DG technologies such as reciprocating engines. The incentive approach will co-exist along with similar offerings from RPS Customer-Sited tier and Consolidated Edison's System Wide Demand Reduction programs.

The total program budget is $67.1 million.

5.7.2 Recent Program Accomplishments

Several near-term, annual goals have been set for the DG-CHP Demonstration Program. These goals and progress for the six month period ending December 31, 2006 are shown in Table 5-18.

Table 5-18. DG-CHP Demonstration Program – Near-Term Goals and Achievements

Activity	Program Goals (July 1, 2006 through June 30, 2007)	Achieved July 1, 2006 through December 31, 2006
Initiate DG-CHP incentive program	Develop and implement a CHP incentive program in cooperation with other DG-CHP programs	Staff are observing activity under NYSERDA's recently launched CHP subscription program using ConEd System Wide Program funds.
Issue annual solicitations and incentive offers	Fund up to 10 CHP demonstration projects with a cumulative capacity of 20 MW and with 10 MW downstate	PON 1043 was issued, and thirty-four proposals were received by the due date of August 22, 2006. Seven demonstration projects were selected for funding with a total of 38.2 MW installed capacity (1.8 MW of which is in ConEd territory).
Technology transfer	Require performance monitoring of all demonstration projects and export data to the CHP website	Data for 21 projects are posted on http://chp.nyserda.org.

5.7.3 Long-Term Program Accomplishments

This section highlights key program outputs as identified through the logic model development work and associated market progress. All values reported are cumulative since program inception, unless otherwise noted. Table 5-19 presents the key outputs for DG-CHP Demonstration through December 31, 2006. Table 5-20 presents a sample of key logic model-driven indicators of program success, especially those

related to market progress, as tracked by the evaluation and program activities and documented most recently as part of a value/cost peer review assessment conducted specifically for this program. Together, these tables indicate the most important ways that program progress is being measured, and report how those values are changing due to program activities.

Table 5-19. DG-CHP Demonstration Program – Key Program Outputs

Outputs	Value (Cumulative through December 2006)
Number of operational DG/CHP systems	28
Total funds awarded for operational DG/CHP systems	$8.9 million
Total cost of operational DG/CHP systems	$39.4 million

Table 5-20. DG-CHP Demonstration Program – Key Market Indicators and Program Cumulative Progress

Topic	Indicator	Initial Value (2004, unless noted)
Awareness and Knowledge	End-use customer familiarity with DG/CHP systems	83% of participants and 100% of partial non-participants said they were at least somewhat familiar
	Developer familiarity with DG/CHP systems	90% said they were extremely familiar, and all developers considered themselves at least somewhat familiar
Market Share and Sales	DG/CHP Program penetration in terms of base case and accelerated case estimate of market potential	7% of base case 3% of accelerated case
Change in practices	Role of energy efficiency in consideration of DG/CHP systems	More than half of program participants and 85% of partial non-participants noted an increase in the role of energy efficiency

Funded Projects[6]

Seventeen feasibility studies have been funded of which eight are completed. In addition to natural gas, the studies address various fuel sources including bio-waste, coal gasification, and wood.

[6] Except for Figures 5-3 and 5-4, the analyses contained in this section are from the Accomplishments Packet for the CHP Demonstration Program which was developed by GDS Associates and HMG Group, Inc. as apart of the Peer Review Assessment conducted in 2006.

Figure 5-3 presents the peak capacity of projects in the portfolio by prime mover type. Figure 5-4 shows the same by utility service area.

Figure 5-3. Peak KW Reduction by Prime Mover for Encumbered Projects (through 2006)

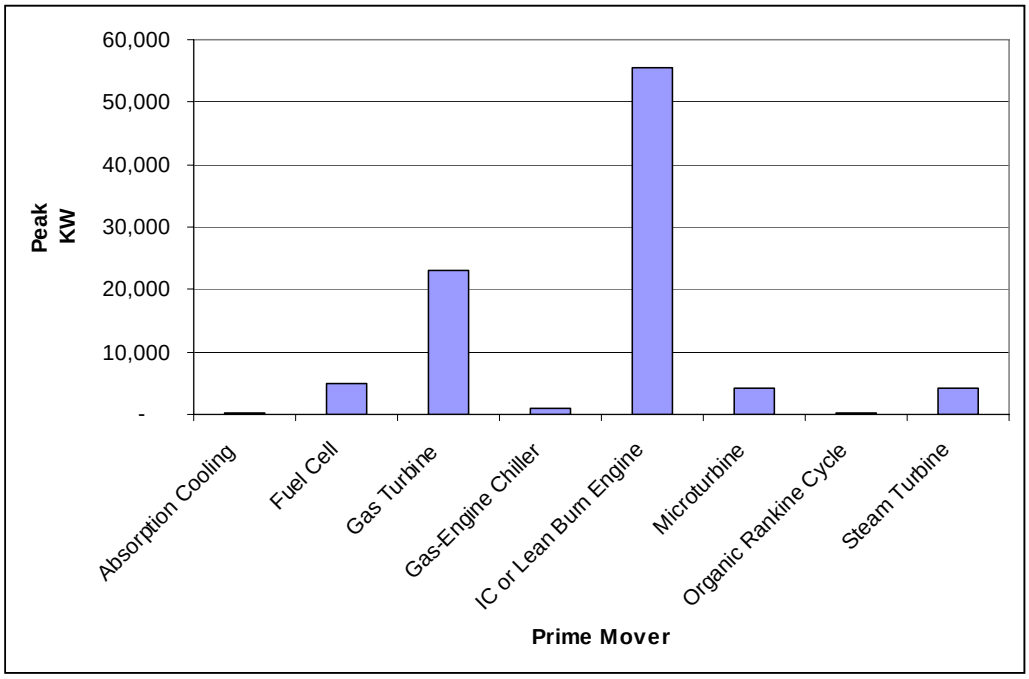
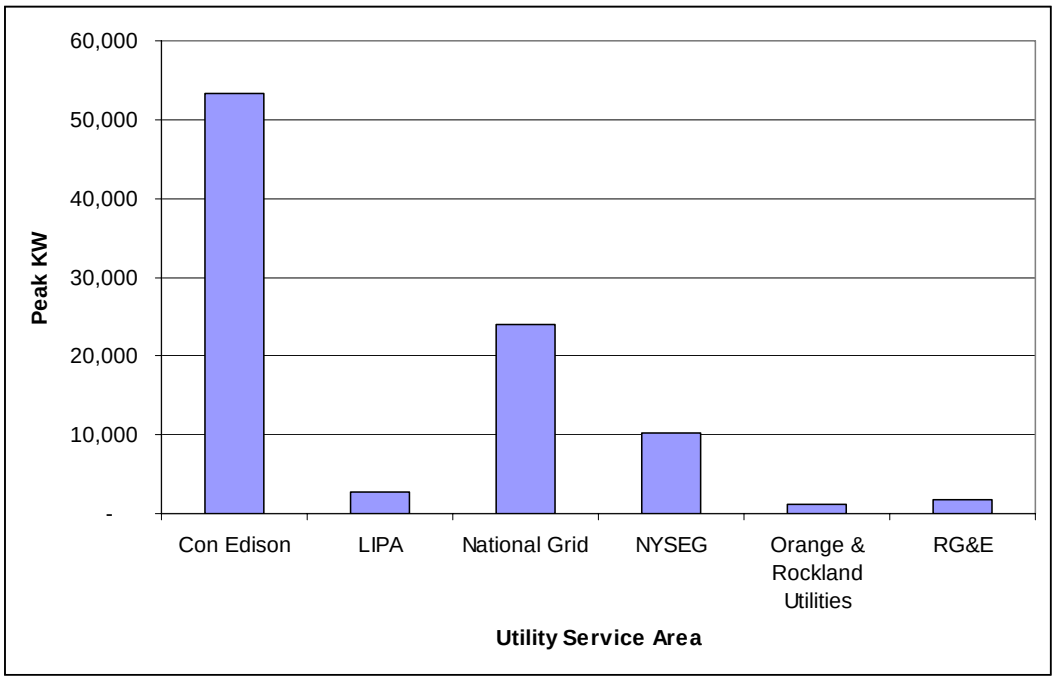


Figure 5-4. Peak KW Reduction by Utility Service Area for Encumbered Projects (Through 2006)



Progress toward Commercialization

Capital Attraction

- Private investment in CHP has increased in New York. The total project cost for all projects funded through the CHP program as of December 2005 is $273.5 million. Of this total, 80 percent represents funds from project participants.

Technical achievements

- As a result of the program, demonstration of innovative electrical interconnection designs has occurred. The system installed at Equity Office Properties at 717 5th Avenue in Manhattan was the first installation of a synchronous interconnection system in New York City.

- As a result of the program, several grid-connected CHP systems that have dual-mode operation (operates in grid-parallel mode during normal conditions and operates in stand-alone mode during grid outage) were successfully demonstrated. For example, during the Northeast Blackout of 2003, the CHP system installed at Greater Rochester International Airport operated in stand-alone mode. The project received an award from the U. S. Environmental Protection Agency (http://www.epa.gov/chp/awards/winners2004.htm).

- As a result of the program, effective use of non-standard fuel sources (e.g., anaerobic digester gas) for CHP has been demonstrated.

- As a result of the program, third-party financing for CHP is being demonstrated in several settings, including New York City at 230 Park Avenue.

Market Progress

Market progress, such as increased awareness and knowledge of CHP and increased promotion by CHP trade allies, was measured in 2004. Details of the findings are presented in the "DG-CHP Market Characterization and Market Assessment and Causality Study."[7]

ECONOMIC AND ENVIRONMENTAL BENEFITS

Economic Benefits

- Economic benefits to facility owners include lower energy costs as well as economic impacts from non-energy benefits such as increased reliability and cleaner air. Economic benefits to New York arise when dollars saved on energy are available to spend on other goods and services, promoting economic growth. Past research by ACEEE[8] has shown that savings are retained in the local

[7] "DG-CHP Market Characterization and Market Assessment and Causality Study," by Skumatz Economic Research Associates, Inc., Summit Blue Consulting, LLC, and Quantec, LLC, Project Number 7721, May 2005.

