APPENDIX A

PROGRAM AND PROJECT SUMMARIES

INTRODUCTION

New York Energy $martK comprises nearly 40 different program initiatives in the major program areas of Energy Efficiency Services, Low-Income, and Research and Development. This Appendix updates the status of each individual program offered under **New York Energy $mart**K. As of June 30, 2001, virtually all of the programs from the initial three-years are in the deployment stage, and several of the programs have surpassed their initial goals. Each individual program is continuously monitored for performance and is modified, as necessary, to adapt to market conditions and needs.

Programs are presented in this Appendix according to the major program areas of Energy Efficiency Services, Low-Income, and Research and Development. Each program summary is organized into the following sections:

- Program Description,
- Program Time Line,
- SBC Three-Year Program Budget,
- Program Goals,
- Program Specific Results,
- Baseline/Market Assessment and Evaluation Studies,
- Lessons Learned, and
- Expanded SBC Program Planning.

The section on Expanded SBC Program Planning is presented as preliminary only, pending input from the SBC Advisory Group and approval of NYSERDA's final operating plan for the expanded **New York Energy $mart**K Program.

A list of programs included in this Appendix, and the page number they appear on, is provided on the following pages.

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ENERGY EFFICIENCY SERVICES PROGRAM AREA

Commercial/Industrial Performance Program (formerly Standard Performance Contracting)

Program Description: The Commercial/Industrial (C/I) Performance Program provides incentives to energy services companies (ESCOs) and other contractors to promote energy-efficiency capital improvement projects. A standard performance contract is executed between NYSERDA and the contractor. The contract between the customer and the contractor can be a performance contract or a fee-for-service contract. Eligible measures include lighting, motors, variable speed drives, energy management systems, packaged air conditioning and chillers, and custom measures.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

June 1998	November 1998	January 1999	October 1999	July 2000
RFP 421 Design assistance	RFP 454 Technical consultants	PON 455 ESCO incentives Year 1	PON 499 ESCO incentives Year 2	PON 566 ESCO incentives Year 3

SBC Three-Year Program Budget: Total program funding of $48 million provided for approximately $230,000 in program design costs, $2.9 million for technical consultants to assist with program implementation, and about $45 million in incentives. In Spring 2000, the program budget was reduced to $40 million based on the initial slow response to the program. By late Spring 2000, program activity picked up dramatically so that by the end of June 2001, program commitments exceeded $50 million and the $40 million in the initial three-year program funding was supplemented by $10 million from the expanded SBC Program.

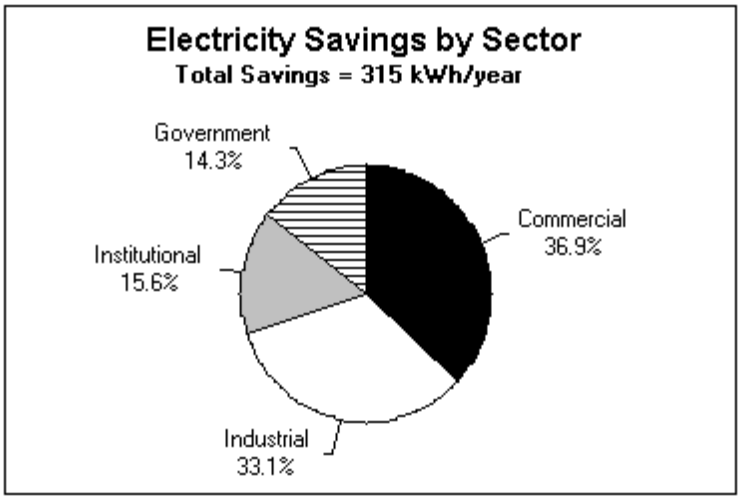
Program Goals: The following goals were set for the first three years of the program:

- Sponsor 300 standard performance contracts (average incentive of $150,000), with 40% dedicated to the institutional sector, 40% in the commercial sector, and 20% in the industrial sector;
- Leverage approximately $200 million in private capital investments in electric energy efficiency measures;
- Increase the number of ESCOs doing business in the State from seven to 21; and
- Achieve annual electric savings of 345 million kWh by the end of the program.

In Spring 2000, concern over the increasing summer peak demand resulted in program changes. Fuel

staff. The purpose of the survey was to assess ESCO activity level prior to program inception. The survey revealed that 13 ESCOs were active in the State. Performance contracting in K-12 schools represented over 70% of the market, with other institutional and governmental customers accounting for an additional 20%. The commercial and industrial sectors shared the remaining 10% of market activity between them.

Figure 3



Lessons Learned: After experiencing a slow start-up, the program sustained steady growth over the past two-years in the number of projects and ESCOs participating in the program. Several program changes were adopted to initiate and sustain this growth. In October 1999, incentive rates were increased to encourage the initial four-to-one leveraging rate. The measurement and verification requirements were also simplified at this time. Other changes include an accelerated payout of the incentives, particularly for projects with reliable and predictable energy savings. In the spring of 2001, the $250 non-refundable application fee was eliminated, and the refundable two and one-half percent deposit was eliminated for projects received after June 30, 2001. These last two changes are expected to make it easier for ESCOs to bring smaller projects into the program.

Most importantly, the program has taken a broad view of the energy efficiency services industry and the goal of building a robust market where energy efficiency projects are financed from the resulting energy cost savings. While the performance contracting method of financing efficiency projects is a distinctive characteristic of the ESCO industry, it is not the exclusive means for project implementation at the customer level. NYSERDA has maximized the market transformation aspects of the program by requiring that ESCOs apply on behalf of eligible customers.

The following bullets highlight the broad reach of the program:

- Four supermarket chains across the State (in six projects sponsored by four different ESCOs) have implemented lighting retrofits in 115 stores reducing peak demand by more than 2.8 MW.

- In two projects, 238 dairy farms across the State installed Variable-Speed Drives on milking equipment resulting in average annual energy savings of $2,300 per farm. An additional 150 farms are expected to be served as the second project continues.

- A total of 35 school districts are receiving $2.2 million in incentives to help with the

implementation of energy improvements with a capital investment of $27 million.

- When fully implemented, the 223 projects approved by June 2001 will reduce annual emissions by more than 138,000 tons of carbon dioxide, 475 tons of sulfur dioxide, and 236 tons of nitrogen oxide.

- In year-three, 40 different energy service companies submitted 128 applications for more than $24 million in incentives.

Expanded SBC Program Planning: The success of the C/I Performance Program is expected to continue in the expanded program. Year four of the program was released in July 2001 and by the end of December 2001, more than $11 million was committed to 74 additional projects on 319 buildings. Marketing efforts, particularly to smaller customers, will be increased with the hiring of marketing coordinators to serve the major regions of the State.

Institutional Energy Performance Contracting Assistance Program

Program Description: The Institutional Energy Performance Contracting Assistance Program provides financial assistance to municipal and institutional customers to cover 50% of the cost of street or traffic light audits, wastewater treatment audits, comprehensive energy audits (CEAs), web-enabled advanced monitoring, and other expenses related to the development of an energy performance contract. This assistance aims to reduce electric energy use and costs by leading interested customers into the **New York Energy $mart**K Commercial/Industrial Performance Program described earlier.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

November 1998	November 1999	August 2000
PON 453 CEA incentives Round 1	PON 506 CEA incentives Round 2	PON 565 CEA incentives Round 3

SBC Three-Year Program Budget: Total program funding of $3.25 million was made available to customers.[1]

Program Goals: The Institutional Performance Contracting Assistance Program goal was to increase

[1] Original program funding of $2.25 million was supplemented with $1 million reallocated from the Standard Performance Contract program.

energy performance contracting in the health care, colleges and universities, and municipal building sectors by providing incentives to 165 to 210 municipal and institutional customers to perform CEAs.

Program Specific Results: As of June 30, 2001, $6.7 million in incentives were awarded to 251 customers. Of the 251 projects, roughly one-third (36%) are in municipal buildings, another one-third (33%) are in K-12 schools, about 22% are in healthcare facilities, and the remaining 9% is in college and university buildings. Electricity and summer peak demand savings of more than 170 million kWh and 45.1 MW are expected. As of September, 2001, 44 projects gone forward and entered into performance contracts under the **New York Energy $martK** C/I Performance Program.

Baseline/Market Assessment and Evaluation Studies: N/A

Lessons Learned: In an effort to reduce program redundancy and better serve municipal and institutional customers, all future audits will be handled under the **New York Energy $martK** Technical Assistance Program. Also, the Technical Assistance Program will reimburse the customer's audit costs if the recommended measures are installed within two years of the audit.

Expanded SBC Program Planning: The Institutional Performance Contracting Assistance Program will not be continued in its current form. However, the audit potion of the program will be covered under Technical Assistance. The web-enabled advanced monitoring effort will be continued, and broadened in scope to include commercial/industrial customers, under the new **New York Energy $martK** Advanced Monitoring Program.

Peak Load Reduction Program

Program Description: The Peak Load Reduction Program provides financial incentives for identifying and implementing measures to reduce energy consumption and electric load during peak electric demand periods. Incentives are available for four categories of measures:

- Permanent Demand Reduction Efforts. Eligible measures include operation and maintenance improvements, energy management system upgrades, metering, controls, and scheduling improvements. The measures must be operational for at least 5 years.

- Short-Duration Load Curtailment. Funding is provided for measures which allow customers to curtail demand in response to an emergency communication from the New York Independent System Operator's Emergency Demand Response Program (NYISO's EDRP) or other load reduction programs. Eligible strategies include load shedding, load shifting, and peak shaving. Measures such as telemetry controls, direct load controls, and radio frequency controlled strategies are encouraged.
- Dispatchable Emergency Generator Initiatives. Incentives are provided to encourage owners of existing emergency or backup generators to have these units supply some or all of their electricity

needs in response to an emergency communication from NYISO's EDRP or other load reduction programs. Eligibility is limited to customers in the Con Edison utility service area.

- Interval Meters. Incentives are provided to fund the purchase and installation of interval meters required to participate in NYISO's EDRP or other load reduction programs.

Participating service providers are encouraged to aggregate facilities before applying for incentives. Applicants may include, but are not limited to, end-use customers, energy services companies, load serving entities, contractors, architectural and engineering firms, energy management firms, and building equipment vendors. Applicants who are not end-use customers must develop their own contractual relationship with customers. All incentives are paid to the applicant, and it is anticipated that the applicant will share a portion of this incentive with the end-use customers either through payment or provision of services.

Program Time Line: Dates on the following time line correspond to major program milestones.

January 2001	August 1, 2001	December 31, 2001	January 2002
PON 577 Release date	PON 577 Application due date	PON 577 Implementation due date	PON 620 Round 2 of incentives. Release date

SBC Three-Year Program Budget: The program budget was $13.9 million for Summer 2001.

Program Goals: Goals include: (1) reduce summer peak demand in the year 2001, (2) mitigate potential state-wide electric capacity shortfall, and (3) reduce customer electricity costs.

Program Specific Results: PON 577 was offered during the winter/summer of 2001. As of June 30, 2001, $13.8 million was awarded. As of August 2001, 473 facilities had been enlisted by 26 aggregators or direct customers. The total anticipated reduction in peak demand from funds awarded was 221.4 MW.

As of June 30, 2001, 67 projects were completed, providing 95.7 MW of load reduction capability. As of November 30, installed measures represented 117 MW of load reduction capability. The distribution of this demand reduction by program components in presented in Table 1.

During the four emergency events that were called by the NYISO in August 2001, 47 customer facilities responded to the emergency, and together curtailed approximately 71 MW per hour during the emergency

events.[2]

Table 1: Demand Reduction Capability by Program Component

Program Component	Load Reduction Capability	%
Permanent Demand Reduction	3	2.5
Short-Term Load Curtailment	76	65.5
Emergency Generators	27	23.1
Interval Meters	11	9.4
TOTAL	**117**	

Baseline/Market Assessment and Evaluation Studies: The participation of PON 577 customers in the NYISO EDRP program was evaluated by Neenan Associates. The results will be available at www.NYISO.com.

Lessons Learned: Reporting mechanisms are needed for program participants to report to NYSERDA the frequency and degree of performance during an EDRP emergency. Administrative time spent on the program can be shortened by having improved data tracking systems. Greater participation can be achieved with higher incentives.

Expanded SBC Program Planning: PON 620, the next round of the program, was released in January 2002. Table 2 provides a comparison of incentives levels between PON 577 and PON 620.

Table 2: Incentive Level Comparison

Program Component	PON 577 (Incentives for measures installed by 12/31/2001)		PON 620 (Incentives for measures installed by 5/31/2002)*	
	Con Edison Service Area	Other	Con Edison Service Area	Other
Permanent Demand Reduction Efforts	$375/kW	$125/kW	$450/kW	$150/kW
Short-Term Load Curtailment	$150/kW	$50/kW	$180/kW	$60/kW
Emergency Generators	$100/kW	N/A	$90/kW	N/A
Interval Meters	$2,000/meter	$2,000/meter	$3,000/meter*	$3,000/meter*

*For measures installed by July 31, 2002.

[2] During those emergency events in August 2001, subscribers in this program, PON 577, along with subscribers in the Enabling Technology Program, PON 585, curtailed a total of 102.4 MW.

Cooling Re-Commissioning Program

Program Description: The Cooling Re-Commissioning Program was created in Summer 2000 to help commercial customers manage and shed electric load and reduce high electricity costs expected during that summer. The Cooling Re-Commissioning Program offers a three-phase approach to help customers reduce energy consumption and utility costs.

- Phase 1: Technical assistance on a cost-shared basis to identify load shedding/shifting opportunities. All energy-consuming equipment is reviewed, with an emphasis on space cooling. For large facilities, NYSERDA funds up to 80% of the technical assistance costs (up to a maximum of $0.06 per square foot or $100,000, whichever is less).

- Phase 2: Implementation of identified improvements. NYSERDA incentives cover up to 80% of the implementation costs (at a maximum of $0.10 per square foot or $200,000, whichever is less; with a minimum of $1,000).

- Phase 3: Verification. An energy consultant verifies energy consumption reductions. These costs are included in the Phase 1 costs.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

July 2000	September 2000
Program start	Year-1 budget fully committed

SBC Three-Year Program Budget: The Summer 2000 budget was $3 million.

Program Goal: Reduce summer peak demand in the year 2000.

Program Specific Results: By June 30, 2001, $3.4 million was committed to 73 facilities. The anticipated savings from these projects is 57 million kWh of electricity and 11.2 MW of summer peak demand reduction.

Baseline/Market Assessment and Evaluation Studies: N/A

Lessons Learned: To encourage participation by owners of large commercial buildings in New York City, the program offered incentives based on square footage. Future efforts need to base incentives on kW reductions.

Expanded SBC Program Planning: This program was replaced by the Peak Load Reduction Program.

New Construction Program

Program Description: The **New York Energy $mart**K New Construction Program was established to encourage energy-efficient design and building practices among architects and engineers and to urge them to inform building owners about the long-term advantages of building to higher energy standards. Building owners can apply for pre-qualified equipment, custom measure, or whole-building design incentives. Funding is provided to eligible building owners or lease holders to offset between 50 and 70% of the incremental capital costs to purchase and install energy-efficient equipment. Only electric energy efficiency measures are eligible for incentives. Design teams may also be eligible for technical assistance, through pre-approved contractors, to evaluate energy efficiency and green building opportunities in their projects.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

August 1998	February 1999	September 1999	September 1999	July 2001	January 2002
RFP 440 Program development	RFP 462 Outreach and technical assistance	RFP 488 Targeted outreach for multiple programs	PON 459 Incentives (initial SBC program)	PON 593 Incentives (expanded SBC program)	RFP 595 Outreach and technical assistance

SBC Three-Year Program Budget: The SBC three-year program budget of $17.1 million included $14.6 million in customer incentives. Remaining funding was allocated to program design, technical assistance, and targeted outreach contractors.

Program Goals: The initial goal of the program was to directly influence the design and construction of 140 projects involving custom measures, and 38 whole building design projects (a total of about 180 projects) by June 2001. In addition, the New Construction Program aims to directly influence the standards for upwards of 1,800 subsequent projects completed by the same design teams over the initial three years (June 1998 through June 2001). The program also provided up to $2 million in pre-qualified incentives for lighting projects, unitary heating, ventilation, and air conditioning (HVAC) projects, and motors projects.

Program Specific Results: By June 30, 2001, the New Construction Program exceeded its three-year

program goal with a projection of awarding $24.5 million in incentives to 509 projects. These projects will impact more than 49 million square feet of building space. A total of 80 whole building design projects and 209 projects involving custom measures are underway. The program has surpassed its initial goal for whole-building design projects. This is one of the most noteworthy achievements since more building design teams are encouraged to view buildings holistically and conduct sophisticated modeling as a result of the program. Annual electricity and demand savings from these projects are expected to amount to 79.5 million kWh and 29 MW, respectively. It is estimated that 1,500 additional subsequent projects by the same design teams have been impacted by the program. Just over $300,000 in pre-qualified lighting, unitary HVAC, motors incentives have been paid to over 200 customers.

Baseline/Market Assessment and Evaluation Studies: A baseline survey to assess current practices, and barriers to energy efficiency among architecture and engineering (A/E) firms in New York State was conducted by NYSERDA in Summer 2000. The survey was mailed to 500 A/E firms listed as members of the American Institute of Architects. A total of 117 usable surveys were returned (a 23.4% response rate). Key findings are summarized below.

