New York State Energy Research and Development Authority

New York's System Benefits Charge Programs Evaluation and Status Report

Year Ending December 31, 2011
Report to the Public Service Commission

Final Report
March 2012
(Revised April 2012)

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NYSERDA RECORD OF REVISION

Document Title
New York's System Benefits Charge Programs Evaluation and Status Report Quarterly Report To The Public Service Commission Quarter Ending December 31, 2011 Final Report March 2012

Revision Date	Description of Changes	Revision on Page(s)
3/31/12	Original Issue	Original Issue
4/6/12	Revised the percentages that appear in Figure 2-7 to reflect National Grid's total spending by Utility Service Area as 26% and NFG's as 19%.	Page 2-13
4/20/12	Revised footnote "a" in Tables ES-5 and 2-6 to better describe savings updates for the **New York Energy $mart**[SM] Products Program.	Page ES-16 Page 2-16

Acronyms and Abbreviations

AEEP: Agriculture Energy Efficiency Program

AHP: Assisted Home Performance with ENERGY STAR®

AMP: Assisted Multifamily Program

ARRA: American Reinvestment and Recovery Act

B/C: Benefit-cost

BOEP: Benchmarking and Operations Efficiency Program

BPI: Building Performance Institute

Btu: British thermal unit

Cx: Commissioning

C/I: Commercial/Industrial

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

CRE: Commercial Real Estate

CSD: Central School District

CSG: Conservation Services Group, Inc.

DEC: New York State Department of Environmental Conservation

DG-CHP: Distributed Generation-Combined Heat and Power

DHCR: New York State Division of Housing and Community Renewal

DI: Low-Income Direct Install Program

DOE: United States Department of Energy

DOR: discount off retail

DPS: New York State Department of Public Service

DR: Demand response

ECIPP: Enhanced Commercial/Industrial Performance Program

EEPS: Energy Efficiency Portfolio Standard

EES: Energy Efficiency Services

EFP: Existing Facilities Program (Created by merging ECIPP and PLMP)

EFRCs: Energy Frontier Research Centers

EMEP: Environmental Monitoring, Evaluation, and Protection Program

EMS: Energy Management Systems

EPA: United States Environmental Protection Agency

EPD: Electro Polymeric Display

EPRI: Electric Power Research Institute

E$C: New York Energy $mart℠ Communities

E$CC: Energy $mart Communities Coordinator

ESCO: Energy services company

ESEERCO: Empire State Electric Energy Research Corp.

ESS: Energy Smart Students

EUR: End-Use Renewables Program

FlexTech: Flexible Technical Assistance Program

FR: Freeridership

GJGNY: Green Jobs - Green New York

GSP: Gross State Product

GW: Gigawatt

GWh: Gigawatt-hour

HEAP: Home Energy Assistance Program

HERS: Home Energy Rating System

HPwES: Home Performance with ENERGY STAR®

HTR: hard-to-reach

HVAC: heating, ventilation, & air-conditioning

IC: Integrated Circuits

IMC: Integrated Marketing Communications

ISO: Independent System Operator

IPPI: Industrial Process & Product Innovation Program

IPE: Industry and Process Efficiency

kW: kilowatt

kWh: kilowatt-hour

LCD: liquid crystal display

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

MBCx: monitoring-based commissioning

M&V: measurement and verification

MCA: Market Characterization and Assessment

MDb: metrics database

MMBtu: Million British thermal units

MOR: margin over rack

MOU: Memorandum of Understanding

MPP: Multifamily Performance Program

MW: Megawatt

MWh: Megawatt-hour

NCP: New Construction Program

NEBs: non-energy benefits

NEI: Non-energy impacts

NOx: Nitrogen oxides

NTG: net-to-gross

NTGR: net-to-gross ratio

NYC: New York City

NYE$: **New York Energy $mart**[SM] Program

NYE$C: **New York Energy $mart**[SM] Communities

NYESH: New York ENERGY STAR® 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

NYWEA: New York Water Environment Association

O&R: Orange and Rockland Utilities, Incorporated

OPC: Outreach Project Consultants

OTDA: New York State Office for Temporary and Disability Assistance

PHEV: Photovoltaic Hybrid-electric Vehicle

PLMP: Peak Load Management Program

PM: particulate matter

PMU: phasor measurement unit

PON: Program Opportunity Notice

PSC: New York State Public Service Commission

PV: photovoltaic

QA: quality assurance

QC: quality control

RAC: room air conditioner

R&D: Research and Development

RD&D: Research, Development, and Demonstration

RFP: Request for Proposals

RG&E: Rochester Gas and Electric Corporation

RPS: Renewable portfolio standard

RR: realization rates

SBC: System Benefits Charge

SCLP: Small Commercial Lighting Program

SFY: State Fiscal Year

SO: Spillover

SO_2: Sulfur dioxide

TA: Technical Assistance

T&D: Transmission and Distribution

T&MD: Technology and Market Development

TPV: Thermophotovoltaic

TRC: Total Resource Cost

VFDs: variable frequency drives

WAP: U.S. Department of Energy Weatherization Assistance Program

WFD: Workforce Development

WNI: Weatherization Network Initiative

Executive Summary

This report updates NYSERDA's progress through December 31, 2011 in implementing its System Benefits Charge (SBC) funded programs, including the original **New York Energy $mart℠** portfolio and the Energy Efficiency Portfolio Standard (EEPS) programs.[1] The report was jointly prepared by staff of the New York State Energy Research and Development Authority (NYSERDA) and a team of third-party evaluation contractors acting under the terms and conditions of a Memorandum of Understanding (MOU)[2] between NYSERDA and the New York State Department of Public Service (DPS). NYSERDA submits this report to the Public Service Commission (PSC) in fulfillment of its responsibility under the terms of the MOU.

Program History and Evolution

On December 21, 2005, the PSC ordered[3] New York's public benefits program funding extended for five years, from July 1, 2006 through June 30, 2011 and increased funding from approximately $150 million to $175 million annually ($896[4] million over the five-year period). The continuation and expansion of the Program was intended to help maintain momentum for the State's efforts to develop competitive markets for energy efficiency; demand management; outreach and education services; research, development, and demonstration; low-income energy assistance; and to provide direct economic and environmental benefits to New Yorkers. The Program continues to address market barriers to the competitive procurement of these services.

[1] Previous annual reports were issued in September 2000, January 2002, May 2003, May 2004, May 2005, May 2006, March 2007, March 2008, March 2009, March 2010 and March 2011. Each report presents cumulative results from the Program's inception on July 1, 1998. Reports are available at http://www.nyserda.ny.gov and by request.

[2] The original MOU between the New York State Public Service Commission, New York State Department of Public Service, and New York State Energy Research and Development Authority was signed March 11, 1998, and revised December 6, 2001. A new MOU between the New York State Department of Public Service and the New York State Energy Research and Development Authority was signed on August 22, 2008.

[3] 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.

[4] Consisting of $866 million in SBC funding plus $30 million in anticipated interest earnings.

During 2008, several changes arising from the PSC's EEPS proceeding have affected NYSERDA's SBC program portfolio and evaluation efforts. The PSC's June 23, 2008 EEPS Order called for an increase in SBC collections and a ramp up of program efforts by NYSERDA and the State's six investor-owned electricity transmission and distribution (T&D) utilities to meet the State's "15-by-15" electricity reduction goal.[5] NYSERDA complied with the PSC's Order by submitting a Supplemental Revision to the SBC Operating Plan incorporating approximately $80 million per year in additional funds for five new or expanded programs as well as general awareness, administration and evaluation associated with those programs.[6] These new and expanded program efforts began in early 2009 upon DPS approval of NYSERDA's revised Operating Plan.[7] NYSERDA documents progress on the new and expanded EEPS program activities in monthly and quarterly reports to the PSC and in this annual report.

The June 23, 2008 Order also specified that evaluation funding shall be set at 5% of program budgets for the new and expanded programs, and increased from 2% to 5% for the remainder of NYSERDA's existing **New York Energy $mart**[SM] Program. NYSERDA complied with the Order by filing a Transition Plan describing planned enhancements to evaluation, measurement and verification.[8] DPS Staff was directed to establish common protocols for evaluation, measurement and verification, and convene an EEPS Evaluation Advisory Group to engage in active oversight of all program administrators' evaluation planning and implementation. The EEPS Evaluation Advisory Group was established in August 2008, and includes a NYSERDA representative.[9] DPS Staff's August 2008 evaluation plan guidelines for program administrators served as the basis for NYSERDA's development and submittal of detailed evaluation plans for the five new/expanded programs in late 2008, and for all major ongoing **New York Energy $mart**[SM] programs in 2009 and 2010. Most of these detailed evaluation plans were approved by

[5] The "15-by-15" goal refers to a 15% reduction in electricity use from 2015 forecast levels.

[6] Expanded programs are New Construction, Flex Tech and EmPower New York. New programs are Industry and Process Efficiency and CFL Expansion. The total EEPS funding included in the Operating Plan was approximately $260 million over three and one quarter years.

[7] In addition to the five programs approved as part of the June 23, 2008 Order, a subsequent program, NYSERDA's Workforce Development Program, was approved by the PSC June 22, 2009.

[8] The August 22, 2008 *New York State Energy Research and Development Authority Transition Plan for Enhancing Program Evaluation* can be found at: http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={C1D57617-28FA-4555-9768-850887AA0A45}

[9] A list of EEPS Evaluation Advisory Group members can be found at: http://www.dps.ny.gov/EAG_Members.pdf

DPS during 2009, and in 2010 are in various stages of implementation. Work completed to date is highlighted in this report and prior reports.

A series of other Commission Orders issued during the latter half of 2009 and early 2010 authorized NYSERDA to further expand and add to its programs. In addition to the electric SBC, the Commission commenced collection of a natural gas SBC in order to allow NYSERDA and other program administrators to broaden or begin offering services for gas efficiency measures. In total, the additional NYSERDA program approvals constitute $447 million in funding through 2011 to support electric and natural gas programs. By the end of 2011, the SBC funds and interest earnings from the three **New York Energy $mart^{SM}** Program rounds and the approved NYSERDA-administered EEPS programs will have provided more than $2.4 billion to support a full range of programs to help the State meet its energy challenges.[10]

In September 2010, NYSERDA submitted a proposal to the Commission requesting approval for a continuation, with modifications, of the current **New York Energy $mart^{SM}** Program and approval of a new program portfolio. In this proposal, NYSERDA requested a six-month extension of the **New York Energy $mart^{SM}** Program to December 31, 2011 to coincide with the conclusion of the current EEPS Program. In addition, the proposal requested Commission approval to transfer eight **New York Energy $mart^{SM}** resource acquisition programs into the EEPS portfolio at current funding levels given their similarity in implementation to existing EEPS programs.[11] Lastly, the proposal introduced a new Technology and Market Development (T&MD) program portfolio that would include programs designed to support innovative technologies and services, such as clean energy technologies and services as well as codes and standards. The proposed funding level for the T&MD portfolio was $82 million per year through December 31, 2016.

In its December 30, 2010 Order in response to this proposal, the Commission approved the six-month extension of the **New York Energy $mart^{SM}** Program through December 31, 2011 and

[10]In addition to NYSERDA's **New York Energy $mart^{SM}** and EEPS programs, funded through the SBC, the Public Service Commission also provided funding for New York utilities to administer EEPS programs. Furthermore, 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 delivery wherever practicable to maximize the use of public funds and to ensure a coordinated statewide effort to meet public policy goals. The results of the utility, NYPA, and LIPA programs are not included in this report.

[11]These programs included Residential Multifamily Building Performance, Low-Income Multifamily Building Performance, EmPower NY, Existing Facilities, New Construction; FlexTech; Single Family Home Performance, and Low-Income Single Family Home Performance.

authorized the transfer of eight **New York Energy $mart**[SM] programs into the EEPS program portfolio pending approval of a revised SBC (**New York Energy $mart**[SM]) Operating Plan due in the first quarter of 2011. The revised Operating Plan submitted by NYSERDA included updates to program goals to reflect the six-month extension and presented a revised budget adding $40.9 million to the **New York Energy $mart**[SM] Program. NYSERDA also revised and resubmitted its EEPS Operating Plans to reflect the additional six months of funding for those programs totaling $49.2 million. The revised SBC/**New York Energy $mart**[SM] and most of the revised EEPS operating plans were approved by DPS in April 2011, and the additional six-month funding and goals have been reflected in this evaluation and status report.

The Commission deferred its decision on the T&MD portfolio and ordered NYSERDA to submit a T&MD Operating Plan that would incorporate input from interested stakeholders through an intensive outreach process led by NYSERDA. NYSERDA submitted the T&MD Operating Plan on May 16, 2011, and on June 8, 2011 the Commission issued a Notice of Proposed Rulemaking requesting public comment on the Operating Plan by July 25, 2011.

In a PSC Order issued on October 24, 2011, the Commission approved the T&MD Operating Plan, including a CHP initiative, for five years (January 1, 2012 – December 31, 2016) at an average annual funding rate of $93.8 million.[12] Of this amount, approximately $82 million was approved to be funded from SBC collections; the balance of the budget (approximately $11.8 million) was designated for the CHP initiative and will be authorized by the Commission for funding using sources identified by NYSERDA in a proposal due to the Commission by March 31, 2012. On December 22, 2011, NYSERDA submitted a supplemental revision to its T&MD Operating Plan incorporating the modifications described in the Order. The Operating Plan covered $410 million of SBC funds over five years with an average annual budget of $82.06 million. The budget represents average annual funding of $70 million in program costs for eight T&MD Initiatives. The Order also authorized an additional $10 million of program costs for the Combined Heat and Power (CHP) Initiative (District Energy and Performance Program) pending NYSERDA's March 2012 proposal.

On October 18, 2011, the Public Service Commission approved the Agriculture Disaster Energy Efficiency Program, seeking to reallocate electric EEPS funding to implement an Agriculture

[12] Case 10-M-0457 – *In the Matter of the System Benefits Charge IV*, issued and effective October 24, 2011.

Disaster Relief Program.[13] The program will assist farm and on-farm producers in replacing systems and equipment damaged or lost due to Hurricane Irene and/or Tropical Storm Lee. Through the program, storm-damaged farms will receive much needed assistance to incorporate energy-efficient electric and natural gas equipment and measures into their replacements and repairs. The total funding allocated to the Agriculture Disaster Relief Program is $5,861,664.

In a PSC Order[14] issued on October 25, 2011, the Commission reauthorized most of the energy efficiency programs under the Energy Efficiency Portfolio Standard that were scheduled to expire December 31, 2011 for a four-year period ending December 31, 2015.[15,16] On December 22, 2011, NYSERDA submitted a supplemental revision to its SBC Operating Plan incorporating the changes to its approved EEPS programs pursuant to the October 2011 Order. Under the Order, EEPS Program Administrators were also afforded an opportunity to seek program modifications that may result in substantive changes to program targets or budgets by March 31, 2012.

This document combines reporting requirements of the original **New York Energy $mart^{SM}** programs with the additional reporting requirements for the approved EEPS programs. For purposes of this report, the "**New York Energy $mart^{SM}** Program" refers to the original 13-and-a-half-year program, and the "EEPS Program" refers to the approved EEPS Programs. The "SBC Program" refers to the portfolio of programs and includes both **New York Energy $mart^{SM}** and EEPS funding sources. Thus, this evaluation report provides an update for the **New York Energy $mart^{SM}** Program as well as the EEPS Programs.

[13] Case 07-M-0548 and Case 08-E-1132. *Order Approving an Emergency Agriculture Disaster Energy Efficiency Program.* Issued and effective October 18, 2011.

[14] Case 07-M-0548 and Case 07-G-0141, *Order Authorizing Efficiency Programs, Revising Incentive Mechanism, and Establishing a Surcharge Schedule*, issued and effective October 25, 2011.

[15] The NYSERDA Workforce Development efforts funded under the first phase of EEPS will continue into 2012, but the Program was not allocated any additional funding in the October 2011 Order. The EEPS phase one NYSERDA Geothermal Heat Pump Systems Program was not allocated additional funding in the October 2011 Order. In a separate Commission Order (Case 07-M-0548, Order Approving an Emergency Agriculture Disaster Energy Efficiency Program, issued October 18, 2011), NYSERDA received approval in October 2011 to reallocate phase one EEPS funds for its Agriculture Disaster Relief Program.

[16] The NYSERDA EEPS Program Portfolio includes the following programs: High Performance New Construction, Flexible Technical (FlexTech) Assistance, Industrial Process and Efficiency, Existing Facilities, Agricultural Energy Efficiency, Benchmarking and Operations Efficiency, Multifamily Performance (including Low-Income Multifamily Performance), Electric Reduction in Master-Metered Buildings, Single Family Home Performance (including New York ENERGY STAR Homes and New York ENERGY STAR Home Performance), Statewide Residential Point-of-Sale, EmPower New York, and Low-Income Single Family Home Performance (including Assisted New York ENERGY STAR Homes and Assisted New York ENERGY STAR Home Performance).

Given the six-month extension of the **New York Energy $mart[SM]** Program funding period and the largely retrospective nature of impact evaluation activities, future evaluation and status reports will more fully define the ultimate achievements and effectiveness of this round of program activity. The future reporting will incorporate results of several current impact evaluation studies and will provide an up-to-date assessment of progress against stated goals.

By mid-2011, the SBC funds and interest earnings from the three **New York Energy $mart[SM]** Program rounds and the approved NYSERDA-administered EEPS programs will have provided more than $2.4 billion to support a full range of programs to help the State meet its energy challenges.[17]

Program Administration

NYSERDA policy ensures that the Program is administered in an open, fair, and equitable manner. Ninety-eight percent (98%) of projects are competitively selected. The remaining 2% of projects involve contracts less than $50,000 each, unsolicited proposals that are deemed to support the Program's goals, sole-source contracts with unique, specially-skilled contractors and contracts less than $200,000 each with NYS-certified Minority and Women-Owned businesses.

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 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 help ensure that solicitations will attract the most appropriate projects that will achieve their goals. All solicitations are published in the New York State *Contract Reporter* and are posted on the NYSERDA website.

The evaluation function is overseen by NYSERDA and conducted by a team of independent evaluation contractors. All evaluation contractors were selected through competitive solicitation with a member of DPS Staff serving on each review panel. DPS helps allocate the evaluation

[17] In addition to NYSERDA's **New York Energy $mart[SM]** and EEPS programs, funded through the SBC, the PSC also provided funding for New York utilities to administer EEPS programs. Furthermore, 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 delivery wherever practicable to maximize the use of public funds and to ensure a coordinated statewide effort to meet public policy goals. The results of the utility, NYPA and LIPA programs are not included in this report.

budget, identify evaluation activities to be conducted, and establish timelines for evaluation activities. The DPS provides final approval of NYSERDA's multi-year detailed evaluation plans and is involved in ongoing evaluation project oversight.

Budget and Spending Status

New York Energy $mart[SM] Program Portfolio

As shown in Table ES-1, the 13-and-a-half-year budget for the **New York Energy $mart[SM]** portfolio is approximately $1.93 billion, which is primarily allocated among four major program areas:

- Commercial/Industrial (C/I) initiatives account for the largest share, 33% of the 13-and-a-half-year **New York Energy $mart[SM]** Program budget, or $635 million.
- Research and Development (R&D) accounts for 21% of the 13-and-a-half-year budget, or nearly $403 million.
- Low-Income initiatives account for approximately 17% of the total 13-and-a-half-year budget, or $321 million.
- Residential (non-low-income) initiatives also account for almost 17% of the 13-and-a-half-year budget, or $322 million.

In addition to these major program areas, the 13-and-a-half-year program budget also includes an environmental disclosure program ($1.9 million), program administration ($131.6 million), program evaluation ($53.5 million), support for Statewide Evaluation Protocol Development ($2.1 million), funding for an evaluation consultant serving DPS and the Evaluation Advisory Group ($1.1 million), and a cost recovery fee ($26.1 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, 2011.

Table ES-1. New York Energy $mart℠ Program Portfolio Budget as of December 31, 2011 ($ million)

	Budget[1]			% of Program Area Budget	% of Total Budget
	SBC I & SBC II[2]	SBC III[3]	Total Budget		
Program Areas					
Commercial/Industrial	247.1	388.3	635.4	37.1%	33.0%
Residential	165.4	156.8	322.2	18.8%	16.7%
Low-Income	86.6	234.2	320.8	18.7%	16.6%
Research and Development	105.9	296.6	402.5	23.5%	20.9%
General Awareness[4] (Marketing)	15.9	15.2	31.0	1.8%	1.6%
Program Areas Total	**$620.9**	**$1,091.1**	**$1,711.9**	**100.0%**	**88.8%**
Other Costs					
Program Administration	59.8	71.7	131.6	-	6.8%
Metrics and Evaluation	14.5	39.0	53.5	-	2.8%
Environmental Disclosure	0.8	1.1	1.9	-	0.1%
NYS Cost Recovery Fee[5]	9.2	16.9	26.1	-	1.4%
DPS Evaluation Consultant	-	1.1	1.1	-	0.1%
DPS Uniform Database	-	0.4	0.4	-	<0.1%
Statewide Evaluation Protocol Development	-	2.1	2.1	-	0.1%
Other Costs Total	**$ 84.3**	**$132.3**	**$216.7**	**-**	**11.2%**
Total New York Energy $mart℠	**$705.2**	**$1,223.4**	**$1,928.6**	**-**	**100.0%**

[1]Reflects carryover in funds and reallocation as approved by the Public Service Commission in 2007.

[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 December 31, 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) through December 31, 2011

	Total 13-Year Budget [1]	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		
Program Areas						
Commercial/Industrial	635.4	247.1	253.0	500.2 78.7%	595.0 93.6%	626.3 98.6%
Residential[5]	322.2	165.4	141.2	306.7 95.1%	313.2 97.1%	319.4 99.1%
Low-Income	320.8	86.6	202.7	289.2 90.2%	307.4 95.8%	314.1 97.9%
Research and Development	402.5	105.9	159.5	265.4 65.9%	353.4 87.8%	400.6 99.5%
General Awareness[6] (Marketing)	31.0	15.9	9.8	25.7 82.9%	30.9 99.7%	30.9 99.7%
Program Areas Total	**1,711.9**	**$620.9**	**$766.2**	**1,387.1 81.0%**	**1,599.9 93.5%**	**1,691.3 98.8%**
Other Costs						
Program Administration	131.6	59.8	71.7	131.6 100.0%	131.6 100.0%	131.6 100.0%
Metrics and Evaluation	53.5	14.5	16.6	31.1 58.1%	34.7 64.9%	45.2 84.5%
Environmental Disclosure	1.9	0.8	-0.8	<0.1 2.6%	<0.1 2.6%	<0.1 2.6%
NYS Cost Recovery Fee	26.1	9.2	18.7	27.9 106.9%	27.9 106.9%	27.9 106.9%
DPS Evaluation Consultant	1.1	-	1.0	1.0 90.9%	1.1 100.0%	1.1 100.0%
DPSUniform database	0.4	-	0.4	0.0 0.00%	0.4 100.0%	0.4 100.0%
Statewide Evaluation Protocol Development	2.1	-	0.9	0.9 42.9%	1.3 44.2%	2.1 100.0%
Other Costs Total	**$216.3**	**$84.3**	**$108.1**	**$192.4 88.4%**	**$196.6 92.0%**	**$208.2 96.1%**
Total New York Energy $mart[SM]	**$1,928.2**	**$705.2**	**$874.3**	**$1,579.5 81.9%**	**$1,796.5 93.2%**	**$1,899.5 98.5%**

[1] Reflects carryover in funds and reallocation as approved by the PSC in 2007.
[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 December 31, 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 Program Area.
Totals may not sum exactly due to rounding. Source: NYSERDA

Energy Efficiency Portfolio Standard Programs

This section presents financial data for the EEPS programs through December 31, 2011. Of the $498.8 million budget, $438.8 million (88%) has been allocated to these programs with the remainder supporting program administration, evaluation and other portfolio costs. Budgets and spending for each EEPS program and other costs are presented in Table ES-3.

Table ES-3. Financial Status of the EEPS Programs ($ million) through December 31, 2011

	Total Budget	Total Funds Spent	% of Budget Spent	Encumbered Funds % of Budget Encumbered	Committed Funds % of Budget Committed
Program[1]					
Commercial/Industrial Electric	230.1	68.4	29.6%	153.8 66.4%	226.4 98.4%
Commercial/Industrial Gas	24.2	5.1	20.6%	20.0 82.3%	24.2 100.0%
Residential Electric	36.6	16.3	46.8%	17.3 49.5%	20.5 56.0%
Residential Gas	53.8	17.1	31.7%	20.5 38.2%	23.6 43.9%
Low-Income Electric	34.4	19.7	56.8%	20.3 58.5%	26.7 77.6%
Low-Income Gas	31.3	11.7	37.3%	14.0 44.7%	28.0 89.5%
Workforce Development	5.8	1.4	23.3%	4.4 76.2%	4.5 77.6%
Subtotal	**$419.2**	**$139.7**	**33.6%**	**$250.4** **60.1%**	**$353.9** **84.4%**
General Awareness	19.6	7.5	42.2%	19.6 100.0%	19.6 100.0%
Program Total	**$438.8**	**$147.2**	**33.9%**	**$270.0** **62.1%**	**$373.5** **85.1%**
Other Costs					
Program Administration	36.2	26.2	74.4%	26.2 74.4%	36.2 100.0%
Metrics and Evaluation	23.8	4.9	20.5%	7.7 32.2%	23.8 100.0%
Other Costs Total	**$60.0**	**31.1**	**52.5%**	**33.9** **57.3%**	**60.0** **100.0%**
Total EEPS Program	**$498.8**	**$178.3**	**35.7%**	**$303.9** **61.5%**	**$433.5** **86.9%**

[1]Program budgets exclude administration and evaluation dollars. Administration and evaluation dollars are summed across programs and included in the Other Costs section of the table. Administration funds spent includes the EEPS allocable share of NYS Cost Recovery Fee.

Totals may not sum exactly 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 four overarching public policy goals.[18] Overall, the Program is making good progress toward achieving its long-term goals. The goals and progress made through December 31, 2011 are shown in Table ES-4. Substantial additional program-specific and sector-level accomplishments are documented in this report, and further detailed in independent evaluation contractor reports that are available on the NYSERDA website or upon request.

[18] 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.

Table ES-4. New York Energy $mart[SM] Program Goals and Progress through December 31, 2011

Public Policy Goal	Progress as of December 31, 2011
Improve New York's energy system reliability and security by reducing energy demand and increasing energy efficiency, supporting innovative T&D 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 933 MW of callable load reduction and installing efficiency measures that permanently reduce peak demand by another 934.2 MW.[1]
	Renewable energy programs have reduced peak demand on the electric grid by an additional 11.7 MW.
	The **New York Energy $mart[SM]** Program has led to the installation of energy efficiency measures saving 4,346.3 GWh per year.[1] Of this, approximately 542.9 GWh of electricity is being generated annually from Distributed Generation/Combined Heat and Power (DG-CHP) systems.
	The **New York Energy $mart[SM]** Program has led to the installation of wind and photovoltaic (PV) technologies, which provide 108 GWh of clean electricity generation per year. This includes the installation of 865 PV and 15 small wind systems.
	Over the past two years, the number of installed DG-CHP systems has increased from 54 to 75.
	Under the Public Benefit Power Transmission and Distribution Program, 30 projects have been approved to provide 29 companies, universities and other institutions $13 million to pursue development of advanced technologies that will improve the efficiency and delivery of power for electric customers across the State.
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.	In 2011, the **New York Energy $mart[SM]** Program has saved participating customers nearly $789 million in annual energy costs.
	Approximately 161,760 eligible New York low-income customers received direct assistance through the **New York Energy $mart[SM]** programs, resulting in $354/year in average customer energy bill savings for this underserved population.
	The **New York Energy $mart[SM]** portfolio has achieved a benefit-cost ratio of 1.5 under the most conservative Total Resource Cost Test scenario.

Public Policy Goal	Progress as of December 31, 2011
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℠** Programs' energy savings is 1,962 tons of nitrogen oxide (NO_X), 3,919 tons of sulfur dioxide (SO_2), and 2.0 million tons of carbon dioxide (CO_2).[2]
	Between 2003 and 2011, the number of PV and small wind installers participating in the **New York Energy $mart℠** Program has increased from 14 to 380.
	The **New York Energy $mart℠** Program has helped optimize energy performance: • in more than 1,200 new commercial buildings, • in more than 19,900 new homes, • in more than 42,600 existing homes, • in more than 112,200 multifamily housing units[2], and • through more than 20,300 energy efficiency projects in existing commercial, industrial and institutional facilities, including technical studies, benchmarking, measure replacement, and reduced-interest financing.
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.	Through 2011, the System Benefits Charge Program has led to the creation of 5,700 total net jobs.[3]
	Initial results show that R&D product development expenditures have lead to an increase in gross state product (GSP). Every one dollar spent on product development projects leads to an increase in the GSP, or value added, by $5.2.
	Private investment in CHP has increased in New York. The total project cost for all projects installed through year-end 2011 is $254.8 million. Of this total, 82% represents funds from project participants.

[1] These savings incorporate a reduction made in Q4 2011 to account for the retirement of installed measures reaching the end of their useful life.

[2] These emission reductions are associated with both electric and fossil fuel saving measures. Under a cap-and-trade system, the total number of emission allowances is determined by regulation. Regulated entities can purchase allowances and collectively emit up to the cap that is currently in place. Therefore, in the near term, electric efficiency projects may not decrease the overall amount of emissions released into the atmosphere. Still, electric efficiency projects will reduce end-users' responsibility or footprint associated with emissions from electricity production. Beginning in Q1 2010, NYSERDA now estimates reductions in emissions of carbon dioxide (CO_2), nitrogen oxides (NO_x), and sulfur dioxide (SO_2) associated with electric efficiency projects based on average emission rates that include emissions associated with imports of electricity. In the past, NYSERDA has reported emissions reductions using marginal emission factors; this transition to average emission factors was performed to be consistent with a footprint reduction framework.

[3] Includes NYSERDA's **New York Energy $mart℠** and EEPS program activity.

Summary of Program Benefits

Table ES-5 provides a summary of the main quantifiable benefits achieved by the SBC Program for the past five years. By December 2011, the portfolio had achieved 5,615 GWh of cumulative annual electricity savings, and nearly 6.3 million MMBtu of natural gas, fuel oil and other fuel savings. NYSERDA's SBC portfolio has also reduced peak demand by 2,010 MW, including 1,077 MW of permanent demand reduction measures and 933 MW of callable load reduction.

Table ES-5. Cumulative Program Benefits from Installed Measures through December 31, 2011 (New York Energy $mart℠ and EEPS)[19]

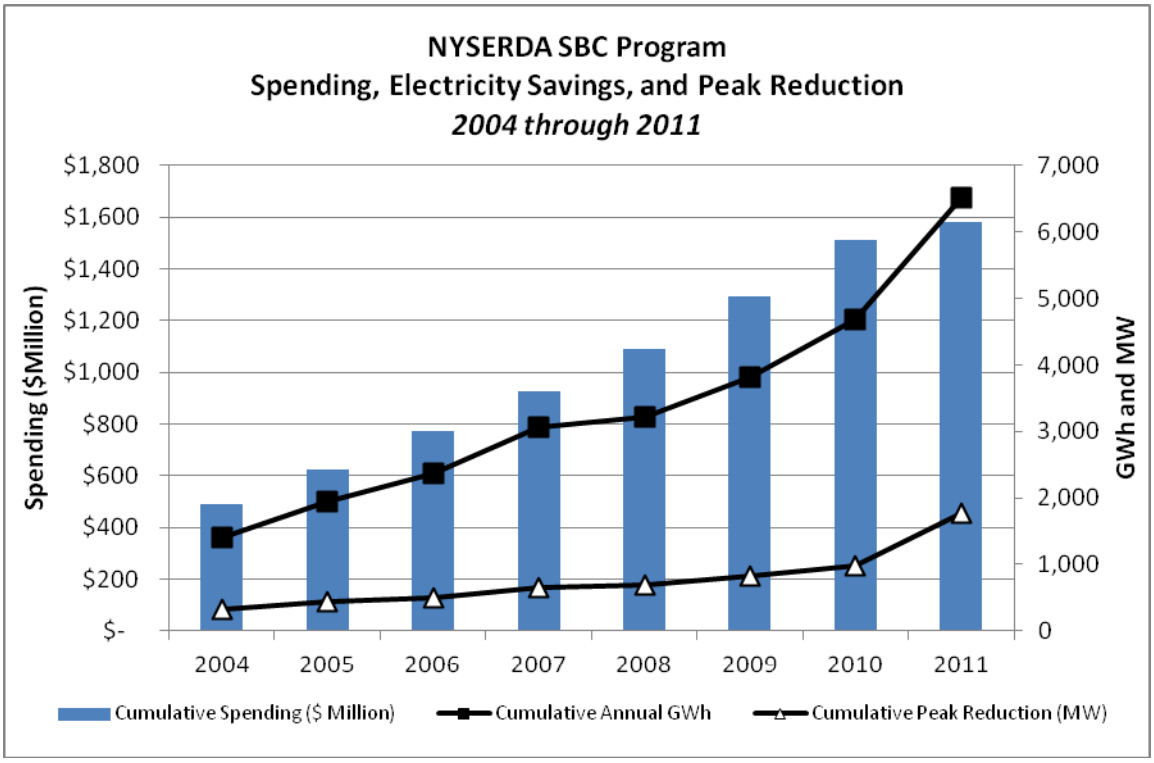
Benefits	Through Year-End 2007a	Through Year-End 2008	Through Year-End 2009	Through Year-End 2010	Through December 31, 2011
Electricity Savings from Energy Efficiency and On-Site Generation (Annual GWh)	3,070	3,220	3,820	4,584a,b	5,615a,b
Peak Demand Reduction[1] (MW)	1,200	1,275	1,415	1,765a	2,010a,b
Permanent Measures (MW)	650	700c	824	1,035a	1,077a,b
Curtailable[2]	550	575	590	729	933
Net Fuel Savings (Annual MMBtu)	4,460,000	5,400,000	4,600,000c	5,810,000a	6,296,794
Annual Energy Bill Savings to Participating Customers ($ Million)	$570	$590	$680	$804	$1,015
Renewable Energy Generation (Annual GWh)	106	106	106	106	108
Net Additional Jobs[3]	3,200	3,385	3,900	4,950	5,700
NO_x Emissions Reductions (Annual Tons)[4]	2,570	2,800	3,030	2,130	2,555
SO_2 Emissions Reductions (Annual Tons)[4]	4,720	5,120	5,710	4,180	5,048
CO_2 Emissions Reductions (Annual Tons)[4]	2,000,000	2,200,000	2,300,000	2,220,000	2,664,590
Equivalent number of cars removed from NY roadways	400,000	435,000	464,000	445,000	522,469

a Savings for the **New York Energy $mart℠** Products Program are cummulative through 2009 and are estimated based on market data, survey research, and deemed savings values.
b These savings incorporate a reduction made in Q4 2011 to account for the retirement of installed measures reaching the end of their useful life.
c Fuel savings decreased over year-end 2008 due to the installation of two large combined heat and power facilities through the FlexTech Program.
[1]Does not include 11.7 MW of renewable energy generation capacity.
[2]Curtailable MW has decreased due to a reassessment of the impact of the Enabling Technologies Program. MW enabled under the SBC2 program Enabling Technologies for Price Responsive Load was not required to persist beyond the period of the contract. As such, the MWs available have steadily declined since the program's close.
[3]Figures in this row represent jobs created through year-end of each year (2007 through 2011) for the full portfolio of SBC-funded programs. This includes **New York Energy $mart℠** and EEPS Programs, based on a methodology updated in 2012. Results for the years previous to 2011 have been restated in this table (from those published in 2011 quarterly and prior annual reports) to be consistent with the updated methodology.
[4]These emission reductions are associated with both electric and fossil fuel saving measures. Under a cap-and-trade system, the total number of emission allowances is determined by regulation. Regulated entities can purchase allowances and collectively emit up to the cap that is currently in place. Therefore, in the near term, electric efficiency projects may not decrease the overall amount of emissions going into the atmosphere. Nevertheless, electric efficiency projects will reduce end-users' responsibility or environmental footprint associated with emissions from electricity production. Beginning in Q1 2010, NYSERDA now estimates reductions in emissions of carbon dioxide (CO_2), nitrogen oxides (NO_x), and sulfur dioxide (SO_2) associated with electric efficiency projects based on average emission rates that include emissions associated with imports of electricity. In the past, NYSERDA has reported emissions reductions using marginal emission factors; this transition to average emission factors was performed to be consistent with a footprint reduction framework.

[19] Some progress indicators for 2009 and 2010, specifically those related to energy and demand savings, bill savings, and emission reductions are inclusive of NYSERDA's EEPS program activity.

Figure ES-1 shows the general trend in program spending, electricity savings, and peak demand reductions over the past five years. Spending bars represent the cumulative total spending, in millions, since inception of the 13-year program. Electricity savings and peak demand reductions depicted by the lines are cumulative annual figures. Values shown for each year represent the total electric savings and peak demand reductions from measures installed since program inception that are still operational.

Figure ES-1. SBC Program Spending and Savings (2004-2011)[1]



[1] Spending and savings for 2009 and 2010 are inclusive of NYSERDA's EEPS program activities.

2011 Evaluation Projects

Findings in this report are compiled based on the cumulative work of NYSERDA and its independent evaluation contractors over the past several years. The report also includes summary findings from the following evaluations completed in 2011:

- Process evaluation:
  - Industry and Process Efficiency
  - **New York Energy $mart**[SM] Products (Upstream HVAC)

  - Distributed Generation/Combined Heat and Power

- Market assessment:
  - FlexTech
  - **New York Energy $mart[SM]** Products
  - Distributed Generation/Combined Heat and Power
- Impact evaluation:
  - Business Partners (evaluation assessment only)
  - FlexTech
  - CFL Expansion
- Program theory and logic model on the Electric Reduction in Master-Metered Buildings component of the Multifamily Performance Program.

Commercial/Industrial Programs

The C/I Programs identify opportunities to improve energy efficiency and load management and attempt to cause changes in energy decision making by building owners and operators. The 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. In recent years, the **New York Energy $mart[SM]** C/I Programs have been streamlined to most effectively 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. In addition, as a result of the Commission's EEPS proceeding and subsequent Orders, NYSERDA has expanded existing C/I programs and began offering new programs.[20] Programs in the C/I area are discussed in detail in Section 3.

Commercial/Industrial Program Findings

Significant progress is being made by the C/I Programs. Several goals were set for the third **New York Energy $mart[SM]** Program funding cycle and the EEPS-funded programs for energy, peak

[20] Expanded programs are Existing Facilities, New Construction and FlexTech. New programs are Industry and Process Efficiency, FlexTech Benchmarking Pilot, Agriculture, Agriculture and Agriculture Disaster Relief.

demand and natural gas savings as well as several other key metrics of program success.[21] Overall, in the five-and-a-half-year measurement period, the **New York Energy $mart**[SM] components of the Existing Facilities and FlexTech programs have exceeded their five-and-a-half-year **New York Energy $mart**[SM] electricity goals. EEPS electric-funded programs continue to make good progress toward their goals. In addition, the following C/I programs have exceeded their five-and-a-half-year **New York Energy $mart**[SM] peak demand savings goals: Existing Facilities, Business Partners, New Construction and FlexTech. EEPS natural gas-funded programs also continue to make good progress toward their goals.

Across the **New York Energy $mart**[SM] programs, 11 additional logic model-driven 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. The Program is making good progress toward these goals. Five of the 11 goals have been exceeded (lenders signing a **New York Energy $mart**[SM] Loan Fund and Financing Program participation agreement and the amount of **New York Energy $mart**[SM] Loan Fund and Financing Program loans leveraged). Progress on the remaining goals is at 90% or less (number of Business Partners signed up, number of **New York Energy $mart**[SM] Loan Fund and Financing Program customers receiving assistance, and participants receiving assistance through the **New York Energy $mart**[SM] Vertical Outreach Program).

Residential and Low-Income Programs

The residential energy efficiency programs influence decisions regarding energy use by homeowners, renters, and participants in the residential energy products, services and new construction markets. These programs also work with the multifamily building industry to improve the efficient use of electricity, petroleum, and natural gas. As a result of the Commission's EEPS proceeding and subsequent Orders, NYSERDA began implementing a new CFL Expansion Program, which will complement NYSERDA's other residential program offerings and increase the sales of CFLs in New York State, as well as expand its Home Performance, New York ENERGY STAR Homes and Multifamily Performance programs to

[21] Fuel savings goals were not established for the **New York Energy $mart**[SM] Commercial/Industrial programs and peak demand savings goals were not established for the EEPS-funded programs.

provide additional energy efficiency services to eligible customers. Residential programs are described in Section 4 of this report.

Low-Income programs reduce households' energy burden[22] by improving the efficiency of energy use and providing energy management and aggregated energy procurement services. Initiatives in this area 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 informing customers about the benefits of energy efficiency and things they can do themselves to reduce consumption. As a result of the Commission's EEPS proceeding and subsequent Orders, NYSERDA expanded its low-income EmPower, Assisted Multifamily Performance, Assisted Home Performance with ENERGY STAR and Assisted New York ENERGY STAR Homes programs to provide more widespread energy efficiency services to low-income customers. Programs in the Low-Income area are also discussed in detail in Section 4.

Residential and Low-Income Program Evaluation Findings

Significant progress is being made by the Residential and Low-Income portfolio. Several long-term goals were set for the third **New York Energy $mart^{SM}** Program funding cycle and the EEPS-funded programs for energy, peak demand and natural gas savings as well as several other key metrics of program success.[23] Overall, in the five-and-a-half-year measurement period, two out of six **New York Energy $mart^{SM}** Residential and Low-Income programs (New York ENERGY STAR Homes and Market and Community Support) have exceeded their five-and-a-half-year **New York Energy $mart^{SM}** electricity goals while the EmPower Program has nearly exceeded its five-and-a-half-year electricity goal. EEPS electric-funded programs are making good progress toward their electricity goals. The Home Performance with ENERGY STAR and New York ENERGY STAR Homes programs have exceeded their **New York Energy $mart^{SM}** fuel savings goals while EEPS natural gas-funded programs continue to make good progress toward their goals.

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

[23] Peak demand savings goals were not established for the **New York Energy $mart^{SM}** Residential and Low-Income programs nor the EEPS-funded programs.

Across the programs, 28 additional five-and-a-half-year 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. Seventeen of the goals have been surpassed (*e.g*., the number of new independent retailers signed up, ENERGY STAR market share increases, number of market rate households served through Home Performance with ENERGY STAR). Progress on some goals is less than expected (*e.g.* number of low-income ENERGY STAR homes built, number of existing market rate multifamily units receiving energy efficiency services).

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 by the R&D portfolio. The R&D portfolio has led to the construction of renewable energy generation amounting to almost 108 GWh per year and 11.7 MW. Electricity savings of 542.9 GWh per year are accruing from the DG-CHP Demonstration Program, though a significant portion of these savings are also supported by other programs in NYSERDA's **New York Energy $mart**[SM] portfolio.

Across the programs, numerous near-term goals were set, 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 performing well with respect to these goals. Results of each program's progress toward its stated goals are shown in table format in Section 5. Many of these goals are qualitative in nature. Still, some key areas of progress include the following:

- Under the Public Benefit Power Transmission and Distribution Research Program, 30[24] projects have been selected to pursue development of advanced technologies that will improve the efficiency and delivery of power for electric customers across the state. The Program has succeeded in collaborating with major stakeholders. The program has funded projects in several of the utility companies, is working with the NYISO's newly formed R&D group to prioritize critical technology needs, and is partnering with the U.S. Department of Energy (DOE) on smart grid projects and technology evaluation.

- The Clean Energy Infrastructure Program has helped develop four accredited training institutions, offered 27 training workshops, supported 160 companies in their efforts to expand renewable business networks, and helped 10 manufacturing companies expand their operations.

- The Power Systems Program has funded 77 projects, launched 13 new products and completed 10 field demonstrations.

- The DG-CHP Demonstration Program has funded 81 projects representing 115 MW of anticipated installed capacity. Approximately 30 MW will be installed in New York City.

- Demand Response and Innovative Rate Research Program has enlisted the participation of 5,330 apartments for time-sensitive electric rate pilot programs.

- The Electric Transportation Program has issued 11 solicitations and selected 34 projects for funding.

- The Environmental Monitoring, Evaluation, and Protection Program has issued 12 solicitations, resulting in 71 contracts and $14.6 million in co-funding. Thirty-six research reports, six summary communications, and 105 journal articles have been published.

- The IPPI Program has issued seven solicitations resulting in 60 projects.

- The Municipal Water and Wastewater Efficiency Program has selected 14 projects for funding. The program goal of providing information to 1,000 individuals serving the municipal wastewater and water treatment sectors was achieved in 2008.

- Under the Next Generation and Emerging Technologies Program, 16 advanced building projects, five daylighting design assistance, two solar thermal projects, and 23 emerging technologies projects have commenced.

Cumulative progress for programs that started before July 1, 2006 includes:

- Under the DG-CHP Demonstration Program, 73 systems are now operational, representing $36 million in program funding, $201 million in total system costs, and 81.7 MW of installed capacity.

[24] Five projects were withdrawn.

- The Municipal Water and Wastewater Efficiency Program is expected to achieve 46,400 MWh of electricity savings and 16.2 MW of peak demand reduction.
- The EMEP Program resulted in nearly 230 peer-reviewed articles published in scientific journals.

Follow Up on Evaluation Recommendations

As appropriate during the course of their work, NYSERDA's evaluation contractors put forth recommendations for programmatic improvements. These recommendations are typically discussed with program staff and included in the evaluation contractors' final reports to NYSERDA. Although it is not expected that every recommendation will be acted upon and result in a programmatic change, NYSERDA's evaluation team seeks to ensure that the recommendations are actionable and are considered by program staff.

NYSERDA has a formal process for tracking response to and implementation of evaluation contractor recommendations for program improvement. This year's report includes new recommendations made by evaluation contractors examining the Upstream HVAC component of the Market and Community Support Program. These recommendations will be shared with program staff and future evaluation reports will detail program staff's responses/actions on those recommendations. Recommendations already reviewed in prior evaluation cycles but not yet acted upon are revisited with program staff if they are still relevant. This formal and systematic recommendation tracking process is expected to result in greater use of the knowledge gained from the evaluation work, and longer-term tracking of programmatic changes will determine whether the recommended changes led to the expected outcomes and improvements.

1 Introduction and Public Policy Context

This report updates NYSERDA's progress through December 31, 2011 in implementing its System Benefits Charge (SBC) funded programs, including the original **New York Energy $mart**[SM] portfolio and the Energy Efficiency Portfolio Standard (EEPS) programs.[1] The report was prepared by New York State Energy Research and Development Authority (NYSERDA) staff and a team of third-party evaluation contractors, in accordance with the Memorandum of Understanding (MOU)[2] between NYSERDA and the New York State Department of Public Service (DPS). NYSERDA submits this report to the Public Service Commission (PSC) in fulfillment of its responsibility under the terms of the MOU.

1.1 Public Policy Context

The **New York Energy $mart**[SM] Program (Program), funded by a System Benefits Charge, was initiated in 1998 by Order of the PSC[3] and has included three funding cycles.[4] The **New York Energy $mart**[SM] Program portfolio is comprised of 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

[1] Previous annual reports were issued in September 2000, January 2002, May 2003, May 2004, May 2005, May 2006, March 2007, March 2008, March 2009, March 2010 and March 2011. Each report presents cumulative results from the Program's inception on July 1, 1998. Reports are available on NYSERDA's website at http://www.nyserda.ny.gov/ and by request.

[2] The original Memorandum of Understanding (MOU) between the New York State Public Service Commission, New York State Department of Public Service, and New York State Energy Research and Development Authority was signed March 11, 1998, and revised December 6, 2001. A new MOU between the New York State Department of Public Service and the New York State Energy Research and Development Authority was signed on August 22, 2008.

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

[4] 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.

Yorkers; and conducting research, development, and demonstration of promising new 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 on market development and technology performance.

The **New York Energy $mart**[SM] Program is currently in its third funding cycle. Table 1-1 provides a snapshot of each funding cycle and the Program's evolution over time.

Table 1-1. New York Energy $mart[SM] Program Funding Cycles and Evolution

Funding Cycle	Approximate Annual Funding Level	Program Description/Evolution
First Funding Cycle June 1998 - June 2001	$58 million	During this three-year period, NYSERDA's administration of the Program was begun with emphasis on designing and launching market transformation programs, conducting outreach, and offering technical and financial assistance to customers and market allies to fully deploy programs. Research and development programs were expanded and there was a Program expansion into low-income and renewable energy infrastructure initiatives.
Second Funding Cycle July 2001 - June 2006	$147 million	July 2001 through December 2002 **New York Energy $mart[SM]** Program's implementation activities were greatly accelerated as committed program funding more than doubled in the first 18-months. The rapid increase in program funding commitments was a direct result of program design, outreach, and marketing efforts introduced during the first funding cycle. The Program's early efforts were designed to create market capacity and capability to deliver energy efficiency, renewable energy, other demand management and related services. Once created, Program activities could be readily accelerated, as partnerships were created with market allies, marketing and general awareness campaigns had stimulated demand for services, and the market infrastructure was in place to deliver such services. January 2003 through December 2004 NYSERDA selectively modified its funding commitments across the many programs offered. For example, some markets, such as residential room air conditioners, were successfully transformed, allowing for product incentive offerings to be reduced and dollars re-programmed to capture other emerging opportunities. Also, because the market and demand for energy efficiency services in New York is extensive, the Program needed to accept fewer applications to preserve funds through the end of the second funding cycle. January 2005 through June 2006 Program gaps and opportunities were continually assessed with respect to energy efficiency, low-income services, and R&D programs as programs and markets matured to assist policy makers in deciding the future of funding for energy-related public benefits programs in the State. Further, information from multi-year program implementation and evaluation activities provided a firm foundation in making those decisions.
Third Funding Cycle July 2006 - December 2011	$175 million	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 and demand management/peak-load reduction; outreach and education services; research, development, and demonstration; and 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.

During 2008, 2009 and 2010, several changes resulting from the PSC's EEPS proceeding have affected NYSERDA's SBC Program portfolio and evaluation efforts. Some of the major changes are summarized below:

- The PSC's June 23, 2008 EEPS Order called for an increase in SBC collections and a ramp up of program efforts by NYSERDA and the State's six investor-owned electricity transmission and distribution utilities to meet the State's "15-by-15" electricity reduction goal.[5] NYSERDA complied with the PSC's Order by submitting a Supplemental Revision to the SBC Operating Plan incorporating approximately $85 million per year in additional funds for five new or expanded programs as well general awareness, administration and evaluation associated with those programs.[6] These new and expanded program efforts began in early 2009 upon DPS approval of NYSERDA's revised Operating Plan.[7] NYSERDA documents progress on the new and expanded EEPS program activities in monthly and quarterly reports to the PSC and in this annual report.

- The June 23, 2008 Order also specified that evaluation funding shall be set at 5% of program budgets for the new and expanded programs, and increased from 2% to 5% for the remainder of NYSERDA's existing **New York Energy $mart**[SM] Program. NYSERDA complied with the Order by filing a Transition Plan describing planned enhancements to evaluation, measurement and verification.[8] DPS Staff was directed to establish common protocols for evaluation, measurement and verification, and convene an EEPS Evaluation Advisory Group to engage in active oversight of all program administrators' evaluation planning and implementation. The EEPS Advisory Group was established in August 2008, and includes a NYSERDA representative.[9] DPS Staff's August 2008 evaluation plan guidelines for program administrators served as the basis for NYSERDA's development and submittal of detailed evaluation plans for the five new/expanded programs in late 2008, and for all major ongoing **New York Energy $mart**[SM] programs in early 2009 and 2010. Several of these detailed evaluation plans were approved by DPS during 2009 and 2010 and are in various stages of implementation. All work completed to date is highlighted in this report and prior reports.