[8] Elliot, R. Neal and Mark Spurr. Combined *Heat and Power: Capturing Wasted Energy*. American Council for an Energy–Efficient Economy. May, 1999.

economy and generate greater economic benefit than the dollars spent on energy.[9] Recovery and productive use of waste heat from power generation is a critical component of energy efficiency.

Environmental and Other Benefits

- The program has produced ambient air emission reductions. Every proposer is required to submit an emissions analysis and undergo the State Environmental Quality Review Act (SEQRA) process. NOx emissions information was compiled for a subset of projects representative of the program's portfolio of projects. For each project, the NOx reduction was estimated based on (1) the NOx emissions for the installed prime mover, (2) the NOx emissions of the generation facility serving the facility, and (3) the NOx emissions of the thermal equipment. On average, each facility reduced NOx emissions by 50%, or nearly 13,000 lbs. per year, or 1.1 lbs. per megawatthour of electricity produced.

- The program supports the use of renewable energy sources. Of the 115,000 MWh per year currently being generated by operating facilities funded through NYSERDA's DG-CHP program, approximately 29,000 MWh per year are from renewably fueled systems.

- The program has supported efforts to improve the reliability of New York's electric transmission and distribution system. New York Independent System Operator Zones J (New York City) and K (Long Island) are considered key in terms of congestion and system reliability.[10] Table 5-21 shows that approximately 43% of the CHP capacity that has been installed or in progress are in Zones J and K.

Table 5-21. Location of NYSERDA CHP Projects by New York Independent System Operator Zone

Location by NYISO Zone	Number of Projects*	Capacity (kW)
Zones J or K	30	12,635
All Other	28	17,264
Total	58	29,899

* Projects beyond the design phase.

5.7.4 Cumulative Impacts

This section presents cumulative impacts for the program from inception through December 31, 2006.

Gross Savings

The objective of the M&V evaluation review is to verify the estimate of the program's cumulative savings. Based on Nexant's review, as of December 31, 2006, the program has resulted in the energy

[9] Spurr, Mark. 1999. *District Energy Systems Integrated with Combined Heat and Power: Analysis of Environmental and Economic Benefits.* Report to the U.S. Environmental Protection Agency. March. Minneapolis, Minn.: International District Energy Association.

[10] *NYISO Electric System Planning Working Group Meeting April 15, 2004, Draft Minutes.*

savings and demand reductions shown in Table 5-22. Note that the realization rate shown is applicable to the entire program period.

Net Savings

The final step to determining net energy savings is attribution analysis. Attribution analysis determines, through various methods, whether the gross savings estimate from the M&V activities should be adjusted downward or upward for freeridership or spillover. Adjustments for freeridership and spillover, and the ultimate program net-to-gross ratio and net savings are shown in Table 5-22.

Table 5-22. CHP Cumulative Annual Energy and Peak Demand Savings (Through December 2006)

	Program-Reported Savings	Realization Rate	Adjusted Gross Savings	Freerider-ship	Spillover	Net-to-Gross Ratio[1]	Net Savings
MWh/year	100,054	0.90	90,391	15%	26%	1.07	96,718
MW	20.0	0.98	19.7	15%	26%	1.07	21.1
MMBtu/year[2]	-777,721	0.89	-690,025	15%	26%	1.07	-738,327

[1] Net-to-Gross Ratio = (1-Freeridership) * (1+Spillover).

[2] Because the electricity saved by the DG/CHP projects replaces electricity formerly purchased from the grid, the program has reduced fuel used at central generating stations, for a net decrease statewide due to greater efficiency of the DG/CHP systems at sites where imported fuel is used. The fuel avoided at the central generating plant is determined from the electricity generated by the DG/CHP installations. Furthermore, at additional projects such as waste water treatment plants, electricity generation is powered fully or partially by digester gas produced on site. Such fuel switching achieves natural gas conservation above and beyond what is achieved through efficiency alone.

Non-Energy Impacts

The MCAC team examined non-energy impacts for the DG-CHP Program in 2004. At that time, customers valued the non-energy impacts at approximately 32-64% of the value of the energy savings from their systems.

5.8 Demand Response and Innovative Rate Research

5.8.1 Program Description

Demand Response and Innovative Rate Research Program, a new initiative, supports participation of small customers in the NYISO's wholesale demand response and time-sensitive retail electric pilots. Residential and small commercial loads constitute a small percentage of participants in these programs because of their relatively small loads, the high cost of aggregation, and the lack of flexible metering options and other load control technologies.

The program promotes the development, demonstration, and use of end-use technologies that have flexible load capabilities. Flexible load technologies are end-use devices, such as air conditioners and lighting, enhanced with features that allow remote access and group control thereby allowing easier load reduction in response to peak demand and price signals. Additionally, the program's time-sensitive pilots promote the development of innovative electric service rates by energy services companies with the ultimate goals of:

- Realizing load shifting and reductions during peak and expensive time periods,
- Creating cost avoidance opportunities for customers, and
- Creating sustainable businesses for providers.

The program concentrates on the New York City metropolitan area where capacity is particularly constrained and value propositions for load reductions are most desirable.

The program budget is $10 million.

An R&D initiative begun in 2000, Enabling Technology for Price-Sensitive Load Management (ET), was a precursor to this new R&D program, Demand Response and Innovative Research. ET, a series of projects in the Next Generation Program has ended; however, energy savings are still being realized from its projects. ET sought projects that demonstrated advanced technologies and commercialized new methods of aggregating load. The advanced technologies enabled electricity load reduction in response to emergency and market-based signals.

5.8.2 Recent Program Accomplishments

Several near-term, annual goals have been set for the Demand Response and Innovative Rate Research Program. These goals and progress for the first six months are shown in Table 5-23.

Table 5-23. Demand Response and Innovative Rate Research Program Goals achieved from July 1, 2006 through December 31, 2006

Activity	First Year Goal through June 30, 2007	Achievements from July 1, 2006 through December 31, 2006
Increase small customer participation in wholesale and local demand response programs (MW)	33	Modeled buildings using advanced window air conditioner control technology to determine the impact on load.
Increase the number of multifamily apartment units participating in real-time and other time-sensitive electric rate pilots	500 apartment units	Finalized a pilot program plan to demonstrate real time pricing rates and advanced load technologies in multifamily buildings in New York City. The solicitation will be released as PON 1151 in 2007.

Additional program highlights from the last six month period ending December 31, 2006 include:

- Time Sensitive Price Pilots, a time-based, behind-the-master-meter rate, is being implemented in New York City at three multifamily building sites containing 3,000 apartments. The current short-duration shadow-bill trial will be followed by education and training pending acceptance of the new rate plan by renters and management.

5.8.3 Program Impact Evaluation

This section presents cumulative annual energy savings for Enabling Technologies, the precursor to Demand Response and Innovative Rate Research. Savings are from program inception through December 31, 2006.

Gross Savings

The objective of the M&V evaluation review is to verify the estimate of the program's cumulative savings. Based on Nexant's review, as of December 31, 2006, the program has resulted in the energy savings and demand reductions shown in Table 5-24.

Net Savings

The final step to determining net energy savings is attribution analysis. Attribution analysis determines, through various methods, whether the gross savings estimate from the M&V activities should be adjusted downward or upward for freeridership or spillover. Adjustments for freeridership and spillover, and the ultimate program net-to-gross ratio and net savings are shown in Table 5-24. All ranges reflect 80% confidence intervals.

Table 5-24. Demand Response and Innovative Rate Research Program Cumulative Annual Energy and Peak Demand Savings (Through December 2006)

	Program-Reported Savings	Realiza-tion Rate	Adjusted Gross Savings	Net-to-Gross Ratio	Net Savings
MW	208.1	0.69	144.4	0.95	137.2

5.9 Electric Transportation

5.9.1 Program Description

Analysis has shown that development, qualification, and deployment of advanced technologies for the electrified rail system could reduce peak load by as much as 100 MW in the highly constrained New York City T&D load pocket. New York's electrified commuter rail and subway system alone uses over 2 billion kWh a year and represents a 1,100 MW demand on the Consolidated Edison distribution system.[11]

The program will fund projects in all stages of technology advancement; and higher risk projects will be funded in phases. Successful completion of milestones will be required before beginning the next phase. Two competitive solicitations are anticipated. The first will target improving energy efficiency in the State's current electrified transportation infrastructure. This solicitation will be administered in collaboration with the New York City Metropolitan Transit Authority and the New York Power Authority. Activities will target conductor rails, regenerative braking systems, and propulsion efficiency. The second will target improving energy efficiency through the use of off-peak power in the transportation sector. This solicitation will target electrified anti-idling, plug-in hybrid vehicles, and reduced on-peak demand associated with producing and fueling alternative fuel vehicles.

The program supports emerging technologies from inception through field testing and pre-commercial deployment. Once a product is commercialized and has reliably demonstrated energy benefits, continued support is frequently available through deployment programs and from State and Federal tax allowances. Helping to develop products that will make this transition is a fundamental goal of the program.

[11] The subway system pays an SBC fee as do the private sector suppliers.

The ultimate goals of the program are:

- Improve the energy efficiency of the New York's current electrically powered commuter rail and subway system in the New York City load pocket.
- Reduce costs of power transmission by allowing unused off-peak capacity to generate revenue and reduce transportation petroleum use, green house gases, and criteria emissions.

The benefits of the electric transportation program will include peak load reduction in the New York City load pocket and permanent energy use reductions. These reductions will result in cost reductions to the subway and commuter rail systems and reduced transmission congestion in the region. Additionally, many projects are expected to reduce transportation costs and emissions from petroleum fueled vehicles.

The program budget is $5.0 million.

5.9.2 Recent Program Accomplishments

Six months of accomplishments toward the program's one-year goals are shown in Table 5-25.

Table 5-25. Electric Transportation Program Goals achieved from July 1, 2006 through December 31, 2006

Activity	First Year Goal through June 30, 2007	Achievements from July 1, 2006 through December 31, 2006
Solicitations released	2	1
Proposals reviewed	N/A	11
Projects funded	N/A	5
Funding/Co-funding	$1,000,000/$1,000,000	$807,097/$1,000,000

5.9.3 Long-Term Program Accomplishments

Long-term success indicators and goals are presented in Table 5-26.

