
5

Residential Programs

5.1 Overview of the Residential Programs

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

ENERGY STAR[®] Products and Marketing (ESPM) Programs. These two programs work in tandem to increase awareness, understanding, stocking, promotion, and sales of ENERGY STAR Products. These programs target the following 16 appliances and lighting products: refrigerators, dishwashers, clothes washers, room air conditioners and through-the-wall (TTW) units, compact fluorescent light bulbs (CFLs), energy-efficient lighting fixtures and ceiling fans, dehumidifiers, and freezers. Marketing also drives consumer demand for other residential programs, such as the Home Performance with ENERGY STAR (HPwES) and New York ENERGY STAR Labeled Homes (NYESLH) programs.

Stay Cool! Program (formerly known as the Keep Cool Program). The Keep Cool Program encouraged the replacement of old, working air conditioners with ENERGY STAR-labeled room air conditioners and TTW units. Turned-in units were permanently removed from service and demanufactured and recycled. The program was coupled with a multi-media marketing campaign encouraging consumers to follow three specific energy tips during the summer months: (1) buy ENERGY STAR products; (2) shift appliance use to non-peak periods and (3) use timers or programmable thermostats on air conditioners. Due to the success of the program, the bounty was reduced in 2003 and eliminated in 2004. The marketing component continued in 2004 and 2005 and in 2004, the program was renamed Stay Cool!. Energy savings values in this report reflect Keep Cool Program activity.

New York ENERGY STAR Labeled Homes (NYESLH) Program. This program is an enhanced version of the EPA's ENERGY STAR Labeled Homes Program, providing technical assistance and financial incentives to one- to four-family home builders and Home Energy Rating System (HERS) raters. The program encourages the adoption of energy-efficient design features and the selection and installation of more energy-efficient equipment in new construction and substantial renovation projects.

Home Performance with ENERGY STAR (HPwES) Program. This program is designed to enhance the capacity for delivering energy efficiency services to existing one-to-four family residences. Energy efficiency improvements supported by the program include building shell measures; electric measures,

such as refrigerators and lighting fixtures; heating and cooling measures, such as boilers and central air conditioning; and renewable energy technologies, such as photovoltaics. Results reported in this section reflect HPwES Program activity, including results achieved through its low-income component, Assisted HPwES.

ENERGY STAR Products Bulk Purchase Program. This program provides purchase assistance for early replacement of inefficient appliances through education, bulk procurement and incentives in order to influence market transformation in the multifamily sector. Bulk purchase activities were originally part of the Appliances and Lighting Program (the precursor to ESPM), but became a separate program in 2002. Incentives were discontinued in 2003 as more comprehensive multifamily building performance programs were underway and because the focus of the ENERGY STAR Products area was on market transformation as opposed to product acquisition.

Residential Comprehensive Energy Management (CEM) Program. This program promotes the acquisition and installation of energy management and advanced metering systems. This program helps position residential customers to take advantage of retail competition, while enabling program implementers to access customers' energy-use data.

Residential Technical Assistance (ResTech) Program. This program improves the operation of multifamily housing by identifying and encouraging the implementation of cost-effective energy-efficiency measures that also enhance health, safety, and comfort. Activities supported include: feasibility studies, computer-assisted building modeling, energy-efficiency technical training and commissioning.

Residential Special Promotions Program. The program seeks to increase the availability, promotion and sale of energy-efficient products and services by implementing promotions in markets not effectively addressed through other marketing activities. This program is designed to influence the behavior of up-stream and mid-stream market participants as well as residential customers.

Energy Smart Students Program. The Energy Smart Students Program provides curriculum materials, training and professional development for teachers on the scientific concepts of energy and provides objective information about energy sources, their use and impact on the environment, the economy and society. The program also includes information to educate students about energy efficiency and conservation, and tools to help educators, energy managers and consumers use energy wisely.

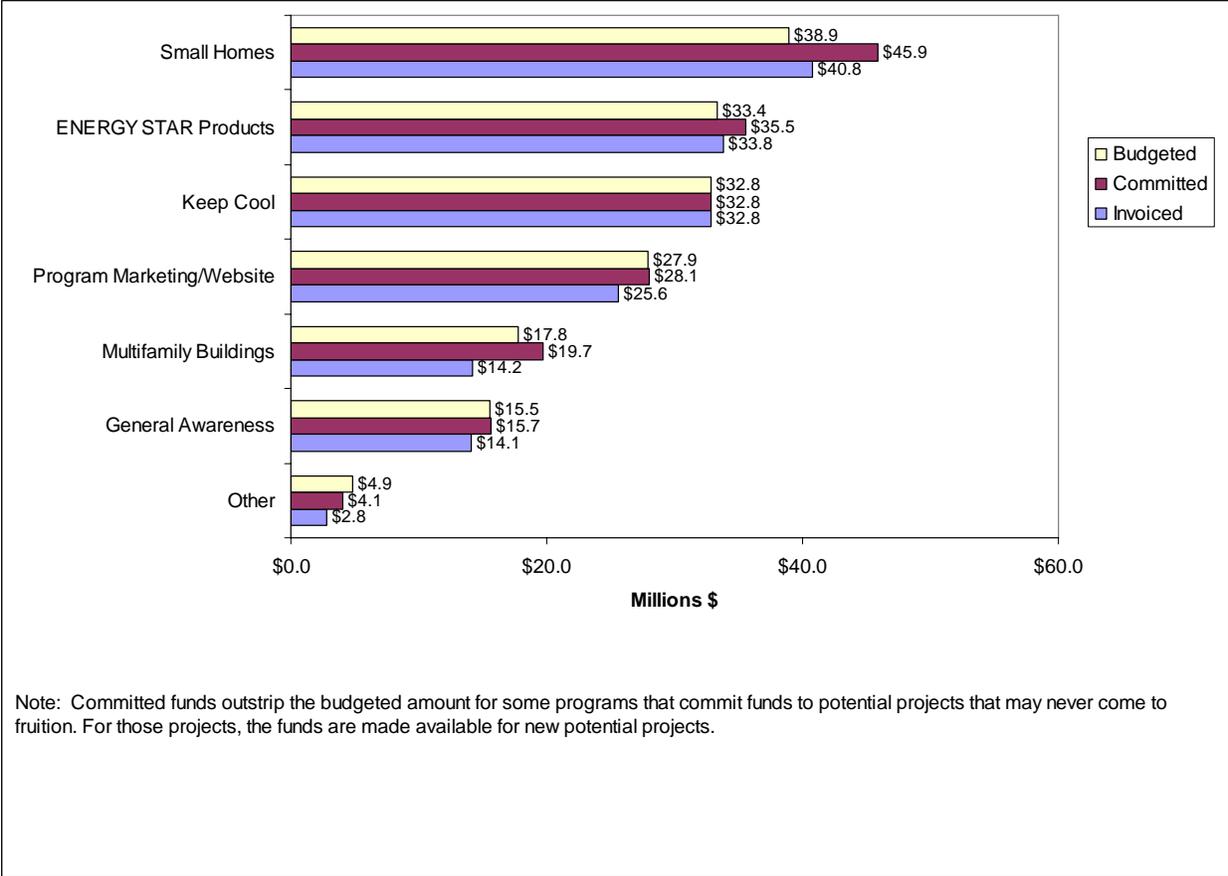
New York Energy \$martK Communities (Energy \$mart Communities) Program. The program was developed to complement the Department of Energy (DOE) Rebuild America Program. Energy \$mart Communities targets regional needs by bringing together organizations and agencies that contribute to local "model" projects demonstrating how energy efficiency and energy resource approaches can be used to create economic, social and environmental benefits. To transfer the success of these model projects to the rest of the region, this program provides information and support at the local level to individuals and organizations interested in energy efficiency and New York Energy \$martK programs.

5.2 Residential Budget Status

The Residential Programs budget is shown in Figure 5-1. The Residential Programs budget of \$171.2 million represents approximately 18% of the total eight-year New York Energy \$martK Program

budget. As of December 31, 2005, the Residential Programs have committed \$181.7 million, or 106%, of the eight-year budget and have expended \$164.1 million of the committed funds. Note that the General Awareness Program, while included in the Residential Programs budget, represents marketing and outreach activities that apply to the overarching **New York Energy SmartK** portfolio. Therefore, a description of that program can be found in Section 3 of this report.

Figure 5-1. Residential Budget Status



5.3 Residential Evaluation Activities

The Residential Programs evaluation activities conducted for this report are shown in Table 5-1; note that the work was conducted over a three-year period covering program years 2003 through 2005.

Table 5-1. Residential Program Area Evaluation Activities

				Process Evaluation
Residential Portfolio	Yes (2005)	No	No	No
ENERGY STAR Products & Marketing	Prelim (2003)	File review (2003) Update (2004) Update (2005)	Full (2003) Update (2004) Full (2005)	Yes (2004) Yes (2005)
Keep Cool	Yes (2003)	Yes (2003) Update (2004)	Full (2003) Update (2004)	No
New York ENERGY STAR Labeled Homes	Yes (2004)	Yes (2003) Expanded (2004) Yes (2005)	Full (2003) Update (2004) Full (2005)	Yes (2004)
Home Performance with ENERGY STAR	Yes (2004)	File review (2003) Expanded (2004) Yes (2005)	Full (2003) Update (2004) Full (2005)	Yes (2004)
ENERGY STAR Products Bulk Purchase Program	No	Yes (2003) Update (2004)	No	No
Residential (MF) Comprehensive Energy Management	Yes (2005)	Yes (2004) Update (2005)	Full (2004)	No
Residential Special Promotions	No	No	No	No

5.4 Key Residential Evaluation Findings

The Residential Programs in the **New York Energy SmartSM** portfolio address critical residential electricity uses. There are efforts promoting efficient lighting, appliances, new homes, and whole house efficiency assessments and improvements. Overall, the evaluation contractors conclude that NYSERDA’s programs provide significant gains in efficiency while also helping to improve the quality of energy-related services for New Yorkers. The programs appear to be having positive effects on market demand, supply, and infrastructure development, and these signs of market progress are generally in line with the length of time spent and the resources invested. The NYSERDA efforts leverage the national investment in ENERGY STAR by incorporating it throughout the residential programs, and in fact enhance the range of residential markets it influences.

The ENERGY STAR label is the overarching symbol tying together NYSERDA’s Residential Programs, so it is essential for consumers to be aware of the label. New Yorkers’ recognition of the ENERGY STAR label has increased steadily, from 34% in 1999 to 77% in 2005. Awareness in the **New York**

Energy \$martSM area consistently exceeds national levels, including some high-publicity areas with ENERGY STAR programs.

Once aware of the ENERGY STAR label, it is important that consumers also understand the meaning of the label. The proportion of consumers in New York who show high understanding of the label has increased from 35% in 1999 to 87% in 2005.

There is also evidence linking people's awareness and understanding directly to NYSERDA's efforts. In 2005, 63% of New York consumers saw television ads related to ENERGY STAR.

Another key program element is increasing the visibility and availability of ENERGY STAR products. The percentage of ENERGY STAR-qualified models out of all models on display in partner stores increased, for example, from 14% in 1999 to 35% in 2005 for refrigerators, from 10% to 82% for dishwashers, from 16% to 39% for clothes washers, and from 26% to 61% for room air conditioners.

NYSERDA's program efforts from 1999 to 2005 have helped increase in the market share of ENERGY STAR refrigerators among NYSERDA partners from 28% to 47%; from 48% to 76% for dishwashers; from 24% to 41% for clothes washers; and from 45% to 76% for room air conditioners. The proportion of new single-family homes sold that are ENERGY STAR-labeled has increased from 0.3% in 2001 to 13.5% in 2004. The proportion of the home improvement market installing efficiency measures through the HPwES Program has increased from 0.2%-0.3% in 2001 to 2.1%-3.3% in 2005.

Process evaluation surveys and interviews indicate that much of the success of ENERGY STAR Products, NYESLH, and HPwES is attributable to: innovation and commitment to quality by NYSERDA staff; program implementation contractors' commitment and performance, and the relationships with retail and contractor partners that have resulted from the programs; teamwork and communication between the staff at NYSERDA and the implementation contractors; staff commitments to consumer education and awareness; and use of retailers and contractors to reach consumers. NYSERDA has been very effective in recruiting partners in appropriate markets, and in providing them with tools—such as training and marketing—to help them persuade consumers to adopt more efficient products and behaviors. Association with NYSERDA's programs and with energy efficiency has helped many of these partners differentiate themselves from their competitors. Moreover, nearly all parties involved in these programs—from retailers to builders to insulation and HVAC contractors to consumers—indicate a high degree of satisfaction with these programs.

NYSERDA has developed innovative residential program approaches with implications beyond New York. For example, the dramatic increases in the market penetration of ENERGY STAR room air conditioners resulting from the Stay Cool! Program, according to interviews with manufacturers, increased the subsequent production of ENERGY STAR room air conditioners across the entire country, essentially “jump-starting” the market. NYSERDA's HPwES Program has been serving as a pilot program for the U.S. Environmental Protection Agency (EPA), and now is being widely adopted by other states.

NYSERDA's Residential Programs are also designed and implemented to support each other. The reliance on ENERGY STAR as an overarching symbol is an example of this approach, with resulting synergies across product lines. There are specific efforts to cross-sell, such as promoting ENERGY STAR products (appliances and lighting) within the NYESLH Program. There are also efforts to support

NYSERDA’s partners across programs, such as developing a business model with HERS raters – necessary to the NYESLH Program – also serving as contractors in the HPwES Program.

NYSERDA’s Measurement and Verification (M&V) contractor assessed the energy and peak demand savings reported for its residential programs. Methods used in this assessment included on-site verification of equipment installation and functionality, and review of NYSERDA’s files for reasonableness and accuracy. Based on this review, the M&V contractor adjusted the savings reported by NYSERDA. In turn, the Market Characterization, Assessment and Causality/Attribution (MCAC) contractor further adjusted these figures to account for freeridership and spillover. A summary of the energy and peak demand savings from the Residential Programs is presented in Table 5-2, Table 5-3, and Table 5-4. These numbers show the savings after adjustments by the M&V and MCAC evaluation contractors.

Table 5-2. Residential Programs Electricity Savings Summary

					Net Savings (MWh/year)
ENERGY STAR Products and Marketing	238,828	-	238,828	-	238,828
Keep Cool	29,460	1.00	29,460	0.94	27,781
New York ENERGY STAR Labeled Homes	5,231	1.01	5,261	1.17	6,155
Home (and Assisted) Performance with ENERGY STAR	9,536	1.01	9,644	1.12	10,802
ENERGY STAR Bulk Purchase	19,451	2.03	39,397	0.95	37,230
Residential Comprehensive Energy Management	3,192	0.97	3,103	1.16	3,588
Residential Programs Total	305,698	-	325,693	-	324,384

Table 5-3. Residential Programs Peak Demand Savings Summary

					Net Savings (MW)
ENERGY STAR Products and Marketing	54.0	-	54.0	-	54.0
Keep Cool	50.5	1.00	50.5	0.94	47.6
New York ENERGY STAR Labeled Homes	0.7	1.11	0.8	1.17	0.9
Home (and Assisted) Performance with ENERGY STAR	1.4	1.07	1.5	1.12	1.7
ENERGY STAR Bulk Purchase	3.9	1.62	6.4	0.95	6.0
Residential Comprehensive Energy Management	0.8	1.77	1.5	1.16	1.7
Residential Programs Total	111.3	-	114.7	-	111.9

Table 5-4. Residential Programs Non-Electric Savings Summary

					Net Savings (MMBtu)
ENERGY STAR Products and Marketing	325,628	-	325,628	-	325,628
New York ENERGY STAR Labeled Homes	225,779	1.67	377,951	1.17	442,203
Home (and Assisted) Performance with ENERGY STAR	378,947	1.0	378,947	1.12	424,421
ENERGY STAR Bulk Purchase	24,307	0.71	17,240	0.95	16,292
Residential Programs Total	954,661	-	1,099,766	-	1,208,544

As described in Section 3.3.3 of this report, benefit/cost ratios were calculated for all major programs. The results for four residential programs are shown in Table 5-5.

Table 5-5. Benefit/Cost Ratios of Residential Programs

				Residential Comprehensive Energy Management
Total Resource Costs	\$63.7	\$30.5	\$37.0	\$14.1
Present Value of Resource benefits	\$316.5	\$82.0	\$53.5	\$5.9
Present Value of Market Price Effect	\$82.5	\$0.9	\$1.0	\$3.5
Present Value of Non-Energy Impacts	\$154.5	\$23.6	\$46.6	\$3.1
Scenario 1 TMET Ratio	5.0	2.7	1.4	0.4
Scenario 1 PET Ratio	8.6	5.0	2.7	0.6
Scenario 2 TMET Ratio	6.3	2.7	1.5	0.7
Scenario 2 PET Ratio	10.8	5.1	2.7	0.9
Scenario 3 TMET Ratio	8.7	3.5	2.7	0.9
Scenario 3 PET Ratio	15.0	6.5	5.0	1.2

Table 5-6 highlights some of the key progress indicators associated with NYSERDA’s Residential Programs.

