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 York℠. 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.

Low-Income Buying Strategies. This program tests a variety of strategies designed to improve energy affordability for low-income customers including aggregation of customers to decrease the cost of electricity, bulk purchase of home heating fuel, and negotiating discounts for the purchase of home heating oil by HEAP recipients.

Low-Income Energy Awareness. This program is designed to implement a public awareness campaign to result in measurable improvements in the enrollment of low-income residents in energy efficiency and energy management programs.

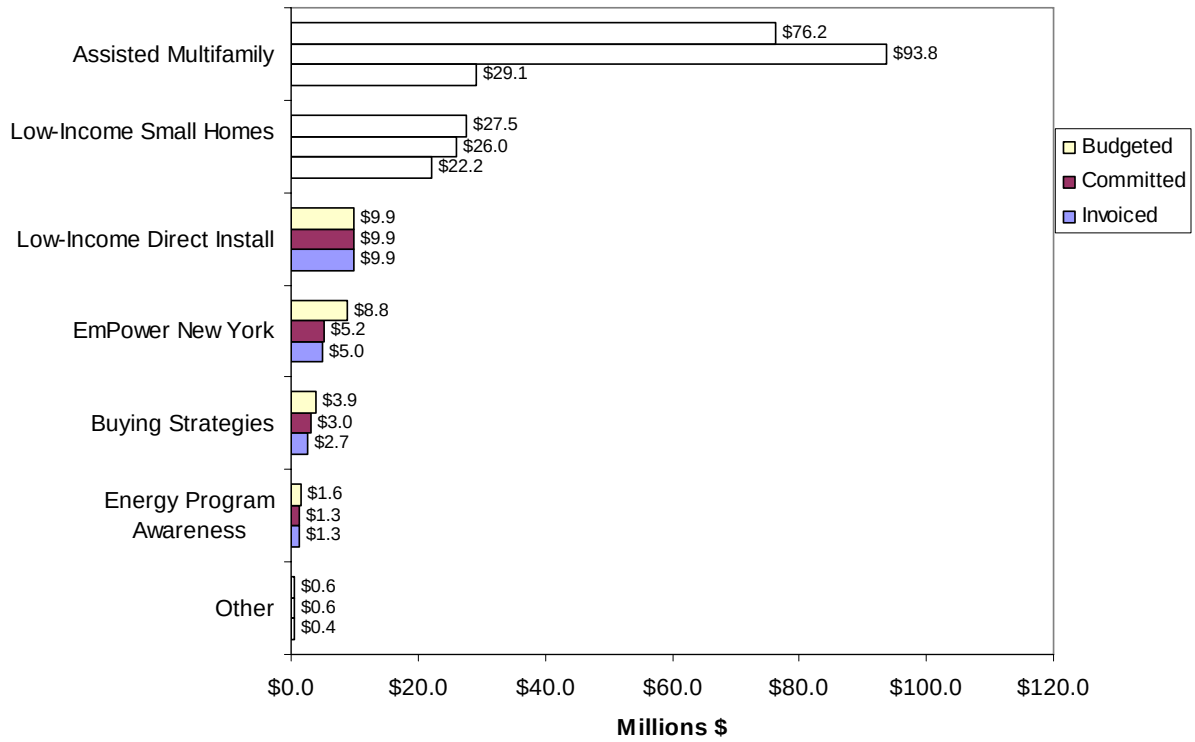
Low-Income Forum on Energy (LIFE). LIFE is a unique statewide dialogue that brings together organizations and individuals committed to addressing the challenges and opportunities facing low-income New Yorkers as they seek safe, affordable and reliable energy.

6.2 Low-Income Budget Status

The Low-Income Programs, funded at $128.4 million represents 13.4% of the total **New York Energy $mart**[SM] Program budget. As of December 31, 2005, 109%[1] ($139.8 million) of the eight-year Low-Income Programs budget had been committed. Approximately $70.7 million of the Low-Income Programs budget has been invoiced. The balance of funds available is $18 million. As of December 30, 2005, the Low-Income Programs budget was distributed among the seven areas as shown in Figure 6-1. The Small Homes category includes funds for both the WNI and Assisted HPwES. The funds for Assisted HPwES are displayed in Figure 6-1, yet the results for the program are combined with HPwES in Section 5.

[1] The AMP program commits funds to potential projects that may not be completed; therefore, the committed funds outweigh the budgeted amount. For projects that will not be completed, the funds are made available for new projects.

Figure 6-1. Low-Income Programs Budget



Note: The AMP program commits funds to potential projects that may not be completed, therefore the committed funds outweigh the budgeted amount. For projects that will not be completed, the funds are made available for new projects. The Small Homes category includes funds for the Assisted Home Performance and Weatherization Network Initiative programs. The Buying Strategies category includes funds for the Low-Income Aggregation program.

6.3 Low-Income Evaluation Activities

The Low-Income Programs evaluation activities conducted for this report are shown in Table 6-1. Most of the work was conducted in 2003 and 2004. The AMP, as a relatively new and by far the largest Low-Income program, has received the most attention. In 2005, a portfolio level Low-Income logic model was developed.

Table 6-1. Low-Income Programs Evaluation Activities

						Process Evaluation
Low-Income Portfolio	Yes (2005)	No	No	No	No	No
Assisted Multi-family (AMP)	Yes (2003)	Yes (2004)	Yes (2003) Update (2004)	Yes (2003) Update (2004)	Yes (2003) Update (2004)	Yes (2003)
Assisted Home Performance with ENERGY STAR	Covered in the Residential Program Section under Home Performance with ENERGY STAR					
EmPower New York^{SM}	No	Yes (2005)	No	No	No	No
Weatherization Network Initiative	No	Yes (2004)	No	No	No	No
LI Direct Installation (DI)	No	Yes (2004)	No	No	Secondary data (2003)	No
LI Oil Buying Strategies	No	No	No	No	No	No
LI Energy Awareness	No	No	No	No	No	No
LI Aggregation	No	No	No	No	No	No
LI Forum on Energy (LIFE)	No	No	No	No	No	No

6.4 Key Low-Income Evaluation Findings

With the exception of some M&V activity for the EmPower New York^{SM} Program, and the development of a Low-Income Sector Logic Model, no evaluation activity occurred during 2005. The M&V activity was directed at the savings calculator tool used in the EmPower New York^{SM} Program. As the calculator was reviewed and improvements made prior to reporting savings, no adjustments to program-reported savings were recommended. The Low-Income Logic Model was developed after the remaining evaluations had been completed, and the results of the logic model development, including indicators and testable hypotheses should be seen more as a guide for future evaluations, rather than a tool for organizing past evaluations.