Prior SBC-funded projects focused on improving the State's energy efficiency through the use of off-peak power to reduce the use of petroleum-based transportation fuels. The Electric Station Car Project leased small neighborhood electric cars to the public and provided charging stations in reserved parking slots at commuter rail stations. Demand for the vehicles exceeded supply by nearly three to one. Thousands of gallons of gasoline consumption were replaced by off-peak power.

A second successful project, the Truck Stop Electrification Project, developed infrastructure technology, sponsored initial demonstrations and created a New York State based business that allows long haul trucks to eliminate sleeper cab engine idling during mandatory rest periods. Systems developed for the program are currently being sold nationally and are eligible for State and federal incentives.

Table 5-26. Long-Term Success Indicators

Activity	Achieved through December 31, 2006
Number of projects contracted/Completed	4/0
Funds Encumbered/Associated Co-funding	$157,600/$237,600

5.10 Environmental Monitoring, Evaluation, and Protection

5.10.1 Program Description

The EMEP commenced in the late 1990s in an effort to increase understanding of the environmental impacts of electricity production. EMEP initiatives are building on past efforts and evolving to support research in three primary areas:

- Ecosystem response to deposition of sulfur, nitrogen, and mercury, including continued support of the Adirondack Lake Water Quality monitoring program with the Adirondack Lake Survey Corporation and the NYS Department of Environmental Conservation.
- Health and energy-related research on air quality, particulate matter, ozone and co-pollutants to support continued development of sound air quality management plans for attainment of new ozone and fine particle standards.
- Crosscutting environmental science, technology and policy projects, such as research on regional climate change, environmental impacts of alternative energy resources (e.g., wind and tidal), and mitigating environmental impacts of electricity generation critical for fuel diversity.

The program is guided by a steering committee comprised of major stakeholder groups. In addition a separate science advisory committee continues to provide technical review. The program has maintained a robust science and policy communication component to deliver program findings to policy-makers, scientists, and the public. As with previous efforts, NYSERDA is collaborating with regional and national entities to leverage funds for pertinent research projects.

The 13-year budget is $39.0 million.

5.10.2 Recent Program Accomplishments

The recent program accomplishments for the six month period ending 12/31/06 are presented in Table 5-27.

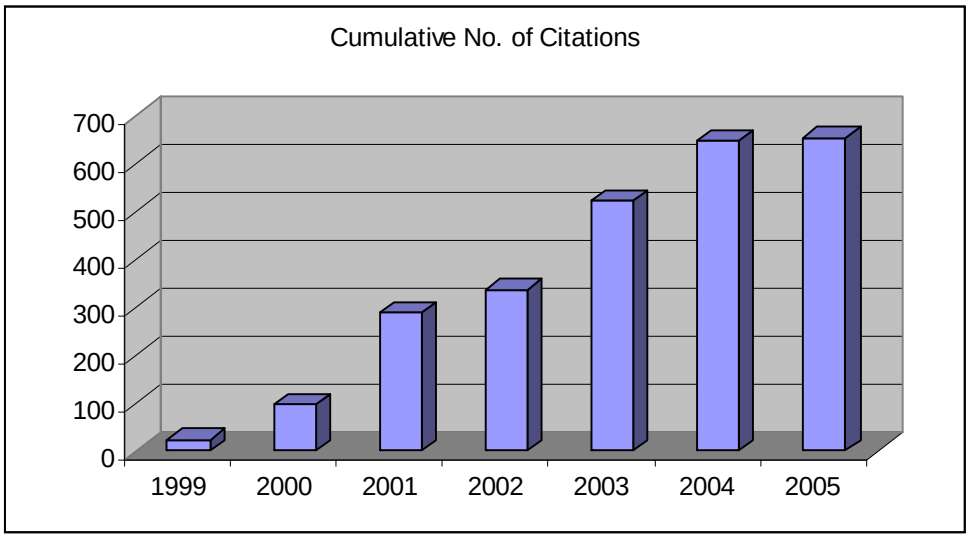
Table 5-27. Environmental Monitoring, Evaluation, and Protection Program Goals achieved from July 1, 2006 through December 31, 2006

Activity	First Year Goal through June 30, 2007	Achievements from July 1, 2006 through December 31, 2006
Develop detailed multi-year EMEP research plan with input from policymakers, scientists, and stakeholders	Complete EMEP research plan in year 1	One planning meeting was held with the EMEP advisors, and two other major program advisory meetings were held in the fall. NYSERDA has signed a contract with the New York Academy of Sciences to help develop a 5 year technical research plan.
Develop, contract, and manage research projects aimed at priority energy-related environmental research areas	Issue 1 solicitation for outreach and science-policy analysis in year 1 Issue 1 solicitation addressing priority research needs Contract 8 projects	Three contractors were selected for the EMEP Outreach and Technical Assistance PON.
Disseminate information:		
Sponsor workshops, conferences, and seminars	2	NYSERDA held a one-day conference with environmental organizations to exchange information and ideas concerning environmental issues and initiatives in New York State.
Provide web-based EMEP data and information	40,000 customer "visits," inquiries, and downloads from EMEP's web page	During these six months, hits on EMEP web sites totaled nearly 115,000 and downloads totaled more than 11,000.
Publish NYSERDA research reports	5	4 research reports and 1 executive summary were published on: urban heat island, source apportionment, health effects of ambient air pollutants and asthma, and clinical health studies on air ultrafine particles, and ambient air ultrafine particles in Rochester
Publish peer-reviewed journal articles	15	8 articles were published in the area of Air Quality & Health in technical journals.
Provide briefings to decision makers	2	NYSERDA sponsored a meeting with policymakers concerning the effect of wind generation installations on wildlife.

Long-Term Program Accomplishments

Under SBC I and II, $21 million in NYSERDA funds were used to support 46 EMEP research projects and an additional $22 million in funding was leveraged. More than 125 peer-reviewed papers were published on EMEP findings and, as shown in Figure 5-5, EMEP research was cited 655 times in peer-reviewed journals. More than 80 organizations were involved in EMEP research projects, and EMEP fostered collaboration with scientists in 13 different countries to address New York environmental issues. Several advanced pollution measuring devices were developed and commercialized. A web page was launched in 2005, which received an average of 19,000 visits per month over the past year (up from 540 in its first month), and is routinely one of the top three NYSERDA web pages. Most importantly, EMEP research was cited as providing the scientific basis for several important environmental policies in air quality and health advisories.

Figure 5-5. Citations of Journal Articles from EMEP Projects



Accomplishments of the EMEP Program's progress since its inception have been documented as part of a peer review value/cost assessment conducted in 2006. Highlights include:

- Environmental monitoring data from hundreds of field sites throughout New York have been collected to support program goals.
- Achievements in knowledge dissemination have been significant, with over 125 articles published in peer-reviewed journals.
- Researchers supported by EMEP have provided dozens of briefings to State and Federal policymakers in a variety of forums including Congressional briefings/testimony, one-on-one briefings, and workshop and conference briefings.
- EMEP-sponsored research has affected energy-related policy at the New York State level, including:
    - the Acid Deposition Reduction Program,
    - the recent State mercury regulations for power plants,
    - and the New York State Department of Health fish consumption advisories for mercury, as well as at the Federal level, including:
    - the Clean Air Mercury Rule,
    - the U.S. EPA's assessment of the Clean Air Interstate Rule,
    - and the U.S. EPA's review of the SO_2 National Ambient Air Quality Standard.

5.10.3 Program Impact Evaluation

A value-cost analysis was conducted for EMEP in 2006. Guided by a logic model, the evaluation team assembled a variety of performance data for EMEP for the following seven outcomes:

1. Knowledge Creation
    - Significance of Knowledge Created
    - Quantity of Knowledge Created
2. Knowledge Dissemination
    A. Availability of Knowledge Products
    B. Target Audience
3. Commercialization Progress
    - Capital Attraction
    - Technical Achievement
    - Market Advancement
4. Realized and Potential Energy Benefits
5. Realized and Potential Economic Benefits
6. Realized and Potential Environmental and Health Benefits
7. Value versus Cost
    - Value vs. NYSERDA and Participant Cost
    - Value vs. NYSERDA Cost

For the EMEP Program, four outcomes were deemed relevant – knowledge creation, knowledge dissemination, realized and potential environmental and health benefits, and value versus cost. All the scores for the four relevant outcomes were above 3.5, out of a possible 4. The overall score across all outcomes was also quite high at 3.7. Knowledge creation included program planning, research project selection and development, and project funding and management. Knowledge dissemination encompassed relevance, acceptance, and use by the scientific community and by policymakers, which included peer-reviewed publications and citations and impact of EMEP research on promulgated regulations. It is clear that EMEP is making noteworthy progress toward achieving significant long-term environmental benefits. Finally, the external peer review panel concluded that the value of the EMEP program significantly exceeds NYSERDA's costs as well as the combined costs of NYSERDA and its research partners, and the reviewers felt that few research programs in the country can claim the variety and significance of accomplishments as EMEP.

5.11 Industrial Research, Development, and Demonstration

5.11.1 Program Description

The IRDD program supports feasibility studies and technology demonstrations and commercialization that (1) improve energy productivity and competitiveness of New York manufacturers (minimize cost per unit output), (2) encourage capital investment and employment growth in New York facilities, (3) introduce New York-manufactured goods into new markets, and (4) encourage adoption of process changes that minimize waste. Cost-shared demonstration projects reduce risk and encourage manufacturers to adopt innovative and underutilized product and process alternatives. IRDD is a new program that combines two Industry programs, Industrial Process and Productivity Improvement (IPPI) and Industrial Product Development, to better serve the industrial sector's needs. IRDD is a collaborative effort of Industrial and Environmental R&D and Energy Efficiency Services.

The five year program budget is $15 million.

5.11.2 Recent Program Accomplishments

Several near-term, annual goals have been set for the Industrial Research, Development and Demonstration Program. These goals and progress for the first six month period ending December 31, 2006 are shown in Table 5-28.