- On average, firms complete approximately 39 design projects per year, 65% of which are for renovations and 35% are for new construction.
- The energy-efficiency measures most commonly incorporated into projects were high-efficiency lighting, building envelope improvements, and high-performance glazing.
- From a building designer's perspective, lack of information on new technologies, lack of information on energy savings, operation and maintenance issues, reliability/performance concerns, and resistence by building owners were the most significant barriers.
- From a building owner's perspective, higher first costs, lack of information on energy savings, lack of information on new technologies, operation and maintenance issues, and reliability/performance concerns were the most significant barriers.
- The majority of respondents, 112, said they generally meet the energy code.
- Those who build higher than the Energy Code exceed it by 36%, on average.
- When asked if their firm uses computer energy modeling to compare alternative energy features, 16 (14%) respondents said yes, and 99 (86%) respondents said no.
- Firms that used computer energy modeling used it on only 24% of their projects.
- The majority of respondents (75%) said that their firm did not recommend building commissioning on projects.

NYSERDA is planning a follow up survey with participating A/E firms.

Lessons Learned: During the initial three-year program, NYSERDA recognized the importance of

expanding the program's outreach capacity in order to reach more A/E firms and influence projects earlier in the building design process. Outreach project management will be expanded in during the course of the five-year program extension.

Expanded SBC Program Planning: The New Construction Program will continue for another five years. The program will expand its outreach capabilities, and will focus primarily on whole-building design projects. The pre-qualified equipment replacement component will be split off to create a separate program called Smart Equipment Choices.

Smart Equipment Choices Program

Program Description: This program is an expansion of the pre-qualified equipment component offered under the New Construction Program. Smart Equipment Choices Program incentives offset a portion of the incremental cost to purchase energy-efficient equipment that reduces electricity consumption. Eligible measures include lighting, premium efficiency motors, transformers, HVAC equipment, and variable-speed drives, high-efficiency windows, vending machine occupancy sensors, and plate and frame heat exchangers for dairy farms.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

July 2001	August 2, 2001	November 2001	June 2002
PON 597 Incentive offer	First program application was received	Program reissued with additional measures.	End date for incentives

SBC Three-Year Program Budget: This is a new SBC offering which was not included in the initial three year program. Smart Equipment Choices is funded out of the expanded SBC Program at $2.5 million over the next five years.

Program Goals: Accelerate the incorporation of energy efficient equipment into the operation of commercial, industrial, institutional, agricultural and multifamily buildings and property.

Program Specific Results: The first incentive application was received in August 2001. By September 30, 2001, 64 applications for $250,000 in incentives were received. More detailed results, including energy savings, will be included in future reporting.

Baseline/Market Assessment and Evaluation Studies: Studies conducted for the Premium Efficiency Motors, Commercial HVAC, and Small Commercial Lighting programs provide baseline information for this program. Additional market assessment information was gained from the New Construction Program.

Lessons Learned: Pre-qualified measure incentives were offered under the New Construction Program during the initial three-year program. However, this was seen as potentially confusing for applicants not constructing a new facility or undergoing major renovations, but still wishing to install high-efficiency equipment. The main impetus for the Smart Equipment Choices Program was to provide a streamlined, one-step application process for smaller end-use customers and customers engaged in smaller renovation projects. This program is designed to make it simple for eligible applicants to identify what equipment is efficient and receive reimbursement for purchasing that equipment. The program provides a customer pull for the energy-efficient products distributed and sold by participants in the upstream market transformation programs.

Premium-Efficiency Motors Program

Program Description: The Premium-Efficiency Motors Program is designed to induce lasting structural changes in the motors market resulting in increased use of premium-efficiency motors in commercial buildings, institutions, industries, and municipal applications. The program employs a multi-faceted approach to encourage vendors to increase their sales of premium-efficiency motors. NYSERDA and its vendor assistance contractor work closely with participating vendors, providing them with information, tools, workshops, and marketing materials. The program also offers incentives to participating vendors for the sale of qualifying motors. Initially, motors had to meet Consortium for Energy Efficiency (CEE) premium efficiency criteria in order to qualify for the program. Starting in July 2001, qualified motors must meet or exceed the National Electrical Manufacturers Association (NEMA) Premium™ efficiency criteria in order to qualify for the program.[3]

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

[3] The Consortium for Energy Efficiency (CEE) and the National Electrical Manufacturers Association (NEMA) agreed to co-promote a recently established set of specifications for premium-efficiency motors. These specifications are generally one to two percent higher than federal minimum standards (set by the Energy Policy Act of 1992), depending on motor type and size. The joint specification is very similar to the one CEE and NYSERDA have been promoting, and at CEE's request, NEMA made significant upward adjustments to its original specification for NEMA Premium™. The consensus specification should provide a boost in the sale of premium-efficiency motors.

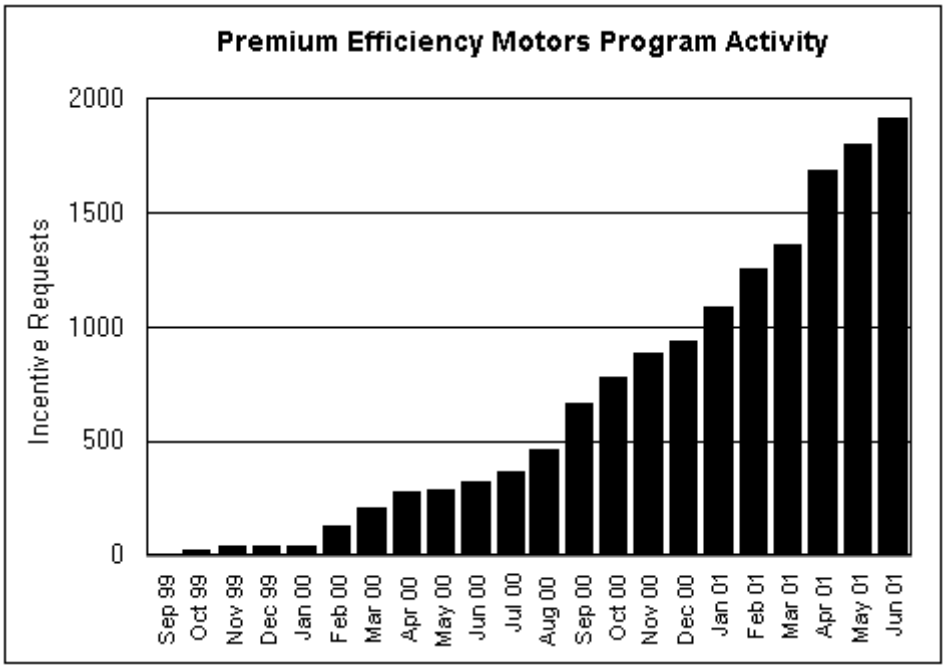
September 1998	December 1998	January 1999	March 1999	February 2000	May 2001	July 2001	January 2002
RFP 452 Vendor assistance contractor	PON 451 Vendor incentives opened (Round 1)	First participation application received from a vendor	First vendor incentive provided	PON 501 Vendor incentives opened (Round 2)	PON 592 Vendor incentives opened (Round 3)	NEMA Premium™ qualification adopted by Program	PON 660 Vendor incentives opened (Round 4)

SBC Three-Year Program Budget: The total program budget of $1.5 million provides $678,798 for vendor assistance and customer marketing, and approximately $800,000 in vendor incentives. A significant portion of the program budget, approximately 45%, was allocated to vendor assistance and customer marketing in order to lay a solid foundation for changes in the market.

Program Goals: The initial three-year goal was to increase the market share of CEE-qualified premium efficiency motors by 10%.

Program Specific Results: The Premium-Efficiency Motors Program is now in its fourth round of incentives to vendors. As of June 30, 2001, there were 29 participating vendors representing more than 80 motor shops serving the **New York Energy $mart**K territory. Nearly 2,000 premium efficiency motors have been sold. These motors are expected to result in annual electricity and summer peak demand savings of 1.4 million kWh and 0.3 MW, respectively. Figure 4 shows sales by month since the first qualifying motors were sold.

Figure 4



Baseline/Market Assessment and Evaluation Studies: NYSERDA participated in the 1998 *Northeast Premium Motor Initiative Market Baseline and Transformation*

Assessment[4] to inform program development and implementation. A second round of this study was completed in October 2001.[5] Key results from the 1998 baseline and 2001 follow up studies are presented in Table 3.

The baseline and follow up studies indicate that the market share of premium-efficient motors in the **New York Energy $mart**K territory has increased from 9% to 13%, despite a 10 to 15% decline in New York's total motor sales during the same time period. The growth in market share is most pronounced for smaller motors of 20 horsepower or less. This is noteworthy since the incremental cost for premium-efficient motors tends to be proportionally higher in the small horsepower sizes, potentially making it more difficult for vendors to sell the smaller premium-efficient motors. Other results include a decline in the average price differential between CEE-qualified and standard motors, and an increase in the percentage of end-use customers recognizing the term "premium-efficient."

Table 3: Key Results from the Motor Market Baseline and Follow Up Studies

	Baseline (98)	**Follow Up (01)**
Estimated New York Total Integral Motor Market (Units)	70,000	60,000
Premium-efficient motor share in **New York Energy $mart**K territory:		
Total(1)	9%(2)	13%
1 to 5 horsepower	5%(2)	8%
5 to 20 horsepower	15%(2)	22%
20 to 50 horsepower	20%(2)	31%
50 to 100 horsepower	32%(2)	49%
100 to 200 horsepower	64%(2)	39%
Average change in price differential (CEE over EPAct)(1)	N/A	-4.3%
Percent of end-use customers recognizing the following terms:		
premium-efficient	11%	17%
high efficiency	20%	49%
energy efficient	20%	13%
NEMA, EPAct, and DOE	8%	6%

(1) Average for all integral motor sizes from 1-200 HP.
(2) This figure does not match the premium efficiency motor share estimate in the 1998 report. The 1998 shares were adjusted because a large number of pre-EPAct motors sold through 1998 were not included in the original calculation of total market size although they were sold in that year.

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[4] Easton Consultants, Inc. and Xenergy, Inc. *Northeast Premium Motor Initiative Market Baseline and Transformation Assessment.* August 17, 1999.

[5] Xenergy, Inc. and Easton Consultants, Inc. *Energy $mart*[SM] *Program Evaluation and Market Assessment,* October, 2001.

Lessons Learned: Based on slower than expected sales in round one, NYSERDA made several modifications to the program to stimulate greater vendor and customer response. Changes made in subsequent rounds include:

Streamlining the application requirements,

- Offering vouchers (worth up to $600) to vendors to cover the full or partial cost of a qualifying motor installed in a customer's facility for every 15 qualified motors sold,
- Enhancing marketing to customers,
- Providing greater interaction with contractors who sell motors to state agencies, and
- Coordinating the delivery of the Premium-Efficiency Motors Program with the **New York Energy $mart**K FlexTech, New Construction, Loan Fund, and Smart Equipment Choices programs

Expanded SBC Program Planning: The Premium-Efficiency Motors Program will continue during the extended SBC Program. Several changes and enhancements, including those described in the following text, have been implemented or are currently under consideration.

NYSERDA will continue to offer vendor incentives for the sale of premium-efficiency motors. In the first three rounds, a $40 vendor incentive was provided for each qualifying motor sold. Starting in Round 4, incentive levels were adjusted to increase with performance. This change is expected to induce both large and smaller vendors to sell higher percentages of qualifying motors. The new incentive schedule is shown in Table 4.

Table 4: Premium-Efficiency Motors Program New Incentive Schedule

Schedule A Previous year's sales = 0-20 motors	**Schedule B** Previous year's sales = 21-60 motors	**Schedule C** Previous year's sales > 61 motors
$25 for the first (1) motor sold *per quarter*	$25 for the first through fifth (1 - 5) motor sold *per quarter*	$25 for the first through fifteenth (1 - 15) motor sold *per quarter*
$50 for the second through fourth (2 - 4) motor sold *per quarter*	$50 for the sixth through fifteenth (6 - 15) motor sold *per quarter*	$50 for the sixteenth through thirtieth (16 - 30) motor sold *per quarter*
$65 for fifth or more (5 +) motor sold *per quarter*	$75 for sixteenth or more (16 +) motor sold *per quarter*	$80 for thirty-first or more (31 +) motor sold *per quarter*

Along with the change in vendor incentives, the new Smart Equipment Choices Program will provide an incentive to end-use customers. Smart Equipment Choices applications have been provided to participating vendors as additional promotional tool.

In upcoming months, the program will also increase the promotion of motor management practices to end-use customers. This will involve offering simple-to-use decision-making tools, and increasing the number of vendor-sponsored customer workshops that address motors systems.

Small Commercial Lighting Program

Program Description: The Small Commercial Lighting Program (SCLP) is designed to demonstrate how effective, energy-efficient lighting services can enhance business opportunities and improve practices for lighting suppliers, electrical contractors, and retailers. The SCLP serves small to medium-sized commercial spaces, less than 10,000 square feet. Effective, energy-efficient lighting is at least 10% more efficient than ASHRAE 90.1-99, and addresses quality issues such as reduced glare, ease of use, and affects on worker fatigue and productivity. The program offers incentives to participating electrical contractors and lighting distributors for the completion of qualifying projects. The program also offers training and qualification incentives to contractors, along with design and installation competitions and other special promotions.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

October 1999	November 2000	May 2001	October 2001
PON 502 Implementation contractor	Market assessment and program design completed.	First participating contractor signed up	First qualifying project approved for incentives

SBC Three-Year Program Budget: The program budget of $3.4 million provides nearly $2.4 million for program design and implementation and about $1 million in incentives.

Program Goals: Small Commercial Lighting Program goals are as follows:

- Increase electrical contractor, lighting supplier, and retailer knowledge on high-quality energy-efficient lighting;
- Increase the availability of customer promotional materials on high-quality energy-efficient commercial lighting;
- Influence lighting decisions for approximately 15 million square feet of commercial building space; and
- Save 42,230 megawatt hours of electricity annually.

Program Specific Results: The program has started to build a network of qualified distributors and electrical contractors. By June 30, 2001, there were nine ally distributors and 17 ally contractors participating in the program. Eight other ally organizations, including lighting designers and manufacturers representatives, were also participating in the program. Ally distributor and contractor training sessions have also begun. The ten distributor training sessions attracted more than 80 attendees and the two contractor training sessions attracted nearly 30 attendees. By June 30, 2001, there were more than 2,000 user sessions on the SCLP website. The first qualified lighting project came in during the third quarter of 2001. More details on participating projects will be provided in upcoming evaluation reports.

Baseline/Market Assessment and Evaluation Studies: The program began with an extensive market research baseline effort and pilot projects to test various methods of influencing lighting design. This market baseline study, conducted by program sub-contractor Opinion Dynamics Corporation, is now complete.[6] Focus groups, in-depth interviews, quantitative surveys, and secondary research were all a part of this research effort. Through this research, program implementors verified the major premises used to structure the program. Program implementors also found that while the small commercial customers reacted favorably to the benefits associated with quality lighting, they wanted to see proof that these benefits were real. More specific results for contractors and customers are as follows:

- Eight-out-of-ten contractors had heard of high-quality, energy-efficient lighting,
- 19% of contractors claim they recommend high-quality, energy-efficient lighting all the time,
- Major benefits of high-quality, energy-efficient lighting cited by contractors were enhanced product appearance for retail stores, reduced maintenance and utility costs, and enhancement of store ambiance,
- Cost was the most significant barrier cited by contractors,
- Three-in-ten customers were familiar with high-quality, energy-efficient lighting, and
- 27% of customers would consider high-quality, energy-efficient lighting, even though their current lighting was adequate.

A mid-term evaluation, including interviews with program account managers, distributors, and manufacturers representatives, is now underway. A final evaluation, which will follow up on the indicators tested in the market assessment, is planned for June 2002.

[6] Opinion Dynamics Corporation. *High Quality, Energy-Efficient Lighting Market Assessment and Baseline Study.*

Lessons Learned: By the end of June 2001, this program had been operational for about seven months. Early lessons learned are summarized in the following bullets.

- This program is one of the first systems-oriented programs offered by NYSERDA under **New York Energy $martK**. Systems-oriented programs are more challenging to design and launch due to their focus on entire building systems rather than specific products.

- Program implementors had planned on developing ally relationships primarily with electrical contractors, but later recognized the important role that manufacturer representatives and other allies play in the lighting market and decision-making process. Therefore, other types of allies, besides electrical contractors, were permitted to take part in the program's design competition incentive.

- Contractors require a great deal of hands-on assistance, in addition to the help they receive from their distributors, in completing their first qualifying projects under the program.

Expanded SBC Program Planning: This program will be continued under the extended SBC Program. At this early stage in program implementation, it is premature make decisions on changes to the program design. However, one modification that will be considered by program managers is to increase the maximum size of qualified projects from 10,000 to 25,000 square feet.

Commercial HVAC Program

Program Description: The Commercial HVAC Program is designed to increase the availability, promotion, sale, and long-term performance of energy-efficient commercial or industrial heating, ventilation, and air conditioning (HVAC) products and services.