Table 5-6. Residential Programs – Key Program Indicators and Progress

			Latest Measurement
General Outputs	Number of retailer participants	<u>2001 Data</u> 756	<u>2005 Data</u> 365
	Number of manufacturer partners	<u>2001 Data</u> 14	<u>2005 Data</u> 23
	Number of active builder partners	<u>2001 Data</u> 34 builders constructed at least one program home	<u>2005 Data</u> 232 builders constructed at least one program home
	Number of participating BPI-certified contractors and firms	<u>2003 Data</u> 104 BPI-certified contractors 127 BPI-accredited firms	<u>2005 Data</u> 109 BPI-certified contractors 138 BPI-accredited firms
	Number of advanced meters installed and progress toward goal of installing 15,000 meters	<u>2004 Data</u> 8,786 59% of program goal	<u>2005 Data</u> 12,937 86% of program goal
	Dollars spent on cooperative advertising	<u>2001 Data</u> ENERGY STAR Products: \$6.0 million	<u>2005 Data</u> ENERGY STAR Products: \$11.2 million

			Latest Measurement
Energy Savings and Cost-Effectiveness	Net MWh, MW, and MMBtu savings	<u>2003 Data</u> 171 GWh, 66.7 MW, and 269,091 MMBtu <u>2004 Data</u> 256 GWh, 93 MW, and 479,897 MMBtu	<u>2005 Data</u> 324 GWh, 111.9 MW and 1,208,544 MMBtu
	Residential sector benefit-cost ratio	<u>2003 Data</u> 1.2 (TMET, Scenario 1) <u>2004 Data</u> 1.1 (TMET, Scenario 1)	<u>2005 Data</u> 2.5 (TMET, Scenario 1)
Awareness and Knowledge	Consumer awareness of the ENERGY STAR label	<u>1999 Data</u> 34% (aided awareness from NYSERDA mail survey)	<u>2005 Data</u> 77% (unaided awareness from NYSERDA telephone survey)
	Consumer understanding of the ENERGY STAR label	<u>1999 Data</u> 35% <u>2003 Data</u> 47%	<u>2005 Data</u> 87%
Availability	Percent of models on display at NYSERDA partner retailers that are ENERGY STAR compliant	<u>1999 Data</u> Refrigerators – 14% Clothes Washers – 16% Dishwashers – 18% RACs – 26% CFL Bulbs – 17% All Fixtures – 0-4%	<u>2005 Data</u> Refrigerators – 35% Clothes Washers – 39% Dishwashers – 82% RACs – 61% CFL Bulbs – 14% All Fixtures – 1-28%
Market Share and Market Penetration	ENERGY STAR refrigerator market share	<u>2001 Data</u> 28% NY Partners 16% National Partners in NY ¹	<u>2005 Data</u> 47% NY Partners 52% National Partners in NY ¹
	ENERGY STAR dishwasher market share	<u>2001 Data</u> 48% NY Partners 15% National Partners in NY ¹	<u>2005 Data</u> 76% NY Partners 90% National Partners in NY ¹
	ENERGY STAR clothes washer market share	<u>2001 Data</u> 24% NY Partners 12% National Partners in NY ¹	<u>2005 Data</u> 41% NY Partners 34% National Partners in NY ¹
	ENERGY STAR RAC market share	<u>2001 Data</u> 45% NY Partners 21% National Partners in NY ¹	<u>2005 Data</u> 76% NY Partners 50% National Partners in NY ¹
	New York ENERGY STAR Labeled Homes market penetration	<u>2001 Data</u> 0.3% of all homes 0.3% of single-family homes	<u>2004 Data</u> 11.1% of all homes 13.5% of single-family homes

			Latest Measurement
	Market penetration of the HPwES Program in the home remodeling market	<u>2001 Data</u> Approximately 0.2-0.3%	<u>2005 Data</u> Approximately 2.1-3.3%

¹ Participating National EPA ENERGY STAR Partner Sales Data, Collected by D&R International.

5.5 ENERGY STAR® Products and Marketing Programs

5.5.1 Program Description

Program Purpose

The ENERGY STAR® Products and Marketing (ESPM) Programs work in tandem to increase awareness and understanding of the ENERGY STAR logo and sales of ENERGY STAR products. The ENERGY STAR Products Program seeks to improve the stocking, promotion, and sales of ENERGY STAR products. In addition, the program promotes proper installation of certain ENERGY STAR products, such as HVAC systems and windows, by skilled technicians. The marketing component involves a multi-media advertising campaign to increase consumer awareness, understanding, and purchase of ENERGY STAR products. Through the combined efforts of these two programs, NYSERDA seeks to permanently transform the market for ENERGY STAR products.

Program Milestones	
2005	8th in-store survey
2004	7th in-store survey
2003	6th in-store survey
2002	5th in-store survey
2001	4th in-store survey RFPs 638, 636
2001	3rd in-store survey
2000	2nd in-store survey and consumer mail survey
1999	1st in-store survey and consumer mail survey
1998	RFP 436

Program Resources

The eight-year budget for the ESPM Programs is \$61.3 million, with \$14.8 million (24%) for implementation, \$18.6 million (30%) for incentives, and \$27.9 million (41%) for marketing. This also includes funding for HPwES and NYESLH marketing, the ENERGY STAR Bulk Purchase Program, the Residential Special Promotions Program, and other small projects. As of December 31, 2005, the programs had spent approximately 97% of the eight-year budget.

A total three NYSERDA contractors work on ESPM, including marketing for the HPwES and NYESLH programs.

Targeted Customers

Both programs are implemented in **New York Energy SmartK** Program territory. The ENERGY STAR Products Program targets appliance and lighting manufacturers and retailers, while

the marketing component targets consumers.

Program Barriers

Key supply-side barriers that affect market actors such as appliance and lighting retailers, distributors and manufacturers include:

- Perception of risk with stocking efficient appliances when consumer demand has yet to be proven
- Lack of sales experience with high efficiency products
- Lack of product for some applications (especially lighting)
- Lack of awareness among retailers leading to limited supply and availability
- Inadequate marketing and promotional materials for efficient products
- Lack of awareness with building professionals

Key demand-side market barriers that affect market actors such as residential consumers include:

- Higher first cost relative to standard efficiency options (for some of the products)
- Lack of information on efficient lighting and appliances
- Lack of awareness of ENERGY STAR product benefits
- Undervaluing energy efficiency benefits
- Skepticism regarding product benefits and reliability
- Lack of availability of some of the products
- Lack of awareness of the existence of some ENERGY STAR products such as fixtures

Implementation Approach/Activities

The ENERGY STAR Products program area is implemented through a variety of contractors with specific goals in the marketplace. Overall, these contractors address retail and manufacturing partnerships; product evaluation and specifications development; appliance recycling to support early retirement; initiatives targeted to specific product areas requiring a higher level of support, such as ENERGY STAR lighting, ENERGY STAR clothes washers, and high-efficiency heat pump water heaters; skill training and certification for proper selection and installation of ENERGY STAR products; and regional and national coordination and collaboration, such as the national ENERGY STAR Clothes Washer Initiative and the national Change A Light, Change The World Initiative.

The “anchor” contract for this program area is the **New York Energy SmartK** Products Market Support contract which establishes partnerships with manufacturers, distributors, and retailers to support the increasing availability and sales of ENERGY STAR products. In exchange for product data and their commitment to ENERGY STAR, partners receive training, sales tools, promotional opportunities, and co-op advertising incentives. This contract also implements a small Training, Education, Certification and Awareness (TECA) initiative in collaboration with manufacturers, professional trade associations and distributors. Other contracts awarded in the program area build on or collaborate with this network to further the success of the ENERGY STAR Products Program in the State.

Included in program implementation are promotions targeted at specific products that have the potential to impact energy use in New York State, but are struggling to achieve significant market share. For example, in 2000, a lighting catalog was introduced that enabled consumers to order ENERGY STAR lighting products, as they were unavailable for the most part in the marketplace. The intent was to build consumer demand for the products and thereby help drive availability in other sectors of the marketplace. In 2002, NYSERDA launched an initiative to promote the sales of Heat Pump Water Heaters, which replace electric resistance water heaters for significant energy savings. At this time, there is no ENERGY STAR label for this class of product; however, the energy savings potential is significant enough to warrant program support. NYSERDA will continue to encourage the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy (DOE) to develop ENERGY STAR specifications for domestic water heaters. In 2003, NYSERDA participated in the national ENERGY STAR clothes washer initiative to promote sales of clothes washers that would save both energy and water - at a time when New York State had just gone through a significant drought. In 2004, NYSERDA supported several projects with the goal of increasing the availability and promotion of ENERGY STAR lighting fixtures in the marketplace, particularly in the residential new construction market.

The marketing program uses various media channels to spread the ENERGY STAR message to consumers, including print articles and ads, public and community events, cooperative advertising with partners (which includes television, radio, print, and in-store promotions), public service advertising, distribution of informational consumer brochures, information and promotion on the www.GetEnergySmart.org website, and cross-marketing through other residential **New York Energy \$martK** programs.

Program Evolution

During 2005, program staff began market research on home electronics in anticipation of a focused home electronics education campaign. In addition, a pilot initiative begun in 2004 that provided retailers with an incentive to increase sales of ENERGY STAR RACs was expanded to ENERGY STAR clothes washers. Marketing materials were also revised and program staff participated in the national Change A Light, Change the World campaign.

5.5.2 Program Market Progress

This section highlights the findings on progress to date by the ESPM Programs in influencing the market in New York. Table 5-7 presents a sample of key indicators of program success tracked by NYSERDA's contractors. They indicate the most important ways that the program progress is being measured, and report how those values are changing due to program activities.

In summary, most key indicators are showing positive changes over time.

- Consumer awareness of the ENERGY STAR label increased from 34% in 1999 to 77% in 2005. Comparisons to national levels show that New York consumers are more aware than the national average. See Figure 5-2.¹ Awareness in the **New York Energy \$martSM** area consistently exceeds national levels, even in other high-publicity areas with ENERGY STAR programs. See Table 5-8.

¹Data sources for figure: Data for 1999 - 2003 are from mail surveys conducted by Aspen Systems Corp. and the Summit Blue MCAC Team and represent aided awareness. Data for 2004 are from the Consortium for Energy Efficiency (CEE) Web TV survey and represent aided awareness (National Awareness of ENERGY STAR for 2004: Analysis of CEE Household Survey,

- The percentage of ENERGY STAR-compliant models of various appliances on display in partner retailer stores has generally increased between 1999 and 2005. See Figure 5-3. However, stocking of lighting products has been volatile over this same time period, with some products not showing an overall increase between 1999 and 2005. Product quality complaints, lack of standardized pin bases, and other technical issues have impacted both stocking and consumer demand of ENERGY STAR lighting products. However, these issues are currently being addressed by the National ENERGY STAR Program, and stocking/sales of lighting products are expected to increase as a result.
- Market share for all major ENERGY STAR products has increased over time at New York partner retailer establishments. Although increases are also apparent for EPA’s national ENERGY STAR partners, they have not reached the levels shown by New York ENERGY STAR partners for RACs or clothes washers.
- When expressed as a percent more costly than standard efficiency products, the incremental cost of ENERGY STAR products has decreased over the past year for three out of four major appliances.
- The number of participating retailers has decreased since 2001, as the Program has focused on local independent and chain stores that are not national ENERGY STAR partners, and began enforcing the requirement that active partners provide sales data on a regular basis. Furthermore, in late 2005, a major local chain went out of business and closed 20 store fronts that had been participating in the program.

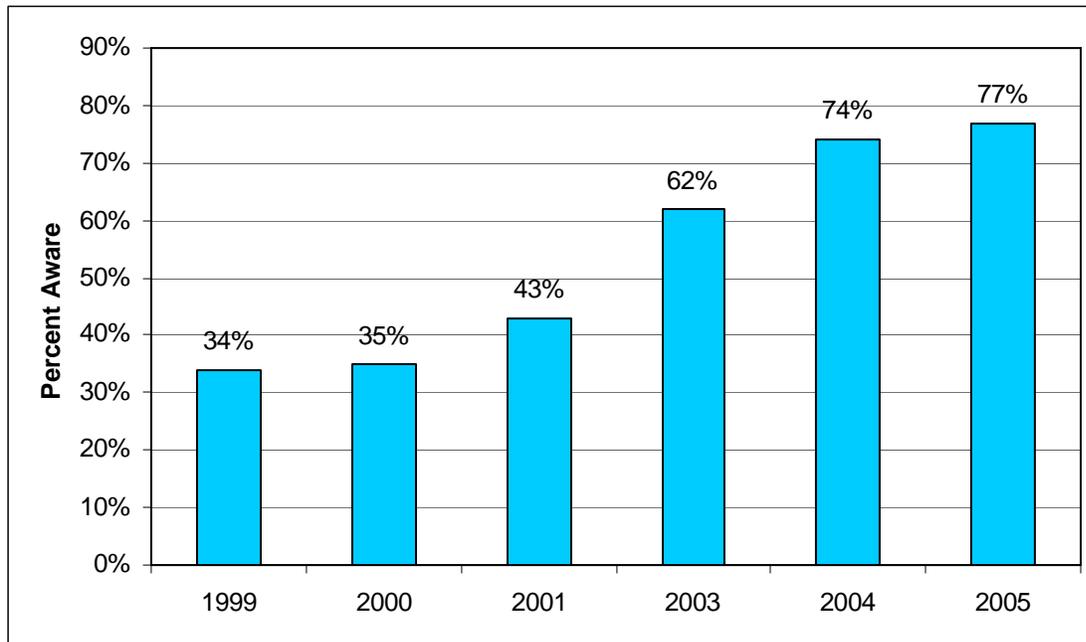
Table 5-7. ENERGY STAR Products and Marketing Key Program Indicators and Progress

		Latest Measurement	
	Number of retailer participants	<u>2001 Data</u> 756	<u>2005 Data</u> 365
	Number of manufacturer partners	<u>2001 Data</u> 14	<u>2005 Data</u> 23
	Dollars spent on cooperative advertising	<u>2001 Data</u> \$6.0 million	<u>2005 Data</u> \$11.2 million
Energy Savings and Cost-Effectiveness	Cumulative Net MWh and MW savings	<u>2003 Data</u> 122,600 MWh and 22.7 MW <u>2004 Data</u> 179,000 MWh and 33.5 MW	<u>2005 Data</u> 238,828 MWh, 54.0 MW and 325,628 MMBtu
	Program benefit-cost ratio	<u>2003 Data</u> 1.8 (TMET, Scenario 1) <u>2004 Data</u> 1.2 (TMET, Scenario 1)	<u>2005 Data</u> 5.0 (TMET, Scenario 1)

http://www.cee1.org/eval/2004_ES_survey_rep.pdf). Data for 2005 are from the Summit Blue MCAC Team telephone survey and represent unaided awareness.

			Latest Measurement
Awareness and Knowledge	NY consumer awareness of the ENERGY STAR label See Figure 5-2 for interim data points for appliances.	<u>1999 Data</u> 34% (aided awareness from NYSERDA mail survey)	<u>2005 Data</u> 77% (unaided awareness from NYSERDA telephone survey)
	Consumer understanding of the ENERGY STAR label	<u>1999 Data</u> 35% <u>2003 Data</u> 47%	<u>2005 Data</u> 87%
Product Availability	Percent of models on display at partner retailers that are ENERGY STAR compliant See Figure 5-3 for interim data points.	<u>1999 Data</u> Refrigerators – 14% Clothes Washers – 16% Dishwashers – 18% RACs – 26% CFL Bulbs – 17% All Fixtures – 0-4%	<u>2005 Data</u> Refrigerators – 35% Clothes Washers – 39% Dishwashers – 82% RACs – 61% CFL Bulbs – 14% All Fixtures – 1-28%
Market Share	ENERGY STAR refrigerator market share	<u>2001 Data</u> 28% NY Partners 16% National Partners in NY ¹	<u>2005 Data</u> 47% NY Partners 52% National Partners in NY ¹
	ENERGY STAR dishwasher market share	<u>2001 Data</u> 48% NY Partners 15% National Partners in NY ¹	<u>2005 Data</u> 76% NY Partners 90% National Partners in NY ¹
	ENERGY STAR clothes washer market share	<u>2001 Data</u> 24% NY Partners 12% National Partners in NY ¹	<u>2005 Data</u> 41% NY Partners 34% National Partners in NY ¹
	ENERGY STAR RAC market share	<u>2001 Data</u> 45% NY Partners 21% National Partners in NY ¹	<u>2005 Data</u> 76% NY Partners 50% National Partners in NY ¹
Incremental Cost	Simple average incremental cost of ENERGY STAR products (% more than non-ENERGY STAR)	<u>2004 Data</u> Refrigerators – \$465 (62%) Clothes Washers – \$410 (89%) Dishwashers – \$174 (47%) RACs – \$44 (18%)	<u>2005 Data</u> Refrigerators – \$413 (44%) Clothes Washers – \$471 (106%) Dishwashers – \$159 (37%) RACs – \$37 (15%)

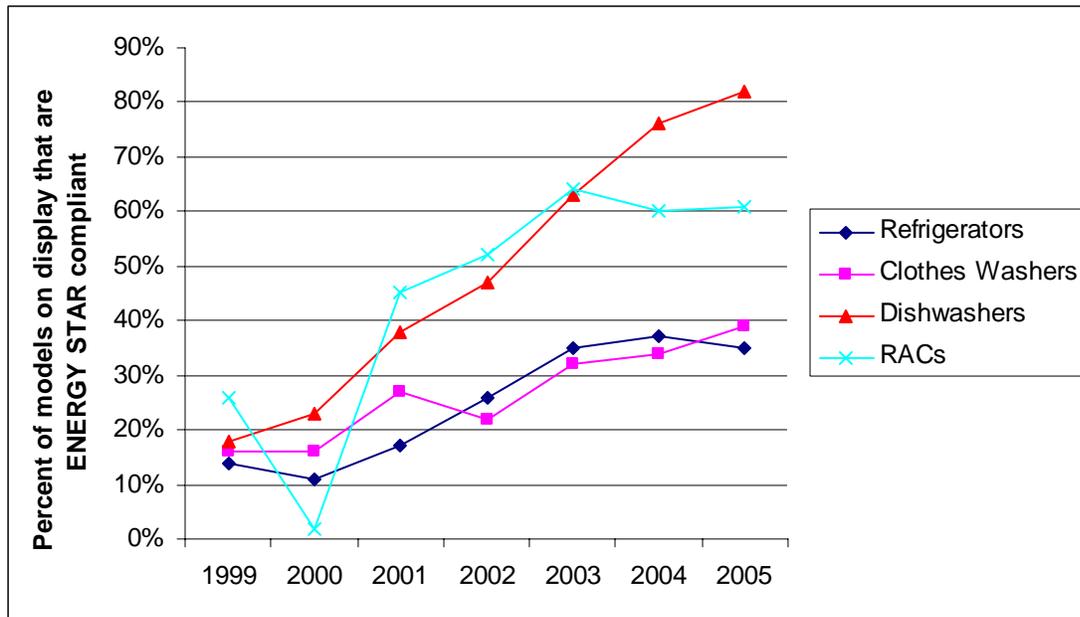
¹ Participating National EPA ENERGY STAR Partner Sales Data, Collected by D&R International.