- A series of other PSC Orders issued during the latter half of 2009 and 2010 authorized NYSERDA to further expand and add to these programs. In addition to the electric SBC, the PSC commenced collection of a natural gas SBC in order to allow NYSERDA and other

[5]The "15-by-15" goal refers to a 15% reduction in electricity use from 2015 forecast levels.

[6]Expanded programs are New Construction, Flex Tech and EmPower New York. New programs are Industry and Process Efficiency and CFL Expansion. The total EEPS funding included in the Operating Plan was approximately $260 million over three and one quarter years.

[7] In addition to the programs approved as part of the June 23, 2008 Order, a subsequent program, NYSERDA's Workforce Development Program, was approved by the PSC June 22, 2009.

[8]The August 22, 2008 *New York State Energy Research and Development Authority Transition Plan for Enhancing Program Evaluation* can be found at: http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={C1D57617-28FA-4555-9768-850887AA0A45}

[9]A list of EEPS Evaluation Advisory Group members can be found at: http://www.dps.ny.gov/EAG_Members.pdf

program administrators to broaden or begin offering services for gas efficiency measures. In total, the additional program approvals constitute approximately $187.6 million in additional funding through 2011, including approximately $69.5 million in electric funding and over $118 million in natural gas funding. The PSC ordered that NYSERDA submit operating plans for each of these new or expanded programs, and those operating plan are either pending DPS approval or being compiled by NYSERDA. NYSERDA submitted operating plans for these programs and received DPS approval during 2009 and 2010. Refer to Section 2 of this report for detailed EEPS budget information.

- In September 2010, NYSERDA submitted a proposal to the Commission requesting approval for a continuation, with modifications, of the current **New York Energy $mart**[SM] Program and approval of a new program portfolio. In this proposal, NYSERDA requested a six-month extension of the **New York Energy $mart**[SM] Program to December 31, 2011 to coincide with the conclusion of the current EEPS Program. In addition, the proposal requested Commission approval to transfer eight **New York Energy $mart**[SM] resource acquisition programs into the EEPS portfolio at current funding levels given their similarity in implementation to existing EEPS programs.[10] Lastly, the proposal introduced a new Technology and Market Development (T&MD) program portfolio that would include programs designed to support innovative technologies and services, such as clean energy technologies and services as well as codes and standards. The proposed funding level for the T&MD portfolio was $82 million per year through December 31, 2016.

- In its December 30, 2010 Order in response to this proposal, the Commission approved the six-month extension of the **New York Energy $mart**[SM] Program through December 31, 2011 and authorized the transfer of eight **New York Energy $mart**[SM] programs into the EEPS program portfolio pending approval of a revised SBC (**New York Energy $mart**[SM]) Operating Plan due in the first quarter of 2011. The revised Operating Plan submitted by NYSERDA included updates to program goals to reflect the six-month extension and presented a revised budget adding $40.9 million to the **New York Energy $mart**[SM] Program. NYSERDA also revised and resubmitted its EEPS Operating Plans to reflect the additional six months of funding for those programs totaling $49.2 million. The revised SBC/**New York Energy $mart**[SM] and most of the revised EEPS operating plans were approved by DPS in April 2011, and the additional six-month funding and goals have been reflected in this evaluation and status report.

- The Commission deferred its decision on the T&MD portfolio and ordered NYSERDA to submit a T&MD Operating Plan that would incorporate input from interested stakeholders through an intensive outreach process led by NYSERDA. NYSERDA submitted the T&MD Operating Plan on May 16, 2011, and on June 8, 2011 the Commission issued a Notice of Proposed Rulemaking requesting public comment on the Operating Plan by July 25, 2011.

- In a PSC Order issued on October 24, 2011, the Commission approved the T&MD Operating Plan, including a CHP initiative, for five years (January 1, 2012 – December 31,

[10]These programs included Residential Multifamily Building Performance, Low-Income Multifamily Building Performance, EmPower NY, Existing Facilities, New Construction; FlexTech; Single Family Home Performance, and Low-Income Single Family Home Performance.

2016) at an average annual funding rate of $93.8 million.[11] Of this amount, approximately $82 million was approved to be funded from SBC collections; the balance of the budget (approximately $11.8 million) was designated for the CHP initiative and will be authorized by the Commission for funding using sources identified by NYSERDA in a proposal due to the Commission by March 31, 2012. On December 22, 2011, NYSERDA submitted a supplemental revision to its T&MD Operating Plan incorporating the modifications described in the Order. The Operating Plan covered $410 million of SBC funds over five years with an average annual budget of $82.06 million. The budget represents average annual funding of $70 million in program costs for eight T&MD Initiatives. The Order also authorized an additional $10 million of program costs for the Combined Heat and Power (CHP) Initiative (District Energy and Performance Program) pending NYSERDA's March 2012 proposal.

- On October 18, 2011, the Public Service Commission approved the Agriculture Disaster Energy Efficiency Program, seeking to reallocate electric EEPS funding to implement an Agriculture Disaster Relief Program.[12] The program will assist farm and on-farm producers in replacing systems and equipment damaged or lost due to Hurricane Irene and/or Tropical Storm Lee. Through the program, storm-damaged farms will receive much needed assistance to incorporate energy-efficient electric and natural gas equipment and measures into their replacements and repairs. The total funding allocated to the Agriculture Disaster Relief Program is $5,861,664.

- In a PSC Order[13] issued on October 25, 2011, the Commission reauthorized most of the energy efficiency programs under the Energy Efficiency Portfolio Standard that were scheduled to expire December 31, 2011 for a four-year period ending December 31, 2015.[14,15] On December 22, 2011, NYSERDA submitted a supplemental revision to its SBC Operating Plan incorporating the changes to its approved EEPS programs pursuant to the October 2011 Order. Under the Order, EEPS Program Administrators were also afforded an opportunity to seek program modifications that may result in substantive changes to program targets or budgets by March 31, 2012.

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[11] Case 10-M-0457 – *In the Matter of the System Benefits Charge IV*, issued and effective October 24, 2011.

[12] Case 07-M-0548 and Case 08-E-1132. *Order Approving an Emergency Agriculture Disaster Energy Efficiency Program.* Issued and effective October 18, 2011.

[13] Case 07-M-0548 and Case 07-G-0141, *Order Authorizing Efficiency Programs, Revising Incentive Mechanism, and Establishing a Surcharge Schedule*, issued and effective October 25, 2011.

[14] The NYSERDA Workforce Development efforts funded under the first phase of EEPS will continue into 2012, but the Program was not allocated any additional funding in the October 2011 Order. The EEPS phase one NYSERDA Geothermal Heat Pump Systems Program was not allocated additional funding in the October 2011 Order. In a separate Commission Order (Case 07-M-0548, Order Approving an Emergency Agriculture Disaster Energy Efficiency Program, issued October 18, 2011), NYSERDA received approval in October 2011 to reallocate phase one EEPS funds for its Agriculture Disaster Relief Program.

[15] The NYSERDA EEPS Program Portfolio includes the following programs: High Performance New Construction, Flexible Technical (FlexTech) Assistance, Industrial Process and Efficiency, Existing Facilities, Agricultural Energy Efficiency, Benchmarking and Operations Efficiency, Multifamily Performance (including Low-Income Multifamily Performance), Electric Reduction in Master-Metered Buildings, Single Family Home Performance (including New York ENERGY STAR Homes and New York ENERGY STAR Home Performance), Statewide Residential Point-of-Sale, EmPower New York, and Low-Income Single Family Home Performance (including Assisted New York ENERGY STAR Homes and Assisted New York ENERGY STAR Home Performance).

1.2 Design and Conduct of the SBC Program

In order to successfully pursue the diverse program objectives described above, NYSERDA employs a variety of strategies. Representative strategies are presented in broad terms 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 residents, retailers, and manufacturers. Creating an energy- efficiency "ethic" is critical if New Yorkers are to improve energy efficiency without sacrificing energy-related 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 or resource-acquisition programs identify energy savings opportunities and install energy-efficient products and technologies in small homes, multifamily buildings, commercial buildings, industrial plants, and other facilities. The new and expanded EEPS programs focus on resource acquisition and obtaining cost-effective savings toward the State's overarching goals, such as 15 by 15.

- Load-management programs allow energy users to shift and reduce energy use from on-peak to off-peak periods – thereby reducing customers' energy bills, and improving the reliability of the electric system.[16]

- Low-income services make energy more affordable for low-income households by installing energy- efficiency improvements and 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.

Given the diversity of program purposes, services, and goals, different evaluation methods must be applied to each of the program offerings. According to needs and available resources, the following major evaluation functions are applied to the SBC programs by NYSERDA staff and

[16] 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.

evaluation contractors: impact assessment, including benefit-cost analysis; market characterization and assessment, including program logic development; and process evaluation. Additional evaluation analyses, such as macroeconomic impact analysis, are conducted at the portfolio level.

1.3 Organization of the Report

This annual report describes how the SBC Program is contributing to meeting its public policy goals. The 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

Appendix A – Evaluation Adjustment Factors

Appendix B – Avoided Costs Used in Benefit/Cost Analysis

The more detailed narrative and numeric (*i.e.*, Scorecard) progress updates required by DPS in its June 29, 2009 *Energy Efficiency Program Information Reporting Manual* for the EEPS Programs have been filed with the Commission under separate cover.

2 Portfolio-Level Reporting

The System Benefits Charge (SBC) portfolio includes numerous program initiatives that individually and collectively help the State progress toward achieving its energy policy goals. This section presents findings and results for the portfolio of System Benefits Charge programs. More specific findings and results from evaluations of individual programs are presented separately in Sections 3, 4 and 5.

Table 2-1 aligns current spending with energy savings to show progress toward goals at the portfolio level for the current program funding cycles. The remainder of Section 2 highlights budget and spending status, and program achievements, in more detail for both the **New York Energy $mart**[SM] and Energy Efficiency Portfolio Standard (EEPS) portions of NYSERDA's SBC portfolio.

Table 2-1. Summary of SBC Program Spending and Progress by Funding Source for Current Funding Periods through December 31, 2011

	Total Budget ($ million)[1]	Total Funds Spent ($ million)[1]	% of Budget Spent	Energy Savings Goal	Energy Savings Achieved	% of Goal Achieved
New York Energy $mart[SM] Program (July 1, 2006 – December 31, 2011)	$1,223.4	$874.3	71%	2,102 GWh[2, 3]	2,149 GWh	102%
EEPS Electric Programs[4]	$353.3	$130.0	37%	2,966.4 GWh[5]	1,268.8 GWh	43%
EEPS Gas Programs[6]	$124.3	$40.4	32%	4,074,101 MMBtu[7]	1,577,979 MMBtu	38%

[1]Inclusive of Administration, Evaluation and other portfolio level costs. Enhanced SBC evaluation and DPS evaluation consultant funding, as provided for in EEPS orders issued June 23, 2008 and June 24, 2009 (Case 07-M-0548 and Case 05-M-0090), are included in the NYE$ row budget.

[2]Certain **New York Energy $mart[SM]** programs also have demand reduction and fuel savings goals. Only the electric goals are shown in this table due to the broad contribution of programs toward those achievements. Individual program goals and progress for demand reduction and fuel savings are shown in Sections 3 and 4 of this report.

[3]This overall goal for the **New York Energy $mart[SM]** Program is based on NYSERDA's February 28, 2011 revised operating plan (resubmitted with revisions April 6, 2011).

[4]Budget and spending in this row do not include General Awareness. Energy savings achieved include some ancillary electric benefits from natural gas funding. Ancillary savings amounts per program are shown in Sections 3 and 4 of this report, and in NYSERDA's scorecard filing.

[5]NYSERDA filed several revised EEPS operating plans with the Commission on March 30, 2011 to incorporate an additional six months of funding approved by the Commission's December 30, 2010 Order. Electricity savings goals increased with the additional funds. Goals for EEPS programs are reflective of the March 30, 2011 Operating Plans.

[6]Budget and spending in this row do not include General Awareness. Energy savings achieved include some ancillary natural gas benefits from electric funding. Ancillary savings amounts per program are shown in Sections 3 and 4 of this report, and in NYSERDA's scorecard filing.

[7]The EEPS Gas Programs goal includes the MMBtu goal for the Agriculture Gas program, which is not yet reporting energy savings.

2.1 System Benefits Charge Budget and Spending Status

This section presents financial data for the SBC-funded Program. Table 2-2 provides summary level budget and spending data for both the **New York Energy $mart[SM]** and EEPS Programs. Sections 2.1.1 and 2.1.2 provide further breakout of budget and spending for each individual **New York Energy $mart[SM]** and EEPS-funded program, respectively.

Table 2-2. Summary of SBC Program Budget and Spending Status through December 31, 2011 ($ million)

	Total Budget	Total Funds Spent	% of Budget Spent
New York Energy $mart[SM] Program (13-and-a-Half-Year Budget)	$1,928.2	$1,579.5	81.9%
EEPS Programs (electric and natural gas)	$498.8	$178.3	35.7%
Total SBC Programs	**$2,427.0**	**$1,757.8**	**72.4%**

Totals may not sum exactly due to rounding.

Source: NYSERDA

2.1.1 New York Energy $mart[SM] Program Budget Spending Status

This financial overview of the **New York Energy $mart**[SM] Program presents budget and funding status from 1998 through December 31, 2011. The 13-and-a-half-year budget is approximately $1.93 billion, of which $1.71 billion is allocated to four major program areas – Commercial/Industrial (C/I), Residential, Low-Income, and Research and Development (R&D) – and a general awareness campaign. The budgets for these program areas are presented in Table 2-3 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 presents a graphic representation of ratepayer **New York Energy $mart**[SM] contributions by utility service area.

[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 2-3. New York Energy $mart[SM] Program Budget as of December 31, 2011 ($ million)

	Budget[1]			% of Program Area Budget	% of Total Budget
	SBC I & SBC II[2]	SBC III[3]	Total Budget		
Program Areas					
Commercial/Industrial	247.1	388.3	635.4	37.1%	33.0%
Residential	165.4	156.8	322.2	18.8%	16.7%
Low-Income	86.6	234.2	320.8	18.7%	16.6%
Research and Development	105.9	296.6	402.5	23.5%	20.9%
General Awareness[4] (Marketing)	15.9	15.2	31.0	1.8%	1.6%
Program Areas Total	**$620.9**	**$1,091.1**	**$1,711.9**	**100.0%**	**88.8%**
Other Costs					
Program Administration	59.8	71.7	131.6	-	6.8%
Metrics and Evaluation	14.5	39.0	53.5	-	2.8%
Environmental Disclosure	0.8	1.1	1.9	-	0.1%
NYS Cost Recovery Fee[5]	9.2	16.9	26.1	-	1.4%
DPS Evaluation Consultant	-	1.1	1.1	-	0.1%
DPS Uniform Database	-	0.4	0.4	-	<0.1%
Statewide Evaluation Protocol Development	-	2.1	2.1	-	0.1%
Other Costs Total	**$ 84.3**	**$132.3**	**$216.7**	**-**	**11.2%**
Total New York Energy $mart[SM]	**$705.2**	**$1,223.4**	**$1,928.6**	**-**	**100.0%**

[1]Reflects carryover in funds and reallocation as approved by the Public Service Commission in 2007.

[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 December 31, 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

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

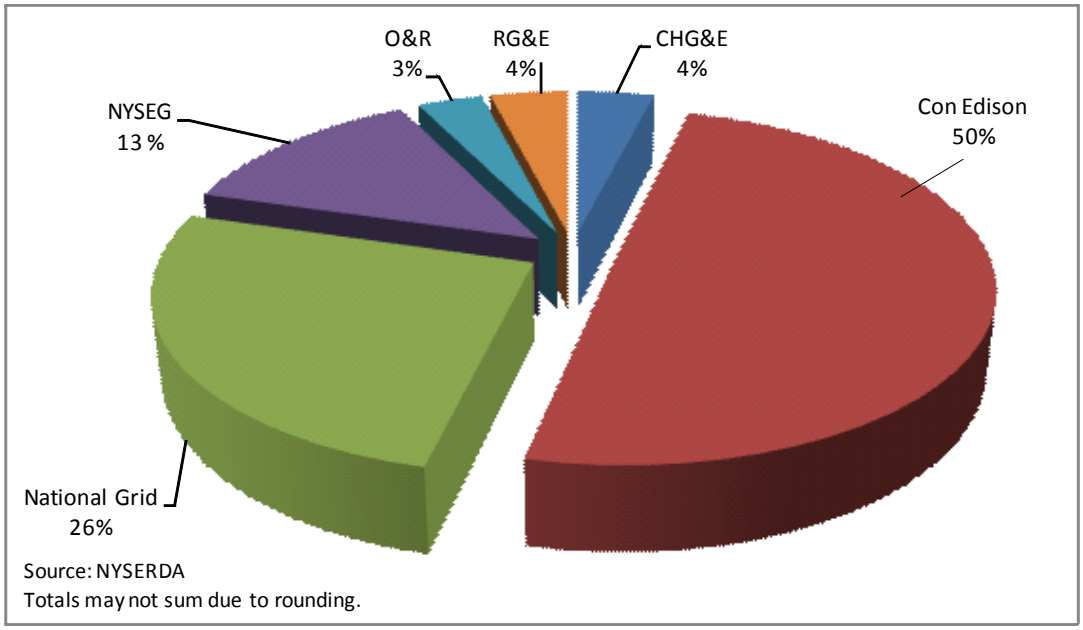


Table 2-4 shows the financial status of **New York Energy $mart[SM]** through 2011. Spending relative to the 13-and-a-half-year budget is: Commercial/Industrial 78.7%; Residential 95.1%; Low-Income 90.2%; and R&D 65.9%.

[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).

Table 2-4. Financial Status of New York Energy $mart℠ Program ($ million) through December 31, 2011 ($ million)

	Total 13-Year Budget [1]	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		
Program Areas						
Commercial/Industrial	635.4	247.1	253.0	500.2 78.7%	595.0 93.6%	626.3 98.6%
Residential[5]	322.2	165.4	141.2	306.7 95.1%	313.2 97.1%	319.4 99.1%
Low-Income	320.8	86.6	202.7	289.2 90.2%	307.4 95.8%	314.1 97.9%
Research and Development	402.5	105.9	159.5	265.4 65.9%	353.4 87.8%	400.6 99.5%
General Awareness[6] (Marketing)	31.0	15.9	9.8	25.7 82.9%	30.9 99.7%	30.9 99.7%
Program Areas Total	**1,711.9**	**$620.9**	**$766.2**	**1,387.1 81.0%**	**1,599.9 93.5%**	**1,691.3 98.8%**
Other Costs						
Program Administration	131.6	59.8	71.7	131.6 100.0%	131.6 100.0%	131.6 100.0%
Metrics and Evaluation	53.5	14.5	16.6	31.1 58.1%	34.7 64.9%	45.2 84.5%
Environmental Disclosure	1.9	0.8	-0.8	<0.1 2.6%	<0.1 2.6%	<0.1 2.6%
NYS Cost Recovery Fee	26.1	9.2	18.7	27.9 106.9%	27.9 106.9%	27.9 106.9%
DPS Evaluation Consultant	1.1	-	1.0	1.0 90.9%	1.1 100.0%	1.1 100.0%
DPSUniform database	0.4	-	0.4	0.0 0.00%	0.4 100.0%	0.4 100.0%
Statewide Evaluation Protocol Development	2.1	-	0.9	0.9 42.9%	1.3 44.2%	2.1 100.0%
Other Costs Total	**$216.3**	**$84.3**	**$108.1**	**$192.4 88.4%**	**$196.6 92.0%**	**$208.2 96.1%**
Total New York Energy $mart℠	**$1,928.2**	**$705.2**	**$874.3**	**$1,579.5 81.9%**	**$1,796.5 93.2%**	**$1,899.5 98.5%**

[1] Reflects carryover in funds and reallocation as approved by the PSC in 2007.
[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 December 31, 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 Program Area.
Totals may not sum exactly due to rounding. Source: NYSERDA

Figure 2-2 provides historical information on program funding and spending.

Figure 2-2. New York Energy $mart[SM] Program Funding History and Activity December 1998 through December 2011

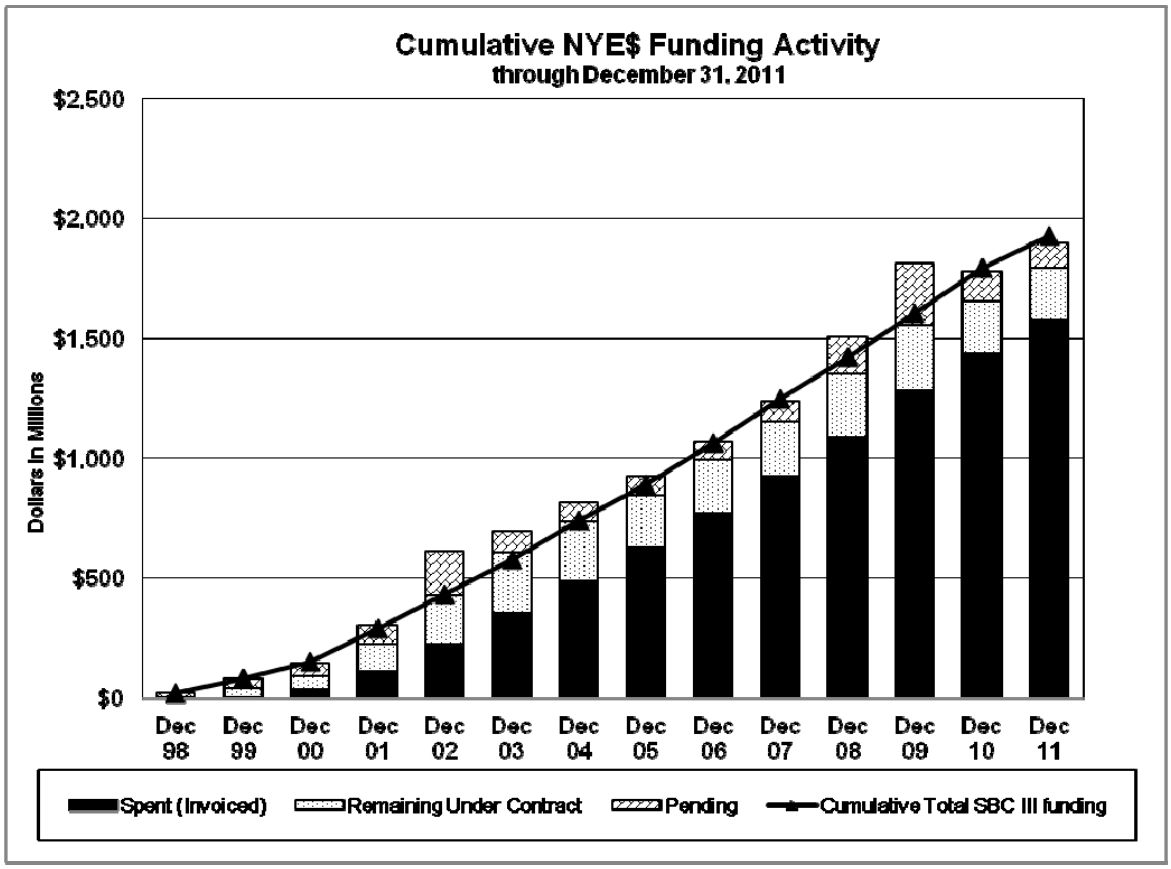
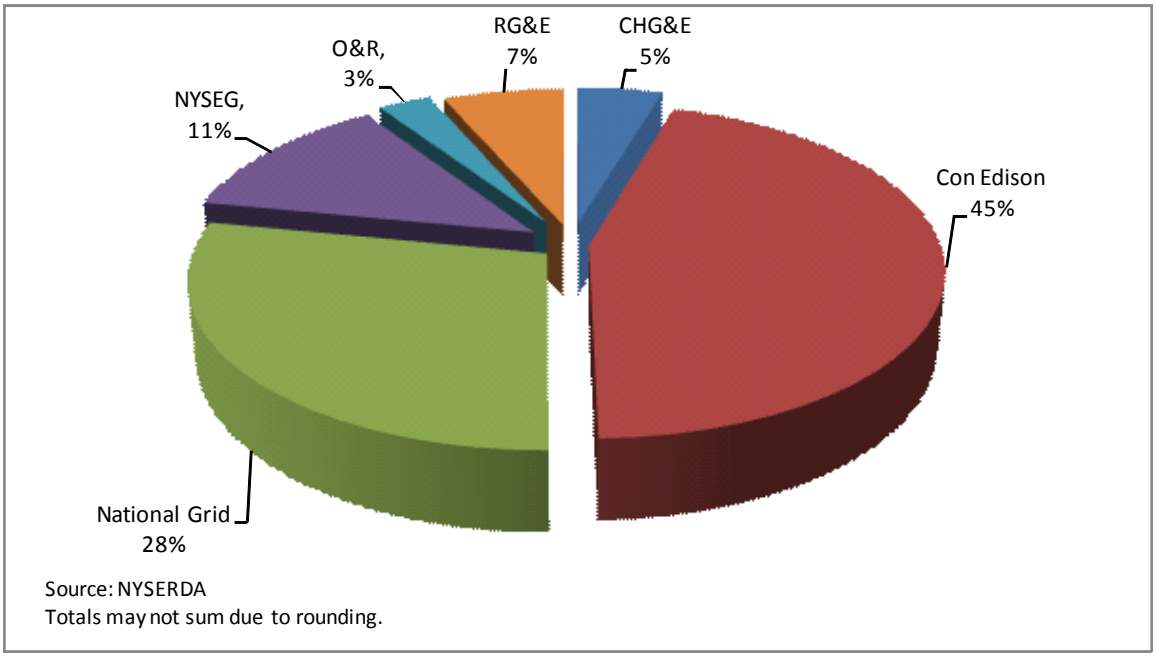


Figure 2-3 shows the percentage of total portfolio spending in each utility territory through December 2011. For some utility territories, spending is currently higher than their SBC collections, and for others spending is currently lower than their SBC collections. Due to the statewide, open competitive nature of nearly all of the **New York Energy $mart [SM]** Program spending, NYSERDA processes applications and awards incentives without regard to where Program applicants are located.

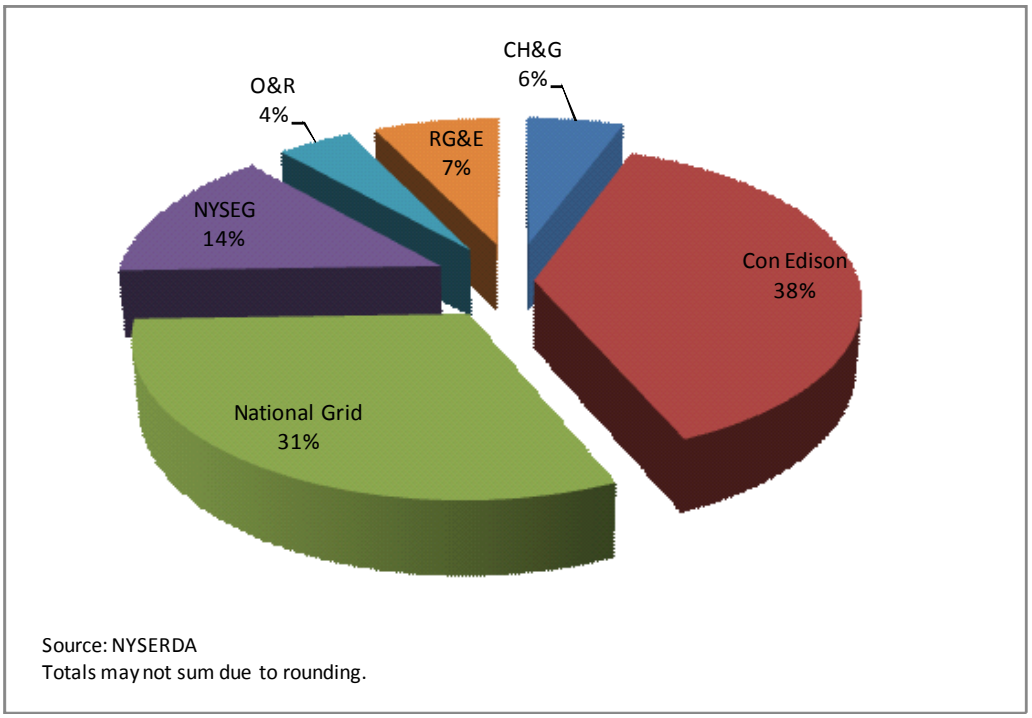
Figure 2-3. Total New York Energy $mart[SM] Expenditures by Utility



2.1.2 EEPS Program Budget Spending and Status

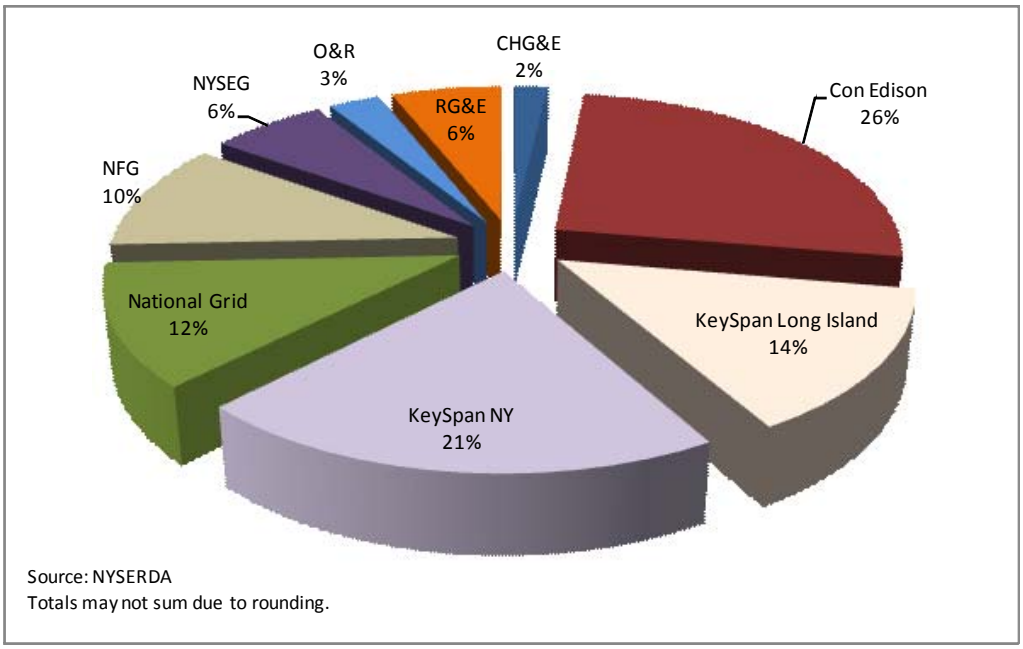
This section presents financial data for the EEPS Programs from their initiation through December 31, 2011. The total EEPS budget is $498.8 million, of which $438.8 million is allocated to the major program areas: C/I, Residential and Low-Income, Workforce Development and General Awareness. Figure 2-4 presents a graphic representation of electric EEPS ratepayer contributions by utility service area and Figure 2-5 presents a graphic representation of natural gas EEPS ratepayer contributions by utility service area.

Figure 2-4. Electric EEPS Ratepayer Contributions by Utility Service Area



Source: NYSERDA
Totals may not sum due to rounding.

Figure 2-5. Natural Gas EEPS Ratepayer Contributions by Utility Service Area



Source: NYSERDA
Totals may not sum due to rounding.

Budgets and spending for EEPS electric and natural gas programs are presented in aggregate in Table 2-5 by major program area, along with the costs for program administration, metrics and evaluation.

Financial status of individual EEPS programs within the C/I, Residential and Low Income areas is presented in Sections 3 and 4, respectively. Spending for the current quarter is further disaggregated per the DPS EEPS reporting guidelines within NYSERDA's scorecard report, which is filed under separate cover for the fourth quarter of 2011.

Table 2-5. Financial Status of the EEPS Programs through December 31, 2011 ($ million)

	Total Budget	Total Funds Spent	% of Budget Spent	Encumbered Funds % of Budget Encumbered	Committed Funds % of Budget Committed
Program[1]					
Commercial/Industrial – Electric	230.1	68.4	29.6%	153.8 66.4%	226.4 98.4%
Commercial/Industrial – Gas	24.2	5.1	20.6%	20.0 82.3%	24.2 100.0%
Residential – Electric	36.6	16.3	46.8%	17.3 49.5%	20.5 56.0%
Residential – Gas	53.8	17.1	31.7%	20.5 38.2%	23.6 43.9%
Low-Income – Electric	34.4	19.7	56.8%	20.3 58.5%	26.7 77.6%
Low-Income – Gas	31.3	11.7	37.3%	14.0 44.7%	28.0 89.5%
Workforce Development	5.8	1.4	23.3%	4.4 76.2%	4.5 77.6%
Subtotal	**$419.2**	**$139.7**	**33.6%**	**$250.4** **60.1%**	**$353.9** **84.4%**
General Awareness	19.6	7.5	42.2%	19.6 100.0%	19.6 100.0%
Program Total	**$438.8**	**$147.2**	**33.9%**	**$270.0** **62.1%**	**$373.5** **85.1%**
Other Costs					
Program Administration	36.2	26.2	74.4%	26.2 74.4%	36.2 100.0%
Metrics and Evaluation	23.8	4.9	20.5%	7.7 32.2%	23.8 100.0%
Other Costs Total	**$60.0**	**31.1**	**52.5%**	**33.9** **57.3%**	**60.0** **100.0%**
Total EEPS Program	**$498.8**	**$178.3**	**36.1%**	**$303.9** **61.5%**	**$433.5** **86.9%**

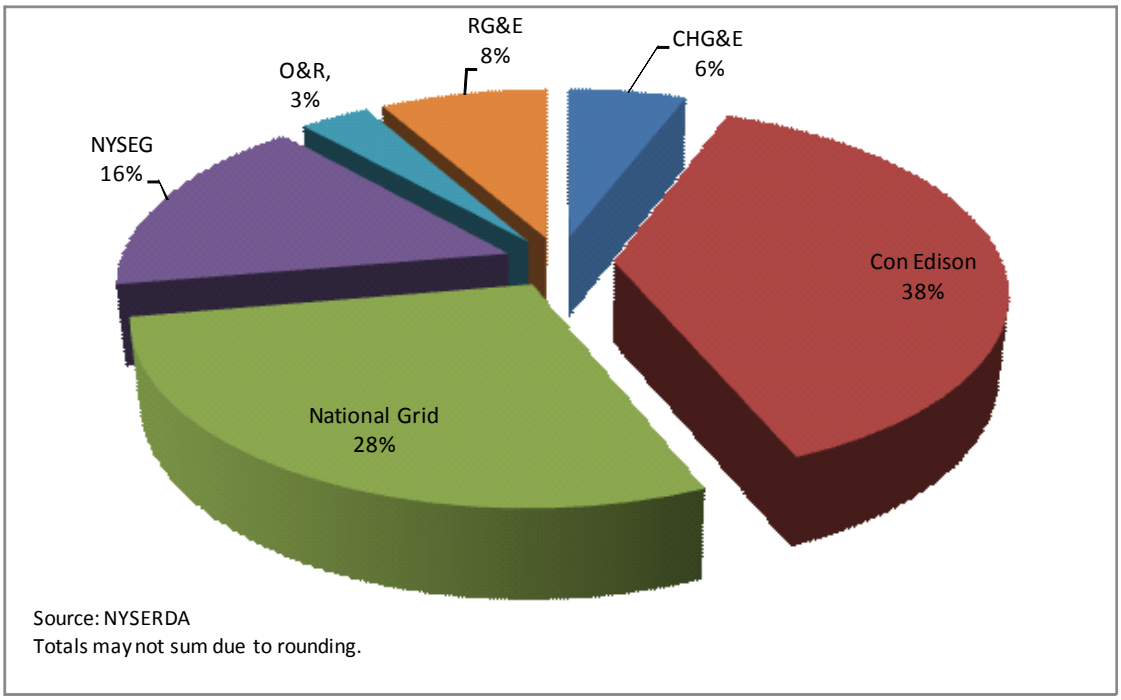
[1]Program budgets exclude administration and evaluation dollars. Administration and evaluation dollars are summed across programs and included in the Other Costs section of the table. Administration funds spent includes the EEPS allocable share of NYS Cost Recovery Fee.

Totals may not sum exactly due to rounding.

Source: NYSERDA

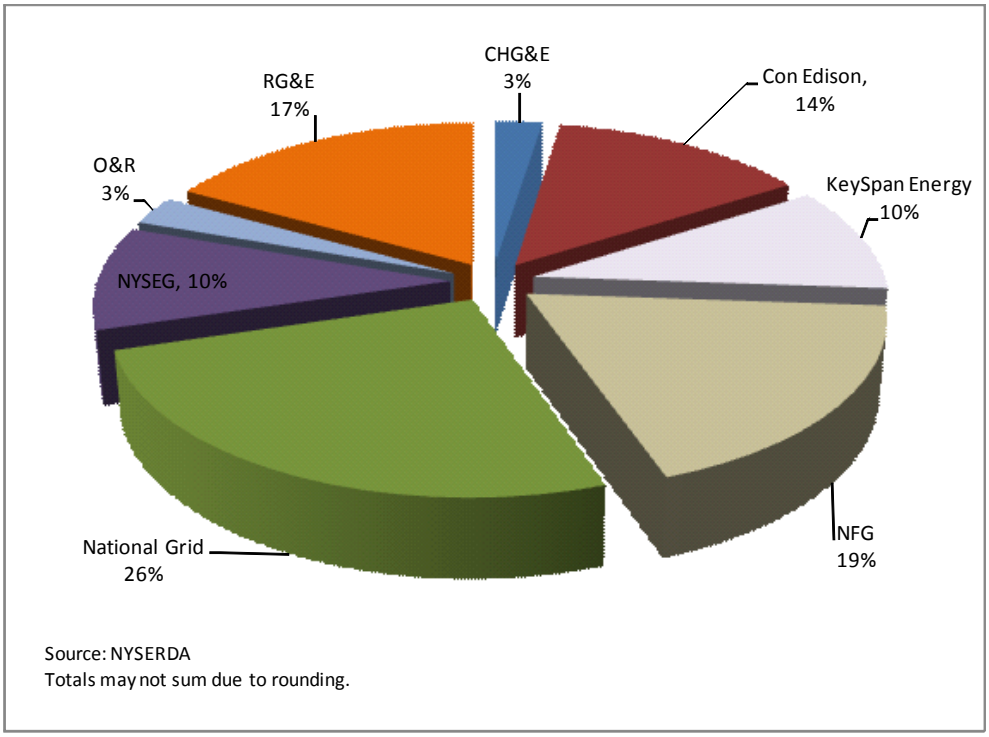
Figure 2-6 shows EEPS electric program spending by utility service area through December 31, 2011. Figure 2-7 shows EEPS natural gas program spending by utility service area through December 31, 2011. EEPS natural gas spending by utility is based on early program activity. At the end of 2011, 21% of the Commercial/Industrial, 32% of the Residential and 37% of the Low-Income natural gas program funds were expended. Therefore, NYSERDA expects this distribution to change over time as more of the budgets are spent.

Figure 2-6. EEPS Electric Program Total Spending by Utility Service Area through December 31, 2011



Source: NYSERDA
Totals may not sum due to rounding.

Figure 2-7. EEPS Natural Gas Program Total Spending by Utility Service Area through December 31, 2011



2.2 Portfolio-Level Findings

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

2.2.1 2011 Evaluation Activities

Findings in this report are compiled based on the cumulative work of NYSERDA and its independent evaluation contractors over the past several years. The report also includes summary findings from the following evaluations completed in 2011:

- Process evaluation:
  - Industry and Process Efficiency
  - **New York Energy $mart**[SM] Products (Upstream HVAC)

  - Distributed Generation/Combined Heat and Power

- Market assessment:
  - FlexTech
  - **New York Energy $mart[SM]** Products
  - Distributed Generation/Combined Heat and Power
- Impact evaluation:
  - FlexTech
  - Business Partners (evaluation review only)
  - CFL Expansion
- Program theory and logic model on the Electric Reduction in Master-Metered Buildings component of the Multifamily Performance Program.

In the coming quarters, NYSERDA expects to complete the following:

- An update to the program level benefit-cost analysis and macroeconomic impact analysis;
- Market characterization and assessment analyses on:
  - C/I natural gas portfolio
  - Existing Facilities
  - Business Partners
  - Industry and Process Efficiency
  - Workforce Development
- Impact assessment on:
  - Existing Facilities
  - Vertical Outreach
  - New Construction
  - Industry and Process Efficiency
  - Nonparticipant Spillover in the Existing Facilities market

- Process evaluation on:
  - Business Partners
  - Vertical Outreach

2.2.2 Energy, Demand and Fuel Savings Achieved

The energy, peak demand, and fuel savings from the SBC Program portfolio (including both the **New York Energy $mart**[SM] and the EEPS programs) from 1998 through December 2011 are presented in Table 2-6. By year-end 2011, the portfolio had achieved 5,615 GWh of cumulative annual electricity savings, and nearly 6.3 million MMBtu of natural gas, fuel oil and other fuel savings. In addition, there are nearly108 GWh of electricity being generated through renewables. The SBC portfolio has reduced peak demand by 2,010 MW, including 1,077 MW of permanent demand reduction measures and 933 MW of callable load reduction.

The reductions in energy use translate into:

- Nearly $1,015 million in annual energy bill savings (electric, natural gas and oil) in 2011 for program participants;
- 2,555 tons of annual nitrogen oxide (NO_x) emission reductions;
- 5,048 tons of annual sulfur dioxide (SO_2) emission reductions; and
- 2.7 million tons of annual carbon dioxide (CO_2) emission reductions, which are equivalent to removing 522,470 automobiles from New York's roadways.

Table 2-6. Cumulative SBC Benefits from Installed Measures through December 31, 2011 (New York Energy $mart[SM] and EEPS)

Benefits	Through Year-End 2007a	Through Year-End 2008	Through Year-End 2009	Through Year-End 2010	Through December 31, 2011
Electricity Savings from Energy Efficiency and On-Site Generation (Annual GWh)	3,070	3,220	3,820	4,584a,b	5,615a,b
Peak Demand Reduction[1]	1,200	1,275	1,415	1,765a,b	2,010a,b
Permanent Measures (MW)	650	700c	824	1,035a	1,077a,b
Curtailable[2]	550	575	590	729	933
Net Fuel Savings (Annual MMBtu)	4,460,000	5,400,000	4,600,000b	5,810,000a	6,296,794
Annual Energy Bill Savings to Participating Customers ($ Million)	$570	$590	$680	$804	$1,015
Renewable Energy Generation (Annual GWh)	106	106	106	106	108
Net Additional Jobs[3]	3,200	3,385	3,900	4,950	5,700
NO_x Emissions Reductions (Annual Tons)[4]	2,570	2,800	3,030	2,130	2,555
SO_2 Emissions Reductions (Annual Tons)[4]	4,720	5,120	5,710	4,180	5,048
CO_2 Emissions Reductions (Annual Tons)[4]	2,000,000	2,200,000	2,300,000	2,220,000	2,664,590
Equivalent number of cars removed from NY roadways	400,000	435,000	464,000	445,000	552,470

a Savings for the **New York Energy $mart[SM]** Products Program are cummulative through 2009 and are estimated based on market data, survey research, and deemed savings values.

b These savings incorporate a reduction made in Q4 2011 to account for the retirement fo installed measures reaching the end of their useful life.

c Fuel savings decreased over year-end 2008 due to the installation of two large combined heat and power facilities through the FlexTech Program.

[1]Does not include 11.7 MW of renewable energy generation capacity.

[2]Curtailable MW has decreased due to a reassessment of the impact of the Enabling Technologies Program. MW enabled under the SBC2 program Enabling Technologies for Price Responsive Load was not required to persist beyond the period of the contract. As such, the MWs available have steadily declined since the program's close.

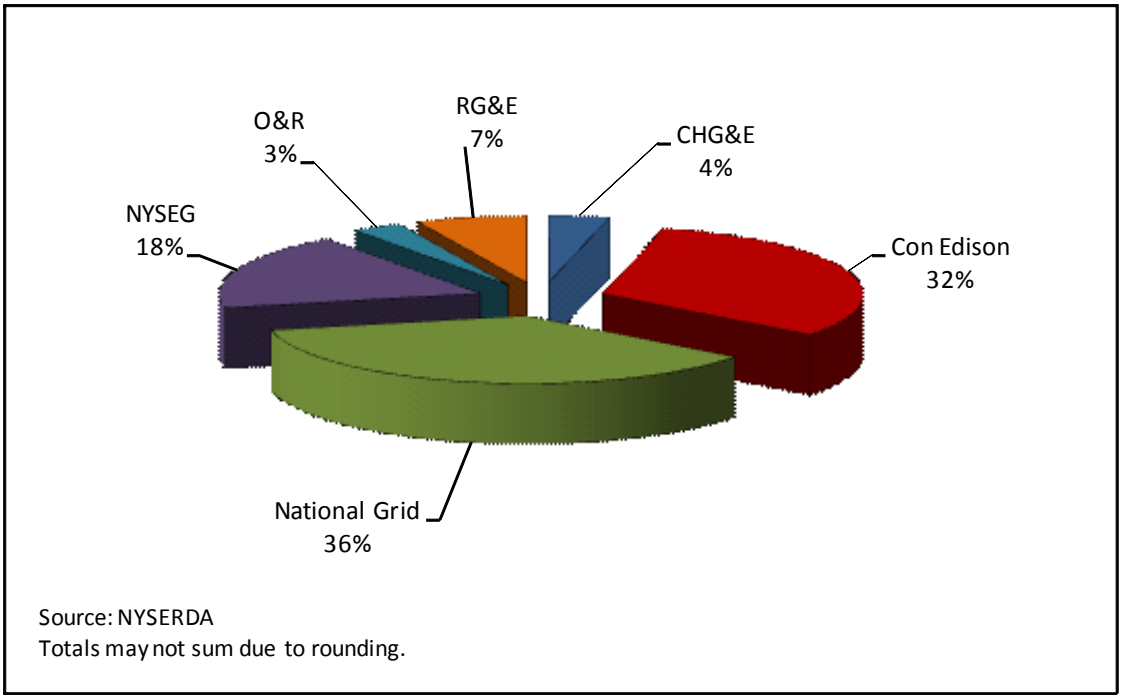
[3]Figures in this row represent jobs created through year-end of each year (2007 through 2011) for the full portfolio of SBC-funded programs. This includes **New York Energy $mart[SM]** and EEPS Programs, based on a methodology updated in 2012. Results for the years previous to 2011 have been restated in this table (from those published in 2011 quarterly and prior annual reports) to be consistent with the updated methodology.

[4]These emission reductions are associated with both electric and fossil fuel saving measures. Under a cap-and-trade system, the total number of emission allowances is determined by regulation. Regulated entities can purchase allowances and collectively emit up to the cap that is currently in place. Therefore, in the near term, electric efficiency projects may not decrease the overall amount of emissions going into the atmosphere. Nevertheless, electric efficiency projects will reduce end-users' responsibility or environmental footprint associated with emissions from electricity production. Beginning in Q1 2010, NYSERDA now estimates reductions in emissions of carbon dioxide (CO_2), nitrogen oxides (NO_x), and sulfur dioxide (SO_2) associated with electric efficiency projects based on average emission rates that include emissions associated with imports of electricity. In the past, NYSERDA has reported emissions reductions using marginal emission factors; this transition to average emission factors was performed to be consistent with a footprint reduction framework.

Figure 2-8 and Figure 2-9, respectively, show electricity and demand savings by utility service area for the **New York Energy $mart**[SM] programs. The National Grid (34%) and Con Edison (30%) service areas show the highest percentages of electricity savings. Rochester Gas & Electric (35%) and Con Edison (26%) are seeing the highest percentages of the overall demand reductions. Both of these figures are based on the cumulative annual savings achieved through December 31, 2011. For certain upstream market transformation and informational programs representing about 35% of the portfolio electricity savings and 16% of the demand reductions, savings were apportioned to utility areas based on incentive dollars.

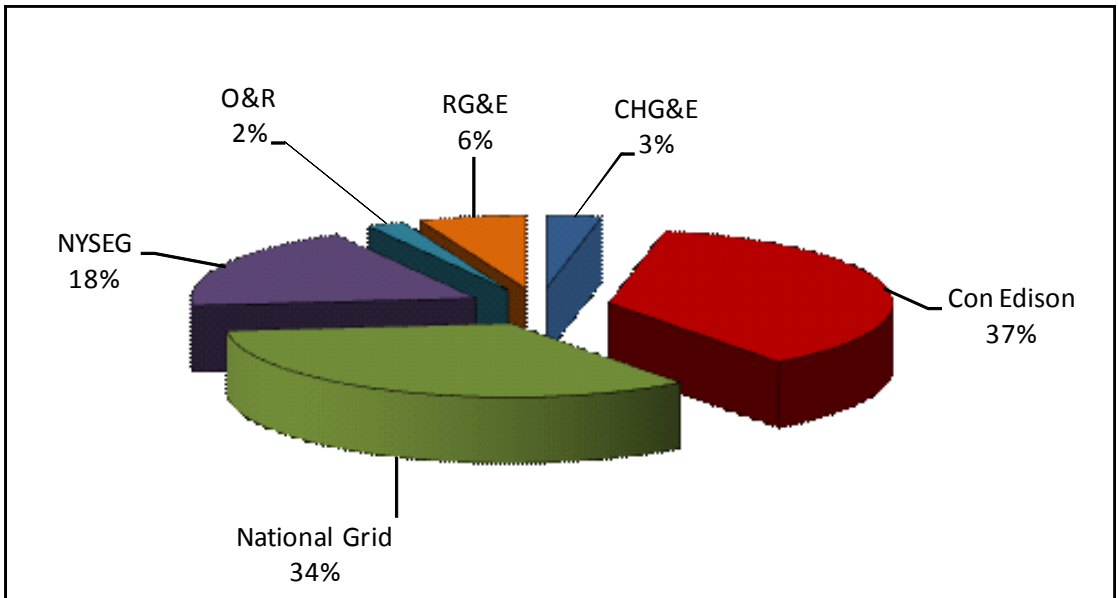
Figure 2-10 and Figure 2-11, respectively, show electricity and demand savings by utility service area for the EEPS funded programs, through December 31, 2011. The Con Edison (46%) and National Grid (23%) service areas show the highest percentages of electricity savings. For overall demand reductions, the Con Edison (41%) and National Grid (24%) service areas also show the highest percentages. Figure 2-12 shows EEPS natural gas savings by utility through December 31, 2011. Similar to the figure on spending distribution, EEPS natural gas savings by utility is based on early program activity. Therefore, NYSERDA expects this distribution to change over time.

Figure 2-8. New York Energy $mart℠ Electricity Savings by Utility through December 31, 2011



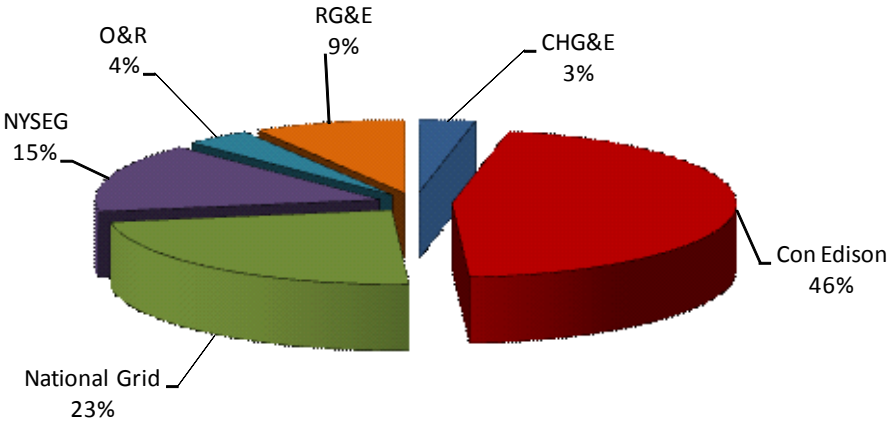
Source: NYSERDA
Totals may not sum due to rounding.