Because of the limited evaluation activity in 2005, and the fact that a full range of evaluation activities were conducted only for the AMP, this section largely restates the findings from past evaluation reports.

AMP is the largest low-income program administered by NYSERDA, and, over the years, evaluation activity has been concentrated in this area. An important evaluation finding in the AMP is that 6.1% of eligible units had efficiency measures installed through the program, and an additional 8.8% had participated in the audit offered by the program. This sums to almost 15% of the eligible population of the low-income multifamily market that had participated in some aspect of the program. Awareness of energy efficiency is high, among both participating and non-participating building owners. Non-energy benefits were seen as being an important component to the decision to participate in the program. Two-thirds of participants in 2003 were satisfied with their participation in the program. Finally, a majority of

building owners and managers declared their intention to replace equipment with more efficient models in the future.

Table 6-2, Table 6-3 and Table 6-4 summarize the electricity, peak demand, and other fuel savings resulting from the Low-Income Programs.

Table 6-2. Low-Income Programs Electricity Savings Summary

					Net Savings (MWh/year)
Assisted Multifamily Program	23,891	0.97	23,074	0.84	19,370
Weatherization Network Initiative	5,428	1.0	5,428	-	5,428
Direct Installation Program	11,494	1.0	11,494	-	11,494
EmPower New York^{SM}	9,302	1.0	9,302	-	9,302
Low-Income Programs Total	**50,115**	**-**	**49,298**	**-**	**45,594**

Table 6-3. Low-Income Programs Peak Demand Savings Summary

					Net Savings (MW)
Assisted Multifamily Program	1.1	1.26	1.4	0.84	1.2
Weatherization Network Initiative	0.8	1.0	0.8	-	0.8
Direct Installation Program	1.6	1.0	1.6	-	1.6
EmPower New York^{SM}	0.8	1.0	0.8	-	0.8
Low-Income Programs Total	**4.3**	**-**	**4.6**	**-**	**4.4**

Table 6-4. Low-Income Programs Non-Electric Savings Summary

					Net Savings (MMBtu)
Assisted Multifamily Program	104,116	1.0	104,116	0.84	87,405
EmPower New York^{SM}	12,992	1.0	12,992	-	12,992
Low-Income Programs Total	**117,108**	**-**	**117,108**	**-**	**100,397**

As described in Section 3.3.3 of this report, benefit/cost ratios were calculated for all major programs. The results for three programs are shown in Table 6-5.

Table 6-5. Benefit/Cost Ratios of Low-Income Programs

			Empower New York[SM]
Total Resource Costs	$25.1	$4.6	$5.4
Present Value of Resource benefits	$36.9	$4.2	$6.7
Present Value of Market Price Effect	$2.1	$1.0	$0.8
Present Value of Non-Enegy Impacts	$33.8	-	-
Scenario 1 TMET	1.5	0.9	1.3
Scenario 1 PET	1.9	0.9	1.3
Scenario 2 TMET	1.6	1.1	1.4
Scenario 2 PET	2.0	1.1	1.4
Scenario 3 TMET	2.9	-	-
Scenario 3 PET	3.7	-	-

6.5 Assisted Multifamily Program

6.5.1 Program Description

Program Milestones	
December 2005	117 properties (including 47,006 units) approved, 64 properties complete
December 2004	96,000 units in pipeline
May 2002	Initial contract ends, services continue under AMP
February 2001	Energy Assessments (audits) begins
April 2000	Contract begins
February 2000	RFP 498 Program implementation contractor is selected.

Program Purpose

The purpose of the Assisted Multifamily Program (AMP) is to improve energy resource efficiency in eligible multifamily buildings, reduce energy bills for tenants and owners, and provide increased health and safety benefits to building occupants.

Program Resources

The program budget is $76.2 million over eight years, including $15.4 million for implementation and $60.8 million for incentives. As of December 31, 2005, $14.8 million has been spent on implementation and $14.3 million on incentives.

Targeted Customers

Targeted customers for AMP are residences of households below 80% of State Median Income (SMI) that reside in publicly-assisted multifamily housing.

Program Barriers

Key barriers that have the potential to impact the demand side of the low-income housing market (*i.e.*, Building Owners, Developers, and Building Operators) include:

- Split incentives (the tenant pays the energy bills, and would benefit from lower energy costs, but is reluctant to make permanent investments in energy efficiency measures or improve the property in other ways).
- Resistance to new and/or innovative technologies.
- Lack of financing for making improvements to low-income properties.
- Lack of consideration of operation and maintenance (O&M) costs compared to first-cost outlays.

Key barriers that have the potential to impact the supply side of the low-income housing market (*i.e.*, Construction, Audits, Housing Agencies) include:

- Business practices and internal regulations that limit the use of life-cycle cost perspectives for multifamily low-income properties - to include the New York State Department of Housing and Community Renewal (DHCR), the Weatherization Assistance Program (WAP), U.S. Department of Housing and Urban Development (HUD), the DHCR Housing Management Bureau, and the New York City Department of Housing Preservation and Development (HPD).
- Many HUD regulations that hinder prompt design and installation of improvements (HUD also pays energy bills; if energy costs are reduced in the building, HUD reduces its payments to the building. AMP is trying to have HUD take the money saved and use it to install energy efficiency measures).
- Other low-income programs' policies.

Implementation Approach/Activities

The program uses a whole-building approach to energy efficiency in the State's portfolio of publicly-assisted housing. AMP provides technical assistance, energy audits, financing services, and the bulk purchase of energy efficiency technologies. The program focuses on the "fiscal health" of building renovation and retrofit projects. The program works with the DHCR Housing Management Bureau, the Weatherization Assistance Program, HUD, HPD, and other **New York Energy $mart**[SM] Programs in implementing its services.

Program Evolution

The program added a statewide network of Local Case Managers (LCMs) in 2004 that perform program duties at the local level including program marketing, intake, case/client management, coordination with the technical assistance provider, and limited construction oversight and post-inspection. These LCMs are expected to greatly facilitate owners' understanding of this program and decrease the cycle-time for participating buildings.

6.5.2 Program Market Progress

Table 6-6 summarizes progress made by the AMP on many fronts.