Table 5-28. Industrial Research, Development and Demonstration Program – Near-Term Goals and Achievements

Activity	Program Goals (July 1, 2006 through June 30, 2007)	Achieved July 1, 2006 through December 31, 2006
Issue annual solicitations	*By fall 2006,contract for 6 to 10* demonstrations and feasibility studies of innovative and under-utilized technologies that save energy and improve productivity in the industrial sector	PON 998 was issued with two rounds of due dates (June 8 and October 5, 2006) with total funding of $4 million ($2M SBC + $2M Statutory funding). NYSERDA selected 6 projects to receive SBC funding in round 1 and 5 projects to receive SBC funding in round 2.
Program metrics	Document realized energy efficiency, environmental, and economic benefits	Projects are being contracted with requirements for documentation of performance metrics. Projects have not been completed; therefore, metrics cannot be ascertained at this time.

Program Highlights

During the third quarter of 2006, NYSERDA solicited proposals for IPPI (which was the precursor to the IRD&D Program). Eleven projects have been selected for funding.

Over the past ten years NYSERDA Industrial Process and Productivity Improvement Program has averaged $1.75 million in annual funding, and resulted in cumulative energy savings of almost $20 million, non-energy benefits in excess of $21 million, project-related incremental sales of almost $40 million, and approximately 85 new jobs. This program combined statutory R&D funds and EES federal funds.

5.11.3 Long-Term Program Accomplishments

This section highlights key program outputs and market progress. All values reported are cumulative since program inception. Table 5-29 presents the key outputs for IPPI and Industrial Product Development (IRDD predecessor) through December 31, 2006. In addition to the key outputs, several long-term success indicators will also be tracked including: energy, demand and fossil fuel savings, cost savings from productivity improvements, processes developed, and processes deployed.

Table 5-29. Industrial Research, Development and Demonstration Program – Key Program Outputs

Outputs	Goal through 2011	Value (Cumulative through December 2006)
Number of Solicitations	5 PONs, 14 due dates	1 PON, 2 due dates
Number of proposals reviewed/Recommended for SBC funding	300/40	40/11
Number SBC contract actions	40	11
Number of unique SBC projects	35	11
SBC Funds Encumbered	$10,000,000	$1,513,547
Co-funding by Project Participants	$20,000,000	$3,155,688

5.12 Municipal Water and Wastewater Efficiency

5.12.1 Program Description

Since 2000, the ongoing water and wastewater initiative has supported projects that accelerate the use of energy-efficient and innovative technologies by municipal water and wastewater systems in New York through demonstrations, technology transfer, and feasibility studies. Approximately three to four billion kWh are consumed by municipal water and wastewater treatment plants in New York every year. On average, the sector consumes 35% of a typical municipality's energy budget.

There are currently 16 SBC-funded water and wastewater projects, derived from eight solicitations developed jointly by NYSERDA's Energy Efficiency Services and R&D staffs. Five of the eight solicitations were PONs, which solicited proposals to demonstrate and evaluate innovative or underutilized energy-efficient water and wastewater technologies. A sixth was an RFP, which solicited proposals to demonstrate real-time monitoring of energy and environmental performance at wastewater treatment plants, attempting to attract the energy service sector into the municipal wastewater market. The seventh was another RFP, which solicited proposals to benchmark energy use and evaluate the potential for energy efficiency and energy production improvements in the sector. The eighth solicitation is a sector-based initiative, the Energy Smart Focus Program, where municipal water and wastewater is one of the five sectors selected to receive services. A separate technology transfer project is helping to increase the utilization of a specific energy-efficient filtration technology by providing technical assistance to up to 10 wastewater treatment plants. In addition, NYSERDA's long-standing Technical Assistance (TA) Program has served municipal water/wastewater customers since 1997, including 70 site-specific analyses. All activities to date have had strong technology transfer components, and municipal

water and wastewater treatment is also integrated with the Enhanced Commercial/Industrial Performance program.

Going forward, the Municipal Water and Wastewater Efficiency Program will focus on providing municipalities with information, resources and services to increase the standard of energy efficiency in the sector. To that means, the program will continue to provide cost-shared demonstration projects to reduce risk and encourage adoption of innovative or underutilized energy-efficient technologies and practices. Energy management training will be offered for treatment plant operators, municipal decision makers, consultants, and product vendors. Technical assistance will continue to be emphasized for municipalities seeking to upgrade or improve the energy efficiency of their equipment and operations. Energy efficiency incentives will continue to be offered to move the market to more efficient equipment. In support of these efforts, technology transfer and outreach will be provided to encourage adoption of innovative and energy-efficient technologies and practices. The program will continue to be a collaborative effort between NYSERDA's R&D and Energy Efficiency Services staff.

The Municipal Process Efficiency Program is funded out of the Commercial/Industrial sector budget. SBC funds are leveraged in this sector for Technical Assistance and from the Enhanced Commercial and Industrial Performance Program.

5.12.2 Recent Program Accomplishments

Several near-term, annual goals have been set for the Municipal Water and Wastewater Program. These goals and progress for the first six month period ending December 31, 2006 are shown in Table 5-30.

Table 5-30. Municipal Water and Wastewater Efficiency Program Goals achieved from July 1, 2006 through December 31, 2006

Activity	First Year Goal through June 30, 2007	Achievements from July 1, 2006 through December 31, 2006
Issue annual solicitation	Select and fund 5 or more projects, provide assistance to a minimum of 5 municipal wastewater and water treatment facilities.	PON 1040 was issued and 17 proposals were received requesting $3.9 million in NYSERDA funding. These proposals were recommended for SBC funding. These contracts are being negotiated.

Activity	First Year Goal through June 30, 2007	Achievements from July 1, 2006 through December 31, 2006
Technology transfer	Provide critical information on technologies and strategies that will optimize energy production and use at municipal wastewater and water treatment facilities. Provide information to 100 treatment facilities in New York.	NYSERDA sponsored an energy management training session for the target sector was co-developed by EPRI and the New York Water Environment Association (NYWEA). Approximately 70 individuals representing consultants, engineers and municipalities attended the two-day session. Additionally, the materials developed for the session will be offered through NYWEA in webcast format in the near future. Energy management presentations were given at four NYSEFC hosted Co-funding Committee conferences and as part of a webcast hosted by the Comptroller's Office. At a minimum, an additional 100 individuals participated in these presentations. The submetering and evaluation of 20 wastewater treatment plants has been completed. The final reports an summary of findings have been posted online. (In a related sector-based EES program, the Energy Smart Focus solicitation was developed to provide sectors with customized services and strategies in support of energy efficiency. Proposals supporting the Municipal Water and Wastewater Sector were reviewed by a Technical Evaluation Panel for technical merit.)
Technical Assistance	Develop six new projects while reviewing and approving six ongoing projects.	Two new Technical Assistance (TA) projects were approved to begin work totaling $12K in NYSERDA funds. Four TA projects, representing $76K in NYSERDA funds, were completed.

5.12.3 Long-Term Program Accomplishments

As of December 2006, $3.2 million has been committed under the targeted water and wastewater initiative. An additional $1.1 million has been awarded for municipal water/wastewater projects under the TA Program. Table 5-31 summarizes the funding status of the programs.

Table 5-31. Project and Funding Status

	Proposals Received	Number of Projects	Number of Sites Approved	Funds Awarded ($ million)	Co-funding ($ million)
RFP 769 Energy Efficiency Improvements at Water & Wastewater Treatment Plants	10	1	n/a	$0.13	$0.05
RFP 601 (Submetering)[1]	17	2	20	$1.1	$0.4
Demonstration Projects (569, 786, 857, 935 and 1040)	99	12	12	$1.86	$2.4
Technical Assistance [2]	75a	70	70	$1.1	$1.1
Technology Transfer	1	1	3	$0.1	$0.1

[1] Funded in part under the general Technical Assistance Program.
[2] Funded under the general Technical Assistance Program.
a Number of viable projects.

5.12.4 Program Impact Evaluation

Energy Savings

On average, these projects take five to seven years from conception to implementation. However, once implementation is complete, the projects should lead to nearly 42,919 MWh of electricity savings and 14,774 kW of peak demand reduction. Depending on the effectiveness of information dissemination from knowledge created, the potential exists for substantial MWh savings and demand reductions due to replication across the broader New York municipal water/wastewater market sector.

5.13 Next Generation and Emerging Technologies

5.13.1 Program Description

The Next Generation and Emerging Technologies program emphasizes discrete and integrated end-use technologies for buildings; daylighting applications; solar thermal applications; and emerging technologies for industry and buildings not covered elsewhere in NYSERDA's portfolio of **New York Energy $mart**[SM] programs. The bulk of funds will be administered through narrowly defined competitive solicitations. Potential focus areas include:

- Advanced Building Products Program which concentrates on residential one- to four-family units. The advanced building demonstration element addresses the whole building – striving to reach a 92 or greater HERS rating (qualifying ENERGY STAR homes start at a HERS rating of 84). The discrete building technologies element targets development and demonstration of distinct technologies, *e.g.*, energy systems (production and recovery), heating and cooling, air quality, etc.

- Emerging technologies to support development and demonstration of discrete technologies that improve electrical end-use efficiency.

- Daylighting applications to support demonstration and provide technical assistance to advance daylight applications in commercial buildings.

- Solar thermal applications to support demonstration and provide technical assistance to advance economical collection and utilization of solar thermal energy.

- Lighting incubator program activities that develop and commercialize advanced lighting technologies.

- Power quality, energy management, controls and sensors activities that promote development of technologies that enable customers to monitor and control energy usage and power quality.

The program emphasis is on funding developers and producers of energy-efficient technology which would be commercially available to end users. Demonstration solicitations are open to all end-use customers, particularly those with high electric loads. For example, advanced building demonstrations will focus exclusively on residential homes of one to four units.

Past solicitations have addressed transportation, sensors, energy efficiency, superconductivity, power quality, energy management, and time sensitive pricing.

The thirteen-year program budget is $47.8 million.

5.13.2 Recent Program Accomplishments

Several near-term, annual goals have been set for the Next Generation and Emerging Technologies Program. These goals and progress for the first six month period ending December 31, 2006 are shown in Table 5-32.