Figure 5-2. New York Consumer Awareness of the ENERGY STAR Label**Table 5-8. Awareness of ENERGY STAR - Comparison of NY to National**

			2004
Aided Recognition	New York Energy \$mart SM Area	57%	74%
	National Total	40%	61%
	National High Publicity Areas	-	70%
	National Low Publicity Areas	-	55%
Unaided Recognition	New York Energy \$mart SM Area	-	64%
	National Total	-	41%
	National High Publicity Areas	-	55%
	National Low Publicity Areas	-	31%

Source: CEE National ENERGY STAR Survey and NYSERDA oversample, 2001 and 2004. The latest 2004 report can be found on the CEE website at: http://www.cee1.org/eval/2004_ES_survey_rep.pdf.

Figure 5-3. Percent of Appliance Models on Display at Partner Stores that are ENERGY STAR Compliant



5.5.3 Program Impact Evaluation

Gross Savings

In 2003, Nexant, Inc. completed an extensive review of the energy and peak demand impacts for the ESPM Programs. The scope of Nexant’s investigation was limited to a review of the deemed per-unit savings values assigned to each of the appliances and lighting fixtures promoted by NYSERDA. In 2004, Nexant added to the 2003 effort by developing deemed per-unit savings values for additional appliances now promoted by ESPM.

Under a separate study, NYSERDA’s Market Characterization, Assessment, and Causality (MCAC) evaluation contractor determines how many units of ENERGY STAR equipment promoted by the program have been installed in the New York market, and then reports the program’s net savings impact based on the unit savings values supplied by Nexant. Nexant’s M&V effort involves reviewing the deemed energy savings values that are stipulated by the programs.

In 2003, Nexant conducted a comprehensive review of deemed savings values used by numerous **New York Energy SmartK** Programs, including the subjects of this report. As part of that work, Nexant developed a Microsoft Access™ database of deemed savings values. NYSERDA uses the database to record consistent deemed savings values across the program portfolio, including ESPM. A separate Nexant M&V evaluation report, “Deemed Savings Review,” describes the database in detail.²

²Nexant, Inc., “M&V Evaluation Deemed Savings Final Report”, NYSERDA, March 2004.

As detailed in the 2003 M&V report,³ Nexant generally adjusted the deemed per-unit electric energy savings values upward and the peak demand (kW) savings downward from values previously used by NYSERDA.

Attribution and Net-to-Gross Ratio

The causality/attribution analysis for the ESPM programs was particularly complex because this program is not incentive based. The analysis included the following activities:

- Use of primary data from surveys along with secondary data (from sources like NY ENERGY STAR partners, Association of Home Appliance Manufacturers (AHAM), and D&R International) to estimate total product sales and ENERGY STAR market share increases over time. Data on ENERGY STAR market shares were presented earlier in this section.
- Examination of baseline market share data from surveys in New York and other sources to estimate the ENERGY STAR market share increase that is attributable to the national ENERGY STAR program efforts, the impacts of other state efforts, high energy prices, and other exogenous factors. The portion of the market share increase estimated to be due to the national program (and not NYSERDA's efforts) varied depending on the product.

This analytical process produced estimated net savings of approximately 239 GWh and nearly 54 MW from the ESPM Programs. This is after the overlaps with the Keep Cool, HPwES, and NYESLH programs were removed. Table 5-9 shows the final net savings due to the ESPM Programs.

Table 5-9. ENERGY STAR Products and Marketing Program Cumulative Annual Energy and Peak Demand Savings (Through December 2005)

	Net Savings
MWh/year	238,828
MW On-Peak	54.0
MMBtu	325,628

Overlap with Other Programs

As noted above, overlaps with the former Keep Cool program, Home Performance, and NYESLH programs were removed from the savings reported in Table 5-9. However, additional overlaps could exist with other residential programs such as ENERGY STAR Bulk Purchase and the Low-Income Assisted Multifamily Program (AMP). These potential overlaps have not been removed.

Non-Energy Impacts

As described in Section 3 of this report, the Summit Blue MCAC team conducted a major study of non-energy impacts (NEIs) this year using both a modification of the direct query approach employed in previous years as well as a new conjoint analysis approach. Key results for the CFL and Clothes Washer

³Nexant, Inc., "M&V Evaluation ENERGY STAR Products and Residential ENERGY STAR Marketing Programs Final Report", NYSERDA, March 2004.

are presented in Table 5-10. For further explanation as to why results from the various approaches differ, see Section 3.3.2.

Table 5-10. CFL and Clothes Washer NEI Results

			Annual Dollar Value per Project
Results from Previous Study	CFL	45%	\$6.30
	Clothes Washer	27%	\$46.98
Results from Current Study Direct Query Approach	CFL	60%	\$8.40
	Clothes Washer	-	-
Results from Current Study Conjoint Analysis Approach	CFL	13%	\$1.66
	Clothes Washer	84%	\$83

Notes: Results from the current study conjoint analysis approach incorporate interactive effects. Assumed measure life for CFLs is eight years, and for clothes washers is 14 years.

5.5.4 Program Recommendations

Process Evaluation

The process evaluation of the ESPM⁴ included interviews with three program staff, 13 implementation contractors, and 80 participating retail partners. Case studies were also conducted with three lighting retail partners and one lighting manufacturer. The process evaluation revealed that no significant changes in program implementation have occurred in ESPM since the 2004 evaluation. Minor changes have included adding dehumidifiers and room air cleaners to the product line, developing new point-of-purchase (POP) materials, and increasing the co-op incentive for lighting manufacturers by \$5,000. Some shifts in focus did occur, however, in an effort to address underdeveloped aspects of the program (e.g., participation of lighting partners). Lockheed Martin/Aspen (the implementation contractor for the program) staff also began efforts to learn more about each partner and their business models (including how they work with builders), to better customize the way in which the program can support the partners' promotion of ESPM.

As of December 31, 2005, there were 365 retail partner stores and 23 manufacturer partners in the program. Of these, there is a core segment of small, long-term, committed partners. ESPM is a mature program and, faced with a potential decline in the number of small retail outlets statewide, has tried to remain flexible, re-energize the partners with new incentive programs, and continue to look for ways to keep the program fresh. The program continues to have successes through promotion of co-op advertising incentives, provision of training, support and POP materials for retailers, and periodic direct incentives.

Process evaluation surveys and interviews indicate that the success of ESPM can be attributed to the following:

⁴ The process evaluation of ESPM assessed the products component of the program but did not evaluate the marketing element.

- The integrity of the program and its continuing to maintain a high quality and commitment to its goals
- The dedication of staff to consumer education and awareness
- Field representatives' relationships with retailers and their performance in educating retailers who, in turn, educate customers
- The program's ability to stay innovative
- Commitment of the implementation contractor
- Teamwork and communication between the staff at NYSERDA and the implementation contractor

Some issues continue, however, including the perceived complexity of the program's promotional and advertising incentive opportunities. Some small partners are going out of business, big box partners have not been re-signing, and enrolling lighting partners is very challenging. These factors have led to a decrease in the number of retail partners. The total sales of ENERGY STAR lighting fixtures declined in 2005, even with the increase in the number and quality of the products available. At the same time, appliance partners are seeing an increase in the demand for ENERGY STAR products and many report that ESPM has been an important factor in this increase, especially with specific products such as room air conditioners and CFLs.

Case studies with lighting retailers and a manufacturer who actively support ENERGY STAR revealed a clear business case for their decision to promote these products. For some, supporting ENERGY STAR is part of a larger, company-wide commitment to the environment; for most, it's a way to distinguish themselves in a competitive market. These partners see value for their company, their staff, and their customers. The case studies also show the potential for cross-program marketing to allow partners to improve not only their promotion of ENERGY STAR products, but to make energy efficiency improvements in their businesses and to serve as a model for showcasing ENERGY STAR products and their benefits.

While the ESPM is perceived successful, opportunities for improvement are available.

Conclusions and Recommendations

1. Conclusion: Program retail partners, even the most innovative and supportive of ENERGY STAR, as well as manufacturers interviewed, find the program options for advertising and promotional support too complex. Many report never having heard of Option 2, the program's support for special promotions, or not understanding it at a time when NYSERDA is considering reducing Option 1 incentives for traditional advertising and giving more emphasis to Option 2. Field staff note that most partners are just not interested or do not have the time to develop ideas and then face the complex application process for Option 2. While field representatives can do more of the paperwork for retail partners, this is not a total solution; nor is NYSERDA's plan to provide customers with pre-designed special promotion packages. With many small retailers and some local chains going out of business due to increased competition, ESPM can be useful in helping those remaining to use ENERGY STAR as a way to develop a unique market identity and maintain it. But participation must be simple and a core group will continue to need incentives for standard advertising.

Recommendation 1: Segment the retail partners by type of support needed and ensure that a range of support options exist for all segments. Program and implementation contractor staffs are currently considering this approach.

Recommendation 2: Maintain Option 1, the co-op advertising incentive, especially for core partners who have consistently, over the long-term, used this option; also, simplify the process.

Recommendation 3: Prepare simple press releases and templates for co-op advertising.

Recommendation 4: Reconsider Option 2 – both its name and its strategy. The name of this option is non-descriptive and does not help to get the concept of NYSERDA’s support for innovative, promotional efforts across to partners. NYSERDA should also consider changing the strategy to one of providing all-inclusive events, promotional packages, and other “made-to-order” efforts that partners can easily adapt to local circumstances. Some ideas from innovative partners highlighted in the case studies could help in the development of these strategies, as could in-depth discussions with a sample of partners. The business profiles being developed by Lockheed Martin/Aspen could also provide insight to assist in this redesign.

2. Conclusion: Periodic incentives revitalize partner and consumer interest and give retail staff something new to promote to customers. These have been effective in increasing consumer demand for room air conditioners and clothes washers and, to a lesser extent, refrigerators.

Recommendation: NYSERDA should consider continuing to offer incentives annually, preferably in consecutive funding cycles, allowing partners a full year of participation. This is particularly important for the market-share incentives, as seasonal effects can limit the number of partners eligible, if their sales for a portion of the year limit their participation.

3. Conclusion: Lighting manufacturers are not aware of the research and development (R&D) opportunities that NYSERDA affords them. With many moving on their own to develop new products and the associated costs remaining a barrier, NYSERDA’s R&D support could be targeted to reduce manufacturing processes, development time, and other variables, as well as providing resources that could reduce final product cost and improve product quality and variety.

Recommendation: ESPM could work closely with NYSERDA R&D to develop an outreach strategy for lighting manufacturers and to explore with these players the areas in which R&D could most benefit their current development efforts, as well as support further innovation.

4. Conclusion: While funding cycle delays and other process issues have been addressed since the 2004 evaluation, delays in important program components – such as the dealer award and outreach to big box retailers – limit program effectiveness.

Recommendation: NYSERDA should consider ways to reduce delays in program components that affect the trust with partners (*e.g.*, the dealer award) and hinder the program in getting into important markets.

Other Program Recommendations

The following programmatic suggestions resulted from the 2005 MCAC evaluation:

- The ESPM Programs should creatively work with big box retailers. As indicated by a distribution channel analysis conducted by the MCAC contractor, big box retailers are playing an increasingly dominant role for many types of products, with increasing market share. Collecting sales data has been the primary stumbling block to their participation. Creatively obtaining the sales data – possibly through D&R/EPA as a “pass through” – and thus allowing the big box stores to participate would allow NYSERDA to reach an even greater percentage of consumers.
- Continue to shift resources to promoting ENERGY STAR lighting. Lighting clearly lags behind the other products in terms of market share and stocking practices. In addition, the deemed savings from one CFL bulb (95 kWh/year) is currently greater than many appliances, including refrigerators (79 kWh/year) and room ACs (40 kWh/year). In addition, ENERGY STAR lighting fixtures can lead to permanent savings. Although the distribution channels are more complex than the appliances (e.g., the high percent sold at supermarkets), an increasingly large share are now being sold at the big box home improvement stores.

5.6 Stay Cool! (formerly known as Keep Cool)

5.6.1 Program Description

Program Purpose

The goals of the Keep Cool Program were to reduce peak demand by encouraging the replacement of old, inefficient, working room air conditioners (RACs) with new ENERGY STAR® RACs, reduce peak demand through behavioral changes and transform the RAC market. Consumers received a bounty payment when they turned in their old unit and purchased a new qualifying unit. Old air conditioners were permanently removed from service, demanufactured and recycled. The program also included a multi-media marketing campaign encouraging consumers to follow three specific energy tips during the summer months: 1) buy ENERGY STAR products, 2) shift appliance use to non-peak periods, and 3) use timers or programmable thermostats on air conditioning. Due to the success of previous years, the bounty was reduced from \$75 to \$35 in 2003 and then eliminated in 2004. The marketing components were continued in 2004 and 2005 and the program was renamed Stay Cool!. Energy savings values in this report reflect Keep Cool Program activity.

Program Milestones	
2005	Stay Cool! Marketing campaign
2004	Stay Cool! marketing campaign
2003	Fourth Keep Cool offer
2002	Third Summer Keep Cool offer
2001	Second Summer Keep Cool offer
2000	First Summer Keep Cool offer

Program Resources

The total eight-year budget for Keep Cool/Stay Cool! is \$32.8 million, with \$5.0 million (15%) for implementation, \$8.9 million (27%) for marketing, \$14.0 million (43%) for incentives, and \$4.9 million (15%) for recycling. As of December 31, 2005, the program had spent 100% of its eight-year budget. A total of two NYSERDA contractors have worked on the Keep Cool and Stay Cool! programs.

Targeted Customers

The Keep Cool Air Conditioner Bounty Program, offered during the summers of 2000 – 2003, targeted consumers in **New York**

Energy \$martK Program territory. However, during the summers of 2001-2003, NYSERDA also established partnerships with the Long Island Power Authority (LIPA) and the New York Power Authority (NYPA) to offer the bounty and marketing campaign statewide. Both LIPA and NYPA contributed to and participated in the 2004 Stay Cool! marketing campaign, while NYPA contributed to and participated in the 2005 campaign.

Program Barriers

Key supply-side barriers that affect market actors such as RAC and TTW retailers and manufacturers include:

- Inability to promote energy-efficient RACs and TTWs because of a lack of information on expected savings
- Information costs
- Perception of risk without proven demand
- Lack of experience with high efficiency products
- Lack of awareness leading to limited supply
- Lack of skill in promoting/commitment to ENERGY STAR

Key demand-side barriers that affect market actors such as residential and small commercial consumers include:

- Lack of information on efficient RACs and through-the-wall units and confidence in expected savings
- Information costs (*i.e.*, the difficulty and cost to consumers to obtain information on the multiple benefits of ENERGY STAR over non ENERGY STAR)
- Difficulty in discarding RACs (*e.g.*, lack of ease and availability for recycling replaced RACs)
- Availability of appliance turn-in locations
- Undervaluing energy efficiency and environmental benefits
- Split incentives to save energy between property owners and renters (where utilities are included in rent)
- Initial lack of availability for ENERGY STAR RACs and TTWs (no longer a barrier)
- Organizational practices (such as selling old units to secondary market instead of disposing of them)

Implementation Approach/Activities

As part of the Keep Cool RAC Bounty Program, purchases of ENERGY STAR RACs could only be made at participating retail stores and drop-off sites were geographically recruited so that old air conditioners could be effectively captured throughout the State. In addition, a statewide multi-media marketing campaign focusing on energy tips was promoted through paid television, radio, print and website advertising.

The current Stay Cool! initiative has continued on a smaller scale, focusing instead on grassroots marketing efforts, such as partnering with community and environmental groups, organizing community RAC turn-in events, advertising in local daily and weekly newspapers and promoting messaging on the www.GetEnergySmart.org website.

Program Evolution

With fewer resources, the marketing campaign continued in 2005 using the same tips messaging and encouraging RAC replacement. In addition, five RAC turn-in events were held throughout the state.

5.6.2 Program Market Progress

This section highlights the findings on Keep Cool Program progress in influencing the market in New York. Table 5-11 presents a sample of key indicators of program success, as tracked by the evaluation and program activities. They indicate the most important ways that the program progress is being measured, and report how those values are changing due to program activities. Note that many of the indicators are also affected by the ENERGY STAR Products and Marketing (ESPM) Program, which were presented earlier in Section 6 and are not repeated here.