Table 6-6. AMP - Key Program Indicators and Progress

			Data Value - 2005
Program Outputs			
General Outputs	Number of participation agreements	82 properties (including 48,336 units) approved	117 properties (including 47,006 units) approved
	Number of projects completed	32 properties complete	64 properties complete
	Number of units in buildings treated	1,328 units classified as "construction complete"	11,202 units classified as "substantially complete" or "project complete"
Program Indicators			
Energy Savings and Cost-Effectiveness	Net MWh, MW and MMBtu saved	1,556 MWh 0.105 MW 22,000 MMBtu	19,370 MWh 1.2 MW 87,405 MMBtu
	Program Benefit-Cost Ratio	-	1.5 (TMET, Scenario 1)
Awareness and Knowledge	Change in awareness of programs and energy efficiency	60% of non-participating building owners were aware of AMP	-
	Increased awareness of usage and energy efficiency options	71% of building owners (participants and non-participants) said they were very or somewhat aware of energy efficiency measures and equipment two years ago, compared to 93% who classify their current awareness in these categories	-
	Owner recognizes benefits	36% of building owners surveyed (participants and non-participants) feel that the estimated energy savings are about right	-
Availability of Services	Amount of NYSERDA funding of energy efficiency measures	$1,375,560	$9,613,622
	Amount of funding leveraged	$5,644,330	$33,614,498
Market Share/Sales, and Market Penetration	Sustained change in market behavior (*e.g.*, buying habits)	67% of building owners report they are very likely to replace program equipment with the same or higher efficiency 50% of building owners report they are very likely to replace non-program equipment with the same or higher efficiency	-
	Percentage of eligible units that are participating (those projects with installed measures, installation underway, and audits complete)	10.5%	14.8% (6.1% had audits and installed measures, 8.8% had an audit only)
Other Indicators	Increased health, safety, and comfort for low-income tenants	Building owners report that building safety and tenant comfort are valuable non-energy benefits.	-

6.5.3 Program Impact Evaluation

Gross Savings

In 2004, Nexant, Inc. conducted an independent review of the savings impacts reported by NYSERDA for AMP. The objective of the review was to verify the estimate of the program's cumulative savings. The basic approach was to examine a sample of 13 completed projects and apply the results to all completed projects reported by NYSERDA. The project sample size was designed to meet an 80/20 confidence/precision accuracy criterion assuming a coefficient of variation of 0.5.

Nexant's analysis to develop the savings ratios in Table 6-7 is based on inspection findings, utility billing analysis, and review of the calculations used to develop NYSERDA's reported savings. While the preferred verification method is utility billing analysis, which is based on actual energy use, historical billing data were not available for several projects in the sample. Therefore, for projects without billing data, calculation methodologies were reviewed and measure installation and equipment counts from Nexant's facility inspections were used to verify the calculated savings and to make adjustments if necessary. Nexant's analysis of non-electric savings resulted in an uncertainty that was too high for the realization rate to be applied to the NYSERDA-reported savings; therefore, the realization rate was set to one. The high uncertainty was due primarily to one project that significantly underestimated the post-installation natural gas consumption resulting from an electric to gas heat conversion.

Based on Nexant's review, as of December 31, 2005, the program has resulted in the energy savings and peak demand reductions shown in Table 6-7. Since inception, the program has resulted in estimated cumulative program savings[2] of 218,582 MWh.

Attribution and Net-to-Gross Ratio

In 2003, the Summit Blue MCAC team conducted a major evaluation of the AMP. This included telephone surveys with 69 owners and managers of low-income multifamily properties. The survey sample included a mix of full participants (who received an audit and completed measure installations), audit-only participants, and true non-participants. The MCAC team also conducted ten surveys with management and field staff of NYSERDA, the implementation contractor HR&A, and the audit contractor firms. Interviews with regulatory agencies were also conducted.

In 2004, the MCAC team updated the earlier research by conducting additional telephone surveys with a new sample of full and audit-only participants. In total, 37 additional surveys were completed in 2004, including 14 with full participants and 23 with audit-only participants.

These survey efforts led to the following estimates of freeridership, spillover, and net-to-gross ratio:

- Freeridership = 27%
- Spillover = 15%
- Net-to-gross ratio = 0.84

[2] *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.

Table 6-7 shows the effect of these adjustments and the final net savings attributable to the AMP through December 2005.

Table 6-7. AMP Cumulative Annual Energy and Peak Demand Savings (Through December 2005)

		-					**Net Savings**
MWh/ year	23,891	0.97	23,074	0.73 (0.64-0.81)	1.15 (1.13-1.17)	0.84 (0.72-0.95)	19,370 (16,613-21,920)
MW	1.1	1.26	1.4	0.73 (0.64-0.81)	1.15 (1.13-1.17)	0.84 (0.72-0.95)	1.2 (1.0-1.3)
MMBtu	104,116	1.0	104,116	0.73 (0.64-0.81)	1.15 (1.13-1.17)	0.84 (0.72-0.95)	87,405 (74,964-98,910)

AMP is having additional positive market impacts beyond spillover. For instance, several respondents indicated that their experience had caused them to enroll other properties in AMP. While the savings from these sites will eventually be directly attributable to the program, and are therefore not spillover, repeat participation is clearly a positive indicator of the program's value and participant satisfaction.

In addition to the spillover cited above, AMP is implementing a new strategy that could lead to substantial energy reduction in the low-income multifamily market: working with government agencies to adopt higher energy efficiency standards. For example, in September 2004, the Housing Preservation and Development Department (HPD) signed a memorandum of understanding with NYSERDA to re-write their building specifications to meet AMP standards. These standards include building shell, heating system, and high efficiency appliance measures. Over the next three years, NYSERDA will help to rehabilitate 5,000 units under these standards, with expected energy cost savings (as calculated and reported by NYSERDA) amounting to $418 per unit. HPD is the first agency to sign such an agreement, but NYSERDA is working toward agreements with other agencies, such as the state Division of Housing and Community Renewal (DHCR).

Non-Energy Impacts

Results from the 2003 evaluation[3] imply that total NEIs could contribute as much as 8% to owners above the value of the estimated energy savings (leading to a multiplier of up to 1.08 times the energy savings). However, the MCAC study team has taken a conservative approach in applying these values to low-income sector energy efficiency investments and recommends a value on the order of one-half the estimated value for NEI values. This would add another 54% on to the net energy and peak demand savings attributable to the AMP.

[3] NEIs were not re-evaluated in the 2004 or 2005 AMP update.

6.6 Weatherization Network Initiative

6.6.1 Program Description

Program Purpose

The WNI works to reduce the energy burden on low-income New Yorkers. The initiative was designed to fill a gap in services created when the U.S. DOE Weatherization Assistance Program (WAP) rules changed to permit installation of electric-reduction measures but did not permit a return to previously weatherized homes. Over time, previously weatherized homes became more difficult to identify and eligibility was extended to homes on a weatherization waiting list for services. Electric reduction measures include energy-efficient lighting, appliances, strategies to reduce the use of electric-resistance space and water heating, and demand management opportunities that reduce peak demand. The goal for this component is to serve 5,500 households over the term of the contract with the Community Based Organizations (CBO).