Figure 2-9. New York Energy $mart℠ Demand Savings by Utility (includes callable MW) through December 31, 2011



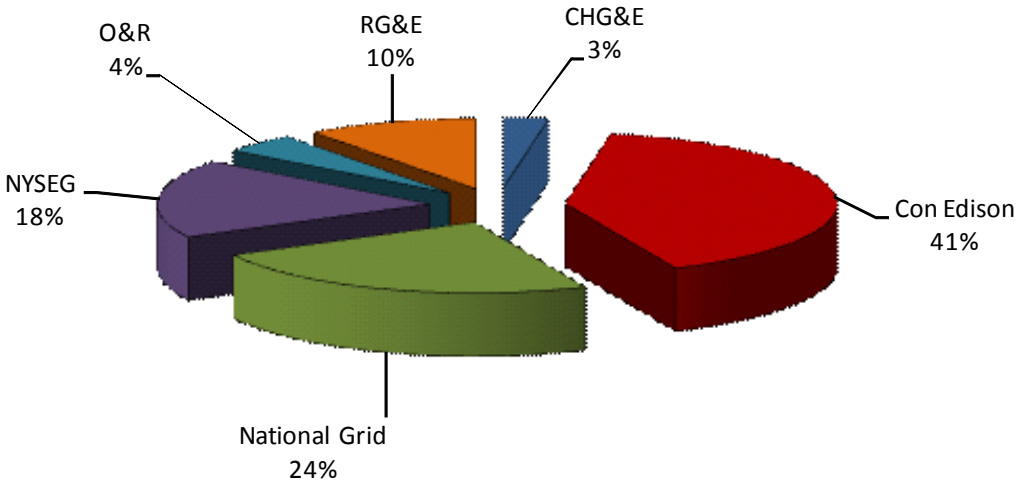
Source: NYSERDA
Totals may not sum due to rounding.

Figure 2-10. EEPS Electricity Savings by Utility through December 31, 2011



Source: NYSERDA
Totals may not sum due to rounding.

Figure 2-11. EEPS Demand Savings by Utility (includes callable MW) through December 31, 2011



Source: NYSERDA
Totals may not sum due to rounding.

Figure 2-12. EEPS Natural Gas Savings by Utility through December 31, 2011

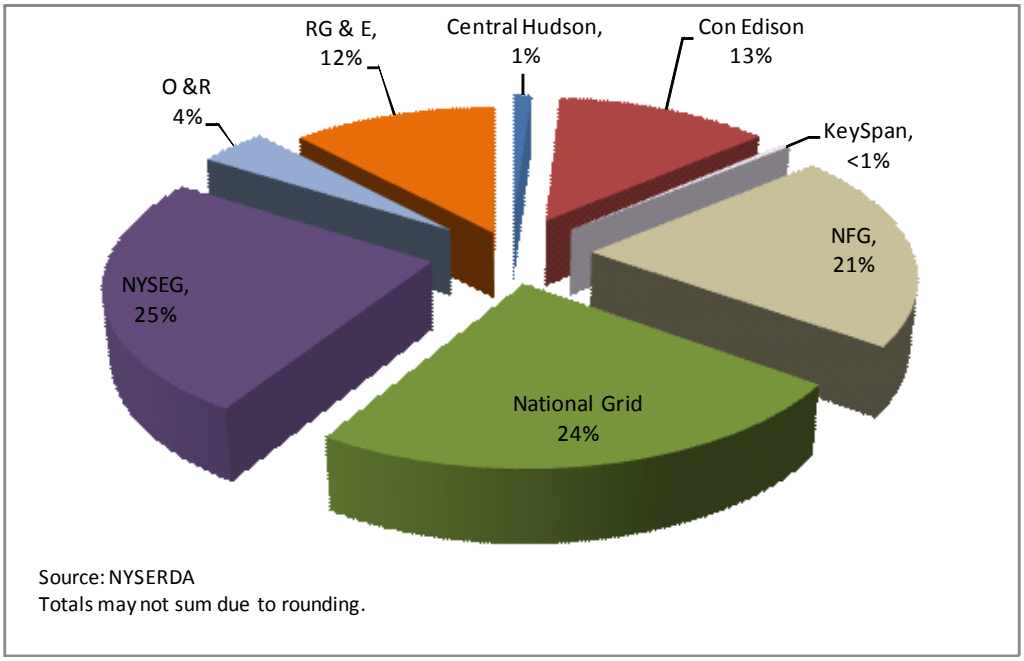


Table 2-7 shows the cumulative annual electricity savings, demand reductions, and other fuel savings from each SBC program, including EEPS program. Entries for the Renewable Energy Program represent clean generation rather than reductions in use.

Table 2-7. Adjusted Cumulative SBC Annual Savings by Program through December 31, 2011

Program	Adjusted Cumulative Annual Savings		
	GWh	**MW**	**MMBtu**
Existing Facilities: Permanent	1,614.7	332.6	-35,096a
Existing Facilities: Callable	N/A	656.6	N/A
New York Energy $mart[SM] Business Partners	138.1	35.5	N/A
New York Energy $mart[SM] Loan Fund and Financing	87.9	52.0	598,666
New Construction Program	480.1	119.0	259,287
Flex Tech Technical Assistance: Permanent	1,349.1	247.1	3,446,368
Flex Tech Technical Assistance: Curtailable	N/A	175.6	N/A
Industry and Process Efficiency	198.6	23.6	369,608
Agriculture	0.6	0	0
C/I Sector Overlap Removed	285.0	58.0	147,596
Subtotal Commercial/Industrial	3,584.1	1,584.0	4,493,677
Single Family Home Performance	73.6	26.4	2,423,824
Multifamily Building Performance	133.3	15.1	1,084,070
Market and Community Support Program	712.4	151.8	444,103
CFL Expansion	846.9	73.1	N/A
EmPower New York Program	70.0	10.2	223,175
Subtotal Residential and Low Income	1,836.2	276.6	4,180,106
DG-CHP Demonstration Program	542.9	98.4	-3,672,082
Enabling Technologies for Price Responsive Load	N/A	99.0	N/A
Demand Response and Innovative Rate Research	0	1.0	N/A
Renewable Energy Production	107.9	11.7	N/A
Subtotal R&D	650.8	210.1	-3,672,082
Cross Sector Overlap Removed	348.3	49.3	-1,295,093
SBC Portfolio	5,772.8c,d	2,021.4c,d	6,291,861

N/A – not applicable, the energy source is not reduced for the particular program.
a Up to this point, EFP has not tracked ancillary fuel savings or use resulting from installation of electric saving measures. The negative fuel savings shown here represent additional fuel use due to the installation of on-site generation at a very small number of projects that were recently evaluation for impacts. In the future, EFP will begin tracking both fuel saving and use more consistently.
b 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.
c This sum includes 107.9 GWh and 11.7 MW of renewable energy production, whereas the portfolio-level electricity and demand savings from energy efficiency and on-site generation shown in Table 2-6 does not.
d These savings incorporate a reduction made in Q4 2011 to account for the retirement of installed measures reaching the end of their useful life.

2.2.3 Progress toward Policy Goals

This section presents the cumulative progress of the **New York Energy $mart**[SM] Program toward meeting the four overarching public policy goals set by the PSC.[4] Overall, the Program is making continued progress toward achieving the long-term goals. The goals and high-level progress through December 31, 2011 are shown in

Table 2-13. Substantial additional program-specific and sector-level accomplishments have been documented and are contributing to sustainable progress toward these important overarching public policy goals.

2.2.4 System Benefits Charge Program Macroeconomic Impact Analysis

This section discusses the macroeconomic impacts of the **New York Energy $mart**[SM] and Energy Efficiency Portfolio Standard programs. Consistent with the rest of the report, references in this section to the SBC programs encompass both NYSERDA's original **New York Energy $mart**[SM] programs as well as the EEPS programs administered by NYSERDA.

Macroeconomic Impact Analysis – 2011 Update

Expenditures made by NYSERDA and SBC Program participants 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. Program participants also experience a stream of energy savings from installed efficiency measures that result in increased economic activity throughout New York. The stream of energy savings results in increased disposable income for residential customers due to lower energy bills and increased profits for commercial and industrial customers due to lower operation and production costs.

[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.

REMI Policy Insight™ ("REMI") Model

Starting in 2009, NYSERDA used the REMI Policy Insight™ ("REMI") model to evaluate the impacts of the SBC Program.[5] Regional Economic Models, Inc. (REMI) is one of the nation's leading providers of economic forecasting and policy analysis software. The REMI Policy Insight model is widely used by state governments, non-profits, consulting firms, cities, and universities. The REMI model is a structural economic forecasting and policy analysis model. It integrates input-output, computable general equilibrium, econometric and economic geography methodologies to project changes in prices, competitiveness factors and business activity over time. The model is dynamic, with continual feedback loops, and produces forecasts of annual values for employment, gross state product, wage rates, labor income, exports, investment, population changes, labor force participation rates, and capital utilization by industry.

Analysis Methodology: Brief Overview

This macroeconomic analysis identifies both the positive and negative economic effects to the New York economy due to the SBC Program. Each effect is modeled individually; the final results show the relative impact of each effect in each year as well as the net impact of all effects that occur in each year.

Positive effects include:

- The increased demand for goods and services resulting from the spending of SBC monies in the New York economy
- The increased demand for goods and services resulting from the spending of co-funding monies in the New York economy
- The increased disposable income for participating residential customers and increased profits for participating business customers resulting from the stream of electricity, natural gas, and petroleum energy bill savings
- The increased disposable income and lowered production costs for both participating and non-participating residential and business customers that result from the marginally lower system-wide wholesale electricity prices caused by lowering the demand for electricity; and

[5] From 2005 through 2008, NYSERDA used the IMPLAN model and emulated the original 2004 analysis conducted by Neenan Associates, *Macroeconomic Impact Analysis of the **New York Energy $mart**[SM] Program: An analysis of short-term and longer term impacts*, August 2004.

- The increased disposable income and lowered production cost to residential and business customers that result from utilities avoiding the need to spend on distribution system upgrades.

Negative effects include:

- The decreased disposable income and increased production costs for residents and business owners resulting from electric ratepayer funding of program spending
- The co-funding cost to residential and business program participants resulting in reduced disposable income; and
- The decreased revenues for companies in the energy industry related to the decreased demand for electricity, natural gas, and petroleum products.

The net macroeconomic impacts are expressed in terms of annual employment[6], personal income[7], and gross state product.[8] 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).

Results of Analysis

This analysis estimates historical and future impacts of program expenditures through 2011. Efficiency measures installed through 2011 are assumed to carry a 15-year life. This means that measures installed in 2011 continue to produce energy saving through 2025. This analysis does not include the potential impacts of program funds that are expected to be spent in 2012 and thereafter. This method provides a level of transparency to allow for the evaluation of impacts of Program efforts through 2011 only, which is consistent with most other evaluation activities.

Results of the macroeconomic analysis, encompassing 13 years of program implementation (1999-2011) and 14 years following the assumed end of Program spending (2011 to 2025), indicate that the SBC Program has provided and will continue to provide net macroeconomic

[6] Employment comprises estimates of the number of jobs, full-time plus part-time, by place of work. Employees, sole proprietors, and active partners are included, but unpaid family workers and volunteers are not included.

[7] Personal Income is the income that is received by all persons from all sources. It is calculated as the sum of wage and salary disbursements and related supplements, proprietors' income, rental income, personal dividend income, personal interest income, and personal current transfer receipts, less contributions for government social insurance.

[8] Gross state product 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).

benefits to New York in the form of increased employment, personal income, and gross state product. Table 2-8 indicates that the SBC Program has created 5,701 jobs through 2011 compared to the number of jobs that would have existed in the absence of the program. In addition, in 2011, the Program increased personal income by $475 million, and gross state product by $622 million.

Table 2-8. Summary of Macroeconomic Impacts of the SBC Program (Constant 2011$)

Economic Variable	Cumulative Annual through 2009	Cumulative Annual through 2010	Incremental Annual in 2011	Cumulative Annual through 2011	Cumulative Total through 2025 (based on program spending through 2011)
Net Additional Jobs	3,899	4,951	750	5,701	----
Net Additional Job Years	22,318	27,269	5,701	32,970	109,454
Net Additional Personal Income (2011$)	$322 million	$407 million	$68 million	$475 million	$10.7 billion
Net Additional Gross State Product (2011$)	$408 million	$527 million	$95 million	$622 million	$13.0 billion

Employment Results

Results of the analysis indicate that the SBC Program provides substantial net macroeconomic benefits to New York in the form of increased employment, both during program spending (1999-2011) and throughout the years of measure life following implementation (2012-2025), during which the energy consumers continue to experience energy bill savings associated with the previous installation of efficiency measures. As shown in Figure 2-13, the SBC Program is estimated to create approximately 5,701 jobs through 2011, compared to the estimated number of jobs that would have existed in the absence of the Program. Figure 2-13 shows estimated net additional jobs created by year, and also shows the relative contribution to the overall result of each modeled input variable. Due to its activities through 2011, the Program is estimated to create more than 109,454 net job years through 2025, which is the assumed end of product life of all energy efficiency measures installed.

Figure 2-13. 2011 Update – Net Employment Impacts by Year

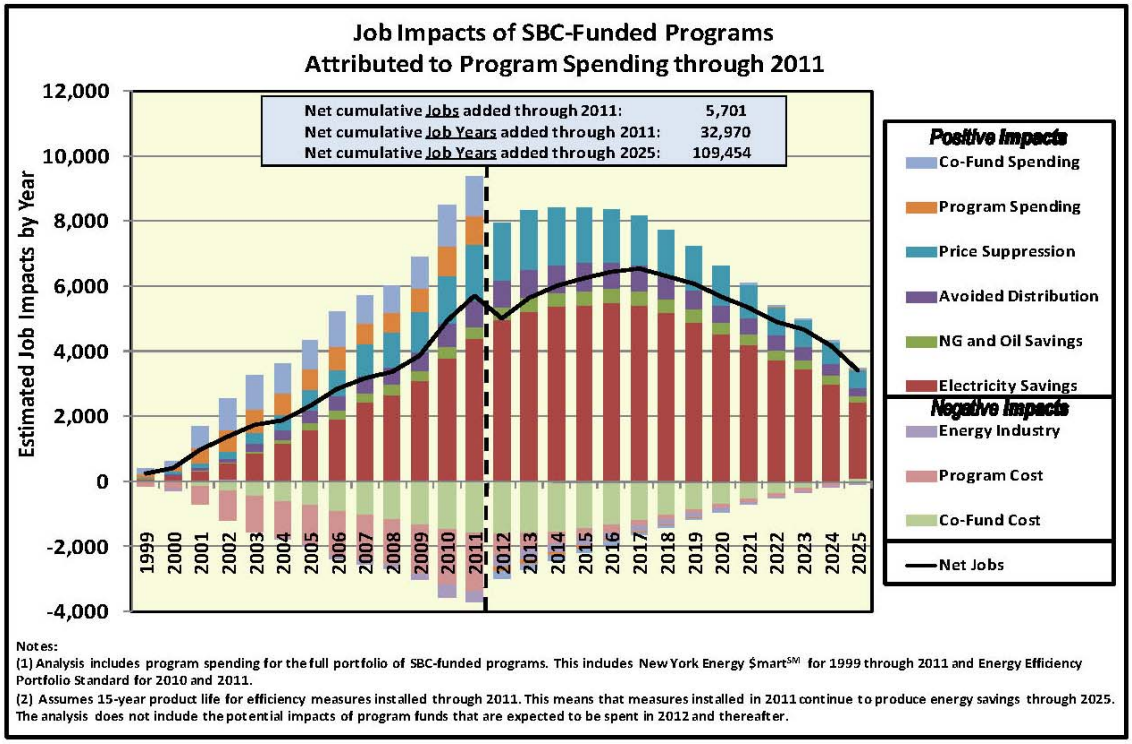


Table 2-9 shows the 2011 net job additions by economic sector. Job creation is estimated to occur across a broad range of economic sectors. The largest job creation activity is estimated to occur in Retail Trade, Health Care and Social Assistance, and Accommodation and Food Service. Substantial job creation is also estimated to occur in Professional and Technical Services, Construction, and Manufacturing.

Table 2-9. 2011 Net Job Additions by Aggregated Sector

Sector	Net Jobs in 2011
Forestry, Fishing, Related Activities, and Other	1
Mining	1
Utilities	-117
Construction	606
Manufacturing	236
Wholesale Trade	119
Retail Trade	811
Transportation and Warehousing	93
Information	88
Finance and Insurance	74
Real Estate and Rental and Leasing	297
Professional and Technical Services	649
Management of Companies and Enterprises	42
Administrative and Waste Services	264
Educational Services	247
Health Care and Social Assistance	656
Arts, Entertainment, and Recreation	116
Accommodation and Food Services	588
Other Services, except Public Administration	344
Government	585
Total	**5,701**

2.2.5 New York Energy $mart[SM] Program Cost Effectiveness

Introduction

This section presents the benefit/cost analysis of the **New York Energy $mart[SM]** Program, for achieved savings between July 1, 2006 and December 31, 2011.

As in previous years, various benefits were calculated:

- Resource benefits, defined as benefits associated with: (a) reduced electricity generation and capacity, (b) reduced fuel use by customers, (c) avoided distribution costs, and (d) CO_2 reduction.
- Participant non-energy impacts: measured as customers' perception of value associated with benefits such as thermal comfort, safety, in-door air quality, productivity, and feeling of doing good for the environment.
- Price Suppression Effect: the increased disposable income and lowered production costs to residential and business customers that result from the slightly lower system-wide wholesale electricity prices caused by efficiency installations.
- Macroeconomic Impact: measured as the change in gross state product (GSP). This represents the net increase in employment income and profits that result primarily from energy bill savings and electric system impacts.

Benefit/Cost Terms

This section provides definitions of benefit/cost analysis terms and describes how certain concepts were applied to this year's analysis.

Avoided Electric Energy Costs. The forecast of energy prices was obtained from Department of Public Service (DPS) staff. The avoided energy costs used in the analysis are shown in Appendix B. For cooling measures, avoided energy costs were increased by 20% to reflect higher energy prices during summer on-peak periods. The CO_2 benefit for electric savings was estimated to be $15 per ton in 2008 dollars. Each MWh of energy efficiency was estimated to avoid 0.5 tons of CO_2 emissions.

Avoided Electric Capacity Costs. Avoided capacity costs were based on clearing prices in the NYISO capacity auctions. The forecast of capacity prices was obtained from DPS Staff.[9] The

[9] Updated in December 2008.

avoided capacity costs are also shown in Appendix B. Costs include reserve margin requirements.

Avoided Electricity Distribution Costs. The avoided distribution costs, determined by DPS Staff, were applied at the rate of $33.48 per kW-year upstate and $100 per kW-year in New York City.

Discount Rate. A real discount rate of 5.5% was used.

Line Loss Factor. Line loss was estimated to be 7.2% of electricity generation. The line loss is represented in the avoided costs shown in Appendix B.

Macroeconomic Benefits. Macroeconomic benefits result primarily from lower energy bills and customer spending of bill savings. The metric used to measure macroeconomic benefit was the change in gross state product (GSP). This metric consists of 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). The macroeconomic impact section of this report describes the methodology. For the benefit/cost analysis in this section, the portfolio impacts were adjusted to remove R&D program spending.

Natural Gas Forecast. The forecast of natural gas prices, obtained from DPS, are shown in Appendix B.

Net Savings. Energy savings used in the analysis are net of freeridership and spillover.

New York Energy $mart^{SM} Spending. Also referred to as NYSERDA spending, this includes incentives paid to customers, cost of implementation contractors, and NYSERDA administration and evaluation costs. The spending in the analysis does not include Research & Development Program funding.

Participant Cost Test. This test is the ratio of the present value of customer bill savings to customer spending on efficiency equipment.

Participant Non-Energy Impacts. Participant non-energy impacts include customer perception of the value of benefits such as thermal comfort, safety, in-door air quality, productivity, and feeling of doing good for the environment**.**

Price Suppression Effect: Price suppression occurs due to the increased disposable income and lowered production costs that result from the slightly lower system-wide electricity prices caused by efficiency installations. The effect was estimated to be $34,600 per GWh of electricity avoided per year since mid-2006.

Program Administrator Cost (PAC) Test. This test divides the ratio of the present value of the benefits to NYSERDA spending.

Total Resource Cost (TRC) Test. This test is the ratio of the present value of the benefits to the sum of NYSERDA and customer spending.

Results of the Benefit/Cost Analysis

The energy savings, measure costs, and customer co-funding for the portfolio analysis were derived from energy savings achieved between July 1, 2006 through year-end 2011 from the following programs:

1. Existing Facilities Program (C/I)
2. Flex Tech
3. New Construction Program (C/I)
4. Home Performance (Market Rate and Low-Income)
5. New York ENERGY STAR® Homes (Market Rate and Low-Income)
6. Multifamily Performance Program (Market Rate and Low-Income)
7. Assisted Multifamily Performance Program (Low-Income)
8. EmPower (Low-Income)

These programs represent the bulk of energy efficiency spending and comprise 80% of funds expended by all non -R&D programs since July 1, 2006. The remainder of the spending represents the spending for education, outreach, and loan programs.

The present-valued benefits are shown in Table 2-10. The resource benefits equal $3.0 billion; non-energy impacts equal nearly $1.0 billion; price suppression effects equal $233 million, and macroeconomic impacts equal $2.2 billion.

Benefit/cost ratios are also shown in Table 2-11. The Total Resource Cost test ratio is 1.5 with resource benefits, 2.0 when participant non-energy impacts are added, 2.1 when price suppression effects are added, and 3.8 when macroeconomic impacts are added. Similarly, the Program

Administrator Cost test ratio is 5.5 with resource benefits; 7.3 when participant non-energy impacts are added, 7.8 when price suppression effects are added, and 14.0 when macroeconomic impacts are added. The Participant Cost Test ratio is 2.6 with resource benefits and 3.3 when participant non-energy impacts are added.

Table 2-10. Benefits and Cost-Effectiveness Ratios

Benefit Source	Present Value of Benefits (Constant Millions $2008)	Cumulative Benefits (across benefit sources) [Constant Millions 2008$]	Total Resource Cost (TRC) Test	Program Administrator Cost (PAC) Test	Participant Test
Resource Benefits	$3,007	$3,007	1.5	5.5	2.6
Participant Non-Energy Impacts	$987	$3,994	2.0	7.3	3.3
Price Suppression Effects	$233	$4,226	2.1	7.8	Not applicable
Macroeconomic Impacts (GSP)	$3.417	$7,644	3.8	14.0	Not applicable

Shown in Table 2-11 are the various cost-effectiveness ratios for individual programs with and without participant non-energy impacts.

Table 2-11. Cost-Effectiveness Ratios of Individual Programs

	Existing Facilities	FlexTech	New Construction Program (C/I)	Home Performance	ENERGY STAR Homes	Residential Products	Multifamily Performance	Empower
	Total Resource Cost Test							
Ratio w/Resource Benefits Only	1.8	1.8	1.7	0.7	1.4	3.3	0.8	1.0
Ratio w/Participant Non-Energy Impacts	2.0	2.0	2.5	1.1	2.2	4.8	1.3	1.7
	Program Administrator (NYSERDA) Cost Test							
Ratio w/Resource Benefits Only	10.2	37.4	4.5	1.2	5.2	14.9	1.9	1.0
Ratio w/ Participant Non-Energy Impacts	11.6	43.7	6.9	1.9	8.4	21.5	3.2	1.7
	Participant Cost Test							
Ratio w/Resource Benefits Only	2.5	2.7	3.4	1.5	1.6	5.3	1.6	Not applicable*
Ratio w/ Participant Non-Energy Impacts	2.8	3.0	4.7	2.5	2.8	7.2	2.6	Not Applicable*

*The Participant Test does not apply to the Empower Program because 100% of equipment costs is paid by the program.

Shown in Table 2-12 is the summary of the cost per MWh analysis conducted for each program and the portfolio. First-year costs were levelized over the lifetime of the energy savings. With both NYSERDA and customer costs, the levelized cost for the portfolio ranged from $53 per MWh (using a 0% discount rate) to $76 per MWh (using a 5.5% discount rate). When only NYSERDA spending is included, the levelized cost ranges from $14 per MWh (using a 0% discount rate) to $21 per MWh (using a 5.5% discount rate).

Table 2-12. Levelized Cost per MWh by Program

	Existing Facilities	FlexTech	New Construction Program	Home Performance	ENERGY STAR Homes	Market Support	Multi-family Performance	Empower	Portfolio
Total Cost per MWh	$58 to $87	$46 to $60	$48 to $76	$63 to $91	$42 to $57	$31 to $41	$62 to $95	$51 to $73	$53 to $76
NYSERDA Cost per MWh	$10 to $15	$2 to $3	$17 to $28	$36 to $51	$11 to $15	$7 to $9	$25 to $39	$51 to $73	$14 to $21

Notes:

(1) Levelized cost is the first-year cost converted to equal annual payments (using an assumed discount rate) divided by the annual MWh.

(2) The low end of the range is based on a discount rate of 0%. The high end of the range is based on a discount rate of 5.5%.

(3) Program and customer costs associated with non-electric savings were excluded. The proportion of costs attributed to electricity was estimated as the proportion of the combined electric and natural gas savings represented by electric savings. Electric savings were converted to MMBtus using a factor of .00314 per kWh.

Summary

The portfolio level TRC ratio of 1.5, using the lowest level of benefits, indicates that the benefits exceed costs incurred by both NYSERDA and by the customers. When all quantified benefits are included, the TRC ratio rises to 3.8. The portfolio total resource levelized cost ranges from $53 to $76 per MWh. The portfolio program administrator levelized cost ranges from $14 to $21 per MWh.

Table 2-13. New York Energy $mart[SM] Goals and Progress through December 31, 2011

Public Policy Goal	Progress as of December 31, 2011
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 933 MW of callable load reduction and installing efficiency measures that permanently reduce peak demand by another 934.2 MW.[1]
	Renewable energy programs have reduced peak demand on the electric grid by an additional 11.7 MW.
	The **New York Energy $mart[SM]** Program has led to the installation of energy efficiency measures saving 4,346.3 GWh per year.[1] Of this, 542.6 GWh of electricity is being generated annually from DG-CHP systems.
	The **New York Energy $mart[SM]** Program has led to the installation of wind and photovoltaic (PV) technologies, which provide 108 GWh of clean electricity generation per year. This includes the installation of 865 PV and 15 small wind systems.
	Over the past two years, the number of installed DG-CHP systems has increased from 54 to 75.
	Under the Public Benefit Power Transmission and Distribution Program, 30 projects have been approved to provide 29 companies, universities and other institutions over $13 million to pursue development of advanced technologies that will improve the efficiency and delivery of power for electric customers across the State.
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.	In 2011, the **New York Energy $mart[SM]** Program has saved participating customers nearly $789 million in annual energy costs.
	Approximately 161,760 eligible New York low-income customers received direct assistance through the **New York Energy $mart[SM]** programs, resulting in $354/year in average customer energy bill savings for this underserved population.
	The **New York Energy $mart[SM]** portfolio has achieved a benefit-cost ratio of 1.5 under the most conservative Total Resource Cost 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 1,962 tons of nitrogen oxide (NO_X), 3,919 tons of sulfur dioxide (SO_2), and 2.0 million tons of carbon dioxide (CO_2).[2]
	Between 2003 and 2011, the number of PV and small wind installers participating in the **New York Energy $mart[SM]** Program has increased from 14 to 380.
	The **New York Energy $mart[SM]** Program has helped optimize energy performance: • in more than 1,200 new commercial buildings, • in more than 19,900 new homes, • in more than 42,600 existing homes, • in more than 112,200 multifamily housing units[1], and through more than 20,300 energy efficiency projects in existing commercial, industrial and institutional facilities, including technical studies, benchmarking, measure replacement, and reduced-interest financing.
Create economic opportunity and	Through 2011, the System Benefits Charge program has led to the creation

Public Policy Goal	Progress as of December 31, 2011
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.	of 5,700 total net jobs.[3]
	Initial results show that R&D product development expenditures have lead to an increase in gross state product (GSP). Every one dollar spent on product development projects leads to an increase in the GSP, or value added, by $5.2.
	Private investment in CHP has increased in New York. The total project cost for all projects installed through year-end 2011 is $254.8 million. Of this total, 82% represents funds from project participants.

[1] These savings incorporate a reduction made in Q4 2011 to account for the retirement of installed measures reaching the end of their useful life.

[2] These emission reductions are associated with both electric and fossil fuel saving measures. Under a cap-and-trade system, the total number of emission allowances is determined by regulation. Regulated entities can purchase allowances and collectively emit up to the cap that is currently in place. Therefore, in the near term, electric efficiency projects may not decrease the overall amount of emissions released into the atmosphere. Still, electric efficiency projects will reduce end-users' responsibility or footprint associated with emissions from electricity production. Beginning in Q1 2010, NYSERDA now estimates reductions in emissions of carbon dioxide (CO_2), nitrogen oxides (NO_x), and sulfur dioxide (SO_2) associated with electric efficiency projects based on average emission rates that include emissions associated with imports of electricity. In the past, NYSERDA has reported emissions reductions using marginal emission factors; this transition to average emission factors was performed to be consistent with a footprint reduction framework.

[3] Includes NYSERDA's **New York Energy $mart^{SM}** and EEPS program activity.

2.3 Solicitations Released

During 2011, 16 solicitations were issued to competitively select contractors for program design, implementation services, and program evaluation activities. Information on solicitations released in 2011 is shown in Table 2-14. In addition, one solicitation for financial incentives was also issued and remains open. Information on the incentive solicitations released in 2011 is shown in Table 2-15.

Table 2-14. Solicitations Released through Year-End 2011

Solicitation Number	Solicitation Name	Solicitation Release Date	Solicitation Closing Date
PON 1151	Innovations in Demand Response Load Management And Dynamics Pricing	01/07/2011	03/15/2011 RD 4
PON 2197	Environmental Monitoring, Evaluation and Protection Program: Air Quality Research	01/31/2011	03/29/2011
PON 2202	Reducing the Energy and Carbon Footprint of Water and Wastewater Treatment Systems	02/04/2011	03/17/2011
PON 2250	Innovation in the Manufacturing of Clean Energy Technologies	03/09/2011	05/26/2011 RD 1 09/15/2011 RD 2
PON 2244	Environmentally Preferred Power Systems Technologies	03/09/2011	05/16/2011
PON 2219	Heating and Cooling	04/06/2011	05/19/2011
PON 2254	Building Envelope Strategies for Advancing Deep-Energy Retrofits	05/17/2011	07/13/2011
PON 2271	Advanced Transportation Technologies	07/08/2011	09/08/2011
PON 2251	Commercialization Option Program	07/29/2011	09/19/2011 RD1 11/10/2011 RD2 01/05/2012 RD3
PON 2392	Electric Vehicle Supply Equipment (EVSE) Support	10/03/2011	11/14/2011
PON 2373	Distributed Generation as Combined Heat & Power	08/24/2011	10/04/2011
RFP 2323	Process and Market Evaluation Contractor	10/11/2011	11/15/2011
RFP 2324	Survey Data Collection Contractor for Evaluation of NYSERDA Programs	10/28/2011	11/29/2011
RFP 2325	Impact Evaluation Contractor	10/28/2011	12/01/2011
PON 2298	Solid-State Lighting Research, Development and Demonstrations	10/25/2011	12/08/2011
RFP 2266	NYS Innovation Metrics	11/03/2011	12/12/2011

Table 2-15. Incentive Solicitations Released through Year-End 2011

Solicitation Number	Incentive Solicitation Name	Solicitation Release Date	Solicitation Closing Date
PON 2309	2011 New York Energy Star Homes	07/29/2011	12/31/2011[1]

[1]This PON has been extended through April 1, 2012.

2.4 Workforce Development

2.4.1 Program Description

In its June 2009 *Order Authorizing Workforce Development Initiatives*[10], the Commission approved a Workforce Development (WFD) Program to be administered by NYSERDA. The goals of the program are to overcome the barriers to workforce training and to expand the existing energy efficiency technical training infrastructure across New York State. An additional goal is to increase employment opportunities for underserved populations in energy efficiency occupations in New York through the Career Pathways for Disadvantaged Workers program. These program efforts will provide the present and future workforce with the technical skills necessary to serve the needs of the portfolio of programs funded through the Energy Efficiency Portfolio Standard (EEPS).

To date, NYSERDA has partnered with 46 new training partners under the open enrollment solicitation PON 1816, and continues key training initiatives with seven new training partnerships selected under terms of the competitive solicitation PON 1817. NYSERDA has partnered with experienced education providers including, community colleges, Board of Cooperative Educational Services (BOCES), trade unions, professional training associations, and not-for-profits, with the goal of rapidly ramping up training capacity through its state-wide network of training providers. The training infrastructure developed under the EEPS Operating Plan has facilitated a collaborative effort among educational institutions and employers to help meet with labor demand established through utility programs funded under EEPS.

[10]Case 07-M-0548 Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard, *Order Authorizing Workforce Development* initiatives, issued June 22, 2009.

Another important goal of the WFD Program is bridging the gap between training and employment through on-the-job training, offered through internships and apprenticeships. These programs provide the hands-on experience employers demand. The WFD Operating Plan called for NYSERDA to implement 15 new sustainable internship/apprenticeship programs; 10 new programs have been initiated to date. Each program includes employer outreach and career development/coaching services to help develop institutional relationships between training providers and local employers.

2.4.2 Program Accomplishments

Program highlights during the last quarter of 2011 include the launch of Advanced Lighting Controls Training Program with the International Brotherhood of Electrical Workers-National Electrical Contractors Association (IBEW-NECA) labor management partnership here in New York. This training offers a certificate in advanced lighting controls for already skilled licensed electricians. Funds from the American Recovery and Reinvestment Act (ARRA) were leveraged to accelerate the purchase of training equipment for the construction of lighting control training boards to be placed in 13 Joint Application Training Centers throughout New York with a goal to certify 650 apprentice electricians.

Under the Career Pathways for Disadvantaged Workers, training, ranging from basic skills to entry-level technical, was primarily contracted in late 2010 and early 2011. The programs are now fully running and are graduating students who will progress to more advanced-level technical training or who will be placed in entry-level employment opportunities. There is an observed increase in hiring from disadvantaged populations over the past six months as on-the-job training incentives were introduced to contractors and are optimistic that this effort, largely in cooperation with the NYSDOL, will continue to support the career pathways model and will help to bridge the gap between training and employment.

Internship initiatives with several training partners have helped to place technicians in positions where they can further develop their skills and relationships with regional employers. Sustainable partnerships between training providers and regional employers are helping to bridge the transition from training in basic construction education to job opportunities in energy efficiency small commercial and residential retrofit areas, and have had particular success in preparing disadvantaged workers to successfully become employed within their urban settings.

Table 2-16 shows WFD program goals and progress to date as a percentage of the levels set in the Program Operating Plan.

Table 2-16. Workforce Development Program - Goals and Achievements

WFD Training Categories	Program Goals January 1, 2010 -December 31, 2012[1]	Contracted To Date January 1, 2010 - June 30, 2011[2]	Achieved To Date January 1, 2010 - June 30, 2011	% of Goal Achieved
Number of Students Trained (Technical Training)	2,225	4,308	912	41%
Number of Students Trained (Career Pathways)	1,797	2,926	856	48%
Number of Students earning Certifications[3]	2,215	1,601	656	30%
Total Number of Students Trained	6,237	8,835	2,424	39%

[1]Program Goals - the number of participants to be trained as outlined in the EEPS Workforce Development Operating Plan under the June 22, 2009 Order Authorizing Workforce Development Initiatives (CASE 07-M-0548)

[2]Contracted To Date - the number of participants to be trained per contract agreements with NYSERDA training partners. These show the current status of contracting with training providers and thus show progress toward operating plan goals.

[3]Certifications - this category reflects reimbursement issued to individuals who have achieved a nationally recognized energy efficiency credential such as, but not limited to, those issued by the Building Performance Institute, Association of Energy Engineers, U.S. Green Building Council or the Residential Energy Services Network.

Table 2-17 shows the status of a number of key program outputs from the WFD Operating Plan, including the total funds allocated to this specific program output compared to the amount encumbered and paid to date.

Table 2-17. Key Program Outputs from Program Inception to December 31, 2011

Program Outputs	Operating Plan Level/Goal	Achieved To Date January 1, 2010 - June 30, 2011
Program Dollars Committed (PON 1816)[1]	$3,812,410	$3,004,451
Program Dollars Committed (PON 1817)[1]	$1,250,000	$1,097,500
Number of Training Partners contracted	N/A	41
Number of Internship/Apprenticeship Programs	15	10

[1]Committed refers to program funds that are either encumbered under contractor or already paid out to training partners contracted through the WFD Program.

3 Commercial/Industrial Programs

3.1 Overview of Commercial/Industrial Programs

NYSERDA's commercial and industrial sector programs cover new and existing schools, hospitals, office buildings, government buildings, commercial establishments, not-for-profit facilities, and industrial plants. 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. Programs offering technical assistance and financial incentives are also part of the portfolio. NYSERDA helps 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 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 warranted. Market development initiatives, including financial incentives, increase the availability, promotion, retail stocking practices, and sales of energy-efficient products and services in end-use markets and sectors. This is brought about by changing the behavior of upstream and midstream market participants, including retailers, dealers, vendors, distributors, contractors, installers, trade associations, and manufacturers.

Specific programs are briefly described below:

Existing Facilities Program. The Existing Facilities Program (EFP) offers performance-based and pre-qualified incentives for a variety of energy projects to customers or ESCOs for electric efficiency, natural gas efficiency, demand response, combined heat and power (CHP), and industrial and process-efficiency projects. 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 in existing facilities for energy efficiency, process equipment, and non-building efficiency measures. Demand response incentives cover equipment and technical solutions that enable significant demand reduction resources and require participation in New York Independent System Operator (NYISO) demand response programs. Energy Efficiency Portfolio Standard (EEPS) funds were added to this program in 2010.

New York Energy $mart[SM] Business Partners. The **New York Energy $mart[SM]** Business Partners Program is a consolidation of the Commercial Lighting Program (CLP), 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 businesses in a highly competitive marketplace, while assuring appropriate quality control mechanisms. 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 drive greater activity in NYSERDA's customer-targeted programs.

New York Energy $mart[SM] Loan Fund and Financing Program. The now closed **New York Energy $mart[SM]** Loan Fund and Financing Program expanded the availability of low-interest capital to help implement energy-efficiency projects and process improvements. Lenders enrolled in the program by signing participation agreements 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 included tools to allow lenders to calculate the cash flow advantages their customers would gain from making energy-efficiency improvements.

Vertical Outreach Program. The Vertical Outreach Program provides services to facilitate and encourage sector-specific energy-efficiency improvements and practices. The program is a marketing and information transfer effort that uses 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, tools and resource training, partnerships with trade associations, and integration with regional and national efforts.

New Construction Program. 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-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 and Leadership in Energy and Environmental Design (LEED) and New York – Collaborative for High Performance Schools (NY-CHPS) certification projects. In early 2009, EEPS funds were added to expand NCP.

FlexTech Technical Assistance Program. The FlexTech Technical Assistance (TA) Program is a consolidation of services previously offered under the FlexTech, TA, and the Energy Audit Programs. The Program provides commercial and industrial customers with objective and customized information to facilitate wiser energy efficiency, energy procurement, and financing decisions. 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. In early 2009, EEPS funds were added to expand Flex Tech.

Industrial and Process Efficiency Program. The Industrial and Process Efficiency Program (IPE), which began in early 2009, is an EEPS-funded Fast Track program designed to increase industrial process efficiency activity. The program is implemented as an additional component to the Existing Facilities Program and New Construction solicitations and provides performance-based incentives for cost-effective process improvements that reduce energy use per unit of production. This industrial and process efficiency component is the implementation path for process improvement projects developed through the

FlexTech TA Program, or brought to this program independently. Potential for process improvements will be predominantly in industrial facilities and data centers.

Benchmarking and Operations Efficiency Program. The Benchmarking and Operations Efficiency Program (BOEP), a component of the NYSERDA FlexTech Program, will provide benchmarking and onsite systems and operational assessments. BOEP targets commercial, institutional, industrial, and multifamily facilities. FlexTech Consultants will benchmark facilities and provide energy consumption metrics. Onsite assessments generate low cost/no cost energy efficiency recommendations concentrated on operational improvements; recommendations may also include systems upgrades and further technical assistance where warranted. The program began in first quarter 2011.

Agriculture Energy Efficiency Program. The Agriculture Energy Efficiency Program (AEEP), a component of the Existing Facilities Program, provides comprehensive, flexible energy efficiency services to New York's agricultural sector, a typically underserved market segment. AEEP consists of four main components: outreach and customer enrollment; audits and studies; energy improvement installation and customer installation support.

Agriculture Disaster Relief Program. The Agriculture Disaster Relief Program will assist farm and on-farm producers as they replace systems and equipment damaged or lost due to Hurricane Irene and/or Tropical Storm Lee. The Program will provide much needed assistance for storm-damaged farms to incorporate energy efficient electric and natural gas equipment and measures into the replacements and repairs. The Program will also incorporate face-to-face, on-line, and telephone support regarding energy efficiency technical knowledge, project review, outreach and general guidance. The efficiency standards employed will be similar to those currently utilized by its existing Agriculture Energy Efficiency Program (a component of the Existing Facilities EEPS Program).

3.2 Commercial/Industrial Evaluation Activities

Table 3-1 provides a snapshot of all recently completed, in-progress, and near-term planned evaluation activities for the Commercial/Industrial (C/I) sector programs. The evaluation activities completed in 2011 are highlighted within Section 3, and were used along with results from past evaluations to inform the overall findings and conclusions presented in this report. NYSERDA expects to report results in future evaluation and status reports for evaluation projects currently underway.

Table 3-1. C/I Program Evaluation Activities

Program Name	Evaluation Activities Completed in 2011	Evaluation Activities Underway or Planned
C/I Sector	--	Update to Non-Participant Spillover in Existing Facilities Market (Q1 2012) C/I Natural Gas Market Characterization (Q1 2012) Non-Participant Spillover Study (Q3 2012)
Existing Facilities Program		Benefit/Cost Analysis Update (Q1 2012) Market Characterization & Assessment (Q1 2012) Impact Evaluation (late Q1 or early Q2 2012)
Business Partners	Impact Evaluation (Motors; Evaluation Review Only)	Market Characterization & Assessment (Q1 2012) Process Evaluation (Q1 2012)
Loan Fund and Financing	--	--
Vertical Outreach	--	Impact Evaluation (Q3 2012) Program Logic Model (TBD) Process Evaluation (TBD)
New Construction Program		Benefit/Cost Analysis Update (Q1 2012) Impact Evaluation (Q2 2012)
Flex Tech / TA	Market Characterization and Assessment Impact Evaluation	Benefit/Cost Analysis Update (Q1 2012)
Industry and Process Efficiency	Process Evaluation	Impact Evalaution Cycle 1 (Q1 2012) Market Characterization and Assessment (Q1 2012)

3.3 Summary of Commercial/Industrial Program Budget and Spending Status

Table 3-2 presents detailed budget and funding information for the **New York Energy $mart[SM]** C/I programs. Table 3-3 presents detailed budget and funding information for EEPS programs.

Table 3-2. Commercial/Industrial Programs – New York Energy $mart[SM] Financial Status through December 31, 2011 ($ million)

Program	Budget [1]			Funds Spent			Encumbered Funds[4] % of Budget Encumbered	Committed Funds[5] % of Budget Committed
	SBC I & SBC II [2]	SBC III[3]	Total Budget	SBC I & SBC II[2]	SBC III [3]	Total Funds Spent		
Existing Facilities[6]	135.4	164.6	300.0	135.4	101.1	236.5 78.8%	281.2 93.7%	300.0 100.0%
New York Energy $mart[SM] Business Partners	21.1	24.7	45.7	21.1	17.3	38.4 85.7%	41.4 92.4%	42.4 92.8%
Loan Fund and Financing	12.3	31.3	43.7	12.3	26.8	39.2 89.5%	39.5 90.4%	39.5 90.4%
Vertical Outreach	4.8	18.5	23.4	4.8	14.8	19.7 89.5%	23.2 99.2%	23.4 100.0%
New Construction Program	53.1	119.3	172.4	53.1	76.4	129.5 75.1%	163.6 94.9%	170.6 99.0%
FlexTech Technical Assistance	20.4	29.8	50.2	20.4	16.6	37.1 72.4%	46.0 91.6%	50.2 100.0%
Total Commercial & Industrial	**$247.1**	**$388.3**	**$635.4**	**$247.1**	**$253.0**	**$500.2 78.9%**	**$595.0 93.6%**	**$626.3 98.6%**

[1]Reflects carryover in funds and reallocation as approved by the PSC in 2007. NYSERDA, *System Benefits Charge Operating Plan for **New York Energy Smart[SM]** Programs (July 1, 2006 – December 31, 2011)*, As Amended February 28, 2011, Revised April 6, 2011.

[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 December 31, 2011.

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

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

[6]Existing Facilities Program (EFP) was formed by merging the Peak Load Management and Enhanced Commercial/Industrial Performance (ECIPP) programs.

Totals may not sum exactly due to rounding.

Source: NYSERDA

Table 3-3. Financial Status of the EEPS Commercial/Industrial Programs through December 31, 2011 ($ million)

		Total Budget	Total Funds Spent	% of Budget Spent	Encumbered Funds % of Budget Encumbered	Committed Funds % of Budget Committed
Program[1]						
Existing Facilities	Electric	35.2	16.0	44.8%	33.8 95.0%	35.2 100.0%
	Gas	3.6	0.8	23.9%	3.4 95.1%	3.6 100.0%
Commercial New Construction Program	Electric	69.7	13.0	18.5%	25.4 36.3%	69.7 100.0%
	Gas	3.7	0.4	9.9%	0.7 18.9%	3.7 100.0%
FlexTech Expansion	Electric	18.7	8.0	43.0%	16.6 88.8%	18.7 100.0%
	Gas	1.6	0.6	32.4%	1.5 93.8%	1.6 100.0%
Industry and Process Efficiency	Electric	92.8	30.2	32.5%	71.0 76.5%	92.8 100.0%
	Gas	14.8	3.2	21.4%	14.1 95.3%	14.8 100.0%
Benchmarking		4.6	<0.4	9.5%	4.0 86.9%	4.6 100.0%
Agriculture	Electric	4.0	0.8	20.4%	2.4 61.4%	4.0 100.0%
	Gas	0.4	<0.1	11.8%	0.4 100.0%	0.4 100.0%
Agriculture Recovery		5.0	<0.1	0.6%	0.7 14.0%	1.3 26.0%
Total Commercial/Industrial		**$254.3**	**$73.5**	**28.8%**	**$173.9 68.4%**	**$250.6 98.5%**

[1]Program budgets exclude administration and evaluation dollars.

Totals may not sum exactly due to rounding.

Source: NYSERDA

3.4 Key Commercial/Industrial Evaluation Findings

This section summarizes key evaluation findings from the 2011 evaluation activities, and from the cumulative prior body of work by NYSERDA and its evaluation contractors.

3.4.1 Energy, Peak Demand, and Fuel Savings

Through NYSERDA's Impact Evaluation activities, independent third-party contractor teams assessed the energy and peak demand savings reported for the Commercial/Industrial (C/I) programs. Methods used in this assessment included on-site verification of equipment installation and functionality, and review of NYSERDA's files and engineering estimates for reasonableness and accuracy. Based on this review, the contractors adjusted the savings reported by NYSERDA. In turn, the contractors further adjusted these figures, based on primary research, to account for freeridership and spillover.

Tables 3-4 through 3-9 summarize the estimated electricity savings, peak demand reduction, and other fuel savings for each of the C/I sector programs, both **New York Energy $mart[SM]** and EEPS. Note that individual program savings are not adjusted for program overlaps. To avoid double counting in the total sector-level savings estimates, the amount of overlap among the individual program savings estimates is subtracted at the bottom of the table.

Table 3-4 and Table 3-5 show progress for the **New York Energy $mart[SM]** and EEPS funded programs, respectively, toward their established goals for electricity savings. Overall, two out of six **New York Energy $mart[SM]** programs (Existing Facilities and FlexTech) have exceeded their five-and-a-half-year **New York Energy $mart[SM]** electricity goals. EEPS electric-funded programs continue to make good progress toward their goals.

Table 3-6 and Table 3-7 show progress for the **New York Energy $mart[SM]** and EEPS funded programs, respectively, toward attaining peak demand reductions, as well as percent of the **New York Energy $mart[SM]** demand reduction goals that have been achieved. Overall, four out of six **New York Energy $mart[SM]** programs (Existing Facilities, Business Partners, New Construction and FlexTech) have exceeded their five-and-a-half-year **New York Energy $mart[SM]** peak demand reductions goals. Peak demand savings goals were not set for EEPS electric-funded programs.

Table 3-8 and Table 3-9 show fuel savings achieved by the **New York Energy $mart[SM]** and EEPS funded programs, respectively, including progress of EEPS-funded programs at achieving their ultimate natural gas targets. Fuel savings goals were not set for the **New York Energy $mart[SM]** programs. EEPS natural gas-funded programs continue to make good progress toward their goals. Fuel savings reported for the **New York Energy $mart[SM]** programs include savings for fuels such as oil and natural gas whereas fuel savings reported for the natural gas EEPS-funded programs show MMBtu savings for natural gas only.

Table 3-4. New York Energy $mart[SM] C/I Program Cumulative Annual Electricity Savings through December 31, 2011 and Progress toward Goals

Program	Energy Savings (GWh)				
	Savings Achieved through			5.5 Year Goal (by December 31, 2011)[3]	Progress Toward Goal (% achieved)
	June 30, 2006	December 31, 2011	July 1, 2006 through December 31, 2011		
Existing Facilities Program[1]	812.3a	1,513.6	701.3	484	145%
Business Partners Program	54.1	138.1	84.0	105	80%
Loan Fund and Financing	49.6	87.9	38.2	N/A	N/A
Vertical Outreach	N/A[4]	N/A[4]	N/A[4]	53	0%
New Construction Program	188.1b	456.2	268.1	356	75%
Flex Tech Technical Assistance	644.1	1,272.6	628.5	409	154%
Overlap Removed[2]	**126.7**	**285.0**	**158.3**	**N/A**	**N/A**
Statewide C/I Total	**1,621.6**	**3,183.4**	**1,561.8**	**1,407**	**111%**

[1] Savings for the Cooling Recommissioning component of the Existing Facilities Program were reduced in Q4 2011 to account for the retirement of installed measures reaching the end of their useful life.

[2] Overlap factors were updated in Q1 2008.

[3]Goals for the **New York Energy $mart[SM]** Program are specified in NYSERDA's February 28, 2011 revised operating plan (resubmitted with revisions April 6, 2011).

[4]Vertical Outreach is primarily a sector-based energy information and services program. Energy and demand savings that may be attributable to the Vertical Outreach Program are currently tracked and reported under the other **New York Energy $mart[SM]** programs.

a Savings reported previously included projects funded through the Con Edison Power Savings Partners Program. These savings have been removed to more accurately reflect accomplishments.

b These savings were adjusted following an extensive clean-up of the program database, which resulted in a change to the program realization rate.

Totals may not sum exactly due to rounding.

Table 3-5. EEPS C/I Program Cumulative Annual Electricity Savings through December 31, 2011 and Progress toward Goals

Program	Energy Savings (GWh)		
	Savings Achieved through December 31, 2011a	**Goal[1]**	**Progress Toward Goal (% achieved)**
Existing Facilities Program: Electric Funding	101.0	221.9	46%
Existing Facilities Program: Ancillary Benefits from Gas Funding	<0.1	N/A	N/A
New Construction Program: Electric Funding	23.9	310.0	8%
Flex Tech Technical Assistance: Electric Funding	76.5	320.1	24%
Industry and Process Efficiency: Electric Funding	198.6	840	24%
Agriculture: Electric	0.6	5.0	13%
Statewide C/I Total	**400.7**	**1,697.0**	**24%**

a The EEPS programs shown in this table began reporting electricity savings in the following months: Existing Facilities in April 2010; New Construction Program in August 2009; Flex Tech in July 2010; Industry and Process Efficiency in June 2009; and Agriculture in August 2011.