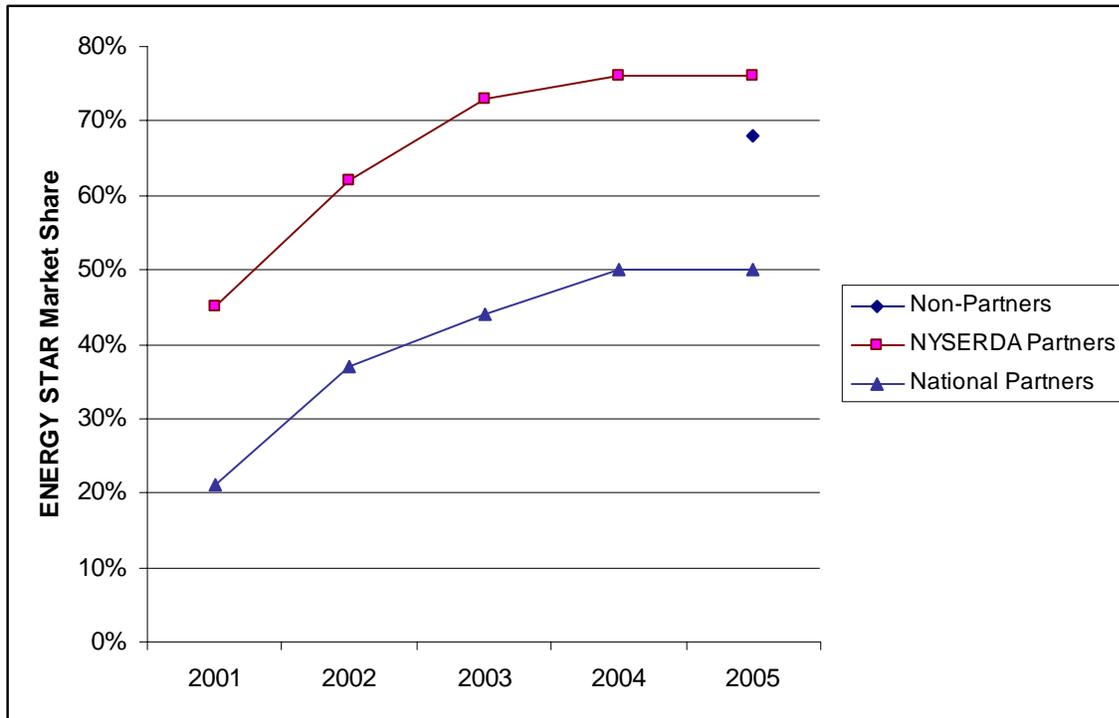
Table 5-11. Keep Cool/Stay Cool! Key Program Indicators and Progress

				Data Value -- 2005
			-	-
		-		2,562
			-	-
			-	-
		-		\$422,000
				27,781 MWh and 47.6 MW

Residential Programs

				Data Value -- 2005
				-
		-		-
				69% were aware after the Summer 2005 Stay Cool! campaign (post marketing campaign study only)
				61%
			-	-
		See Figure 5-4. Note the NYSERDA RAC bounty was eliminated after 2003.		

Figure 5-4. ENERGY STAR Room Air Conditioner Market Share by Year and Partnership Status



5.6.3 Program Impact Evaluation

Gross Savings

In 2003, Nexant, Inc. conducted a review of the savings impacts reported by NYSERDA for the Keep Cool Program. The objective of the review was to obtain the best possible estimate of the program's cumulative verified savings within the limits of a set budget. In 2004, Nexant updated the work done in 2003 by reviewing additional program documentation and adjusting the program's cumulative and annual savings impacts. Based on Nexant's review, as of December 31, 2005, the program has resulted in energy savings and peak demand reductions shown in Table 5-12.

Since beginning in 2000, the program has resulted in estimated cumulative program savings of 90,012 MWh⁵. Note that despite the fact that the program came to an end in 2003, program savings continue to accrue from units replaced in earlier program years. The program has provided incentives for 141,015 purchases of new energy-efficient air conditioners since 2000. The number of purchases, and the type, size and energy efficiency ratios of both the new and replaced air conditioners are monitored as part of the bookkeeping process conducted by the program's implementation contractor.

⁵ Cumulative program savings impacts are the sum of the savings realized to date since program inception. A measure completed in January of 2001 and that delivers 100 kWh/year annual savings, will have delivered 500 kWh cumulative program savings as of December 31, 2005. The measure still delivers an annual savings of 100kWh/year at the close of 2005.

The Keep Cool Program used deemed energy savings values to calculate the program’s total energy savings impacts. The deemed savings values are estimated based on engineering assumptions and actual data recorded from the replaced and new equipment. Nexant’s 2004 M&V evaluation primarily consisted of reviewing newly updated deemed savings values for the room air conditioners installed during each program year.

Attribution and Net-to-Gross Ratio

The MCAC team conducted a major evaluation of the Keep Cool Program in 2003. Primary data collection consisted of a mail survey completed by more than 2,660 households, a Keep Cool participant telephone survey with 57 respondents, and a non-participant survey with 69 respondents who bought a new appliance or lighting product (including air conditioners) that did not have an ENERGY STAR label. In-store measurements and interviews were conducted with 19 non-participating retailers and manufacturers. Staff and implementer surveys also addressed the Keep Cool Program.

For the Keep Cool Program, a freerider is a participant who purchased a new ENERGY STAR room air conditioner and received the bounty payment but would have purchased the new ENERGY STAR unit without the program inducement (the bounty and the advertising of ENERGY STAR). Based on the analysis conducted by the MCAC team in 2003, Keep Cool Program freeridership is estimated at 18%, resulting in a net factor of 0.82. This value is a weighted average of freeridership rates provided by participant and staff survey respondents.

The estimated spillover from the Keep Cool Program is 15%, giving a market effects factor of 1.15. However, it should be noted that spillover from Keep Cool could be higher since many thousands of ENERGY STAR room air conditioner purchases are being credited to the ENERGY STAR Products Program described earlier, and it is difficult to separate the impacts of these two programs on the market in general. The net program savings are shown in Table 5-12.

Table 5-12. Keep Cool Cumulative Annual Energy and Peak Demand Savings (Through December 2005)

							Net Savings
MWh/year	29,460	1.0	29,460	0.82 (0.44-0.94)	1.15 (1.1-1.3)	0.94 (0.79-1.34)	27,781 (23,273-39,476)
MW	50.5	1.0	50.5	0.82 (0.44-0.94)	1.15 (1.1-1.3)	0.94 (0.79-1.34)	47.6 (39.9-67.7)

Note: Savings shown in this table do *not* overlap with savings shown for the ESPM Program.

Although not a part of the MCAC Team’s review, a separate study, conducted by DDB Bass and Howes, found that the percentage of residents in the **New York Energy SmartK** territory who shift their laundry and dishwashing tasks to off-peak hours has grown steadily between 2002 and 2005 due to the Keep Cool and Stay Cool marketing campaigns, increasing from 45% to 86% for laundry and 59% to 80% for dishwashing among the targeted group of 25-54 year olds. Consumer surveys indicate that up to an

additional 100 MW of load shifting may have occurred during the 2002-2005 time period due to behavioral changes promoted by the Summer tips campaign.⁶

Overlap with Other Programs

As noted above, it is difficult to separate the impacts of the Keep Cool and ESPM programs on the market as a whole. The table above which shows savings from the Keep Cool Program, however, does not overlap with savings claimed earlier for the ENERGY STAR Products Program as Keep Cool savings are subtracted out of the market-level estimates produced for that program.

5.7 New York ENERGY STAR® Labeled Homes

5.7.1 Program Description

Program Purpose

The New York ENERGY STAR® Labeled Homes (NYESLH) Program provides technical assistance and financial incentives to one- to four-family home builders to encourage the adoption of energy-efficient design features and the selection and installation of more energy-efficient equipment in new construction and substantial renovation projects. Participating builders construct New York ENERGY STAR labeled homes that use approximately 30% less energy than homes built to the current energy code. In addition, the program is an enhanced version of the EPA’s ENERGY STAR Labeled Homes Program because in order to earn the New York ENERGY STAR home label, these homes must include a qualified ventilation system; electrical savings measures (either ENERGY STAR lighting or appliances) that produce annual electricity savings of 450 kWh, compared to standard efficiency measures; and have their performance verified by a certified home energy rater who acts as the independent third party, ensuring that these homes meet program performance criteria.

Program Milestones	
2005	6,490 homes; 680 participating builders
2004	4,786 homes; 360 participating builders
2003	2,366 homes; 286 participating builders
2002	680 NYESLHs, RFPs 655, 658
2001	First NYESLH built; 50 labeled homes by year end.
2000	RFP 530

Program Resources

The eight-year budget for the NYESLH Program is \$12.4 million, which includes with \$6.5 million (52%) for incentives and \$5.9 million (48%) for implementation. Marketing costs are included in the ENERGY STAR program marketing budget. As of December 31, 2005, the program had spent approximately 105% of its eight-year budget. A total of three NYSERDA contractors work on the NYESLH Program.

⁶ These estimates were derived from the 2002, 2003, 2004 and 2005 DDB Bass and Howes pre- and post-campaign surveys. The derivation of the 2002 results is detailed in: GDS Associates, Inc. and Megdal and Associates, *Assessment of Electric Load Impacts from the Keep Cool Advertising Campaign*, NYSERDA, March 10, 2003.

Targeted Customers

The program targets new home buyers in **New York Energy SmartK** Program territory.

Program Barriers

A key supply-side barrier that affects market actors such as utilities, builders and ESCOs includes:

- Real time prices for electricity not being offered (cost of equipment installation and transaction costs for infrastructure change)

Key market infrastructure and policy barriers that affect actors such as builders, HERS providers and HERS Raters include:

- Lack of builder regard for energy efficiency as a value-added measure
- Lack of builder awareness concerning NYESLHs and their benefits
- Builders lack information on how to build NYESLHs
- Builders lack experience building NYESLHs and to do so affordably
- Lack of builder knowledge and experience in selling NYESLHs and to do so profitably
- A geographically-dispersed supply of qualified HERS raters are not available to builders to certify NYESLHs
- Lack of demand for HERS raters by builders means this is not a profitable occupation
- Lack of high efficiency equipment and parts for repair
- Lack of trained technicians who can fix and maintain the equipment

Key demand-side barriers affecting new home and potential new home buyers include:

- Lack of awareness of NYESLHs and their benefits
- Lack of consumer information on energy efficiency in new construction
- Lack of consumer awareness of ENERGY STAR lighting and appliances and their benefits
- Lack of consumer awareness of need, and how to obtain, healthy indoor air quality in a new home

Implementation Approach/Activities

This program is designed to change the way energy efficiency is delivered in new construction by employing a market transformation philosophy. To achieve this market transformation, the program seeks to create consumer demand through a multi-media marketing campaign and stimulate infrastructure development through the use of incentives targeted to mid-stream market actors, primarily participating

builders and home energy raters. As consumer demand increases, it is expected that builders will incorporate the NYESLH standard into their normal building practices, resulting in the NYESLH standard becoming the rule rather than the exception.

Program Evolution

For the 2005 program year (beginning April 1, 2005), notable changes were made to the program, in part because New York adopted an energy code that is stricter than the 1993 Model Energy Code upon which the NYESLH Program was originally designed. This and other developments – such as the potential for tax credits for homes built to ENERGY STAR standards – prompted a new “tiered” incentive structure that provides higher incentives for higher ratings, thus pushing the bar for efficiency. This tiered system reduces the incentive by \$100 for homes that meet the lowest scores (86 to 89.9); this is typically the rating for many of the homes produced by large production builders. In addition, kWh savings requirements were increased from 450 to 600. In addition, testing for carbon monoxide safety was included as part of the requirements for NYESLHs.

5.7.2 Program Market Progress

This section highlights the findings on NYESLH Program progress in influencing the market in New York. Table 5-13 presents a sample of key indicators of program success, as tracked by the evaluation and program activities. They indicate the most important ways that the program progress is being measured, and report how those values are changing due to program activities. Some of the key findings from the table are summarized in the following bullets. Additional information on market progress is highlighted below.

- Awareness of NYESLHs has increased sharply among participating home buyers. Among non-participating home buyers, lack of awareness of either ENERGY STAR or the New York ENERGY STAR Label for homes was the primary reason they did not purchase a NYESLH.
- The majority of NYESLH purchasers reported that NYESLHs were very or somewhat available, significantly greater than among purchasers of non-NYESLH homes. This “availability gap” indicates that NYESLHs are generally available, although there are a significant number of home purchasers that have still not been exposed to New York ENERGY STAR labeled homes.
- The majority of the participating builders in the NYESLH Program reported that their familiarity with energy efficiency measures and equipment had increased in the last few years. Fewer of the non-participating builders reported increasing familiarity during the same period.

Consumer Demand for New York ENERGY STAR Labeled Homes

Both non-participating (72%) and participating (69%) builders reported that consumer interest in energy-efficient homes had increased during the last few years. In addition, 70% of the participating builders who felt there was an increase in consumer demand indicated that the NYESLH Program was either very (45%) or somewhat important (25%) in bringing about the increase.

Incremental Cost of New York ENERGY STAR Labeled Homes

Recent purchasers of NYESLHs were much less likely than previous survey respondents to report that the cost of a NYESLH was higher than the cost of a standard home. Increasing energy prices over the past two years and greater payback on energy bills may be impacting this response. Builders, on the other hand, did not report a substantial decrease in the incremental cost of a NYESLH.

Table 5-13. New York ENERGY STAR Labeled Homes Key Program Indicators and Progress

			Data Value -- 2005
Short Term Outputs and Indicators			
			6,561 projects completed including: <ul style="list-style-type: none"> ▪ 5,768 Single-family labeled homes ▪ 235 Assisted NYESLHs ▪ 371 Model homes ▪ 116 Display homes ▪ 71 1-4 family builder incentives
			\$8.9 million
			353 builders in 2004 232 builders in 2005
			6,155 MWh, 0.9 MW and 442,203 MMBtu
			2.7 (TMET, Scenario 1)
			92% of participating home buyers were aware of the ENERGY STAR label for homes
			85% of the participating builders reported that their familiarity had increased significantly (31%) or somewhat (54%) in the last few years 65% of the non-participating builders reported increasing familiarity

			Data Value -- 2005
			72% of NYESLH purchasers in 2004-2005 reported that NYESLHs were very or somewhat available
		-	Builders reported that efficient lighting (93% of participating builders), water heaters (92%), central ACs (86%), and furnaces/boilers (83%) had all shown substantial increases in availability during the last few years
		-	Fewer than half of the non-participating (36%) and participating (43%) builders stated that HERS raters were very or somewhat available
Intermediate and Long Term Indicators			
			11.1% (or 13.5% of single family homes only) in 2004

5.7.3 Program Impact Evaluation

Gross Savings

Nexant, Inc. conducted a review of the savings reported by NYSERDA for the NYESLH Program. The objective of the review was to obtain the best possible estimate of the program's cumulative savings.

Based on Nexant's review, as of December 31, 2005, the program resulted in energy savings and peak demand reductions shown in Table 5-15. Since beginning in 2001, the program has resulted in estimated cumulative program savings⁷ of 9,712 MWh of electricity and 708,761 MMBtu, primarily natural gas.

Nexant's 2005 M&V evaluation found that the annual energy consumption of individual homes in the program vary widely, and the differences appear to be based more on occupancy characteristics and individual habits than on the size of the home or climate zone. However, in general, homes with the ENERGY STAR label are saving energy relative to those built according to the 1993 Model Energy Code and the 2002 Energy Conservation Construction Code of New York State.

Nexant's review analyzed utility billing data for a sample of homes, and the results were compared to usage and savings reported by NYSERDA, which are based on the results of software modeling and deemed savings values. Nexant's review concluded that the modeled baseline home energy use should be increased. As shown in Table 5-14, the overall observed percentage reduction in energy use from a baseline home was very similar to the model; however, the energy consumed per home, for both electric

⁷ Cumulative program savings are the sum of the savings realized across the life of the program. A measure completed in January of 2001 and that delivers 100 kWh/year annual savings, will have delivered 500 kWh cumulative program savings as of December 31, 2005. The measure still delivers an annual savings of 100kWh/year at the close of 2005.

and natural gas use in the adjusted model and observed, was higher than NYSERDA’s modeled use. This finding results in higher total energy savings for the project sample and for the program.

Table 5-14. Comparison of Average Per-Home Savings¹

			Non-Electric (MMBtu)	
				Nexant
Baseline Home Energy Use	9,611	10,807	92.1	153.6
ENERGY STAR Home Energy Use	8,922	10,118	62.1	103.2
Savings	689	689	30.1	50.4
% Reduction in Baseline Use	7%	6%	33%	33%

¹ Totals may not sum due to rounding.

Attribution and Net-to-Gross Ratio

In 2003, the MCAC team conducted a major evaluation of the NYESLH Program. In total, almost 210 surveys were completed (this does not include more than 2,600 completed mail surveys that also informed the 2003 evaluation effort). In 2004, the MCAC team conducted Integrated Data Collection (IDC) surveys to update this major evaluation and determine if any adjustments were needed. The IDC surveys consisted of post-project surveys of participating builders. In total, 45 additional surveys were conducted to examine freeridership, spillover, and decision making. In 2005, the MCAC team conducted another major evaluation of the NYESLH Program including four surveys with program staff, 78 surveys with new ENERGY STAR Home purchasers (participants), 74 surveys with new non-ENERGY STAR home buyers (non-participants), 71 surveys with participating home builders, and 61 surveys with non-participating home builders. In total more than 280 surveys were completed with confidence/precision levels ranging from 90/8 to 90/11 depending on the audience.

Findings suggest that NYSERDA should use a net-to-gross ratio of 1.17 to adjust savings from program inception through year-end 2005. The net-to-gross ratio is derived from the following inputs from the MCAC survey responses from various market actors:

- Freeridership = 28% from program inception through December 2005. The overall value since program inception is weighted based on program savings during the time periods evaluated. The first major evaluation found freeridership to be approximately 23%, while the most recent major evaluation found freeridership levels had increased somewhat to 29.7%. Freeridership likely increased for a number of reasons. The program has grown substantially as more mid-to small-sized builders have joined. This particular subset of builders was found to have a higher freeridership rate. Rising energy prices could impact on how the market values energy efficiency, and the current surveys were administered in September 2005 after Hurricane Katrina disrupted fuel supplies and led to increases in gas and oil prices. Finally, over time, builders may forget the effect of the program and start considering the ideas they learned from it their own. An increasing rate of freeridership, therefore, may be an indication of market transformation.
- Spillover = 47.6% from program inception through December 2005. The overall value since program inception is weighted based on program savings during the time periods evaluated. The

first major evaluation found spillover to be approximately 51%, while the most recent major evaluation found spillover levels have decreased somewhat to 46.4%.