Program Milestones	
December 2005	3,695 units completed
December 2004	1,426 units completed
January/ June 2003	Contract negotiations successfully completed with 10 regional teams
May 2002	Technical Evaluation Panel recommended contract negotiations with 10 teams
April 2002	11 Proposals received under PON 614

Program Resources

The total budget is $8.0 million. Of this amount, $2.5 million is allocated to implementation services, and $5.5 million for incentives. In total, there are ten implementation contractors and one contractor for quality assurance work on this program. As of December 31, 2005, $2.5 million has been spent on incentives.

Targeted Customers

The program targets New York households (one-to-four family residences) with incomes below 60% of the State Median Income that either participated in the Weatherization Assistance Program during the period of time when electric reduction measures were not part of the work scope or are on a waiting list for Weatherization services.

Program Barriers

At the time this program was launched, DOE did not permit investment in electric reduction measures by the Weatherization Assistance Program. The program also addresses the standard barriers to the implementation of energy efficiency measures by low-income households:

- Lack of reliable information about opportunities to save energy; and
- Lack of financial resources to invest in efficiency.

Implementation Approach/Activities

Ten regional teams, consisting of community-based organizations, are implementing this initiative statewide. The program also works closely with the portfolio of **New York Energy $mart**[SM] Low-Income Programs in an effort to leverage information, resources, and external investment when doing so creates administrative efficiencies and greater benefit for customers. The program also works with non-

NYSERDA energy efficiency and community based organization-run programs such as WAP and the NYS DHCR, and the New York State Weatherization Directors Association to coordinate training and services.

Program Evolution

As noted above, eligibility was extended to include homes that were on a waiting list for Weatherization services. Plans for SBC III include merging WNI with EmPower New York[SM].

6.6.2 Program Market Progress

The WNI will serve 5,500 previously weatherized homes. The WNI serviced homes will receive electric reduction measures that were not part of the work scope allowed under WAP. The program has been available since the third quarter of 2003. To date, 3,695 units have been completed, at an average cost of $666 and savings of 1,475 kWh per unit. Total savings are 5.4 MWh/year. Under this initiative, 74 CBOs have formed ten regional teams to deliver these efficiency services throughout New York.

6.6.3 Program Impact Evaluation

Gross Savings

In 2004, Nexant, Inc. conducted an independent review of the savings impacts reported by NYSERDA for the WNI. 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 has resulted in the energy savings and peak demand reductions shown in Table 6-8. Since beginning in 2002, the program has resulted in estimated cumulative program savings[4] of 4,764 MWh.

Table 6-8. WNI Cumulative Annual Energy and Peak Demand Savings (Cumulative Annual Through December 2005)

							Net Savings
MWh/year	5,428	1.0	5,428	-	-	-	5,428
MW	0.8	1.0	0.8	-	-	-	0.8

[4] Cumulative program savings impacts are the sum of the savings realized across the life of the program. A measure that delivers 100 kWh/year cumulative annual savings will have delivered 400 kWh cumulative program savings after four years.

6.7 Low-Income Direct Installation

6.7.1 Program Description

Program Milestones	
April 2002	Program ends, meeting or exceeding implementation targets
May 2000	First installations of electric measures completed
October 1999	Program design complete and implementation begins
October 1998	RFP 435 Program implementation contractor selected

Program Purpose

The Low-Income Direct Installation Program was designed to reduce energy burden and provide information and related services to the low-income community regarding energy use and efficiency. The program was designed to fill a gap in the eligible measures by introducing electric reduction measures, which were not then supported by DOE in the Weatherization Assistance Program (WAP). The added measures had a greater impact on reducing the energy burden of the low-income households served.

Program Resources

The program budget was $9.9 million for three years (1999 through 2002). The entire budgeted amount was expended. The program concluded in April 2002.

Targeted Customers

Low-income customers in the Central Hudson Gas and Electric Company (CHG&E), Con Edison, and Orange and Rockland Utilities, Inc. (O&R), utility service areas.

Program Barriers

In 1999-2002, the majority of the measure installed included hard-wired compact fluorescent light bulbs and refrigerators, which were quite expensive at the time and the market offered few model choices. Since then, less expensive and higher quality models have been introduced into the market.

Implementation Approach/Activities

This program extended the existing service infrastructure of the federal WAP by offering electric reduction measures, including energy-efficient lighting and appliances for low-income customers.

The program worked with the WAP administered by the NYS DHCR and implemented by a network of community-based organizations; and other **New York Energy $mart**^{SM} Program areas in designing and implementing this program.

Program Evolution

Portions of the Direct Install program were folded into the implementation of the AMP and the WNI.

6.7.2 Program Impact Evaluation

Gross Savings

In 2003, Nexant, Inc. reviewed the basic savings calculations and data tracking tools for the Low-Income Direct Installation Program. The objective of the review was to verify that the algorithms and engineering assumptions used to report the program's impacts were reasonable and conformed to accepted practices. No additional review was conducted in 2004 or 2005. Based on NYSERDA's quarterly savings estimates through March 2002 (program conclusion), the program has resulted in the cumulative annual[5] energy savings and peak demand reduction shown in Table 6-9.

Since October 17, 2001, the program has resulted in an estimated cumulative program savings[6] of 46,189 MWh. Although the program has concluded, measures installed continue to accrue savings. Nexant's cumulative program savings are calculated from October 17, 2001 through December 31, 2005, even though some projects may have been built as early as 2000. This is due to insufficient information from the program tracking spreadsheets provided by NYSERDA. The calculated program impacts are extrapolated from NYSERDA's annual savings reports, which have been found to be based on generally accepted M&V practices, assumptions and engineering calculations.

Table 6-9. Direct Install Program Cumulative Annual Energy and Peak Demand Savings (Cumulative Annual Through December 2005)

							Net Savings
MWh/year	11,494	1.0	11,494	-	-	-	11,494
MW	1.6	1.0	1.6	-	-	-	1.6

6.8 EmPower New York^{SM}

6.8.1 Program Description

Program Purpose

EmPower New York^{SM} was launched in July of 2004 to provide energy efficiency measures and energy-use management education to participants in the National Grid and New York State Electric and Gas (NYSEG) low-income programs. The goal is to install electric reduction measures at an average cost of $900 in a total of 6,200 low-income homes over a two-year period. Additionally, an estimated 1,032 households are to receive home performance measures at an average cost of $1,200.