One project, with the American Council for an Energy-Efficient Economy (ACEEE), is designed to reduce barriers to building commissioning in New York State. ACEEE is implementing a program that includes education and technical assistance for both the purchasers and providers of commissioning services. Purchasers are provided with introductory workshops, a variety of printed materials, and technical assistance to help them learn about the benefits of commissioning. Providers receive hands-on technical training on commissioning processes. By mid-December 2001, seven workshops had been held, including six one-day sessions and one three-day session. These workshops attracted approximately 150 attendees.

Work has recently begun, or will soon begin on the other two projects. These other two projects both target unitary air conditioning equipment. One project, by Xenergy, aims to increase the penetration of commercial high-efficiency unitary (packaged) air conditioners by: (1) informing decision-makers on the benefits and cost-effectiveness of high-efficiency units; (2) promoting the sale of high-efficiency units; and (3) lowering the price by organizing group purchases. This project will reach out to architecture and

engineering firms, energy service companies, building owners and managers, and state and local procurement officials. Activities include: producing and disseminating a variety of materials to highlight high efficiency equipment performance and benefits; offering workshops on applying design and analysis principles to high-efficiency equipment; developing a web site to help equipment buyers make more informed purchases; and approaching purchasing decision makers to participate in aggregated purchases. The market assessment study was recently completed. Results from this study are expected to help in finalizing the project design. This project is expected to commence in early Spring 2002.

The other project will develop and offer training and marketing support services that promote high efficiency packaged air conditioning equipment, improved packaged equipment installation practices, and broader use of commissioning procedures. This project primarily targets HVAC distributors and contractors and aims to furnish contractors with tools to market and deliver HVAC efficiency services; convince contractors that investment in developing capabilities to deliver these services is worthwhile; and provide marketing support to those contractors who promote energy efficiency. Additionally, the project will offer training to increase customer knowledge about HVAC efficiency products and services, enhance understanding of the value of these goods and services; and provide customers with the tools and guidelines needed to make informed purchases of energy-efficient products and services.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

November 1999	December 2000 (through May 2001)	June 2001 (through Spring 2002)	December 2001
PON 522 Implementation contractors	ACEEE Project: One-day workshops held.	ACEEE Project: Three-day workshops held.	Xenergy Project: Draft market assessment study is completed.

SBC Three-Year Program Budget: The program budget is $1.7 million over three years. This funding is split among the three projects.

Program Goals: The program is expected to save an estimated 6,000 mWh annually.

Program Specific Results: As noted, the ACEEE commissioning project is working to provide education and training to commissioning purchasers and providers. Results will be reported for the other two projects as soon as they become available.

Baseline/Market Assessment and Evaluation Studies: All three of the contractors selected for project

funding will conduct a baseline and market assessment study.

ACEEE completed a baseline study on commissioning practices for large (greater than 100,000 square feet of floor area) public and private sector commercial and institutional buildings in December 2001.[7] This study involved telephone surveys of 16 commissioning providers and 14 commissioning purchasers. The main purpose of the study was to evaluate knowledge and awareness of building commissioning among these market actors. Findings indicate that most (over 80%) of the building services providers are very familiar with commissioning. According to providers, the most significant barriers to commissioning are that clients do not request it, and their current fees do not cover the costs of commissioning. Providers believe their clients do not request commissioning because they think it is already part of the construction process, or they are not aware of it. Although most (85%) of the commissioning purchasers (building owners and operators) felt very or somewhat comfortable with commissioning, their knowledge on the commissioning process is limited. Most (86%) of the respondents had some experience with commissioning in new construction projects, but very few (20%) had experience with commissioning existing buildings. Building owners and operators cited the perceived costs of commissioning, other organizational priorities, and lack of awareness as the main barriers to commissioning.

As noted earlier, Xenergy just completed a market assessment of the unitary HVAC market for Tier 1 equipment. These results will be summarized in a future evaluation report. There are also plans to conduct a baseline and market assessment study for the third project once it is underway.

Lessons Learned: Given the early stage of program implementation, lessons learned will be provided in later evaluation reports.

Expanded SBC Program Planning: Plans for the expanded SBC Program have not yet been finalized, however funding has been set aside for upstream HVAC activities. Stakeholder meetings are being considered for Spring 2002 as a means of gathering ideas on program strategies. NYSERDA plans to continue activities targeting commissioning and strengthening the infrastructure of service providers.

New York Energy $martK Loan Fund

Program Description: The **New York Energy $martK** Loan Fund is designed to increase awareness among loan officers of a client's ability to repay loans from the energy savings resulting from energy efficiency and renewable energy projects. The program aims to add projected savings from energy efficiency projects to the list of criteria used by lending institutions in approving loans. The program targets smaller projects, and provides interest reductions on loan amounts up to $500,000 for up to five

[7] Portland Energy Conservation, Inc., and American Council for an Energy-Efficient Economy. *Characterizing the Market for Building Commissioning in New York State: A Baseline Study.* December 2001.

years. The program is expected to leverage $8.8 million in private-sector investment in energy efficiency and renewables projects. Many pre-qualified energy efficiency improvements are eligible under this program, including: heat pumps, water heaters, windows, insulation, lighting, motors, and appliances. Custom projects, which have a payback of 10 years or less, are permitted and approved on a project-by-project basis. Process measures and renewable energy projects are also eligible.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

November 1998	September 1999	January 2000	May 2000	December 2000	June 2001
RFP 433 Program design and implementation	RFP 488 Targeted outreach for Loan Fund and other programs	PON 504 Participating lender and borrower solicitation (initial SBC Program)	First participating lender signs up for the program	First participating borrower closes on loan	PON 602 Participating lender and borrower solicitation (expanded SBC Program)

SBC Three-Year Program Budget: The program budget of $5.8 million provides about $60,000 for targeted outreach, and approximately $400,000 for program design and implementation. The remaining $5.3 million is available for interest rate reduction incentives.

Program Goals: The Loan Fund seeks to increase awareness among loan officers of a client's ability to repay loans from the energy savings resulting from energy efficiency and renewable energy projects, and to expand the criteria used by lending institutions in approving loans to include projected savings from energy efficiency projects. In terms of energy savings, the program goal is to reduce electricity use by 54 million kWh per year.

Program Specific Results[8]: As of September 30, 2001, total of 61 lenders are participating in the Loan Fund. More than 280 borrower applications, amounting to more than $15.8 million in principal value, had been received. Of these, 260 applications, amounting to more than $12 million in principal value, have been approved. Approved loan applications will result in borrower interest reductions of more than $1.5 million. This equates to an average financial benefit of more than $5,000 (in current dollars) per borrower. The 260 approved projects are expected to result in energy savings of more than 6.7 million kWh, and 40,000 BTU of natural gas and oil. Summer peak demand reductions of more than 1,500 kW are also expected.

[8] All results for the Loan Fund are through September 30, 2001.

Baseline/Market Assessment and Evaluation Studies: NYSERDA has initiated a comprehensive baseline and market characterization effort with specific questions on exactly how, if at all, the costs savings from energy efficiency are integrated into lending criteria. A survey of non-participants is currently underway and a participant survey will begin soon. Initial results are expected to be available in Spring 2001.

Lessons Learned: The initial program design achieved interest rate reductions for participating borrowers through a revolving loan fund in which participating lenders' Certificates of Deposit (CD) were purchased by NYSERDA at reduced interest rates. The avoided interest payment was used to buy down the rate on the customer loan. The CD approach was eliminated after program managers devised a plan to provide banks with lump-sum payments in the amount of the interest rate reductions. The CD deposit approach was abandoned because it tied up significant amounts of program funding, essentially the principal value of all the loans, for a five year period. With the lump sum approach, more consumers can take advantage of the program funding immediately. During the first year of implementation, program managers also raised the cap for loans to $500,000. Multifamily housing projects can finance up to $5 million. Another program change added credit unions as participating lenders.

Expanded SBC Program Planning: This program will be continued beyond the initial three years with consideration of these enhancements:

- Enhanced borrower marketing through strategic alliances with vendors of high-efficiency equipment, and
- A broadening of the program to include capital and municipal leases.

Loan Fund Multifamily Building Demonstration

Program Description: The Loan Fund Multifamily Building Demonstration is intended to increase lenders' use of projected savings from energy efficiency projects as a consideration in approving loans. This program will develop a template for financing energy efficiency improvements in multifamily buildings by implementing pilot demonstrations in approximately 10-15 buildings. Guaranteed loans will be offered for energy efficiency improvements in publicly-assisted and other hard-to-finance housing.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

August 1999	December 1999	May 2000	June 2000	June 2001
RFP 456 Program implementation contractor.	Development of the loan product begins.	Development of the loan product completed.	Loan product is made available to potential customers.	Several projects reviewed and considered for participation.

Initial 3-year Budget: Program funding of $1 million is available for guaranteed loans.

Program Goals: The program will conduct pilot studies in 10-15 buildings. The larger goal of the program remains to develop and test a loan product which recognizes energy efficiency improvements as a valued commodity and includes energy savings projections in the approval and underwriting process.

Program Specific Results: As of June 30, 2001, no guaranteed loans were closed. However, several projects are being reviewed for participation.

Baseline/Market Assessment and Evaluation Studies: NYSERDA conducted a survey of banks, appraisers and realtors throughout the **New York Energy $mart**K territory to assess attitudes toward energy efficiency and the role of energy efficiency in decision-making. Results are currently being analyzed and will be available in a future evaluation report.

Lessons Learned: Given the early stage of program implementation, lessons learned will be provided in future evaluation reports.

Expanded SBC Program Planning: It is premature, at this early stage in the pilot program, to comment on future plans.

Commercial and Industrial Innovative Opportunities Program

Program Description: The Commercial and Industrial Innovative Opportunities Program seeks to increase the availability, promotion, and sale of energy-efficient products and services not addressed through NYSERDA's other market transformation programs. Each of these projects is described briefly in the following text.

- Project on Energy Efficiency and Property Valuation. This project, conducted by the Institute for Market Transformation, will develop and implement strategies to promote energy efficiency as a component of property valuation. The target audience is appraisers and commercial property investors. The project was initiated in December 1999, and a market assessment of property

valuation practices has since been completed. A total of 1,000 written questionnaires were mailed to appraisers in October 1999, with 114 completed surveys received (a response rate of approximately 13%). Approximately 25% of respondents said that energy saving technologies rarely or never affect commercial property valuation, 45% said these technologies sometimes affect value, and 30% said that energy-saving technology affects valuation often or always.[9] Insulation levels, HVAC equipment, and windows were the most frequently cited energy-saving measures considered in property valuation. The development of recommendations and guidelines for energy reporting in property valuation has been completed. The contractor has begun to promote these guidelines with the real estate market and property appraisers. Four continuing-education courses have been held for property appraisers and realtors. There were nearly 100 attendees at the first four courses, and another two courses are planned. The contractor has also completed an evaluation of the bench-marking tool for the ENERGY STAR® building label, and is now working with the U.S. Environmental Protection Agency to integrate energy cost data into the tool. This project will be completed in June 2002.

Transforming Commercial, Industrial, and Institutional Buildings with GeoExchange. This project, by the Geothermal Heat Pump Consortium, seeks to increase the use of geothermal heat pumps by providing strategic outreach and design assistance to commercial, industrial, and institutional customers. The project will provide technical workshops to architects, engineers, drillers, appraisers and other market influence groups. The project contractor has modified their national design assistance program and marketing materials to meet New York's needs. The project started in November 1999. To date, the contractor has completed six technical workshops with about 55 attendees in total. A total of 44 design assistance applications have been received, and 40 have been approved for participation in this project. A total of 34 geothermal heat pumps have been recommended. The recommended heat pumps will cost approximately $47 million[10] to implement, and annual gas and oil savings are expected to amount to 200,000 MMBtu if all of the heat pumps are installed. Experience with NYSERDA's technical assistance programs indicates that approximately two-thirds of customers will actually implement the recommended measures. Therefore, the savings expected to be closer to 159,000 MMBtu per year.

Assisting Energy Service Companies (ESCOs) to Improve Lighting Quality and Efficiency. This project, by the New York Energy Efficiency Council, Inc., promotes energy-efficient lighting upgrades (in schools, healthcare, and commercial office buildings) as part of ESCO performance contracts. The project began in January 2000. The market and needs assessment is nearing completion. The contractor has completed three two-day informational sessions addressing

[9] Institute for Market Transformation, *Results of a Survey on the Energy-Related Practices and Priorities of Certified General Appraisers in the* **New York Energy $mart**K *Program Territory*, January 2000.

[10] Heat pump costs range from $40,000 for a small commercial facility to more than $19 million for a large university. The median cost is approximately $350,000.

energy-efficient lighting technologies, lighting evaluation and application issues, and lighting quality issues for energy service companies (ESCOs). Sessions were held in New York City, Albany, and Buffalo. Approximately 40 people attended the three sessions. In addition, two informational sessions were held on high-quality lighting, one for healthcare facilities with approximately 10 participants, and one for the Building Owners and Managers Association with around 20 participants.

Increasing New York State Market Awareness and Demand for Energy-Efficient Light-Emitting Diode Traffic Signals. This project, with the Lighting Research Center, is designed to develop market demand for single-color, light-emitting diode (LED) retrofits and for the new, fully-integrated, three-color signal products. The project was initiated in February 2000. Several initial tasks have already been completed. The contractor has finished an assessment of product availability, reliability, current installations, and market structure. Results from the initial and follow-up studies will be included in future evaluation reporting. Performance and purchasing specifications, and outreach materials have also been developed. Results from case studies and a demonstration project are currently available through NYSERDA's web site.

Energy and Environmentally Sensitive Schools. This project develops and implements strategies to increase energy efficiency in schools. The major tasks include: conducting school surveys for purposes of market assessment and identifying those most in need of assistance; designing program materials for marketing, recruiting, and energy analysis in schools; and conducting intensive outreach to analyze the 100 New York State schools most in need of energy efficiency measures, and recommend alternatives to improve efficiency. The project began in September 1999. The ***New York Energy $mart*** K *Schools Market Assessment*[11] is now complete. This report had a detailed survey of 214 public and private schools of various types (pre-school to adult learning center) in the service territories of Central Hudson Gas & Electric Corporation (CHG&E), Consolidated Edison Company of New York, Inc. (ConEd), Niagara Mohawk Power Corporation (NMPC), New York State Electric & Gas Corporation (NYSEG) and Orange and Rockland Utilities, Inc. (O&R). Results indicate that nearly half of the school buildings are more than 50 years old. Natural gas was the most common heating fuel in these schools. Over one-third of schools indicated that they did not specifically track their energy costs. When asked to rate their barriers to addressing energy and air quality needs, schools rated lack of money for improvements as the largest barrier. In terms of specific types of assistance, schools were most interested in a means of reducing bills, rate analysis, air quality and standardized guidelines for efficiency. Now that the market assessment has been completed, the outreach portion of this project has commenced.

[11] RLW Analytics. ***New York Energy $mart*** K *Schools Market Assessment.* June 7, 2000.

Round two projects include:

Increasing Awareness, Availability, and Penetration of ENERGY STAR® Building Transformers. This project, by the American Council for an Energy-Efficient Economy, targets low-voltage transformers used in commercial and industrial buildings. These devices reduce electric utility power distribution line voltages to secondary voltages suitable for customer equipment. The project will employ a three pronged approach: (1) education to electrical system designers, contractors, facility planners and developers about the benefits of ENERGY STAR® Transformers, (2) direct customers to short term incentives to build initial demand, and (3) coordinate promotional activities with manufacturers, trade allies and utilities. A study on *Market Actor Perspectives on* ENERGY STAR®*/NEMA TP-1 Transformers in New York State* was completed in early 2001.[12] A total of 45 surveys were conducted with manufacturers, distributors, designers, and contractors. The results of this study will be used to generate hypotheses for program direction and for further testing. The contractor has also completed Transformer Efficiency Calculator software and an efficient transformer web site containing technical and marketing information on this technology. A total of three transformer workshops have been held with approximately 60 attendees.

High Efficiency Public Street Lighting. This project, by ICF Consulting and the Lighting Research Center, aims to increase the energy efficiency of public street lighting by developing a "how-to" guide for elected officials, and street lighting design and maintenance officials. The project will also develop a showcase of a successful street lighting project. A market assessment and baseline study, involving surveys of municipalities, utilities and manufacturers, as well as a compilation of existing information, was completed in Spring 2001. Key findings from the market assessment report[13] are summarized in the following bullets.

- Only two of 12 municipalities (17%) use design guides for their street lighting projects, but seven (58%) said they would use a design guide if it were provided;
- Two out of the five municipal utility representatives (40%) did not use a lighting design guide;
- High-pressure sodium street lighting accounts for the majority (90%) of street lighting in the municipal surveys;
- Eight municipalities (67%) indicated that lack of information is the most significant barrier to installing high-efficiency public street lighting, four (33%) indicated that

[12] American Council for an Energy-Efficient Economy, *Market Actor Perspectives on ENERGY STAR®/NEMA TP-1 Transformers in New York State: A Baseline Study*, 2001.

[13] ICF Consulting and Lighting Research Center, *Market Assessment Report: Street Lighting In New York State*, 2001.

first cost was a significant barrier; and

- Nine municipal respondents (75%) indicated that they were billed a flat tariff for their street lighting electricity costs, four (33%) were billed based on energy use, and two (17%) were billed on both an energy use and flat tariff basis.