- $NTG = 1 - FR + SO = 1.17^8$

Savings estimates and adjustments are shown in Table 5-15.

Table 5-15. New York ENERGY STAR Labeled Homes Program Cumulative Annual Energy and Peak Demand Savings (Through December 2005)

	-						Net Savings
MWh/ year	5,231	1.01	5,261	0.280 (0.23-0.32)	0.476 (0.41-0.54)	1.17 (0.99-1.34)	6,155 (6,079-8,266)
MW	0.7	1.11	0.8	0.280 (0.23-0.32)	0.476 (0.41-0.54)	1.17 (0.99-1.34)	0.9 (0.88-1.19)
MMBtu	225,779	1.67	377,951	0.280 (0.23-0.32)	0.476 (0.41-0.54)	1.17 (0.99-1.34)	442,203 (436,674-593,829)

Non-Energy Impacts

As described in Section 3 of this report, the MCAC team conducted a major study of non-energy impacts (NEIs) this year using both a modification of the direct query approach employed in previous years as well as a new conjoint analysis approach. Key results for the NYESLH Program are presented in Table 5-16. In terms of the value of NEIs as a percentage of energy savings, the results from the current study direct query approach are similar to results found in previous years, while the results from the current study conjoint analysis approach are more than double the previous findings. For more explanation regarding the differences in results from the various approaches, see Section 3.3.2.

Table 5-16. NYESLH Program NEI Results

		Annual Dollar Value per Project
Results from Previous Study	50%	\$300
Results from Current Study Direct Query Approach	51%	\$303
Results from Current Study Conjoint Analysis Approach	134%	\$801

Notes: Results from the current study conjoint approach incorporate interactive effects between attributes. Assumed measure lifetime for NYESLHs is 30 years.

⁸ The blended NTG ratio is the weighted average of the NTG ratios estimated in the previous MCAC analysis and this current analysis.

5.7.4 Program Recommendations

The following programmatic suggestions resulted from the 2005 MCAC evaluation effort:

- Continue to improve the NYESLH Program database. Although the program is being transitioned to a new database, for the purposes of this evaluation it was extremely difficult to obtain a usable version of a program database that included a data dictionary to allow data mining capabilities.
- Continue to develop the HERS rater market. Availability of HERS raters remains limited. One reason might be that many of them are plumbing, HVAC, and general contractors and are focusing on opportunities in the HPwES Program. Still, HERS raters are a key component of the NYESLH Program and the market for their development should be encouraged. Many of the previously participating and never-participating builders stated that a primary deterrent in participating in the program was the cost of having a home rated; more targeted incentives to home raters might help mitigate this barrier and increase the number of certified NYESLHs that are constructed each year.
- Attempt to facilitate program participation and prompt incentive payments. A common complaint among both participating and non-participating builders was that it took quite a long time to receive their incentive payments, and that the “hassle” of joining the program was simply not worth it. Dissatisfaction with the program, in fact, was one reason that the attrition rate of builders was 51%. Raters were a key reason for the delay in incentive payment, and putting them under supervision of a HERS provider could potentially remedy this problem.
- In order to maximize participation and minimize freeridership, target the largest builders in New York. The larger builders in the program had substantially lower freeridership rates than the mid- to small-sized builders, indicating that the smaller builders do more custom homes and are more likely to emphasize energy efficiency in absence of the program.

Based on Nexant’s M&V review, recommendations for the NYESLH Program are:

- Modify the program lighting savings value to 0.0056 kW per CFL and 0.0078 kW per ENERGY STAR light fixture. This adjusted value is based on the calculated value listed in the Deemed Savings Database.
- Revise the baseline water heating and space heating baseline gas use in the CSG database for each climate zone. The billing analysis provides actual energy use information that can be applied to adjust the baseline energy use. To implement the recommended change, the baseline values in the CSG database for water heating for each climate zone should be multiplied by a factor of 1.65 and the space heating baseline for each climate zone should be multiplied by a factor of 1.68.
- Billing release forms and billing data should be collected for all homes in the program as part of program participation.
- Inclusion of data from REM/Rate files in CSG’s database for the population including detailed equipment and appliance information and square footage of each home. In addition, NYSERDA should periodically conduct quality control checks to verify that the information in the database is correct.

5.8 Home Performance and Assisted Home Performance with ENERGY STAR®

5.8.1 Program Description

Program Purpose

The HPwES Program is designed to enhance the current capacity for delivering comprehensive energy efficiency services to existing one- to four-family residences. The program fosters consumer protection by offering training, and requiring certification and accreditation for participating contractors. The program seeks to create a “one-stop shopping” experience for consumers looking to make energy efficiency improvements to their homes. This is accomplished by requiring the participating contractor who provides the comprehensive home assessment to have the capability to prepare a scope of work and install the energy efficiency measures.

Eligible homeowners have the choice of using either the program’s low-interest financing options, the **New York Energy SmartK** Loan Fund, the Homeowner Financing Incentive (HFI), or the Assisted Home Performance with ENERGY STAR subsidy for income-eligible homeowners to assist in paying for the recommended improvements. Energy efficiency improvements covered by this program include building shell measures such as air sealing and insulation, electric measures like ENERGY STAR refrigerators, heating measures such as boilers and furnaces, cooling measures such as ENERGY STAR room or central air conditioners, and certain renewable energy technologies. This section reflects HPwES activity, as well as Assisted HPwES activity.

Program Resources

The eight-year budget for HPwES is \$25.1 million, which includes \$9.7 million (39%) for incentives, \$8.9 million (36%) for implementation, \$4.4 million (18%) for Home Performance financing and \$2.0 million (8%) for the Small Homes Loan Fund. As of December 31, 2005, the program had spent 106% of these budgeted funds. In addition, there is \$21.9 million allocated to the low-income component of HPwES (Assisted HPwES) with \$13.8 million (63%) for incentives and \$8.1 million (37%) for implementation. As of December 31, 2005, the Assisted HPwES Program had spent 90% of its budget. A total of three NYSERDA contractors work on the HPwES Program with an additional 10 community-based organizations working on the low-income component of the program.

Program Milestones	
2005	9,574 jobs completed; 109 BPI-certified contractors and 138 BPI-accredited firms
2004	6,409 jobs completed; 99 BPI-certified contractors and 137 BPI-accredited firms ⁹
2003	3,844 jobs completed, 104 BPI certified contractors, 127 BPI accredited firms
2002	1,340 households served and 98 BPI contractors participating
2002	RFP 658
2001	315 households served
1999	RFP 517

Targeted Customers

HPwES targets existing one-to-four family homes within **New York Energy \$martK** Program territory.

Program Barriers

Key market infrastructure and policy barriers that affect actors such as contractors, remodelers, distributors and lenders include:

- Cost of completing training and Building Performance Institute certification (course cost and opportunity cost associated with contractors taking time off from their contracting schedules)¹⁰
- Uncertainty of whether investment in BPI certification will pay off (contractors need to be assured that work can be provided in order to recoup costs)

- Contractors being unwilling to learn about and conduct services outside of their own specific trade
- Availability of eligible contractors
- Availability of high efficiency equipment

Key demand-side barriers that affect actors such as residential consumers and low-to-moderate income families include:

- Lack of awareness of the benefits of energy efficiency investments for bill savings and increased comfort, health and safety
- Lack of money to pay for energy efficiency investments by low- to moderate-income households

Implementation Approach/Activities

This program is designed to create consumer demand through an aggressive, multi-media marketing campaign and stimulate infrastructure development through the use of financial incentives targeted to mid-stream market participants, such as contractors. Contractors participating in the program are required to be accredited by BPI, a national organization that promotes building science technology and sets standards for assessing and improving the energy performance of homes. In addition, contractors assess each home employing the “house as a system” approach. Instead of making individual, separate recommendations, contractors recommend a host of measures or improvements that enhance and increase the overall energy performance of the home.

⁹ During 2004, the Home Performance with ENERGY STAR Program shifted from recruiting a large number of contractors to increasing the number of actively, participating contractors. As the program expanded into the lower Hudson Valley and NYC areas in 2005, there was a focus on expanding the contractor infrastructure in those markets.

¹⁰ NYSERDA provides an incentive to partially-offset the cost of the training and certification.

As consumer demand for these services increases, and as more home improvement contractors incorporate the program's "house-as-a-system" philosophy into their standard business practices, the need for financial incentives to maintain market share will diminish.

5.8.2 Program Market Progress

This section highlights the findings on HPwES Program progress in influencing the market in New York. Table 5-17 presents a sample of key indicators of program success, as tracked by the evaluation and program activities. They indicate the most important ways that the program progress is being measured, and report how those values are changing due to program activities. The bullets below summarize some of the key indicators shown in the table. Additional information is also presented below on other important indicators.

- The HPwES Program was instrumental in raising awareness of energy efficiency measures and equipment among both homeowners and contractors.
- Awareness of BPI was limited among homeowner participants, despite the fact they all used a BPI-accredited contractor.
- Contractors confirmed that BPI awareness is low and few customers are requesting it, yet some contractors are embracing the concept of BPI certification as a way to ensure high quality work and distinguish themselves from their competitors.
- Contractors are aggressively marketing and promoting the program. Non-energy benefits, such as comfort, health, and safety, were perceived as being more important than the energy savings in terms of marketing the program. Some contractors were not even charging for the CHA, using it as a business development tool.
- Contractors indicated that energy efficient equipment is more readily available now than in previous years.
- Satisfaction with the program is generally high, but there is a dissatisfied group of customers who have been disappointed by their contractors.
- A substantial number of program jobs are not passing the first inspection by CSG, the program implementer.

Incremental Cost of HPwES Jobs

Estimates of incremental cost for HPwES projects above and beyond standard home improvement work are difficult to quantify. However, surveys indicate that they were quite variable, and there was no indication that the incremental cost had dropped. Some respondents reported that HPwES jobs are more comprehensive than standard jobs, making the apparent incremental cost to the customer appear higher. The average reported incremental cost was about 21%.

Developing the Market Infrastructure

The HPwES Program has also been instrumental in increasing the availability of BPI-certified contractors. The number of BPI contractors increased from only 52 in 2001 to 138 at the end of 2005. According to the BPI, there are only 154 accredited BPI contractors in the entire United States, 138 (90%) of whom are in New York. Conversations with the BPI confirmed that the HPwES Program is the primary driver, by far, for the disproportionate representation of BPI contractors in New York compared to other States. Also, BPI is a New York-based organization formed with the help of NYSERDA.

Table 5-17. Home Performance Key Program Indicators and Progress

			Data Value -- 2005
Short Term Outputs and Indicators			
			9,574 homes treated 91% of goal of 10,500 homes by June 2006
			109 BPI-certified contractors 138 BPI-accredited firms
			\$5.3 million in participating contractor incentives
			10,802 MWh, 1.7 MW, 424,421 MMBtu
		-	81% of the participating home owners reported that their familiarity had increased either significantly or somewhat during the last few years More than half of these participants said "all" or "most" of the increase was due to their participation in the HPwES Program
		-	89% of the contractors said their familiarity had increased significantly or somewhat during the last few years 87% said "all" or "most" of this increase was due to their participation in the HPwES Program
		-	38% of participants had heard of the BPI
		-	Among those who had heard of the BPI, 82% considered BPI certification very or somewhat important in their selection of a contractor
		-	36% view BPI as a strong selling point and 30% see it as a moderate selling point

			Data Value -- 2005
		-	89% of the participating contractors indicated that they were very (53%) or somewhat (36%) actively promoting the HPwES Program
		-	82% reported that energy-efficient measures and equipment are very available
Intermediate and Long Term Indicators			
			Approximately 2.1-3.3%
		-	75% of the participating homeowners were very or somewhat satisfied with their contractors

5.8.3 Program Impact Evaluation

Gross Savings

Nexant, Inc. conducted an independent review of the savings reported by NYSERDA for the HPwES Program (including the subsidized portion, Assisted HPwES). The objective of the review is to verify the program's cumulative savings.

Based on Nexant's review, as of December 31, 2005, the program has resulted in energy savings and peak demand reductions shown in Table 5-18. Since beginning in 2001, the program has resulted in estimated cumulative program savings¹¹ of 16,849 MWh of electricity and 749,929 MMBtu of fossil fuel consumption. Most of the program savings are for non-electric or fossil fuels, primarily natural gas.

Nexant's 2005 M&V evaluation analyzed historical billing data for a sample of homes in the program, and calculated the actual energy savings achieved by the homes by comparing baseline and post-installation energy use. The actual billing record savings were compared to NYSERDA-reported savings, which are based on the results of software modeling. The billing analysis resulted in a wide range of energy consumption and savings, indicating that external factors such as occupant behavior and occupancy characteristics contribute significant variance to energy use patterns. A comparison of annual electric energy use for the homes during a two-year period after completion of HPwES measures showed that usage varied year to year by an average of 15%, and in one case as much as 51%. Due to the variance in home electric use and savings, the billing analysis results cannot be used to verify or adjust the total electric savings predicted by the HomeCheck or TREAT modeling software.

Billing analysis showed that non-electric or natural gas savings are more consistent than electric savings for homes in the sample, with 20 of the 22 homes achieving gas savings. In addition, the average per home savings for the sample calculated in the billing analysis was found to be statistically significant.

¹¹ Cumulative program savings are the sum of the savings realized across the life of the program. A measure completed in January of 2001 and that delivers 100 kWh/year annual savings, will have delivered 500 kWh cumulative program savings as of December 31, 2005. The measure still delivers an annual savings of 100kWh/year at the close of 2005.

The billing analysis indicates that the average savings were only 73% of the average reported by the program for the sample. However, factors such as occupant behavior appear to also contribute to changes in gas consumption and the billing analysis was unable to distinguish between the program's influence and these other factors in predicting gas usage. Therefore, at this time, the results of the billing analysis cannot be used to verify or adjust the modeled gas savings.

Attribution and Net-to-Gross Ratio

In 2003, the MCAC team conducted an evaluation of the HPwES Program. In total, more than 220 surveys were completed (this does not include more than 2,600 completed mail surveys that also informed the 2003 evaluation effort). In 2004, the MCAC team conducted Integrated Data Collection (IDC) surveys to update this major evaluation and determine if any adjustments were needed. The IDC surveys consisted of post-project surveys of participating contractors. In total, 37 additional surveys were conducted to examine freeridership, spillover, and decision making. In the most recent evaluation cycle, the MCAC team conducted another major evaluation of the HPwES Program including 135 surveys with participating or partial participating (audit only) homeowners, 56 surveys with currently or previously participating contractors, seven interviews with non-participating contractors, and four surveys with program staff. In total, more than 200 surveys were completed with confidence/precision levels ranging from 90/9 to 90/11 depending on the audience.

Findings suggest that NYSERDA should use a net-to-gross ratio of 1.12 to adjust savings from program inception through year-end 2005. The net-to-gross ratio is derived from the following inputs from the MCAC survey responses from various market actors:

- Freeridership = 26% from program inception through December 2005. The overall value since program inception is weighted based on program savings during the time periods evaluated. The first major evaluation found freeridership to be approximately 17%, while the most recent major evaluation found freeridership levels had increased to 31%. Freeridership likely increased for a number of reasons. Rising energy prices could impact on how the market values energy efficiency, and the current surveys were administered in September 2005 after Hurricane Katrina disrupted fuel supplies and led to increases in gas and oil prices. Furthermore, the previous MCAC evaluation relied more heavily on program staff responses, whereas the latest evaluation had more robust sample sizes with various market actors. Finally, over time, contractors may be more pervasively promoting the program and the concept of energy efficiency. Therefore, increasing freeridership may be an indication of market transformation.
- Spillover = 41% from program inception through December 2005. The overall value since program inception is weighted based on program savings during the time periods evaluated. The first major evaluation found spillover to be approximately 44%, while the most recent major evaluation found spillover levels have decreased somewhat to 37%. This difference between the first and second evaluation could be due to the first evaluation relying on a limited number of responses to extrapolate non-participant spillover.
- $NTG = 1 - FR + SO = 1.12^{12}$

Savings estimates and adjustments are shown in Table 5-18.

¹² The blended NTG ratio is the weighted average of the NTG ratios estimated in the previous MCAC analysis and this current analysis.

Table 5-18. Home Performance Cumulative Annual Energy and Peak Demand Savings (Through December 2005)

							Net Savings
MWh/ year	9,536	1.01	9,644	0.26 (0.22- 0.29)	0.41 (0.36-0.46)	1.12 (0.97-1.27)	10,802 (10,507-13,689)
MW	1.4	1.07	1.5	0.26 (0.22- 0.29)	0.41 (0.36-0.46)	1.12 (0.97-1.27)	1.7 (1.67-2.17)
MMBtu	378,947	1.0	378,947	0.26 (0.22- 0.29)	0.41 (0.36-0.46)	1.12 (0.97-1.27)	424,421 (412,830- 537,872)

Non-Energy Impacts

Non-energy impacts were examined by the MCAC Team in 2003. The analysis examined the array of NEIs that participants associate with their involvement in the HPwES Program. The estimated NEIs by survey respondents were approximately 100% of the annual energy savings for the projects.¹³

Determining a value for these benefits poses challenges, but the methods applied indicate that the magnitude of these benefits could be substantial. Therefore, a conservative value of 50% of the energy savings benefits is recommended by the MCAC team for use in examining benefit-cost scenarios.