Additional program highlights include:

- Two solicitations are under development for the Advanced Building Program. They are PON 1096 High Performance Residential Development Challenge (funded at $1.5 million) and PON 1126 Next Generation Emerging Technologies for Residential Buildings (funded at $2.5 million).

Table 5-32. Next Generation and Emerging Technologies Program – Near-Term Goals and Achievements

Activity	Program Goals (July 1, 2006 through June 30, 2007)	Achieved July 1, 2006 through December 31, 2006
Advanced Building Program	2 solicitations, 5 product development projects, 1 demonstration test bed	Proposals in response to PON 1062 *Advanced Building Envelopes and Energy Systems* are due by October 18, 2006. Total funding available is $1 million. Two proposals were funded for PON 1062 Advanced Building Envelopes and Energy Systems with total funding of $120,000. One proposal was funded for RFP 1032 *Reference Design Guide* with total funding of $100,000.
Daylighting Applications	5-10 design assistance projects, 1 daylighting implementation in buildings	Nine proposals were received in response to PON 1079 *Daylight Technical Services, Training and Demonstrations.* Total available funding is $675,000. RFP 1068 "Establishment of a Lighting Incubator Center to support lighting start-up companies in New York" was released. Proposals are due by January 25, 2007. Total funding available is $2 million.
Solar Thermal Applications	1 solicitation, 2 demonstrations	Submissions for PON 1085 *Solar Thermal Demonstrations* are due by February 5, 2007. Total available funding is $500,000.
Emerging Technologies	1 solicitation, 5 product development projects	Three projects involving emerging hydrogen technologies were selected to be funded with SBC funds through PON 957 Hydrogen Technology Development and Demonstration. PON 1105 has total funding of $4,000,000 for two rounds of proposals. First round proposals are due by January 22, 2007. The second round proposals are due by June 7, 2007.

5.13.3 Long-Term Program Accomplishments

In early 2007, project managers were asked to provide information on completed projects. The remainder of this section provides the results of this effort.

Program Portfolio

Since its inception in September 1998, the program has funded projects totaling over $25 million. There are currently 123 projects funded under the program. Of these, 71 are complete and 52 are ongoing. Projects were categorized into the following project types:

1. Research/Support Studies: include studies that analyze market potential, technological feasibility, and other studies designed to inform policy makers and supply-side market actors.

2. Product Development: projects that are focused on a clearly defined product and benefit New York manufacturers.

3. Demonstration: projects that demonstrate the performance of products that are commercially available.

4. Conference/Membership: projects support activities related to conferences and association membership.

The number of projects in each category is shown in Figure 5-6. Categories with the most projects are Research & Support at 35%, followed by Demonstration at 31%. The distribution of funding by project categories is shown in Figure 5-7. The largest categories in terms of funding are Demonstration with 50% of the funding, followed by Product Development with 21% of the funding. The distribution of funding by sector is shown in Figure 5-8. The industrial/manufaturing sector has been awarded the most funding at 39%.

Figure 5-6. Projects Distributed by Project Type

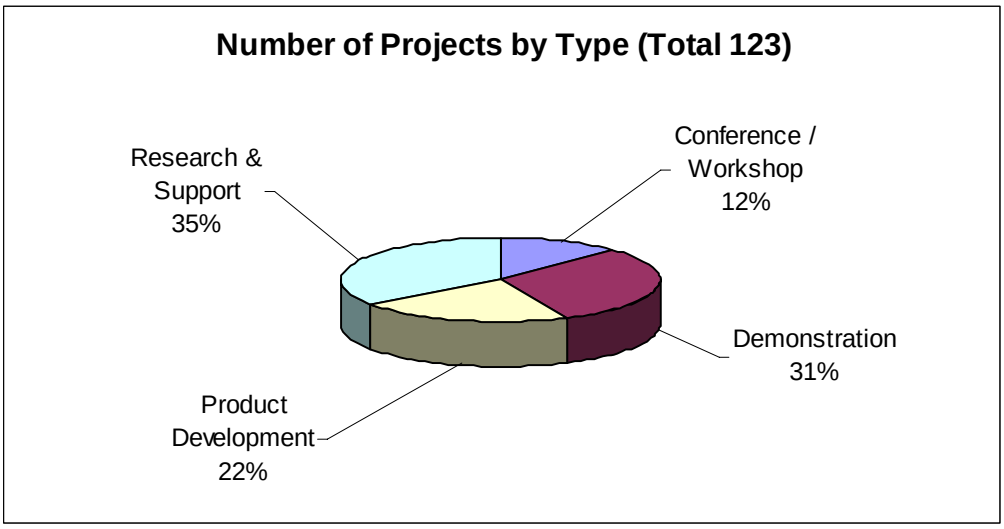


Figure 5-7. Distribution of Funding by Project Type

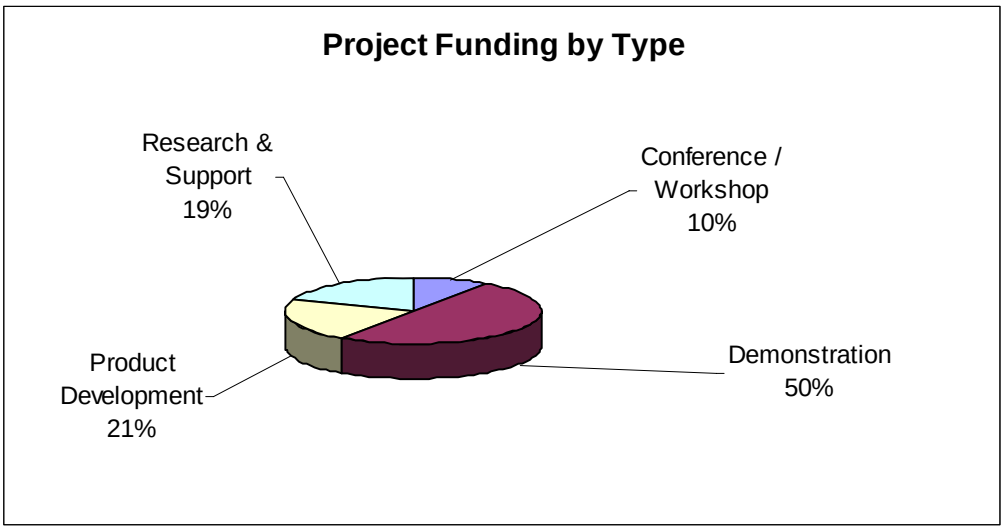


Figure 5-8. Encumbered Funding by Sector (through 2006)

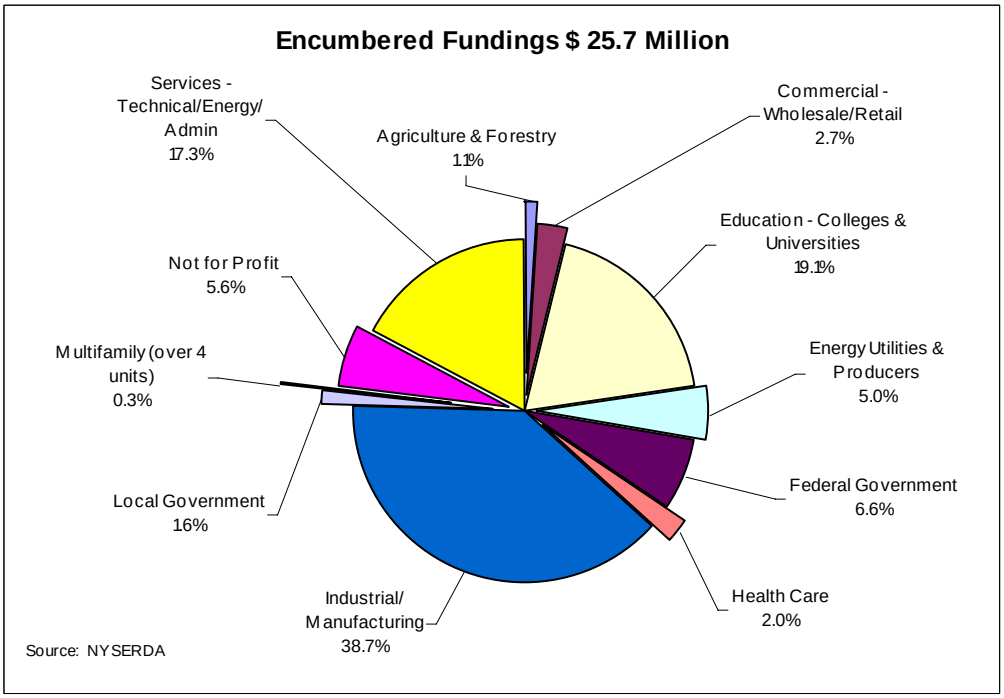


Table 5-33 presents results regarding the magnitude of knowledge creation, dissemination, and commercialization progress activities. For each project, project managers indicated whether a particular project resulted in 0, 1 to 5, 6 to 10, or 11 or more of specific outcomes such as published articles, websites reporting project information, conference presentations, etc. The number of projects with more than 1 instance of these outcomes is shown in Table 5-33 for the different response categories. Other program outcomes are shown in Table 5-34.

Table 5-33. Next Generation and Emerging Technologies Program – Number of Projects with Selected Outcomes (Through Year-End 2006)

Outcomes	Response Category		
	1 - 5	6 - 10	11 or more
Knowledge Creation and Disseminations			
Number of published articles	34	3	2
Number of websites where reports are available	28	0	0
Number of Conference Presentations	30	2	2
Number of field tests initiated	16	3	2
Number of lab tests initiated	14	1	1
Commercialization Progress			
Number of projects with UL listing, other Listings, patents, or patent applications	11	0	0

Table 5-34. Other Program Outcomes: Number of Projects with Attribute

Outcome	Result
Number of projects with recoupment provisions[1]	24
Number of new products developed	9
Number of projects with sales	4
Number of projects with job creation	7
Number of projects with new investments	17

1 Includes ongoing and completed projects

Nine new products were developed under the Next Generation Program and are in various stages of commercialization. These are shown in Table 5-35.

Table 5-35. Next Generation and Emerging Technologies Program: New Products Developed Since 1998.