Commercial Heat Pump Water Heaters. This project will involve market research to rank various market segments according to their potential for adopting commercial heat pump water heaters. The project will also establish informational resources for customers, develop performance standards for commercial heat pump water heaters, and develop technical training tools on proper selection and the benefits of this technology.

Local Government Energy Efficient Product Procurement. This project will promote the use of ENERGY STAR® office equipment in the local government sector. This will involve identification of successful strategies implemented in other jurisdictions, and the development of guide books, and written tools to assist with local government purchasing.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

February 1999	November 1999
PON 450 Round 1 projects	PON 500 Round 2 projects

SBC Three-Year Program Budget: The nine projects from rounds one and two are funded at $2.6 million.

Program Goals: Increase the availability, promotion, and sale of energy-efficient products and services not addressed through NYSERDA's other market transformation programs.

Program Specific Results: Noted above in project descriptions where applicable.

Baseline/Market Assessment and Evaluation Studies: Noted above in project descriptions where applicable.

Lessons Learned: Noted above in project descriptions where applicable.

Expanded SBC Program Planning: Information gained as a result of several of these projects has provided background for the expanded program planning efforts. Specific technologies promoted by

these projects are also being more widely encouraged through the expanded SBC programs. For example, a high level of interest in the geothermal heat pump project has led to the continuation of this effort, and ENERGY STAR® TP-1 transformers have been included as a pre-qualified measure under several **New York Energy $mart**K programs.

Residential Appliances and Lighting and ENERGY STAR® Public Awareness

Program Description: The Residential Appliances and Lighting, and ENERGY STAR® Public Awareness programs work in tandem to increase awareness and understanding of the ENERGY STAR® logo, and increase sales of qualifying products. The Residential Appliances and Lighting Program focuses on mid-stream market actors, including retailers, contractors, and multifamily building owners in an effort to improve stocking, promotion, and sales of ENERGY STAR® products.[14] The ENERGY STAR® Public Awareness Program targets end-use consumers through a multi-media campaign intended to increase awareness and understanding of the ENERGY STAR® logo, and sales of these products. Through the joint effort of these two programs, NYSERDA seeks to permanently transform the market for ENERGY STAR® products .[15]

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

August 1998	May 1999	August 1999	August 15th 1999	September 1999	February 2000	February 2001

[14] A total of 15 appliances, lighting and home electronics products are targeted under this program. They are ENERGY STAR® refrigerators, dishwashers, clothes washers, room air conditioners, compact fluorescent lights (CFL's), suspended lighting fixtures, portable fixtures, ceiling mounted fixtures, wall mounted fixtures, recessed fixtures, exterior fixtures, cabinet integrated fixtures, televisions (TVs), video cassette recorders (VCRs), and combination TV/VCR units.

[15] Other **New York Energy $mart**K programs, such as the Residential New Construction Program, also support the effort to promote ENERGY STAR® products to the residential sector.

RFP 436 Appliance and Lighting Program implementation contractor	NYSERDA contracts with DDB Needham for consumer awareness	Baseline consumer mail survey and retail (in-store) surveys completed	Mass-media advertising begins	Program opened to retailer participants	Second consumer mail survey and second retail (in-store) survey completed.	Third consumer mail survey and third retail (in-store) survey completed.

SBC Three-Year Program Budget: The Appliance and Lighting program is funded at $8.5 million.[16] The ENERGY STAR® Awareness Program is funded at $8.3 million.[17]

Program Goals: The two primary goals for these programs are to:

- Create long-term consumer awareness of the benefits of ENERGY STAR® products, and
- Increase market share of ENERGY STAR® -compliant appliances, lighting, and home electronics.

Program Specific Results: Three waves of consumer mail surveys and in-store retailer surveys, along with other program data collection are the basis of the results presented in this section. Results for the two key program goals are as follows.

- Awareness: February 2001 survey results indicated that 43.1% of consumers are now aware of ENERGY STAR® and 56% of those who are aware now understand its meaning.[18] This compares to a baseline consumer mail survey conducted in 1999 where only 34% of consumers were aware of ENERGY STAR®, and 57% of those consumers aware of the ENERGY STAR® logo understood its meaning prior to the launch of the program. These data show that awareness of ENERGY STAR® has increased while understanding of the logo (among those aware) has remained at the same level. The fact that understanding by those who are aware of the logo has remained stationary is positive when viewed in light of the increase in awareness.
- Market Share: The baseline and follow up studies also took measurements of market share. The market share for ENERGY STAR® products sold in New York State during 2000 increased 119% for appliances, 144% for lighting, and 7% for home electronics.

Since program inception, purchases of ENERGY STAR® appliance and lighting products are estimated to have increased by about 642,000 units within the Designated Market Areas covered by the program. In

[16] Original program funding of $6 million was supplemented with $2.5 million during the reallocation of Standard Performance Contract Program funding. The additional funding will support the electric equipment bounty on old air conditioners which has been added to the program.

[17] Original program funding of $5.8 million was supplemented with $2.5 million during the reallocation of Standard Performance Contract Program funding.

[18] Aspen Systems Corporation. *Final Project Report: New York State ENERGY STAR® Appliances and Lighting Program, Phase II, Task 6.* August 9, 2001.

an effort to spur ENERGY STAR® lighting sales, the program included Torchiere Trade In events and a Lighting Solutions Catalogue. Torchiere Trade In events resulted in the surrender of 2,013 halogen torchieres, and the Lighting Solutions Catalogue resulted in the purchase of more than 30,000 ENERGY STAR® lighting products including compact fluorescent bulbs, and portable and hard-wired fluorescent fixtures. In total, the ENERGY STAR® appliance and lighting products will save an estimated 57 million kWh per year and will reduce summer peak demand by nearly 7.8 MW.

Program participation and advertising reach are also important indicators of program performance. By June 30, 2001, the program had recruited 618 retail shops[19], up from the 325 retail shops participating as of one year prior. Figure 5 shows the number of retail shops by region. All regions are well-represented. The Rochester area was just added to the program under the extension of the SBC funding. Representation in this area is expected to grow in upcoming quarters. The program had also recruited 12 manufacturers by that same date. Contractor recruiting was phased out under Appliances & Lighting during the past year due the advent of the Home Performance with ENERGY STAR® Program. Contractors that signed up under Appliances & Lighting had the opportunity to join the Home Performance Program.

By June 30, 2001, participating retailers had placed 6,480 cooperative ads. NYSERDA awarded nearly $3.8 million for the placement of these ENERGY STAR® ads. Retailer co-funding of ads is estimated at more than $15 million. Incentives for cooperative advertising constitute about 90% of the incentive awards. The remaining 10% of incentives awarded were for other purposes such as retailer special promotions and contests, multifamily building assessments, multifamily building bulk purchases, and manufacturer incentives.

Figure 5

The multifamily building component of the Appliances & Lighting Program took off during the second quarter of 2001, with 54 building assessments completed by June 30th. More than 600 refrigerators, 25 dishwashers, and 3,800 lighting fixtures were installed in these buildings. Nearly 1,100 more buildings are participating and will soon have completed assessments.

By June 30, 2001, more than $4.5 million had been spent on paid

[19] Retail shops are not to be confused with retailers. Some retailers have multiple shops, or storefronts, participating in the program. There are 421 separate retailers participating in the program.

advertising which has achieved more than one billion impressions.[20] The majority of paid advertising funding has gone toward the purchase of television ads, followed by radio, then print ads. The ENERGY STAR® Public Awareness campaign has also been successful in garnering additional impressions from Public Service Announcements (PSAs) and media relations (another form of free media coverage). More than 27,000 ENERGY STAR® PSAs have run, leading to more than 86 million impressions. Another 75 print stories were gained from media relations. These print stories have resulted in four million impressions. The free advertising from PSAs and media relations is valued at about $2 million. The advertising has resulted in a significant number of customer inquiries to the toll-free hotline and the web site. More than 7,000 web site hits and 3,200 calls have been reported through June 2001.

A great deal of additional program tracking is taking place. Results for other important indicators are presented in the following section on baseline and market assessment studies.

Baseline/Market Assessment and Evaluation Studies: To assess the extent of market transformation, the consumer mail surveys described earlier were combined with in-store surveys of retailers to provide measurements on 19 key market indicators. These indicators, along with the data collection method used for measurement, are listed in Table 5.

Results for the three key in-store indicators, the average percentage of displayed models that are ENERGY STAR® compliant, the average percentage of showroom display area devoted to ENERGY STAR® models, and the average percentage of ENERGY STAR® models that are actually labeled as such, are shown in Table 6 for the baseline and February 2001 follow up. Results from a final retailer survey, completed in October 2001, will be provided in a future evaluation report.

On the first indicator, average percent of displayed models that are ENERGY STAR® compliant, increases were seen for 10 out of 15 products. The five products which either remained the same or decreased were all lighting products. On the second indicator, average percent of showroom display area given to ENERGY STAR® models, eight out of 15 products showed increases. For the third indicator, average percent of displayed ENERGY STAR® models that are showing the ENERGY STAR® label, all products showed significant increases with the exception of cabinet-integrated lighting.

Table 5: Market Transformation Indicators

Indicator	Data Collection Method
Percent of appliance, lighting and home electronic products purchases that are ENERGY STAR® compliant	Household mail survey
Consumer awareness of the ENERGY STAR® logo	Household mail survey

[20] An impression is defined as the sum of the gross audience of all vehicles used in an advertiser's schedule. One person in the audience could experience hundreds of impressions.

Table 5: Market Transformation Indicators

Indicator	Data Collection Method
Consumer understanding of the meaning of the ENERGY STAR® logo	Household mail survey
Consumer recall of advertising using the ENERGY STAR® logo	Household mail survey
Percent of appliances, lighting and home electronics models on display that are ENERGY STAR® compliant	Store manager interview
Percent of showroom display space for appliance, lighting and home electronic products given to ENERGY STAR® compliant models	Actual store measurement
Percent of ENERGY STAR® complaint products on display that are actually labeled ENERGY STAR®	Actual store measurement
Count of ENERGY STAR® logos displayed in store showroom per square foot of display area given to covered products	Actual store measurement
Percent of all product models displayed in stores that are mis-labeled ENERGY STAR®	Actual store measurement
Reasons why energy efficient products are not displayed as such	Store manager interview
Type and level of training for sales persons on the benefits of ENERGY STAR® products	Store manager interview
Percent of all newspaper ad space for covered products that is devoted to ENERGY STAR® products	Measured from newspapers on best ad day for category
Percent of all newspaper ad space for covered products that is devoted to energy efficient products (other than ENERGY STAR®)	Measured from newspapers on best ad day for category
Number of retail partners recruited by the Appliance & Lighting Program	Program records
Type of retail partners (independent or chain) in the Appliance & Lighting Program	Program records
Number of NY retail partners listed on the ENERGY STAR® retail locator web site	Measured from ENERGY STAR® retail locator
Number of inquiries to the ENERGY STAR® product locator web sites from NY zip codes	EPA and DOE records
Number of inquiries to the ENERGY STAR® toll free hot line	Supplied by D&R International

TABLE 6: Baseline and Follow-Up Measurements for Key Indicators

	Average % of Displayed Models that are ENERGY STAR® Compliant		Average % Showroom Display Area Given to ENERGY STAR® Models		Average % of Displayed ENERGY STAR® Models that are Labeled as Such	
Product	**Baseline 8/99**	**Follow-Up 2/01**	**Baseline 8/99**	**Follow-Up 2/01**	**Baseline 8/99**	**Follow-Up 2/01**
Refrigerators	13.5	19.6	15.4	14.0	1.4	83.1

Clothes Washers	16.4	27.8	14.7	23.6	1.7	83.4
Dishwashers	17.8	35.0	17.9	26.7	1.7	80.5
Room Air Conditioners	26.3	30.9	25.0	18.0	2.0	91.7
CFLs	31.8	47.7	10.5	25.5	0.6	62.8
Suspended Light Fixture	0.0	0.0	0.4	0.0	0.0	33.3
Ceiling Light Fixture	4.4	6.3	2.7	4.7	1.2	80.5
Wall-Mounted Light Fixture	0.8	0.7	1.2	0.6	0.0	66.7
Recessed Light Fixture	0.6	0.2	1.8	0.1	0.0	100.0
Portable Light Fixture	0.6	7.1	1.2	9.1	0.0	80.0
Exterior Light Fixture	1.0	0.2	1.9	0.1	0.0	100.0
Cabinet-Integrated Fixture	0.0	0.0	0.0	0.0	0.0	0.0
TV	16.5	39.3	17.2	33.3	10.0	84.8
VCR	33.7	58.2	30.8	60.2	26.0	96.3
Combination TV/VCR	14.9	37.0	14.2	32.1	7.5	74.0

Lessons Learned: The following lessons have been learned during the first two years of the program.

- Paid advertising was successful in getting consumers to recognize the ENERGY STAR® label. However, more grass-roots activities are necessary to get consumers to understand the meaning of the label, and the multiple benefits of ENERGY STAR® products.
- Paid advertising has been most effective when coupled with a "call to action" such as encouraging consumers to call the hotline for more information.
- Leadership support (*i.e.*, Governor Pataki's support) has enhanced the credibility of the program.
- Teaming arrangements with manufacturers, retailers, and other mid-stream market actors is important in spreading the ENERGY STAR® message.
- Once retailer recruiting was well-underway, additional circuit riders were hired to handle the outreach and consistent contact with all participating stores.
- In early 2001, recruitment was scaled back so that program implementors could focus on enhancing quality relationships with those retailers already participating.

Expanded SBC Program Planning: This program will be continued in the expanded SBC Program. However, the multi-family bulk purchase component will operate separately.

Keep Cool (Air Conditioner Bounty) Program

Program Description: In Summer 2000, the Residential Appliances and Lighting and ENERGY STAR®

Public Awareness programs were expanded to include Keep Cool. The goal of Keep Cool is to reduce peak electric demand by promoting and enabling the purchase of ENERGY STAR®-qualifying room air conditioners and the retirement of old units. Residents and multifamily building owners and management companies can receive a $75 bounty payment when they return their old, working room air conditioner and purchase a new one with the ENERGY STAR® label. Old air conditioners are permanently removed, demanufactured, and recycled in an environmentally-sound manner. The bounty is coupled with a strong information campaign encouraging consumers to buy ENERGY STAR® products, shift appliance usage to non-peak periods, and use air conditioner timers to control overall consumption.

The Keep Cool Program involves many of the existing ENERGY STAR® retail partners recruited through the Appliances and Lighting Program. In addition, drop off sites are geographically recruited so that old room air conditioners are effectively captured.

During Summer 2001, Keep Cool was expanded statewide through partnerships with the Long Island Power Authority (LIPA) and the New York Power Authority (NYPA).

Program Time Line: The following time line indicates when major program milestones occurred.

June 21, 2000	September 20, 2000	May 1, 2001	September 20, 2001
Summer 2000 offer begins.	Summer 2000 offer ends.	Summer 2001 offer begins.	Summer 2001 offer ends.

SBC Three-Year Program Budget: The SBC three-year program budget for Keep Cool includes program implementation, public awareness (advertising), and bounties. For the Summer 2000 program, $3 million was budgeted for bounty payments, and approximately $80,000 was paid out by the end of October 2000.[21] The remaining Summer 2000 bounty budget was applied to Summer 2001. The Summer 2001 Keep Cool budget totaled $7.2 million in **New York Energy $martK** funds. This included $3 million for public awareness, $2.2 million for implementation, and $2 million for bounties. In addition to the **New York Energy $martK** funding, the Long Island Power Authority (LIPA) and New York Power Authority (NYPA) each provided $2 million to expand the Keep Cool Program into their territories.

Program Goals: The goal for Summer 2000 was 10,000 air conditioners. The goal for Summer 2001 was 17,000 air conditioners.

[21] For Summer 2000, an additional $1.4 million was set aside within NYSERDA's existing ENERGY STAR® Awareness Program to provide special advertising for Keep Cool.

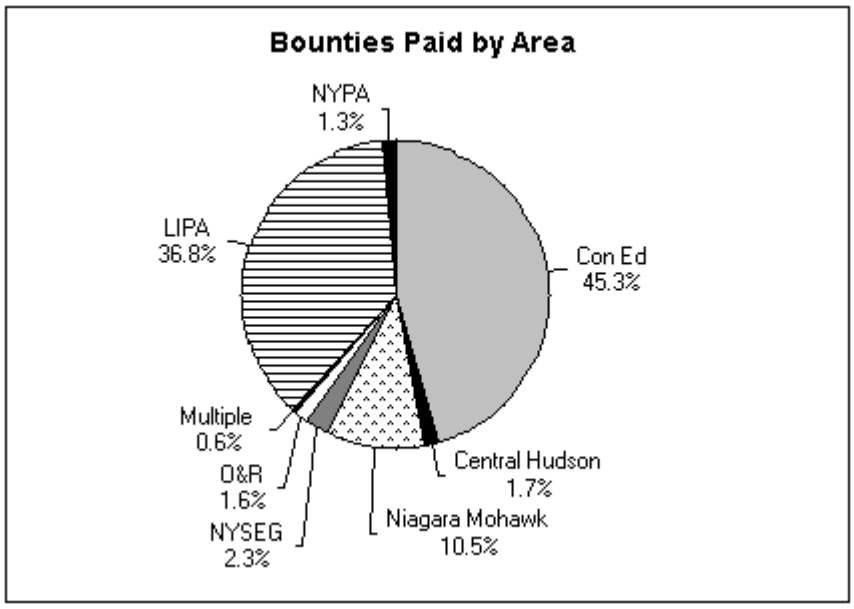
Program Specific Results[22]: The Summer 2000 program moved more slowly than expected, after a June 21st launch and cool summer weather. Only 721 room air conditioners were turned in and recycled. Numerous program enhancements were made for the 2001 program, including expansion into the LIPA and NYPA service areas, a $25 per unit storage fee was offered to retail partners, and an expanded television advertising campaign in the New York metropolitan area. As a result of these and other changes, the program met with greater success for Summer 2001. By the end of September 2001, 39,344 old air conditioners had been turned in within the **New York Energy $mart**K, LIPA, and NYPA service areas. More than 32,000 bounties had been paid for the purchase of new ENERGY STAR® air conditioners. Figure 6 shows the distribution of bounties paid by area for the Summer 2001 program. Most of the bounty payments (more than 82%) went to the Consolidated Edison and LIPA service areas where peak demand issues were of greatest concern.