[5] Cumulative annual savings impacts are the savings realized in a single calendar year from all measures installed to date.

[6] 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.

Program Milestones	
December 2005	3,612 households have received efficiency services
July 2004	Program launched
June 2004	Implementation contractor selected through RFP
May 2004	PSC approved plan for transfer of two SBC funded utility efficiency programs to NYSERDA

Program Resources

The two-year budget for this program is $8.8 million. There is one program implementation contractor and 51 participating contractors. As of December 31, 2005, $5.0 million has been spent.

Targeted Customers

Participants in the two utility low-income payment assistance programs are the primary target for services. Referrals are accepted from County Offices for the Aging and Community Based Organizations.

Program Barriers

This program builds on earlier efforts of Direct Installation and the WNI. It too seeks to address barriers to the implementation of energy efficiency measures by low-income households, including the lack of reliable information about opportunities to save energy, the lack of financial resources to invest in efficiency measures, and an immature infrastructure of trained contractors to install the measures.

Implementation Approach/Activities

The program implementer, Honeywell DMC, is developing a network of energy services contractors qualified to provide services. Referrals are made from utility staff at National Grid and NYSEG. Additionally, local offices for the aging are encouraged to make referrals.

Program Evolution

The WNI, which delivers electric reduction measures through a statewide network of Community Based Organizations, will be merged with EmPower New York^{SM} in SBC III.

6.8.2 Program Progress and Impacts

Through December of 2005, a total of 3,612 units received services at a total cost of $4.7 million and achieving savings of 9,302 MWh. The average cost of the measures installed is $871 per unit. Over 3,000 households have attended 184 Energy Use Management workshops and 150 Financial Management workshops in their communities. In December of 2005 alone, a total of 453 people attended 50 workshops.

6.8.3 Program Impact Evaluation

Gross Savings

In 2005, Nexant, Inc. conducted an independent review of the savings calculator tool used by the EmPower New York^{SM} Program. The objective was to review the assumptions and calculations used to estimate energy savings from the energy conservation measures installed through the program. As NYSERDA's estimated program savings calculations were reviewed shortly after the program began and improvements incorporated, no adjustments were made to reported savings. As of December 31, 2005,

the program resulted in the energy savings and peak demand reductions shown in Table 6-10. Since the program began in 2004, it has resulted in estimated cumulative program savings[7] of 4,476 MWh.

Table 6-10. EmPower New York^{SM} Cumulative Annual Energy and Peak Demand Savings (Cumulative Annual Through December 2005)

							Net Savings
MWh/year	9,302	1.0	9,302	-	-	-	9,302
MW	0.8	1.0	0.8	-	-	-	0.8
MMBtu	12,992	1.0	12,992	-	-	-	12,992

6.9 Low-Income Aggregation Program

6.9.1 Program Description

Program Purpose

The purpose of the Low-Income Aggregation Program is to: 1) help the State's low-income households compete effectively in the evolving deregulated energy market; 2) identify the regulatory, legislative, and market barriers that may be preventing low-income consumers' participation in the market; and 3) improve energy affordability by aggregating low-income energy customers and taking advantage of reduced commodity prices through bulk purchases of energy. In addition to overcoming the barriers listed below, the Aggregation Program is designed to:

- Educate participants on energy efficiency and retail choice, and provide program referrals.
- Develop an infrastructure to be utilized when retail market conditions allow.
- Aggregate customers into a buying pool to procure the most attractive commodity pricing offers (at least 51% of participants must be under 80% of State Median Income).

[7] 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.

Program Milestones	
August 2002	RFP released by a second implementation contractor for electric supply.
April 2001	RFP released by implementation contractor to procure electric supply.
February 2001	Kick-off and coordination meeting held with three implementation contractors.
April 2000	PON 518 was released seeking program implementation contractors.

Program Resources

The eight-year budget of $752,000 has been expended. Two NYSERDA contractors worked on this program.

Targeted Customers

Consumers with annual income of 80% or less than the State Median Income (SMI) were targeted by this program. Three pilot projects were initiated in the Con Edison, Orange & Rockland, and Central Hudson service areas. One was converted to an Oil Buying Strategies Pilot when preliminary investigation of electric aggregation showed poor potential. Results for that project are discussed with the Oil Buying Strategies Program.

Program Barriers

The Aggregation Program was designed to overcome barriers that: 1) prevent low-income customer participation in retail electric and gas markets, and 2) affect ESCO willingness and ability to serve them.

Implementation Approach/Activities

Two pilot projects tested different approaches. One project focused primarily on public housing authorities and developed a website www.aggregateny.org to match energy buyers with energy suppliers. The second project targeted multifamily building owners and managers and developed a relationship with competitive suppliers. This approach assumed an "expert shopper" relationship, with the owner/manager relying on the contractor as a trusted source of energy market information. The approach includes technology development (*e.g.*, meters and load control devices). Both projects sought to create lasting mechanisms to facilitate low-income customer awareness and access to the competitive energy marketplace. A key component of the projects was to develop recommendations for overcoming market barriers.

The Aggregation (including Oil Buying Strategies) Program has coordinated its efforts with the NYS Weatherization Assistance Program, using previously weatherized households and buildings as potential aggregation members. In addition, the contractors provided information in the form of a referral, when appropriate, to other energy efficiency and assistance programs offered in the designated territories.

Program Evolution

The program is on hold pending the emergence of a more active ESCO market for residential customers or other shifts in the marketplace that may indicate a more receptive environment.

6.9.2 Program Progress and Impacts

The Aggregation Program has provided valuable insight on how the current energy markets are performing; the availability, or lack of, a robust competitive retail market; how ESCOs buy and price energy; the need for increased consumer choice education; the reasons for the discrepancy between aggregation in theory and aggregation in practice; and recommendations as to appropriate next steps in supporting the retail electric market for the residential customer.

In total, over 17,000 units of low-income housing were aggregated by these two projects. Of these units, more than 9,000 units have been impacted by a competitive purchase (this includes both direct and master metered buildings, as well as electric and natural gas accounts). The second aggregation of more than 8,000 units did not receive bids that were attractive enough to pursue. The most aggressive tariff discount offered was $0.001 per kWh.

6.10 Low-Income Buying Strategies Program

6.10.1 Program Description

Program Purpose

This program tests a variety of strategies designed to improve energy affordability for low-income customers including aggregation of customers to decrease the cost of electricity, bulk purchase of home heating fuel, and negotiating discounts for the purchase of home heating oil by Home Energy Assistance Program (HEAP) recipients.