[1]The time frames for achieving savings goals vary by program. For the Existing Facilities Program, the savings goal is through December 31, 2014; for the New Construction Program and FlexTech Program, the savings goals are through December 31, 2015; for the Industry and Process Efficiency Program, the savings goal is through December 31, 2013.

Totals may not sum exactly due to rounding.

Table 3-6. New York Energy $mart℠ C/I Program Cumulative Peak Demand Savings through December 31, 2011 and Progress toward Goals

Program	Peak Demand Savings (MW)				
	Savings Achieved through		July 1, 2006 through December 31, 2011	5.5 Year Goal (by December 31, 2011)[3]	Progress Toward Goal (% achieved)
	June 30, 2006 (Cumulative)	December 31, 2011 (Cumulative)			
Existing Facilities Program Permanent[1]	166.4a	308.9	142.5	123	116%
Existing Facilities: Callable	421.1a	656.6	235.5	239	99%
Business Partners Program	11.8	35.5	23.7	21	113%
Loan Fund and Financing	14.3	52.0	37.7	N/A	N/A
Vertical Outreach	N/A[4]	N/A[4]	N/A[4]	10	0%
New Construction Program	41.0b	112.9	71.9	41	175%
Flex Tech TA	120.9	232.9	112.0	83	135%
Flex Tech TA: Callable	10.2	175.6	165.4	N/A	N/A
Overlap Removed[2]	**24.5**	**58.0**	**33.5**	**N/A**	**N/A**
Statewide C/I Total	**761.3**	**1,516.5**	**755.2**	**517**	**146%**

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

[1] Savings for the Cooling Recommissioning component of the Existing Facilities Program were reduced in Q4 2011 to account for the retirement of installed measures reaching the end of their useful life.

[2] Overlap factors were updated in Q1 2008.

[3] Goals for the **New York Energy $mart℠** Program are specified in NYSERDA's February 28, 2011 revised operating plan (resubmitted with revisions April 6, 2011).

[4] Vertical Outreach is primarily a sector-based energy information and services program. Energy and demand savings that may be attributable to the Vertical Outreach Program are currently tracked and reported under the other **New York Energy $mart℠** programs.

a Savings reported previously included projects funded through the Con Edison Power Savings Partners Program. These savings have been removed to more accurately reflect accomplishments.

b These savings were adjusted following an extensive clean-up of the program database, which resulted in a change to the program realization rate.

Totals may not sum exactly due to rounding.

Table 3-7. EEPS C/I Program Cumulative Peak Demand Savings through December 31, 2011

Program	Peak Demand Savings (MW)
	Savings Achieved through December 31, 2011
Existing Facilities Program	23.7
Existing Facilities Program: Ancillary benefits from gas funding	0.02
New Construction Program	6.1
Flex Tech TA	14.2
Industry and Process Efficiency	23.6
Statewide C/I Total	**67.6**

Notes:

These MW values were taken from the "Net utility KW reductions acquired to date" row of the scorecard. NYISO peak MW values may differ.

There are no EEPS goals for peak demand savings.

Totals may not sum exactly due to rounding.

Table 3-8. New York Energy $mart[SM] C/I Program Cumulative Annual Fuel Savings through December 31, 2011a

Program	Fuel Savings (MMBtu)
	Savings Achieved through December 31, 2011
Existing Facilities Program	-71,075b
Loan Fund and Financing	598,666
New Construction Program	8,786
Flex Tech Technical Assistance[1]	2,951,921c
Overlap Removed	**147,596**
Statewide C/I Total	**3,340,702**

Note: There were no **New York Energy $mart[SM]** goals for fuel savings for Commercial/Industrial sector programs.

[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 calculated impacts. Also, the program recommends on-site generation, which would result in an increase in fuel use, offsetting fuel reductions achieved.

a **New York Energy $mart[SM]** MMBtu savings reported in this table include savings for fuels such as oil and natural gas.

b EFP has not tracked ancillary fuel savings or use resulting from installation of electric saving measures. The negative fuel savings shown here represent additional fuel use due to the installation of on-site generation at a very small number of projects that were recently evaluated for impacts. In the future, EFP will begin tracking both fuel saving and use more consistently.

c The savings reported for FlexTech in the last quarter report (Q3 2011) erroneously overestimated the MMBtu savings. This error has been corrected in the current reporting of MMBtu savings.

Totals may not sum exactly due to rounding.

Table 3-9. EEPS C/I Program Cumulative Annual Natural Gas Savings through December 31, 2011 and Progress toward Goals[1]

Program	Natural Gas Savings (MMBtu)[2]		
	Savings Achieved through December 31, 2011a	Goal[3]	Progress toward Goal (% Achieved)
Existing Facilities Program: Gas funding	35,979	155,927	23%
Existing Facilities Program: Ancillary benefits from electric funding	2,439	N/A	N/A
New Construction Program: Gas funding	322	285,743	<1%
New Construction Program: Ancillary benefits from electric funding	250,179	N/A	N/A
Flex Tech Technical Assistance: Gas funding	58,579	381,963	15%
Flex Tech Technical Assistance: Ancillary benefits from electric funding	435,868	N/A	N/A
Industry and Process Efficiency: Gas funding	369,608	1,682,265	22%
Statewide C/I Total	**1,152,974**	**2,505,898**	**46%**

[1]The MMBtu savings for EEPS-funded programs presented consist of natural gas only, and these figures do not include savings for other fuels such as oil and propane.

[2]EEPS natural gas goals and impacts are typically tracked in therms and have been converted to MMBtu units in this report so total impacts can be summed with those from **New York Energy $mart**[SM] programs for NYSERDA's entire System Benefits Charge portfolio.

[3]For the Existing Facilities Program, the savings goal is through December 31, 2013; for the New Construction and Flex Tech programs, savings goals are through December 31, 2015; for the Industrial and Process Efficiency Program, the savings goal is through December 31, 2013. EEPS gas goals and impacts were originally stated in therms and have been converted to MMBtu units so total impacts can be summed with those from **New York Energy $mart**[SM] programs.

a The EEPS programs shown in this table began reporting natural gas savings in the following months: Existing Facilities in October 2010; FlexTech in July 2010; and Industry and Process Efficiency in April 2010.

3.4.2 Summary of Other Key Program Impacts and Results

Across the **New York Energy $mart**[SM] programs, eleven additional five-and-a-half-year goals were set for other key metrics apart from energy savings such as the number of business partners participating, number of Loan Fund lenders and number of participants receiving assistance through the Vertical Outreach Program. The programs are making good progress toward these goals with five out of 11 goals exceeded (number of Existing Facilities Projects, leveraged funds for Existing Facilities Projects, lenders signing a **New York Energy $mart**[SM] Loan Fund and Financing Program participation agreement and the amount of **New York Energy $mart**[SM] Loan Fund and Financing Program loans leveraged and number of customers receiving FlexTech assistance).

- Progress on the remaining goals is at 90% or less.
- The results of each program's progress toward its stated goals are shown in table format in the subsequent sections.
- Selected longer-term achievements (cumulative since **New York Energy $mart[SM]** program inception) and evaluation findings are as follows:
- Over 9,739 customer projects and $866 million leveraged funds are attributable to the EFP.
- The **New York Energy $mart[SM]** Business Partners Program has provided training for over 3,300 persons on effective, energy-efficient lighting.
- Since its inception the Loan Fund and Financing Program has closed on 292 commercial loans valued at $906 million.
- The New Construction Program has provided technical studies for 1,090 projects and completed 1,288 projects; 249 projects have received commissioning.
- The FlexTech TA Program, since its inception, has completed over 6,900 customized studies for customers that identify and encourage the implementation of cost-effective, energy-efficient measures, and 311 ESCOs and engineering firms are participating in the program.

3.5 Existing Facilities Program

3.5.1 Program Description

The Existing Facilities Program[1] (EFP) offers integrated electric (kWh) and natural gas (MMBtu) incentives to offset the cost of implementing cost-effective energy efficiency measures. EFP focuses on custom, systems based approaches that encourage comprehensive energy solutions. These high energy savings projects require more time to develop, design and implement. EFP promotes energy efficiency and demand management by offering incentives for a variety of energy projects, which include lighting efficiency upgrades, HVAC, motors, variable frequency drives (VFDs), Energy Management Systems (EMS), energy storage, demand response-load management, interval meters, and combined heat and power (CHP), industrial and process efficiency, and monitoring-based commissioning (MBCx). To

[1] EFP is a consolidation of two precursor NYSERDA programs -- the Peak Load Management Program (PLMP) and the Enhanced Commercial and Industrial Performance Program (ECIPP). Building upon the success of these two programs, the July 1, 2008 merger provides a less complicated, more accessible program presentation to potential customers in the marketplace.

increase awareness for potential energy cost savings, EFP targets sectors of customers that include commercial and industrial businesses, healthcare facilities, agriculture, universities and colleges, K-12 schools, State and local governments, not-for-profits, and mission critical facilities such as data centers and communications facilities. The primary target audience for the Existing Facilities program is large energy users within these sectors that will yield the highest gas and electric savings.

EFP offers two types of incentives, pre-qualified and performance-based:

- **Pre-qualified** incentives encourage customers working on small-sized energy projects and equipment replacement projects to purchase and install more energy efficient measures. These prescriptive incentives are structured on a dollar-per-unit basis. Some of the measures available to qualifying customers include lighting, HVAC, chillers, motors, VFDs, commercial refrigeration, commercial kitchen equipment and washers, interval meters, and natural gas equipment.

- **Performance-based** incentives are provided for customers working on large-scale projects, and the incentive amount is determined based on the amount of annual energy savings achieved (kWh, MMBtu, or kW). These incentives are typically higher than those for pre-qualified projects, and performance-based projects must meet minimum incentive thresholds to be eligible for the program. Performance-based projects require an engineering analysis to substantiate energy savings, and larger projects are potentially subject to measurement and verification (M&V) protocols that meet international standards. For those projects, a performance-based incentive is not fully paid by NYSERDA until the performance of the project (i.e., all anticipated energy savings) is proven through M&V. The M&V process is conducted by the applicant, but is closely monitored by NYSERDA's technical assistance contractors. The various types of performance-based incentives are described below, along with their expected impact on the program.

    - Electric and gas efficiency incentives encourage the implementation of projects that deliver verifiable annual electric savings.

    - Demand response provides help with a portion of the cost for technology that enable facilities to participate in demand response programs that reduce electricity load in response to emergency and/or market-based price signals.

    - MBCx incentives enable technologies and measurement tools that deliver persistent and measurable electricity savings through more efficient day-to-day operations. Incentives are offered to offset the costs of installing data gathering technologies or enhancing building management systems that provide critical information to monitor and improve building operation. Technologies include temperature sensors for chilled water supplies, condenser water, flow rates, chilled and condenser water temperatures, and wet and dry bulb temperatures.

Energy demand reduction contributes to improvements of New York's energy system reliability and security, while helping businesses and industries to reduce operating costs. 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 efficiency measures.

The 13-year EFP budget is $300.0 million for **the New York Energy $mart[SM]** program. In addition, EFP has also received EEPS funding in the amount of $35.2 million for electric and $3.6 million for natural gas activities through 2011. **New York Energy $mart[SM]** and EEPS program impacts are separately identified in the savings tables presented in this report. Additionally, NYSERDA has separately filed with the Commission scorecard and narrative reports for the EFP providing further details on the EEPS-funded program activities through December 31, 2011.

3.5.2 Program Accomplishments

With EFP being the product of merging two programs, there are not EFP program goals per se since continued tracking of the original individual programs' goals is no longer possible.[2] Nevertheless, NYSERDA does track EFP program outputs that somewhat parallel the former programs' goal activities. A count of EFP customer projects and the leveraged funds for the entire program since 1999 is listed in Table 3-10.

[2] Although the goals for PLMP (750 customers receiving assistance) and ECIPP (3,300-3,500 customer projects) are similar, they are not the same metric; consequently the goals cannot be merged. As for the ECIPP leveraged funds goal ($400-$450 million), the data merge does not permit continued tracking of this information.

Table 3-10. Existing Facilities Program – Program Outputs

Output	Program Goals (July 1, 2006 through December 31, 2011)	Achieved (July 1, 2006 through December 31, 2011)	% of Goal Achieved
Customer Projects	4,500 – 4,800	9,739	>100%
Leveraged Funds ($ million)	$400 - $450 million	$866 million	>100%

3.5.3 Follow-Up On Evaluation Recommendations

There are no recent Existing Facilities evaluation recommendations to report. Any new program evaluation recommendations will be included in future quarterly and annual reports, including information on their status and NYSERDA's response to the recommendation.

3.6 New York Energy $mart[SM] Business Partners

3.6.1 Program Description

The **New York Energy $mart[SM]** Business Partners Program consolidated four prior programs, and added an umbrella Core Services support function. NYSERDA's Core Services contractor provides program design, development, and implementation services. The four program elements included in Business Partners are described below.

- Commercial Lighting: Formerly known as the Small Commercial Lighting Program, this effort involved promotion of 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. In 2008, NYSERDA hired an implementation contractor through RFP 1054 to evolve and continue these efforts under the Business Partners Program.

- Motor Systems: Formerly known as the Premium-Efficiency Motors Program, this effort worked with suppliers and providers of motors and motor repair services to promote sales of National Electrical Manufacturers Association (NEMA) Premium® motors, quality motor repairs, and motor management services. Motor management activities included 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.

- Building Performance and HVAC: Prior activities under the commercial HVAC Program focused on training and supporting HVAC contractors, distributors and commercial building owners to

increase the market share of energy-efficient unitary HVAC units, and increase the demand for retro-commissioning services in existing commercial buildings. The Business Partners Building Performance and HVAC program has supported green building operations and unitary HVAC advanced diagnostics training for trade unions including the International Union of Operating Engineers (IUOE) Local 94 and Service Employees International Union (SEIU) Local 32BJ, while separate market transformation efforts continued to support benchmarking best practices and retro-commissioning services to improve commercial office building performance.

- Innovative Opportunities: Competitively selected projects on emerging and under-used technologies to increase market adoption and penetration. Six projects totaling approximately $1.7 million in program funding are still underway.

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 businesses in a highly competitive marketplace, while assuring appropriate quality. 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 State's economy.

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 13-and-a-half-year **New York Energy $mart**[SM] program budget is $44.8 million.

3.6.2 Program Accomplishments

Table 3-11 shows the Business Partners Program goal to sign up 1,800 partners between July 1, 2006 and December 31, 2011. Although more than 800 allies are currently participating in the commercial lighting program element, a total of 305 partners have signed up over the past 66 months. Program staff expects an increase in partners as the core services and program elements ramp up.

Table 3-11. New York Energy $mart℠ Business Partners Program – Goals and Achievements

Activity	Program Goals (July 1, 2006 through December 31, 2011)	Achieved July 1, 2006 through December 31, 2011	% of Goal Achieved
Business Partners (signed up)	1,800	456	25%

3.6.3 Program Outputs and Indicators

This section highlights key program outputs. All values reported are cumulative since program inception. Table 3-12 presents the key outputs for the program through December 31, 2011. Some metrics are carried forward from predecessor programs in an effort to show cumulative progress.

Table 3-12. New York Energy $mart[SM] Business Partners Program – Key Program Outputs

Outputs	Value (Cumulative through December 31, 2011)
Commercial Lighting	
Number of participating allies	1,101
Dollar value of incentives awarded	$1,231,121
Number of completed projects	1,674
Square footage of projects completed	21.7 million
Total persons trained on effective, energy-efficient lighting	3,351
Number of individuals at CLP ally companies that have taken the National Council on Qualifications for Lighting Professions (NCQLP) certification exam	23
Motor Systems	
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)	43
Number of vendor motor management training sessions held and number of people attending training sessions	28 sessions with 178 attendees
Number of completed customer motor inventories using MotorMaster and number of motors inventoried	125 inventories covering 10,861 motors
Number of written motor management plans developed by customers	1
Building Performance & HVAC	
Number of participating vendors	76
Number of commissioning providers trained	289
Number of HVAC/Retrocommissioning contractors and distributors trained	534 (384 Green Building Operations, and 150 Existing Building Commissioning)

3.6.4 Follow-Up on Evaluation Recommendations

There are no recent Business Partners evaluation recommendations to report on. Any new program evaluation recommendations will be included in future quarterly and annual reports, including information on their status and NYSERDA's response to the recommendation

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 four percent in most of the State to 6.5% in 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.

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.

NYSERDA has worked with more than 100 lenders and leasing companies across the State to increase the availability of low-interest capital for energy efficient equipment and process improvements.

The 13-and-a-half-year **New York Energy $mart[SM]** program budget was $43.7 million.[3] The program committed its entire budget during the second quarter of 2009. No additional funding is available to allow NYSERDA to reopen the **New York Energy $mart[SM]** Loan Fund and Financing Program in its present form. Nevertheless, other activities such as the Green Jobs/Green NY Program are expected to provide financing options to customers wishing to make energy efficiency improvements.

[3] In early 2009, an additional $18.3 million in funding was added to the Loan Fund.

3.7.2 Program Accomplishments

Table 3-13 highlights the Loan Fund's five-and-a-half-year goals and accomplishments as of December 31, 2010. The Program surpassed its goal to sign up 75 lenders and has also met its goal for the dollar value leveraged by closed loans in the commercial and industrial sector. Although the number of commercial/industrial loans was in line with expectations, projects were much larger than anticipated. The Loan Fund per-project cap remained unchanged, but the loan amounts were larger than projected.

Table 3-13. New York Energy $mart[SM] Loan Fund and Financing Program – Goals and Achievements

Activity	Program Goals (July 1, 2006 through December 31, 2011)	Achieved July 1, 2006 through September 30, 2011	% of Goal Achieved
Customers receiving assistance (closed commercial/industrial loans)	550	292	53%
Participating lenders (signed participation agreements)	75	151	>100%
Leveraged loan amount (for closed commercial/industrial loans)	$60 million	$106 million	>100%

3.8 Vertical Outreach

3.8.1 Program Description

The NYSERDA Vertical Outreach effort, previously referred to as Energy Smart Focus, provides services to facilitate and encourage sector-specific energy-efficiency improvements and practices.
FlexTech Vertical Outreach is an offering aimed to encourage and facilitate greater energy efficiency awareness and penetration to targeted verticals across New York State. Strategies may include (1) key account management (2) outreach and one-on-one interactions, (3) targeted program materials and messages, (4) partnerships with trade associations, (5) integration with regional and national efforts, (6) development of tools and resources, (7) training, and (8) limited technical assistance. FlexTech Outreach leverages the energy and non-energy priorities and benefits of each vertical to deliver vertical-specific guidance and resources. Below is a description of current Outreach verticals.

Commercial Real Estate (CRE): NYSERDA CRE Outreach assists commercial building owners, managers and consultants with vertical-specific guidance about improving energy efficiency and property

value and facilitates NYSERDA participation by providing information about and participation support for funding opportunities.

Hospitality: NYSERDA Hospitality Outreach addresses hotel and motel and restaurant facilities by providing guidance on energy efficiency and NYSERDA Programs. NYSERDA works closely with the NYS Hospitality and Tourism Association and the NY Restaurant Associations to promote the programs and services offered by NYSERDA.

Institutions: NYSERDA Institutions Outreach works with Schools (K-12) and State Facilities. Activities include educational outreach, training, limited technical assistance, development of tools and resources, support of several executive orders, and direct assistance for the NY-New York Collaborative for High Performance Schools Program (NY-CHPS).

Water and Wastewater: NYSERDA Municipal Water and Wastewater Outreach encourages municipal water and wastewater facilities to adopt technology that is more energy efficient and economical, while preserving environmental standards. NYSERDA partners with institutions such as the New York Environmental Facilities Corporation, the NYS Department of Environmental Conservation, and the NYS Department of Health. Activities include training to provide new operators with exposure to the benefits and opportunities of energy efficiency in their plants, with an emphasis on identification of easily implemented energy efficiency improvements.

Industry: NYSERDA Industry Outreach targets facilities used in manufacturing and information technology. It assists customers with identifying and implementing cost-effective projects that improve energy efficiency and productivity at manufacturing and data center facilities. Projects that reduce energy usage per unit of production or computing are encouraged.

Healthcare: NYSERDA Healthcare Outreach addresses hospitals and other healthcare facilities. It assists the healthcare industry with reducing energy costs and improving the environment while enhancing the treatment of patients by communicating energy and non-energy benefits that align with the objectives and goals of New York State healthcare institutions.

Local Government: NYSERDA Local Government Outreach addresses villages, town, city, and county level buildings and assists participants in the planning, financing and implementation of strategies to reduce their environmental footprint and lower their energy costs.

The five-and-a-half-year **New York Energy $mart[SM]** program budget is $21.9 million.

3.8.2 Program Accomplishments

Table 3-14 shows the Vertical Outreach Program five-year goal for participants receiving assistance. The Program has achieved 30% of its goal. Nevertheless, only the Outreach Schools Program element existed prior to July 2006 and, thus, services to other sectors have taken time to fully ramp up. Also shown are the Outreach Program sector partnerships that have been developed. Partnerships include outside organizations, associations, agencies, utility account executives, supply chain partners and others who have pledged to assist in the development, promotion, and execution of the Vertical Outreach Program.

Table 3-14. New York Energy $mart[SM] Vertical Outreach Program – Goals and Achievements

Activity	Program Goals (July 1, 2006 through December 31, 2011)	Achieved July 1, 2006 through December 31, 2011	% of Goal Achieved
Participants Receiving Assistance	24,000	6,297	30%
Focus Sector Partnerships[1]	N/A	1,234	N/A

[1]This metric was not part of the original SBC3 Operating Plan goals.

Table 3-15 shows the number of new projects brought into other NYSERDA programs by the Vertical Outreach Program during the fourth quarter of 2011 and cumulatively to date.

Table 3-15. Projects Brought into Other NYSERDA Programs by Vertical Outreach[1]

Focus Sector	Number of 4th Quarter Projects	Total Projects to Date (cumulative)
Colleges and Universities	5	98
Commercial Real Estate	33	245
Healthcare	0	132
Hospitality	0	206
Industrial	34	240
Institutions	0	177
Water and Wastewater	6	82
Total	**78**	**1,180**

[1]Programs include Existing Facilities, FlexTech, Solar PV and New Construction.

3.8.3 Sector Highlights

As a sector-based energy information and services program, metrics of success are difficult to quantify for the Vertical Outreach Program. Still, achievements are presented within this section in the context of sector highlights. While not quantifiable, these activities and achievements are indicative of success in penetrating the market and influencing the energy efficiency of individual sectors.

Colleges and Universities (C&U)

The Outreach on Colleges & Universities program has been expanding outreach efforts to identify energy efficiency projects. The following items represent a sampling of activities completed to date:

- Ninety-one campus meetings representing 66 separate institutions;
- Twelve presentations to six C&U organizations and their members;
- Ninety-nine projects have been brought into NYSERDASBC funded programs.

Commercial Real Estate (CRE)

The Commercial Real Estate Outreach (CREO) team continues working towards increasing NYSERDA program intake and accomplishing the goals established in the 2010 contract extension scope of work and 2011 budget amendment. Over the past year, the program has gained significant momentum in our effort to increase program awareness, activity and efficacy.

- HR&A continues to aggressively recruit new participants into NYSERDA programs through direct outreach to potential clients, involvement in industry organizations and events, and coordination with potential outreach partners.
- Over the course of 2011, this has resulted in a significant increase in the number of applications submitted to NYSERDA in addition to an extensive list of projects in the pipeline for 2012.
- CREO has submitted 33 new applications in 2011, representing over 45 million square feet and nearly 10 million kWh in energy savings. Total incentives from these applications will exceed $2 million.

Industrial and Process

Industrial and Process Outreach was initiated in October 2009. The program focuses on outreach efforts to expand awareness of the benefits of energy efficiency and NYSERDA programs at manufacturing and

data center sites. Activities and actions completed by the Outreach Contractors for 2011 are summarized below.

- Provided support to datacenter and industrial customers to analyze potential projects and determine eligibility in NYSERDA programs.

- Continued coordination and involvement with stakeholders, vendors, trade allies, industrial development agencies and economic development corporations.

- Employed various market research strategies to assist in identifying potential customers and technologies customers may implement that result in energy savings.

- Brought forty-eight new projects into the Con Edison NYSERDA Data Center Efficiency Program.

Institutions

K-12 Schools Outreach:

In the fourth quarter of 2011 the K-12 Schools Outreach continued its ongoing communication, training, and consultation to New York's K-12 public and private Schools. Some of the most significant accomplishments during this quarter include:

- Approval from the U.S. EPA for one ENERGY STAR® Leader Award for the North Syracuse Central School District (CSD), as well as four SWAT visits to the following school districts: Cherry Valley-Springfield CSD, Chenango Forks CSD, Lansing Central CSD, and Ithaca CSD.

- The K-12 Schools Outreach program continued to expand its benchmarking effort and added an additional seven new schools from two new districts.

- This quarter's benchmarking effort has identified and assisted four districts submit applications for 11 school buildings to receive the ENERGY STAR® Label for Buildings.

    - This brings the totals to: 1,029 schools across 236 districts have benchmarked through the program; 163 School Buildings have received a total of 289 building labels for their

excellence in energy efficiency, and 16 districts have been awarded 32 ENERGY STAR leader awards.

State Institutions Outreach:

- In the fourth quarter of 2011, the State Institutions Outreach has submitted the completed State Fiscal Year (SFY) 2009-2010 Executive Order 111 Report to NYSERDA for final approval and publishing.
- A total of 34 State Entities reported energy consumption data as required through the Executive Order 111 for the SFY 2009-2010. Efforts were immediately made to contact and retrieve annual EO 111 report forms for the State Fiscal Year 2010-2011 from all reporting State Entities.

Water and Wastewater

The Vertical Water and Wastewater Outreach program has been focusing on both utility staff and elected officials to expand awareness of the benefits of energy efficiency and NYSERDA programs at Water and Wastewater Treatment Plants. The following items represent a sampling of activities completed in 2011:

- Formulated partnerships with 27 members of the Infrastructure Alliance (including outside organizations, associations, agencies, etc.).
- One hundred sixty three million gallons/day of wastewater design flow have serviced over six hundred and fifty thousand people under the outreach to large facilities.
- Eighty-two SBC funded projects brought into NYSERDA programs.

3.9 New Construction Program

3.9.1 Program Description

The New Construction Program (NCP) 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 LEED® certification. Enhancements under the NCP 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-and-a-half-year **New York Energy $mart**[SM] Program budget is $172.4. million. In addition, the New Construction program received EEPS funding in the amount of $69.7 million for electric and $3.7 million for gas activities through 2011. **New York Energy $mart**[SM] and EEPS program impacts are identified in the savings tables presented in this report. Additionally, NYSERDA has separately filed with the Commission scorecard and narrative reports for the NCP providing further details on the EEPS-funded program activities through December 31, 2011.

3.9.2 Program Accomplishments

Table 3-16 shows the status of three key non-energy metrics compared to their five-and-a-half-year goals. Overall, these measures continue to show progress over time, corresponding with program growth.

Table 3-16. New Construction Program – Goals and Achievements

Activity	Program Goals (July 1, 2006 through December 31, 2011)[1]	Achieved July 1, 2006 through December 31, 2011	% of Goal Achieved
Customers receiving assistance (completed projects)	1,272	667	52%
Construction market affected (square feet)	127 million	71.4 million	56%
Participating architecture and engineering firms (completed projects)	1,357	1,067	79%

[1]Goals through December 2011 from the SBC III Operating Plan for **New York Energy $mart**[SM] Programs: July 2006-December 31, 2011. Revised February 28, 2011

3.9.3 Program Outputs and Indicators

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 3-17 presents the key outputs for NCP through December 31, 2011.

Table 3-17. New Construction Program– Key Program Outputs

Outputs	Value (Cumulative through December 2011)[1]
Number of buildings participating	1,606 active projects (248 with encumbered dollars)
Square footage for active projects	173 million
Number of completed projects	1,288
Number of projects receiving TA studies	986
Number of projects receiving commissioning	249

[1]Note that some of the figures show slight declines from the prior year due to couple of factors: a number of NCP projects are still being assigned from **New York Energy $mart**[SM] to EEPS funding, thus moving these projects out of the **New York Energy $mart**[SM] totals. Also, the program experiences a consistent dropout rate over each quarter that can result in a net decrease in the numbers of buildings participating, square footage affected, and the number of projects receiving commissioning. Note that the number of completed projects continues to grow, albeit at a modest pace.

3.9.4 Follow-up on Evaluation Recommendations

NCP Process Evaluation

Research into action conducted a two phase process evaluation of the NCP. The first phase ended in November 2010 and the second in November 2011. This description includes results of the second phase of the evaluation. The overall goal of the evaluation was to help program staff, contractors, and NYSERDA assess the effectiveness of NCP in meeting goals of its Fast Track efforts and to make recommendations for improvements. The central Fast Track goal of the NCP is to achieve greater savings, while at the same reducing program incentives from an average of 22¢ per kWh to an average of 16¢ per kWh, as the program implemented Program Opportunity Notice (PON) 1501. To meet this goal, the NCP has taken steps to change its incentive structure to attract higher levels of efficiency and whole building approaches; developed a new marketing plan; and expanded efforts to reach a larger share of the market. The second phase of the report examined the programs efforts to streamline the contracting process; the results of expanded marketing efforts among program staff and Outreach Project Consultants (OPCs); the early effects of changes to the program TRC; progress toward program goals of serving more small building projects; and the influence of the TA provider performance on program success.

The following conclusions and recommendations are based upon a review or program materials and database information and in-depth interviews with NCP and other NYSERDA staff, outside consultants working with the program (*i.e.,* TA providers and OPCs, and owners and design teams of NCP projects. In addition, 237 in-depth interviews were completed for this evaluation, with sample sizes meeting or exceeding their goals, except for cancelled project participants.[4] The interviews were spread among NYSERDA staff, OPCs, TA providers, and owners and design team members from 109 active and 35 cancelled projects (projects that dropped out).

Conclusions and Recommendations

Conclusion: The NCP has taken and is taking steps to improve timeliness and to better synchronize project and program schedules, including improved communication, standardization of technical analysis and reports, and accelerating the TA contracting process.

While progress has been made in these areas, findings from this research suggest further improvements are needed. Just over one-half of the NCP participants who were interviewed recommended that the NCP process should be streamlined or that the program's timeliness should be improved. Program staff, OPCs, and TA providers also report synchronization and timing need to be improved, especially at the front-end of projects where key decisions about energy efficient design are being made.

Recommendation: The NCP should continue its efforts to ensure that projects are enrolled at the optimal time and that early participation steps are streamlined and as timely as possible. In their efforts to streamline the program, NCP staff should revisit every review or approval step in its process flow to see if any can be shortened or removed. The next process evaluation of NCP should conduct this type of review if streamlining remains a central issue for the program. To improve timeliness and synchronization, several TA providers suggested that very interested design teams should receive interim design assistance and reporting services prior to the final technical assistance report. These TA providers believe these interim services positively influence building design and energy savings. NCP staff should investigate how these interim steps might become more standardized. Finally, some NCP staff members suggested that new program paths be explored. For instance, they wondered if new paths were needed to serve

[4] In general, interviews with representatives from cancelled projects were hard to obtain, especially interviews with design team members, despite strong efforts on the part of the evaluation team. The cancelled projects design team group was abandoned with NYSERDA and DPS approval. Many of the projects that drop out do so at an early phase, often due to projects being stopped. Thus, design team involvement was often limited, and many didn't recall their participation in NCP.

particular customer situations, such as an express path, a first-time project path, or a path that matches very motivated design teams with the best TA providers in the program.

Conclusion: Both increased OPC and NYSERDA commercial sector marketing efforts are generating substantially more leads than the program has seen before.

Recommendation: OPC marketing should be continued and the program should continue to track its results, including the conversion rate of leads to applications. In addition, the new NYSERDA Solutions campaign should be continued and the results tracked, since initial tracking suggests it is generating interest and leads. The marketing efforts need to be carefully monitored so that the volume of projects remains manageable within program resources.

Conclusion: Tension continues to exist between market transformation and market leadership goals for NCP and its savings acquisition goals. Many TA providers, and some staff, voiced concerns that that the program's ability to influence maximum energy savings and advance leading edge whole building design is declining. They noted that the change from a whole building Total Resource Cost (TRC) test[5] to an individual measure TRC test is compromising the market transformation and market leadership intent of the whole building path. These TA providers and staff members also said it can be difficult to explain the consequences of the shift in the test, and that customers seeking to do leading edge integrated design may find NCP incentives disappointing for advanced design options. Finally, they said design teams are becoming more sophisticated about energy efficient design and that if NCP wishes to lead the market toward the next level of high performance buildings, it needs to incorporate better support for innovative design.

Recommendation: To avoid unexpected results for participants seeking to employ integrated whole building designs, NCP staff members, OPCs, and TA providers need to continue to develop effective ways to explain the consequences of the shift in the TRC test. In addition, staff could consider developing alternative ways to encourage higher performance designs despite the current application of

[5]The TRC test is used in both the custom and whole building paths within NCP. The whole building TRC test assesses the cost effectiveness across all efficiency measures planned for a new building. A whole building TRC test, for instance, would allow leading edge, but less cost-effective, high efficiency measures to be offset by more standard and cost-effective high efficiency measures.

the TRC. Finally, NCP should consider conducting an empirical analysis to explore the effects of the TRC on project scope, design, cost, and market transformation.

Conclusion: NCP continues to struggle with how to serve small buildings. At the same time, new marketing efforts appear to be attracting more small projects. NCP needs more effective and cost-effective ways to work with smaller buildings.

Recommendation: While NCP has made substantial progress in its efforts to develop an advanced analysis tool designed to foster deeper, cost-effective savings for smaller buildings, documentation and other steps need to be taken to finalize and implement the package. Completing this analysis tool should be a high priority, especially given the surge in smaller building applicants.

Conclusion: The effectiveness of key NCP elements varies, particularly those that depend upon TA provider performance, such as scoping meetings and technical reports. Findings across all respondent groups suggest that inconsistent TA provider performance impedes NCP efforts, especially since the most sophisticated customers expect TA providers to combine the highest levels of technical ability, knowledge, and communication skills.

Recommendation: NCP staff members should assess individual TA provider performance in scoping meetings and throughout the technical assistance process and devise training strategies that will help TA providers better influence efficiency decisions. For example, high performing TA providers could inform the design and delivery of a training package for TA providers whose skills need improvement. One staff member suggested such training could change "order takers" to "game changers."

3.10 FlexTech Technical Assistance Program

3.10.1 Program Description

The FlexTech TA Program is a consolidation of services previously offered under the FlexTech, TA, 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 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 13-and-a-half-year **New York Energy $mart**[SM] program budget is $51.5 million. The FlexTech TA program received EEPS funding in the amount of $17.8 million for electric and $1.6 million for gas activities through 2011. **New York Energy $mart**[SM] and EEPS program impacts are separately identified in the savings tables presented in this report. Additionally, NYSERDA has separately filed with the Commission scorecard and narrative reports for the FlexTech TA Program providing further details on the EEPS-funded program activities through December 31, 2011.

3.10.2 Program Accomplishments

FlexTech TA continues to monitor the number of customers receiving assistance to assess its progress. Table 3-18 shows this metric and its current status.

Table 3-18. FlexTech TA Program – Goal and Achievement

Activity	Program Goals (July 1, 2006 through December 31, 2011)	Achieved July 1, 2006 through December 31, 2011	% of Goal Achieved
Customers receiving assistance (approved proposals)	3,025	4,390	> 100%

3.10.3 Program Outputs and Indicators

This section highlights key program outputs and market progress. All values reported are cumulative since program inception. Table 3-19 presents the key outputs for the FlexTech TA Program from inception through December 31, 2011.

Table 3-19. FlexTech TA Program – Key Program Outputs

Outputs	Value (Cumulative through December 2011)
Customers receiving assistance (approved proposals)	7,716
Number of studies completed	6,977
Total funds committed	$40.4 million
Customer cofunding of studies	$40.4 million
Participating allies (ESCOs and engineering firms)	311

3.10.4 FlexTech Market Characterization and Assessment Evaluation

A market characterization and assessment evaluation of the FlexTech Program was completed in October 2011. Findings from this study were summarized in the August 2011 New York's System Benefits Charge Evaluation and Status Report, which is available on NYSERDA's website at http://www.nyserda.ny.gov/en/Publications/~/media/Files/Publications/NYES%20Program/2011/2011q2_nyes_sbcreport.ashx. The full report will be posted on NYSERDA's website soon.

3.10.5 Follow-up on Evaluation Recommendations

There are no recent FlexTech evaluation recommendations to report on. Any new program evaluation recommendations will be included in future quarterly and annual reports, including information on their status and NYSERDA's response to the recommendation.

3.11 Industrial and Process Efficiency

The Industry and Process Efficiency Program, as approved in the revised SBC Operating Plan[6], is one of the five Fast Track programs originally presented in the June 23rd, 2008 DPS Order[7].

The IPE program received EEPS funding in the amount of $92.8 million for electric and $14.8 million for gas activities through 2011. EEPS program impacts are identified in the savings tables presented in this report. Additionally, NYSERDA has separately filed with the Commission scorecard and narrative

[6]System Benefits Charge, Supplemental Revision for New York Energy $mart[SM] Programs (2008 – 2011). As amended August 22, 2008 and revised March 12, 2009.

[7]CASE 07-M-0548 – Proceeding on Motion of the Commission regarding and Energy Efficiency Portfolio. Issued and effective June 23, 2008.

reports for the IPE Program providing further details on the EEPS-funded program activities through December 31, 2011.

3.11.1 IPE Program Process Evaluation

This process evaluation of the IPE program assesses the effectiveness of the program's outreach/marketing and operational processes, documents program progress, and makes recommendations for improvement. Research Into Action, Inc. completed the first of three waves of research in June 2010 and the second wave in March 2011. The Wave 3 research, completed in mid-2011, included in-depth interviews with the six Industrial and Process Efficiency Project Managers who worked at least 30 percent time on Industrial and Process Efficiency; two NYSERDA staff members who provide managerial oversight for the program; NYSERDA's Commercial and Industrial Marketing Manager; four Technical Reviewers (consultants to NYSERDA); and three outreach contractors (consultants supporting program outreach to customers, service providers, and stakeholders). The research also included in-depth interviews with 23 participating customers and 13 contractors who worked on participants' projects.

Conclusions and Recommendations

Given the program's progress to date and promising future, this evaluation finds only a few opportunities for improvement.

Project Delays

Conclusion: Overall project support as well as response time for project approval, measurement and verification (M&V), and payment processing have improved, yet further improvements are desirable. Western New York and data centers throughout the state could be better served by additional project support.

Project delays decreased subsequent to staff's development of the "Project Management Dashboard" to track the duration between various program milestones, which enables staff to flag delayed projects for follow-up by the appropriate party or parties. In addition, the program has been able to provide more timely pre- and post-installation support as a result of the nine additional Technical Reviewer firms that NYSERDA hired.

Recommendation: The program would benefit from database and application processing upgrades needed for staff to improve project management, including implementing electronic signatures and better integration of NEIS and Buildings Portal.

Recommendation: The program team should continue to refine the dashboard in coordination with NYSERDA's Operations Group.

Recommendation: The program would benefit from additional Technical Reviewer support for Western New York and data centers throughout the state.

Targeting and Outreach

Conclusion: NYSERDA and program staff members have continued to improve its targeting of, and outreach to, the large and medium-size industrial customers the program intends to serve; yet ongoing targeting and outreach efforts are needed.

Between the Wave 2 and 3 evaluations, program staff increased the role of outreach contractors to address challenges associated with targeting customers, including list development and prioritization of outreach. The outreach contractors conducted extensive market analysis to augment NYSERDA's list of manufacturing establishments for targeted outreach; staff contacts generally agreed that the list of manufacturing establishments was nearly complete. In addition, staff and contractors considered successful their outreach to motivate contractors working with compressed air and data center customers to market the program's incentives. NYSERDA's Integrated Marketing Communications Approach for C&I programs (IMC) shows promise in increasing the clarity of Industrial and Process Efficiency messaging by providing specialized tools geared towards specific industrial subsectors and directed towards key decision makers.

Recommendation: The program would benefit from additional Outreach Contractor outreach to data centers, to consulting engineers that serve targeted industrial submarkets, including data centers and compressed air users, and to industrial customers in Western New York (the greater Buffalo area, in particular). Across the state, outreach contractors should increase leveraging of economic development organizations to assist with targeted outreach.

Branding

Conclusion: Industrial and Process Efficiency competes for customers' attention with other non-efficiency plant investment opportunities and with utility efficiency programs. Participating customers have a greater understanding of the process improvement opportunities afforded by the program than they did at the program's outset, yet additional gains can be made.

Recommendation: Program staff could take steps to more strongly brand Industrial and Process Efficiency as a one-stop shop that leverages a cohesive team of people to assist customers from opportunity identification and justification to verification and investment in the next cost-saving project. Solidifying this identity could further distinguish Industrial and Process Efficiency in the market and facilitate further cohesion of staff, outreach contractors, and Technical Reviewers around customer projects.

Key Account Management

Conclusion: The program team more successfully employed the key account management approach than they had as of the Wave 2 evaluation. Better use of salesforce.com facilitated key account management, and additional improvement in its use would benefit the program.

Outreach contractors' increased role in program activities benefitted key account management by increasing the extent to which customers received individualized attention. In addition, program staff members use of the dashboard decreased project delays, thereby increasing customer satisfaction.

Recommendation: To facilitate coordinated outreach between program staff and outreach contractors and reduce duplicative or non-coordinated outreach to individual customers, the process evaluation team recommends that program staff use salesforce.com more consistently. To accomplish this, NYSERDA may need to implement database and application processing upgrades to increase staffs' available time.

Energy Savings Calculations

Conclusion: To address confusion about baseline, and about "net" versus "per-unit-of-production" savings calculations, the staff worked with Technical Reviewers to develop calculation protocols for baseline measurements, variations in production schedules, and data center per-unit-of-production calculations.

Recommendation: The Industrial and Process Efficiency staff could host a workshop with Technical Reviewers and outreach contractors to further develop guidance case examples for per-unit-of-production calculation methodologies and messages likely to provide the best energy savings for the customer and the program. Staff might test-run the guidance, examples, methods, and messaging with customers that have conducted such per-unit-of-production projects and with whom the program has strong relationships, to explore the extent to which the new methods and messages increase the value of information and assist decision making.

The Wave 2 of this process evaluation of the IPE Program was completed in March 2011. Findings from this study were summarized in the March 2011 New York's System Benefits Charge Programs Evaluation and Status Report, which is available on NYSERDA's website at http://www.nyserda.ny.gov/~/media/Files/Publications/NYES%20Program/2011/2011q1_nyes_sbcreport.ashx.

The full process evaluation report is also available online at http://www.nyserda.ny.gov/~/media/Files/EDPPP/Program%20Evaluation/2011ContractorReports/2011%20IPE%20Wave%20Two.ashx.

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3.12 FlexTech Benchmarking Pilot

The Benchmarking and Operations Efficiency Program (BOEP), a component of the NYSERDA FlexTech Program, will provide benchmarking and onsite systems and operational assessments. BOEP targets commercial, institutional, industrial, and multifamily facilities. FlexTech Consultants will benchmark facilities and provide energy consumption metrics. Onsite assessments generate low cost/no cost energy efficiency recommendations concentrated on operational improvements; recommendations may also include systems upgrades and further technical assistance where warranted. The Benchmarking Program has received EEPS funding in the amount of $9.8 million for electric activities through 2011. The program began in first quarter 2011.

NYSERDA has separately filed with the Commission scorecard and narrative reports for the Benchmarking Program providing further details on the EEPS-funded program activities through December 31, 2010.

3.13 Agriculture Energy Efficiency Program

The agricultural sector has a large New York State economic impact, with many local businesses and communities dependent upon it for success. The purpose of the Agriculture Energy Efficiency Program (AEEP) is to provide comprehensive, flexible energy efficiency services to this underserved market segment.

AEEP consists of four main components:

1. **Outreach and Customer Enrollment** - to recruit farms into the program and streamline participation;
2. **Audits and Studies** - for farms interested in identifying their energy efficiency options;
3. **Energy Improvement Installation** - to off-set the cost of energy efficiency improvements, and;
4. **Customer Installation Support** - to provide farms with any assistance required to facilitate implementation.

The program supports electric and natural gas efficiency improvements with an electric budget of $12 million and a gas budget of $1.3 million in EEPS funding. The AEEP is available to all farms and on-farm producers, including but not limited to: orchards, dairies, greenhouses, vegetables, vineyards, grain dryers, maple producers, and poultry/egg. Since 98% of New York State's farms are located upstate, the majority of the activity is expected to occur in that region. The AEEP will operate as a distinct component within the Existing Facilities Program (EFP). AEEP funding, projects, and reporting will be tracked separately and distinctly within the EFP.

3.14 Agriculture Disaster Energy Efficiency Program

On October 18, 2011, the Public Service Commission approved the Agriculture Disaster Energy Efficiency Program, seeking to reallocate electric EEPS funding to implement an Agriculture Disaster Relief Program.[8] The program will assist farm and on-farm producers in replacing systems and equipment damaged or lost due to Hurricane Irene and/or Tropical Storm Lee. Through the program, storm-damaged farms will receive much needed assistance to incorporate energy-efficient electric and natural

[8] Case 07-M-0548 and Case 08-E-1132. *Order Approving an Emergency Agriculture Disaster Energy Efficiency Program.* Issued and effective October 18, 2011.

gas equipment and measures into their replacements and repairs. The total funding allocated to the Agriculture Disaster Relief Program is $5,861,664.

Hurricane Irene and Tropical Storm Lee were declared “major disasters” by the Federal Emergency Management Agency. Record flooding from these storms caused severe damage to many communities including the loss of nearly 140,000 acres of farmland, numerous barns, outbuildings and agricultural systems and equipment. Other sources of assistance funds are primarily focus on crop loss and soil conservation, and many damaged farms will need to replace equipment and systems in order to remain viable.

Agriculture Disaster Relief Program will assist farm and on-farm producers as they replace systems and equipment damaged or lost due to Hurricane Irene and/or Tropical Storm Lee. The Program will provide much needed assistance for storm-damaged farms to incorporate energy efficient electric and natural gas equipment and measures into the replacements and repairs. The Program will also incorporate face-to-face, on-line, and telephone support regarding energy efficiency technical knowledge, project review, outreach and general guidance. The efficiency standards employed will be similar to those currently used by its existing Agriculture Energy Efficiency Program (a component of the Existing Facilities EEPS Program).

The Program is expected to produce 2,500 MWH of electricity savings, all of which is likely be installed by mid-to-late-2012.

4 Residential and Low-Income Programs

4.1 Overview of the Residential and Low-Income Programs

4.1.1 Residential Programs

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

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 Homes Initiative (NYESH) for newly constructed homes. On the supply side, these initiatives support market development through recruitment, training and incentives for contractors and builders, in order to encourage them to offer energy-efficient options. On the demand side, these initiatives market the benefits of energy efficiency, in addition to health and safety, to residential consumers and reduce the barriers of participation to increase demand for efficient products and services. Both HPwES and NYESH have low-income components providing additional incentives for households earning between 60 and 80 percent of New York State or area median income.

Multifamily Performance Program. The Multifamily Performance Program (MPP) 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 – 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. Both the new construction and existing buildings tracks provide incentives to the building owner and include a low-income component, providing increased incentives. The program results in reduced energy bills and health and safety benefits for occupants.

Market and Community Support Program. The Market and Community 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 two major components to the Market and Community Support Program: 1) the **New York Energy $mart**[SM] Products Initiative, which seeks to increase the availability and sales of residential energy-efficient appliances, lighting and home electronics products; and 2) Residential Program Marketing Support, which, in partnership with NYSERDA's Marketing and Economic Development Group, implements marketing initiatives for all the residential programs, as well as workforce development and training, Energy Smart Students, the summer and winter "tips" campaigns, and mid-stream partners.

CFL Expansion Program. The CFL Expansion Program is an Energy Efficiency Portfolio Standard (EEPS)-funded program designed to increase the sales of CFLs in New York State. The program, a component of the Market and Community Support Program, is designed to increase marketing and cooperative advertising promotions with retail stores and lighting manufacturers; continue to increase the network of retail partners and manufacturers; increase consumer accessibility to a wider variety of CFLs by providing incentives to retailers to increase the number of CFLs sold, and increase permanent shelf space for these products; increase in-store promotions and point-of-purchase information to educate consumers; increase participation in the CFL Collection Center Program; and promote the manufacture, sale, and usage of high power factor CFLs.

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 **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

NYSERDA's 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. In addition to the low-income components of the programs described above, NYSERDA administers programs targeted only at low-income households. Progress of the following low-income programs is discussed in this section:

EmPower New York. The EmPower New York program provides energy efficiency services to utility customers earning at or below 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). In early 2009, as a result of the Commission's EEPS proceeding, NYSERDA expanded the EmPower Program to provide more widespread energy efficiency services to low-income customers.

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 (OTDA) to negotiate discounts on purchases of home heating oil by the Low-Income Home Energy Assistance Program (HEAP), 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 ESS Initiative (described above).

4.2 Residential and Low-Income Evaluation Activities

Table 4-1 provides a snapshot of all recently completed, in-progress, and near-term planned evaluation activities for the Residential and Low-Income sector programs. The evaluation activities completed in 2010 are highlighted within Section 4, and were used along with results from past evaluations to inform the overall findings and conclusions presented in this report. NYSERDA expects to feature results in future evaluation and status reports for evaluation projects currently underway.

Table 4-1. 2011 Residential and Low-Income Program Evaluation Activities

Program Name	Evaluation Activities Completed in 2011	Evaluation Activities Underway or Planned
Residential Sector	Results of the 2010 National CEE ENERGY STAR® survey Results of the 2010 National Energy Conservation, Efficiency and Demand Response survey	Residential Statewide Baseline Study (2013)
Home Performance Program		Benefit/Cost Analysis Update (Q1 2012) Impact Evalaution NY Energy Star New Homes (Q1 2012) Impact Evaluation Home Performance(Q2 2012)
Multifamily Building Performance Program	Program Logic Model of the Electric Reduction in Master-Metered Buildings	Benefit/Cost Analysis Update (Q1 2012)
Market and Community Support Program	**New York Energy $mart^{SM}** Products Market Characterization and Assessment **New York Energy $mart^{SM}** Products Initiative Process Evaluation	
CFL Expansion Program	Impact Evaluation Update	
Communities and Education Program	--	None planned
EmPower New York		Benefit/Cost Analysis Update (Q1 2012) Impact Evalaution (Q1 2012)
Buying Strategies and Energy Awareness	--	None planned

4.3 Summary of Residential Program Budget and Spending Status

Table 4-2 presents detailed budget and funding information for the Residential and Low-Income programs. Table 4-3 presents budget and funding information for the Residential and Low-Income programs.