Product Name	Development Objective
Ultra-Low Power Oil-fired Burner	Confirm fitness for full scale commercialization of the Ultra-Low Power system.
Voltage Sag Mitigation Device	Evaluate performance characteristics of an energy-efficient, voltage sag mitigation technology.
T 9000	Development and evaluation of a wall mounted, wireless thermostat control system for baseboard electric heaters and room air conditioners.
Power-Line-Carrier Controlled Fluorescent Lighting	To develop an ultra-efficient, electronic, sub-miniature dimming ballast (SMDB) for fluorescent lighting in the power range of 13W to 32W and a high power electronic dimming ballast (HPEDB) in the power range of 60W to 200W; both with 10-year reliabilities and on/off/dimming control functions through the use of power line carrier controls.
Online Lighting Education Training	To develop and conduct on-line educational seminars on energy efficient lighting systems for key lighting decision-makers in New York State.
Low electric power battery back up oil-fired heating system	Develop and laboratory test a self-powered, oil-fired, heating system for residential and small commercial buildings.
Hybrid Skylighting System	To design, evaluate and demonstrate a hybrid skylighting system combining a skylight with a photosensor to moderate electric light use.
HID Wallpack & Floodlight	To develop, manufacture and market high quality, affordable high intensity discharge (HID) wallpack and floodlight fixtures.
Revolutionary Power Cell	Design and develop a hybrid system including a high power density battery integrated with the contractor's high energy density power cell and demonstrate it in a small electric vehicle.

The primary technology investigated by each project was provided by the project managers. The technology categories are shown in Table 5-36. along with the number of projects in each category. The projects are further divided by project type, project status, and outcome attributes.

Table 5-36. Project Outcomes by Technology Type (Cumulative Through 2006)

Technologies	Project Type[1]					Status[1]		Knowledge Created, Disseminated, Commercialized[2]							Economic Benefits[2]			
	Research and Support	Product Development	Demonstration	Conference/Member-ship	Total number of projects	Ongoing	Completed	Lab tests initiated	Field tests initiated	Published articles	Conference Presentations	Websites where reports are available	Certifications or listings	Patents/patent applications	Recoupment Contracts	Products with Sales	Resulted in new jobs	Resulted in new investment
Aggregation/ Metering/Demand Management	10	3	15	2	30	7	23	1	3	16	13	10			5		3	9
Emissions/Clean Vehicles/Truck stop Electrification	2	1	2		5	2	3	1	2	2	3	3					1	2
Energy Generation/ Storage/CHP	4	5	1		10	3	7		2						5			
HVAC/R	8	5	2		15	8	7	5	1	6	6	6			4			
Industrial Processes	4	1	4		9	2	7	3	5	5	3						1	2
Lighting and Lighting Controls	6	7	8	5	26	14	12	4	5	7	6	7	2	3	6	3	1	2
Power Quality/Power Management/ Inverter/Control Systems	2	5	4		11	7	4	2	3	2	2	1	3	3	4	1	1	2
Residential Building Systems	3				3	3												
Technology Transfer	4			8	12	5	7			1	1	1						
Transmission & Distribution			2		2	1	1											
Totals	43	27	38	15	123	52	71	16	21	39	34	28	5	6	24	4	7	17

[1] Includes ongoing and completed projects [2] These numbers represent each instance of a range of 1 – 11 cumulative events per project

Appendix A: Glossary

ACRONYMS AND ABBREVIATIONS

AC: Air conditioner

A&E: Architecture and engineering firms

AD: Advanced diagnostics

AHP: Assisted Home Performance with ENERGY STAR®

AIA: American Institute of Architects

AMP: Assisted Multifamily Program

ASERTII: Association of State Energy Research and Technology Transfer Institutions

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

ASME: American Society of Mechanical Engineers

AUSA: Association of the United States Army

B/C: Benefit-cost

B/I: Business and institutional

BPI: Building Performance Institute

Btu: British thermal unit

Cx: Commissioning

C/I: Commercial and industrial

CBO: Community-based organization

CEE: Consortium for Energy Efficiency

CEM: Residential Comprehensive Energy Management Program

CFL: Compact fluorescent light

CHG&E: Central Hudson Gas & Electric Corporation

CHP: Combined heat and power

CIPP: Commercial/Industrial Performance Program

CO: Carbon monoxide

CO_2: Carbon dioxide

Con Edison: Consolidated Edison Company of New York, Incorporated

CSG: Conservation Services Group, Inc.

CSP: Curtailment service provider

DCV: Demand control ventilation

DEC: New York State Department of Environmental Conservation

DEGI: Dispatchable Emergency Generation Initiative, a component of the Peak Load Reduction Program (PLRP)

DG: Distributed generation

DHCR: New York State Division of Housing and Community Renewal

DI: Low-Income Direct Install Program

DOE: United States Department of Energy

DPS: New York State Department of Public Service

DR: Demand response

DCV: Demand control ventilation

ECIPP: Enhanced Commercial/Industrial Performance Program

EDRP: New York Independent System Operator Emergency Demand Response Program

EES Energy Efficiency Services

EESAT: Electrical Energy Storage Applications and Technology

EMEP: Environmental Monitoring, Evaluation, and Protection Program

EMP: **ENERGY STAR®** Multifamily Building Program

EPA: United States Environmental Protection Agency

EPRI: Electric Power Research Institute

ERO Electricity Reliability Organization

ESA: Electrical Storage Association

ES: ENERGY STAR®

ESCO: Energy services company

ESPM: ENERGY STAR® Products and Marketing

ESS: Energy Smart Students

ET: Enabling Technology for Price-Sensitive Load Management

EUR: End-Use Renewables Program

FERC: Federal Energy Regulatory Commission

FlexTech: Flexible Technical Assistance Program

FR: Freeridership

GW: Gigawatt

GWh: Gigawatt hour

HEAP: Home Energy Assistance Program

HERS: Home Energy Rating System

HFI: Homeowner Financing Incentive

HPD: New York City Department of Housing Preservation and Development

HPwES: Home Performance with ENERGY STAR®

HTR: Hard-to-reach

HTS: High temperature superconducting

HUD: United States Department of Housing and Urban Development

HVAC: Heating, ventilation, & air-conditioning

ICAP: New York Independent System Operator Installed Capacity Program

ISO: Independent system operator

IDC: Integrated Data Collection

IM: Interval Meters Program, a component of the Peak Load Reduction Program (PLRP)

IRDD: Industrial Research, Development, and Demonstration Program

kW: Kilowatt

kWh: Kilowatt hour

LC/S: Load Curtailment and Shifting Program, a component of the Peak Load Reduction Program (PLRP)

LED: Light emitting diode

LEED™: Green Buildings Leadership in Energy and Environmental Design

LI: Low Income

LIFE: Low-Income Forum on Energy

LIHEAP: Low-Income Home Energy Assistance Program

LIPA: Long Island Power Authority

LNG: Liquefied natural gas

LSE: Load-serving entity

M&V: Measurement and verification

MCAC: Market characterization, assessment, and causality analysis

MF: Multifamily

MMBtu: Million British thermal units

MOU: Memorandum of Understanding

MW: Megawatt

MWh: Megawatt-hour

NAAQS: National Ambient Air Quality Standard

Nat'l Grid: National Grid

NBI: New Buildings Institute

NCP: New Construction Program

NCQLP: National Council on Qualifications for Lighting Professions

NEEP: Northeast Energy Efficiency Partnerships

NEI: Non-energy impacts

NEMA: National Electrical Manufacturers Association

NextGen: Next Generation of Energy Efficient End-Use Technologies Program

NOx: Nitrogen oxides

NSTAR: See Glossary of Terms.

NTG: Net-to-gross

NYC: New York City

NYCA: New York control area

NYE$: **New York Energy $mart**[SM] Program

NYE$C: **New York Energy $mart**[SM] Communities

NYESLH: New York ENERGY STAR® Labeled Homes

NYISO: New York Independent System Operator

NYPA: New York Power Authority

NYS: New York State

NYSEG: New York State Electric and Gas Corporation

NYSERDA: New York State Energy Research and Development Authority

NYSRC: New York State Reliability Council

NYWEA: New York Water Environment Association

O&M: Operations and maintenance

O&R: Orange and Rockland Utilities, Incorporated

OPC: Outreach project consultant

OTDA: New York State Office for Temporary and Disability Assistance

PDRE: Permanent Demand Reduction Effort, a component of the Peak Load Reduction Program (PLRP)

PEM: Premium-Efficiency Motors Program

PET: Program Efficiency Test

PLC: Power line carrier

PLRP: Peak Load Reduction Program

PM: Particulate matter

PON: Program Opportunity Notice

POP: Point-of-purchase

PSC: New York State Public Service Commission

PT/LM: Program Theory and Logic Modeling

PV: Photovoltaic

QA: Quality assurance

QC: Quality control

R&D: Research and development

RD&D: Research, development, and demonstration

RAC: Room air conditioner

RCx: Retrocommissioning

ResTech: Residential Technical Assistance Program

RFP: Request for Proposals

RG&E: Rochester Gas and Electric Corporation

RPS: Renewable portfolio standard

RTO: Regional transmission organization

RTP: Real time pricing

RTU: Rooftop unit

SBC: System benefits charge

SCLP: Small Commercial Lighting Program

SEC: Smart Equipment Choices Program

SEER: Seasonal energy efficiency ratio

SIR: Standard Interconnection Requirements

SO: Spillover

SO_2: Sulfur dioxide

TA: Technical assistance, Technical Assistance Program

T&D: Transmission and distribution

TECA: Training, Education, Certification and Awareness

TEP: Technical Evaluation Panel

TMET: Total Market Effects Test

TREAT: Targeted Residential Energy Analysis Tools

TSP: Technical service provider

TTW: Through-the-wall air conditioner

V/C: Value/cost analysis

VEIC: Vermont Energy Investment Corporation

VSD: Variable speed drive

WAP: U.S. Department of Energy Weatherization Assistance Program

WNI: Weatherization Network Initiative

GLOSSARY OF TERMS

A

Acid Deposition Reduction Program: Regulations issued by the New York State Department of Environmental Conservation that result in reducing emissions of the harmful acid rain pollutants sulfur dioxide and nitrogen oxides.