Program Milestones	
January 2005	OTDA commits to phased rollout of HEAP Oil Buying component
Fall 2003	HEAP Oil Pilot launched
July 2003	RFP 765 proposals due for program implementation
January 2002	Contractors selected and projects begin
August 2001	PON 615 Proposals Due

Program Resources

The total program budget is $3.9 million, which includes funds for the Low-Income Aggregation Program. A total of five NYSERDA contractors worked on this program with one contract now active. As of December 31, 2005, $2.7 million has been spent.

Targeted Customers

The Low-Income Buying Strategies Program serves consumers with an annual income 80% or less than the State Median Income.

Program Barriers

One of the main barriers is oil dealers' resistance to efforts to secure lower prices for HEAP customers.

Implementation Approach/Activities

Five pilot projects were initiated by competitively selected contractors. All of these projects are aimed at demonstrating approaches to purchase heating oil on behalf of low-income customers at a lower cost. Each pilot project tested a unique approach.

Four of the pilots are now completed. These projects worked closely with the local Department of Social Services (DSS) offices responsible for administering HEAP benefits, so that HEAP recipients could participate in the pilot project. Each project included a free clean-and-tune service of the furnace or boiler for participating households. The projects also included family development, budget counseling, or financial literacy services to member households. A key component of these four pilots was to identify and develop approaches that could be replicated on a larger scale and transfer lessons to HEAP administrators.

The HEAP Oil Buying component, now in its third year, is being implemented in partnership with the NYS Office for Temporary and Disability Assistance (OTDA) and local DSS offices. A "Margin Over Rack" procurement strategy to purchase heating oil at a lower cost for HEAP recipients was used in the first two years of the pilot. In the first year of the phased rollout statewide "Discount Off Retail" pricing was added at the request of oil dealers who argued that this better fit their business model. The Buying Strategies Program is coordinated with community-based organizations, the NYS DHCR and the Office of Temporary and Disability Assistance, and local Department of Social Services to ensure coordination between NYSERDA programs and HEAP.

Program Evolution

For the 2006-2007 heating season the HEAP Oil Buying Strategies will be expanded to 40 counties and then statewide the next year.

6.10.2 Program Progress and Impacts

The Buying Strategies Program was designed to:

- Partner with oil vendors to develop sustainable models.
- Achieve reductions in fuel oil costs for low-income customers.
- Alleviate 'crisis' situations by moving customers to automatic delivery and budget plans.
- Inform low-income customers about energy efficiency practices and measures that can reduce energy costs.
- Increase the financial literacy of program participants.
- Coordinate the projects with other **New York Energy $mart**[SM] low-income programs and those offered by other State agencies (*e.g.*, WAP, HEAP).
- Develop replicable models to be deployed on a larger scale and/or transfer lessons to the administration of HEAP.
- Offer funding for preventive maintenance service for heating systems of participating customers to increase efficiency and safety and provide incentives for fuel dealers to participate.
- Develop market mechanisms to facilitate purchase on behalf of low-income households.

"Margin Over Rack" and "Discount Off Retail" strategies have demonstrated the potential to reduce the cost per gallon of fuel oil by 7-13% for low-income households, resulting in an average energy bill savings of about $50 per year per household.[8]

[8] Navigant Consulting, Inc., *Oil Buying Component of HEAP, Summary of Results to Date*, February 22, 2006.

6.11 Low-Income Energy Awareness Program

6.11.1 Program Description

Program Purpose

The purpose of the Low-Income Energy Awareness Program was to design and implement a public awareness campaign that would result in measurable improvements in the enrollment of low-income residents in energy efficiency and energy management programs. The program seeks to inform low-income residents on the energy- and money-saving opportunities available to them.

Program Milestones	
June 2002	Contract ends
April 2002	Program call center is closed
March 2002	Advertising campaign ends
November 2001	Advertising campaign begins
August 2001	Market research ends
July 2001	Market research begins
November 2000	RFP 567 Implementation contractor is hired

Program Resources

The program budget is $1.6 million over eight years, of this amount, $1.3 million was spent. A single NYSERDA contractor works on this program.

Targeted Customers

Low-income energy customers and statewide low-income energy affordability program implementers are targeted by this program.

Program Barriers

Some low-income residents do not seek help because of pride or an assumption that they do not qualify. Language or geographic barriers often make reaching the population a challenge.

Implementation Approach/Activities

Applicable programs of the public awareness campaign include all NYSERDA, State, Federal, utility, and community-based low-income energy efficiency and energy assistance programs, including Assisted Home Performance, Weatherization, and HEAP, offered in New York. Early phases of the program included the development of a television commercial promoting the hotline to the eligible population.

After the contract ended, efforts continued in-house using existing contracts. Current Low-Income Public Awareness efforts are focused on marketing and promoting applicable **New York Energy $mart**^{SM}, state, federal, and utility energy efficiency and energy assistance programs through www.GetEnergySmart.org, **New York Energy $mart**^{SM} Communities and a growing network of Community Based Organizations (CBO) that NYSERDA is working with to bring needed services to the local level. The network of CBOs include 74 weatherization agencies participating in Assisted HPwES and the WNI, and 30 Cornell Cooperative Extension agencies participating in a residential energy efficiency consumer education program.

A sample of the detailed tasks of the CBO initiative for the Assisted HPwES Program included:

- Training hotline operates on eligibility guidelines, subsidy levels, financing terms, and other pertinent information for the Assisted HPwES Program.

- Modifying the consumer brochure to include information on the availability of subsidies.
- Developing a 30-second radio script template for CBOs to communicate the Assisted HPwES Program to their individual target audiences.
- Developing a newspaper advertisement template for use by CBOs for Assisted HPwES Program marketing.
- Developing two template press releases to create awareness of, and provide case-study examples of, work performed under the Assisted HPwES Program.

The Low-Income Public Awareness Campaign works with community-based organizations, other government agencies (*e.g.*, NYS Department of Housing and Community Renewal), utilities, local and state government representatives, and ESCOs, through program marketing and implementation efforts.

6.11.2 Program Progress and Impacts

The Low-Income Awareness Program seeks to increase the awareness of low-income energy efficiency and energy assistance programs available in New York; increase participation in Assisted HPwES; and increase knowledge of eligibility guidelines used by agencies that offer assistance.