Table 4-2. Residential & Low-Income Programs - New York Energy $mart℠ Financial Status through December 31, 2011 ($ million)

Program	Budget[1]			Funds Spent			Encumbered Funds[4] % of Budget Encumbered	Committed Funds[5] % of Budget Committed
	SBC I & SBC II[2]	SBC III[3]	Total Budget	SBC I & SBC II[2]	SBC III[3]	Total Funds Spent		
Residential Programs								
Single Family Home Performance	47.4	62.0	109.4	47.4	58.5	105.9 96.8%	106.4 97.3%	107.8 98.5%
Multifamily Building Performance	18.3	29.3	47.6	18.3	25.5	43.8 91.9%	45.2 95.0%	47.6 100.0%
Market and Community Support Residential	96.5	55.6	152.2	96.5	48.1	144.6 95.1%	148.7 97.8%	151.1 99.3%
Communities and Education	3.2	9.9	13.0	3.2	9.1	12.3 94.6%	12.9 99.2%	12.9 99.2
Subtotal Residential	**$165.4**	**$156.8**	**$322.2**	**$165.4**	**$141.2**	**$306.7 95.2%**	**$313.2 97.2%**	**$319.4 99.1%**
Low-Income Programs								
Single Family Home Performance	22.3	53.5	75.8	22.3	42.0	64.3 84.8%	68.7 90.6%	69.3 91.4%
Multifamily Building Performance	45.4	115.7	161.1	45.4	99.3	144.7 89.8%	156.1 96.9%	161.1 100.0%
EmPower New York	14.3	53.1	67.4	14.3	51.3	65.6 97.3%	66.2 98.2%	67.4 100.0%
Buying Strategies & Energy Awareness	4.7	11.9	16.6	4.7	10.0	14.7 88.6%	16.3 98.2%	16.3 98.2%
Subtotal Low-Income	**$86.6**	**$234.2**	**$320.8**	**$86.6**	**$202.7**	**$289.2 90.2%**	**$307.4 95.8%**	**$314.1 97.9%**
TOTAL Residential and Low-Income	**$252.0**	**$391.0**	**$643.0**	**$252.0**	**$343.9**	**$595.9 92.7%**	**$620.6 96.5%**	**$633.5 98.5%**

[1]Reflects carryover in funds and reallocation as approved by the PSC in 2007. NYSERDA, *System Benefits Charge Operating Plan for **New York Energy $mart℠** Programs (July 1, 2006 – December 31, 2011)*, As Amended February 28, 2011, Revised April 6, 2011.
[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

Table 4-3. Financial Status of the EEPS Residential and Low-Income Programs through December 31, 2011 ($ million)

		Total Budget[1]	Total Funds Spent	% of Budget Spent	Encumbered Funds % of Budget Encumbered	Committed Funds % of Budget Committed
Residential Programs						
CFL Expansion		17.2	13.9	81.0%	14.5 84.3%	15.6 90.7%
Home Performance with ENERGY STAR	Electric	1.8	<0.1	5.0%	<0.1 5.0%	0.3 16.7%
	Gas	21.7	8.6	39.6%	9.7 44.7	11.1 51.2%
New York ENERGY STAR Homes	Electric	1.4	0.2	14.3%	0.2 14.3%	0.3 21.4%
	Gas	16.0	6.6	41.3%	8.5 53.2%	9.1 56.9%
MPP Market Rate	Electric	2.6	0.5	19.2%	0.7 26.9%	1.6 61.5%
	Gas	16.0	1.9	11.9%	2.4 15.0%	3.5 21.9%
Geothermal		2.0	0.3	15.0%	0.3 15.0%	0.3 15.0%
Electric Reduction in Master Metered Buildings		11.6	1.5	13.0%	1.6 13.8%	2.4 20.7%
Subtotal Residential		**$90.4**	**$33.4**	**36.9%**	**$37.8** **41.8%**	**$44.1** **48.8%**
Low-Income Programs						
Assisted Home Performance with ENERGY STAR	Electric	0.9	<0.1	11.0%	<0.1 11.0%	0.1 11.1%
	Gas	8.0	5.7	71.3%	6.2 77.5%	7.4 92.5%
EmPower	Electric	28.0	18.9	67.0%	19.3 68.4%	24.6 60.6%
	Gas	8.6	3.5	40.4%	4.2 48.6%	8.6 31.8%
MPP Low Income	Electric	6.5	0.8	12.3%	1.0 15.4%	1.9 29.2%

	Total Budget[1]	Total Funds Spent	% of Budget Spent	Encumbered Funds % of Budget Encumbered	Committed Funds % of Budget Committed
Residential Programs					
Gas	13.7	2.5	18.2%	3.5 25.5%	11.0 80.3%
Assisted New York ENERGY STAR Homes Electric	2.0	<0.1	5.0%	<0.1 5.0%	<0.2 10.0%
Gas	1.1	<0.1	9.1%	0.2 18.2%	1.0 90.9%
Subtotal Low-Income	**$68.7**	**$31.4**	**45.7%**	**$34.3** **49.9%**	**$54.7** **79.6%**
Total Residential and Low-Income	**$159.0**	**$64.8**	**40.8%**	**$72.1** **45.3%**	**$98.8** **62.1%**

[1]Program budgets exclude administration and evaluation dollars.
Totals may not sum exactly due to rounding.
Source: NYSERDA

4.4 Residential and Low-Income Evaluation Findings

Significant progress is being made by the Residential and Low-Income portfolio. 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.

4.4.1 Energy, Peak Demand and Fuel Savings

Through NYSERDA's Impact Evaluation activities, independent third-party contractor teams 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 and engineering estimates for reasonableness and accuracy. Based on this review, the contractors adjusted the savings reported by NYSERDA. In turn, the contractors further adjusted these figures, based on primary research, to account for freeridership and spillover.

Tables 4-4 through 4-9 summarize the estimated electricity savings, peak demand reductions, and fuel savings for each of the Residential and Low-Income programs, both **New York Energy $mart^{SM}** and EEPS. Savings for the Low-Income program elements are broken out in the footnotes to each table.

Table 4-4 and Table 4-5 show progress for the **New York Energy $mart[SM]** and EEPS-funded programs, respectively, toward their established goals for electricity savings. Overall, two out of six **New York Energy $mart[SM]** Residential and Low-Income programs (New York ENERGY STAR Homes and Market and Community Support) have exceeded their five-and-a-half-year **New York Energy $mart[SM]** electricity goals. One other **New York Energy $mart[SM]** Program, EmPower New York has nearly achieved its goal at 99%. EEPS electric-funded programs are also making good progress overall toward their goals. Table 4-6 and Table 4-7 show progress for the **New York Energy $mart[SM]** and EEPS funded programs, respectively, toward attaining peak demand reductions. Peak demand savings goals were not set for the **New York Energy $mart[SM]** nor EEPS electric-funded programs.

Although not impacting program progress toward goals, the electricity and demand savings for the **New York Energy $mart[SM]** Products component of the Market and Community Support Program were reduced by 99.8 GWh and 8.3 MW, respectively, in this Q4 2011 report, to account for the retirement of measures installed early in the **New York Energy $mart[SM]** Program that have since reached the end of their useful life.

Table 4-8 and Table 4-9 show progress for the **New York Energy $mart[SM]** and EEPS-funded programs, respectively, toward their established goals for fuel savings. Overall, two out of six **New York Energy $mart[SM]** programs (Home Performance with ENERGY STAR and New York ENERGY STAR Homes) have exceeded their five-and-a-half-year savings goals. EEPS natural gas-funded programs continue to make good progress toward those goals. Fuel savings reported for the **New York Energy $mart[SM]** programs include savings for fuels such as oil, propane and natural gas whereas fuel savings reported for the natural gas EEPS-funded programs show MMBtu savings for natural gas only.

Table 4-4. New York Energy $mart[SM] Residential and Low-Income Program Cumulative Annual Electricity Savings through December 31, 2011 and Progress toward Goals

Program	Energy Savings (GWh)				
	Savings Achieved through		July 1, 2006 through December 31, 2011	5.5 Year Goal (by December 31, 2011)[1]	Progress Toward Goal (% achieved)
	June 30, 2006	December 31, 2011			
Single Family Home Performance Program: Existing Homes[2]	13.5	31.8	18.3	31.1	59%
Single Family Home Performance Program: New Homes	7.3	39.4a	32.1	13.1	245%
Multifamily Performance Program: Existing Buildings[3]	29.8	126.8	97.0	361.3	27%
Multifamily Performance Program: New Buildings	0	3.0	3.0	24	13%
Market and Community Support Program[4]	439.3b	712.4	273.1	234	117%
EmPower New York	20.1	54.9	34.8	34.9	99%
Statewide Residential & Low-Income Total	**510.0**	**968.3**	**458.3**	**698.4**	**87%**

[1]Goals for the **New York Energy $mart[SM]** Program are specified in NYSERDA's February 28, 2011 revised Operating Plan (resubmitted with revisions April 6, 2011).

[2]Savings for the low-income Assisted Home Performance Program (16.7 GWh) are included in this row.

[3]Savings for the low-income Assisted Multifamily Program (55.6 GWh) are included in this row, the remainder are savings from the closed Residential Comprehensive Energy and Direct Install programs and the new Multifamily Performance Program.

[4]Savings for the **New York Energy $mart[SM]** Products Program are cumulative through 2009 and are estimated based on market data, survey research, and deemed savings values. In addition, during Q4 2011, savings for the **New York Energy $mart[SM]** Products component of the Market and Community Support Program were reduced to account for the retirement of installed measures reaching the end of their useful life.

a Electricity savings changed only marginally in the 3rd quarter of 2011 as electric projects were supported by EEPS funding.

b This baseline savings figure does not match the 2nd quarter 2006 published value. The impacts for the **New York Energy $mart[SM]** Products component of this program are derived annually from market data, and the 2nd quarter savings value was estimated retrospectively to provide a more accurate baseline for measuring progress.

N/A – Not Applicable

Totals may not sum exactly due to rounding.

Table 4-5. EEPS Residential and Low-Income Program Cumulative Annual Electricity Savings through December 31, 2011 and Progress toward Goals

Program	Energy Savings (GWh)		
	Savings Achieved through December 31, 2011a	**Goal[1]**	**Progress Toward Goal (% achieved)**
Multifamily Performance Program: Market Rate			
Electric Funding	1.3	17.8	7%
Ancillary impacts from Gas funding	-0.2	N/A	N/A
Multifamily Performance Program: Low-Income			
Electric Funding	1.9	28.8	7%
Ancillary benefits from Gas funding	0.4	N/A	N/A
Home Performance with ENERGY STAR	<0.1	6.4	1%
Assisted Home Performance with ENERGY STAR	<0.1	1.4	5%
New York ENERGY STAR Homes	1.7	5.0b	41%
Assisted New York ENERGY STAR Homes	0.5	3.2b	16%
CFL Expansion Program[2]	846.9	1,083.4	78%
EmPower New York			
Electric Funding	15.1	34.9	43%
Ancillary benefits from Gas funding	<.1	N/A	N/A
Statewide Residential & Low-Income Total	**867.9**	**1,180.9**	**73%**

a The EEPS programs shown in this table began reporting electricity savings in the following months: Multifamily Performance Program in September 2010; Low Income Multifamily Performance Program in May 2010; CFL Expansion in July 2009; and EmPower in June 2009.

b Goals were updated in Q4 2011 to account for the transfer of funding from the **New York Energy $mart**[SM] Program to EEPS.

[1]Committed savings goals are through December 31, 2011; however, the timeframe for actually achieving those savings goals may vary by program.

[2]Savings for the CFL Expansion Program incorporate a 1.6 net-to-gross ratio based on a baseline evaluation study. NYSERDA's CFL Expansion Program evaluation update was completed in September 2011. NYSERDA is awaiting DPS guidance on how to apply this new result in Scorecard and other reporting.

N/A – Not Applicable

Totals may not sum exactly due to rounding.

Table 4-6. New York Energy $mart℠ Residential and Low-Income Program Cumulative Peak Demand Reductions through December 31, 2011

Program	Demand Savings (MW)	
	Savings Achieved through	
	June 30, 2006	December 31, 2011
Single Family Home Performance Program: Existing Homes[1]	2.0	9.0
Single Family Home Performance Program: New Homes	0.9	17.4a
Multifamily Performance Program: Existing Buildings[2]	3.9	12.8
Multifamily Performance Program: New Buildings	0.0	1.1
Market and Community Support Program	96.0b	151.8b
EmPower New York	2.5	8.7
Statewide Residential & Low-Income Total	**105.4**	**200.8**

Note: No peak demand savings goals were set for residential and low-income **New York Energy $mart℠** programs.

a Demand reduction changed only marginally in the 3rd quarter of 2011 as electric projects were supported by the EEPS funding.

b Savings for the **New York Energy $mart℠** Products Program are cumulative through 2009 and are estimated based on market data, survey research, and deemed savings values. In addition, during Q4 2011, savings for the **New York Energy $mart℠** Products component of the Market and Community Support Program were reduced to account for the retirement of installed measures reaching the end of their useful life.

[1]Includes 3.8 MW from the low-income Assisted Home Performance Program.

[2]Savings for the low-income Assisted Multifamily Program are included in this row. They represent 6.6 MW of these savings.

Totals may not sum exactly due to rounding.

Table 4-7. EEPS Residential and Low-Income Program Cumulative Peak Demand Reductions through December 31, 2011

Program	Demand Savings (MW)
	Savings Achieved through December 31, 2011
Multifamily Performance Program: Market Rate	
Electric funding	0.15
Ancillary impacts from Gas funding	0.031
Multifamily Performance Program: Low-Income	
Electric funding	1.0
Ancillary benefits from Gas funding	0.032
CFL Expansion[1]	73.1
EmPower New York	1.5
Statewide Residential & Low-Income Total	**75.8**

Notes:

These MW values were taken from the "Net utility KW reductions acquired to date" row of the scorecard. NYISO peak MW values may differ.

No peak demand savings goals were set for residential and low-income EEPS programs.

Totals may not sum exactly due to rounding.

[1]Savings for the CFL Expansion Program incorporate a 1.6 net-to-gross ratio based on a baseline evaluation study. NYSERDA's CFL Expansion Program evaluation update was completed in September 2011. NYSERDA is awaiting DPS guidance on how to apply this new result in Scorecard and other reporting.

Table 4-8. New York Energy $mart[SM] Residential and Low-Income Program Cumulative Annual Fuel Savings through December 31, 2011 and Progress toward Goals[1]

Program	Fuel Savings (MMBtu)				
	Savings Achieved through		July 1, 2006 through December 31, 2011	5.5 Year Goal (by December 31, 2011)[2]	Progress Toward Goal (% achieved)
	June 30, 2006	December 31, 2011			
Single Family Home Performance Program: Existing Homes[3]	454,958a	1,223,140	768,182	743,981	103%
Single Family Home Performance Program: New Home	376,103b	868,946	492,844	409,952	120%
Multifamily Performance Program: Existing Buildings[4]	43,932	1,006,740	962,808	6,791,300	14%
Multifamily Performance Program: New Buildings	0.0	25,143	25,143	649,000	4%
Market and Community Support Program[4]	241,998c	444,103d	202,105	300,000	67%
EmPower New York[5]	38,151e	202,927	164,776	210,441	78%
Statewide Residential & Low-Income Total	**1,155,142**	**3,771,000**	**2,615,858**	**9,104,674**	**29%**

[1]**New York Energy $mart[SM]** MMBtu savings reported in this table include savings for all fuels including oil, propane and natural gas.

[2]Goals for the **New York Energy $mart[SM]** Program are specified in NYSERDA's February 28, 2011 revised operating plan (resubmitted with revisions April 6, 2011).

[3]Energy savings for the low-income Assisted Home Performance Program are included in this row. They represent 553,361 MMBtu of these savings.

[4]Energy savings for the low-income Assisted Multifamily Program are included in this row. They represent 378,781 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.

b This value does not match earlier published values as the realization rate for MMBtu was reassessed during this period to a lower level and applied retroactively in order to accurately reflect progress.

cThe value shown for savings through June 30, 2006 does not match earlier published values, as an error in the tracking data was found and repaired.

d Savings for the **New York Energy $mart[SM]** Products Program are cumulative through 2009 and are estimated based on market data, survey research, and deemed savings values.

eThe MMBtu savings for EmPower was reduced to exclude some non-SBC sources through June 30, 2006, so the value shown here will not match earlier published values.

Table 4-9. EEPS Residential and Low-Income Program Cumulative Annual Fuel Savings through December 31, 2011 and Progress toward Goals[1]

Program	Fuel Savings (MMBtu)		
	Savings Achieved through December 31, 2011a	Goal[2]	Progress Toward Goal (% achieved)
Single Family Home Performance Program: Existing Homes	114,264	401,815	28%
Single Family Assisted Home Performance Program: Existing Homes	54,339	58,053	94%
Single Family Home Performance Program: New Homes	156,967	428,767	37%
Assisted Single Family Energy Star Homes	11,102	7,736	144%
Multifamily Performance Program: Market Rate			
Gas funding	39,578	377,285	10%
Ancillary effects from Electric funding	10,023	N/A	N/A
Multifamily Performance Program: Low-Income			
Gas funding	21,530	204,522	11%
Ancillary effects from Electric funding	-3,047	N/A	N/A
EmPower New York			
Gas funding	22,895	84,584	27%
Ancillary effects from Electric funding	-2,647	N/A	N/A
Statewide Residential & Low-Income Total	**425,004**	**1,562,762**	**27%**

[1]The MMBtu savings for EEPS-funded programs presented consist of natural gas only, and these figures do not include savings for other fuels such as oil and propane.

[2]Committed savings goals are through December 31, 2011; however, the timeframe for actually achieving those savings goals may vary by program.

a The EEPS programs shown in this table began reporting natural gas savings in the following months: Single Family Home Performance Existing and New Homes in May 2010; Multifamily Performance Program in September 2010; Low Income Multifamily Performance Program in May 2010; and EmPower in April 2010.

N/A – Not Applicable

4.4.2 Summary of Other Key Program Impacts and Results

Across the programs, 28 additional 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. Seventeen of the goals have been surpassed (*e.g.*, the number of new independent retailers signed up, ENERGY STAR market share increases, number of market rate households served through Home Performance with

ENERGY STAR, number of teachers trained) . Progress on some goals is less than expected (*e.g.*, number of low-income ENERGY STAR homes built, number of existing market rate multifamily units receiving energy efficiency services). The results of each program's progress toward its stated goals are shown in table format in the subsequent sections.

Select longer-term achievements (cumulative since program inception) and evaluation findings are as follows:

- More than 19,900 ENERGY STAR homes have been built, and more than 42,600 existing homes have received energy-efficiency measures of which 8,750 households have implemented measures through the low-income component of the HPwES Program.
- As detailed in Section 4.4.3, more than 181,000 low-income households have been served by the SBC Program.
- Over 857 retail store fronts and 47 manufacturer partners are participating in the Market and Community Support Program.
- Since program inception, 558 existing multifamily properties comprising 112,292 individual units have received efficiency services. A total of 283 new construction multifamily projects comprising 17,252 individual units have signed a participation agreement. Also, 114 new construction multifamily projects comprising 7,093 individual units have developed energy-reduction plans.
- Since its inception, the Communities and Education Program has trained 9,452 teachers on educating about energy issues at 709 workshops. An estimated one million students have been reached.
- 823 oil vendors are participating in the Buying Strategies and Energy Awareness Program.

4.4.3 Low-Income Customers Served

In total, more than 181,000 low-income customers have been served by the SBC Program. Approximately 45% of the customers served are in the Con Edison utility area where the low-income population is concentrated in larger multi-family buildings. Table 4-10 shows the distribution of low-income customers served by program and utility service area.

Table 4-10. Number of Low-Income Households Served by Program and Utility Area through December 2011

Utility Service Area	Assisted Multi-family Program[1]	EmPower	Weather-ization Network Initiative[1]	Assisted Home Performance[2]	Multi-family Per-formance Program	Direct Install[1]	Total
Central Hudson Gas & Electric	772	2,172	97	404	850	388	4,683
Con Edison	32,016	11,358	1,292	210	26,744	9,612	81,232
National Grid	8,051	23,609	2,026	8,881	12,294	0	54,861
NYSEG	2,097	15,953	755	2,328	2,697	0	23,830
Orange & Rockland	420	2,111	54	81	348	235	3,249
Rochester Gas & Electric	5,181	2,999	357	2,269	2,160	0	12,966
Total[3]	48,537	58,202	4,581	14,382	45,093	10,235	181,030

[1] Closed programs.

[2] In addition to the households listed in this table, the Assisted Home Performance with ENERGY STAR Program has also served 152 households located in multiple utilty areas (i.e., more than one utility area) as well as another 57 households served by municipal power companies and 424 households in National Fuel Distribution territory.

[3] The following total households by program were funded by EEPS: EmPower (16,446), Assisted Home Performance (1,129), and Multifamily Performance programs (1,695)

4.5 Home Performance Program

4.5.1 Program Description

The Home Performance Programs address one- to four-unit homes and low-rise multifamily buildings through the New York ENERGY STAR® Homes (NYESH) initiative for newly constructed homes and buildings, and the Home Performance with ENERGY STAR® (HPwES) 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 existing homes more efficient. The HPwES Program offers incentives and financing options to homeowners to encourage them to make their homes more energy efficient. In

response to a growing need to focus on training and certification for energy efficiency and renewables, workforce activities are consolidated under a separate Workforce Development Initiative delivered through the Market and Community Support Program and described in Section 4.6. The NYESH Program began serving low-rise multifamily buildings in 2011. By expanding its scope, the NYESH program is now capable of serving a subset of small multifamily buildings that were not adequately served through the Multifamily Performance Program. This expanded scope is now making energy efficiency a priority for a rapidly expanding market.

NYESH provides technical assistance to builders and Home Energy Raters, 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 work with third party verifiers called Home Energy Rating System (HERS) Raters to construct New York ENERGY STAR homes that use approximately 30% significantly less energy than homes built to the current energy code. In addition, the program is an enhanced version of the EPA's ENERGY STAR Homes Program, because in order to earn the New York ENERGY STAR home label designation, these homes must include a qualified ventilation system; have electrical savings measures (either through the installation of ENERGY STAR lighting, or appliances, and high efficiency motors) that produce annual electricity savings of 750 kWh, compared to standard efficiency measures; and have their performance verified by a certified HERS Home Energy Rater participating in the program who acts as the independent third party to ensure that these homes meet program performance criteria.

The HPwES Program 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 energy assessment, to have the capability to prepare a scope of work and install, or partner with others to install, the energy-efficiency measures. The program also fosters consumer protection by offering contractor training, a robust quality assurance/quality control (QA/QC) process and requiring third party certification and accreditation for participating contractors.

Energy-efficiency improvements covered by HPwES include building shell measures such as air sealing and insulation, electric measures such as ENERGY STAR refrigerators, heating measures such as boilers

and furnaces, cooling measures such as ENERGY STAR room or centrals. Contractors also identify opportunities for certain renewable energy technologies and health and safety improvements such as carbon monoxide detectors and ventilation fans. In addition to contractor incentives, the program offers financial incentives to eligible homeowners to help offset the costs of these improvements. Homeowners may be eligible to receive a 10% cash back incentive on eligible measures. The HPwES Program is complemented by Green Jobs – Green New York (GJGNY), which is a statewide program to promote energy efficiency and the installation of clean technologies to reduce energy costs and greenhouse gas emissions. Through GJGNY, the HPwES Program offers free or reduced cost comprehensive home energy assessments and low interest financing.

Integrated with these market-based efforts is the Low-Income Home Performance Initiative, which includes the Assisted Home Performance with ENERGY STAR (AHPwES) effort and the Assisted New York ENERGY STAR Homes effort. This initiative provides additional incentives for low-income households. In the AHPwES Program, customers can receive up to 50% of the approved work scope (up to $5,000). In addition, participants can use the **New York Energy $mart**[SM] Loan Fund or GJGNY Program Financing to further offset costs. The "Assisted" components of the Home Performance Program are available for residents or tenants with up to 80% of Area Median Income, or 80% of State Median Income, whichever is higher, for the county (as compared to the 60% of state median income criterion used for participation in the federally-funded Weatherization Assistance Program). In the NYESH initiative, there is an additional $500 incentive distributed to building owners completing a program project and meeting the income criteria identified above.

The 13-and-a-half-year **New York Energy $mart**[SM] program budget is $185.2 million, which includes $75.8 million for low-income. In addition, the Home Performance with ENERGY STAR, Assisted Home Performance with ENERGY STAR, New York ENERGY STAR Homes, and Assisted New York ENERGY STAR Homes programs also received EEPS funding to support natural gas and electric efficiency measures through 2011. The EEPS funding for the NYESH program includes $16 million for market rate natural gas projects, $1.2 million for market rate electric projects, $1.1 million for Assisted NYESH natural gas projects, and $600,000 for Assisted NYESH electric projects. **New York Energy $mart**[SM] and EEPS program impacts are identified separately in the savings tables presented in this report. Additionally, NYSERDA has separately filed with the Commission scorecard and narrative reports for the Home Performance, Assisted Home Performance, New York ENERGY STAR Homes and

Assisted New York ENERGY STAR Homes programs providing further details on the EEPS-funded program activities through December 31, 2011.

4.5.2 Program Accomplishments

Table 4-11 shows the **New York Energy $mart**[SM] Program's five-and-a-half-year goals and performance. The program is making good or excellent progress on most goals, but is falling somewhat behind expectations in terms of goals specific to the low-income segment.

Table 4-11. New York Energy $mart[SM] Home Performance Program – Goals and Achievements

Activity	Program Goals (July 1, 2006 through December 31, 2011)	Achieved July 1, 2006 through December 31, 2011	% of Goal Achieved
New York ENERGY STAR Homes Initiative			
New ENERGY STAR Homes built (market rate only)	11,184	11,024	98%
New low-income ENERGY STAR Homes built	4,075	669	16%
Home Performance with ENERGY STAR Initiative			
Existing homes served (receiving treatment) (market rate only)	17,945	20,329	>100%
Existing low-income homes served (receiving treatment)	13,866	8,750	63%

4.5.3 Program Outputs and Indicators

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, and represent both **New York Energy $mart**[SM] and EEPS program impacts, collectively. Table 4-12 presents the key outputs for Home Performance Program completions through December 31, 2011.

Table 4-12. Home Performance Program – Key Program Outputs

Outputs	Value (Cumulative through December 2011)
New York ENERGY STAR Homes Initiative	
Number of completed projects by type	19,949 projects completed including: • 18,799 Certified Single-family market-rate homes • 1,150 Certified Assisted NYESHs • 734 Model homes • 230 Display homes[1]
Number of "active" participating builders (built at least one home)	409
Dollar value of incentives paid	$24.5 million
Home Performance with ENERGY STAR Initiative	
Number of homes treated	42,615 40,457 Single Family homes 2,158 2-4 units
Number of participating Building Performance Institute (BPI) certified contractors and BPI-accredited firms	3,211 BPI-certified technicians statewide 297 Participating BPI-accredited firms 199 "active" Participating BPI-Accredited firms
Dollar value of incentives paid	$27.5 million in participating contractor incentives

[1] This value is a decrease from the value reported in the December 31, 2010 Program Evaluation and Status Report. NYSERDA program staff is reviewing program data further to identify a possible reason for this decrease.

4.5.4 Follow-Up on Evaluation Recommendations

Home Performance with ENERGY STAR

Table 4-13 presents a summary of Home Performance with ENERGY STAR recommendations resulting from program evaluations. This table also provides the status of each recommendation (*i.e.*, if a recommendation already has been adopted, if it will be adopted in the future, or if it will not be adopted) as well as a response from program staff to each recommendation. Per DPS quarterly and annual reporting guidelines, these program recommendations will be revisited with program staff and updated, as applicable, on a quarterly basis.

Table 4-13. Home Performance with ENERGY STAR Evaluation Recommendations and Status

Source of Recommendation (Contractor, Report Title, Date)	**Recommendation**	**Status** (Adopted, Plan to Adopt, or Not Adopting)	**Program Implementer Response to Recommendation and Adoption Decision Rationale**
Nexant, HPwES M&V, June 2007	The program database should maintain the utility account information for all homes in the program. Information for both electric and fossil fuel accounts are unique identifiers for a home. Additionally, for multi-family units, all utility account information should be included so that homes with multiple meters can be easily identified.	Adopted	Adopted in part. Utility account information is now collected at the time of audit application. Staff acknowledges the need for meter information on the multifamily side and is looking into implementing this recommendation.
Summit Blue Consulting, HPwES MCA, February 2009	Recognize that homeowners are installing energy efficiency measures outside of the program. Reasons for homeowners' measure installation actions taken outside of the program were not directly assessed within this study, but could provide valuable insights for future program design and effectiveness improvement purposes. As part of such additional assessment, how these installation actions may have varied if the customer had not received a comprehensive home assessment would also be important to capture.	Adopted	NYSERDA has contracted with a firm to complete an impact evaluation study to examine free ridership and spillover. The final report is planned for completion during the second quarter of 2012.

New York ENERGY STAR Homes

Table 4-14 presents a summary of Home Performance with ENERGY STAR recommendations resulting from program evaluations. This table also provides the status of each recommendation (*i.e.,* if a recommendation already has been adopted, if it will be adopted in the future, or if it will not be adopted) as well as a response from program staff to each recommendation. Per DPS quarterly and annual reporting guidelines, these program recommendations will be revisited with program staff and updated, as applicable, on a quarterly basis.

Table 4-14. New York ENERGY STAR Homes Evaluation Recommendations and Status

Source of Recommendation (Contractor, Report Title, Date)	**Recommendation**	**Status** (Adopted, Plan to Adopt, or Not Adopting)	**Program Implementer Response to Recommendation and Adoption Decision Rationale**
Nexant, NYESH M&V, June 2007	Data from REM/Rate files should be included in CSG's database for all homes, including detailed equipment and appliance information and square footage of each home. CSG indicated that this recommendation will be incorporated into a future version of the program database. In addition, NYSERDA should periodically conduct quality control checks to verify that the information in the database is correct.	Plan to Adopt	NYESH Program staff have been assessing ways to facilitate the export of data from the REM/Rate software in a meaningful way into the implementation database. Some success has been made in the LIPA ENERGY STAR Homes Program to accomplish this, and NYSERDA staff has been using its experience to accomplish the task.

4.6 Multifamily Performance Program

4.6.1 Program Description

The Multifamily Performance Program has two tracks: the New Construction component for new construction and complete gut-rehabilitation projects and the Existing Buildings component. Both initiatives in the Multifamily Performance Program have low-income components.

Before 2007, construction of new multifamily buildings was addressed through the commercial New Construction Program. Because multifamily buildings differ from non-residential buildings, and because market penetration for multifamily buildings was lower compared to other building types, NYSERDA now addresses new multifamily building construction in the residential program portfolio. The New Construction component provides technical assistance to mid-stream market participants, addressing renewable technologies, advanced metering technologies, real-time pricing strategies, and combined heat and power systems. Training regarding the rationale for energy-efficiency measures is also provided for engineers, architects, building owners, building maintenance staff, and tenants.

The Existing Buildings component 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 management companies to find appropriate NYSERDA services more easily.

The 13-and-a-half-year program **New York Energy $mart^{SM}** program budget is $208.7 million. The majority of the budget ($161.1 million) is allocated to the low-income program elements. In addition, the suite of Multifamily Performance programs have also received EEPS funding in the amount of $9.2 million for electric and $29.7 million for gas activities through 2011. **New York Energy $mart^{SM}** and EEPS program impacts are identified in the savings tables presented in this report. Additionally, NYSERDA has separately filed with the Commission scorecard and narrative reports for the various MPP program elements providing further details on the EEPS-funded program activities through December 31, 2011.

4.6.2 Program Accomplishments

As shown in Table 4-15, several long-term non-energy goals have been set for the **New York Energy $mart^{SM}** Multifamily Performance Program. Achievements include ongoing activities completed during this time period for the Assisted Multifamily Program (AMP). Progress has been slow due to time initially devoted to program design, as well as lengthy timelines for individual projects.

Table 4-15. New York Energy $mart[SM] Multifamily Performance Program – Goals and Achievements

Activity	Program Goals (July 1, 2006 through December 31, 2011)	Achieved July 1, 2006 through December 31, 2011	% of Goal Achieved
Number of existing market rate multifamily units receiving energy efficiency services (completed projects)	61,600	15,151	25%
Number of new market-rate multifamily units receiving energy efficiency services (completed projects)	7,500	1,318	18%
Tenant energy savings per year – existing and new market rate (at $250/unit)	$17,275,000	$4,117,250	24%
Number of existing low-income multifamily units receiving energy efficiency services (completed projects)	248,600	68,434	28%
Number of new low-income multifamily units receiving energy efficiency services (completed projects)	12,700	5,963	47%
Low-income tenant energy savings per year – existing and new (at $195/unit)	$65,325,000	$14,507,415	22%

4.6.3 Program Outputs and Indicators

Key program outputs and indicators, resulting from the **New York Energy $mart[SM]** and EEPS funding, include the following:

- Since program inception, 558 existing multifamily properties comprising 112,292 individual units have received efficiency services.
- A total of 283 new construction multifamily projects comprising 17,252 individual units have signed a participation agreement.
- A total of 114 new construction multifamily projects comprising 7,093 individual units have developed energy-reduction plans.

4.7 Market and Community Support Program

4.7.1 Program Description

The **New York Energy $mart[SM]** Market and Community Support Program provides support services to the building performance and low-income programs by increasing the availability of energy-efficient products, developing a trained workforce and by providing residential program outreach and marketing services to recruit midstream participants and build consumer demand. The two major initiatives

involved in this program are the **New York Energy $mart[SM]** Products Initiative and Residential Program Marketing Support.

The **New York Energy $mart[SM]** Products Initiative, established in 1999, seeks to increase sales of residential energy-efficient 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 high-efficiency and ENERGY STAR products through consumer awareness and understanding of the ENERGY STAR label.

Residential Program Marketing 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: Home Performance Program, Multifamily Performance Program, summer and winter energy-saving tips campaigns, and leveraged campaigns such as the "Change a Light, Change the World" campaign.

The 13-and-a-half-year **New York Energy $mart[SM]** Program budget is $152.2 million.

4.7.2 Program Accomplishments

Table 4-16 shows the Program's five-and-a-half-year goals and performance over the **New York Energy $mart[SM]** Program. The program has exceeded all four of its goals.

Table 4-16. New York Energy $mart℠ Market and Community Support Program – Goals and Achievements

Activity	Program Goals (July 1, 2006 through December 31, 2011)	Achieved July 1, 2006 through December 31, 2011	% of Goal Achieved
New manufacturing partners signed up	21	59	>100%
New retail partners (independent) signed up	103	280	>100%
New retail partners (big box, mass merchandisers) signed up	6	25	>100%
ENERGY STAR market share increase on targeted products (on average, across products)	28%	55%	>100%

4.7.3 Program Outputs and Indicators

This section highlights key program outputs and market progress. Table 4-17 presents the key outputs for the Market and Community Support Program through December 31, 2011.

Table 4-17. Market and Community Support Program – Key Program Outputs

Outputs	Value (Cumulative through December 2011)
Number of retailer participants	857 (store fronts)
Number of manufacturer partners	47
Dollars spent on cooperative advertising, market share incentives and special promotions	$34.1 million

4.7.4 Market and Community Support Program Process Evaluation

A process evaluation of the Upstream HVAC Partners Program (Upstream HVAC) was completed in August 2011. Findings from this study were summarized in the August 2011 New York's System Benefits Charge Programs Evaluation and Status Report, which is available on NYSERDA's website at http://www.nyserda.ny.gov/Page-Sections/Program-Evaluation/~/media/Files/Publications/NYES%20Program/2011/2011q3_nyes_sbcreport.ashx. The full process evaluation report is also available online at http://www.nyserda.ny.gov/Page-Sections/Program-Evaluation/NYE$-Evaluation-Contractor-Reports/2011-Reports/~/media/Files/EDPPP/Program%20Evaluation/2011ContractorReports/2011%20HVAC%20Process%20Report%20Final.ashx.

4.7.5 New York Energy $mart[SM] Products Market Characterization and Assessment Evaluation

A market characterization and assessment evaluation of the **New York Energy $mart[SM]** Products Program was completed in June 2011. Findings from this study were summarized in the August 2011 New York's System Benefits Charge Evaluation and Status Report, which is available on NYSERDA's website at http://www.nyserda.ny.gov/Page-Sections/Program-Evaluation/~/media/Files/Publications/NYES%20Program/2011/2011q3_nyes_sbcreport.ashx. The full report, revised in December 2011 to add savings for 2007 lighting purchases, will be posted on NYSERDA's website soon.

4.7.1 Follow-Up on Evaluation Recommendations

Table 4-18 presents a summary of the **New York Energy $mart[SM]** Products Program recommendations resulting from program evaluations. This table also provides the status of each recommendation (*i.e.*, if a recommendation already has been adopted, if it will be adopted in the future, or if it will not be adopted) as well as a response from program staff to each recommendation. Per DPS quarterly and annual reporting guidelines, these program recommendations will be revisited with program staff and updated, as applicable on a quarterly basis.

Table 4-18. New York Energy $mart[SM] Products Evaluation Recommendations and Status

Source of Recommendation (Contractor, Report Title, Date)	Recommendation	Status (Adopted, Plan to Adopt, or Not Adopting)	Program Implementer Response to Recommendation and Adoption Decision Rationale
Research Into Action, Energy $mart Products Upstream HVAC Program Process Evaluation, November 2011	Develop a program logic model that illustrates the intended program flow from program activities to short- and long-term objectives to overall market transformation goal(s). An effective program logic model should create a visual map leading from activity to short- and then long-term outcomes and finally to the overall market transformation goal. One example might be: cooperative advertising ➔ increased public awareness of energy efficiency ➔ higher consumer demand for energy-efficient products ➔ increased manufacturer supply of energy-efficient product options ➔ increased market share of energy-efficient HVAC products	Plan to Adopt	Program logic will be developed in concert with Energy Analysis and NYSERDA's evaluation contractors in the next program iteration. The next program design is being planned during the first half of 2012.
Research Into Action, Energy $mart Products Upstream HVAC Program Process Evaluation, November 2011	Clearly define the selection criteria for eligible products. Explain the Eligible Products Table to existing and prospective program partners and the selection criteria for new products. These criteria ideally would flow from a well-developed program logic model	Plan to Adopt	Selection criteria will be clearly defined in next program iteration. Criteria must be coordinated with other (deployment) program requirements, including TRC cost-effectiveness, to ensure that program end goals, such as development of new technologies for inclusion in EEPS-funded programs, are met. This criteria will then be shared with program participants to reduce questions about why some products are not eligible.
Research Into Action, Energy $mart Products Upstream HVAC Program Process Evaluation, November 2011	Consider the industry insight-driven sales mechanism when working to clarify the program's specific market transformation goals. For example, specify whether the desired market effect is to grow the market for "best" equipment, to minimize the market for "good" equipment, or to improve the efficiency of available "better" models (since sales of these mid-range models seem to represent a significant portion of the market).	Plan to Adopt	The program has already begun to incorporate industry-drive insights into its offerings, with promotions focused on assisting partners to have a presence at industry shows as well as by putting on trainings for their contractor customers. In the next program iteration, insight gained in the current program will be used to inform and guide market engagement and the scope of activities that receive NYSERDA support. For example, initial concepts have been discussed regarding tools to assist partners in making sales for energy-efficient equipment so that the customer is less confused by their choices, i.e. developing NYSERDA materials that are customizable and make evident the "second cost" of buying

Source of Recommendation (Contractor, Report Title, Date)	Recommendation	Status (Adopted, Plan to Adopt, or Not Adopting)	Program Implementer Response to Recommendation and Adoption Decision Rationale
			lowest cost equipment.
Research Into Action, Energy $mart Products Upstream HVAC Program Process Evaluation, November 2011	Investigate opportunities for improved partner outreach to raise awareness about the variety of activities, assistance, and training opportunities available through the program. Provide tangible examples of the types of promotions and activities carried out by other program partners. NYSERDA might consider developing a partner forum or newsletter for sharing program experiences among participants	Plan to Adopt	The program has developed a special promotions booklet to help partners learn about the variety of opportunities available through the program. Case studies are being considered to both assist partners in envisioning how these opportunities can and have been used in the past as well as letting non-program participants see the program and the partners. Additionally, the program has begun to discuss developing PR around active partners to drive more program participation and value.
Research Into Action, Energy $mart Products Upstream HVAC Program Process Evaluation, November 2011	The Upstream HVAC Program and the Business Partners Program should consider designing their program offerings in concert. A more coordinated effort might improve information flow throughout the HVAC supply chain and improve overall industry awareness and knowledge of energy-efficient HVAC equipment	Plan to Adopt	Program staff from the Upstream HVAC Program and the Business Partners Program have been speaking weekly for the past half year. Consideration is being given to: a) having the next Upstream HVAC Program iteration managed by the same project manager as the Business Partners Program to provide consistency and integration, and b) having the same implementation contractor for both to improve service delivery and to reduce administrative costs.
Navigant, NYE$ Products MCA, June 2011	Another issue that the MCA team recommends addressing is the small but increasing minority of customers who definitely would not purchase ENERGY STAR again and definitely would not recommend ENERGY STAR. A follow up study to understand the concerns of this group could lead to more effective target marketing that could dispel some of the perceptions that act as barriers to the adoption of ENERGY STAR products.	Plan to Adopt	Program Staff will work with evaluation staff to address this recommendation.

4.8 CFL Expansion Program

The CFL Expansion Program is an Energy Efficiency Portfolio Standard (EEPS)-funded program designed to increase the sales for CFLs in New York State. The program, a component of the Market and Community Support Program, is designed to increase marketing and cooperative advertising promotions with retail stores and lighting manufacturers; continue to increase the network of retail partners and manufacturers; increase consumer accessibility to a wider variety of CFLs by providing incentives to retailers to increase the number of CFLs sold and increase permanent shelf space for these products; increase in-store promotions and point-of-purchase information to educate consumers; increase participation in the CFL Collection Center Program; and promote the manufacture, sale and usage of high power factor CFLs.

The EEPS electric budget for this program is $17.2 million through 2011.

4.8.1 CFL Expansion Impact Evaluation

An impact evaluation of the CFL Expansion Program was completed in September 2011. Findings from this study were summarized in the November 2011 New York's System Benefits Charge Evaluation and Status Report, which is available on NYSERDA's website at http://www.nyserda.ny.gov/Publications/~/media/Files/Publications/NYES%20Program/2011/2011q3_nyes_sbcreport.ashx. The full report will be posted on NYSERDA's website soon.

4.8.2 Follow-Up on Evaluation Recommendations

Table 4-19 presents a summary of CFL Expansion recommendations resulting from program evaluations. This table also provides the status of each recommendation (*i.e.,* if a recommendation has already been adopted, if it will be adopted in the future, or if it will not be adopted) as well as a response from program staff to each recommendation. Several of these recommendations have already been adopted by program staff as described in previous quarterly reports; this section provides an update to those recommendations not yet adopted as of December 31, 2011. Per DPS quarterly and annual reporting guidelines, these program recommendations will be revisited with program staff and updated, as applicable, on a quarterly basis.

Table 4-19. CFL Expansion Evaluation Recommendations and Status

Source of Recommendation (Contractor, Report Title, Date)	Recommendation	Status (Adopted, Plan to Adopt, or Not Adopting)	Program Implementer Response to Recommendation and Adoption Decision Rationale
NMR Group, CFLExpansion Random Digit Dial and Onsite Survey Results, June 2011	Continue outreach messaging to CFL users encouraging additional purchases of CFLs rather than focusing on improving consumer awareness. Future marketing campaigns may want to educate committed current CFL users on the benefits of further increasing the number of sockets where they install CFLs.	Not Adopting	As per direction from PSC in its October 25, 2011 Order, NYSERDA will no longer support promitions for standard CFL bulbs. Still, to the extent this recommendation can be applied to promoting specialty CFL bulbs, NYSERDA will take this into consideration.
NMR Group, CFLExpansion Random Digit Dial and Onsite Survey Results, June 2011	If NYSERDA decides to target specialty CFLs, they may wish to pursue agreements with large retailers, who nationally have shown a greater propensity to carry specialty products when incented by CFL programs.	Plan to Adopt	Program staff plan on focusing on specialty CFLs.
NMR Group, CFLExpansion Random Digit Dial and Onsite Survey Results, June 2011	Continue to incentivize products to encourage consumers to purchase CFLs. Specifically, target replacement of exterior lighting with CFLs to increase penetration of CFLs in this segment.	Plan to Adopt	Through this EEPS program, staff plan on focusing on speciality CFLs for all residential applications.

4.9 Communities and Education Program

4.9.1 Program Description

The Communities and Education Programs provide 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 programs 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 these programs are Energy Smart Students (ESS) and **New York Energy $mart**[SM] Communities (E$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 that 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. ESS 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. In addition, the program participates in statewide teacher conferences and organizations, including the New York State Technology Educators Association and the Science Teachers Association of New York State.

In 2001, E$C was developed as a partnership with the U.S. Department of Energy's (DOE) Rebuild America Program. This initiative provides a regional Energy $mart Communities Coordinator (E$CC). The Coordinator 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. The E$CC also provides ready access to **New York Energy $mart**[SM] programs by referring building owners and managers to appropriate program entry points. The initiative includes ten partnerships throughout New York: Western New York, Finger Lakes Region, Central New York, Southern Tier, North Country, Capital Region, Mid-Hudson, and three partnerships in New York City. Throughout the year, the regional partnerships sponsor seminars and workshops, meet with community leaders, and staff the NYSERDA booth at local events, for the following purposes: to educate the public on saving energy at home and in the workplace; to provide public forums for the discussion of energy issues important to their communities; and to work with planners in their communities to ensure that energy is addressed in local ordinances and growth plans. In addition, E$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 13-and-a-half-year **New York Energy $mart**[SM] program budget is $13.0 million.

4.9.2 Program Accomplishments

As shown in Table 4-20, seven long-term non-energy goals have been set for the Communities and Education Program. As of December 31, 2011, the Program has exceeded all its goals.

Table 4-20. New York Energy $mart℠ Communities and Education Program – Goals and Achievements

Activity	Program Goals (July 1, 2006 through December 31, 2011)	Achieved July 1, 2006 through December 31, 2011	% of Goal Achieved
Teachers trained	6,050	9,452	>100%
Total students reached	184,125	1,100,470	>100%
Portion of total estimated to be low-income students	131,125	440,188	>100%
Community events held statewide	1,250	2,778	>100%
Recruiting seminars held statewide	545	746	>100%
Home performance contractors, technicians, builders and raters recruited for the Home Performance Program[1]	888	1,745	>100%
Building analysts, designers, energy consultants, equipment installers, etc. recruited for Multifamily Building Performance Program[1]	100	629	>100%

[1] Refers to number of individuals attending recruiting seminars or meetings

4.9.3 Program Outputs and Indicators

Table 4-21 presents the key logic model-driven outputs for the Communities and Education Program through December 31, 2011.

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

Outputs	Value (Cumulative through December 2011)
Energy Smart Students Initiative	
Number of teacher conferences held to promote ESS	93
Number of workshops	709
Number of teachers (including administrators) trained on energy education topics	9,452
Number of student-centered events attended	48
Number of energy education projects awarded through mini grants	121

4.10 EmPower New York

4.10.1 Program Description

The EmPower New York 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 at or 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 one-to-four 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 DHCR, and funded by DOE), 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 Performance Program that NYSERDA determines are better served through EmPower NewYork

EmPower New York 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 who are referred to the program and are not targeted for in-house energy services 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 BPI.

Effective July 2006, the Weatherization Network Initiative (WNI) was merged with EmPower New York. The WNI 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 4,581 households received services through the WNI. The total cost was $5,438,408[1] with an average cost of $1,187 and average annual savings of $189 per household. As services are tailored to the needs of the household, actual costs and savings can vary. EmPower expanded the involvement of these weatherization agencies while adding private contractors to ensure cost-effective and timely services.

The combined WNI and EmPower New York budget for the **New York Energy $mart^{SM}** program through December 2011 is $67.4 million. The EmPower program has also received EEPS funding in the amount of $28 million for electric and $8.6 million for gas activities through 2011. **New York Energy $mart^{SM}** and EEPS program impacts are identified in the savings tables presented in this report. Additionally, NYSERDA has separately filed with the Commission scorecard and narrative reports for the EmPower Program providing further details on the EEPS-funded program activities through December 31, 2011.

In addition, the comprehensive nature of the program has allowed NYSERDA to leverage considerable non-SBC funds, more than $23 million of which have been expended to date to install efficiency measures in 11,917 households. Table 4-22 displays details of the budget and goals of the non-SBC funding sources.

[1] The total cost includes all implementation dollars spent.

Table 4-22. Non-SBC Funds Leveraged for EmPower

Source	Incentive Total	Expended on Completed Projects	Unit Goals	Units Completed
Regional Greenhouse Gas Initiative	$5,950,000	$611,644	1,700	286
WNY Efficiency Project	$634,157	$634,244	200	935
Indian Point-EmPower[1]	$145,100	$144,924	145	190
Indian Point 2[1]	$2,049,116	$2,049,116	2,232	2,232
Western NY Environmental Program	$640,160	$640,160	805	805
National Grid Low Income Gas Customer Efficiency Program				
Phase 1	$2,251,041	$2,251,041	1,039	1,039
Phase 2	$2,097,668	$2,097,668	1,027	1,027
Phase 3	$1,368,254	$1,368,254	551	613
AES Environmental Program	$255,000	$255,000	322	322
Con Edison Gas[2]				
Phase 2	$925,000	$925,000	431	431
Phase 3	$903,504	$903,504	463	381
National Fuel Gas				
Phase 1	$2,513,000	$2,513,000	718	731
Phase 2	$2,513,000	$2,513,000	718	782
Phase 3	$2,513,000	$2,508,047	718	793
Phase 4	$2,559,200	$2,599,200	743	723
Other				
Central Hudson Gas	$311,500	$311,500	145	164
AEP Oil Pilot	$735,000	$735,000	294	363
TOTALS	**$28,363,700**	**$23,060,302**	**12,251**	**11,917**

[1] Indian Point 2 was its own unique program. At the end of the program, unspent funds were transferred to the EmPower Program.

[2] Con Edison Gas funding was allocated in three phases. EmPower was granted funding for phases 2 and 3.

[3] National Fuel added Phase 4 of their Gas Program in 2011 and completed 97% of their unit goals in the 2011 program year.

4.10.2 Program Accomplishments

The EmPower Program continues to monitor a key non-energy metric to assess its growth as a proxy for program expansion. Table 4-23 shows this metric and its current status. Overall, this measure continues to show progress over time, corresponding with program growth.

Table 4-23. EmPower New York Program – Goals and Achievements

Activity	Time Frame for Goal	Goal	Achieved through December 31, 2011a	% of Goal Achieved
Households served (**New York Energy $mart**SM)[1]	July 1, 2006 – December 31, 2011	34,362	35,206	>100%
Households served (EEPS electric)[2]	April 1, 2009 – December 31, 2011	27,015	16,431	61%
Households served (EEPS natural gas)	April 1, 2010 – December 31, 2011	2,115	1,013	48%

a Rows are not additive because households could be served by more than one funding source.

[1]The revised SBC Operating Plan added 251 households to the target of households served to estimate the number of households that heat with fuels other than electricity or natural gas.

[2]The revised EEPS operating plan added 4,233 households to its unit goals in March 2011

4.10.3 Program Outputs and Indicators

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 energy cost for the average low-income household served by the program has been reduced by $267 per year at an average cost of $1,421 per household.

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 Program – Key Market Indicators and Program Cumulative Progress[1]

Topic	Indicator	Accomplished through 2011
Recruitment of Low-Income Households	Number of referrals to the program	242,823
	Number of participants selected for comprehensive audit, education, electric reduction, and Home Performance services	63,351a
	Number and types of community-based organizations working with the program	51 Offices for the Aging, 17 Local Department of Social Services, 85 Housing Agencies, and 52 other Community Based Organizations
	Number of WAP agencies working with the program	37
	Number of utilities working with the program	6 electric and 9 gas
	Number of energy services contractors working with the program	93
Low-income Households and Buildings Served	Households receiving print and in-home education	59,139
	Individuals attending energy and financial management workshops	62,097 attendees in 5,490 workshops
	Number of low-income buildings with energy efficient measures installed	52,145

[1]Includes results from both the **New York Energy $mart**[SM] and EEPS funded program activities.
a Note that this number does not include participants in the WNI program.

4.10.4 Empower Program Impact Evaluation

The purpose of the EmPower impact evaluation was to establish first year energy savings for program installation years 2007 and 2008. The primary vehicle for estimating savings was a billing analysis covering the pre- and post-installation periods. In addition, the evaluators estimated savings by major measure group and assessed the realization rates (RR) for each measure group to provide feedback to program implementers for identifying and addressing specific issues in the field.