5.8.4 Program Recommendations

The following programmatic suggestions were generated by the 2005 MCAC evaluation effort:

- Continue to improve the HPwES database. Although the program is transitioning to a new database, for the purposes of this evaluation, it was extremely difficult to obtain a usable version of a program database that includes a data dictionary to allow ease of data mining.
- Continue to improve the pool of approved contractors. Although satisfaction with the program was generally high, dissatisfaction with program contractors was the largest – and most vocal – source of discontent among participating homeowners. HPwES staff need to continue close monitoring of contractor performance and identification of those that are causing dissatisfaction among participants. In addition, at this time, staff should avoid an aggressive push to sign up more contractors just to meet program goals as contractor quality could suffer.
- Develop ways to reduce the failure rate. The current rate of failures, 25.8%, is high. Failures, even minor, can be costly for the contractors, implementation staff, NYSERDA, and the customers.

¹³ For this report, the assumption is that the multiplier will be applied to the net energy savings. Although respondents were asked to report the benefits relative to their energy savings (which may have elements of “gross” savings), the application to net savings is the more conservative assumption.

NYSERDA should track the failure rate over time and monitor that it is decreasing; if not, more aggressive strategies of reducing the failure rate should be developed.

- Commit resources to meet the needs of the participating contractors. With 109 participating contractors and 40 previously participating contractors, the attrition rate is approximately 37%. Surveys with a sample of eleven previous participants indicated that there was an extremely high level of dissatisfaction among the previous participating contractors with many aspects of the program, particularly the software and the responsiveness of the program implementation contractor. NYSERDA and CSG need to ensure that communication is responsive and effective in terms of meeting the needs of participating contractors or risk losing additional participants.

Based on Nexant's M&V review, recommendations for the HPwES Program are:

- Refrigerator savings should be documented for each home. Refrigerator baseline energy use should be based on year of manufacture, size and type. New refrigerator performance should be based on ENERGY STAR estimates.
- Adjust the manual kWh/year savings calculations used for cooling savings not captured by HomeCheck. The adjustments include:
 - Track the SEER and size of each central air conditioner (CAC) replacement made through the program, and the total number of replacements. At the end of 2003, when the program stopped counting, approximately 14% of projects included CAC replacement. This estimate should be updated using the actual number of replacements.
 - Change the estimated SEER rating used in the shell improvements for the room air conditioners measure to match the baseline SEER rating of 10.5.
 - Change the ECM deemed savings value to match the ENERGY STAR Products and New York ENERGY STAR Labeled Homes deemed value of 396 kWh/year.
- Billing release forms and billing data should be collected for all homes in the program. While the billing analysis did not produce results that could be directly compared with the modeling results, billing analysis that includes additional external factors is a useful evaluation tool. In addition, with billing data available for all homes, targeted billing analyses could be performed on specific groups of projects and measures. Billing records are the only measured performance data available to the program and these data have significant potential value for targeted, future analysis.
- NYSERDA's Quality Assurance inspections should include an occupant interview to determine if any non-program changes have occurred to the home. The interviews should include the following questions:
 - How many adults and children live at the house? Has the number of occupants changed in the last two years?
 - Have the schedules of any occupants changed in the last two years?
 - Have any non-program additions or renovations been performed on the house in the last two years?
 - Have any new appliances or equipment been installed in the home in the last two years? (*i.e.* pool or hot tub, gas fireplace, switch from electric to gas dryer)

- 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.

5.9 ENERGY STAR® Products Bulk Purchase

5.9.1 Program Description

Program Purpose

The Multifamily Buildings Bulk Purchase Program for ENERGY STAR appliances and lighting provides purchase assistance for early replacement of inefficient appliances through education, bulk procurement, and incentives influencing market transformation in the multifamily sector. Bulk purchase activities were originally part of the Appliances and Lighting Program (the precursor to ESPM), but due to program volume, became a separate program in 2002. In 2003, the decision was made to make the next step in market transformation by eliminating incentives and transitioning to a fully market-based program, linking potential buyers to sources of ENERGY STAR products, including ENERGY STAR Products Program partners and bid-based purchasing. In addition, widespread deployment of the Assisted Multifamily Program (AMP) enabled the packaging of ENERGY STAR products with other energy efficiency improvements that were eligible for incentives and low-interest financing. As a result of this change, and the need to increase program synergy while reducing costs, the Bulk Purchase initiative was eliminated as an incentive program and components of the program were folded into the **New York Energy \$martK** Products Market Support contract.

Program Milestones	
2001	RFP 659

Program Resources

The eight-year budget for this program is included in the ESPM Programs budget.

Targeted Customers

This program targeted multifamily building owners, building performance contractors, housing associations, and community-based organizations (CBOs) in the **New York Energy \$martK** territory.

Program Barriers

Key barriers that influenced the ENERGY STAR Bulk Purchase Program included:

- Higher first cost relative to standard efficiency options (for some of the products)
- Lack of information on efficient lighting and appliances
- Lack of awareness of ENERGY STAR product benefits
- Undervaluing energy efficiency benefits

- Skepticism regarding product benefits and reliability
- Lack of availability of some of the products
- Lack of awareness of the existence of some ENERGY STAR products such as fixtures

Implementation Approach/Activities

The Bulk Purchase Program initially provided a variety of services to multifamily building owners and operators, including lighting and appliance assessments for multifamily buildings, recommendations for the installation of ENERGY STAR measures, educational materials and training on the benefits of ENERGY STAR products, information on financing options, facilitation of bulk purchase bids on behalf of building owners and managers, and incentives for the installation of the ENERGY STAR products. The program also coordinated the collection and demanufacturing of old room air conditioners and refrigerators. As the state of the market evolved, and ENERGY STAR product prices decreased with increasing supply, the program design evolved. While incentives were useful to jump-start the purchases of ENERGY STAR appliances and lighting products for multifamily buildings, they are not seen as an effective means to make long-term changes in the marketplace, and were eliminated. In addition, as NYSERDA's whole-building programs were launched and grew (AMP, ResTech, HPwES, NYESLH), the need to keep Bulk Purchase a separate program was reduced. Current services offered through the program include referrals into other NYSERDA energy efficiency programs targeting the residential sector, assistance in developing ENERGY STAR product bid packages, and education on the benefits of ENERGY STAR products.

5.9.2 Program Market Progress

The MCAC Team has not conducted a separate evaluation on the Bulk Purchase Program. Evaluations conducted for the ESPM Program help shed light on general progress in the market for ENERGY STAR appliances and other products. See Section 6.5.

5.9.3 Program Impact Evaluation

Gross Savings

In 2003, Nexant, Inc. conducted an independent review of the savings impacts reported by NYSERDA for the ENERGY STAR Bulk Purchase Program. The objective of the review was to verify the estimate of the program's cumulative savings. In 2004, Nexant added to the 2003 effort by reviewing additional program documentation and adjusting the program's cumulative and annual savings as a result. Based on Nexant's review, as of December 31, 2005, the program resulted in energy savings and peak demand reductions shown in Table 5-19.

Since beginning in 2002, the program has resulted in estimated cumulative program savings of 124,297 MWh¹⁴. Note that despite the program end¹⁵ in 2003, savings continue to accrue from units installed

¹⁴ Cumulative program savings impacts are the sum of the savings realized across the life of the program. A measure completed in January of 2001 and that delivers 100 kWh/year annual savings, will have delivered 500 kWh cumulative program savings as of December 31, 2005. The measure still delivers an annual savings of 100kWh/year at the close of 2005.

during earlier program years. As indicated by the ratios in Table 5-19, Nexant adjusted the annual electric energy savings (MWh/year) and the peak demand reduction (MW) upward and the annual non-electric energy savings (MMBtu/year) downward from NYSERDA's reported values. The changes are due to modifications made by Nexant to the deemed savings values used by the program.

Attribution and Net-to-Gross Ratio

In 2003, the MCAC team conducted an attribution assessment which consisted of a review of net-to-gross (NTG) ratios used by similar programs around the nation. However, secondary data on programs promoting ENERGY STAR measures in multifamily buildings was sparse. Typically, NTG ratios found in the literature for ENERGY STAR appliance and lighting programs range between 0.9 and 1.0 (1.0 being the most common).¹⁶ Freeridership generally ranges from 0 to 0.1. No spillover factors are cited in the literature on other programs. However, where primary research was conducted in 2003 for NYSERDA on related programs, spillover factors were found to be between 1.1 (for the ENERGY STAR Products Program) and 1.15 (for the AMP). Based on the sources reviewed, a 0.95 net-to-gross ratio is recommended as a placeholder value for the ENERGY STAR Bulk Purchase Program until primary research can be conducted. These adjustments and the final net savings are shown in Table 5-19.

Table 5-19. Bulk Purchase Cumulative Annual Energy and Peak Demand Savings (Through December 2005)

							Net Savings
MWh/year	19,451	2.03	39,397	0.90	1.05	0.95	37,230
MW	3.9	1.62	6.4	0.90	1.05	0.95	6.0
MMBtu	24,307	0.71	17,240	0.90	1.05	0.95	16,292

Non-Energy Impacts

Non-energy impacts have been evaluated for various appliance and lighting products. See Section 5.5 for results.

¹⁵ The program closed in 2003 due to budget constraints and the need to more effectively meet market transformation goals. Its activities were folded into the Assisted Multifamily Program.

¹⁶ These figures are derived mostly from programs run by National Grid and Wisconsin Focus on Energy.

5.10 Residential Comprehensive Energy Management

5.10.1 Program Description

Program Purpose

The Residential CEM Program promotes the acquisition and installation of energy management and advanced metering systems. This program helps encourage residential customers to reduce their energy use, positions residential customers to take advantage of retail competition, and enables program implementers to access customers' energy-use data. Advanced metering systems provide data on actual energy use in multifamily buildings and one- to four-family dwellings and provide results of energy efficiency measures installed under other residential **New York Energy SmartK**-funded programs.

Program Milestones	
2005	605 multifamily buildings participating in the program
2004	477 multifamily buildings and 143 single family homes participating in program
2003	374 buildings in program
2002	Implementation services for CEM begin.
2001	RFP 664
2000	RFP 495

The data collected through these advanced metering systems will facilitate comparisons of actual energy use to projected use, allowing conclusions to be drawn regarding: 1) the reliability of projected savings, and 2) the availability of an income stream for debt service as a result of the energy efficiency installations. Use of advanced metering systems is expected to permit energy management interventions to remedy problems if actual use is not in line with projected use. Incentives for direct load control devices and technical assistance are also provided.

Program Resources

The eight-year budget for the CEM Program is \$15.2 million. This amount includes \$2.4 million for implementation, \$11.4 multifamily incentives and \$1.4 million in single-family incentives. In addition, building owners are required to share the installation cost. Through December 31, 2005, the program had spent 71% of its eight-year budget. A total of six NYSERDA contractors work on the program.

Targeted Customers

Targeted customers of the CEM Program are those residing in **New York Energy SmartK** Territory. Both multifamily buildings and single family homes are eligible with additional incentives provided to low-income buildings.

Program Barriers

A key supply-side barrier that affects market actors such as manufacturers, distributors, suppliers, utilities and regulators is the following:

- Lack of standards and common connectivity environment for broad market development

Key market infrastructure and policy barriers that affect market actors such as manufacturers, distributors, suppliers, utilities, regulators, building owners and low-income building managers include:

- Lack of experience
- High cost of meters
- Uncertainty with performance and savings
- Regulatory barriers such as accreditation needed for installers to meet PSC and utility standards, refining meter classifications and certified equipment lists
- Lack of availability of real-time pricing structure linked to hourly changes in wholesale prices versus traditional time of use rates linked to average prices
- Lack of standards and difficulty of obtaining reliable usage information that is useful to end-use consumers
- Required technologies not yet being in place
- Lack of alignment of interests of retail customers, local utilities and competitive suppliers

Key demand-side barriers that affect market actors such as building owners and managers, homeowners and residential consumers include:

- Tenant resistance
- Uncertainty about savings
- High cost of meters
- Lack of information regarding benefits, issues and options
- Lack of knowledge and experience managing varying prices
- Lack of proper pricing signals to be provided directly to customers (without which demand response behavior will not be sustainable)

Implementation Approach/Activities

The program works with the PSC, equipment vendors, and stakeholders to eliminate market barriers through policy changes, feasibility studies, education, and consumer awareness. Incentives are provided to building owners to install meters and direct load equipment, and owners are required to provide NYSERDA with third-party access to interval data from the meters to measure and verify energy savings. This data can be used by energy marketers for load aggregation and sales, and position the buildings to offer various forms of variable pricing that would not be possible without advanced metering.

Program Evolution

The program is increasing its focus on market development. The program will increase consumer demand through education and awareness efforts targeted toward tenants, building owners and property managers, and the program will work with market participants, such as vendors, consultants, and

manufacturers to continue to expand the infrastructure necessary to support the demand generated in the market.

In addition, starting in 2006, the CEM Program will be incorporated into the Multifamily Building Programs and will no longer be a separate program. Advanced meters, real time pricing structures and load control devices will be included in the list of energy efficiency measures that all building owners will be eligible to install under cost-effective scenarios.

5.10.2 Program Market Progress

This section highlights the findings on CEM Program progress in influencing the market in New York. Table 5-20 presents a sample of key indicators of program success, as tracked by the evaluation and program activities. They indicate the most important ways that the program progress is being measured, and report how those values are changing due to program activities.

5.10.3 Program Impact Evaluation

Gross Savings

In 2004, Nexant, Inc. conducted an independent review of the savings impacts reported by NYSERDA for the Residential CEM Program. The objective of the review was to obtain the best possible estimate of the program's cumulative, verified savings. Based on Nexant's review, as of December 31, 2005, the program resulted in energy savings and peak demand reductions shown in Table 5-21.

Nexant's review, which consisted of an examination of a sample of ten completed projects, found that all meters in the project sample were in place and operating. However, an analysis of utility billing records before and after project completion shows that energy and demand impacts are lower than reported by NYSERDA. Only four of the ten projects in the billing analysis sample saved more than 5% of baseline electric energy consumption, compared to NYSERDA-reported savings, in which six projects in the sample saved at least 5% of baseline consumption.

Based on the billing analysis results for the sample, it appears that there is a relationship between the age of a project and its savings, with savings increasing over time. Projects with small or no savings were all completed within 12 or fewer months of this review, while the four projects that have been in place for more than two years show savings greater than 10%. In addition, the four projects with at least two years of post-installation billing data all showed second-year savings at least 11% higher than during the first year. The time dependency is an indirect corroboration of the program's premise that tenants and energy managers will learn to use the information provided by advanced metering systems to better control their electric energy use. If this relationship continues, the program's savings should increase as voluntary reductions respond to the new information provided by the metering systems.

Table 5-20. Residential CEM Key Program Indicators and Progress

			Data Value -- 2005
Outputs and Indicators			
			\$8.6 million
			\$7.3 million
			98 buildings
			12,937 86% of program goal
			15,992
			3,588 MWh, 1.7 MW
			0.4 (TMET, Scenario 1)
			-
			-
			-
			-
			-
			-

Attribution and Net-to-Gross Ratio

Attribution was last examined as part of the 2004 MCAC evaluation of the CEM Program. The CEM Program targets savings in some future time and not energy savings in the current year. The MCAC team did perform an analysis of the energy savings attributable to the program based on program-reported savings and surveys with market actors. However, the MCAC Team recognizes that, except for the immediate savings from master meter/submeter conversions and other program efforts discussed in this report, much of the benefit from the CEM Program are not expected or intended to be realized for several years. The types of meters being installed, and the majority of the energy savings that will be derived from these meters will be realized only after the real-time pricing market and “Smart Homes” capabilities have matured. Furthermore, these additional expenses are currently being incurred in order to avoid “lost opportunities” and to avoid possibly having a second round of meter replacements in the not too distant future. This could be required if meters with lesser capabilities were being installed as part of current meter change outs. That being said, the following section discusses the net impacts currently attributable to the Residential CEM Program.

In total, 93 surveys were conducted with participating and non-participating multifamily building owners, metering contractors/vendors, and program staff. The attribution analysis was based on 37 surveys with participating building owners and 16 surveys with metering contractors/vendors. The ranges presented are based on the method for calculating a 90% likelihood interval for the consolidated distribution with weighted respondent-specific values.¹⁷

The CEM Program encourages the use of advanced meters as a method for moving the market forward, and ultimately readying this market for real-time pricing. These meters include features that are not necessary for simply achieving individual metering in multi-family situations. For this reason, one would expect to find low freeridership associated with the program. Freeridership was determined to be 2%, and the resulting freeridership factor, calculated as one minus freeridership, is 0.98.

Total spillover is 0.18, and the resulting market effects factor, calculated as one plus the total spillover value, is 1.18. This is consistent with expectations because, although there was an inconsequential number of NYSERDA-eligible advanced meters installed outside of the program in New York, program actors also reported that other energy-saving measures were installed as a result of the program’s influence. The program can be helpful in getting participants thinking about energy efficiency. Final net savings are shown in Table 5-21.

¹⁷ This approach can be viewed as similar to “bootstrapping” in that the sampling distribution is directly being developed using the raw data and the application of weights based on strata and sample size. This approach creates a combined distribution across the actor groups replicating observations to achieve the appropriate weighting for each observation in the combined distribution.

Table 5-21. Residential CEM Program Cumulative Annual Energy and Peak Demand Savings (Through December 2005)

							Net Savings
MWh/ year	3,192	0.97	3,103	0.98 (0.90-1.06)	1.18 (1.10-1.25)	1.16 (1.05-1.26)	3,588 (3,258-3,910)
MW	0.8	1.77	1.5	0.98 (0.90-1.06)	1.18 (1.10-1.25)	1.16 (1.05-1.26)	1.7 (1.6-1.9)
Values in parentheses represent realistic ranges for net factor, market factor, NTG ratio, and net savings given the data collected and the weighting factors used.							