The 40,065 air conditioners turned in during the past two summers are expected to result in Statewide annual electricity and summer peak demand savings of 8.7 million kWh and 12 MW, respectively. Roughly 60% of these savings will accrue within the **New York Energy $mart**K service area.

Retailer participation also doubled from 2000 to 2001, with 425 retailers participating in this year's program. More than 150 retailer drop off sites, about equally distributed between upstate, downstate and Long Island, were operational in Summer 2001.

The Summer 2001 program also involved a special effort to reduce summer peak demand downstate where it was needed most. With help from Governor Pataki, NYSERDA provided a coupon (for redemption at a participating retail store) for a free air conditioner setback timer, as well as a special two-for-one CFL bulb offer which was mailed to residents in the Consolidated Edison service territory, and offered statewide on the NYSERDA website. A total of 27,932 timers were

Figure 6



[22] Given the seasonal nature of this program, results presented here extend through the end of September 2001. However, funds awarded, customers served, and electric and summer peak demand savings presented in Section 4 of this report are through June 30, 2001, the official end of the initial three-year SBC period.

distributed to consumers by September 30, 2001. Over the 14-week period ending September 30, 2001, 107,470 bulbs had been ordered through the two-for-one offer. These bulbs are expected to result in annual electricity savings of approximately 7.3 million kWh, and summer peak demand reduction of approximately 536 KW.

Baseline/Market Assessment and Evaluation Studies: The Appliance and Lighting Program baseline serves as the baseline for this program as well. This study indicated that the market share of ENERGY STAR® room air conditioners has increased from 9.5% to 18.4% over the time frame from August 1999 to February 2001. Market shares could be higher than the February 2001 survey indicated since this measurement was taken prior to the Summer 2001 Keep Cool Program.

The Keep Cool Program included mass-media advertising which provided consumers with "tips" on how to reduce electricity consumption and demand in the home. Simple practices such as using major appliances later in the evening, and using an air conditioner timer were promoted through these advertisements. With assistance from program contractors, NYSERDA conducted a pre- and post-campaign consumer survey in 2001 in order to assess awareness, perceptions, and behavior concerning energy supply and energy efficiency in New York State. These survey results are being reviewed for insights on the impact of the communication campaign.

NYSERDA is also in the process of conducting a survey of bulb offer participants and non-participants to assess satisfaction with the products purchased, reasons for purchasing or choosing not to, market barriers to the purchase of similar products through retail channels, and to confirm energy savings from the purchases. Results, expected in early Spring 2001, will help guide program planning.

Lessons Learned: Timely changes to the 2000 program had a positive impact on 2001 results. These changes include:

- Coordination of a statewide program with LIPA and NYPA,
- An earlier program start date (May 1st instead of later in June) and the earlier "expanded" launch of associated advertising,
- A full-scale television marketing campaign in the New York Metropolitan area,
- A creative, statewide multi-media campaign including television, radio, newspaper and trade publication articles, public service announcements and special events,
- Coordination with the New York City Sanitation Department,
- Increased coordination and planning with retail partners early in the process,
- Coordination with New York utilities and the ability to promote the Keep Cool Program in their

respective newsletters,

- Improved collection procedure for old room air conditioners, with drop off sites receiving $25 for every air conditioner collected,
- Development of an active multifamily bulk purchasing program,
- Redesign of the program website with clear, accurate information on participating retailers and drop off sites, and
- The inclusion of special promotions in target markets (*i.e.*, compact fluorescent bulb 2-for-1 offer and the air conditioner timers offer).

Enhanced planning for the 2001 program included research on the New York residential air conditioner market, focus groups with retailers and multifamily building owners/managers, discussion with the U.S. Environmental Protection Agency (EPA) on grandfathering the 2000 ENERGY STAR® models into the program as well as through-the-wall units with an 8.7 Energy Efficiency Rating (EER), and discussions with manufacturers regarding product availability, rebates, etc.

Expanded SBC Program Planning: This program will be continued in the expanded SBC Program. Planning for Summer 2002 began with the September 2001 Keep Cool Conference attended by program staff, program implementation contractors, retailers, manufacturers and other interested stakeholders. Additional changes and enhancements being considered for the 2002 program include: bar coding on bounty applications for ease of processing, reduced storage costs for air conditioners, and the inclusion of central air conditioning through the Home Performance with ENERGY STAR® Program.

Residential New Construction: ENERGY STAR® Homes Program

Program Description: The Residential New Construction Program, also known as the New York ENERGY STAR® Homes 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. The program promotes an enhanced ENERGY STAR® Homes Program within the **New York Energy $martK** Program service area. Participating builders construct ENERGY STAR® Homes that use 30% less energy than homes built to the Model Energy Code. This program also incorporates ENERGY STAR® appliances and ventilation standards beyond the current national standard for an ENERGY STAR® home. The program offers technical assistance to builders, helping them assess the potential range of improvements available for specific projects.

Program Time Line: Dates correspond to when RFPs or PONs were released, and when major program milestones occurred.

February 2000	Quarter 1 2001	Quarter 1 2001	Quarter 2 2001	Quarter 3 2001
RFP 530 Program design and implementation contractor	Baseline study and program design completed. Builder contact initiated	First participating builder signed up. First training session held.	First ENERGY STAR® home built and labeled.	16 Energy Star Homes built and labeled.

SBC Three-Year Program Budget: Total program funding is $2.4 million. Implementation contractors will receive approximately $900,000 for their services. The remaining $1.5 million is available for builder incentives.

Program Goals: The three-year program goal is to promote the construction of more than 500 New York ENERGY STAR® labeled homes and enlist 100 builders.

Program Specific Results: The program began in late-Spring 2001. In less than two months of operation, through June 2001, the program enrolled 43 New York partners, including 38 builders and five raters. By that same date, construction had begun on seven New York ENERGY STAR® homes. These homes are expected to result in energy savings of more than 8,000 kWh, 195 BTU of natural gas and 145 BTU of fuel oil. The Residential New Construction advertising campaign, which kicked off during the second quarter of 2001, garnered more than 15 million impressions by various types of media by June 30th. Reported achievements will increase significantly in upcoming quarterly evaluation reports as the program ramps up to full scale operation.[23]

Baseline/Market Assessment and Evaluation Studies: Given that there were only 10-20 ENERGY STAR® homes in New York State at the start of the program, the pre-program market assessment study focused on measuring the overall appeal of planned advertising efforts and seeking input from key market participants to help position the program. The study, completed in May 2001, consisted of two 90-minute focus groups with contractors and three 70-minute focus groups with consumers.

Key results from the contractor focus groups include:

- Most have heard of the ENERGY STAR® program, but they have varying degrees of knowledge. Generally, builders/developers are better informed than general contractors.
- Contractors interest in the program increased with awareness of ENERGY STAR®.

[23] By the end of December 2001, there were more than 127 participating builders. These builders had constructed more than 50 ENERGY STAR® homes. These achievements will be reported in more detail in upcoming quarterly reports. These later results will be provided in more detail in future reporting.

- Education and awareness are key to program success. Both contractors and consumers need to understand the benefits of the ENERGY STAR® Labeled Home Program.

- Energy efficiency is a timely issue. Consumers are becoming more concerned about energy efficiency and contractors are receiving more calls about ways to save energy with the rising fuel prices and the cold winter of 2000/2001.

- Contractors say the most important issue for consumers is that ENERGY STAR® homes are up to 30% more efficient.

- Participants say the advertising messages should be simple and to the point.

- Third Party endorsements, both New York State and the Home Builders Association, added credibility to the advertising.

- Contractors say branding, perhaps with plaques or more permanent items, is a good idea.

- Participants liked the idea of having a yellow page insert that would include the names and phone numbers of ENERGY STAR® participating builders.

- Contractors expressed moderate to strong interest in attending an ENERGY STAR® seminar.

- Contractors endorse government-backed incentives for the ENERGY STAR® program. Participants mentioned the need for incentives for both contractors and consumers. Items discussed included state tax deduction, ability to lease equipment or receive it in return for attending a seminar and mortgage deductions.

Key results from the consumer focus groups include:

- A bad winter in 2000/2001 and major increases in utility and gas prices have made energy efficiency an important issue for consumers.

- While the majority of consumers claim energy efficiency is important, the issue becomes more complicated once trade-offs were mentioned. Whether participants would forego a cosmetic upgrade to add more efficiency measures is hard to predict.
- Annual cost savings is the key driver to putting energy efficiency upgrades into the "consideration set" of new home buyers along with the cosmetic upgrades.

- Most participants were concerned with the accuracy of the promised annual savings. They did not understand how the 30% less energy could be guaranteed or how it translated into savings over the life of a home.

- Concern for air quality is important as it related to families with children, older consumers, consumers with asthma, allergies and other medical conditions.

- The majority of participants were aware of the ENERGY STAR® logo and what it means. Most participants knew the logo from appliances, mostly computers. They felt the logo helped sell electrical products.

- The concept of state sponsorship and support of the program was well received. Any credible third party endorsement was a plus, but not a definite requirement according to participants.

- Trying to convey the Home Energy Rating System (HERS) in quick television sound bites did not work, and the 86 point rating was not understood by respondents.

- Reaction to the Yellow Page insert was positive and some respondents said they would call the contractors on the list. However, the majority said they do not look to the Yellow Pages for builders or contractors. Participants mentioned the Better Business Bureau, referrals from friends, real estate agents, Home Builders Guide and Home Shows as better ways to find a contractor.

- Certification of ENERGY STAR® homes was important to most consumers. The stringent requirements to get the ENERGY STAR® rating were viewed as a key component. Without the certified building inspectors/energy raters, the program becomes commercial.

Lessons Learned: Given the early stage of program implementation, lessons learned will be described in future reports.

Expanded SBC Program Planning: This program will be continued in the expanded SBC program. Changes and enhancements being considered include:

- Consumer incentives to compliment the contractor incentives offered in the initial three-year program,

- Statewide expansion of the program,

- Enhancement of the HERS infrastructure,

- Continuation of the 'call to action' marketing campaign for consumers,

- Incorporation of the new Targeted Residential Energy Analysis Tool (TREAT) software as a rating tool, and

- Incorporation of a residential photovoltaic demonstration component.

Home Performance with ENERGY STAR®

Program Description: The Home Performance with ENERGY STAR® Program is designed to enhance the existing capacity for delivering energy efficiency services to existing one- to four-family residences. The program fosters consumer protection by training and certifying mid-stream market participants, including building performance contractors, home energy raters, and contractors who provide energy efficiency services. Certified home performance contractors provide low-cost home energy audits and assist homeowners by developing work scopes for energy efficiency improvements. Eligible homeowners can receive reduced interest financing to implement the recommended improvements. The homeowner's initial audit cost is also refunded, in the form of a credit toward their overall energy efficiency work

scope, if the recommended measures are implemented. Energy efficiency improvements covered by this program include electric measures like refrigerators, heating measures such as boilers and furnaces, cooling measures such as room air conditioners, building shell measures such as insulation, and renewables.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

December 1999	February 2001	February 2001	February 2001	March 2001	March 2001
RFP 517 Program design and implementation contractor	First contractor signed up	First technical training session held	First software training session held	First home performance audit completed	First installation job completed

SBC Three-Year Program Budget: Program funding is $7 million, including approximately $1.13 million for program design and implementation, and $5.87 million in contractor incentives and consumer marketing.

Program Goals: The program aims to certify 100 contractors and provide services to 500 residential dwellings in the covered geographic areas (Capital District, Binghamton, Buffalo/Niagara, and Syracuse).

Program Specific Results: The program began during the first quarter of 2001. After only a four months of implementation, the program had certified 14 contractors and completed 200 home energy assessments. By June 30, 2001, 32 residential homes, 31 single-family and one multifamily, received treatments. The work performed in these homes is valued at more than $400,000, most of which has been financed under the program's reduced-interest loan offer. The home improvements completed as of June 30th are expected to result in annual savings of more than 6,000 kWh, and 800 MMBTU. Reported accomplishments are expected to increase significantly over the next two quarters as the program ramps up to full scale implementation.[24]

Baseline/Market Assessment and Evaluation Studies: A study was conducted to identify standard practices of HVAC and insulation contractors. This study, which involved interviews with 50 heating, ventilation, and air conditioning (HVAC) contractors, 10 HVAC distributors, 21 insulation contractors, and two insulation distributors, was conducted by Opinion Dynamics Corporation. The study, which was

[24] By the end of December 2001, the program had certified 62 home performance specialists. A total of 315 homes had received services, with 313 financing their energy efficiency improvements through the program. The average loan amount is nearly $10,000. These later results will be provided in more detail in future reporting.

completed in September 2000, serves as the program baseline and helped to inform program design. Key results are summarized in the following bullets.

- HVAC contractors cited customer request as the most important factor in deciding the efficiency level of the equipment they install.
- More than half (58%) of HVAC contractors responded that they treat duct leakage.
- While large percentages of HVAC distributors provided hands-on training on proper HVAC installation (70%), training materials on proper installation (80%), and techniques for quality assurance of the installation (70%), a comparatively smaller percentage (40%) offered on-site inspection of installations.
- Insulation contractors indicated that local building codes were the most important factor in deciding insulation R-value.
- About half (52%) of the insulation contractors indicated that they treat for air leakage when they are installing insulation in existing homes.
- Half (50%) of the insulation distributors indicated that they provide incentives to contractors for purchasing insulation with higher R-values.

Lessons Learned: The program started recruiting participating contractors in February 2001 and completed its first home energy assessment in March 2001. Since that time, field experience has significantly enhanced program implementors' understanding of the market. While the baseline and market assessment study provided substantial insight into the manner in which the market operates and barriers that exist, some additional, unforeseen barriers were identified in the early stages of program implementation. For instance, program managers recognized early on that special training would be critical in helping participating contractors become proficient with the more sophisticated mathematics and computer technology that are necessary to perform the home energy assessments. Special contractor training sessions covering mathematic requirements and basic computer operation are now being offered. It was initially envisioned that the Home Performance initiative would consist of many small jobs, each with a cost of approximately $ 3,500. However, program experience indicates that the average loan amount is more than $ 9,300. This data can lead to a number of conclusions, such as:

- The existing housing stock in New York State is in need of more energy efficiency work than originally anticipated, and
- The 5% APR loan was a significant factor in homeowners willingness to finance larger energy efficiency projects.

Expanded SBC Program Planning: This program will continue in the expanded SBC Program. Changes and enhancements that are soon to be implemented or are currently being considered include:

- The use of the new Targeted Residential Energy Analysis Tool (TREAT) software for whole-house diagnostic work and identification of energy savings improvements,
- The addition of a new contractor incentive for electric saving achievements which is expected to lead to increased implementation rates and improved project tracking,
- The expansion of the program statewide,
- A coordinated effort with the Keep Cool Program to cover the change out of existing central air conditioning systems,
- Development and implementation of a BPI central air conditioning certification process,
- Expansion of the program into the Manufactured Housing sector, and
- Enhancement of the consumer "call to action" marketing campaign.

Residential Innovative Opportunities Program

Program Description: The Residential Innovative Opportunities Program seeks to increase the availability, promotion, and sale of energy-efficient products and services not currently addressed through NYSERDA's other market transformation programs. This program is designed to influence the behavior of up-stream and mid-stream market participants and residential customers. Several of the individual projects are working to identify market barriers to energy efficiency and affordability, and recommend strategies to overcome them. Six projects are currently funded under this program. Each project is described in the following text.

Market Assessment of Coin-Operated Washing Machines in New York City. This project was designed to conduct a market assessment study to identify the market structure and energy efficiency of coin-operated washers in New York City, and recommend strategies for increasing the energy efficiency levels. The final report was issued and the project is now complete. Findings and recommendations from the market assessment report are summarized in Table 7.

Table 7: Summary of Findings and Recommendations from Coin-Operated Washing Machine Market Assessment

Key Findings
Manufacturers thought the best way to reach the multi-family market is through the route operators since more than 80% of multi-family housing laundry market is being serviced by route operators.