The rigorous analysis had multiple components with both internal and external validation to ensure that the results of the billing analysis were within a reasonable range. All of the supplemental activities support the use of the results from the full billing model. The realization rates of 54% for electric and 70% for non-electric (fossil fuel) savings were applied to the total program reported savings to obtain the Program's evaluated gross savings.

In addition, a pilot effort to assess free ridership (FR) and spillover (SO) in the low income market was conducted through a participant telephone survey of self reports, as is consistent with the approach used in other NYSERDA evaluations. The study demonstrated that there are Program net effects with an estimated free ridership rate of 17% and spillover of 14%, and an overall net to gross ratio (NTGR) of 0.97, which is very close to the current estimate of 1.00. Since this was a pilot effort and the result was so close to 1.00, the evaluated gross savings are reported for this program without any adjustments for net effects. It is possible that the magnitude of the net effects may change in the future.

Conclusions and Recommendations

Energy Savings

Conclusion: The billing analysis provided reliable savings estimates for the energy benefits associated with the EmPower Program; however, the low realization rates for some commonly installed measures, such as refrigerator replacements, insulation and air sealing, indicate the program should review and update the process for calculating savings. The Impact Evaluation Team understands that program staff are in the process of reviewing and updating savings algorithms.

Recommendation: Methods for estimating savings for envelope measures (both natural gas and electric) and replacement refrigerators should be evaluated.

Installation of CFLs

Conclusion: For program years 2007 and 2008 the Program is seeing lower savings than expected from the installation of CFL lamps. While estimating lighting savings from a billing model tends to be challenging, even the most favorable reading of the data suggests that the lighting savings are substantially lower than claimed. The Impact Evaluation Team understands that EmPower program staff has taken proactive steps to adjust CFL savings depending on the number installed in the home for program years 2009 and 2010.

Recommendation: Review policies for CFL installation to assess how to assist participants and achieve cost-effective savings, and monitor change in CFL market to determine whether it is necessary to modify the approach to the installation of CFL's further as CFL's gain greater market acceptance.

Tracking System Validation

Conclusion: An initial review of the program tracking database identified additional fields that would be useful for future impact evaluation activities. In addition, some fields could use improved error checking and a number of internal data inconsistencies were identified, particularly relating to the fuel use for water and space heating. Program staff was responsive to questions and used the opportunity to make corrections to the tracking system.

Recommendation: Review the fields in the database and data collection processes to assess whether additional information, such as the presence of working air conditioning, could be added to the tracking system. Review the coding of measure descriptions to make it easier to identify fuel switching measures and differentiate attic and wall insulation. Improve error checking methods and frequency to correct tracking system errors in a timely manner.

4.10.5 Evaluation Recommendations

Non-Energy Benefits (NEBs)

Conclusion: Low income programs often provide non-energy benefits to participant in terms of improve comfort, health and safety. Future low cost participant surveys could provide information on the Program effects on health, comfort, property values and other potential non-energy benefits. Also, there are national efforts to quantify NEBs that may be used and even "piggy-backed" to help to provide a balance to future impact evaluations.

Recommendation: Consider including indicators of NEB's into future evaluation efforts, a lower cost option than full monetization studies, to aid policy makers ability to have a more complete viewpoint when decisions are being made regarding low income Programs.

Monitor on-going efforts that seek to quantify NEB's so these may be referenced within impact evaluations. This type of referral and indicators of the importance of NEBs to NYSERDA's participants may offer a low cost approach to ensure a socially responsible perspective is not lost in the reporting of savings estimates from sophisticated quantitative impact evaluations.

Billing Data Issues

Conclusion: One impediment to conducting the billing analysis was the difficulty in obtaining complete billing data.

Recommendation: Work with utilities to ensure that billing data is complete, useful and properly interpreted.

Pilot Net-to-Gross (NTG)

Conclusion: Although the evaluated gross savings are reported for this program without any adjustments for net effects because the overall net to gross ratio of 0.97 is so close to 1.00, the pilot study indicates that periodic measurement of net effects is warranted as it is possible that future studies may find different results.

Recommendation: Although the NTG component of the evaluation may not need to be conducted with every evaluation cycle, continuing to measure net effects for EmPower in the future is warranted.

Survey Responses

Conclusion: Overall, the surveys provided valuable information that has helped corroborate the billing analysis that there were few changes in energy use, and also provided insight into NEBs through the investigation of participants' ability to pay utility bills.

Recommendation: Continue to use survey instruments to inform the billing analysis, assess non-energy benefits and NTG factors.

4.10.6 Follow-up on Evaluation Recommendations

Table 4-25 presents a summary of EmPower recommendations resulting from program evaluations. This table also provides the status of each recommendation (*i.e.*, if a recommendation has already been adopted, if it will be adopted in the future, or if it will not be adopted) as well as a response from program staff to each recommendation. The most current recommendations come from a recently completed process evaluation report issued in August 2010. New recommendations from the recently completed impact evaluation will be added in future reports. Per DPS quarterly and annual reporting guidelines,

these program recommendations will be revisited with program staff and updated, as applicable, on a quarterly basis.

Table 4-25. EmPower Evaluation Recommendations and Status

Source of Recommendation (Contractor, Report Title, Date)	Recommendation	Status	Program Implementer Response to Recommendation and Adoption Decision Rationale
Nexant, EmPower M&V, April 2007	Devise a methodology to automate the electronic transfer of results from the EmPower New York Calculator to the EmPower New York database.	Plan to Adopt	Staff are currently reviewing the EmPCalc tool, the current version of the NY State Technical Manual, and audit tools underconsideration for the Home Performance Program. Changes related to this recommendation are on hold pending outcome of this review and completion of current program evaluations. Still pending
Nexant, EmPower M&V, April 2007	Devise a methodology to incorporate the AHAM baseline energy usage data, adjusted for degradation for refrigerators and freezers in to the EmPower New York Calculator to avoid the manual data entry errors while transferring results from REFRIGERATION® software to the EmPower New York Calculator.	Plan to Adopt	These revisions are on hold pending the process described for the above recommendation.

4.11 Buying Strategies and Energy Awareness Program

4.11.1 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: [2]

- ***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

[2] Starting with the 2010-2011 heating season the implementation of the Buying Strategies initiative was transitioned from NYSERDA to the Office of Temporary and Disability Assistance (OTDA). OTDA will take over all record keeping and reporting responsibilities starting with the results from this season.

Low Income Home Energy Assistance Program (LIHEAP) customers.[3] 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" (MOR) and "discount off retail" (DOR) buying strategies, the program has increased the buying power of LIHEAP funds for heating oil by four-to-eleven percent, saving about $50 per year per household. Based on the successes of the earlier pilot efforts, OTDA committed to a three-year phased implementation of the program, the roll out of this program is shown in

- Table 4-26.

During the 2005-2006 heating season, the Buying Strategies program included 20 counties, and 200 oil vendors participated in the program. During the 2006-2007 heating season, the program expanded to 39 counties, with a total of 317 participating oil vendors. The program expanded its offerings statewide for the 2007-2008 heating season, operating in all 62 counties with 724 oil vendors providing MOR or DOR priced heating oil to HEAP clients. An additional 79 oil vendors are providing heating oil to HEAP clients through price protection plans and/or service contracts. The number of vendors participating in the program grew to 792 for the 2008-2009 heating season. For the 2009-2010 heating season, 823 oil vendors are participating in the program by providing heating oil to HEAP clients with service contracts. Starting with the 2010-2011 heating season the implementation of the initiative was transitioned from NYSERDA to OTDA.

Table 4-26. Buying Strategies Program Evolution

Heating Season	Number of Participating Counties	Number of Oil Vendors
2005 – 2006	20	200
2006 – 2007	39	317
2007 - 2008	62	724
2008 - 2009	62	792
2009-2010	62	823

Included in the Buying Strategies initiative is the Clean and Tune Program, which provides preventive maintenance for the oil-fired heating systems of HEAP households. Under LIHEAP, recipients are offered heating repair and replacement assistance for inoperable furnaces, but they are not offered preventive maintenance services. The Clean and Tune Program 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 and Tune Program ended in the spring of 2010, as OTDA introduced the HEAP Clean and Tune Program in the Fall of 2009.

In addition to providing service to HEAP households, the Clean and Tune Program supports the oil industry by providing heating system technician training opportunities and incentives for the purchase of diagnostic equipment. To date, 300 technicians have received training on heating

[3] Customers who have an annual household income of 60% or less than the State Median Income.

system maintenance procedures and 40 companies have received incentives for the purchase of diagnostic equipment, increasing the quality of the service performed.

- ***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 13-and-a-half-year **New York Energy $mart^{SM}** program budget is $16.6 million.

4.11.2 Program Accomplishments

Table 4-27 shows the Program's five-and-a-half-year goals and performance. The program has exceeded all four of its goals.

Table 4-27. New York Energy $mart^{SM} Buying Strategies and Energy Awareness Program – Goals and Achievements[1]

Activity	Program Goals (July 1, 2006 through December 31, 2011)	Achieved July 1, 2006 through December 31, 2011	% of Goal Achieved
Funds leveraged through Buying Strategies initiative	$20 million	$22.5-24 million	>100%
Additional low-income individuals reached via newsletters, weekly newspapers, etc. (readership)	5 million	54.8 million	>100%
Additional low-income individuals reached via seminars and workshops (attendees)	15,000	551,706	>100%
Additional contractors and other partners recruited in low-income districts	137	1,885	>100%

[1] The first row shows Buying Strategies as financed by SBC funds through July 1, 2010. The remaining rows show the ongoing progress of the remaining program elements as they continue under SBC funding.

4.11.3 Program Outputs and Indicators

Table 4-28 presents the key outputs for the Buying Strategies and Energy Awareness Program through December 31, 2011.

Table 4-28. Buying Strategies and Energy Awareness Program – Key Program Outputs

Outputs	Value (Cumulative through December 2011)
Buying Strategies[1]	
Total number of participating oil vendors	823
Number of clean and tune contractors enrolled	115
Number of clean and tune services	7,833
Number of oil buying educational material distributed (includes materials sent out by OTDA and NYSERDA)	150,000
Low-Income Forum on Energy (LIFE)	
Numbers of LIFE Steering Committee members	20 member organizations
Number of LIFE meetings and conferences held	43 regional meetings, 7 statewide conferences
Number of attendees at LIFE meetings and conferences	3,881

[1] Figures for the Buying Strategies Program reflect cumulative totals to 2010 when the program was transferred to OTDA.

5 Research and Development Programs

5.1 Overview of the Research and Development Programs

New York Energy $mart[SM] Research and Development (R&D) activities target the following areas: (1) transmission and distribution, (2) clean energy infrastructure, (3) power systems, (4) combined heat and power, (5) demand response, (6) electric transportation, (7) environmental monitoring, (8) industrial process, (9) water and wastewater, and (10) emerging technologies. Projects funded by the programs generally fall under one of four project types: demonstrations, business development, product development, and information dissemination/research study. These types are defined as follows:

- Demonstrations: Demonstration of a new product in its intended environment. The goal is to increase sales/usage of that particular product in the market. Results are used for product commercialization or to generate objective performance information for policy makers or end-users. This category includes demonstrations of on-site power generation.

- Business Development: Business development involves evaluating a business and then helping them realize full potential using such tools as marketing, information management and customer service. Activities include but are not limited to: assessment of market opportunities; intelligence gathering on customers and competitors; and advising on, drafting and enforcing sales policies and processes.

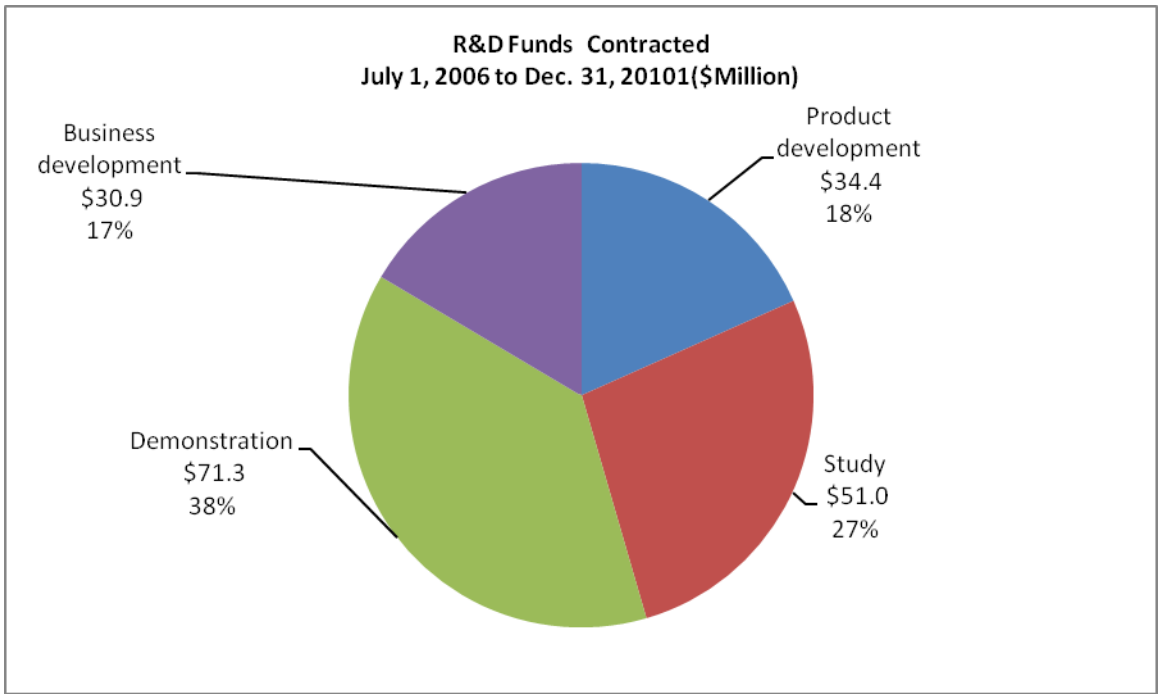
- Product Development: The process of bringing new products or services to the market or the improvement of existing products. This category ranges from proof of concept, product design, to detailed engineering.

- Information Dissemination/Research Study: A paper study or outreach activity, including environmental research studies, feasibility studies to examine technical gaps, feasibility studies to example installation of equipment at a specific site, a market potential studies for a specific technology, or activities to disseminate information.

Shown in Figure 5-1 is the distribution of contracted funds, for the time period July 1, 2006 to December 31, 2011, by project type, across the 10 R&D programs. For example, since July 1, 2006, Demonstration

projects represent 38% of R&D contracted funds, Business Development projects represent 17%, Product Development projects represent 18%, and Research Studies represent 27%.

Figure 5-1. Distribution of Contracted R&D Funds by Project Type (July 1, 2006 to December 31, 2011)



The following is a brief description of the 10 programs:

Public Benefit Power Transmission and Distribution Research. The Public Benefit Power Transmission and Distribution Research Program supports transmission and distribution (T&D) research that has broad statewide benefits. Projects provide improvements in energy efficiency, power reliability, quality and security, and reduce the cost of energy and energy delivery. NYSERDA is coordinating with all key stakeholders including the New York State Independent System Operator (NYISO), the New York State Department of Public Service (DPS) and the electric utilities to implement a comprehensive R&D strategy to optimize performance of the electric power delivery system.

Clean Energy Infrastructure. The previous End-Use Renewables Program (EUR) 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 Power Systems Program, to

develop and commercialize clean energy technologies. The ultimate goal of these programs is to reach the point at which 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 is complementing 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. The goal of this program is to work with New York technology companies to develop distributed generation and storage products, and to expand the number of marketable competitive products that reduce peak load, improve power quality, and provide improved cost-effective environmental performance. The Power Systems Program supports New York businesses 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.

Distributed Generation-Combined Heat and Power (DG-CHP) Demonstration. The DG-CHP Demonstration Program supports the growth of combined heat and power and other distributed generation applications in New York. The program provides funding for single and multi-site demonstrations, and seeks to improve awareness among 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 digesters 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, steam turbines, gas turbines and microturbines. The program is coordinated with similar offerings from RPS Customer-Sited Tier and other System Benefits Charge programs such as the Multifamily Performance and the Existing Facilities Programs.

Demand Response and Innovative Rate Research. This new program addresses technology and market barriers that hinder retail customers from being active participants in a smart grid by: 1)

participating in energy markets as demand response resources (*i.e.,* load curtailment, demand response generation, etc.), 2) managing and responding to market-based electric rates, and 3) having access to real-time, direct and in-home feedback on energy consumption. Novel load control technologies and techniques can enable more retail electric loads to participate as demand response resources and also respond to dynamic rates. Load controls often yield substantial energy efficiency and can be self-financed from the market-based DR revenues and cost avoidance. The new In-Home Energy Feedback research seeks to quantify the effects of providing NYS households with direct real-time feedback on their electrical consumption and cost, as may be accomplished with smart metering.

Electric Transportation. This 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 further result in cost savings for the subway and commuter rail systems and reduced transmission congestion in the region. Additionally, many projects are expected to lower 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 as an effort to increase understanding of the environmental impacts of electricity production. EMEP initiatives are building on past efforts and evolving to support policy-relevant research in five primary areas: ecosystem response to sulfur, mercury, and nitrogen deposition; health- and energy-related research on air quality, particulate matter (PM), ozone, and co-pollutants; climate change; environmental impacts of alternative energy; and crosscutting environmental science and technology 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 closely collaborates with regional and national entities to leverage funds for pertinent research projects.

Industrial Process & Product Innovation (formerly known as Industrial Research, Development, and Demonstration). The Industrial Process & Product Innovation (IPPI) 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 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 process alternatives. IPPI is a collaborative effort of Industrial and Environmental R&D and Energy Efficiency Services (EES).

Municipal Water and Wastewater Efficiency. The Municipal Water and Wastewater Efficiency initiative is a collaborative effort between NYSERDA's R&D and EES 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. All projects have had strong technology transfer components. Additionally, the municipal water and wastewater treatment sector has been integrated into 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 is being administered through narrowly defined competitive solicitations focusing on advanced building demonstrations, discrete building technologies, solar thermal applications, daylighting applications, and emerging technologies. The program emphasis is on funding developers of energy-efficient technologies that 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 **New York Energy $mart**[SM] R&D program evaluation consists of an integrated, multi-faceted approach to assess the processes used by NYSERDA to conduct the work, determine the impacts of the product development and demonstration projects, conduct macro-level impact analyses of the projects on the New York State economy, and design and construct a database for collecting and storing project-by-project data and information necessary for further conduct of the impact and process evaluations.

Table 5-1 provides a snapshot of all recently completed, in-progress, and planned evaluation activities for the R&D programs. The evaluation activities completed in 2011 are highlighted within Section 5, and were used along with results from past evaluations to inform the overall findings and conclusions

presented in this report. NYSERDA expects to feature results of evaluation projects currently underway or planned in future **New York Energy $mart**[SM] evaluation and status reports.

Table 5-1. R&D Program Evaluation Activities

Program Name	Evaluation Activities Completed in 2011	Evaluation Activities Underway or Planned
R&D Portfolio	AWS Truewind Product Development Case Study – described below R&D Program Metrics Database (Phase I)	R&D Program Metrics Database (Phase II) – described below
DG-CHP Demonstration	Process Evaluation Market Characterization and Assessment Evaluation	

R&D Program Metrics Database (Phase II)

NYSERDA's R&D Metrics database (MDb) was implemented in June 2010. The purpose of the MDb is to build a warehouse of information that can be used for evaluation as well as a tool for managing the progress of research projects. The database will eventually be used as a central storage location for all metrics related to R&D projects. The foremost benefit derived from this activity will be the database's ability to quickly and accurately report out detailed metrics regarding the efforts of R&D projects and which will be used to inform all evaluation activities, including determining the impact on the New York State economy.

Work is underway to characterize all of the projects in the database and collect metrics for active projects. Elements of Phase 2 of the database development is completed; a website has been designed to search and display all research project summaries, it is expected to be implemented in quarter 2 of 2012; a workflow system for the review of the research project summaries has been implemented and is being used to ensure all summaries have been reviewed before being posted on the web.; and a document management module is being built to store pertinent project documents such as final reports. Design work is completed to develop a module for contractors to submit their annual metrics reports directly through the MDb and is expected to be built in quarter 2 of 2012.

Case Study

In case study of AWS Truepower's Wind Forecasting and Wind Mapping Products and Services was completed and summarized in the June 2011 quarterly evaluation report available on NYSERDA's website at http://www.nyserda.ny.gov/Publications/NYE$-Program-Reports.aspx.

NYSERDA's project with AWS Truepower, LLC was to support the development of Wind Forecasting and Wind Mapping Products and Services for wind energy applications. In partnership with NYSERDA, AWS Truepower developed a computer program to generate wind maps (MesoMap®) and the state-of-the-art wind forecasting service (eWind®).[1] MesoMap® provides accurate, reliable, and affordable wind maps. The eWind® forecasting service provides accurate, dependable and convenient short-term wind forecasts for wind plants.

5.3 Summary of R&D Program Budget and Spending Status

Table 5-2 presents detailed budget and funding information for the Research, Development, and Demonstration (RD&D or R&D) programs.

[1]Both MesoMap® and eWind® are based on MASS (Mesoscale Atmospheric Simulation System), a numerical weather model, customized to increase resolution and account for important meteorological phenomena.

Table 5-2. Research & Development Programs – New York Energy $mart℠ Financial Status through December 31, 2011 ($ million)

Program	Budget[1]			Funds Spent			Encumbered Funds[4] % of Budget Encumbered	Committed Funds[5] % of Budget Committed
	SBC I & SBC II[2]	SBC III[3]	Total Budget	SBC I & SBC II[2]	SBC III[3]	Total Funds Spent % Funds Spent		
Public Benefit Power Transmission and Distribution Research	0.0	14.8	14.8	0.0	4.7	4.7 31.8%	9.0 60.8%	14.7 99.3%
End Use Renewable Energy Market[6]	19.0	24.9	43.8	19.0	23.7	42.7 97.3%	43.8 99.8%	43.8 99.8%
Clean Energy Infrastructure	0.0	53.2	53.2	0.0	25.5	25.5 47.9%	41.6 78.2%	52.1 97.7%
Distributed Energy Resources: Products and Demonstrations[7]	34.0	119.3	153.2	34.0	55.8	89.8 58.6%	135.6 88.5%	153.2 99.9%
Demand Response and Innovative Rate Research	0.0	6.0	6.0	0.0	0.8	0.8 13.3%	2.6 43.3%	5.3 88.3%
Electric Transportation	0.0	6.0	6.0	0.0	2.7	2.7 45.0%	4.9 81.7%	6.0 100.0%
Environmental, Monitoring, Evaluation, and Protection	17.7	25.6	43.3	17.7	16.5	34.2 79.0%	42.0 96.8%	43.3 99.8%
Industrial and Municipal Process Efficiency[8]	0.0	15.4	15.4	0.0	8.5	8.5 55.2%	11.7 76.0%	15.4 100.0%
Next Generation and Emerging Technologies	18.3	28.2	46.5	18.3	18.3	36.6 78.7%	41.7 89.7%	46.5 100.0%
Wholesale Renewable Energy Market	16.5	3.4	19.9	16.5	2.9	19.4 97.5%	19.9 100.0%	19.9 100.0%
Other[9]	0.4	-	0.4	0.4	<0.1	0.4 100.3%	0.4 100.0%	0.4 100.0%

Program	Budget[1]			Funds Spent			Encum-bered Funds[4] % of Budget Encum-bered	Committed Funds[5] % of Budget Committed
	SBC I & SBC II[2]	SBC III[3]	Total Budget	SBC I & SBC II[2]	SBC III[3]	Total Funds Spent % Funds Spent		
TOTAL Research & Development	**$105.9**	**$296.6**	**$402.5**	**$105.9**	**$159.5**	**$265.4** **65.9%**	**$353.4** **87.8%**	**$400.6** **99.5%**

[1] Reflects carryover in funds and reallocation as approved by the PSC in 2007. NYSERDA, *System Benefits Charge Operating Plan for **New York Energy Smart**[SM] Programs (July 1, 2006 – December 31, 2011),* As Amended February 28, 2011, Revised April 6, 2011.
[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] Over committed amounts will be reclassified to the approved Renewable Portfolio Standard (RPS) Customer Sited Tier budget.
[7] This includes the DG/CHP Demonstration Program and Power Systems Product Development.
[8] This includes the Industrial Process and Product Innovation Program and Municipal Water and Wastewater Program.
[9] Other: Projects transferred from the Empire State Electric Energy Research Corp. (ESEERCO) Program closed.
Totals may not sum due to rounding.
Source: NYSERDA

5.4 Summary of R&D Evaluation Findings

Through NYSERDA's Impact Evaluation activities, independent third-party contractor teams assessed the energy and peak demand savings and clean generation reported for the DG-CHP Demonstration, Clean Energy Infrastructure, and Demand Response and Innovative Rate Research 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 contractors adjusted the savings reported by NYSERDA. In turn, the contractors further adjusted these figures, based on primary research, to account for freeridership and spillover. Table 5-3 summarizes the estimated electricity savings and clean generation for each of the two applicable R&D programs. Table 5-4 summarizes peak demand reductions. Table 5-5 shows natural gas impacts for the R&D programs.

Table 5-3. New York Energy $mart[SM] R&D Program Electricity Savings and Clean Generation through December 31, 2011

Program	Energy Savings (GWh)	
	Savings Achieved through	
	June 30, 2006	December 31, 2011
DG-CHP Demonstration Program[1,2]	82.7	542.9
Renewable Energy Production	103.8	107.9
Statewide R&D Total	**186.5**	**650.8**

[1]Savings shown in this row are inclusive of overlap with the FlexTech Technical Assistance Program. This cross-sector overlap is subtracted out of the portfolio level results presented in Section 2 of this report.

[2]Value decreased from Quarter 3, 2011 due to database cleanup.

Table 5-4. New York Energy $mart[SM] R&D Program Cumulative Peak Demand Savings through December 31, 2011

Program	Demand Savings (MW)				
	Savings Achieved through				
	June 30, 2006	December 31, 2011	July 1, 2006 through December 31, 2011	5.5 Year Goal (by December 31, 2011)[1]	Progress Toward Goal (% achieved)
DG-CHP Demonstration Program[2,3]	18.1	98.4	80.3	101.0	84%
Enabling Technologies for Price Response Load[4]	137.2	99.0	-	-	-
Demand Response and Innovative Rate Research	-	1.0	1.0	25.0	4%
Renewable Energy Production	8.1	11.7	3.6	N/A	N/A
Statewide R&D Total	**163.4**	**210.1**	**84.9**	**126.0**	**37%**

[1]Goals for the **New York Energy $mart[SM]** Program are specified in NYSERDA's February 28, 2011 revised operating plan (submitted with revisions on April 6, 2011).

[2]Savings shown in this row are inclusive of overlap with the FlexTech Technical Assistance Program. This cross-sector overlap is subtracted out of the portfolio level results presented in Section 2 of this report.

[3]Value decreased from Quarter 3, 2011 due to database cleanup.

[4]MWs enabled under this SBC2 program were not required to persist beyond the period of the contract. As such, the available MWs have steadily declined since the program's close. This program was replaced by the Demand Response and Innovative Rate Research Program.

Table 5-5. New York Energy $mart[SM] R&D Program Natural Gas Impacts through December 31, 2011

Program	Fuel Savings (MMBtu)	
	Savings Achieved through	
	June 30, 2006	December 31, 2011
DG-CHP Demonstration Program[1]	-571,310	-3,672,082
Statewide R&D Total	**-571,310**	**-3,672,082**

[1]This table shows the negative natural gas impacts from DG-CHP demonstration projects due to an increase in on-site gas use resulting from project operations. Although other R&D programs result in positive natural gas impacts, these impacts are not verified and therefore are not reported here. 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. Impacts shown in this row are inclusive of overlap with the FlexTech Technical Assistance Program. This cross-sector overlap is removed from the portfolio level results presented in Section 2 of this report.

5.4.1 Follow up on R&D Program Portfolio Level Evaluation Recommendations

Table 5-6 presents a summary of R&D Program recommendations resulting from program evaluations. This table also provides the status of each recommendation (*i.e.*, if a recommendation has already been adopted, if it will be adopted in the future, or if it will not be adopted) as well as a response from program staff to each recommendation. These recommendations come from a recently completed process evaluation on R&D Program funding opportunities issued in August 2010. The full report is available on NYSERDA's website at http://www.nyserda.ny.gov/Page-Sections/Program-Evaluation/NYE$-Evaluation-Contractor-Reports/2010-NYE$-Evaluation-Contractor-Reports/~/media/Files/EDPPP/Program%20Evaluation/2010ContractorReports/2010%20funding%20process%20report.ashx and is summarized in the Q3 2010 report. Per DPS quarterly and annual reporting guidelines, these program recommendations will be revisited with program staff and updated, as applicable, on a quarterly basis. Recommendations that have already been addressed and discussed in prior reports are not included here.

Table 5-6. R&D Program Portfolio Level Evaluation Recommendations and Status

Source of Recommendation (Contractor, Report Title, Date)	Recommendation	Status	Program Implementer Response to Recommendation and Adoption Decision Rationale
RIA, Research and Devlopment Program Funding Opportunties, Process Evaluation, August 2010	Continue to explore ways to make requirements clear and easy to follow; *e.g.*, conduct research on what of the commercialization requirements need clarification.	In Process	R&D program staff are researching ways to define and guide proposers through the solicitation process, in particular stage gates that will direct proposers to apply for funding appropriate to their stage of commercialization.
	Consider waiving or lowering cost-share requirements for not-for-profits.	Under consideration	R&D program staff are considering this as an option for future solicitations.
	Annually review procedures for requesting and scheduling debriefings and for communicating those procedures to proposers, and subsequently review those procedures with all R&D staff to ensure that the procedures are understood and followed.	Plan to Adopt	R&D program staff intends to implement this recommendation.
	Carry out the ORDB update as planned, and as possible incorporate features and conventions to ensure consistent data entry and include fields to record technical and non-technical contacts, entity type, and type of interest in funding opportunities and to mark records that should be excluded from surveys. Revise existing records to comply with convention.	In Process	Marketing staff are in the process of implementing a Customer Relationship Management System. R&D has representation on the implementation team.
	Develop ways to update existing records after adding new fields, such as by sending email requests or allowing individuals to update their database records on line.	In Process	Marketing staff are in the process of implementing a Customer relationship Management System. R&D has representation on the implementation team.
	Generate an individualized email to each recipient of a broadcast email announcement.	Plan to Adopt	R&D program staff intends to implement applicable parts of this recommendation.

5.4.2 Summary of Other Key Results

Across the **New York Energy $mart[SM]** R&D programs, five-year goals, encompassing the period July 1, 2006 to June 20, 2011, were established in the SBC III Operating Plan.[2] Overall, the programs are performing well with respect to these goals. Results of each program's progress toward its goals are shown in table format in the subsequent sections.

Progress toward the five-year goals includes the following:

- Under the Public Benefit Power Transmission and Distribution Research Program, 30[3] projects have been selected to pursue development of advanced technologies that will improve the efficiency and delivery of power for electric customers across the state. The Program has succeeded in collaborating with major stakeholders. The program has funded projects in several of the utility companies, is working with the NYISO's newly formed R&D group to prioritize critical technology needs, and is partnering with the U.S. Department of Energy (DOE) on smart grid projects and technology evaluation.

- The Clean Energy Infrastructure Program has helped develop four accredited training institutions, offered 27 training workshops, supported 175 companies in their efforts to expand renewable business networks, and helped 10 manufacturing companies expand their operations.

- The Power Systems Program has funded 77 projects, launched 13 new products and completed 10 field demonstrations.

- The DG-CHP Demonstration Program has funded 83 projects representing 115 MW of anticipated installed capacity. Approximately 30 MW will be installed in New York City.

- Demand Response and Innovative Rate Research Program has enlisted the participation of 5,330 apartments for time-sensitive electric rate pilot programs.

- The Electric Transportation Program has issued 11 solicitations and selected 34 projects for funding.

- The Environmental Monitoring, Evaluation, and Protection Program has issued 12 solicitations, resulting in 71 contracts and $14.6 million in co-funding. Thirty-six research reports, six summary communications, and 105 journal articles have been published.

- The IPPI Program has issued seven solicitations resulting in 60 projects.

[2] Systems Benefits Charge: Supplemental Revision for New York Energy $mart[SM] Programs (2008-2011), As amended, March 12, 2011.

[3] Five projects were withdrawn.

- The Municipal Water and Wastewater Efficiency Program has selected 14 projects for funding. The program goal of providing information to 1,000 individuals serving the municipal wastewater and water treatment sectors was achieved in 2008.

- Under the Next Generation and Emerging Technologies Program, 25 advanced building projects, six daylighting design assistance, two solar thermal projects, and 38 emerging technologies projects have been contracted. Of these, 28 projects have been completed.

Cumulative progress for programs that started before July 1, 2006 includes:

- Under the DG-CHP Demonstration Program, 75 systems are now operational, representing $42 million in program funding, $255 million in total system costs, and 93.8 MW of installed capacity.

- The Municipal Water and Wastewater Efficiency Program is expected to achieve 46,400 MWh of electricity savings and 16.2 MW of peak demand reduction.

- The EMEP Program resulted in nearly 255 peer-reviewed articles published in scientific journals.

5.5 Public Benefit Power Transmission and Distribution Research

5.5.1 Program Description

The Public Benefit Power Transmission and Distribution Research Program, established in July 2006, supports transmission and distribution (T&D) research that has broad statewide energy efficiency and reliability benefits. Projects selected will provide improvements to power reliability, quality and security, and reduce the cost of energy and energy delivery. The market response to the program has been significant and the program budget has been committed.

The Program goals, developed in cooperation with the New York Independent System Operator, DPS, and the electric utilities:

- Develop fast simulation modeling systems to rapidly assess grid stability and anticipate and respond to power disturbances,

- Analyze 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,

- Monitor electric power frequencies to pinpoint and analyze disturbances,

- Create business models to promote sustainable investment in T&D infrastructure, and

- Reduce line losses and improve the overall efficiency of the electric power delivery system.

The 5.5 year budget from July 1, 2006 through December 31, 2011 is $14.8 million.

5.5.2 Recent Program Accomplishments

To date, two Public Benefit Power Transmission and Distribution Research Program solicitations (PON 1102 and PON 1208) have been issued. An additional solicitation was offered under the newly formed Energy Markets and Power Delivery - Electric Power Transmission and Distribution Smart Grid Program (PON 1913). Four project categories were specified under the original program: demonstrations, product development, engineering studies, and research studies. Projects in the first three categories were required to fall within six areas critical to the development of an advanced electric power delivery system in New York: (1) Monitoring and Diagnostics; (2) Data Processing and Analysis; (3) Optimized Visualization; (4) Secure Communication (per the August 14th Blackout Report recommendations); (5) Improved Control Options; and (6) Enhanced System Performance. Projects in the research study category were required to fall within the following categories: (1) Business Strategies; (2) Regulatory Issues; (3) Public Policy Issues; and (4) Advanced Concepts (promoting collaboration with in-state academic institutions). The later PON 1913 introduced the smart grid with demonstration and engineering studies covering (1) Advanced Metering & Controls; (2) Distribution Automation & Management; (3) Demand Response; (4) Energy Storage; (5) Renewable Energy Integration; and (6) Advanced System Modeling. Summarized in Table 5-7 is progress through year-end 2011 toward the five-year goals set for this program.

Table 5-7. New York Energy $mart[SM] Public Benefit Power Transmission and Distribution Research Program Goals achieved from July 1, 2006 through December 31, 2011

Activity	Program Goals (July 1, 2006 through June 30, 2011)	Achieved July 1, 2006 through December 31, 2011
Issue annual solicitations	Twelve or more projects resulting in progress toward program objectives	Three solicitations were completed (total of five rounds), resulting in 30 projects (an additional five projects were withdrawn). The American Recovery & Reinvestment Act (ARRA) of 2009 provided a unique opportunity to leverage funding. Three (3) additional projects used ARRA funding for a variety of research activities. All projects are in various stages of development with six projects completed.
Technology transfer	Identify successful projects and undertake outreach and knowledge transfer activities aimed at utilities	Knowledge transfer activities have begun as projects are completed or nearing completion. General Electric presented results from its Greenhouse Gas study to the NYS Smart Grid Consortium and at the 2010 CIGRE (International Council on Large Electric Systems) conference. Seven final reports for completed projects were posted on the NYSERDA website for information dissemination. A Smart Grid Group Meeting was held at NYSERDA on September 26, 2011 for all NYS utilities to discuss and disseminate lessons learned from their projects funded under the Public Benefit Power Transmission and Distribution Research Program. Selected project results were presented at the NYISO.

The number of approved and contracted projects by solicitation are shown in Table 5-8.

Table 5-8. Status of Public Benefit Power T&D Research Program Projects by Solicitation (July 1, 2006 to December 31, 2011)

	Number of Projects Approved	Number of Signed Active Contracts	Number of Unsigned Contracts	Number of Withdrawn or Terminated Contracts	Number of Completed Projects
PON 1102 (2 rounds)	15	14	0	1	6
PON 1208 (2 rounds)	16	12	0	4	0
PON 1913 (1 round)	4	0	4	0	0

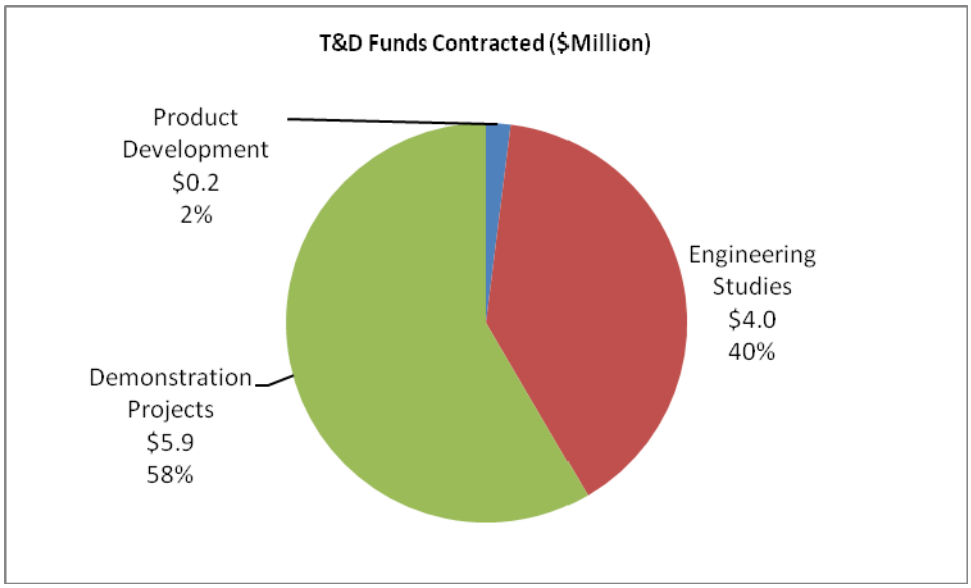
Shown in Table 5-9 are the NYSERDA funds awarded and contracted by project type. Also shown is the associated co-funding from external parties for contracted projects.

Table 5-9. New York Energy $mart[SM] Public Benefit T&D Funds Awarded and Contracted by Project Type (July 1, 2006 to December 31, 2011)

Project Type	Number of Projects Approved for Funding	Funds Awarded to Approved Projects ($Million)	Funds Contracted for Approved Projects ($Million)	External Co-funding for Contracted Projects ($Million)	Number of Projects Completed as of Year-End 2011
Demonstration Projects	13	$8.5	$5.9	$45.7	3
Product Development	1	$0.2	$0.2	$0.2	0
Engineering and Research Studies	16	$4.4	$4.0	$5.8	3
TOTAL	**30**	**$13.1**	**$10.1**	**$51.7**	**6**

Shown in Figure 5- 2 is the funding distribution by type of project. Of the $10.1 million contracted to date, 2% is for product development projects, 58% is for demonstrations, and 40% is for studies.

Figure 5- 2. Distribution of Contracted Public Benefit Power T&D Research Program Funds (July 1, 2006 to December 31, 2011)



The 26 active (plus four to be contracted) projects are very diverse, such as development of transmission line fault-detecting software, an underground compressed-air energy storage project near the Finger Lakes

Region of New York, and demonstration of a distribution microgrid. Projects selected for funding are described below:

- **Energy Storage**

  - Demonstration of a compressed air energy system (CAES) facility in Western New York using solution-mined salt caverns. The plant will offset the intermittent characteristics of local wind resources and provide 150 MW of installed peak capacity. This is the first demonstration of CAES technology in New York, and NYSERDA is contributing $1.0 million.[4] NYSERDA's funds provided the required "cost-share" in NYSEG's successful bid for federal funding through the DOE under the ARRA.

  - A research study investigating the merits of energy storage as a publicly owned asset will quantify the value of the public benefits.

  - Demonstration of a flywheel technology that can raise or lower frequency as needed in real-time will be demonstrated. A 20 MW system will be deployed in Stephentown, New York to provide ancillary services in the NYISO market. NYSERDA's total contribution is $2.0 million toward an estimated $45 million initiative involving funds from the DOE. NYSERDA also worked with the NYISO to expedite the development of energy storage market rules necessary for project implementation. The plant has been operational as of July 2011 and is providing 20 MW of frequency regulation service to the NYISO.

- **Improved Efficiency**

  - The first in-depth evaluation of secondary network losses, methods for loss reduction, and the development of an accurate simulation tool. This project will provide information on the best way to reduce the loss of electric energy on secondary distribution circuits.

  - A research study to determine how to maximize existing transmission network capacity and rights-of-way, particularly where New York has not attracted capital investment for new transmission infrastructure.

  - Development of a software tool that the NYISO can incorporate into its energy management control center to optimize real and reactive power dispatch. Significant reductions in electric energy loss are possible by simultaneously controlling real and reactive power flows.

- **Improved Reliability**

  - A $4.4 million Smart Grid pilot project that will upgrade West Nyack area substations and associated distribution circuits to perform as "intelligent" networks with advanced sensors, field devices, on-line decision-making software, and improved communications. It will also serve to automatically restore power after disturbances, minimize losses, and maximize customer service

[4] NYSERDA also funded an engineering study in connection with this project as a result of PON 1102.

reliability. NYSERDA is contributing $1 million to the project that will complement Orange and Rockland utilities' plans for installing advanced meters for its customers.

- Demonstration of a distribution microgrid in the Town of Denning, which will take the form of a distribution load center along with a paralleling generator source. The load center will be automatically isolated from the grid during a distribution circuit disturbance and operate independently of the remainder of the Central Hudson Electric and Gas electrical system. While the theoretical advantages of microgrids are well understood, there is minimal practical experience to inform national and State policy makers.

- A research study to document the different types of microgrids that have been deployed around the world, analyze different ownership structures, and provide a comprehensive guide for policy makers and regulators regarding how to promote microgrid implementation.

- A product development project to develop a high voltage insulator that suppresses current leakage, lasts longer, and reduces maintenance costs. Modeled after the water shedding properties of the lotus leaf, its super hydrophobic attributes will be designed, tested, and, ultimately, manufactured in New York.

- The development of a software tool that assesses the impact of distribution system designs on the reliability and power quality of radial distribution circuits. The primary focus is to establish uniform design techniques that reduce the frequency of power outages (particularly momentary outages).

- An environmental engineering and economic study to identify and test scenarios relating to greenhouse gas policy implementation. The electric power sector produces one-quarter of the State's greenhouse gas emissions and analysis is needed to study the impact of the Regional Greenhouse Gas Initiative's proposed regional carbon cap-and-trade program on the reliability of the electric power transmission system. The scenarios will evaluate factors such as fuel prices, new generation, emission prices, and transmission improvements and will weigh these against generation dispatch, transmission congestion, and changes in power imports into New York. This project has been completed and a final report is available on the NYSERDA website.

- Consolidated Edison will demonstrate a superconducting cable system that has the technical capability for installation as a substation-to-substation tie within severely congested distribution networks. The innovative technology will combine the functionality of a superconducting cable and a fault current limiter into a single, fully-integrated product.

- Central Hudson will demonstrate the use of a comprehensive model-based distribution management and automation system. This software can be used to build models that contain millions of components that perform analysis at very high speeds to support real-time controls and operations. The proposed work will combine recent Department of Energy (DOE) and Department of Defense (DOD)-sponsored utility research to standardize, evaluate and implement a model-based distribution management and automation systems that can aid Central Hudson and other New York utilities.

- **Demand Side Application**

  - A New York City local grid project to enable customer-owned demand-response resources to reduce peak demand within critical load pockets. Thirty-two field sites of customer-owned distributed generation resources, amounting to about 20 MW, will be coordinated using innovative software protocols to enhance grid reliability in lower Manhattan.

  - Installation of a ground fault protector that will prevent reverse current flow from a natural gas-fueled combustion turbine operating in a combined heat and power mode.

  - An engineering study to investigate whether a facility with an electrically intensive industrial load can be effectively controlled in response to near real-time dispatch signals from the NYISO. This study will provide information about the costs, payback, and technical risks associated with participating in the NYISO's wholesale market for demand side resources.

  - A study to develop alternative strategies for promoting the deployment of distributed generation, including the removal of certain regulatory restrictions on utility ownership of distributed generation (DG) assets, establishing geographically targeted "DG Development Zones", and administering a modified solicitation that reduces DG development risks.

  - A first-of-its-kind research study in New York to evaluate the impacts of end-use technologies on the power quality of the distribution network.

- **Improved Situational Analysis**

  - Development of a software application that will improve the ability of network operators to accurately view the status of the grid from a regional perspective, identify critical voltage areas and real-time reactive power requirements, and automate system load shedding to preserve voltage stability and prevent blackouts.

  - Development of a comprehensive software solution that improves the situational awareness of cascading outages, minimizes their impacts, and prevents major catastrophic events.

- **Facilitation of Renewable Resources**

  - Evaluate the opportunity to develop, build, and operate a privately-financed non-utility transmission line and large-scale wind farm that will alleviate constraints within the national transmission corridor, and facilitate the delivery of utility-scale quantities of offshore wind shared by New York as well as New Jersey. A two-part study will include analyses of the commercial complexities and the regulatory constraints facing the development of new transmission assets. These findings will result in recommendations and a framework for investment in new infrastructure that will effectively upgrade the electric power delivery system to meet growing demand and promote open access to new generation sources, such as offshore wind.

- **Improved Risk Assessment**

  - An engineering study to develop a concept that uses real-time sensing data and history to predict probability factors that consistently recognize the relative importance of potential outages.

  - An engineering study to develop a consistent process for calculating electric system losses using applicable industry standards (*e.g.*, ANSI, IEEE, and EPRI).

  - A project designed to expand the number of phasor measurement units (PMUs) in New York. Purchased from NYS manufactures, PMUs should be placed at critical locations in the power system where power flow and exchange on key transmission lines can be monitored. In addition, the 'New York Phasor Network' will be set up so that new PMUs can be readily accommodated. Extending the PMU network reduces the probability of large-scale blackouts, provides monitoring of transmission systems, and, ultimately, supports smart grid. NYSERDA's investment in this program was instrumental in leveraging an award of additional federal funds under ARRA.

- **Energy Frontier Research Centers (EFRCs)**

  - To accelerate the scientific breakthroughs needed to build a new 21st-century energy economy, DOE announced funding for 46 new multi-million-dollar Energy Frontier Research Centers (EFRCs) located at universities, national laboratories, nonprofit organizations, and private firms across the nation. NYSERDA provided letters of support, pledging $250,000, to each of the 23 New York EFRC applicants. Four (4) New York applicants were chosen by DOE to establish EFRCs. Two will receive SBC funding and two will receive Statutory R&D funding.

- **Smart Grid Consortium**

  - To prepare New York for competitive participation, NYSERDA assembled a diverse team of industry, academic, and regulatory organizations. The development of a New York State Smart Grid vision and action plan helped coordinate the collective efforts of the NYS Smart Grid Consortium, industry, academia, government, and the electric utilities in submitting approximately 30 proposals for Smart Grid grants. The result: New York is the recipient of approximately $262 million in ARRA funds for Smart Grid projects. The **New York Energy $mart**[SM] Program is providing $100,000 to the consortium effort.

5.6 Clean Energy Infrastructure

5.6.1 Program Description

The success of the previous End Use Renewables Program (EUR) provided the foundation for the Clean Energy Infrastructure Program. Clean Energy Infrastructure efforts have been closely integrated with other SBC-funded efforts, such as the DG-CHP Demonstration Program and the Power Systems Program, to promote 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. In 2007, the PV and small wind incentives offered under the EUR Program were transitioned to the Renewable Portfolio Standard (RPS) Customer-Sited Tier program. The Clean Energy Infrastructure program is designed to complement the RPS program by supporting training, education, and market development for RPS-eligible technologies and supporting early stage clean energy companies such as those that target photovoltaics and small wind.

The Clean Energy Infrastructure Program continues the market development work begun under the EUR Program. Market development activities include supporting the training of renewable energy professionals, establishing voluntary certification standards for PV system installers, establishing accredited training programs in New York, establishing an internship program to give students from the training programs the experience necessary to pass the certification exam, developing a series of specialized workshops and training tools, and integrating PV systems on schools with lesson plans that meet New York State learning standards for math, science, and technology. These efforts have expanded over the years to cover training for many renewable energy technologies such as large and small wind systems, geothermal heat pumps, anaerobic digesters, solar thermal systems and fuel cells. The Clean Energy Infrastructure Program also complements the RPS Customer-sited Tier program in developing a sustainable market for renewable and clean energy technologies. The following strategies are used to meet program objectives:

- Support market participant training, increase consumer awareness, and increase market demand for clean and renewable energy;

- Conduct targeted research, analysis, and education to address technical and information barriers to adoption of renewable and clean energy market development; and

- Accelerate the development of early stage entrepreneurial clean energy technology companies. The Program uses an array of business support activities designed to share the risk of implementing new approaches to business growth and market expansion and to encourage the manufacturing of clean technologies in New York.

Funding for the time period July 1, 2006 to December 31, 2011 is $52.5 million.

5.6.2 Recent Program Accomplishments

In 2009, the Clean Energy Workforce Development program sponsored a third conference and held five more training workshops, which exceeds the program goal. NYSERDA and its contractor are planning the fourth national Clean Energy Workforce Education Conference in March 2011.

In addition to establishing a qualified workforce, the program implemented a series of initiatives to increase the likelihood and speed to commercialization of clean energy products developed in other NYSERDA R&D efforts. The activities can be summarized as follows:

- Clean Energy Technology Business Incubators: NYSERDA is supporting six incubators across the state. Funding support is provided over a four year period with a portion of the funds tied to the success of the client companies in the incubator. Even with two to three years left in the projects, the incubators are providing business mentoring support to 77 companies. These companies employ more than 300 and have raised nearly $41 million in private capital.

- The Clean Energy Business Growth and Development competitive program has made almost 30 awards to early stage companies to share the financial risk of developing the business structure necessary to commercialize an innovative clean energy technology. Assisting firms in their efforts to raise private capital was one component of the program. Clean Energy Technology Manufacturing Incentive Program. NYSERDA offered a competitive program to provide incentives to firms to establish new manufacturing capacity in New York State. Seven projects selected in the program have moved forward to manufacture products ranging from energy storage devices, photovoltaic modules, and efficient lighting fixtures. The leverage ratio for the capital investment in the program is over 8:1.

- Increasing Entrepreneurship in Clean Energy: NYSERDA is supporting an Entrepreneurs-in-Residence (EIR) program that provides targeted, short-term professional support to early-stage technology companies. The program is an efficient mechanism to introduce experienced business expertise to start-up companies. Through 41 engagements between EIRs and client companies, the companies raised $1.4 million in private capital and realized $4.5 million in new revenues, leading to the creation or retention of 61 jobs. In addition, through the efforts of the New York City clean energy business incubator, a program has been implemented to educate experienced

business executives in the needs and opportunities of the clean energy market. The goal is to increase the pool of financial entrepreneurs that can partner with technology focused businesses.