Non-Energy Impacts

Non-energy impacts were last examined in 2004. The results show that participants clearly recognize the NEIs examined in the analysis and place a value on these NEIs equivalent to approximately 44% to 110% of the value of the energy savings realized from the program. The MCAC study team has taken a conservative approach in applying these values to commercial sector energy efficiency investments and recommends a value on the order of one-half the estimated value for NEI use values. This would add another 22% to 55% on to the net energy and peak demand savings attributable to the CEM Program. For this report, the assumption is that the multiplier will be applied to the net energy savings. Although respondents were asked to report the benefits relative to their energy savings (which may have elements of “gross” savings), the application to net savings is the more conservative assumption.

5.11 Residential Technical Assistance Program**5.11.1 Program Description****Program Purpose**

The ResTech Program improves the operation of multifamily housing by identifying and encouraging the implementation of cost-effective energy efficiency measures that also enhance health, safety, and comfort. NYSERDA contracts with qualified firms to provide energy-related and environmental technical assistance services to multifamily housing facilities and organizations. The program’s standard methodology includes: engineering feasibility and technical assistance studies (for building and occupant energy use, lighting, building envelope, mechanical ventilation systems, Energy Management Systems, heating/cooling distribution systems, and utility metering); computer-assisted building modeling; energy efficiency technical training; commissioning; and links to other NYSERDA programs.

Program Milestones	
2005	128 audits conducted
2004	RFP 845 ResTech Contractor
2000	RFP 556 ResTech Contractor

Program Resources

The eight-year budget for the ResTech Program is \$1.3 million. As of December 31, 2005, the program had spent 34% of its eight-year budget. In total, 12 NYSERDA contractors work on this program.

Targeted Customers

Targeted customers include multifamily building owners and managers, not-for-profit housing entities, and public housing authorities.

Program Barriers

The ResTech Program is working to overcome the following barriers:

- Cost of high efficiency HVAC systems
- High retrofit costs of building envelope systems
- Tenant and owner resistance to new technologies (*e.g.*, PV, wind, combined heat and power, and advanced meters)
- Lack of training of contractors on installation of renewable technologies

Implementation Approach/Activities

The program audits buildings and makes recommendations for energy efficiency improvements. Additional technical services, such as design assistance, construction assistance, and financial packaging are now available following completion of the audit. The ResTech Program works closely with the **New York Energy SmartK** Loan Fund, Smart Equipment Choices (SEC), the Residential CEM Program, the Assisted Multifamily Program, and the Peak Load Reduction Program (PLRP) by directing the property owner or manager to appropriate incentive programs and financial resources to encourage implementation of recommended measures.

Program Evolution

RFP 845 solicited proposals from energy consultants to provide ResTech services independent of FlexTech. Eligible technical services were expanded to include audits, financial packaging, design and construction assistance, as well as post-construction monitoring. The cost sharing was maintained along with the potential for reimbursement of the owner's share, based on owner installation of energy efficiency improvements recommended in the audit.

5.11.2 Program Progress and Impacts

The goals of the ResTech Program are to inform multifamily building owners and managers of available cost-effective energy-related improvements and to encourage the installation of recommended measures. The program has conducted audits in more than 500 buildings, incorporating approximately 15,000 apartments. If each project installs all of the recommended measures, electricity and peak demand savings could amount to approximately 62 GWh and 21 MW, respectively. In addition, fossil fuel consumption would be reduced by 160,000 MMBtu.

5.12 Residential Special Promotions Initiative

5.12.1 Program Description

Program Purpose

The Residential Special Promotions Initiative seeks to increase the availability, promotion, and sale of energy-efficient products and services in ways not currently addressed through NYSERDA’s other market transformation efforts. Projects are expected to be short in duration, target specific markets, and achieve specific goals. This initiative is designed to influence the behavior of up-stream and mid-stream market participants and residential customers. The primary goal is to increase the availability, promotion, and sale of energy-efficient products and services in markets not effectively addressed through NYSERDA’s other market transformation efforts. Several of the individual projects are working to overcome specific market barriers to energy efficiency and affordability. Projects that have been funded through this program are described below in the Implementation Approach/Activities section.

Program Milestones	
2001	PON 635: Special Promotions: Residential Sector Initiatives
2000	GetEnergySmart.org website and on-line energy audit tool operational.
1999	PON 464 Innovative Opportunities - Residential Sector

Program Resources

The eight-year budget for Residential Special Promotions is included in the ESPM budget. In total, four NYSERDA contractors currently work on this program.

Targeted Customers

Up-stream and mid-stream market actors and residential customers are targeted.

Program Barriers

The program is intended to overcome the following barriers:

- Lack of variety and supply of residential ENERGY STAR fixtures in the marketplace.
- Lack of understanding of energy efficiency options, and lack of awareness of programs that can improve residential energy efficiency.
- Inability to reach some consumers through traditional advertising.

Implementation Approach/Activities

Projects that have been funded through the Special Promotions Initiative include:

WKBW-TV Special Promotion. WKBW-TV, an ABC affiliate in Buffalo, brought the **New York Energy \$martSM** Program and the ENERGY STAR[®] message to the Buffalo market. This was accomplished through a series of promotions and events, such as live and pre-recorded interviews on energy issues with a NYSERDA spokesperson (*e.g.*, “Ask the Energy Expert” spots, and appearances on *AM Buffalo* and *WNY Live*), internet banner sponsorships on WKBW’s website, commercials played during Buffalo Bills games, attendance at the Erie County Fair, and the production of an ENERGY STAR[®] documentary.

ENERGY STAR[®] Lighting Fixture Project. The goal of this project was to identify four manufacturers of moderate- to high-end lighting fixtures to develop, certify, and introduce eight to ten higher-end ENERGY STAR[®] lighting fixtures into the lighting market, and sell them through 20 to 30 lighting showrooms and specialty retailers that are currently ENERGY STAR[®] Products partners.

Consumer Education Program for Residential Energy Efficiency Project. Cornell Cooperative Extension contracted with NYSERDA to promote consumer education efforts in 24 counties throughout New York. These efforts included special events, media outreach, presentations and other creative means of promoting energy efficiency and the **New York Energy \$martK** Program.

ENERGY STAR Appliance Fairs. The goal of this project was to organize and promote ENERGY STAR appliance and lighting fairs in multifamily and cooperative residential buildings and to market ENERGY STAR and the **New York Energy \$martK** Program to attendees.

Program Evolution

The successful WKBW-TV project, and the follow-on contracts, led to NYSERDA’s release of a competitive solicitation in 2005 to secure contracts with local television stations in four markets – Buffalo, Rochester, Syracuse and Albany. The contracts include programming that is intended to educate consumers on energy topics, tips for reducing their energy consumption, and highlights on **New York Energy \$martSM** Programs.

5.12.2 Program Progress and Impacts

The lighting fixtures project concluded with only two manufacturers participating, Sea Gull and Wilshire, and approximately 2,900 fixtures being sold. However, the two manufacturers each increased the number of retail outlets for their products in New York State, and each produced a catalog of their products which was directly distributed to NYSERDA’s ENERGY STAR builder partners and others. Sea Gull has also proposed and implemented other co-op promotions through our ENERGY STAR Products Program as a result of participating in this special promotion project.

5.13 Energy Smart Students Program

5.13.1 Program Description

Program Purpose

The Energy Smart Students Program provides curriculum materials, training and professional development for teachers on the scientific concepts of energy and provides objective information about energy sources, their use and impact on the environment, the economy, and society. The program also includes information to educate students about energy efficiency and conservation, and tools to help educators, energy managers and consumers use energy wisely.

Program Milestones	
December 2005	600 teachers trained with over 50,000 students benefitting
December 2004	122 teachers trained with 10,200 students benefitting
October 2004	1st regional workshop & first issue of newsletter
July 2004	Summer conference
April 2004	Contract awarded
October 2003	RFP 794 Energy Efficiency Education Program

Program Resources

The budget for the Energy Smart Students Program is \$728,000. As of December 31, 2005, the program had spent 46% of its budget. The program was launched in April 2004 with the selection of a program implementation contractor through a competitive Request for Proposal process. One NYSERDA contractor works on this program.

Targeted Customers

The program targets New York State K-12 teachers and students in the **New York Energy \$martSM** service area.

Program Barriers

The increased emphasis on standardized tests increases the challenge of getting new materials adopted in classrooms.

Implementation Approach/Activities

Energy education is brought to teachers through annual conferences, regional workshops, newsletters, the www.GetEnergySmart.org website, and partnerships with the statewide Board of Cooperative

Educational Services (BOCES) network, Science Teachers Association of New York State, New York State Technology Educators Association, New York State Department of Education, and various colleges and universities.

The Energy Smart Students Program partnered with NYSERDA's R&D programs, Long Island Power Authority, and New York Power Authority to deliver Hydrogen workshops to New York teachers. The Energy Smart Students Program also worked with NYSERDA's Energy Efficiency Services and R&D staff to develop workshops on biodiesel with funding from the National Biodiesel Board.

Program Evolution

In July 2006, the program will host a four-day workshop on energy topics for up to 20 teachers that commit to become trainers of other teachers in their school district. This revised approach will lay the

groundwork to expand the program in the future. Where a single trainer delivered an average of 25 workshops per year, training teachers as trainers will allow the program to deliver an estimated 60 workshops each year.

5.13.2 Program Progress and Impacts

The goal of the Energy Smart Students Program is to create an energy-conscious society by training teachers on the sources of energy, the global impacts of energy, and the need for energy efficiency. The teacher training is passed on to students, and ultimately their parents, through projects-based activities and a take-home component. Through December 2005, more than 600 teachers have been trained and more than 50,000 students have benefited from expanded lessons on energy and energy efficiency.

Six issues of the Energy Smart newsletter have been published, reaching over 2,200 science, technology, math, elementary, and home and careers teachers and administrators.

5.14 New York Energy \$martSM Communities

5.14.1 Program Description

Program Purpose

The Energy \$mart Communities Program was developed to complement U.S. DOE's Rebuild America Program. Energy \$mart Communities targets regional needs by bringing together organizations and agencies that contribute to local "model" projects demonstrating how energy efficiency and energy resource approaches can be used to create economic, social and environmental benefits. To transfer the success of these model projects to the rest of the region, this program provides information and support at the local level to individuals and organizations interested in energy efficiency and **New York Energy \$martSM** programs.

This program pursues some of its projects in New York Energy Target Zones, which are specific neighborhoods within the region that can substantially benefit from energy efficiency due to economic, social, and/or other local circumstances. Energy \$mart Communities encourages local groups to reach out to neighbors and spread the energy efficiency message. The program also provides one-on-one assistance to building owners, matching them with financial and technical assistance available through NYSERDA and other agencies.

By bringing such collaborations to communities that need them the most, this program intends to set a precedent that encourages community leaders and building owners to adopt energy efficiency and sustainable practices. Collaborative efforts have resulted in downtown redevelopment efforts, energy-related infrastructure development, and residential energy improvements.

Program Resources

The eight-year budget for this program is \$3.9 million. As of December 31, 2005, the program had spent 64% of its budget. Regional coordinators are required to provide matching funds for activities pursued in this program. In total, 45 NYSERDA contractors work on this program, of which 35 are Extension

Educators from Cornell Cooperative Extension who have integrated energy efficiency education into their everyday activities.

Targeted Customers

The program targets residential and commercial entities residing in Energy Target Zones in the **New York Energy \$martSM** Program territory.

Program Milestones	
2004	35 Energy Target Zones in New York
2003	25 Energy Target Zones in New York; RFP 643 Regional Coordinator for New York City
2002	20 Energy Target Zones in New York
2001	RFP 642 Regional Coordinator for Capital/Saratoga, North Country, and Western New York Regions; RFP 641 Regional Coordinator for the Southern Tier, Finger Lakes Central New York and Mid Hudson Regions

Program Barriers

The lack of Rebuild Partners to access makes it a little more difficult to find speakers for the Tech seminars that the Coordinators are charged with producing twice a year.

Implementation Approach/Activities

There are currently eight Energy \$mart Communities regions. NYSERDA contracts with a local organization in each of the regions to implement the program. A full-time coordinator, employed by the contract organization, runs the program in each region. The coordinator and the contract organization are responsible for: (1) managing the Energy \$mart Communities partnership; (2) defining the Energy Target Zones; (3) identifying and managing Energy \$mart Communities projects; and (4) marketing **New York Energy \$martSM** Programs within the region. Due to the large population in New York City, the region has been split between two separate Coordinators.

Strategies for the program include creating Energy Target Zones and other public demonstration projects; regional marketing; public education forums; matching building owners with NYSERDA programs; and training local organizations to market NYSERDA programs to the public. Market awareness of New York Energy \$mart Communities is gained through local

marketing, including local newspaper and media outlets, direct mailings, marketing by local organizations, and marketing case studies.

Along with coordinating with the Rebuild America Program, the program capitalizes on its coordination with other **New York Energy \$martSM** programs. Since Energy \$mart Communities projects consider the needs of communities, buildings involved in the program come from many different sectors. The program accesses almost all of the **New York Energy \$martSM** programs. This program is also active in communities that have been designated as Quality Communities by the Governor’s Quality Communities task force.

Program Evolution

The program is exploring a possible expansion to Long Island.

5.14.2 Program Progress and Impacts

The goal of the Energy \$mart Communities Program is to match buildings to **New York Energy \$martSM** programs to increase energy efficiency; establish Energy Target Zones that demonstrate the economic, social, and environmental benefits of energy efficiency; and educate the public about the value of energy efficiency. As of December 31, 2005, the Program has contracted with nine organizations to implement the program in seven upstate regions and New York City. Forty Energy Target Zones have been established. The program has held 491 outreach events and has 248 partners across the State. Regional outreach activity has resulted in approximately 1,093 referrals to NYSERDA and 235 projects that are either completed or in progress.

In addition to the program milestones noted, the following list summarizes other program highlights over the past year.

- An ENERGY STAR model home was showcased in Victor, NY, a Finger Lakes Energy \$mart Communities partner, on Change a Light Day, October 5th 2005. “Take the Change a Light Challenge and SAVE!” was the message delivered by NYS Lieutenant Governor Mary Donahue and at Curtis Lumber in Ballston Spa by Peter R. Smith. As of October 31, NYS led the nation in residents taking the pledge.
- Capital/Saratoga Energy \$mart Communities hosted the Multifamily Building Facilities Management and Energy Efficiency Training series. Steven Winter Associates presented on seven topics: introduction to energy efficiency building operations, heating and cooling, ventilation and indoor air quality (IAQ), lighting and appliances, energy management, savings from water and pumps and motors. A total of 245 people participated.
- North Country, Central NY, Finger Lakes and Southern Tier Energy \$mart Communities hosted the Energy Efficiency in Public Housing Authorities Seminar for small housing authorities in their regions. NYSERDA along with officials from HUD demonstrated how the DOE Weatherization program and NYSERDA funds could be used to make energy efficient improvements while following HUD guidelines.
- An on-line registration link has been created for the seminars that the Energy \$mart Communities Program hosts. This streamlines the registration process and allows for good accounting and information on attendees.
- The Western Regional Coordinator organized the Town of Tonawanda Energy \$mart Holiday Decorating Contest which awarded homeowners for Most Traditional, Best Green Decorating, Best Overall, and Most Unique, all of which centered around using light-emitting diode (LED) lights. Articles on the event appeared in a number of local newspapers.
- The Southern Tier has been promoting the “Energy \$mart Office Program”. By mid-October the following entities will have completed their audits and have estimated energy savings: Ithaca College, Tompkins County Community College, City of Ithaca, Tompkins County. Lehman Alternative School (K-12) which also participated will now add the NYSERDA's Energy \$mart Students Program, which will have introduce Energy related curriculum, and associated teacher training.

- In 2005, the Hostos Community College and Sullivan Community College Energy Seminars were hosted with over 500 participants.

5.15 Residential Sector Level Program Theory and Logic

This section is based on development of a full theory and logic model for the **New York Energy \$martSM** Residential Programs.

5.15.1 Residential Sector Activities

NYSERDA's Residential Programs include a number of activities that produce outputs that lead to short, intermediate and long-term outcomes supporting the **New York Energy \$martSM** Program goals. There are six main types of activities:

- marketing, consumer education and public awareness
- incentives
- technical support
- verification and quality assurance/quality control (QA/QC)
- partner recruitment and outreach
- training, education and certification

These activities range across the spectrum from demand-oriented (*e.g.*, marketing and consumer education) through market infrastructure (*e.g.*, technical support and verification activities) to supply-oriented (*e.g.*, partner recruitment and training). Identification of the common set of activities at the sector level was derived from program-specific logic models developed for many of the residential sector programs. More specific information on each activity can be found in NYSERDA's individual residential program descriptions and logic models presented in NYSERDA's May 2005 **New York Energy \$martSM** Program Evaluation and Status Report. Table 5-22 lists activities along with their designated targets on the demand-supply continuum.

5.15.2 Residential Sector Market Barriers

The residential sector presents a number of barriers that inhibit the adoption of energy-efficient products and services. These barriers fall into two groups, barriers affecting the supply side (and related infrastructure) and barriers affecting demand-side (and associated end-use) market actors. Supply-side barriers generally involve business practices and policies that deter the delivery of energy efficiency services and the lack of availability of or commitment to energy-efficient products. Demand-side barriers in the residential sector primarily focus on the lack of awareness and education regarding energy efficiency options and benefits and its priority given competing uses of funds. Table 5-23 lists specific barriers and the related market actors (the order of these barriers does not reflect priority).