The Low-Income Public Awareness Program included television and other advertising methods to promote the use of a toll-free phone number, 1-866-HELP-4-NY. Advertising addressed some of the more typical barriers to using available services. These include pride, the assumption of ineligibility, and the feeling that others have greater need. When consumers called, they were asked a series of questions used to identify programs for which they may have been eligible. Callers to the hotline were provided with referral information directing them to potential programs or sources of assistance, and some received a follow-up mailing of that information. To be eligible for services, the caller had to be a New York resident and have a household income that fell below 80% of State Median Income. This program ended in April of 2002.

A total of 16,585 referrals were made through the 1-866-HELP-4-NY hotline with an average rate of over 1,300 referrals per month. Approximately 72% of callers were referred to over 115 separate services. These 115 services represented utility programs, public benefits programs, community action efforts, and federal assistance programs, among others. The majority of referrals were made to HEAP and the WAP. In a survey conducted to determine the impact of the program, it was found that about 56% of survey respondents were either “very satisfied” or “satisfied” with the hotline and services and 79% of survey respondents said they would recommend calling the 1-866-HELP-4-NY hotline number to a friend or family member. Advertising for the Low-Income Awareness Program resulted in over 300 million impressions, or viewings, with 76% of impressions occurring in the New York City area.

6.12 Low-Income Forum on Energy

6.12.1 Program Description

Program Purpose

The Low-Income Forum on Energy (LIFE) is a unique statewide dialogue that brings together organizations and individuals committed to addressing the challenges and opportunities facing low-income New Yorkers as they seek safe, affordable and reliable energy.

Program Milestones	
August 2005	Six regional meetings
April/May 2004	Six regional meetings
November 2004	4th LIFE Statewide Conference
November 2003	Regional discussion groups
November 2002	3rd LIFE Statewide Conference
January 2002	Contractor Competitively Selected
November 2001	RFP 651 Released
September 2001/ April 2002	Six Regional Meetings Held
November 2000	2nd LIFE Statewide Conference
April/ March 2000	Five Regional Meetings
April 1999	1st LIFE Statewide Conference

Program Resources

The program budget is $486,000 over eight years, of which $375,000 has been spent. There is a single program implementation contactor.

Targeted Customers

This program targets low-income energy affordability program managers, policy makers, and local service providers.

Program Barriers

The program addresses informational, communication, and coordination barriers facing the managers of diverse energy assistance and efficiency programs.

Implementation Approach/Activities

LIFE consists of a multi-party Steering Committee, representing State agencies involved with energy and consumer issues, Community Based Organizations, utilities, and low-income advocacy organizations, which meets regularly and is responsible for the development and implementation of events and activities that further this dialogue. State agencies represented include the Department of Public Service, NYSERDA, the Office of Temporary and Disability Assistance (OTDA), the Division of Housing and Community Renewal (DHCR), the Consumer Protection Board and the State Office for the Aging. OTDA and DHCR are the state administrators of the federally-funded Home Energy Assistance Program (HEAP) and Weatherization Assistance Program (WAP) respectively.

The LIFE process in New York provides a public forum dedicated to discussing the issues facing the low-income population in the changing energy environment. The forum includes nearly 300 organizations that are actively engaged in addressing low-income energy issues and can function as resources for each other and for the State as it addresses the energy needs of low-income consumers. The process encourages multi-party involvement through open dialogue, thereby presenting the opportunity for identifying collaborative approaches for increasing the energy affordability of the State's low-income customers. The LIFE database includes

over 4,000 names of organizations and individuals interested in low-income energy issues. The database enables these stakeholders to be tracked and invited to LIFE conferences, creating opportunities for them to meet and share ideas and approaches with individuals throughout the State who are dealing with similar issues. Input provided through the LIFE dialogue is captured in conference reports and available to the public. Conference reports are also shared with policy makers and program implementers.

Program Evolution

A statewide conference is planned for May of 2006.

6.12.2 Program Progress and Impacts

LIFE seeks to provide a forum for open dialogue on issues facing low-income energy consumers and to encourage collaborative approaches for increasing energy affordability. To date, four statewide conferences and 23 regional forums attracting over 850 participants from 300 organizations have been held to achieve these goals. LIFE maintains a database of over 4,000 names. A LIFE website (www.lifenynews.org) was developed as an avenue to exchange information. In addition, with the 2002 Statewide Conference LIFE developed a series of six briefing papers on a variety of key topics concerning low-income energy affordability and success.

LIFE is continuing the development of the LIFE website, www.lifenynews.org, to provide an online venue to further the LIFE dialogue. This website includes information on events and serves as a resource for information on low-income issues. The LIFE Steering Committee continues to meet regularly to discuss the issues facing the low-income sector. The Committee reviews the activities of LIFE and collectively sets goals and objectives for the types of activities LIFE will undertake in the coming year.

6.13 Low-Income Sector Level Program Theory and Logic

This section is based on development of a full theory and logic model for the **New York Energy $martK** low-income energy affordability programs.

6.13.1 Low-Income Sector Activities

NYSERDA's low-income sector programs include a number of activities designed to produce outcomes that correspond with NYSERDA's ultimate goals. These activities, listed below, are grouped into four general categories: (1) Marketing, Outreach and Education; (2) Incentives, Direct Installation and Energy Services; (3) Training, Certification, Recruitment and Audits; and (4) Verification and Quality Assessment/Quality Control. More information on each activity can be found in NYSERDA's individual low-income program descriptions presented earlier in this section. Collectively, these activities provide a comprehensive implementation approach that reaches supply-side, mid-market and demand-side actors. Table 6-11 lists the specific activities associated with NYSERDA's low-income sector programs.

Table 6-11. Low-Income Sector Activities

Marketing and Outreach Activities
TV, radio, press releases, case studies
Consumer hotline (1-877-NY-SMART)
Direct mailings to consumers and contractors (AHP)
Website www.getenergysmart.org
Organization of conferences and forums
Coordination with the Home Energy Assistance Program (HEAP) so HEAP participants can participate in the Low-Income Oil Buying Strategies Program
Coordination with the Weatherization Assistance Program (WAP) to identify participants eligible for direct install services
Incentives, Direct Installs, Other Energy Services
Direct installs
Gap financing
Financing assistance
Incentives for energy-efficient measures
Coordinated procurement of bulk purchasing for energy-efficient measures
Bulk purchasing of home heating fuel
Free cleaning and tune up service for furnaces / boilers
Energy use and financial management workshops
Training to private building owners on financial packaging to incorporate energy efficiency into capital improvement projects
Design and construction management support
Training, Certification, Recruitment and Auditing
Work with Community Based Organizations to recruit Local Case Managers for outreach and recruitment of building owners into the AMP Program
Training of CBOs and Local Case Managers (LCMs)
Marketing to contractors to increase program participation
Developing list of approved contractors (AMP), Training and accreditation of contractors (AHP and EmPower New York)
Reduced price or free energy audits
Development of an audit industry for low-income housing
Development of audit certification in order to standardize the audit process and bring costs down
Training and guidelines to ensure consistent use of TREAT audit software
Verification and Quality Assurance / Quality Control
Three-year monitoring of post-installation energy savings (AMP)
Verification of a sample of installations
Construction oversight (AMP)

6.13.2 Low-Income Sector Barriers

The low-income sector presents a number of barriers that inhibit the adoption of energy-efficient products and activities. These barriers can be generalized as: 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. Demand-side barriers in the low-income sector primarily center on limited resources and the

lack of awareness, education, and training regarding energy efficiency options. Table 6-12 lists specific barriers and the related market actors.