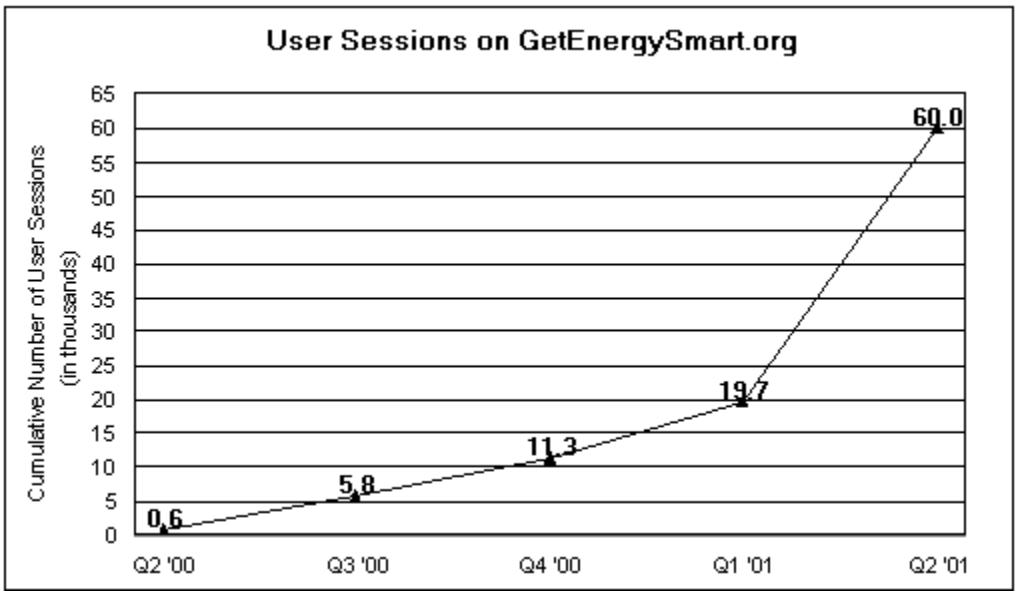
Table 7: Summary of Findings and Recommendations from Coin-Operated Washing Machine Market Assessment

Several building managers were unhappy with the timeliness and responsiveness of route operators and were concerned that route operators had not informed them of the fact that resource efficient machines are available.
The primary barrier mentioned by all route operators is the higher up-front costs of resource efficient machines. All route operators indicated that any program that would assist in covering the price gap would be beneficial.
Route operators report higher maintenance costs with front-loading, horizontal-axis machines. These machines have had to be replaced with top-loaders because of numerous complaints (primarily due to over soaping).
Route operators also indicate that the building owners are usually more interested in the initial cost than they are in the long term benefit.
All manufacturers were aware of the price gap between standard clothes washers and resource-efficient models. They suggested a financial incentive to cover the higher cost of the resource-efficient machine would encourage a greater penetration of the machines into the market.
The wholesaler mentioned they would like a financial incentive per resource-efficient machine sold. The recommended amount per machine by the wholesaler interviewed was $50 per unit.
Most building owners and managers had little understanding of the term "resource efficient machines."
Key Recommendations
Encourage building owners to install resource efficient laundries with incentives and tools to help calculate water and electricity savings.
Provide incentives to route operators for each resource efficient washing machine they install under a lease of five or more years. Route operators should also be given training and promotional materials explaining the benefits of the resource efficient machines.
Provide educational materials to tenants (such as visible stickers placed on the machines, a display or poster in the laundry room, literature explaining how to properly use the machines, and smaller scoops for their detergent).
The most significant impact can be achieved by influencing the types of appliances that are installed at the time of a changeover in an existing lease rather than new installations. Any outreach, and public relations or incentives for building owners should be coordinated with other NYSERDA programs targeting multi-family buildings.

Residential Software Demonstration. This project identifies and demonstrates the market transforming effects of Personal Computer (PC) ownership and Internet access in the area of home energy efficiency. PC ownership and the Internet enable residential customers to conduct home energy analyses; obtain information on energy use, electricity industry restructuring and efficiency; and directly purchase retrofit items through e-commerce. This project developed and distributed on-line and CD-based software tools for home energy analysis. About 20,000 CDs have been distributed. The on-line web audit tool and the website, which were operational since

June 2000, have generated significant interest as shown in Figure 7.[25]

Figure 7



Developing the Market for Whole-House Energy Services. This project provided contractor outreach and training to encourage value-added, whole-house energy services in the form of problem solving, problem avoidance, liability reduction, and energy efficiency. The project, which was closely coordinated with the Home Performance with ENERGY STAR® Program, offered qualification, field training, and technical support to contractors. The project is now coming to a close.

Increasing the Availability of Residential Building Science Training. This project developed and disseminated residential building science training to adults and high school students. The training curriculum offered under this project served as a pre-requisite course for contractors wishing to become Building Performance Institute-certified and participate in the Home Performance with ENERGY STAR® Program. This project is expected to continue.

Development of Dispute Resolution Procedures for Sub-metered Cooperatives. This project researched and developed alternative procedures for dispute resolution for sub-metered consumers with delinquent accounts. By developing appropriate procedures for reducing delinquent accounts, there may be less reluctance by cooperative members to install submetering in their buildings. This project recommended procedures that appear most promising. The project is nearing completion.

[25] A user session is defined as the session of activity (all hits) for one visitor to a website. User sessions are terminated when the user falls inactive for more than 30 minutes.

Policy Research on Submetering. Focusing on the needs of low- and moderate-income tenants, this project examined the evolution of the New York State Public Service Commission regulations regarding the submetering of rental properties. The goal was to discern the opportunities presented by the submetering of direct metered rental properties and the potential impact on public policy. This project directed attention to the prospect of renters in multi-family buildings paying lower electric costs through submetering, and energy management and aggregation in the emerging competitive energy marketplace. This project is nearing completion.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

March 1999	June 2000
PON 500 Selection of implementation contractors	GetEnergySmart.org website and the on-line home energy audit tool operational

SBC Three-Year Program Budget: A total of $816,000 is allocated for these projects.

Program Goals: The primary goal is to increase the availability, promotion, and sale of energy-efficient products and services not currently addressed through NYSERDA's other market transformation programs.

Program Specific Results: Noted in project summaries.

Baseline/Market Assessment and Evaluation Studies: Three of the six projects are completing some type of baseline or market assessment research as one of their deliverables. Results are described above where available, and will be used to inform future program planning.

Lessons Learned: Noted in project summaries.

Expanded SBC Program Planning: These projects have served to inform planning for the expanded SBC Program.

Technical Assistance

Program Description: The Technical Assistance Program funds detailed energy studies by customer-selected consultants. It includes energy feasibility studies, energy operations management, and rate analysis and aggregation. These three program components, which were once managed separately, are

now offered as components of one solicitation. The purpose of each component is described as follows:

- Energy feasibility studies improve electrical efficiency by identifying and encouraging implementation of cost-effective, energy-efficient capital improvements. The program will help individual customers overcome barriers preventing them from implementing energy efficiency projects by providing technical information and expertise on a cost-shared basis.

- Energy operations management identifies and encourages the adoption of operational efficiency improvements through engineering analysis and on-site energy management services. Types of assistance eligible for funding include; development of baseline information on energy use, energy planning, facility staff outreach and training, and commissioning of existing systems.

- Electric rate analysis and account aggregation projects provide analysis of electricity rates and consumption trends for customers. The analysis helps prepare customers to work with power marketers and energy service companies. The goal is to help customers purchase and use energy in a more cost-effective and efficient manner through a better understanding of their electricity use and purchase options.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

August 1998	May 1999	Sept. 1999	Feb. 2000	July 2000	Nov. 2000	June 2001	Nov. 2001
PONs 439, 441, 442 Incentives (Round 1)	PONs 475 - 477 Incentives (Round 2)	PONs 510 - 512 Incentives (Round 3)	PONs 525 - 527 Incentives (Round 4)	PONs 562 - 564 Incentives (Round 5)	PON 583 Incentives - first round with all three components together (Round 6)	PON 605 Incentives - first round offering reimbursement of customer costs upon implementation of recommendations (Round 7)	PON 657 Incentives (Round 8)

SBC Three-Year Program Budget: The three-year budget the Technical Assistance Program was $6.1 million with budgets for each of the major components as follows:

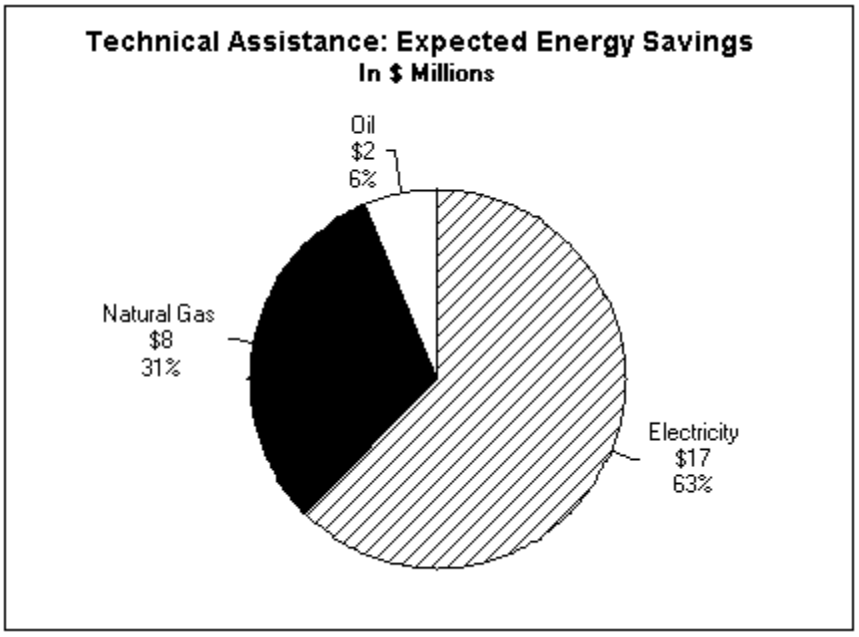
- $3.2 million for energy feasibility studies,
- $1.9 million for energy operations management, and
- $1.0 million for rate analysis and aggregation.

Program Goals: The goal for Technical Assistance was to sponsor approximately 300 studies, identifying

nearly $20 million in energy savings. The feasibility studies were also expected to identify approximately $45 million in energy saving capital improvements. The Technical Assistance Program was also working to increase the number of firms in the State providing energy operations management services. Nine firms were identified as providing these services at the beginning of the program. Along these same lines, Technical Assistance Program also aimed to increase the number of identified rate analysis and aggregation service providers.

Program Specific Results: As of June 30, 2001, the Technical Assistance Program had awarded $6.7 million in funding for 273 studies. By that same date, 54 of the studies had been completed. More than $7.5 million in external funding has been leveraged to conduct the 273 studies. An additional $90 million in capital improvements are expected to be made as a result of these studies. Total energy savings of $27 million is expected to result from these studies.[26] Figure 8 shows the anticipated distribution of energy savings by fuel type.

Figure 8



Baseline/Market Assessment and Evaluation Studies: FlexTech Program evaluations have provided a basis from which to estimate the implementation rate and the corresponding energy savings that can be achieved from technical assistance studies.

Lessons Learned: The major lessons learned, and associated program modifications, are described in the following bullets.

- During the first two years of the program, the three components of technical assistance were offered under separate solicitations. The program was designed this way to promote the market transformation of energy operations management and rate analysis and aggregation. Feedback indicated that one solicitation, offering all three components together, might be more user-friendly, and this change was implemented.

[26] Assuming that 2/3 of the customers implement 2/3 of the recommended measures. This assumption in based on prior experience with the FlexTech Program.

- The proposal selection process was also modified. In early solicitations, winning projects were selected once the solicitation had closed. Now, projects are awarded on a first-come-first-served basis. As a result of this change, applicants no longer have to wait for the solicitation to close to find out whether their project is approved.

Expanded SBC Program Planning: Technical Assistance will continue in the expanded SBC Program. The following additional modifications and enhancements are being implemented or are under consideration.

- Elimination of the Institutional Energy Performance Contracting Assistance Program, resulting in coverage of these municipal and institutional customer services (*i.e.*, comprehensive energy audits) under Technical Assistance.

- Reimbursement of study costs for customers who implement recommended measures (starting with PON 605).

Energy Audit Pilot

Program Description: In early 1999, a decision was made to modify the initial SBC plan for technical assistance offerings and add an Energy Audit Pilot Program to better serve small customer facilities. Funds totaling $300,000 were taken from the Feasibility Studies budget to implement the pilot. The Energy Audit Pilot is designed to assist small facilities (with less than $100,000 in annual electric bills) by providing information to assist with energy decisions, implementing energy efficiency strategies, and achieving energy performance goals. The program provides quality, inexpensive walk-through audits, whereas the Feasibility Studies component of the Technical Assistance Program provided more costly, detailed studies. The pilot was only provided to ratepayers of the Consolidated Edison, Central Hudson, and Orange and Rockland utilities.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

March 1999	January 2000	March 2000

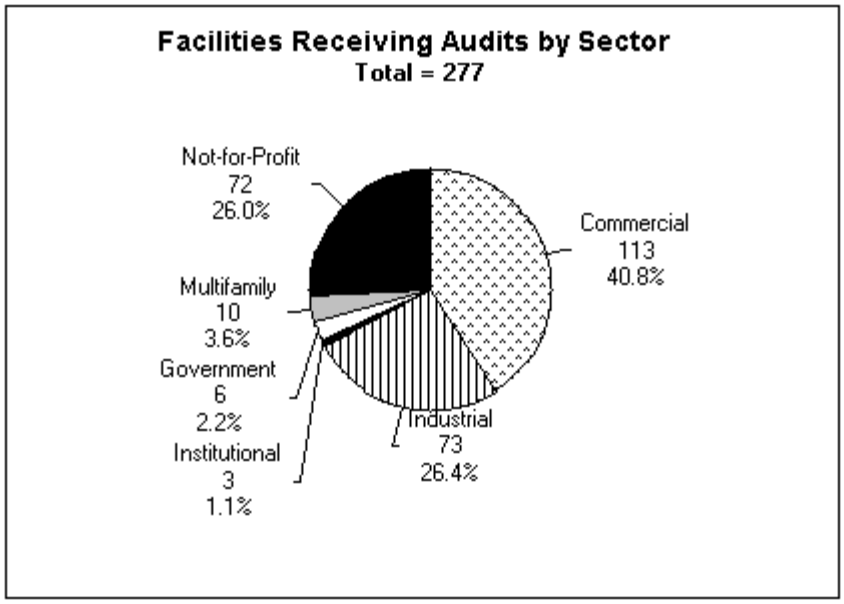
RFP 463 Program implementation contractor	Beginning of customer identification and audits	First energy audit completed

SBC Three-Year Program Budget: The budget under the initial SBC Program was $300,000. This budget includes costs for marketing, program evaluation, audit follow-ups and, co-funding customer audits.

Program Goals: The program was designed to fund 200 to 300 energy audits, depending on program marketing, reporting, evaluation, follow-up and other costs. It also assists interested customers in becoming an ENERGY STAR® partner, and participating in other NYSERDA, New York State, and utility sponsored programs.

Program Specific Results: By June 30, 2001, 277 customers had applied for energy audits. The entire program budget will be expended to complete these audits. Figure 9 shows the number of facilities, by sector, that will receive audits. These audits are expected to result in annual energy savings of approximately $1.2 million. As of June 30th, 147 audits were completed. This program is being extended until all of the funds are distributed.

Figure 9



Baseline/Market Assessment and Evaluation Studies: FlexTech Program evaluations have provided a basis from which to estimate the implementation rate and the corresponding energy savings that can be achieved from the energy audits.

Lessons Learned: The Audit Program gives small facilities a tool to assist in improving their energy efficiency and making informed energy decisions about energy use. Previously, small facilities could not afford this tool or were disregarded by the energy service community. This program will be expanded to eligible ratepayers statewide. The pilot has provided many lessons in bidding, marketing, audit delivery, reporting, evaluation and follow-up. These lessons will be used in design and contractor management for the full-scale program.

Expanded SBC Program Planning: This program will be expanded to a full-scale statewide program. In the first three years of the expanded SBC Program, $1 million dollars will be allocated to this program per year.

FlexTech

Program Description: The FlexTech Program provides customers with the information necessary to obtain management support and project financing for energy-efficient improvement measures. FlexTech existed prior to the SBC Program and is funded by other sources in addition to the **New York Energy $mart** K Program. FlexTech provides similar services to the Technical Assistance Program. The difference is that NYSERDA provides the contractors under FlexTech. Contractors are selected by NYSERDA through a competitive process every three years.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

September, 1997	January, 1999	September, 2000
RFP 398 Seeking multiple contractors to provide FlexTech studies	First SBC funded FlexTech study completed	RFP 556 Seeking multiple contractors to provide FlexTech studies

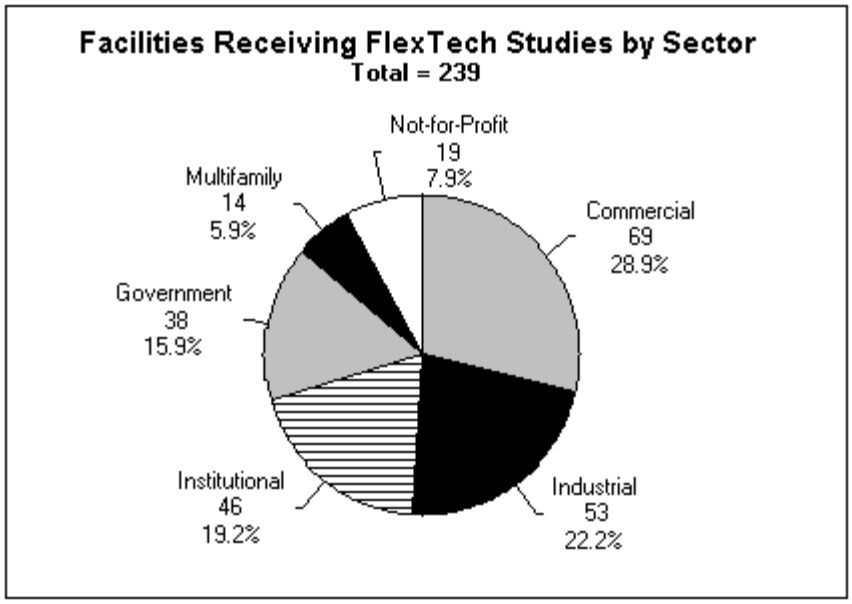
SBC Three-Year Program Budget: The FlexTech Program received $3.5 million in SBC funds.