Adjusted gross savings: NYSERDA-reported savings adjusted with M&V realization rates.

Aggregator: An entity that brings customers together to (1) buy electricity in bulk to increase customers' buying power and (2) benefit from programs with participation requirements that exclude small customers.

Allies: Service providers involved in projects that are funded through the **New York Energy $mart℠** Program.

Attribution: The assertion that a program is responsible for observed or measured effects. **(**Used interchangeably with causality.**)**

Avoided cost: The cost of power that a load serving entity avoids by not generating or purchasing the power from another source.

Awarded funds: Funds that have been contracted, approved for contracting, or set aside as a result of incentive applications.

B

Base case: The first step in macroeconomic analysis. The base case is an estimate of the impacts that system benefits charge funds would have had on New York's economy if the funds had been retained by customers of the participating utilities.

Benefit/cost analysis (B/C): Estimating the benefits of programs relative to their delivery costs. The general B/C ratio is the cumulative net present value of benefits divided by the cumulative net present value of costs.

Biomass: Materials that are biological in origin, including living and dead organic material. Biomass can be used as fuel and is available on a renewable basis through natural processes and as byproducts of human activities.

Btu (British Thermal Unit): The standard unit for measuring quantity of heat energy necessary to raise the temperature of one pound of water one degree Fahrenheit.

C

Callable: Short term load curtailment that can be requested by the New York Independent System Operator to maintain system reliability when generation resources become scarce.

Capacity: The volume of electrical power measured in megawatts needed to meet the expected demand for electricity.

Carbon dioxide (CO_2): The primary greenhouse gas associated with climate change and produced from the combustion of all fossil fuels.

Causality: The assertion that a program is responsible for the observed or measured effects. (Used interchangeably with attribution.)

Clean Air Mercury Rule: On March 15, 2005, EPA issued the Clean Air Mercury Rule to permanently cap and reduce mercury emissions from coal-fired power plants. With this rule, the United States is the first country in the world to regulate mercury emissions from utilities.

Clean Air Interstate Rule: A federal program that will permanently cap emissions of sulfur dioxide (SO_2) and nitrogen oxides (NOx) in the eastern United States, including New York. When fully implemented, the Clean Air Interstate Rule will reduce SO_2 emissions in affected states by more than 70 percent and NOx emissions by more than 60 percent from 2003 levels.

Co-funding: Financial and in-kind services contributions to the **New York Energy $mart℠** Program by sources outside NYSERDA that are necessary to ensure the Program as designed achieves the expected benefits. It is assumed that the expenditures would not have been made by the external contributors in the absence of the Program.

Combined heat and power (CHP): The use of single sources to provide heat energy and generate electricity for industrial and commercial productions and processes.

Commissioning: The process of ensuring that systems in new construction projects are designed, installed, functionally tested, and capable of being operated and maintained according to the original design intent and the building's operational needs.

Committed funds: Funds that have been set-aside for a **New York Energy $mart℠** program or project but have not been awarded to a contractor or customer.

Confidence interval: Error is involved whenever an experiment is run or people are sampled for a survey. Confidence intervals estimate the amount of error involved in data. The larger the confidence interval the less precision is implied in the analysis.

Cost recovery fee: A fee assessed by New York State for services to public authorities. The fee is determined by the New York State Division of Budget and imposed and collected by the New York State Department of Taxation and Finance.

Cumulative annual savings: Savings realized in a single calendar year from all installed measures.

Cumulative program savings: The sum of the savings realized across the life of the program. For example, a measure completed in January 2001 that delivers 100 kWh per year of annual savings will have delivered 500 kWh of cumulative program savings through December 31, 2005. The measure will continue to deliver annual savings of 100 kWh per year in subsequent years for the life of the measure.

Curtail, curtailable, curtailment: A customer's deliberate short-term reduction in electricity use, usually in response to a call by the New York Independent System Operator (NYISO) to maintain system reliability.

Custom measure: An energy efficiency measure that has been designed to meet specific performance criteria and application requirements and for which no widely available commercial product or application is available.

Customer-sited Tier: The component of the Renewable Portfolio Standard that includes electricity generated "behind the meter" by facilities that are not economically competitive with Main Tier technologies. Customer-sited resources include fuel cells, photovoltaics, anaerobic digesters, and wind resources of 300 kW or less.

Cycle time: The interval between a solicitation's due date and the date of contract signing. The interval is spent reviewing proposals, selecting winning bidders, and reaching agreement with proposers on specific work scopes and contract terms.

D

Daylighting: Daylighting is an energy efficiency measure that involves placing windows and other transparent media and reflective surfaces so that, during the day, natural light provides effective internal illumination.

Deemed savings: Savings associated with commonly adopted measures and that do not require measurement and verification for individual projects.

Deemed-savings database: A database developed for NYSERDA by its M&V contractor and used by six **New York Energy $mart℠** programs. The deemed savings database contains results from a comprehensive review of stipulated savings of more than 400 measures.

Demand reduction: A lessening in the amount of energy drawn by end-use customers from the grid.

Demandside: See Market actor: Downstream or demandside.

Distributed generation (DG): Small generation facilities using a range of technologies, including reciprocating engines, small and micro-turbines, fuel cells, photovoltaic arrays, wind, and other renewable energy sources.

Dual enthalpy economizer: A type of economizer that restricts economizer cooling to times when the heat content (enthalpy) of the outside air is less than the heat content of the return air.

E

Economizer: Control systems that are installed on mechanical cooling systems such as packaged rooftop units and outdoor air handlers and that save cooling energy by using outside air as a first stage in cooling.

Electric energy savings: Reductions in customers' annual KWh consumption.

Encumbered funds: **New York Energy $mart℠** funding that has been awarded for an energy efficiency project but has not been paid to the contractor or customer under contract.

End user: A person or entity that purchases or uses electricity at a site.

Energy burden: The percentage of household income used to pay for energy.

Energy efficiency measures: Energy-efficient products that are promoted through the **New York Energy $mart℠** Program. Installing energy efficiency measures rather than standard products results in energy and cost savings.

Energy services company (ESCO): Load serving entities, retail load aggregators, providers of comprehensive energy services, and formal groups of such entities that provide various services for customers in New York such as: matching buyers and sellers of electric power, tailoring physical and financial instruments to suit customers' needs, and developing, installing, and financing projects that are designed to reduce customers' energy and maintenance costs. NYSERDA's ECIPP program includes A&E firms, contractors, and manufacturers among ESCOs eligible for incentives.

F

Freeridership: A term for in-program impacts (*e.g.*, energy savings) that would have occurred in the absence of the program and without program incentives.

Fuel cell: An electrochemical device to convert chemical energy directly into electricity.

G

Gigawatt: One billion watts.

Gigawatt hour: A measure of electricity consumption equal to 1,000,000,000 watts of power over a period of one hour.

Green marketing: The sale of green power in competitive markets where multiple suppliers offer diverse products and services.

Green power: Energy from indefinitely available resources and whose generation has zero or negligible environmental impacts, whether through reduced emissions or minimal environmental disruption. Such sources of energy include: wind, wave, tidal, small scale hydropower, biomass, landfill gas, geothermal power, and solar.

Grid: A network for the transmission of electricity.

Gross savings: The reduction in energy and power requirements enjoyed by customers participating the **New York Energy $mart℠** Program (Program). Gross savings do not account for secondary effects that occur outside the Program nor do they systematically consider degradation and removal of equipment.

I

Incentives: Monetary and non-monetary awards offered to encourage consumers to buy energy-efficient equipment and to participate in programs designed to reduce customers' energy use.

Incremental cost: The cost of energy-efficient equipment less the cost of comparable standard-efficiency equipment.

Infrastructure development: Increasing the supply of energy efficient products to facilitate competition among end-use customers.

Inputs: Resources available to a program that include money, staff time, volunteer time, and existing knowledge.

Installed Capacity Program (ICAP): A New York Independent System Operator (NYISO) demand-response program in which generators and load serving entities are capable of supplying and reducing their demand for energy to ensure that sufficient energy and capacity are available to meet the State's reliability rules.

Installed measures: Energy efficiency measures that have been installed in end-use applications as the direct result of one of the **New York Energy $mart℠** programs.

Integrated Data Collection (IDC): A survey technique that garners participation feedback in nearly real time on market characterization and attribution/causality. IDC is usually integrated with standard program implementation and program paperwork.

Interval meter: A meter that captures, stores, and communicates energy-use information.

K

Kilowatt: One thousand watts.

Kilowatt hour: A measure of electricity consumption equal to 1,000 watts of power over a period of one hour.

L

Leveraged funds: Financial expenditures and in-kind services made by sources outside NYSERDA that would have occurred in the absence of the **New York Energy $mart℠** Program. Leveraged funds supplement NYSERDA funds such that their effectiveness and benefits are increased beyond what **New York Energy $mart℠** Program funding alone could have achieved.

Load: The electric power consumed at one moment in time by customers.

Load curtailment: Instantaneous, short-term (*i.e.*, several hours) reductions in power used by customers.

Load management: Activities designed to influence the timing and magnitude of customers' use of electricity.

Load serving entity (LSE): Entities, including municipal electric systems, energy services companies, and electric cooperatives that are authorized and required by law, regulatory authorization or requirement, agreement or contractual obligation to supply energy, capacity, and ancillary services to retail customers located within the New York Control Area (NYCA), including entities that take service directly from the New York Independent System Operator (NYISO) to supply their own load in the NYCA.

Load shifting: A form of electricity load management that involves shifting energy use to different time periods of the day.

Logic model diagram: Documents that discuss the logical relationships among elements within programs through diagrams constructed with boxes and circles that (1) map the step-by-step process of inputs, activities, outputs, and outcomes embedded within programs, (2) identify hypotheses and key indicators, and (3) identify potential external influences.

Low-income customer: For purposes of the **New York Energy $mart℠** Program, low-income households are those having income less than or equal to 80% of the state's median income. Median income is determined by the number of persons in the household. In 2005, 80% of the state median income for a family of four was $55,488. The figure varies from year to year.