Table 6-12. Low-Income Sector Market Barriers

		Market Actors
Supply-side Market infrastructure / policy (upstream and mid-stream actors)	Tradition of business practices and regulations that limit the use of life-cycle cost analysis for multifamily low-income properties Regulations that deter design and installation of energy efficiency improvements (*e.g.*, HUD reimburses eligible building owners for such expenses as energy bills. If a building owner installs energy efficiency improvements, under current regulations, any resulting energy bill reductions will lower the amount of HUD reimbursement rather than being distributed to tenants through reduced rent) Inability of energy efficiency service providers and programs to effectively deliver assistance to inner city and rural populations Cost of training and certification for contractors Lack of availability of eligible contractors and energy efficient equipment Contractors unwilling to learn/conduct services outside their specific trade Contractors unwilling to deal with financial eligibility processes	Contractors Distributors Lenders Community Based Organizations (CBOs) Local Case Managers (LCMs)
Demand-side (downstream actors)	Split incentives for rental units (building owners often do not pay the energy bills; tenant does but has little incentive/ability to improve the property) Inadequate security to ensure that energy-efficient equipment stays in place Lack of consumer awareness of the benefits of energy-efficient equipment Lack of reliable info on energy-efficient practices in existing homes Resistance to new and/or innovative technologies Performance uncertainties Limited resources (financial and informational) of income-eligible customers to address energy efficiency in their homes Lack of financing to make improvements to low-income properties Lack of consideration of operation and maintenance costs compared to first cost outlays when making capital investment decisions (multifamily building owners) Limited awareness by income-eligible customers of weatherization, fuel assistance, and other services related to energy use in homes	Low-income customers Multifamily building owners and managers

6.13.3 Low-Income Sector Goals

The ultimate goal of NYSERDA's portfolio of Low-Income energy efficiency programs is to reduce the energy cost burden on low-income customers. To achieve this goal, the programs work to generate energy savings, reduce energy bills and educate low-income customers about activities that allow them to control and reduce energy use. The NYSERDA Low-Income Programs also work to create a sustainable market for energy efficiency products and services in the low-income sector. Specific goals of the NYSERDA Low-Income Programs are listed in Table 6-13 by targeted market area.

Table 6-13. Low-Income Sector Goals

-	Demand-Side
Increased number of firms (contractors, home builders, equipment suppliers, etc.) with experience and willingness to provide energy efficiency services to the low-income residential sector Financial institutions recognize the potential for lower risk and accelerated paybacks resulting from energy efficiency investments, and in turn are more willing to support energy efficiency projects in the low-income residential sector Improved energy and environmental performance of existing and new homes that incorporate green design practice and energy efficiency technologies and operations Larger robust and sustainable market for energy-efficient products in the low-income residential sector Improved regulations and purchasing criteria at housing agencies to facilitate adoption of energy-efficient products in the low-income residential sector	Sustained energy savings and reduced energy costs for low-income residential customers Building owners recognize value of energy efficient equipment and consider energy efficiency in their purchasing decisions Customers have reliable information on which to understand and base their energy-related decisions Increased consumer awareness about the benefits of energy efficiency options Customers and building owners have confidence in energy saving estimates Customers value the energy-efficient and green building features of their homes and associated purchases Access to residential energy efficiency products is improved for low-income customers

6.13.4 Low-Income Outputs, Outcomes and Associated Measurement Indicators

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 will collectively work toward achievement of anticipated short-, intermediate- and long-term program outcomes.

The Low-Income 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 Low-Income sector evaluation plan.

6.13.5 Low-Income Testable Hypotheses for Evaluation Efforts

Based on this logic model assessment for NYSERDA's Low-Income sector programs, a number of researchable issues have been identified and are noted below. Some of these issues have been or are currently being investigated.

- Has awareness and knowledge of NYSERDA's Low-Income programs, energy efficiency opportunities and potential benefits increased as a result of the Low-Income programs?
- Is the auditor, contractor, and financial packager training offered by the programs effective?

- Are services provided by trained auditors, contractors and financial packagers leading to increased installation of energy-efficient measures in low-income households?
- Are the realized savings from the installed energy-efficient measures consistent with initial expectations?
- Is participation in the program by low-income residents and building owners increasing their knowledge about energy saving behaviors and measures? Is this leading to increased demand for energy-efficient products and services?
- 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, if so, what are the reasons for these increases?
- Have the programs resulted in changes in policies and practices at housing agencies?
- Have energy efficiency factors become a standard part of investment decisions for financers, developers, and those in the business of rehabbing low-income properties? How important is energy efficiency relative to other factors influencing financial decisions?
- Do market actors, participants, and trade allies actively promote NYSERDA's low-income programs?
- In the long run, what is required to sustain the energy efficiency market infrastructure and demand in the low-income sector in absence of program incentives?
- How much is the demand for these programs influenced by interest rates? That is, will the demand for program support decrease substantially if interest rates increase?
- Is the program resulting in a notable reduction in the energy burden for low-income households? Is it increasing their ability to meet other priority spending needs?
- Is the energy efficiency market in the low-income housing sector large enough to sustain auditors and financial packagers in the long run?
- How well do NYSERDA's low-income programs operate with other regional and national low-income program efforts? With other NYSERDA programs?
- To what extent are external influences impacting program accomplishments?

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.

6.13.6 Low-Income Sector Logic Diagram

Figure 6-2 illustrates the Low-Income sector logic in diagram form. This diagram is based mainly on key activities and logic elements derived from a workshop held with NYSERDA staff along with a careful review of NYSERDA's Low-Income Program documents and related program implementation details. The diagram was 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 6-2. Low-Income Sector Logic Model