Program Goals: The program's goal was to sponsor 175 projects, identifying $49 million in capital investments and $14 million in energy savings.[27]

[27] Initial program targets (sponsor 175 projects with $66 million in capital improvements and $19 million in annual energy savings) were based on a FlexTech evaluation report entitled *FlexTech Final Evaluation*. Results from a subsequent FlexTech Evaluation Update indicate that the ratios of dollars in capital improvements and dollar value of energy savings identified to NYSERDA funds expended are 14:1 and 4:1 respectively.

Program Specific Results: As of June 30, 2001, $2.3 million in FlexTech funding was awarded to 239 customers. The program exceeded its goal of sponsoring 175 projects by more than 35%. Figure 10 shows the sector distribution of facilities receiving FlexTech studies. These studies are expected to result in annual energy savings of $9.2 million, consisting of $5.8 million in electricity savings, $2.9 million in natural gas savings, and about $0.6 million in oil savings. By June 30th, 140 studies were completed.

Figure 10



Baseline/Market Assessment and Evaluation Studies: Prior FlexTech Program evaluations provide a basis from which to estimate the implementation rate and the corresponding energy savings.

Lessons Learned: NYSERDA's method of funding studies was changed to encourage the greater implementation of identified improvements. Customers will still be required to pay for 50% of the audit cost, but will be eligible for a refund if they implement any of the recommended improvements.

Expanded SBC Program Planning: This program will be continued during the expanded SBC Program. In anticipation of the extended SBC Program, an RFP was issued during September 2001 to competitively select a new group of FlexTech contractors to provide these audits and related services.[28] As a result of this RFP, 36 contractors were selected.

Residential Comprehensive Energy Management Services

Program Description: The Residential Comprehensive Energy Management (CEM) Program promotes the acquisition and installation of sophisticated energy management and advanced metering systems and prepare the residential sector. This will help position residential customers to take advantage of retail competition, while performing a necessary function associated with the provision of energy efficiency services. Advanced metering systems provide data on actual energy use in multifamily buildings and one- to four-family dwellings and also provide results of energy efficiency measures installed under other

[28] NYSERDA issues RFPs for FlexTech contractors every three years.

SBC-funded programs. The data 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 monitoring systems is also expected to permit energy management interventions to remedy problems if actual use is not in line with projected use.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

March 2000	February 2001	November 2001
RFP 495 Implementation contractor	First CEM multifamily application received	First multifamily building metering system completed.

SBC Three-Year Program Budget: Program funding of $2.5 million provides $500,000 for design and implementation services, and $2 million for capital subsidies on qualifying equipment.

Program Goals: The program provides incentives to owners of 3,000 single-family homes and 15,000 multi-family units to reduce the expense of advanced metering and energy management systems.

Program Specific Results: As of June 30, 2001, 15 multifamily buildings, containing 2,544 units, have been approved. Co-funding of $503,450 is expected to match the CEM incentives awarded to these projects. The installed building control devices are expected to result in electricity savings of 1.2 million kWh per year. Summer peak demand savings of one MW are expected from these measures.

Baseline/Market Assessment and Evaluation Studies: A white paper, entitled *Policy Issues that Inhibit the Deployment of Advanced Metering in New York State with Recommendations to Address Existing Barriers* is being developed to characterize the market for multfamily buildings and one- to four-family dwellings.

Lessons Learned: Policy issues have delayed the deployment of advanced metering in New York.

Expanded SBC Program Planning: This program will be continued in the expanded SBC Program. A solicitation (RFP 664-01) seeking Implementation Services for the Residential Comprehensive Energy Management Services Program closed in January 2002. The contract ($1.75 million per year which includes both incentives and contractor implementation services) is expected to begin by March 2002 and run for two years with annual options to renew at NYSERDA's discretion through June 2006.

LOW-INCOME ENERGY AFFORDABILITY PROGRAM AREA

Low-Income Direct Installation

Program Description: The Low-Income Direct Installation Program reduces energy costs for low-income households and provides information and related services regarding energy use and efficiency. The program builds upon the federal Weatherization Assistance Program (WAP) to offer electric reduction measures, including energy-efficient lighting, appliances, and electric-to-gas fuel conversions[29], to low-income customers.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

October 1998	October 1999	May 2000	
RFP 435 Program implementation contractor	Program design complete and field implementation started	First installation of electric measures completed	Program expansion beyond WAP buildings

SBC Three-Year Program Budget: Total program funding is $9.92 million, including $1.2 million for implementation and $8.72 million for electric reduction measures.

Program Goals: The initial two-year goal was to serve approximately 9,400 units in the utility service territories of Central Hudson Gas & Electric Corporation (CHG&E), Consolidated Edison Company of New York, Inc. (Con Edison), and Orange and Rockland Utilities, Inc (O&R).

[29] Consistent with the principles articulated in the Public Service Commission's January 30, 1998 Opinion and Order Concerning System Benefits Charge Issues (Order No. 98-3), the goal of the low-income programs is to address and minimize the energy affordability problems of low-income households. According to NYSERDA's *Proposed Plan for Public Benefit Programs Funded by System Benefits Charge* (May 8, 1998), energy affordability relates to more than just electricity use. Therefore, SBC strategies include efforts to reduce the usage and cost of all forms of energy in low-income households.

Program Specific Results: By June 30, 2001, 9,279 units within 1,099 buildings had been approved for program participation. The geographic distribution of program applications by type of dwelling is featured in Table 8. Approximately 72% of the approved units (6,726 units) had been considered for electric measures by June 30th. Electric reduction measures installed consist of lighting and refrigerators.

Table 8: Geographic Distribution of Program Applications by Building Type

	Single Family or Small Multifamily Buildings (1-4 units)		Large Multifamily Buildings (>4 units)	
	Buildings	Units*	Buildings	Units*
CHG&E	171	219	2	454
Con Edison	480	827	215	7550
O&R	136	171	5	58
Total	787	1217	222	8062

*A unit is defined as a single-family home or an apartment within a multifamily building.

Some limited fuel conversions have also taken place. Table 9 shows the number of measures installed by June 30 in single family or small multifamily buildings, and in large multifamily buildings.

Table 9: Installed Measures by Building Type

Measure Type	Number of Measures Installed in Single Family or Small Multifamily Buildings	Number of Measures Installed in Large Multifamily Buildings	Total Number of Measures Installed
Compact Fluorescent Light (CFL) Bulbs	6,061	13,644	19,705
Hard Wired Lighting (in-unit)	1,068	17,634	18,702
Hard Wired Lighting (common area and outdoor)	133	9,629	9,762
Refrigerators	336	2,532	2,868
Fuel Conversions	9	0	9

The cost of the installed electric reduction measures, approximately $2.4 million, is shared by the Direct Installation Program, the Federal Weatherization Assistance Program (WAP) and the participating owners of low-income buildings. If the level and proortion of internal and external investment remains the same for all approved units, the Direct Installation Program will spend approximately $4.3 million and leverage $1.7 million once all 9,279 units are completed.

The electric savings from installed measures exceeds 5.3 million kWh per year. If comparable savings are achieved in all the units that have applied for the program, then electric reductions of approximately 7.6 million kWh per year will accrue. Savings will depend upon the specific measures. However, electricity cost savings on the order or 25 to 30% have been reported for households receiving refrigerators.

Baseline/Market Assessment and Evaluation Studies: During Summer 2000, and again in Summer 2001, NYSERDA conducted surveys of building owners participating in the Low-Income Direct Installation Program. These surveys examined barriers to purchasing high-efficiency equipment, reasons for participation, satisfaction with the program, causality, and changes in attitudes and practices. Results, as they pertain to causality, are presented in Section 5 of this report. Results for the other areas of inquiry are summarized in the following bullets.

- Initial cost is the most important barrier to purchasing and installing more high-efficiency equipment.
- Saving money on electric bills, measures offered to tenants free of charge, and building owners' sense of responsibility to help low-income tenants were the most important reasons for participation in the program.
- Shortening the length of time between the energy audit and the measure installation would made building owners more satisfied with the program.
- Nearly 77% of respondents felt the program had affected their attitudes toward finding ways to save electricity in their buildings and toward helping tenants find ways to save.

In addition to the building owner surveys conducted by NYSERDA, the program implementation contractor is conducting an ongoing survey to assess tenant satisfaction with the installed lighting measures and perceptions on whether the new lighting has improved conditions in the building. A random sample of 102 low-income tenant responses was drawn from a population of 400 completed questionnaires as of September 2001. Of these, 85% were apartment lighting responses and 15% were public area lighting responses. Findings are presented in Table 10.

Table 10: Direct Installation Program Tenant Questionnaire Results

Apartment Lighting Responses **85% (87 tenants)** **Represented 14 buildings**	**Public Area Lighting Responses** **15% (15 tenants)** **Represented 4 buildings**
SPECIFIC FINDINGS • The majority (81%) of respondents were satisfied with lighting improvements in four key areas of their apartments including: kitchen, living room, bathroom and bedroom areas. Satisfaction was highest for lighting upgrades provided to the bathroom. • When compared to previous lighting quality, 77% of the respondents rated the new lighting quality as better. • 82 of the potential 87 tenants (94%) responded to the question: "Are there any parts of your home where you think the new lighting is Very Good?". Of these, 84% or 69 respondents stated that there were areas were the lighting was Very Good. • Kitchens and bathrooms were the areas that were most frequently sited as having Very Good lighting improvements.	SPECIFIC FINDINGS • The majority (95%) of respondents were satisfied with lighting improvements in four key public lighting areas of their buildings including: hallway/stairs, lobby, front entrance, and building side and rear. • When compared to previous lighting quality, 95% of respondents rated the new lighting quality as better. • 83% of the respondents responded positively to being aware of the enhanced positive attribute (color, safety, feeling safer at night, seeing well, attractive during the day) new energy-efficient lighting has contributed to in their building. • 14 out of 15 respondents answered the questions "Are there any public areas around your home where you think the new lighting is Very Good?'. Of these, 11 of the 14, or 79% answered affirmatively that the new lighting is Very Good. Good areas of lighting included the front entrance, backyard, hallways, outside, kitchen, hallway and stairs, and the front entrance and hallway lobby areas.
OVERALL FINDINGS • A high degree of tenant satisfaction with the work; • A high degree of positive post-installation comparison among qualitative attributes selected;	OVERALL FINDINGS • A high degree of satisfaction with the work; • A high degree of positive comparison, post-installation; • Unanimous indications that the new lighting allows the respondent to see well and to feel safer at night.

Lessons Learned: The Direct Installation Program was originally designed to support the installation of electric load reduction measures solely in buildings participating in the Weatherization Assistance Program (WAP). In May 2001, NYSERDA expanded the program to include low-income buildings not currently participating in WAP to:

- Increase the coordination opportunities with utility-sponsored low-income programs (*e.g.*, from Orange & Rockland Utilities Gas Weatherization Program and the Low Income Discount and Aggregation Programs being developed by Con Edison in cooperation with the NYC Human Resources Administration);

- Incorporate electric measures in weatherized buildings where electric measures had not previously been installed; and,

- Target large buildings located in census tracts containing the greatest concentrations of low-income households.

The program still refers weatherization-eligible buildings to the local WAP agency to leverage federal weatherization funds and owner investment in "whole-building" energy efficiency improvements in the Direct Install targeted buildings.

Increased completions in WAP-participating buildings accounted for the large increase in Direct Install completed measure installations since Spring 2001. Initially some WAP agencies have been slow in ramping up, but by the end of that first full year of program implementation, several agencies had completed Direct Install measures in all of their WAP buildings. All but one eligible local WAP agency had completed some homes or buildings under the program.

The **New York Energy $martK** Direct Install Program has informed building owners about the extended multiple benefits, including improved health and safety, that is an extension of investing and installing in measures that most building owners would not otherwise have installed, such as common-area lighting. As shown in Table 10, high satisfaction rates have been measured among both low-income tenants and building owners with regards to the safety, security, and lighting levels being afforded by the energy-efficient, hard-wired lighting products installed through the Direct Install Program. Under the previous WAP rules these measures would not have been installed.

By targeting **New York Energy $martK** investments for non-WAP measures, NYSERDA has been able to stimulate market development activities by building on the satisfaction of early adopters. By carrying out SBC-funded electric load reduction measures in conjunction with shell and heating system measures co-funded by WAP and the building owner (from a comprehensive, whole building, fuel neutral approach), the reduction in the total energy cost for these buildings has been greater than would have occurred if either WAP or Direct Install had completed their work separately in different buildings. A key lesson is that there are advantages to developing and fostering methods that insure low-income program coordination at all levels of program operation.

Expanded SBC Program Planning: The Direct Installation and Publicly Assisted Housing programs will be combined under the expanded SBC Program. This will reduce implementation costs since many buildings will be eligible for both programs.

Low-Income Aggregation

Program Description: The Low-Income Aggregation Program gathers low-income energy consumers to secure lower prices through bulk purchase of electricity, natural gas, fuel oil, and propane.[30] The program will also supply energy efficiency services to low-income customers in an effort to reduce demand. Three contractors were selected to launch pilot aggregation projects that explore different ways of improving the market position and self-sufficiency of low-income consumers. Actual aggregation of customers and commodity purchase is expected to occur during the course of these pilots. At least 51% of the total aggregated customer pool will consist of low-income customers. The remaining 49% may include municipalities, institutions, and commercial buildings. It is anticipated that a more balanced load will make the customer pool more attractive to marketers.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

April 2000	February 2001	April 2001
PON 518 Program implementation contractors	Kick off and coordination meeting held with all three pilot contractors	First RFP released to obtain competitive electric supply

SBC Three-Year Program Budget: A total of $1.7 million was available for this program. Funding for the three projects totals $1.2 million.

Program Goals: The aggregation pilot aims to lower energy costs low-income customers. Beyond this, the pilot projects will test various aggregation strategies to see which are most promising.

Program Specific Results: As of June 30, 2001, 93 suppliers were contacted by phone and mail to determine potential suppliers eligible to respond to an RFP. As a result, six phone interviews were conducted. The RFP seeking electric supply was sent to nine potential suppliers. Three bids were received as a result of the RFP.

Baseline/Market Assessment and Evaluation Studies: Each of the three pilot project contractors are

[30] Consistent with the principles articulated in the Public Service Commission's January 30, 1998 Opinion and Order Concerning System Benefits Charge Issues (Order No. 98-3), the goal of the low-income programs is to address and minimize the energy affordability problems of low-income households. According to NYSERDA's *Proposed Plan for Public Benefit Programs Funded by System Benefits Charge* (May 8, 1998), energy affordability relates to more than just electricity use. Therefore, SBC strategies include efforts to reduce the usage and cost of all forms of energy in low-income households.

required to undertake a competitive process to secure suppliers to serve their aggregated pool of customers. This solicitation process and supplier responses will provide "baseline" information such as the number of suppliers interested in serving low-income customers, the type of deals offered, and the conditions of those deals. The baseline used for price comparison purposes (to determine cost savings from the aggregated purchase) will be the prevailing commodity price.

Lessons Learned: Lessons learned include the following:

- Energy supplier response to the RFP was more limited than anticipated,
- Supply offers varied dramatically based on customer rate class, and
- Proposal prices for fixed-price contracts were higher than anticipated, but fixed price contracts have the benefit of price stability.

Expanded SBC Program Planning: This program will be continued in the expanded SBC Program, and NYSERDA plans to issue solicitation seeking additional pilot aggregation projects in early 2002. This solicitation will request projects throughout the entire **New York Energy $mart**K territory. NYSERDA plans another solicitation for technical support for consumer groups.

Low-Income Oil Buying Strategies Pilot

Program Description: The objective of the Low-Income Oil Buying Strategies Pilot Program is to determine an effective approach to the procurement of home heating fuel.[31] Projects will take into consideration the timing of purchase, financing mechanisms, combined with offering energy efficiency incentives such as clean and tune services for home heating systems. Individual projects will attempt to lower fuel oil costs and inform participants on energy efficiency practices and measures.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

[31] Consistent with the principles articulated in the Public Service Commission's January 30, 1998 Opinion and Order Concerning System Benefits Charge Issues (Order No. 98-3), the goal of the low-income programs is to address and minimize the energy affordability problems of low-income households. According to NYSERDA's *Proposed Plan for Public Benefit Programs Funded by System Benefits Charge* (May 8, 1998), energy affordability relates to more than just electricity use. Therefore, SBC strategies include efforts to reduce the usage and cost of all forms of energy in low-income households.

