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

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[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: SBC I & SBC II [1,2]	Funds Spent: SBC III[3]	Funds Spent: Total Spent / % of Budget Spent	Encumbered Funds[4] / % of Budget Encumbered	Committed Funds[5] / % of Budget Committed
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.