Table 5-10 shows the Program's five-year goals and cumulative performance through December 2011.

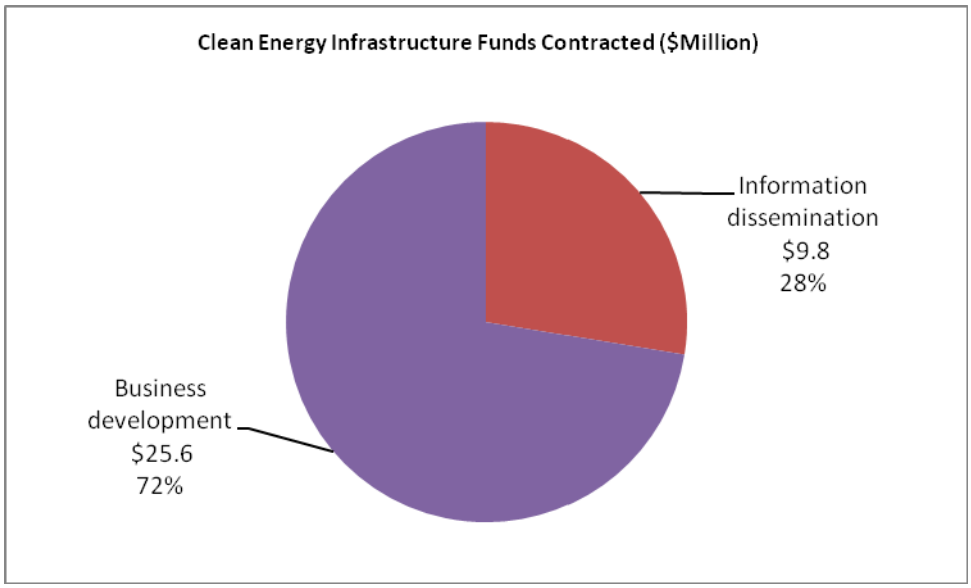
Table 5-10. Clean Energy Infrastructure Program Goals achieved from July 1, 2006 through December 31, 2011

Activity	Program Goals (July 1, 2006 through December 31, 2011)		Achieved July 1, 2006 through December 31, 2010	% of Goal Achieved
Education, Consumer Awareness and Market Development				
New accredited training institutions	4	Self-sustaining accredited training and certification programs for clean energy technologies in addition to PV	4	100%
New certification exams	4		3	60%
Training workshops	34		27a	>100%
Renewable Resource Applications				
Stakeholder workshops	10	Addressing knowledge and technical barriers currently impeding installation and operation of wholesale and end-use clean energy technologies	13	>100%
Competitive research solicitations	10		14	>100%
Clean Energy Technology Manufacturing and Business Development				
Companies expanding renewable business networks	70	Increase the number of companies developing and manufacturing clean energy technologies, and serving the clean energy businesses in New York	175	>100%
Companies expanding manufacturing	10		10	70%

a This program goal does not include the many clean energy renewable and efficiency training workshops throughout the state held by NYSERDA's training partners.

Shown in Figure 5-3 is the distribution of funding for contracted projects by project type. Seventy-two percent of the contracted funds were applied to business development and the remainder was applied to information dissemination/research study projects.

Figure 5-3. Distribution of Contracted Clean Energy Infrastructure Funds by Project Type (July 1, 2006 to December 31, 2011)



5.6.3 Cumulative Accomplishments

Shown in Table 5-11 is progress on key market indicators. The results show steady increase in number of participating installers and NABCEP certifications.

Table 5-11. New York Energy $mart℠ Clean Energy Infrastructure – Key Market Indicators and Program Cumulative Progress

Topic	Indicator	Data Value 2003	Data Value 2004	Data Value 2005	Data Value 2006	Data Value 2007	Data Value 2008	Data Value 2009	Data Value 2010	Data Value 2010
Availability of Services	Total Participating Installers	14	27	32	26	44	100	181	274	380
	NABCEP certified				-	-	35	56	81	112
	Fully Eligible						46	62	107	149
	Provisional						19	63	167	231

The number of eligible PV installers increased from 14 in 2003 to 380 in 2011. Of the 380 participating installers, 112 are NABCEP certified. The NABCEP certified installers are in both Fully Eligible and Provisional categories.

5.7 Power Systems

5.7.1 Program Description

Power Systems Program supports New York businesses 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 products that reduce peak demand or improve end user power quality. Additionally, the Program focuses on addressing regulatory barriers to the adoption of new technologies and emphasizes the development of economically competitive options for end users. As of mid-2008, projects related to transmission and distribution of energy were moved to the Public Benefit Power Transmission and Distribution Research Program discussed in Section 5.4.

Funding for the time period July 1, 2006 through December 31, 2011 is $27.0 million.

Objectives of the program include:

- Developing products that decrease energy consumption and peak demand
- Economic development and job creation in New York
- Developing 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, stability, and increased security

Activities supported under this program include:

- Product development, including concept development, prototype production, and product demonstration
- Technology transfer through conferences, papers, and Internet accessible data
- Technology and market assessment studies

5.7.2 Recent Program Accomplishments

Table 5-12 shows the Program's five-year goals and performance since July 1, 2006. The program is making excellent progress toward the majority of its five year goals. Thirteen new products have been launched since July 1, 2006.

Table 5-12. New York Energy $mart℠ Power Systems Program Goals and Achievements (July 1, 2006 to Year-End 2011)

Activity	Program Goals (July 1, 2006 through December 31, 2011)	Achieved July 1, 2006 through December 31, 2011	% of Goal Achieved
Number of contracts signed between July 1, 2006 through December 31, 2011	81	77	95%
New products launched between July 1, 2006 through December 31, 2011a	6	13	>100%
Sales revenue from new products launched between July 1, 2006 through December 31, 2011a	$54 million	TBD	TBD
Number of completed field demonstrations between July 1, 2006 through December 31, 2011a	16	10	56%
Projects successfully completing milestones	27	TBD	TBD
Number of technology assessment studies funded between July 1, 2006 through December 31, 2011	22	8	32%

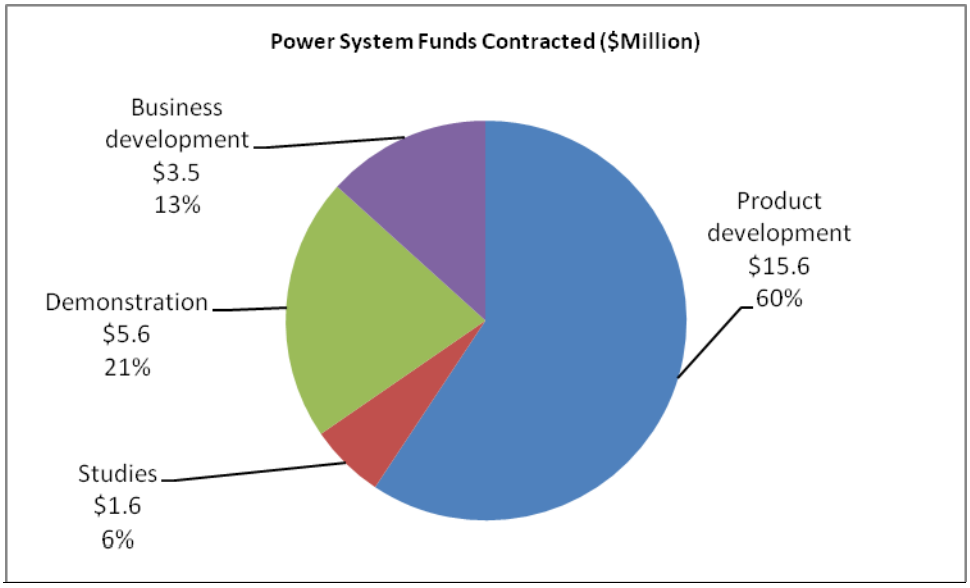
a Includes results from projects funded prior to July 1, 2006.

Shown in Table 5-13 is the funding activity since July 1, 2006. Also shown are the funds encumbered (contracted) and the associated co-funding. The distribution of funds contracted by project type is shown in Figure 5-4.

Table 5-13. New York Energy $mart[SM] Power Systems Funds Awarded and Contracted by Project Type (July 1, 2006 to Year-End 2011)

Project Type	Number of Projects	Funds Awarded to Approved Projects ($Million)	Funds Contracted for Approved Projects ($Million)	External Co-funding for Contracted Projects ($Million)
Product Development	48	$15.6	$15.6	$16.5
Studies	8	$1.6	$1.6	$1.9
Demonstration	18	$ 7.1	$ 5.6	$12.1
Business Development	4	$3.5	$3.5	$4.6
TOTAL	78	$ 27.8	$ 26.3	$35.1

Figure 5-4. Distribution of Contracted Power Systems Funds by Project Type (July 1, 2006 to December 31, 2011)



5.7.3 Cumulative Accomplishments

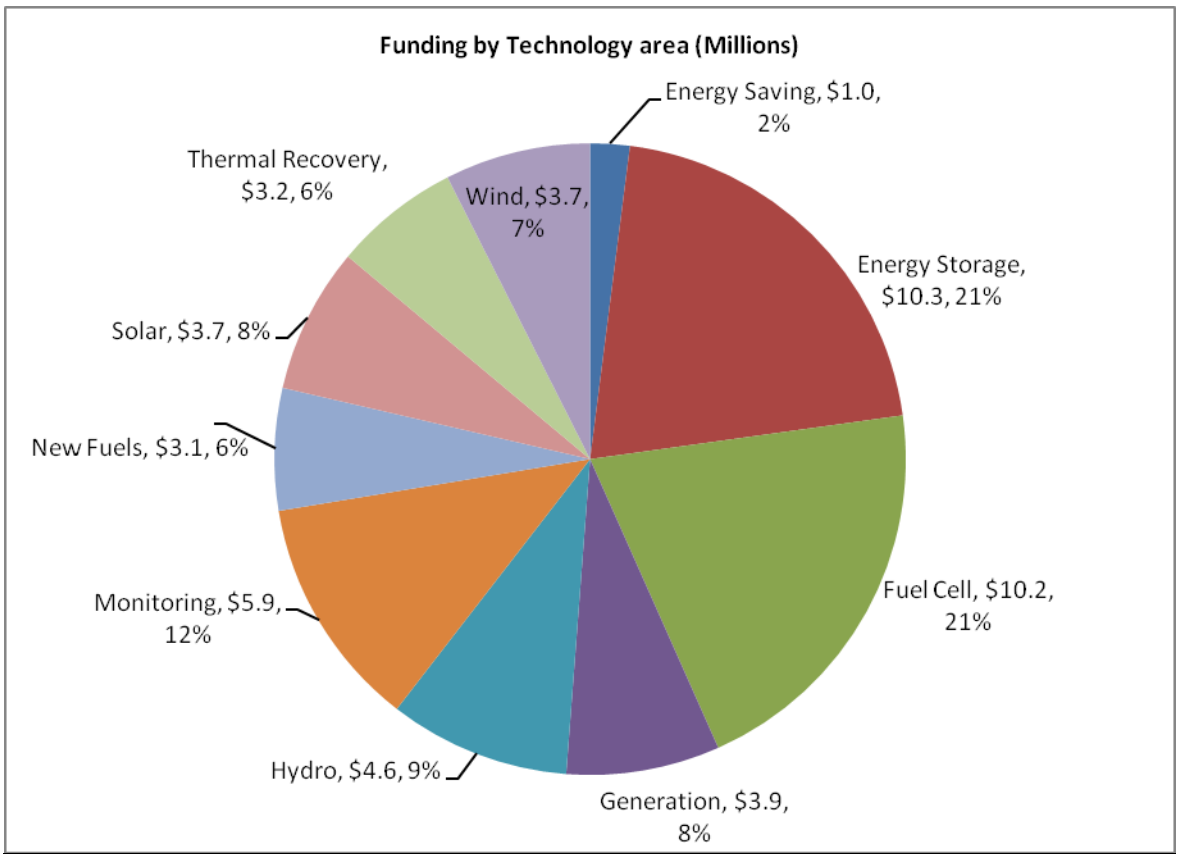
This section describes cumulative results since 2001 when the program began. Projects funded through the program were categorized as Technology/Market Analysis Studies; Product Development; and Demonstration. The Technology/Market Analysis studies include projects that analyze market potential, technological feasibility, and policies that benefit suppliers of power. Product development projects focus on a clearly defined product produced by 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. The cumulative number of projects and amount of funding by project type are shown in Table 5-14. Shown in Figure 5-5 is the distribution of funding by technology.

Table 5-14. Cumulative Power Systems Results from 2001-2011

Activity	Outcomes
Number of product development projects initiated and completed to date	74 initiated 34 completed
Number of demonstration projects initiated and completed to date	40 initiated 28 completed
Number of technology/market-analysis studies initiated and completed to date	35 initiated 25 completed
Funds contracted to date	$ 49.5 Million
Number of new products launched to date	19

Figure 5-5. Power Systems Contracted Funding by Technology Area (2001 to 2011)



The status of products developed with assistance through the Power Systems Program are shown in Table 5-15.

Table 5-15. Power Systems Commercialization Progress 2001-2011

Product Name	Development Objective	Technical or Commercialization Progress
Pressure Actuated Leaf Seals for Turbine Shaft Sealing	Increase turbine performance as a result of reduced pressure loss through improved shaft seal designs.	Technology was licensed to Dresser-Rand, a NYS turbine manufacturer. Developer continues to refine the technology and has attracted interest from additional manufacturers.
Development and Performance Testing for Distributed Power	Development of standardized testing protocols to provide reliable and consistent data for comparing the performance of various DG/CHP.	In accordance with the standardized testing protocols developed, NYSERDA's DG-CHP database provides detailed performance data based on over 100 DG-CHP projects that can be used by potential adopters, developers, and other stakeholders to understand and gain confidence in the technology. The website address is: http://chp.nyserda.org.

Product Name	Development Objective	Technical or Commercialization Progress
Gaia Power Tower	Develop a battery-based energy storage device that can store energy from intermittent resources to meet power needs.	Gaia Power Technologies' Power Tower resulted in New York investments totaling $3 million. The company employed 16 full-time workers at its Peekskill, New York facility and the product was sold nationwide. Since then, due to lower than expected sales, the company was forced to cease operations; however the basic technology was shown to be viable.
Direct Methanol Fuel Cell Manufacturability Readiness	Develop a methanol fuel cell, with water management features for the low power applications market.	MTI has over 100 patent applications related to methanol fuel cells and has brought $1 million in capital investment from Samsung and Gillette/Duracell and a 6% equity investment from E.I. DuPont. A product launch is planned for this year.
Underwater Electrical Turbine Development	Use tidal water flow to generate power through underwater turbines.	The Roosevelt Island Tidal Energy (RITE) project in NYC's East River was the world's first grid-connected array of tidal turbines. The first generation device was tested. Continued efforts to build a more robust system are underway. Company has received a 10-year license from FERC for 1 MW of hydropower to be built in the East River. The first three units will be installed in 2012. Up to 30 units will be installed in the next few years.
Use of Flywheels for Grid Stabilization	Develop and demonstrate an advanced flywheel-based energy storage technology to perform fast-response frequency regulation. This technology has highly attractive performance attributes, low variable operating costs, and produces zero direct CO2 greenhouse gas or other emissions.	Unlike the conventional frequency regulation methods utilizing fossil generating plants, energy storage technology does not consume fossil fuel or produce particulates or other air emissions. Construction was completed in 2011 and is fully operational.
Innovative Wind Generators for Low Speed Wind	Develop a wind sysem that generates electricity using low-speed wind, found in large sections of the country, and can be installed where local restrictions do not allow traditional wind turbines.	Optiwind has designed and tested a new turbine and is actively searching for demonstration sites. The company has garnered $5 million of investment funds to further develop its low speed wind generator. It has also hired five employees.
Wind Analyzer	Development of software that predicts wind availability and power generation taking into account manyfactors. The software will be used to reduce site selection costs and increase power generation.	Commercialization is in progress. The Wind Analyzer will be used to determine site feasibility for small wind turbines including optimum mounting locations for potential building site applications.
Photovoltaic Controllers and Inverting Technology for Improving Production and Demand Balancing when Combined with Energy Storage	Improve AC-DC conversion and reduce system drain from shaded or dysfuctional panels.	Certification for grid interconnection of the 2.5 kVA Utility-Interactive Inverter was conducted by a nationally-recognized testing laboratory. The product is available for sale.

Product Name	Development Objective	Technical or Commercialization Progress
Oil-Free 5-20 kW High-Speed Turbo Generator	Develop an inexpensive generator that can utilize waste heat through Rankine Cycle generator.	The 5 kW unit was tested successfully. Starting in 2012, the high-efficiency compressors from the 5 KW unit are beign tested in the 50 KW system.
Hammer Mill for Biofuels	Development of a hammer mill crushing technology that prepares fibrous fuels to be fed into traditional boilers.	Product has been successfully developed and commercialized.
Electric Double layer Capacitors (EDLC)	Develop carbon electrodes to allow capacitors to hold more electrical energy.	Ioxus has opened a manufacturing plant and hired new employees. They have received government funding and national attention for their product which prolongs the lifespan of batteries used in mobile devices.
Fuel Cells	NYSERDA has issued many contracts to develop, test, and demonstrate fuel cells for remote power as well as combined heat and power units.	Plug Power contructed their R&D and manufacturing facility in New York State resulting in over 120 jobs and attracting over $800 in investments. Plug Power has commercialized products in the remote/prime, residential, and material handling markets. A new high temperature fuel cell heating appliance is being demonstrated at several residential sites. A number of New York State companies are developing components and advanced materials to be used in fuel cell systems. Sales of forklift truck batteries have begun. Three residential combined heat and power systems were demonstated.
Wind Plant Analyst	Develop analytical system for wind turbines to increase output and predict failures.	Comercialized first product, and have made their first three sales.. Developing further health monitoring software for future product improvements.
Fish Friendly Turbine	Design a hydro turbine that will reduce the fish fatality rate at hydropower sites.	Finished design of turbine; exploring market potential in New York.
Front Line Metalization	Reduce the cost of solar by using alternatives to silver paste metalization lines.	Proven feasability. Narrower front lines allow more Silicon to be exposed to solar rays, increasing efficiency of the cell.
Active vibration flow control for large scale wind turbines	Improve the efficiency of large scale wind turbines and reduce wear on gearboxes through arodynamic control.	Computer modeling has scale models that have shown potential for controling vibration and load, which can shorten the life of equipment.
Paper Battery	Developed thin, paperlike battey/capacitor device.	Product has been developed and tested. Work continues on transitioning into larger scale manufacturing. Initial applications include critical backup power for computer servers. Company was recently awarded a $200,000 angel investment.

5.8 DG-CHP Demonstration

5.8.1 Program Description

The goal of the Distributed Generation-Combined Heat and Power (DG-CHP) Demonstration Program is to contribute to the growth of the number of DG-CHP installations in New York. The program provides funding for single-site and multi-site (fleet) demonstrations and targets both end-users and project developers. The program also seeks to address DG-related issues such as DG permitting; Standard Interconnection Requirements (SIR); utility standby service; tariffs; technology risk; and renewable fuel options such as biomass and landfill gas; and impact of fluctuating prices of natural gas.

The program uses financial incentives to demonstrate and validate advanced features (such as synchronous-parallel interconnection) of customer-sited CHP using commercially-available CHP technologies such as reciprocating engines and gas turbines, and emerging DG technologies such as microturbines and organic Rankine cycle systems. Once validated, commercial CHP technologies are supported by NYSERDA through an incentive approach that co-exists with similar offerings from the RPS Customer-Sited Tier.

The program funding for the time period July 1, 2006 through December 31, 2011 is $86.1 million.[5]

5.8.1 Recent Program Accomplishments

Table 5-16 shows the Program's five-year goals and performance. The program has met its total capacity goal and has reached 59% of the Downstate capacity goal. Also shown are the technology transfer activities.

The program won the 2010 American Council for an Energy Efficient Economy National Review of Exemplary State Energy Efficiency Programs Award. A media event was held on September 13, 2010 to announce the 10 winners.

[5] This budget is slightly higher than the 5.5-year budget in the revised SBC 3 Operating Plan. Approximately $3.9 million was transferred back from the DG-CHP Incentives Program.

Table 5-16. New York Energy $mart[SM] DG-CHP Demonstration Program - Goals and Achievements

Activity	Program Goals (July 1, 2006 through December 31, 2011)	Achieved July 1, 2006 through December 31, 2011	% of Goal Achieved
Issue annual solicitations and incentive offers	Fund 51 or more CHP demonstrations with a cumulative capacity of 101 MWs with 50 MWs installed downstate.	No. of projects funded: 83 Cumulative capacity from funded projects: 115.3 MW Downstate Capacity: 29.5 MW Six solicitations, since 2006, have resulted in 83 funded projects with a total of 115.3 MW (47 are active[1] projects, representing 54.6 MW). Of the active projects, 32 are in the Consolidated Edison service area, representing 8.4 MW.	No. of projects funded: >100% Cumulative capacity: >100% Downstate capacity: 59%
Technology transfer	Conduct technology transfer and outreach activities to broaden acceptance of DG and CHP. Hold annual workshops and publish at least 10 final reports per year.	Currently, site-specific performance data is posted on http://chp.nyserda.org for 73 projects. A U.S. Environmental Protection Agency (EPA) CHP Partnership meeting was held in October 2009 and NYSERDA sponsored a CHP Roundtable. In Feb 2011, NYSERDA held a stakeholders workshop to gather feedback from the marketplace. Eighteen (18) conferences, workshops and seminars have been hosted or sponsored. Twenty-four (24) Technology Transfer Reports have been published. A CHP Programs Brochure has been developed and is distributed at appropriate conferences.	N/A

[1] Active refers to projects that have been contracted and are either in progress or completed.

Shown in Table 5-17 are the solicitations released since July 1, 2006, number of projects funded, and amount of total and downstate capacity represented by the funded projects.

Table 5-17. Projects Funded (July 1, 2006 through December 31, 2011)

Solicitation	Proposals Due	No. of Projects Approved	MW	MW Downstate
PON 984	Sept. 2006	14	18.5	18.5
PON 1043	June 2006	8	37.8	1.4
PON 1178	Oct. 2007	8	30.4	.004
PON 1241	Aug. 2008 – April 2009	22	12.3	3.8
PON 1931	Dec. 2010	19	13.3	4
PON 2373*	Oct. 2011	12	3	1.8
Total		**83**	**115.3**	**29.5**

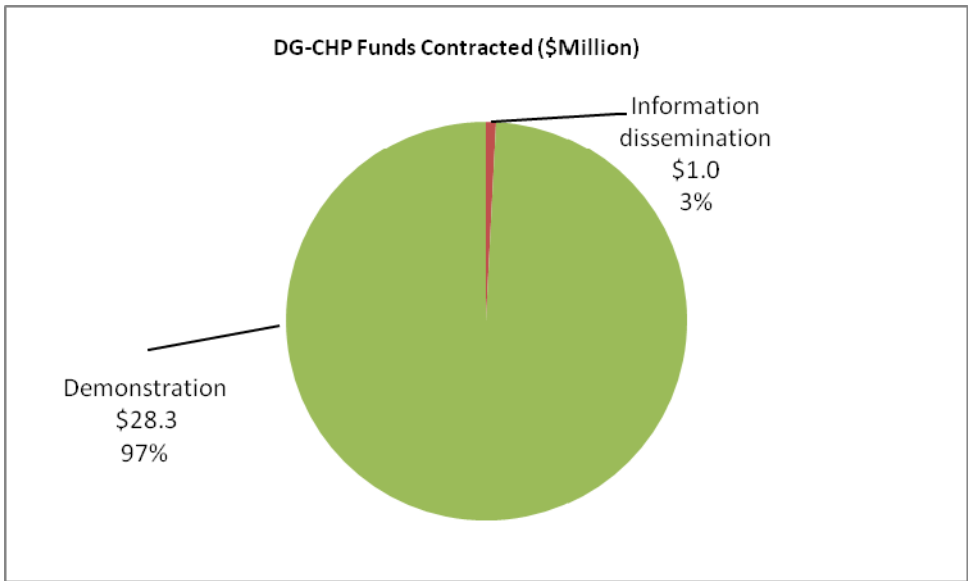
*PON 2373 used additional funding from RD1D1 ($820,694) and RD5A1 ($1,250,000) to supplement funding of three CHP projects.

Show in Table 5-18 is the distribution of funds approved by project type from July 1, 2006 to December 31, 2011. Shown in Figure 5-6 is the distribution of contracted funds by project type. Ninety-seven percent of contracted funds have supported demonstration projects.

Table 5-18. Distribution of DG-CHP Funds Approved by Project Type (July 1, 2006 to December 31, 2011)

Project Category	Funds Approved	Funds Contracted	Projects Contracted	Cost Share
Demonstration	$54.0	$41.9	47	$140.6
Information Dissemination/ Research Study	$1.6	$1.6	32	$0.3
Total	**$55.6**	**$43.5**	**79**	**$140.9**

Figure 5-6. Distribution of Contracted DG-CHP Funds by Project Type (July 1, 2006 to December 31, 2011)



5.8.2 Cumulative Accomplishments

This section highlights key program outputs identified through the logic model development work, and associated market progress. All values reported are cumulative since 2000. Presented in Table 5-19 are the number of operational systems through year-end 2007, 2008, 2009, 2010 and 2011. Seventy-five systems have been installed.

Table 5-19. DG-CHP Demonstration Program – Installed Systems (2000-2011)

	Cumulative through December 2007	Cumulative through December 2008	Cumulative through December 2009	Cumulative through December 2010	Cumulative through December 2011
Number of Installed systems	45	49	54	70	75
Funds Awarded for Installed Systems ($Million)	$21.8	$24.6	$27.4	$36.3	$42.02
Cost of Installed Systems ($Million)	$81.3	$93.0	$123.4	$204.9	$254.8
Capacity of Installed Systems (KW)	25,235	32,296	47,883	79,806a	93,766a

a This capacity value includes all installed systems, whether currently operational or not. On-peak KW savings are slighting higher than the installed capacity.

One hundred and twelve projects have been contracted (encumbered), representing 123.8 MW of peak capacity reduction. Figure 5-7 presents, by prime mover type, the peak capacity reduction potential of all encumbered projects. Figure 5-8 shows the peak capacity reduction from encumbered projects by utility service area.

Figure 5-7. Peak KW Reduction by Prime Mover for Encumbered Projects (2000 to 2011)

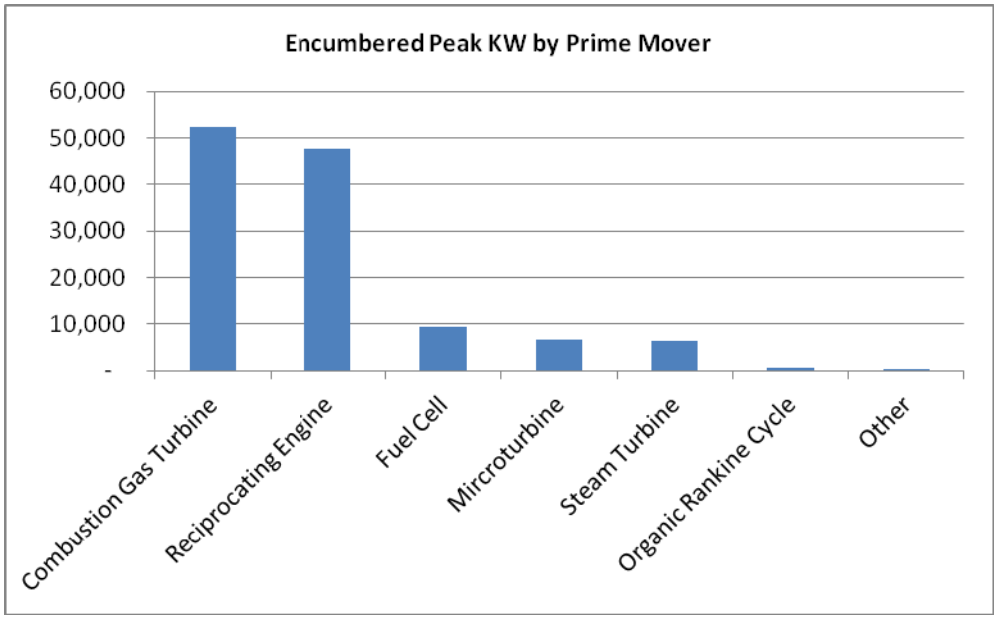
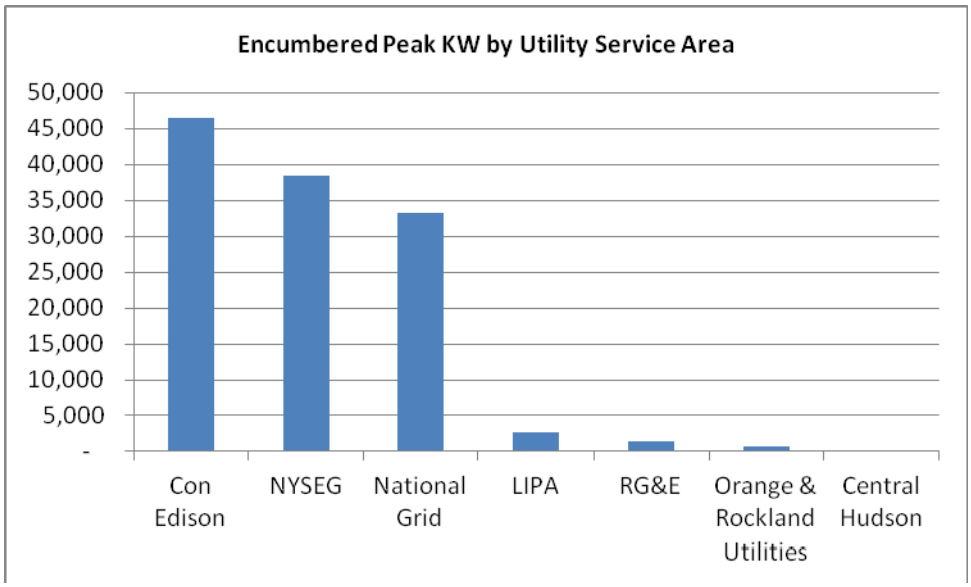


Figure 5-8. Peak KW Reduction by Utility Service Area for Encumbered Projects (2000-2011)



5.8.3 DG-CHP Demonstration Program Process Evaluation

This evaluation addresses projects approved for funding within the Distributed Generation-Combined Heat and Power (DG-CHP) Demonstration program from 2005 through 2010 under the third round of system benefit funding (SBC-3), and solicited through four PONs (914, 1043, 1178, and 1241). The program's evolution is evident in the changing project requirements described in those PONs. The program has always focused on DG-CHP system demonstrations. SBC-3 funded PONs added and discontinued re-commissioning studies, and added support for fleet demonstrations, and "bonus" funding for certain locations, technologies, and facilities.

In order to ensure the process evaluation was unbiased, interviews were conducted with program staff and with randomly selected project owners and developers. Project owners included both owners with completed or ongoing projects, and "partial participants." Partial participants are facility owners who had been selected for program funding, but who had withdrawn from the program without installing their project.

Conclusions and Recommendations

Conclusion: As concluded during the 2004 process evaluation of the DG-CHP program, the program is working well, and program staff members are respected for their technical competence and their helpfulness to end-users and consultants who are working to design and install DG-CHP projects. It is clear the skill and flexibility of the staff in implementing the program is one of its greatest strengths. Staff's responsiveness to program participants is the principal reason participants described program communication as excellent. Nonetheless, it may be possible to enhance program communications with project developers and facility owners in two ways: one related to the proposal review process, and the other related to proposers' eventual interactions with utilities.

Recommendation: To ensure demonstration program proposers have clear expectations about the impact of the proposal review process on project timelines, examine communications with proposers about the proposal review process with a view to conveying greater understanding of the steps in the process, and of the length of the process.

Recommendation: To assist project developers and owners (especially first-time developers and owners) to minimize difficulties and misunderstandings with utilities, consider providing to project contacts greater advice and encouragement to communicate with their utility early and often about utility expectations and requirements for distributed generation projects. Additionally, staff should explore even greater proactive intervention at the individual utility level (especially with National Grid) to expand relationships and enhance utility staff understanding of CHP and of owners' perspectives on the development of CHP projects. Finally, staff should continue its work with policy makers and other stakeholders to achieve policies and standards that provide even greater support for DG-CHP systems.

Conclusion: This process evaluation did not inquire into the metrics used by staff to determine when a demonstrated approach is ready for support through a deployment program. An understanding of these metrics would be useful in measuring the alignment of program goals and activities, and would support a more specific determination of the effectiveness of the program in demonstrating new approaches to DG-CHP installations and in advancing the market for DG-CHP.

Recommendation: To help to evaluate the effectiveness of the program's efforts to demonstrate new approaches to DG-CHP installations and to advance the market for DG-CHP, and to aid evaluating the alignment of program goals and activities, consider reviewing and further developing the program metrics

used by staff to determine the point at which demonstrated approaches are ready for support through a deployment program.

Conclusion: Confusion about NYSERDA's CHP offerings is commonplace. Neither facility owners nor generally more technically sophisticated project developers are always clear about which systems are supported in which facilities under which PONs. Still, because the demonstration program is oversubscribed, this confusion has no apparent, direct, negative impact on that program. Further, this confusion transcends the demonstration program in two ways. First, if confusion about CHP offerings has a dampening effect on the number of NYSERDA supported CHP projects in New York State, that dampening effect may be on CHP projects supported by other programs. Second, some of the activities required to dispel that confusion are marketing activities (deployment-program PONs, website navigability and content, CHP brochures) that are outside the purview of demonstration program staff.

Some amount of confusion may arise simply from the complexity of CHP projects. This is particularly true for demonstration projects, which are based on evolving experiences and conditions, and therefore, on evolving program criteria. CHP projects can span several years from preliminary design to operation. Thus, these projects may outlive not only the PON under which they were approved, but even the funding cycle in which they were approved. A result is that project developers sometimes work simultaneously on multiple projects approved under different criteria.

Recommendation: To minimize confusion about CHP offerings, NYSERDA should consider a review of the consistency of deployment-program project criteria for CHP projects. (In contrast, to respond to lessons learned and to meet changing market conditions, demonstration-program projects cannot be subjected to rigidly consistent criteria.) Further, NYSERDA should consider a review of the overall marketing of CHP offerings. Such a marketing review should at a minimum, explore inclusion of CHP and DG-CHP as website links, and review the currency and effectiveness of printed CHP marketing collateral.

5.8.4 DG-CHP Demonstration Program Market Characterization and Assessment Evaluation

This MCA study addressed researchable issues and indicators for the program, as well as areas of specific interest to program staff. A select set of researchable issues that were explored through this research effort includes:

- Have the program approaches resulted in effective DG-CHP system demonstrations being installed?
- How effective has the program been at graduating technologies to the deployment programs?
- Is the program funding a range of promising technology applications? Are certain technology applications worthy of merit having difficulty obtaining funding?
- Has increased awareness resulting from program activities led to DG/CHP system refinements in existing projects and innovative new demonstration projects?
- Are policies and standards being developed to support DG-CHP systems?
- To what extent are external influences helping or hindering achievement of NYSERDA's DG-CHP Demonstration Program goals?

Primary data collection for this study consisted of 104 in-depth interviews with market actors spanning seven categories: 1) participating developers, 2) non-participating developers, 3) participating facility owners, 4) non-participating facility owners, 5) partially participating facility owners, 6) other market participants, and 7) program staff. Target populations included participants in three Program Opportunity Notices (PONs) issued during the SBC 3 funding period, facilities owners involved with projects not funded by the DG-CHP Demonstration Program, utility representatives, and trade association representatives, and other market experts. The MCA evaluation results can be used to assess progress toward meeting the New York State Public Service Commission's public policy goals under which NYSERDA operates, as well as the institutional goals NYSERDA has established to move markets toward improved energy efficiency. In addition, the evaluation results can be used by NYSERDA program staff and managers to adjust program offerings as needed to ensure continual improvement of the programs and increase market interest and uptake of existing program offerings.

Conclusions and Recommendations

Market Activity

Conclusion: A period of steady growth in CHP installation activity has occurred since the NYSERDA DG-CHP Demonstration Program was launched in 2001. The majority of program-funded projects installed during the last decade have been smaller than 5 MW. Reciprocating engines and gas turbines are the most common types of CHP systems in use in New York. Non-program-funded DG-CHP systems exceed program-funded systems in terms of number of systems, but not in terms of installed capacity. It appears that a market shift has occurred; installation activity was once focused on industrial facilities located in central and western parts of the state, but now a strong concentration of activity exists in the New York City area. Favorable economic conditions that exist for CHP development downstate relative

to other parts of the state are likely the key factor driving the concentration of project activity in the downstate region, but it may also reflect the City of New York's pro-DG policies and the Demonstration program's efforts to increase the amount of development activity in New York City.

Market Structure and Firm Strategies

Conclusion: The number of firms developing and completing projects in New York is slowly increasing. This growth is driven by existing firms in the building and energy sectors expanding their services to include CHP-specific offerings. Firms are pursuing strategies to offer customers more integrated CHP-related services. Opportunities exist for project developers willing to aggregate multiple projects to help reduce equipment purchase costs, facilitate project financing, and mitigate costs related to the construction of new natural gas supply infrastructure (*i.e.*, for adjacent properties in New York City).

Policy Framework

Conclusion: New York State's policies related to clean DG are considered to be some of the strongest in the nation.[1] Changes in policies related to interconnection and standby rates during the past several years have reduced, but not eliminated market barriers in these areas. Policies introduced in New York City during the last five years demonstrate a strong commitment to CHP market growth.

Recommendation: The Program should strive to maintain its consistent support for policy that helps reduce the barriers to CHP market growth (*e.g.*, emissions and permitting requirements). The Program should also maintain its incentive structure over time to support market development through demonstration projects. [6]

Project Economics and Drivers

Conclusion: Key factors currently affecting project economics include appropriate system design, commodity cost uncertainty, and increased payback complexity for systems in New York City. Commodity price volatility is the greatest perceived risk to CHP's economic viability. The economic recession has sharply reduced the pace of installations in New York State and has exacerbated concerns

[6] This recommendation was edited for clarity, with Nicole Wobus of Navigant, after completion of the DG-CHP MCA Report.

about economic risk which have always existed for DG-CHP projects. Any near-term policy or regulatory changes that detract from the economic viability of DG-CHP projects would threaten an already fragile market. Project payback thresholds for investment decision-making vary widely among current and potential CHP system users.

Recommendation: Consider offering additional / alternative strategies for assisting CHP systems on the margin of economic viability.

System Performance and Technological Trends

Conclusion: Most technical issues arise during construction, commissioning, or early-stage system operations when manufacturers' warranties cover repair and replacement costs. Market actors are generally supportive of NYSERDA increasing its focus on smaller prepackaged and modular systems. Building owners and ESCOs are increasing installation of sub-meters and building management systems to enhance control and operations of their facilities.

Recommendation: Publish case studies highlighting experience of systems that have participated in the program.

Market Barriers

Conclusion: The most substantial market barrier is the long simple payback on some CHP projects. Despite the improvements on issues related to interconnection, the costs and time frames associated with interconnection processes are still problematic. Demand costs associated with standby rates are still perceived by some in the market to be a barrier in New York. For projects in New York City, uncertain and often unexpectedly high costs for Con Edison to upgrade the natural gas line serving a facility have prevented several otherwise viable CHP projects from moving forward. Other barriers include: uncertainty about future market conditions; low levels of knowledge and awareness; siting, infrastructure, and logistical barriers; competing investment priorities; and the complexity of the CHP market and development process.

Recommendation: The PSC should explore the impacts of raising system size caps on streamlined interconnection requirements and the clean DG system exemption from standby rates.

Awareness and Knowledge

Conclusion: Awareness and knowledge of CHP opportunities in general is relatively low. Awareness about NYSERDA DG funding opportunities is strong, though there is some confusion about the differences between incentives offered by the DG-CHP Demonstration Program and those offered by the Existing Facilities Program.

Recommendation**:** Expand outreach and education activities.

Recommendation: Update website and provide clearer explanation of the differences in incentive offerings provided by the DG-CHP Demonstration Program and EFP.

DG-CHP Demonstration Program's Interaction with the Market

Conclusion: The New York CHP market appears to still be relatively immature and the continuation of financial incentives will accelerate the pace at which it can proceed toward achieving its potential. While projects possessing strong characteristics can move forward without incentives, NYSERDA incentives are speeding the development of projects, and turning some projects with borderline project economics into solidly viable investments. Through project funding and staff support, as well as through broader efforts to break down barriers in the market, the program is playing an important role in helping to advance the CHP market in the state.

Recommendation: Consider supporting pilot projects that demonstrate innovative CHP-related technology applications but that fall outside standard program eligibility criteria.

Market Outlook

Conclusion: It appears that the prospects for growth in the CHP market are strong, and that they are greatest in the downstate region where electricity prices are highest, and where CHP receives support from local policies. Volatile commodity costs and siting barriers are likely to remain substantial barriers. Gas supply infrastructure in New York City may take on greater significance as a barrier as demand for natural gas grows.

Recommendation: Continue drawing on lessons learned from program participant experiences to highlight necessary changes in the market.

5.9 Demand Response and Innovative Rate Research (DR and IRR)

5.9.1 Program Description

This program addresses ways to enable and increase participation by small retail customers, including multi-family buildings, in load curtailment programs sponsored by NYISO and local utilities. The program also addresses self-initiated load management, and technologies that help energy customers benefit from smart grid applications such as in-home energy feedback. DPS, utilities, and NYISO are key stake holders in the advancement of the smart grid, advanced metering, and demand response (DR) programs.

An important barrier to participation by small customers in the NYISO demand response programs is the high cost of the equipment needed to participate and the high cost of aggregating small loads to meet NYISO minimum capacity requirements. The program promotes the development, demonstration, and use of technologies related to load control, load aggregation, and flexible end-use devices, including technologies that address demand response strategies such as storage and on-site generation. Load curtailment in New York City, where capacity is particularly constrained and load curtailment has the highest market value, is encouraged.

The program also supports research that facilitates participation in mandatory hourly pricing and time-sensitive pricing opportunities. Expansion of utility mandatory hourly pricing programs has greatly increased the number of small commercial and industrial customers that are eligible to respond to hourly electric rates. The program also promotes the development of innovative electric service rates that energy services companies (ESCOs) can offer their customers, thus leading the way to greater load shifting, bill savings through peak load reduction, and creating sustainable businesses for providers.

Funding for the time period July 1, 2006 through December 31, 2011 is $6.0 million.

5.9.2 Recent Program Accomplishments

The Demand Response and Innovative Rate Research Program has pursued development of technologies that enable small-customer load flexibility for either building peak load management or as a demand response resource. These included aggregation of controlled residential room air conditioners and commercial fluorescent lighting; and interfaces that allow for communication and control by building

management or third party service providers. The program has been successful in demonstrating various enabling control and communication technologies including:

- Low-cost techniques for aggregation and direct load control for shedding 30% of the energy consumption of commercial fluorescent lighting fixtures;
- Integration of networked room air conditioners in a multifamily building with a wireless submeter system enabling low-cost aggregated air conditioner load control; and
- Strategies for leveling the electricity demand of controlled room air conditioners in master-metered multifamily buildings.

Technologies developed to control residential air conditioners and commercial fluorescent lighting have not yet gained commercial adoption necessary to meet this Program's 100 MW goal. Still, companies continue to research and invest in such technologies. For example, OSRAM Sylvania has launched its family of load-shed ballasts and continued improvements are occurring in the control of room air conditioners in master-metered multifamily buildings

Activities associated with the goal of increasing small customer participation in demand response programs include the following:

- Four rounds of PON 1151 "Innovations in Demand Response, Load Management and Dynamic Rates" resulted in seven signed contracts, with four more contracts in negotiation.
- Completed Phase I of a project to demonstrate control of a fleet of room air conditioners (RAC) at Pratt University. Phase II will deploy 247 additional RACs. When completed, the project will have enabled 361 kW of remotely-controlled demand response.
- An ESCO demonstrated the feasibility of bundling electricity supply with demand response services.
- A project with Lawrence Berkeley National Laboratory is underway to evaluate the application of a smart grid interoperability standard called OpenADR in NYS's electricity market. Use of this standard could enable buildings with energy management system to respond automatically to

prices and reliability events. This study will also seek to quantify the ability of NYC commercial office buildings to undertake demand response.

- A project that will integrate a NYS manufacturer's industrial process load to the NYISO's new 'direct-to-ISO' dispatchable communications protocol is underway. This project will demonstrate how the new protocol lowers the barriers for capable demand response resources to provide spinning reserves and competing with traditional generation resources.

- In the summer of 2011, 230 smart air conditioners were installed in a New York City high-rise. With the help of high-efficiency appliances and centralized controls, the building's peak demand was reduced by about 10%. The building was enrolled in the NYISO demand response program and participated in its curtailment events.

In August 2011, NYSERDA hosted a meeting with representatives from NYS Department of Public Service, Consolidated Edison, the Electric Power Research Institute, Brookhaven National Laboratory, Lawrence Berkeley National Laboratory, KEMA and the NYISO at a day-long Technical Review Group Meeting to discuss the direction of NYSERDA's R&D demand response related activities. The group noted the growing importance of integrating demand response into a smarter grid. A number of demand response activities were discussed, including the NYS Public Service Commission's Demand Response Initiative proceeding, demand response market reforms by FERC and the NYISO, development of Smart Grid Interoperability Standards for demand response by the National Institute of Standards and Technology (NIST), and support for open integration standards by utilities and leading building controls companies. NYSERDA's role in development of technologies that allow automated responses to price and reliability signals and in demonstrating the value of demand response was discussed.

Two long-term non-energy goals have been set for the Demand Response and Innovative Rate Research Program. These goals and progress are shown in Table 5-20. Shown in Table 5-21 is the solicitation activity for the program and the status of projects selected through the various solicitations .

Table 5-20. New York Energy $mart[SM] Demand Response and Innovative Rate Research Program – Goals and Achievements

Goal	Program Goals (July 1, 2006 through December 31, 2011)	Achieved July 1, 2006 through December 31, 2011	% of Goal Achieved
Increase small customer participation in wholesale and local demand response programs	25 MW	1 MW	4%
Increase the number of multifamily apartment units participating in real-time and other time-sensitive electric rate pilots	3,000 apartment units	5,330 units participating in the demonstration	>100%

Table 5-21 show the number of projects that have been approved for funding, total funds approved and funds contracted (encumbered) between July 1, 2006 and December 31, 2011. The distribution of contracted DR and IRR funds by project type are shown graphically in Figure 5-9

Table 5-21. Demand Response and Innovative Rate Research Program Project Status

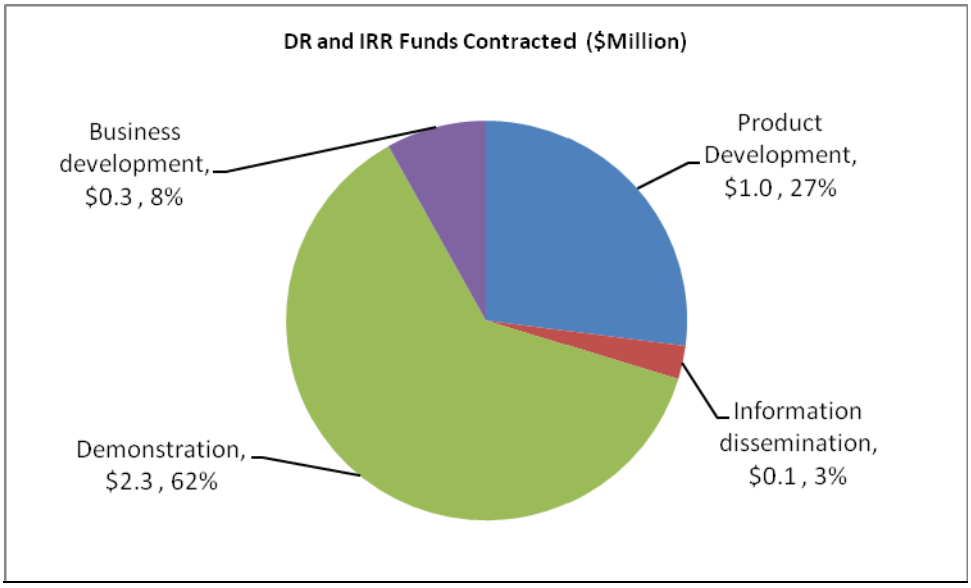
	Number of SBC-funded Projects Approved	Number of Signed Active Contracts	Number of Unsigned Contracts	Number of Withdrawn or Terminated Contracts	Number of Completed Projects
PON 1151 "Innovations in Demand Response, Load Management and Dynamic Rates" (four rounds)	12	7	4	1	0
PON 1772 " Next Generation Emerging Technologies for End-Use Efficiency" (three rounds)*	5	4	2	0	0

*PON 1772 was issued under the Next Generation and Emerging Technologies Program and used Demand Response and Innovative Rate Research funds for five of the funded projects, which are listed above.

Table 5-22. Funds Awarded and Contracted by Project Type (July 1, 2006 to December 31, 2011)

Project Type	Number of Projects Approved for Funding	Funds Awarded to Approved Projects ($Million)	Funds Contracted for Approved Projects ($Million)	External Co-funding for Contracted Projects ($Million)
Demonstration	12	$3.5	$2.3	$3.5
Product Development	7	$2.2	$1.0	$2.8
Research Study	1	$0.1	$0.1	$0.05
Business Development	1	$0.3	$0.3	$0.5
TOTAL	**21**	**$6.1**	**$3.7**	**$6.9**

Figure 5-9. Distribution of Contracted DR and IRR Funds by Project Type (July 1, 2006 to December 31, 2011)



5.10 Electric Transportation

5.10.1 Program Description

This 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 further result in

cost savings for the subway and commuter rail systems and reduced transmission congestion in the region. Additionally, many projects are expected to lower transportation costs and emissions from petroleum-fueled vehicles.

Funding for the time period July 1, 2006 through December 31, 2011 is $6.0 million.

5.10.2 Progress Toward Goals

The ultimate goals of the Electric Transportation Program are to:

- Improve the energy efficiency of New York's current electrically powered commuter rail and subway system in the New York City load pocket, and
- Reduce costs of power transmission by allowing unused off-peak capacity to generate revenue and reduce transportation petroleum use, greenhouse gases, and air emissions.

As shown in Table 5-23, five metrics are being monitored for the Electric Transportation Program.

Table 5-23. New York Energy $mart[SM] Electric Transportation Program Goals achieved from July 1, 2006 through December 31, 2011

Activity	Achievements from July 1, 2006 through December 31, 2011
Solicitations released	11
Proposals reviewed	90
Projects funded	43 approved, 35 contracted
Funding for contracted projects	$6.0 million
Customer co-funding of contracted projects	$16.8 million

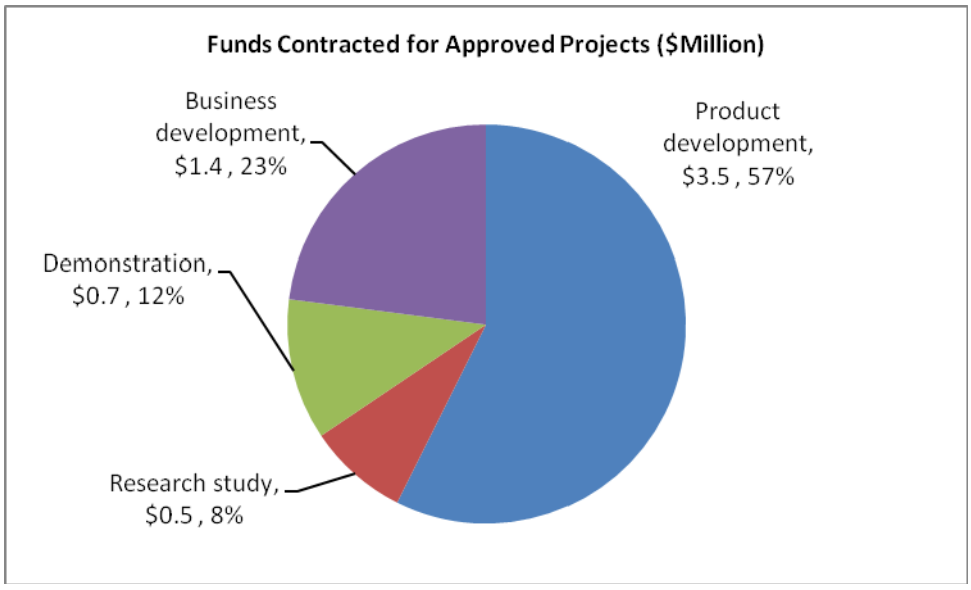
Shown in Table 5-24 is funding by project type for approved and contracted projects. Of the 43 approved projects, 28, or 65% are product development projects. Of the $7.7 million of approved projects, $6.1 million has been contracted. The contracted funding has leveraged $16.9 million of co-funding from program participants.