Table 5-22. Residential Sector Activities

Marketing, Consumer Education and Public Awareness	
Demand-Side Activities	
<p>Collateral marketing materials and advertising to inform end-users of opportunities (coordinated with other organizations and leveraged awareness activities), including Point Of Purchase (POP) materials, videos and brochures (Energy Tips, etc.), radio, TV and paid print ads - leveraged funding and co-advertising, as part of broad NYSERDA marketing activities (within and across program areas, sectors and portfolios)</p> <p>Promotional opportunities, home shows, local events, special promotions and community education with significant co-funding through USDOE Rebuild America</p> <p>Website enhancements and information/promotion on website (on-line marketing), screen website visitors through a series of questions and encourage them to take action, toll-free hot line/call center</p> <p>Contact via project contractors and on-going NYSERDA Residential Program management/support staff, Cross marketing through other programs</p> <p>Provide educational support and conduct awareness activities for tenants and owners to increase consumer demand</p> <p>Provide information and tools to K-12 teachers to help them educate students about energy efficiency and conservation and to help educators, energy managers and consumers use energy wisely</p>	
Incentive Activities	
Market Infrastructure Activities	
<p>Incentives to building owners to install meters and direct load control equipment</p> <p>Financing options and incentive for self-financing (ENERGY STAR financing, Loan Fund, HFI and Low Income option)</p> <p>Periodic special product incentives</p>	<p>Product-specific targeted incentives (<i>e.g.</i>, market share-based incentives for lighting and appliances)</p> <p>Incentives to builders – to reimburse them for expenses they have paid up front</p> <p>Co-operative advertising incentives</p> <p>Contractor and rater training and certification incentives</p>
Technical Support	
Market Infrastructure Activities	
<p>Provide one-on-one assistance to building owners, matching them with financial and technical assistance available through NYSERDA and other agencies</p> <p>Conduct feasibility studies</p> <p>Support distribution of technical education material through state-wide TV, radio and print media (Steve Thomas), PR, consumer hotline, printed materials mailed and contractor follow-up, home shows, State fair, website</p> <p>High School HPwES Pilot</p> <p>Provide lighting and appliance assessments for multifamily buildings and associated measure installation suggestions</p>	<p>Product evaluation and specifications development</p> <p>Comprehensive marketing, outreach and education to address contractor uncertainty regarding sufficient demand for whole-house services</p> <p>Contract with qualified firms to provide energy-related and environmental technical assistance to multifamily housing facilities and organizations, provide energy efficiency technical training</p> <p>Support computer-assisted building modeling, provide commissioning, development and technical support</p> <p>Provide one-on-one assistance to building owners, matching them with financial and technical assistance available through NYSERDA and other agencies</p> <p>Provide lighting and appliance assessments for multifamily buildings and associated measure installation suggestions</p> <p>Develop technical education material</p> <p>Support development of builder and HERS rater training and technical support mechanisms</p>

Verification, QA/QC and Other	
	Market Infrastructure Activities
<p>QA/QC for sample of new homes in each target market to document and confirm performance</p> <p>Follow-up QC support to consumers and related consumer protection</p>	<p>Delisting and decertification process for builders, contractors and HERS raters whose work does not meet program standards</p> <p>Survey of builders and homebuyers</p> <p>Cost-effectiveness screening, written work scopes, certificates of completion, post-completion QC inspections, appliance recycling and early retirement support</p> <p>Identification of turn-in facilities, contracts with entities to pick up and demanufacture</p>
Partner Recruitment & Outreach	
	Supply-Side Activities
<p>Builder recruitment</p> <p>Retailer recruitment</p> <p>HERS rater recruitment, encourage contractor partnerships and contractors to obtain BPI accreditation</p> <p>Work with PSC to develop a market infrastructure to support advanced metering and a real-time pricing tariff</p>	<p>Work with manufacturers and coordinate with regional and national efforts to ensure consistency and market advancement</p>
Training, Education and Certification	
	Supply-Side Activities
<p>Builder training</p> <p>Retailer training, provision of educational materials and training on the benefits of ENERGY STAR products, educate retailers in the operation of the programs, provide sales tools and POP materials and information on qualifying equipment and knowledge to help them sell, inform of financing options</p> <p>HERS rater recruitment and training, encourage contractor partnerships and contractors to obtain BPI accreditation, provide classroom training on a market basis, offer continuing education credits for those occupations that require it</p> <p>Influence certification criteria when appropriate, align programs with existing processes (BPI, codes training), TECA initiative, in collaboration with manufacturers, professional trade associations and distributors, vocational schools pilot</p> <p>Host video-based training materials, participation agreements and other materials on website to improve program delivery and management, allow for reporting of performance data on line</p> <p>Support contractors in modifying their businesses to incorporate whole-house approach and related elements, provide field support to contractors on Home Check software, etc.</p>	<p>Work with manufacturers and coordinate with regional and national efforts to increase manufacturer knowledge and involvement</p>

Table 5-23. Residential Sector Market Barriers

		Market Actors
<p>Supply side (manufacturers, developers, etc.)</p> <p>Market Infrastructure / policy (builders, contractors, retailers, etc.)</p>	<p>Lack of information and awareness among upstream and mid-stream market actors regarding the benefits and business opportunities for energy efficient homes, efficient equipment, renewable energy and load management products, and related services</p> <p>Limited experience with efficient homes and equipment, renewable energy products, load management equipment, and energy monitoring equipment</p> <p>Uncertainty about product performance and profit potential for providing energy efficiency services</p> <p>Limited availability of subcontractors with training and experience necessary for efficient equipment/building techniques and optimum energy performance of efficient equipment/building techniques.</p> <p>Undervaluing energy efficiency and sustainability</p> <p>Contractors unwilling to learn and conduct services outside of their specific trade</p> <p>Lack of available real-time pricing and other load management options</p>	<p>Equipment manufacturers and developers</p> <p>Contractors</p> <p>Builders</p> <p>Retailers</p> <p>Distributors</p> <p>HERS providers</p> <p>HERS raters</p> <p>Multifamily property managers</p> <p>Sub-contractors and building trades</p> <p>Teachers</p>
<p>Demand side (downstream actors)</p>	<p>Lack of awareness, knowledge and understanding of energy efficiency, renewable energy and load management features, products and services</p> <p>Information costs associated with understanding these features and associated benefits</p> <p>Competing needs for capital</p> <p>Lack of reliable information on energy-efficient practices in existing homes</p> <p>Resistance to new and/or innovative technologies</p> <p>Performance uncertainties</p> <p>Split incentives for rental units (building owners often do not pay the energy bills, the tenant does but has little incentive or ability to improve the property)</p> <p>Lack of available real-time pricing and other load management options</p>	<p>Residential customers, including existing and potential new home owners</p> <p>Multifamily building owners</p> <p>Tenants</p> <p>Students</p> <p>Communities</p>

5.15.3 Residential Sector Goals

The ultimate goal of NYSERDA’s portfolio of residential energy efficiency programs is to develop residential markets that achieve all four **New York Energy \$martSM** Program goals. To achieve these, the programs work to reduce supply-side barriers, increase necessary market infrastructure, and increase demand for energy-efficient equipment, homes, and the use of renewable energy sources in the residential sector. The Residential Programs seek to create a sustainable market for energy efficiency and renewable products and services throughout the residential sector. The goals of the Residential Programs are listed in Table 5-24.

Table 5-24. Residential Sector Goals

	Demand Side Activities
<p>Increased awareness, knowledge and willingness or ability to make available technically proven and economically viable residential energy efficiency, renewable energy and demand response products and services (including real time pricing/load management options)</p> <p>Increased number of firms (contractors, home builders, equipment suppliers, etc.) with experience and confidence in delivering residential energy efficiency, renewable energy and demand response products and services that produce reliable benefits</p> <p>Improved energy and environmental performance of existing and new homes that incorporate green design practices, energy efficiency and alternative energy technologies and operations</p> <p>Larger robust and sustainable market for residential energy efficiency, renewable energy and demand response products and services</p> <p>More efficient residential building stock</p>	<p>Projects demonstrate persistent energy savings, reduced energy costs and provide other benefits to end-users</p> <p>Customers have reliable information on which to understand and base their energy-related decisions</p> <p>Increased consumer awareness about the benefits of energy efficiency and alternative energy options and associated understanding/awareness of the environmental impacts of energy choices and emerging energy options</p> <p>Customers have confidence in energy saving estimates and value the energy efficiency and green building features of their homes and associated purchases</p> <p>Access to residential energy efficiency, renewable energy and demand response (including real time pricing/load management) products and service options is improved for all types of customers, including underserved customers</p>

5.15.4 Residential Sector Outputs, Outcomes, and Associated Measurement Indicators

It is important to distinguish between outputs and outcomes. For the purposes of this report, outputs are defined as the immediate results from specific program activities. These results are more easily identified and quantified through counting and/or review of program records. Outcomes are distinguished from outputs by their less direct (and often harder to quantify) results from specific program activities. Outcomes represent anticipated impacts associated with NYSERDA’s program activities and will vary depending on the time period being assessed. On a continuum, program activities will lead to immediate outputs that, if successful, will collectively work toward achievement of anticipated short-, intermediate- and long-term program outcomes.

The residential sector-level logic model work conducted this year included development of detailed output and outcome lists, as well as documentation of potential data sources and data collection approaches that could be used to obtain data to report on these in future evaluation efforts. Where appropriate, the need for baseline data was also noted. The output and outcome lists are not shown here since they still need to be prioritized and subsequently considered as potential areas for investigation as part of a future formal residential sector evaluation plan.

5.15.5 Residential Sector Testable Hypotheses

Based on this preliminary program logic model assessment for NYSERDA’s residential sector programs, a number of researchable issues have been identified and are noted below. Some of these have been investigated and continue to be investigated through NYSERDA evaluation activities.

- Has awareness and knowledge of NYSERDA’s residential programs, energy efficiency and renewable opportunities and associated potential benefits increased as a result of the programs?

- Is the contractor, builder, and retailer training offered by the programs effective in creating the desired level of knowledge about and quality in energy efficiency and renewable products, installation, and services? Does it enable contractors, builders, and retailers to create a profitable business model selling energy efficient and renewable products and services?
- Are the activities, advertising, and educational services provided by contractors, builders, and retailers leading to increased installation of energy efficiency and renewable measures in households?
- Are the realized savings from the installed energy efficiency measures consistent with initial expectations? Are they meeting customer expectations for bill savings and non-energy benefits?
- Is participation in the program by residents, building owners, and mid-market actors increasing their knowledge about energy saving behaviors and measures? Is this leading to increased demand/supply for/of energy efficiency products and services? Are they willing and are they purchasing/adopting additional energy efficiency and renewables without incentives due to their prior experience with the products/services and the program efforts?
- Are suppliers, vendors and mid-stream market actors finding provision of efficiency options profitable through the program? Is their support for and promotion of energy efficiency products and services increasing over time and what are the reasons for these increases?
- Are the advertising and marketing efforts effective in increasing awareness, knowledge, changes in intention, and changes in behavior without additional financial incentives being provided?
- What does it take to make each of the individual markets within the residential sector sustainable: whole house assessments, HERS raters, the various renewables options, peak demand reduction and price response? What progress has been made?
- In the long run, what is required to sustain the energy efficiency market infrastructure and demand in the residential sector in absence of program incentives? What thresholds must be met for sustainability to become an accepted part of the market infrastructure?¹⁸ What progress has been made towards these thresholds?

Research addressing these questions will help to validate the reasonableness of the associated theories and will help to inform NYSERDA program staff of progress and potential areas for program enhancement and refinement.

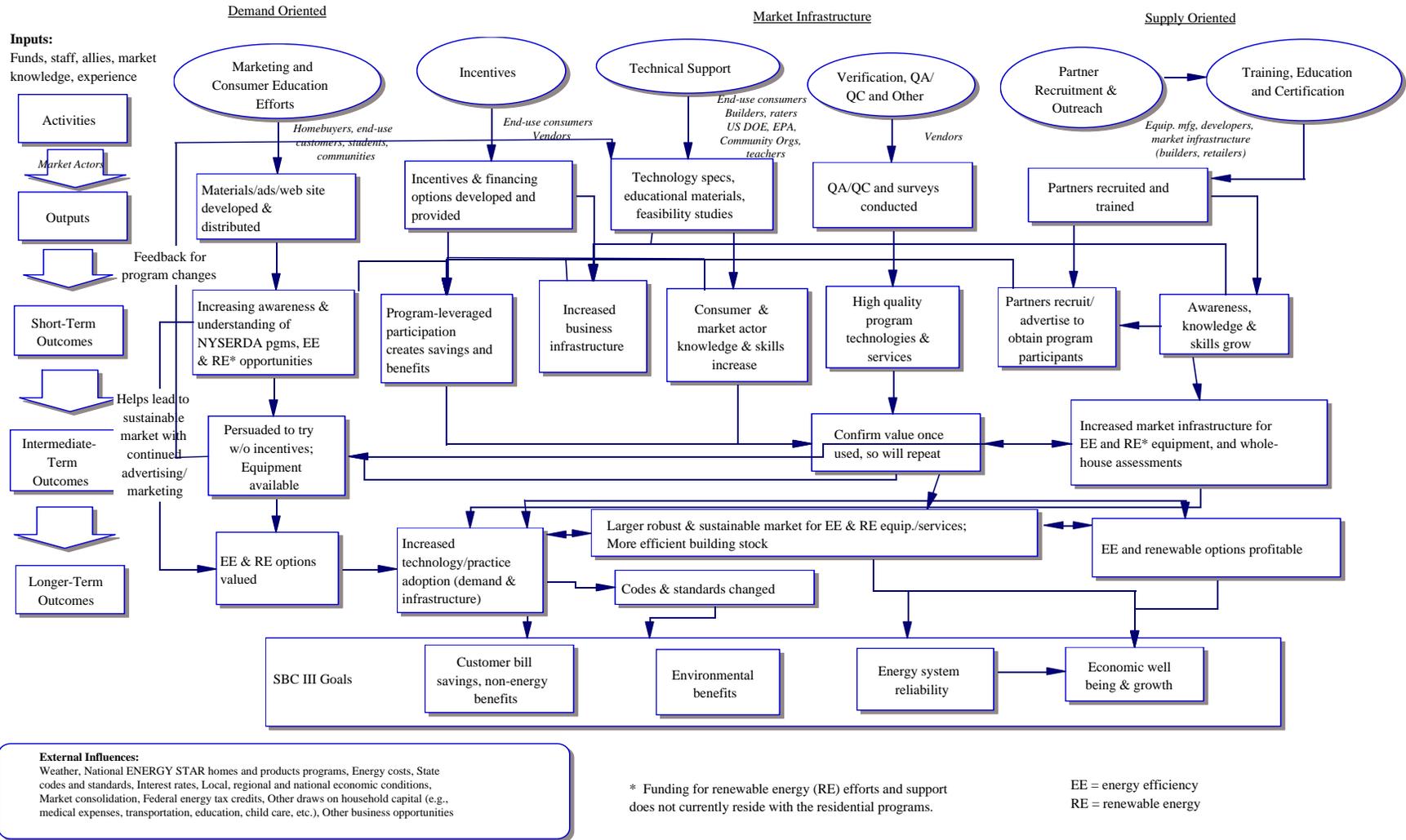
5.15.6 Residential Sector Logic Model

Figure 5-5 illustrates the residential sector logic at a relatively high level in diagram form. This diagram is based mainly on key activities and logic elements derived from a workshop held with NYSERDA staff

¹⁸ Most systems and behavior are not linear. They often have inflection points where a relationship change occurs. Moving through that point of stability is often slightly more difficult going up or down. For sustainability, this would be points at which it takes more momentum to go back to not offering efficient products and services than to maintain their offering and promotion. In essence, there is a point at which the function becomes an accepted part of the market infrastructure. This could include incorporation into standard business practices, inclusion in cyclical media purchase plans, where consumers shop for specific products/services without thinking about where to shop for it, etc.

along with a careful review of NYSERDA's residential program documents and related program implementation details. The diagram was then modified based on feedback received through teleconferences and e-mail communications with NYSERDA staff to help better define specific elements and logic flow. In the diagram, program activities, outputs, and short, intermediate and long-term outcomes are denoted within text boxes and general program inputs and potential external influences are also noted.

Figure 5-5. Residential Sector Logic Model



6

Low-Income Programs

6.1 Overview of the Low-Income Programs

The Low-Income Programs are designed to reduce the energy burden of low-income households by improving energy efficiency and providing energy management and aggregated energy procurement services. Initiatives in this program area include: (1) providing support for and installing a broad range of energy-efficient electric end-use measures in low-income housing, (2) paying a portion of the incremental cost of energy efficiency measures and electric heat conversions in publicly-assisted housing, (3) helping low-income households aggregate energy purchasing power, (4) incorporating energy-efficient equipment and design specifications into State- and federally assisted housing, and (5) informing customers generally about the benefits of energy efficiency.

Specific Low-Income Programs include:

Assisted Multifamily Program (AMP). This program is designed to improve energy efficiency in eligible multifamily buildings, reduce energy bills for tenants and owners, and provide increased health and safety benefits to building occupants.

Assisted Home Performance with ENERGY STAR® (HPwES). This program is designed to reduce the energy burden on low-income New York residents by bringing a “building performance” approach to home improvement. The program follows a market transformation model first introduced by the HPwES Program. Results for this program are covered in Section 5 with HPwES.

Low-Income Direct Installation (DI). This program, now closed, was designed to improve energy efficiency for low-income households by installing electric reduction measures in homes receiving shell and heating system improvements through the federal Weatherization Assistance Program at a time when electric reduction measures were ineligible.

EmPower New YorkSM. This program provides energy efficiency measures and energy-use management education to participants in the National Grid and New York State Electric and Gas low-income programs.

Weatherization Network Initiative (WNI). This program is built on the lessons learned in the Low-Income Direct Installation Program. It implements electric reduction measures in 1- to 4-family homes that did not receive electric reduction measures through the Weatherization Assistance Program or are on the waiting list for Weatherization Assistance.