M

Macroeconomic benefits: The economic value added by the **New York Energy $mart℠** Program estimated by comparing the impacts of the program's expenditures and energy savings to the impacts that would have resulted had the program not been implemented and the money not been paid by ratepayers into the System Benefits Charge fund. Value added includes labor income (employee compensation and proprietor income), property income (interest, rental income, royalties, dividends, and profits), and indirect business taxes (primarily sales and excise taxes).

Main-Tier Technologies: The component of the Renewable Portfolio Standard that includes wholesale generation of electricity from renewable resources including wind, hydropower, and biomass.

Market actor: Persons, organizations, and groups that influence (*e.g.*, by buying, selling, providing services, providing information, distributing, transporting, manufacturing, consuming) the decision chain for energy-efficient and renewable products, services, technologies, and program endeavors. Types of market actors include:

- **Upstream or supply-side:** Market actors such as manufacturers, developers, and research and development organizations that provide the energy-efficient and renewable products, services, and technologies.

- **Mid-stream or market infrastructure:** Market actors who purchase energy-efficient and renewable products, services, and technologies from upstream actors and who sell them downstream to customers. Retailers, distributors, wholesalers, contractors, installers, energy services companies, designers, governmental units, building owners, commodity providers, aggregators, and architects and engineers are examples of mid-stream market actors.

- **Downstream or demandside:** Market actors who purchase and use energy-efficient and renewable products, services, and technologies. Downstream market actors include residential homeowners, small business customers, and power plant owners and operators.

Market barrier: Conditions and concepts that prevent and inhibit market adoption of energy efficient technologies, products, and services and inhibit implementation of energy efficient behaviors. Market barriers to the adoption of high efficiency and renewable measures can include: lack of awareness, knowledge, and information about technologies, products, and services; lack of availability of products and services; perceived and actual difficulty financing the higher incremental cost often associated with energy efficient and renewable products and services; and perceived risk associated with implementation of energy efficient and renewable products and services.

Market development: See, Market transformation.

Market effects: Changes in the structure of markets and in the behavior of participants in markets that reflect increased adoption of energy-efficient products, services, and practices.

Market infrastructure: See, Market actors: Mid-stream or market infrastructure.

Market price effects: Cost savings by rate payers caused by lower wholesale electricity prices.

Market sector: A group whose members display common activities and shared values. Examples include the residential buildings sector, the commercial buildings sector, and the small business sector.

Market transformation: Market states in which desired activities and behaviors have become standard practices due to the reduction in market barriers resulting from market interventions. Market transformation is apparent when market effects endure after interventions have been withdrawn, reduced, and changed. Market transformation programs are designed to induce lasting structural and behavioral changes in markets. **(**Used interchangeably with market development.)

Master metered: Commercial buildings with a single electric meter serving the entire building. The meter is owned by the utility company providing electricity to the building, and the building manager receives a single bill for the building's electricity use.

Measurement and verification (M&V): An evaluation modality used to: confirm that program baselines are accurately defined; ensure that energy measures are installed properly to generate the predicted savings and energy output; and determine the actual savings achieved by energy efficiency and renewable resource projects.

Megawatt: One million watts or one thousand kilowatts. Generally, one megawatt will power 1,000 homes.

Megawatt hour: A measure of electricity consumption equal to 1,000,000 watts of power over a period of one hour.

N

NSTAR: A private utility company, with the following operating units: Boston Edison Company, Cambridge Electric Light Company, Commonwealth Electric Company, and NSTAR Gas Company, that provides retail electricity and natural gas to customers in eastern and central Massachusetts .

National Ambient Air Quality Standard: The United States Environmental Protection Agency has established standards to control six "criteria" pollutants: carbon monoxide, lead, nitrogen dioxide, particulates, ozone, and sulfur oxides.

Net savings: The amount of energy savings attributable to a program after adjustments are made for freeridership and spillover market effects.

New York Energy $mart℠: New York's public benefits program was established by Order of the New York State Public Service Commission (PSC) in January 1998.[2] The program began July 1, 1998 with funds collected from customers by New York's electric utilities through a non-bypassable system benefits charge (SBC). The PSC designated the New York State Energy Research and Development Authority (NYSERDA) as the statewide administrator of most of the program funds. **New York Energy $mart℠** is the service mark name of the Program. Under this service mark, NYSERDA administers a portfolio of energy efficiency, low-income, and research and development programs.

[2] New York State Public Service Commission. In the Matter of Competitive Opportunities Regarding Electric Service., Opinion No. 98-3. *Opinion and Order Concerning System Benefits Charge Issues*. Issued and effective January 30, 1998. Cases 94-E-092 *et al.*

Nitrogen oxides (NOx): Gases produced from the combustion of fossil fuels including coal, oil, and natural gas, diesel fuel, and gasoline. Oxides of nitrogen are pollutants associated with a number of environmental problems including ground-level ozone (smog), acid deposition, formation of particles, and eutrophication or oxygen depletion of water bodies associated with excessive growth of algae.

Non-energy impacts (NEI): Difficult-to-measure effects that can nevertheless be monetized and included as a percentage of energy savings. NEIs include perceived improvements in comfort, safety, and productivity.

Non-participant: Customers who are eligible but do not participate in NYSERDA programs.

O

Off-peak: Time periods when the demand for electricity by customers is relatively low.

Opinion leader: Persons and organizations viewed by members of professions as demonstrating good professional practice.

Outcome: The results of the delivery of programs, services, and products and changes in knowledge, attitude, and behavior by program participants.

Output: The immediate products from the activities of programs.

P

Participant: Individuals and entities that receive services and incentives through the **New York Energy $mart**[SM] Program.

Payback: The ratio expressed in years of the estimated annual savings of new measures to estimated costs. Payback can be used to determine whether measures are cost effective.

Peak demand: Electricity demand during periods of high electricity use.

Portfolio: The term used for the totality of individual programs comprising the **New York Energy $mart**[SM] Program.

Portfolio level: Evaluation activities that address the **New York Energy $mart**[SM] **Program** as a whole and the business and institutional, low-income, residential, and research and development program areas.

Pre-qualified measures: Energy efficiency measures with established, tested, and verified energy savings. Savings calculations for pre-qualified measures use deemed savings. See, deemed savings, deemed-savings database.

Program case: The second step in a macroeconomic analysis. The program case is the estimated economic effect on New York's economy of the complete portfolio of **New York Energy $mart**[SM] Program expenditures on goods and services.

Process evaluation: An evaluation modality that examines the extent to which programs are operating as intended by assessing ongoing program operations and determining whether the target population is being served.

Program Efficiency Test: The ratio of program benefits divided by NYSERDA's costs.

Program Opportunity Notice (PON): A NYSERDA solicitation approach for identifying and procuring multiple projects within specified technology areas.

Program summary: Program-specific information developed from secondary research.

Program theory: The assumptions underlying programs; descriptions of how programs fit within their market context. Program theory defines how programs are expected to work and identifies intended outcomes.

Public benefits programs: Programs that promote energy efficiency and renewable energy and are funded by surcharges on energy bills. See, **New York Energy $mart℠.**

R

Realization rate: Measured and verified energy and demand savings divided by energy and demand savings claimed by NYSERDA. A rate of 1.0 means that measured and verified savings align precisely with claimed savings. A rate greater than 1.0 means that savings are under-reported, while a rate less than 1.0 means the savings are over-estimated.

Real-time pricing: A pricing mechanism for selling power to consumers in which a consumer's price is based on the spot power market price at the time of consumption.

Recommissioning: An ongoing process in existing commercial buildings that seeks to resolve operating problems, improve comfort, optimize energy use, and identify promising retrofits. Sometimes called "continuous commissioning," the process focuses on improving overall building system controls and operations under actual conditions based on existing occupancy.

Renewable resources: Naturally replenished energy sources including: biomass, hydropower, geothermal, solar, wind, and tidal action.

Request for Proposals (RFP): A NYSERDA solicitation approach for identifying and procuring projects in specific areas of interest and with a high degree of specificity. A single award is typical. See, Program Opportunity Notice (PON).

Resource acquisition: Installation of energy efficiency measures to reduce demand.

Retrocommissioning: A systematic process used for optimizing performance of systems in existing buildings by identifying and implementing relatively low-cost operations and maintenance improvements.

S

Scenario 1: A benefit-cost test that includes only resource savings such as energy, demand, fuel, and water. Scenario 1 is prescribed by the New York State Public Service Commission in its total resource cost test.

Scenario 2: A benefit-cost test that includes resource savings and market price effect benefits.

Scenario 3: A benefit-cost test that includes resource savings, market price effect benefits, and non-energy impacts.

Sector: A group whose members display similarities including common activities and shared values. Examples include the commercial, industrial, institutional, government, non-profit, farm and agribusiness, multifamily, and residential sectors.

Solicitation: A device to publicly announce funding opportunities and seek proposals for specific program activities. See, Request for Proposals, Program Opportunity Notice.

Spillover: The proportion of impacts (*e.g.*, energy savings) that occur as a result of **New York Energy $mart**[SM] Program activities but without program incentives.

Submetering: The measurement and billing of electric use in individual apartments in a master metered building. The meters, or submeters, are owned by the building, and the utility continues to read the building master meter and issue a single bill to the building. Submetering allows residents to pay only for their individual electric use. See, Master metered.

Sulfur dioxide (SO_2): A gas emitted into the atmosphere largely through the combustion of fossil fuels, *e.g.,* coal and oil, and diesel and gasoline. SO_2 contributes to acid rain and the formation of particulate matter.

Supply-side: See, Market actor: Upstream or supply-side.

System benefits charge: A charge on consumers' bills from electric distribution companies used to pay for certain public benefits such as assistance to low-income consumers and the delivery of energy efficiency programs.

System-wide reliability: A measure of the ability of the electric delivery system to continue operating while some lines or generators are out of service.

T

Total-Market-Effects Test: The ratio of program benefits divided by NYSERDA's and customers' costs.

Total Resource Benefits: Avoided cost benefits including electric energy and demand, fuel, and water.

Total Resource Costs: The sum of program costs and customer costs.

U

Utility service area: Defined areas designated by the New York State Public Service Commission that define utility companies' boundaries and within which companies serve end-use customers.

V

Value/cost analysis: An analytic technique that assesses the cost effectiveness of research and development programs, which are difficult to monetize.