Table 5-24. Funds Awarded and Contracted by Project Type (July 1, 2006 to December 31, 2011)

Project Type	Number of Projects Approved for Funding	Funds Awarded to Approved Projects ($Million)	Funds Contracted for Approved Projects ($Million)	External Co-funding for Contracted Projects ($Million)
Product development	28	$ 5.0	$ 3.5	$ 9.4
Studies	7	$ 0.5	$ 0.5	$ 1.9
Demonstration	6	$0.8	$0.7	$2.7
Business development	2	$1.4	$1.4	$2.9
TOTAL	**43**	**$ 7.7**	**$ 6.1**	**$ 16.9**

Contracted funding is shown graphically in Figure 5-10 by project type.

Figure 5-10. Distribution of Contracted Electric Transportation Funds Project Type (July 1, 2006 to December 31, 2011)



5.10.3 Cumulative Accomplishments

Results to date, including projects that began before July 1, 2006, are summarized in Table 5-25, Table 5-26 and Table 5-27 for electrified vehicles, rail, and energy storage projects, respectively.

Table 5-25. Electrified Vehicles Progress

Project Name	Project Description	Status as of December 31, 2011
Station Car Project	A pilot project to lease Ford Think! Electric vehicles together with reserved parking/charging at commuter train stations.	Demand for the vehicles exceeded supply by nearly three-to-one. Still, Ford discontinued production of the vehicle, thereby terminating the leasing program.
All-Electric Grounds-Keeping Work Vehicle	Development of an off-road, all-electric grounds-keeping work vehicle	In 2010, two small grounds-keeping vehicles were modified with advanced lithium ion batteries. Testing is underway with major equipment manufacturer.
Electric Motorcycle	An electric motorcycle that features removable battery packs. This promises to be popular in urban areas with on-street parking.	This project has developed a working prototype; the contractor is currently refining parts and specifications.
Auterra Hyper-Capacitors	Hyper-capacitors that could be integrated with PHEVs are being developed.	This project is currently underway.
Cornell University's PHEV Concept Vehicle	NYSERDA supported Cornell University in Progressive's X-Prize competition.	This project is finished. The Cornell team did well, finishing in the top 10 out of 100 entrants.
Solar-Powered Pontoon Boat	A solar-powered pontoon boat has been developed and is moving forward with commercialization.	Design is finalized and plans for manufacturing/assembly are moving forward in NYS.
Electrovaya Pickup Project	Demonstrate plug-in technology in the Dodge Ram pickup truck. This will be the first demonstration of a plug-in technology in a pickup truck.	Produced 140 battery packs for Dodge ram pickup project. Packs are undergoing testing around the United States in various climates to verify emissions reduction.

Table 5-26. Rail Progress

Project Name	Project Description	Status as of December 31, 2011
Third-Rail Heater Control	Development of a third-rail heater control system	The product was successfully developed and demonstrated, but has been slow in adoption due to recent competition in the marketplace.
Cleaning of Third-Rail Insulators	Development of machines that clean third-rail insulators on the subway system.	A prototype was successfully demonstrated. On-track testing to start spring of 2012. Commercialization activities underway.
NYPA Electrified Rail Energy Storage	Develop a model of NYC subway power supply and evaluate benefits of energy storage.	It was determined that in-vehicle batteries and ultra capacitors both offer energy storage/discharge solutions.
LED Lamp Bank lighting	Development of LED lights for use during repair work on the transit system.	This product has been commercialized. To date, 500 units have been sold and over 2,500 units, valued at $2.0. to $2.5 million,

Project Name	Project Description	Status as of December 31, 2011
		are expected to be sold.
Freight Transportation Using Electrified Rail	A study to examine the use of electrified rail for freight transportation.	Following an initial project that indicated feasibility, preliminary design and business planning activities are underway.
Solar Panels on the Poughkeepsie Train Station	Use of solar technology was combined with historic preservation on the Poughkeepsie train station.	Solar panel design has been completed.
Ultracaps on Rail	Test the use of ultracapacitors to store and release energy on the electrified rail system. The capacitors represent a capital avoidance of a new sub station in a residential neighborhood.	The expanded 2 MW system will soon be tested on the NYC Transit system, with alternative sites on the MTA system. The testing, which will last 5 months, will assess voltage and electromagnetic stabilization..

Table 5-27. Energy Storage

Project Name	Project Description	Status as of December 31, 2011
Wayside Energy Storage	Development of a 300 kW trackside battery system	Testing completed. System moved to a Manhattan demonstration site for further evaluation.
1 MW Capacitor System	Develop a 1 MW ultracapacitor energy storage system to capture and use energy from subway braking and acceleration.	The system has been successfully tested in the Contractor's plant.
Small Distributed Energy Storage Systems	Development of an energy storage battery system for load shifting, use of renewable power, and demand response for five or so residences.	Project is currently underway.
SOFC APU for long distance trucks	Develop insulation package for high temperature fuel cells, which can replace generators on long haul trucks.	Product development is complete; product is entering market in 2013.

Table 5-28. Infrastructure

Project Name	Project Description	Status as of December 31, 2011
LED Roadway lights	Replace roadway and signage lights with LED technology	Product is developed and is undergoing testing by NYSDOT.
ShorePower	Provide anti-idling equipment to long distance tractor trailers by use of electrical alternatives.	Utica based Shorepower Tech. has received a $20 million dollar award to electrify 50 truck stops around the United States. Funding includes low interest loans for on-truck equipment.
EnviroDock	Provide anti-idling equipment to long distance tractor trailers by use of electrical alternatives.	Units were installed in Tennessee in 2011. Currently developing battery powered unit for 2012.

5.11 Environmental Monitoring, Evaluation, and Protection (EMEP) Program

5.11.1 Program Description

The EMEP Program commenced in the late 1990s in an effort to increase understanding of the environmental impacts of electricity production. The EMEP Program initiatives are building on past efforts and evolving to support research in five primary areas:

- Ecosystem response to deposition of sulfur, nitrogen, and mercury, including continued support of the Adirondack Lakes Water Quality monitoring program with the Adirondack Lakes Survey Corporation and the NYS Department of Environmental Conservation (DEC).
- 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.
- Regional climate change research, including impacts of climate change on New York, and mitigation and adaptation options for the State.
- Environmental impacts of alternative energy resources, including effects of wind turbines and tidal-energy production on wildlife.
- Crosscutting environmental science, technology, and policy projects, such as 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.

Funding for the time period July 1, 2006 through December 31, 2011 is $25.6 million.

5.11.2 Recent Program Accomplishments

Table 5-29 shows the EMEP Program accomplishments toward its five-year goals.

Table 5-29. New York Energy $mart℠ Environmental Monitoring, Evaluation, and Protection Program Goals achieved from July 1, 2006 through December 31, 2011

Activity	Program Goals (July 1, 2006 through December 31, 2011)	Achieved July 1, 2006 through December 31, 2011	% of Goal Achieved
Develop detailed multi-year EMEP research plan with input from policymakers, scientists, and stakeholders	Complete EMEP research plan and update research plan as needed to ensure relevancy	EMEP's research plan, developed with assistance from the New York Academy of Sciences, was released in September 2007. The Alternative Energy section was updated in 2008 with impacts of wind power development on wildlife in the state.	N/A
Develop, contract, and manage research projects aimed at priority energy-related environmental research areas	• Issue six to 12 solicitations • Contract 60 projects • Leverage $20 million into New York, help build a knowledge-based research infrastructure in New York	Twelve solicitations have been issued. Seventy-one projects have been contracted, leveraging more than $14.6 million in outside co-funding.	100% of solicitation goal >100% of projects goal 73% of leveraged funds goal
Sponsor workshops, conferences, and seminars	10-15	EMEP has co-sponsored or hosted: six workshops two seminars 10 conferences one collaborative meeting	>100%
Provide Web-based EMEP data and information	200,000 total customer visits, inquiries, and downloads to the EMEP Website	EMEP websites had 170,000 hits during this period, totalling 327,000 hits and more than 63,000 downloads since inception.	>100%
Publish NYSERDA research reports	40	Thirty-six research reports and six summaries were published, including one on RGGI emission allowance auction.	90%
Publish peer-reviewed journal articles	100	Articles published include: 48 on Air Quality/Health Effects, 49 on Ecosystems, three on Climate Change, and five crosscutting research articles.	>100%
Provide briefings to decision makers	20	26 briefings were held with various regulators, policymakers, and other decision-makers relevant to EMEP research.	>100%

Shown in Table 5-30 is the funds awarded and contracted between July 1, 2006 and December 31, 2011. Funds contracted total $24.1 million, including funding for information dissemination activities.

Table 5-30. EMEP Funds Approved and Contracted (July 1, 2006 to December 31, 2011)

Project Type	Number of Projects Approved for Funding	Funds Awarded to Approved Projects ($Million)	Funds Contracted for Approved Projects ($Million)	External Co-funding for Contracted Projects ($Million)
Research study and information dissemination	191	$25.6	$24.1	$14.65

5.11.3 Cumulative 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 150 peer-reviewed papers were published on EMEP findings and 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's environmental issues. Several advanced pollution measuring devices were developed and commercialized. EMEP's Web page has received a total of 327,000 hits since its inception in 2005. Most importantly, EMEP research was cited as providing the scientific basis for several important environmental policies in air quality and health advisories.

5.11.4 Follow-Up on Evaluation Recommendations

The process evaluation completed by Research into Action in 2010 focused on the information transfer component of NYSERDA's EMEP, which has been part of the **New York Energy $mart^{SM}** Program since 1999.[7] The process evaluation specifically sought to understand how EMEP information products are perceived and how they are used by several key contact populations. As part of this effort, the research team also sought to identify areas where EMEP could improve the access, usability, and/or relevance of the information products that flow from the program-sponsored research. The process evaluation report is now posted on NYSERDA's website.

[7] Research Into Action, Process Evaluation: Environmental Monitoring, Evaluation and Protection Program, June 2010.

Based on the report's findings and conclusions, the process evaluation made the following recommendations, which are presented in Table 5-31.

Table 5-31. EMEP Evaluation Recommendations and Status

Source of Recommendation (Contractor, Report Title, Date)	Recommendations	Status	Program Implementer Response to Recommendation and Adoption Decision Rationale
RIA, Process Evaluation of EMEP, June, 2010	Program staff members should focus on networking as an outreach activity and encourage others involved in the program to provide information about the program directly to their peers.	Under Review	These recommendations have been presented to the EMEP Program. Advisory Group and staff have received feedback from them. EMEP staff are in the process of reviewing proposals for an Outreach Contractor who will likely help begin implementing some of the recommendations.
	Continue to require that EMEP researchers submit a final report that is appropriate for the project, the scope of which will vary on a case-by-case basis.		
	Consider strategies for simplifying the review process associated with finalizing reports when indicated by project characteristics.		
	Regardless of the level of technical review or the number of reviewers, project managers should continue to be alert for opportunities to collect and summarize comments; to minimize the number of document revisions; and ensure that each successive review is providing marginal improvement sufficient to justify the time required of the researcher and NYSERDA staff.		
	Define the purpose of quarterly reports and what NYSERDA expects these reports to contain, and consider ways to facilitate the quarterly reporting process for researchers, recognizing that they may not be accustomed to tracking budgets and research progress in this way.		
	Consider milestone reports and payments rather than quarterly reports if appropriate, given the anticipated workflow associated with individual research projects.		
	Consider a facilitated meeting with advisors to create a statement of focus or mission and otherwise clarify their role and what the program expects of them.		
	Clarify for advisors NYSERDA's expectations for dissemination of results, document review tasks, and promotion of EMEP efforts.		
	Improvements in constituent tracking would be valuable for implementing improvements to EMEP's overall outreach strategy.		

5.12 Industrial Process & Product Innovation Program

5.12.1 Program Description

The Industrial Process & Product Innovation (IPPI) Program[8] supports feasibility studies and technology demonstrations and commercialization that (1) improve energy productivity and competitiveness of New York manufacturers (minimize cost per unit of 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 underused product and process alternatives. IPPI addresses product development as well as industrial process improvements. Occasionally, in addition to the general-industry IPPI solicitation, the program also offers a sector-specific solicitation such as PON 1236, "Energy Productivity in Innovative Local Food Production Systems".

Funding for the time period July 1, 2006 through December 31, 2011 is $12.0 million.

5.12.2 Recent Program Accomplishments

Several goals have been set for the IPPI Program. The goals and progress for the period July 1, 2006 to December 31, 2011 are shown in Table 5-32.

[8] This program was formerly known as the Industrial Research, Development and Demonstration Program.

Table 5-32. New York Energy $mart℠ Industrial Process & Product Innovation Program – SBC III Goals and Achievements

Activity	Program Goals (July 1, 2006 through December 31, 2011)	Achieved from July 1, 2006 through December 31, 2011	% of Goal Achieved
Issue annual solicitations	Fund 35 to 45 cost-shared projects	Total of 67 projects approved for funding	>100%
Technology transfer	Conduct technology transfer and outreach activities to broaden the acceptance of successful technologies and technical approaches via participation in at least two workshops. Publish six final reports as projects are completed.	Final reports: 11 Training sessions: 4 Conferences papers/presentations: 40 Site tours: 4 Open House: 1 Trade Journal articles: 7 Press release: 5 Excellence award: 1 Patents: 2	N/A
Program metrics	Projects supported during the SBC III period are expected to result in cumulative annual energy savings of $6 million, and project-related sales of $12 million.	Fourteen projects completed: - Actual Energy savings: $1.3 Million - Actual Non-energy savings: $0.3 Million - Actual Project-related sales: $3 Million - Potential energy savings: $1.0 Million - Potential project-related sales: $2.5 Million	Energy Savings: 22% Sales: 21%

As shown in Table 5-33, 66 projects (from various NYSERDA solicitations) have been approved for funding. At this time, there are 23 signed contracts that are active and 21 projects have been completed.

Table 5-33. Status of IPPI Projects by Solicitation

	Number of SBC-funded Projects Approved	Number of Signed Active Contracts	Number of Terminated Contracts	Number of Completed Projects
PON 998: Industrial Process & Productivity Improvement	11	1	7	3
PON 1130: Industrial Research, Development and Demonstration	13	5	1	7
PON 1190: Industrial Process & Product Innovation	15	6	1	8
PON 1206: Data Center and Server Efficiency	2	1	1	0
PON 1236: Energy Productivity in Innovative Local Food Production Systems	3	2	1	0
PON 1276: Industrial Process and Product Innovation	14	7	4	3
PON 2250: Innovation in the Manufacturing of Clean Energy Technologies	8	1	0	0
Other – one purchase order for Agriculture Worksheets	1	0	0	1
All Solicitations	**67**	**23**	**15**	**22**

PON 998 was issued in 2006 with total funding of $4 million.
PON 1130 was issued in 2007 with total funding exceeding $5.7 million.
PON 1190 was issues in 2007 with total funding of $5.5 million.
PON 1206 was issued in 2008 with total funding of $3 million.
PON 1236 was issued in 2008 with total funding of $1.5 million.
PON 1276 was issued in 2009 with total funding of $2.75 million.
PON 2250 was issued in 2011 with total funding of $2.5 million.

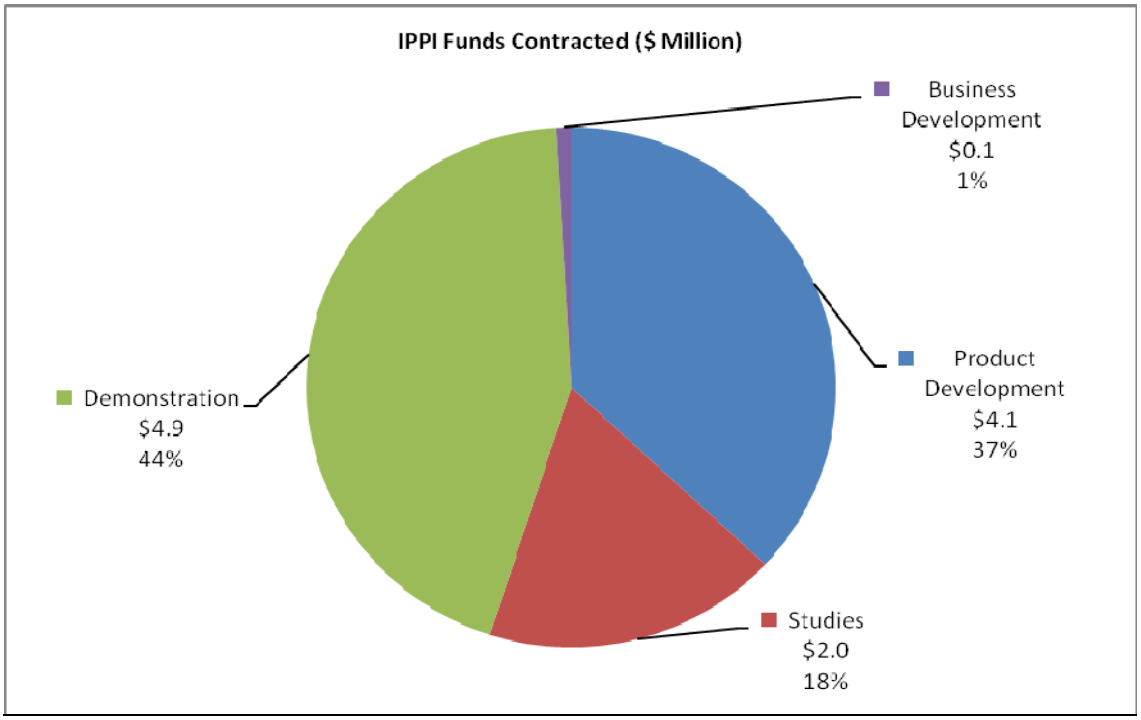
*In 2011, DG-CHP PON 2373 utilized funds from RD5A1 ($1,250,000) to supplement funding of two industrial CHP projects. That funding and related impacts are included in the DG CHP program results.

Shown in Table 5-34 is a distribution of funded projects by type for the time period July 1, 2006 to December 31, 2011. The distribution of contracted projects is shown graphically in Figure 5-11.

Table 5-34. Funds Awarded and Contracted by Project Type (July 1, 2006 to Dec. 31, 2011)

Project Category	Funds Awarded to Approved Projects	Funds Contracted ($Million)	Contracted Projects	External Co-Funding for Contracted Projects ($Million)
Product Development	$4.1	$4.1	14	$4.7
Information Dissemination/Research Study	$2.5	$ 2.0	25	$1.9
Demonstration	$5.5	$4.9	17	$12.7
Business Development	$0.1	$0.1	1	$0.1
Total	**$12.2**	**$11.1**	**57**	**$19.4**

Figure 5-11. Distribution of Contracted IPPI Funds by Project Type (July 1, 2006 to December 31, 2011)



5.13 Municipal Water and Wastewater Efficiency

5.13.1 Program Description

The Municipal Water and Wastewater Efficiency Program supports the development and demonstration of new technologies for the water/wastewater treatment sector. Studies and technology transfer activities, designed to accelerate the adoption of energy efficiency technologies, are also supported. In New York, the water/wastewater treatment sector uses 2.5 to 3 billion kWh annually. On average, treatment of water and wastewater represents 35% of a municipality's energy budget.

This R&D program is closely coordinated with programs offered through NYSERDA's Energy Efficiency Services Group. The FlexTech Program (formerly known as the Technical Assistance Program) has served the municipal water/wastewater sector since 1997 and has provided funding for 92 site-specific feasibility analyses to date. Also, equipment incentives are available through NYSERDA's Existing Facilities Program. In addition, technology transfer and outreach, through the **Energy $mart**[SM] Focus Program, will continue to play a key role in encouraging the adoption of innovative and energy-efficient technologies and practices.

The funding for the time period July 1, 2006 through December 31, 2011 is $3.35 million.

5.13.1 Recent Program Accomplishments

Several goals have been set for the Municipal Water and Wastewater Efficiency Program. Since July 1, 2006, the Program has been making good progress toward its goals as shown in Table 5-35.

Table 5-35. New York Energy $mart℠ Municipal Water and Wastewater Efficiency Program Goals Achieved from July 1, 2006 through Dec. 31, 2011

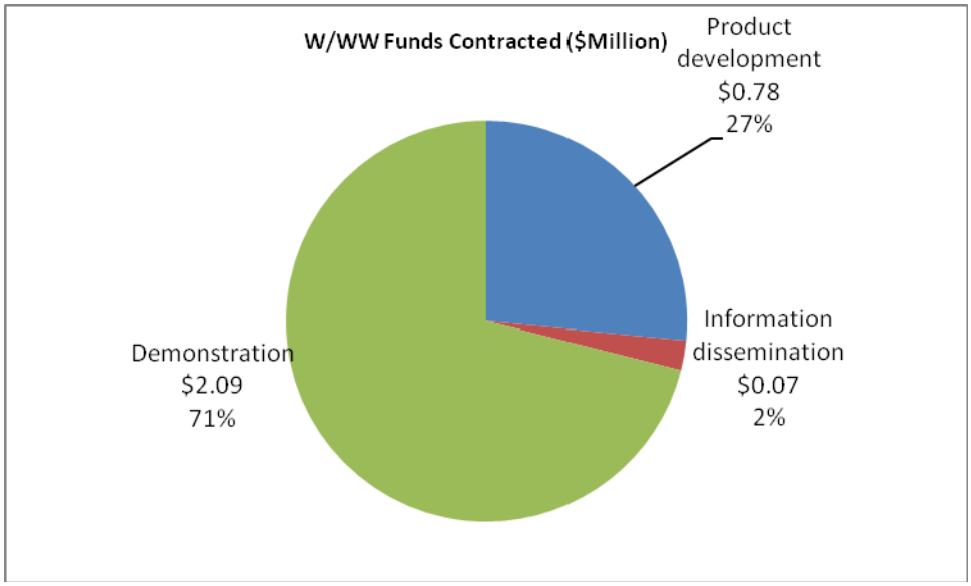
Activity	Program Goals (July 1, 2006 through December 31, 2011)	Achievements from July 1, 2006 through December 31, 2011	% of Goal Achieved
Issue annual solicitation	Fund 25 or more projects.	Sixteen project funded to date from PON 1040 (2006), PON 1171 (2008), and PON 2202 (2011).	64%
	Provide assistance to 25 treatment facilities.	Sixteen facilities impacted to date.	64%
Technology transfer	Provide critical information to 1,000 individuals serving the municipal wastewater and water treatment sector in New York on ways to optimize energy use at municipal water and wastewater treatment facilities.	2006: Four presentations at the Water and Sewer Infrastructure conferences attracted about 300 individuals. A presentation was given as part of a Webcast hosted by the Comptroller's Office. A two-day energy management training, co-developed by Global Energy Partners and the NY Water Environment Association (NYWEA), was attended by about 70 municipal operators and officials, consultants, and engineers. 2007: Submetering data for 20 wastewater treatment plants were posted online. Four presentations, as part of the Water and Sewer Infrastructure conferences, attracted about 300 individuals. NYWEA published an Energy Management issue of *Clearwaters*. 2008: Ten presentations, attracting about 550 individuals, were given to diverse audiences 2009: A presentation at the Greater Buffalo Environmental Conference, sponsored by the Western NY Section of NYWEA, attracted about 120 individuals. 2010: A web-based presentation as part of the EPA's Combined Heat and Power Partnership outreach program attracted about 100 individuals. A presentation on the results of a NYSERDA/Water Environment Research Foundation project was given to staff at NYSDEC and NYSEFC. Energy Water Conferences were held in Syracuse, White Plains, and on Long Island, which were developed by a task force consisting of NYSERDA, NYSEFC, NYPA and LIPA staff. 2011 and On-going: The Energy Smart Focus program is providing outreach materials and training to individuals associated with the sector statewide.	100%
Energy and cost savings		See Section 5.13.3.	

Shown in Table 5-36 is the funding activity for the program since July 1, 2006. Funds contracted to date total $2.9 million. Funds contracted by project type are shown graphically in Figure 5-12.

Table 5-36. Municipal Water and Wastewater Funds Awarded and Contracted by Project Type (July 1, 2006 to Dec. 31, 2011)

Project Type	Number of Projects Approved for Funding	Funds Awarded to Approved Projects ($Million)	Funds Contracted ($Million)	External Co-funding for Contracted Projects ($Million)
Product development	5	$0.78	$0.78	$1.13
Research study/information dissemination	1	$0.07	$0.07	$0.05
Demonstration	10	$2.09	$2.09	$2.76
TOTAL	**16**	**$2.94**	**$2.94**	**$3.94**

Figure 5-12. Distribution of Contracted Water and Wastewater Funds by Project Type (July 1, 2006 to December 31, 2011)



5.13.2 Long-Term Program Accomplishments

Through December 31, 2011, $5.99 million has been committed under the Municipal Water and Wastewater Efficiency Program. Thirty projects, from nine solicitations, have been funded. Seven of the nine solicitations were Program Opportunity Notices (PONs) that sought proposals to develop new

technologies or demonstrate underutilized energy-efficiency technologies. The eighth PON solicited proposals to demonstrate real-time monitoring of energy and environmental performance at wastewater treatment plants, with the goal of attracting the energy service sector to the municipal wastewater market. The ninth was an RFP that solicited proposals to benchmark energy use and evaluate the potential for energy efficiency and energy production improvements in the sector. In addition to the above, a technology transfer project helped to increase the use of a specific energy-efficient filtration technology by providing technical assistance to 10 wastewater treatment plants. Moreover, technology transfer and outreach were significant components of all of the projects derived from the various solicitations.

A summary of the funding status is presented in Table 5-37.

Table 5-37. Project and Funding Status through December 31, 2011

	Number of Projects Approved	Funds Awarded ($ million)	Co-funding ($ million)
RFP 769 Energy Efficiency Improvements at Water & Wastewater Treatment Plants (Benchmarking Study)	1	$0.13	$0.05
RFP 601 (Real-time monitoring)	2	$1.10	$0.4
Demonstration Projects (PON 569, 786, 857, 935, 1040, 1171, and 2202)	26	$4.66	$6.22
Technology Transfer Project	1	$0.10	$0.1
TOTAL	**30**	**$5.99**	**$6.77**

5.13.3 Energy Savings

On average, water and wastewater treatment project take five to seven years from conception to implementation. The projected energy savings from the real-time monitoring and technology transfer projects (shown in Table 5-37) and from 92 feasibility studies completed to date,[9] are estimated to be 46,400 MWh of electricity and 16,200 kW of peak demand reduction. In addition to these savings, substantial impacts are anticipated from the demonstration projects that resulted from the various solicitations shown in Table 5-37. The magnitude of the impact will depend on how well the knowledge from the projects is disseminated and applied across New York's municipal water/wastewater sector.

[9] These 92 feasibility studies were funded by the FlexTech/Technical Assistance Program that is part of NYSERDA's Energy Efficiency Services Program. Approximately $1.6 million was spent on these studies.

5.14 Next Generation and Emerging Technologies

5.14.1 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. Areas of focus include:

- Advanced building products for residential one- to four-family buildings. The advanced building demonstration element addresses whole-building systems that support the goal of achieving a Home Energy Rating System (HERS) score of 92 or greater.[10] The discrete building technologies element targets development and demonstration of distinct technologies, *e.g.*, energy systems (production and recovery), heating and cooling, and air quality.
- Development and demonstration of emerging technologies that improve electric end-use efficiency;
- Demonstrations and feasibility studies of solar thermal applications to support economical collection of solar energy for space and water heating;
- Support for lighting incubators to develop and commercialize advanced lighting technologies; and
- Development of energy management, sensors, and other products that enable customers to monitor and control energy use and power quality

The Product development efforts are focused on funding developers of commercially available energy-efficient technologies. Demonstration efforts are focused on end-use customers, particularly those with high electric loads. Advanced building demonstrations focus exclusively on one- to four-unit residential buildings.

A new focus area is data center efficiency. A rising demand for computer resources has led to significant growth in the number of data center servers, increasing the energy used by these servers and the required cooling equipment that represents 30% to 50% of the energy used by data centers. Data centers in the U.S. used about 61 billion kilowatt-hours (kWh) in 2006, representing 1.5 % of total U.S. electricity consumption. If current trends continue, energy consumption by data centers is expected to double in the next five years. New York has the second highest number of data centers in the U.S. Increasing energy

[10] Qualifying ENERGY STAR® homes start at a HERS rating of 84.

use, rising cost of energy and floor space, and the need for reliable power are causing many data centers to consider re-locating out of the State, leading to the loss of high paying jobs.

NYSERDA's data center activities target energy-efficiency strategies and energy saving technologies. Energy efficiency opportunities in data centers include adoption of best practices and use of state-of-the-art technologies. Depending on the current state of the data center and level of energy efficiency opportunities implemented, a 30% to 80% improvement in energy efficiency could be realized.

Past solicitations have addressed transportation, sensors, energy efficiency, superconductivity, power quality, energy management, and time sensitive pricing.

The 13-and-a-half-year program budget is $42.7 million. The funding for the time period July 1, 2006 through December 31, 2011 is $28.2 million.

5.14.2 Recent Program Accomplishments

Table 5-38 shows the Program's goals and performance since July 1, 2006.

Table 5-38. New York Energy $mart℠ Next Generation and Emerging Technologies Program – Goals and Achievements

Activity	Program Goals (July 1, 2006 through December 31,2011)	Achievements (July 1, 2006 through December 31, 2011)	% of Goal Achieved
Advanced Building Program	Three solicitations Four demonstration test beds Three product development projects	Eight solicitations completed. The advanced building solicitations have explored building systems such as whole-house ventilation, compression-less air conditioning, window improvements, and micro-CHP. Under PON 1096, Demonstration of High Performance Residential Homes, four teams were formed to design, build, and demonstrate high-performance residential homes to illustrate the importance of tight building envelopes and improved construction practices. Ten product development projects are underway	>100% of solicitations goal >100% of demo test beds goal >100% of product development projects
Daylighting Applications	15 -20 design assistance projects Eight daylighting implementations in buildings	Nineteen clients have received daylighting design assistance services. One daylighting implementation project is underway.	95% of the design assistance goal 13% of the daylighting goal

Activity	Program Goals (July 1, 2006 through December 31,2011)	Achievements (July 1, 2006 through December 31, 2011)	% of Goal Achieved
Solar Thermal Applications	One solicitation Six demonstrations	One solicitation (PON 1085) completed. Five out of seven installations are complete from two demonstration projects.	50% of the solicitations goal >40% of the goal for demonstration projects
Emerging Technologies	Six solicitations 30 product development projects	Seven solicitations have been completed to date. Solicitations have funded a wide variety of product development and demonstrations of end-use technologies including thermo-photovoltaic applications, micro-CHP, solid copper rotor electric motors, high-efficiency billboard displays, and solar thermal air conditioning. Twenty-three product development projects are underway.	>100% of the solicitations goal 76% of the projects goal

Since July 1, 2006, the program has awarded projects totaling $29 million, and contracted nearly $24 million. Projects were categorized into the following project types:

- Research/Support Studies: include studies that analyze market potential, technological feasibility, and other studies designed to inform policy makers and supply-side market actors.
- Product Development: projects that are focused on a clearly defined product and benefit New York manufacturers.
- Demonstration: projects that demonstrate the performance of products that are commercially available.

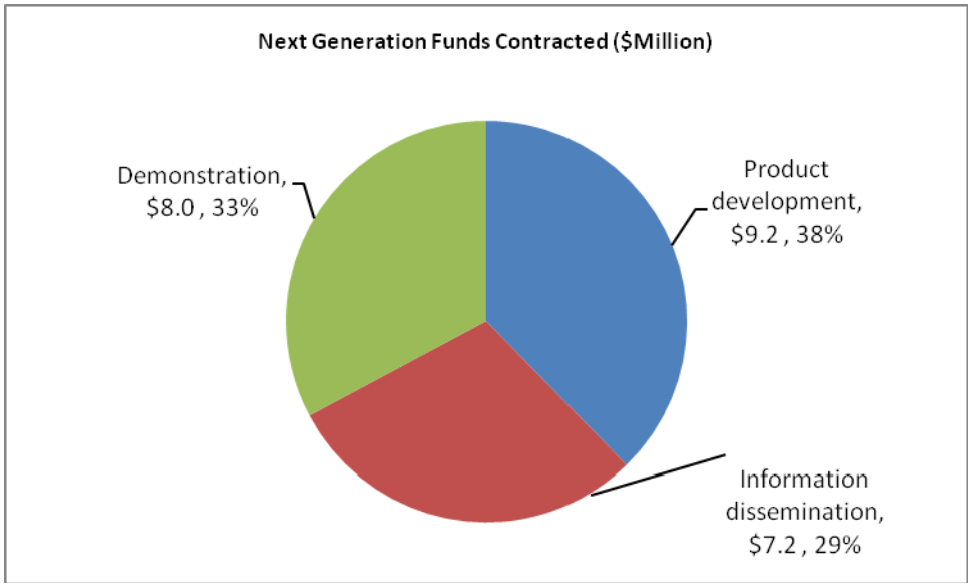
The distribution of funding by project type is shown in Table 5-39, and the distribution of contracted funds by project type is shown graphically in Figure 5-13.

Table 5-39. Distribution of Funding by Project Type (July 1, 2006 to December 31, 2011)

Project Type	Number of Projects Approved for Funding	Funds Awarded to Approved Projects ($Million)[1]	Funds Contracted for Approved Projects ($Million)	External Co-funding for Contracted Projects ($Million)
Product development	44	$11.2	$9.2	$9.6
Information dissemination/Research studies	54	$7.6	$7.2	$6.1
Demonstration	37	$9.8	$8.0	$5.4
TOTAL	**135**	**$28.6**	**$24.4**	**$21.1**

[1] Funding may drop to due project cancellations**.**

Figure 5-13. Distribution of Contracted Next Generation Funds by Project Type (July 1, 2006 to December 31, 2011)



Shown in Table 5-40, by activity area, is the contract status of approved projects.

Table 5-40. Status of Next Gen Projects by Solicitation

	Number of Signed Contracts in Progress	Number of Unsigned Contracts	Number of Completed Projects
Advanced Building Program	11	4	14
Daylighting Applications	4	0	2
Solar Thermal Applications	2	0	0
Emerging Technologies	26a	7	12
Total	**41**	**11**	**28**

a One of these projects is funded with Demand Response funds.

5.14.3 Cumulative Program Accomplishments

Shown in Table 5-41 is a description of product development projects that have been completed. Some of these projects were funded prior to July 1, 2006. Shown in Table 5-42 is a status update of ongoing product development projects.

Table 5-41. Examples of Products Developed as of December 31, 2011

Product Name	Development Objective
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 backup 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.
Combined Heat & Power for Households: The Practical Acoustic-Stirling Solution	The project will demonstrate a novel solution to residential co-generation by capturing and using the waste heat generated from a residential furnace or boiler to produce electricity on site for household use.
Demonstration of 600 Watt TPV for Gas Furnace CHP	Thermophotovoltaic electricity generation (TPV) is based on the PV conversion of infrared radiation. The infrared radiation is generated by heating an appropriate emitter. The technical goal for this project is to design a 600 watt TPV system that can be used to self-power a residential warm-air furnace.
Piezoelectric Vibrational Energy Harvester	The goal of this project is to deliver the first integrated, complete power source based on Microgen's PVEH technology. This system will be a first-effort, developmental system, but is expected to provide enough power to successfully power a chosen commercial wireless sensor node in a relevant environment.
Electro Polymeric Display	Billboard tiles using Electro Polymeric Display (EPD) technology. EPD has the same performance, is less expensive and consumes less power than traditional LED billboards.
Scattered Photon Extraction	A liquid crystal displays (LCD) with a blue light emitting diode (LED) red and green Nano phosphors-based backlighting system. The Novelty of the scattered photon extraction (SPE) optics technology in conjunction with high efficiency ZnSSe based green and ZnSSeTe based red Nan phosphors results in a white backlight system that is more efficient than the current Red-Green-Blue (RGB) based LED backlights for LCDs.
Advanced Energy Efficient Solid State Track Lighting System	The project developed an advanced, energy-efficient solid-state track lighting system that will provide superior performance over current state-of-the-art technologies;The W.A.C. LED track light system was commercialized and

Product Name	Development Objective
	demonstrated in an art gallery at the Mineola Library in Mineola NY, and the results published in a Field Test DELTA Snapshot publication by RPI's LRC.

Table 5-42. Status of On-going Projects

Product Description	Development Objective	Status Update
Solar Powered LED Lighting System	To develop and commercialize two solar-powered light-emitting diode (LED) pedestrian level (12 ft.) luminaires with a full cut-off design; one luminaire design with the light output comparable to a 20W Metal Halide light source, and one luminaire design with the light output comparable to a 35W Metal Halide light source.	Project has been delayed due to staffing issues but the Contractor intends to increase work on this project during the first quarter 2012. Task 2 (Market Research Survey) was provided for NYSERDAs review and comment.
Advanced Development & Demonstration of Duct Lining Technology	Lab experimentation, design, development, and field demonstration of a new class of ductwork retrofits / duct-lining equipment installed in two identified residential buildings in New York State.	Milestone 1 has been completed (Lab test results completed) and Milestone 2 is in progress (design and development of equipment for duct lining installations).
Solar PV Dehumidification and Cooling Systems	Develop a cooling system that can (1) supplement a hydronic geothermal system where ground water temperatures are intermittently at 58°F (the effective system ground water temperature threshold); or, (2) function as a self-contained / stand-alone (i.e., non-geothermal) hydronic system.	This project was given a No-Go decision after performing a Solar A/C vs. conventional SEER A/C comparison. Milestone 1 was paid and project was closed.
Energy Saving Dynamic Windows	Create a solar responsive façade that substantially lowers the buildings energy consumption profile through the reduction in electric lighting, heating and cooling loads.	The testing work has been completed. Results indicate further development work is required before this technology is ready for commercialization in the proposed application. The final report is being prepared.
Residential Renewable Electricity Production Without Solar PV	Develop a product that can produce residential electricity from non-PV renewable energy sources by utilizing the Organic Rankine thermal cycle and their patented Trochoidal Gear Expander (TGE ™) technology.	All project operations are completed (Milestone 1 – 5.2). Project is just awaiting the submittal of Milestone 6, which is the Final Report expected in 2nd quarter of 2012.
Bulk down converters for high efficiency LEDs	To develop an Yttrium aluminium garnet (YAG:Ce)-based bulk downconverter (BDC) to produce a white light emitting diode (LED) that is 30% more efficacious than commercially available light-emitting diodes (LEDs).	The work has been completed and the project close out paperwork completed. The Contractor's work to synthesize YAG:Ce resulted in the formation of small yellow micro crystals using low temperature solutions, but the size, yield and luminescence were not able to attain project goals. Growth of longer length crystals will require very long duration of production (two-three

Product Description	Development Objective	Status Update
		months for 1cm long crystal) and therefore this approach is not feasible for large scale LED applications for economic reasons.

Appendix A: Evaluation Adjustment Factors

This appendix was created in lieu of tables previously presented in Sections 3, 4, and 5 of each quarterly report showing the adjustments applied to each program's reported savings for measurement and verification (M&V) and attribution (net-to-gross) evaluation assessments. Only the final net program savings, with all adjustments applied, are presented within the main body of this quarterly report, but these adjustment factors are provided so the reader can understand the extent to which M&V realization rates and the attribution work on freeridership and spillover affect the overall program achievements.

Table A-1. Commercial/Industrial Program Evaluation Adjustment Factors

Program	Savings Metric	Realization Rate	Freeridership	Spillover	Net-to-Gross Ratio
Existing Facilities (**New York Energy $mart[SM]**)	MWh	N/A[1]	N/A[1]	N/A[1]	N/A[1]
	MW	N/A[1]	N/A[1]	N/A[1]	N/A[1]
	Curtailable MW	N/A[1]	N/A[1]	N/A[1]	N/A[1]
	MMBtu	N/A[1]	N/A[1]	N/A[1]	N/A[1]
Existing Facilities (EEPS electric and natural gas)	MWh	1.0	N/A	N/A	0.90a
	MW	1.0	N/A	N/A	0.90a
	MMBtu	1.0	N/A	N/A	0.90a
Business Partners: Small Commercial Lighting	MWh	0.94	39%	79%	1.10b
	MW	1.0	39%	79%	1.10b
Business Partners: Premium Efficiency Motors	MWh	1.0	67%	168%	0.88
	MW	1.0	67%	113%	0.70
Business Partners: Commercial HVAC	MWh	N/A	N/A	N/A	N/A
	MW	N/A	N/A	N/A	N/A
Business Partners: Hospitality Lighting	MWh	Not Evaluated	Not Evaluated	Not Evaluated	Not Evaluated
	MW	Not Evaluated	Not Evaluated	Not Evaluated	Not Evaluated

Program	Savings Metric	Realization Rate	Freeridership	Spillover	Net-to-Gross Ratio
Loan Fund	MWh	0.81c	27%	20%	0.93
	MW	1.73c	27%	20%	0.93
	MMBtu	1.59	27%	20%	0.93
New Construction (**New York Energy $mart**[SM])	MWh	1.03d	39%	89%	1.22d
	MW	0.97d	39%	89%	1.22d
	MMBtu	1.0d	39%	89%	1.22d
New Construction (EEPS electrical and natural gas)	MWh	1.03	39%	89%	1.22
	MW	0.97	39%	89%	1.22
	MMBtu	1.0	N/A	N/A	0.9a
Flex Tech (**New York Energy $mart**[SM])	MWh	1.0d	25%	48%	1.14d
	MW	1.0d	25%	48%	1.14d
	Curtailable MW	1.0d	25%	48%	1.14d
	MMBtu	1.0	25%	48%	1.14
Flex Tech (EEPS electric and natural gas)	MWh	1.0	N/A	N/A	1.14
	MW	1.0	N/A	N/A	1.14
	MMBtu	1.0	N/A	N/A	0.9a
Industry and Process Efficiency (EEPS)	MWh	1.0	N/A	N/A	0.9a
	MW	1.0	N/A	N/A	0.9a
	MMBtu	1.0	N/A	N/A	0.9a

[1]Realization rates and Net-to-Gross ratios are applied to the several individual predecessor components of this program and savings are reported at an aggregate level.

a DPS directed NTG ratio of 0.9 until evaluation of program is done.

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

c The realization rates calculated only apply to the custom measure kWh and kW savings. Savings arising from pre-qualified measures have a realization rate of 1.0.

d Adjustment factors shown here do not include separate adjustments made to a subset of large energy saving projects that were separately evaluated.

Table A-2. Residential and Low-Income Program Evaluation Adjustment Factors

Program					
New York ENERGY STAR Homes (**New York Energy $mart℠**)	MWh	1.10	28%	48%	1.17
	MW	2.32	28%	48%	1.17
	MMBtu	0.74	28%	48%	1.17
Home Performance with ENERGY STAR (**New York Energy Smart℠**)	MWh	1.00	26%	41%	1.12
	MW	1.04	26%	41%	1.12
	MMBtu	0.86	26%	41%	1.12
New York ENERGY STAR Homes (EEPS natural gas)	MMBtu	1.0	N/A	N/A	0.9a
Home Performance with ENERGY STAR (EEPS natural gas)	MMBtu	1.0	N/A	N/A	0.9a
Assisted Multifamily	MWh	0.97	27%	15%	0.84
	MW	1.26	27%	15%	0.84
	MMBtu	1.0	27%	15%	0.84
Comprehensive Energy Management	MWh	0.57	2%	18%	1.16
	MW	0.82	2%	18%	1.16
Low Income Direct Installation	MWh	1.0	N/A	N/A	0.9a
	MW	1.0	N/A	N/A	0.9a
Multifamily Performance Program (**New York Energy $mart℠**)	MWh	1.0	N/A	N/A	0.9a
	MW	1.0	N/A	N/A	0.9a
	MMBtu	1.0	N/A	N/A	0.9a
Market Rate Multifamily Performance (EEPS electric and natural gas)	MWh	1.0	N/A	N/A	0.9a
	MW	1.0	N/A	N/A	0.9a
	MMBtu	1.0	N/A	N/A	0.9a
Low Income Multifamily Performance (EEPS electric and natural gas)	MWh	1.0	N/A	N/A	0.9a
	MW	1.0	N/A	N/A	0.9a
	MMBtu	1.0	N/A	N/A	0.9a

Program	Savings Metric	Realization Rate	Freeridership	Spillover	Net-to-Gross Ratio
New York Energy $mart[SM] Products and Marketing	MWh	N/A	N/A	N/A	N/A
	MW	N/A	N/A	N/A	N/A
	MMBtu	N/A	N/A	N/A	N/A
Keep Cool	MWh	1.0	18%	15%	0.94
	MW	1.0	18%	15%	0.94
Bulk Purchase	MWh	2.03	10%	5%	0.95
	MW	1.62	10%	5%	0.95
	MMBtu	0.71	10%	5%	0.95
CFL Expansion (EEPS electric)	MWh	Not Evaluated	N/A	N/A	1.6 b, c
	MW	Not Evaluated	N/A	N/A	1.6 b, c
Empower (**New York Energy $mart[SM]**)	MWh	N/A d	N/A	N/A	Not Evaluated
	MW	1.0	N/A	N/A	Not Evaluated
	MMBtu	1.0	N/A	N/A	Not Evaluated
Empower (EEPS electric and natural gas)	MWh	0.81e	N/A	N/A	1.0e
	MW	1.0	N/A	N/A	1.0e
	MMBtu	1.0	N/A	N/A	0.9a

a DPS directed NTG ratio of 0.9 until evaluation of program is done.

b NTG estimation is based on sales from service territories compared with sales from one or more non-program comparison areas, sometimes selected to be demographically similar to the program area. The NTG equals the CFL sales in the program area minus CFL sales in the comparison area all divided by program-supported sales in the program area.

c The NTG estimate for the CFL Expansion Program is based on baseline conditions. NYSERDA has completed a CFL Expansion Program evaluation which resulted in a lower net-to-gross ratio. NYSERDA is currently awaiting DPS guidance on how to apply the new net-to-gross ratio in scorecard and other reporting.

d **New York Energy $mart[SM]** EmPower impacts include EmPower New York and Weatherization Network Initiative (WNI) programs, which have different realization rates for MWh/year.

e The last EmPower impact evaluation conducted for the **New York Energy $mart[SM]** program resulted in a 0.81 realization rate. Net-to-gross was not evaluated. Thus, the total adjustment being applied to EEPS reported savings, based on prior evaluation results, is currently a 0.81. An updated impact evaluation will be completed for the EmPower program in 2011, which is expected to result in new adjustment factors.

Table A-3. Research & Development Program Evaluation Adjustment Factors

Program	Savings Metric	Realization Rate	Freeridership	Spillover	Net-to-Gross Ratio
End Use Renewables	MWh	1.04	N/A	N/A	1.0
	MW	0.85	N/A	N/A	1.0
Wholesale Renewables	MWh	1.0	N/A	N/A	1.0
	MW	1.0	N/A	N/A	1.0
DG-CHP	MWh	0.9a	N/A	N/A	1.07a
	MW	0.98a	N/A	N/A	1.07a
	MMBtu	0.89a	N/A	N/A	1.07a
Demand Response and Innovative Rate Research	MW	0.50	N/A	N/A	0.95

a Adjustment factors shown here do not include separate adjustments made to a subset of large energy saving projects that were separately evaluated.

Appendix B: Avoided Costs Used in Benefit/Cost Analysis

Table B-1. Avoided Electric Energy Cost Forecast (2008$)

Year	Downstate	Upstate
2006	0.08738	0.07153
2007	0.08738	0.07153
2008	0.08738	0.07153
2009	0.08960	0.07459
2010	0.08786	0.07314
2011	0.08624	0.07178
2012	0.08465	0.07045
2013	0.08434	0.07020
2014	0.08402	0.06995
2015	0.08371	0.06970
2016	0.08391	0.06987
2017	0.08412	0.07004
2018	0.08433	0.07021
2019	0.08453	0.07038
2020	0.08474	0.07056
2021	0.08495	0.07073
2022	0.08516	0.07090
2023	0.08537	0.07108
2024	0.08558	0.07125

Source: New York State Public Service Commission Order Approving "Fast Track" Utility-Administered Electric Energy Efficiency Programs with Modification, Issued January 16, 2009. The values in the Order were adjusted to reflect line losses estimated at 7.2% of generation.

Table B-2. Avoided Electric Capacity Cost Forecast (2008$)

Year	Downstate	Upstate
2006	167.236	69.627
2007	167.236	69.627
2008	167.236	69.627
2009	167.575	77.726
2010	237.306	85.399
2011	236.789	92.532
2012	236.228	99.235
2013	242.543	105.550
2014	238.190	111.487
2015	229.914	117.069
2016	239.537	122.328
2017	254.397	127.263
2018	255.550	131.907
2019	256.584	136.272
2020	257.522	140.366
2021	258.362	144.213

Source: New York State Public Service Commission Order Approving "Fast Track" Utility-Administered Electric Energy Efficiency Programs with Modification, Issued January 16, 2009. The values in the Order were adjusted to include avoided distribution costs of $100 per kW downstate and $33.28 per kW upstate.

Table B-3. Avoided Winter Natural Gas Price Forecast: $/MMBtu (2008$)

Year	Downstate	Upstate
2006	15.80	12.40
2007	15.80	12.40
2008	15.80	12.40
2009	13.87	10.47
2010	13.64	10.24
2011	13.41	10.01
2012	13.19	9.79
2013	13.19	9.79
2014	13.19	9.79
2015	13.19	9.79
2016	13.27	9.87
2017	13.34	9.94
2018	13.42	10.02

Source: New York State Public Service Commission Order Approving "Fast Track" Utility-Administered Gas Energy Efficiency Programs with Modification, Issued April 7, 2009.

Table B-4. Avoided Year-Round Natural Gas Price Forecast: $/MMBtu (2008$)

Year	Downstate	Upstate
2006	14.09	11.53
2007	14.09	11.53
2008	14.09	11.53
2009	12.24	9.67
2010	12.01	9.45
2011	11.79	9.23
2012	11.58	9.02
2013	11.58	9.02
2014	11.58	9.02
2015	11.58	9.02
2016	11.66	9.09
2017	11.73	9.17
2018	11.80	9.24

Source: New York State Public Service Commission Order Approving "Fast Track" Utility-Administered Gas Energy Efficiency Programs with Modification, Issued April 7, 2009. The year-round cost was derived by weighting summer prices (for seven months) and winter prices (for five months).

Table B-5. Retail Price of Electricity and Natural Gas

Retail Price of Electricity	
Downstate: Commercial/Industrial	$0.238
Upstate: Commercial/Industrial	$0.135
Downstate: Residential	$0.231
Upstate: Residential	$0.127
Retail Price of Natural Gas	
Commercial/Industrial	$11.58
Residential	$15.49

Electricity prices reflect average prices excluding fixed costs.

The split between commercial and industrial sectors was assumed to be 64%/36%.

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New York's System Benefits Charge Programs Evaluation and Status Report

Year Ending December 31, 2011
Report to the Public Service Commission

State of New York
Andrew M. Cuomo, Governor

New York State Energy Research and Development Authority
Francis J. Murray, Jr., President and CEO

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