July, 2001	August, 2001	September, 2001
PON 615 Seeking contractors to run pilot projects	Proposals due for PON 615.	Technical Evaluation Panel review of proposals.

SBC Three-Year Program Budget: Funding for the three pilot projects is just over $1 million.

Program Goals: Goals for the Oil Buying Strategies Pilot Program include:

- Achieve reductions in fuel oil cost for low-income customers;
- Inform low-income customers about energy efficiency practices and measures that can reduce energy costs; and
- Coordinate the projects with other **New York Energy $mart**K Low-Income programs.

Program Specific Results: NYSERDA is negotiating contracts with three entities. The pilots are expected to extend through the 2002-2003 heating season. Final results will be available in subsequent evaluation reports.

Baseline/Market Assessment and Evaluation Studies: The baseline used for price comparison purposes (to determine cost savings through program involvement) will be the prevailing market price at the time. Commodity price and services will be negotiated with individual suppliers.

Lessons Learned: n/a

Expanded SBC Program Planning: Based on program performance, additional Oil Buying Strategy projects may be sought.

Low-Income Assisted Housing Program

Program Description: The Low-Income Assisted Housing Program will lower energy costs for publicly-assisted housing residents in by improving energy efficiency and energy management. The program is comprised of two complementary efforts, the Publicly Assisted Housing Program (PAHP), and the Affordable Assisted Housing Program.

Publicly Assisted Housing Program. Pilot projects will incorporate design, selection, and installation of energy-efficient equipment into the State's portfolio of publicly-assisted housing.

The program will support and promote:

- The use of new replacement technologies for electric resistance heat;
- Training and certification of boiler mechanics responsible for large heating plants;
- The bulk purchase of energy-efficient appliances; and
- Financing mechanisms to fund energy efficiency.

PAHP provides a unique combination of technical assistance and financial packaging to improve the fiscal health of a project. A comprehensive building audit identifies and recommends energy and resource measures for implementation, and financial specialists consolidate available loans, incentives, and grants with owner equity to fund the improvements.

Typical recommendations include envelope improvements such as added insulation and weatherstripping, replacement of older appliances, lighting, heating equipment and domestic hot water systems, and the introduction of building-wide energy management systems. In some instances, recommendations also include advanced technology options such as heat recovery ventilation systems, cogeneration, and electric-to-gas conversions. The PAHP audit also recommends measures such as smoke/carbon monoxide detectors and emergency lighting as required to promote the health and safety of building occupants.

Affordable Assisted Housing Program. This program was created in Spring 2000 as a result of the **New York Energy $mart**K funding re-allocations. This $3 million program will add-on to the Publicly-Assisted Housing Program (discussed above) by establishing an incentive pool to write down the incremental cost of energy efficiency measures and electric heat conversions in the Division of Housing and Community Renewal (DHCR) and Housing and Urban Development (HUD) publicly-assisted housing portfolios. The work recommendations and conversion strategies will be in accordance with those developed under the Publicly-Assisted Housing Program, which currently has funding only for development of the energy work protocols for several pilots. The incentive pool will be managed by the contractor selected under the Publicly-Assisted Housing Program.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

February 2000

RFP 498
Program implementation contractor

Initial 3-year Budget: $790,000 is available for program implementation and $3 million in program incentives. Funding for energy efficiency improvements is available from a wide variety of sources, including the **New York Energy $mart**K Loan Fund, Multifamily Low Income Housing Fund (LIHF), DHCR Weatherization Program, and various NYSERDA incentive programs. Owner equity (through building reserves, loans, or other means) is required to fund at least 50% of the total cost of the work. NYSERDA incentives, provided through Publicly Assisted Housing Program (PAHP), are always the "last money in" to maximize the building owner's contribution. Tax credits are sometimes available though local housing management bureaus as a post-installation incentive. In every case, PAHP provides the building ownership a means to improve their net operating income while reducing energy and maintenance costs.

Program Goals: To serve 75,000 multi-family building units. In doing so, the program will seek to:

- Influence housing officials to use life-cycle costing in their regular decision-making process for energy-efficiency projects;
- Use new replacement technologies for electric resistance heat within the HUD and DHCR building portfolios, and those of local housing entities in the State;
- Increase the availability and use of energy efficiency improvement loans within the HUD and DHCR portfolios, and those of local housing entities in the State; and,
- Increase the implementation of energy efficiency and fuel switching measures in publicly-assisted housing throughout SBC territories.

Program Specific Results: To date, over 200 projects and 60,000 units have entered the program, and over 20 projects representing 5,800 units have either prepared for, or have commenced, construction. Approximately 75% of the projects are funded and supervised through federal, state, or local housing management agencies, with the remaining 25% privately owned and financed.

Baseline/Market Assessment and Evaluation Studies: In 2001, the program implementation contractor, Hamilton, Rabinovitz & Alschuler (HR&A) conducted a study to determine the scope of unique finance,

service, and support resources available for multi-family publicly assisted buildings.[32] The study resulted in a catalog of program offerings and services that exist in the State to potentially serve multi-family buildings that will be updated as programs change. The purpose of the catalog is to guide public housing officials, managers, and technical assistance providers in identifying and accessing programs that offer incentives for the installation of energy efficiency measures in the rehabilitation or new construction of public housing.

On January 17, 2002 the first annual PAHP report was issued to NYSERDA by HR&A. This report also provides a baseline assessment of the publicly-assisted building market in New York State.[33]

Lessons Learned: Under the expanded SBC Program, the PAHP will be combined with the Direct Installation Program. This will reduce implementation costs as many buildings qualify for both programs.

Expanded SBC Program Planning: NYSERDA incentive costs per unit range from virtually nothing (when the owner is capable of funding the entire cost) to $2,500 - $3,000 per unit for financially troubled, electrically-heated buildings. Regardless of the actual incentive cost, PAHP provides what prudent technical and financial advice from a trustworthy source. In 2002, PAHP will continue to provide these essential services with the added goals of streamlining and expanding the reach of the program.

Low-Income Public Awareness

Program Description: The Low-Income Public Awareness Program informs low-income residents on the energy- and money-saving services and options available to them. The program provides consumer energy education and referrals to existing energy assistance and energy management services available locally. The program also supports the ongoing Low-Income Forum on Energy (LIFE).

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

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[32] Resources for Energy Efficiency in Multi-family Publicly Assisted Buildings: A Catalog of Programs. Hamilton, Rabinovitz & Alschuler.

[33] The NYSERDA Publicly Assisted Housing Program: First Annual Report. January 17, 2002.

November 2000	July 2001	August 2001	November 19, 2001
RFP 567 Implementation contractor	Market research commences	Market research completed	Advertising campaign begins

SBC Three-Year Program Budget: To the initial three-year program budget of $720,000, an additional $700,000, from the expanded SBC funding, was added. The total of $1.4 million was divided between program implementation (approximately $600,000), and advertising (approximately $840,000).

Program Goals: Inform low income residents on the programs available.

Program Specific Results: By June 30, 2001, the baseline and market assessment study was underway. This study was intended to provide direction for the advertising campaign and strategy. Therefore, no advertising purchases were made as of this date.

Baseline/Market Assessment and Evaluation Studies: During Summer 2001, a baseline and market assessment study was conducted as measure against which to judge future program success at increasing awareness among the low-income population and to provide direction to the advertising campaign.[34] A database of low-income households was randomly sampled for this survey effort and income screening was performed.[35] Key findings from the 2,557 eligible households responding to the telephone survey are noted below:

- Two in five respondents (43%) report difficulty paying their utility bills.
  - Less than half (45%) of these respondents are aware of energy assistance programs.
  - Among those aware, payment assistance (35%) and budget plans (35%) are recognized by the largest proportions of residents.
  - The Home Energy Assistance Program (HEAP) is known by most of the respondents who could name any program (62%). Few other energy assistance programs are known by name by the survey respondents.
  - Word-of-mouth is the way in which one out of four respondents (25%) heard about energy assistance programs.
- One-third (34%) of those surveyed have participated in an energy assistance program. Half of

[34] Low Income Public Awareness Baseline Study; Prepared by Colwell & Salmon Communications Inc., for NYSERDA. August 2001.

[35] Low-income households are those with an income less than or equal to 80% of State median income for the size of the household.

these (17%) are currently enrolled in a program, and the others (17%) participated in the past.

- The largest proportion of respondents who have participated in a program (80%) participated in a HEAP program.
- Saving money is considered the greatest benefit (49%) and reason for participation in an energy assistance program.
- Approximately 73% of current and past participants were satisfied with the program they participated in.
- The majority (81% of current participants and 71% of past participants) are very interested in participating in energy assistance programs if their household qualifies.

- Survey respondents who are not participating in any program report that they have no need (42%) or claim that they do not qualify (28%) for an energy assistance program.
- Survey respondents suggest that direct mail (53%) is the best way to inform them of energy assistance programs. Television (46%) and utility bill inserts (43%) would also be effective.

Table 11 shows respondent awareness of energy assistance programs in New York, and participation in programs by utility territory.

Table 11: Awareness and Program Participation

Utility	Awareness of Energy Assistance Programs*	Participation in Energy Assistance Programs
Consolidated Edison Company of New York	26%	4%
Niagara Mohawk Power Corporation	57%	11%
New York State Electric and Gas Company	56%	9%
Rochester Gas and Electric Company	49%	8%
Central Hudson Gas and Electric Company	42%	6%
Orange and Rockland Utilities, Inc.	35%	5%
Average Statewide	**44%**	**7%**

*Awareness of Energy Assistance Programs including (1) HEAP, (2) Weatherization Assistance Program, (3) Power Partners, (4) Utility Budget Plan, (5) Low-Income Plan, (6) Public Assistance, (7) Home Performance with ENERGY STAR®, (8) Direct Installation, (9) On Track, (10) Residential Reduced Rate, (11) Affordability Program, (12) Energy Saving Partners, (13) REACH, and (14) Aggregation, were tested through the survey. Awareness of Types of Energy Assistance Programs including (1) Payment assistance, (2) Budget plans/budget ones, (3) Emergency assistance, (4) Energy management/conservation, (5) Energy efficiency improvement, and (6) Arrears forgiveness were tested through the survey.

Lessons Learned: The baseline survey indicated both recommended media to use, and areas of the state to target. Recommendations led to the production of a television commercial, and to the development of a direct mail piece for low-income households. Data is being captured from callers regarding where they learned of the hotline number and the vast majority report seeing the TV commercial (84%).

Expanded SBC Program Planning: An February 2002 evaluation will determine whether to continue the campaign past the March 1, 2002 planned end-date.

RESEARCH AND DEVELOPMENT PROGRAM AREA

New York State Wind Power Plant Demonstration

Program Description: The Wind Power Plant Demonstration Program supports the installation, demonstration, and operation of one or two utility-scale wind power plants to foster future wind development in the state.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

November 1998	December 1999	April 2000	September 2000	August 2001	December 2001
PON 437 Solicit wind power developers	Environmental review of the Madison plant completed.	Ground-breaking on Madison wind plant.	11.5-MW Madison Plant completed.	Environmental review of the Fenner plant completed and ground-breaking.	30-MW Fenner Plant completed

SBC Three-Year Program Budget: The initial budget for this program was $2 million. An additional $7 million was added to support promising projects.

Program Goals: The program goal was to install at least four megawatts (MW) of large-scale, grid-tied wind energy systems in New York State.

Program Specific Results: Three major wind projects are underway.

- An 11.5 MW wind project in Madison (Madison County) was completed in September of 2000. The cost of this project was $16 million, with a SBC contribution of $2 million. Production reports from the plant indicate that it is operating at approximately 24% of capacity.
- A second plant was completed in December 2001 in Fenner (Madison County). This $42 million 30-MW project received $5 million in SBC funding.
- A contract for another 10 MW plant in Buffalo is under negotiation.

The total wind capacity from these three plants will be 51.5 MW, enough capacity to generate approximately 130 million kWh per year. Each million kWh of wind energy potentially avoids air emissions of 1,500 pounds of nitrogen oxides, 3,020 pounds of sulfur dioxide, and 882,000 pounds of carbon dioxide. The Wind Power Plant Demonstration Program has created significant momentum for the development of wind power plants in New York.

Baseline/Market Assessment and Evaluation Studies: Prior to the SBC Program, there was no utility-scale wind power being generated in New York. The first SBC-supported 6.6 MW wind plant was built in Western New York by Niagara Mohawk Power Corporation in 2000.

Lessons Learned: Experience from the Madison and Fenner projects has shown that there is a high degree of public acceptance of wind power plants, particularly for on-farm facilities. Developer interest in New York has also increased. However, due to the current immaturity of deregulated electric power markets and hence, lack of green retail marketing on an effective scale, energy and environmental attributes associated with the Madison and Fenner plants remain unsold.

Expanded SBC Program Planning: Approximately $46 million of the expanded SBC funding has been earmarked for the development of the wholesale renewable energy market. The funding will be used, principally, to support green marketing initiatives, the development of a renewable energy credit trading system, and additional wind power plant development.

Wind Prospecting Program

Program Description: The goal of the Wind Prospecting Program is to build on the momentum of the Wind Power Plant Demonstration Program by helping wind developers with the cost of site development. Results of the Wind Power Plant Demonstration solicitation indicated interest in developing wind power plants in the State, but that the risks of doing so are perceived to be high. Therefore, there is a need for NYSERDA to seed future wind development and keep the industry's attention focused on New York. Through this program, NYSERDA will support site development costs including measurement of site-specific wind data, environmental impact reviews, interconnection studies, etc.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

August 2000	November 2000	First Quarter 2001	Second/Third Quarter 2001	Fourth Quarter 2001

PON 529 Solicit Wind Developers to study potential sites	Six contractors selected to study potential wind farm sites across New York State	Contracts Executed	Contractors gain site control, commence preliminary activities	Several contractors initiate wind measurement activities at selected sites

SBC Three-Year Program Budget: The initial program budget was $300,000. This was later supplemented with funding from the expanded SBC Program.

Program Goals: Expedite construction of wind farms in the state by characterizing potential sites.

Program Specific Results: Six contractors were awarded approximately $600,000 to conduct site-specific studies across the State. To receive NYSERDA support, contractors needed to demonstrate that each site under study can support a project of no less than 10 MW of rated capacity. In total, 60 to 180 MW of new wind capacity could be installed by 2003 as a result of these efforts. Program participants will be providing $1.7 million in co-funding.

Baseline/Market Assessment and Evaluation Studies: N/A

Lessons Learned: N/A

Expanded SBC Program Planning: $500,000 has been budgeted for a re-release of the PON in the second quarter of 2002.

Residential Photovoltaics Program

Program Description: The Residential Photovoltaics Program encourages the installation of grid-connected photovoltaic (PV) energy systems by (1) developing the infrastructure necessary to have quality installations (*i.e.*, dealer networks, trained installers, marketing, etc.), and (2) by providing customer incentives.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

March 1999 October 1999

PON 448 Solicitation for implementation contractors	Contractors selected

SBC Three-Year Program Budget: Initial program funding was $1 million for the first three years. Due to the high quality proposals received, an additional $250,000 was made available to the program, bringing the total funding amount up to $1.25 million.

Program Goals: The original program goal was to install 150 to 200 residential PV systems; demonstrate that residential grid-connected systems are safe and reliable; provide experience to installers; document equipment, installation, and operation & maintenance costs; and lower customer's net cost.

Program Specific Results: The following three firms were awarded contracts:

- Astropower was awarded $499,880 to identify PV system dealers and installers and develop an outreach program with Pace Energy Project. The Company expects to install 150 systems. To date, Astropower has installed 23 systems in New York and another 12 systems are on order for spring installation.

- Sun Wize Technologies was awarded $499,952 and is identifying dealers and installers of PV systems. Sun Wize has prepared informational materials for consumers. The company expects to install approximately 100 PV systems. To date, Sun Wize has sold 19 systems; 7 are fully installed.

- Four Seasons Solar was awarded $250,000. The company had expected to install approximately 35 systems. Due to technical issues with the panels, the project has been put on hold.

Baseline/Market Assessment and Evaluation Studies: N/A

Lessons Learned: Utilities continue to have major interconnection issues on most installations. There was a one-year delay in getting the program started due to need for inverter testing. Even today, interconnection is a tremendous hurdle that is still holding up efforts to get systems installed.

Expanded SBC Program Planning: The Residential PV Program is a subset of the $24 million end-use market development initiative. The goals of the residential PV program are to:

- Further develop supply and service infrastructure, providing support to system integrators, equipment distributors, contractors, installers, and utility staff. Support activities include training, certification, and accreditation of installers and contractors.
- Promote repeat business by ensuring that only reliable, high-quality, well-designed systems are installed.

- Promote PV in new construction.

Photovoltaics on Buildings Program

Program Description: This program demonstrates innovative PV technologies and applications on commercial, industrial, institutional, and certain multifamily buildings.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

October 1999	October 2000
PON 449 Project implementation contractor	First PV system installed on Thompkin's Library in Ithaca, New York.

SBC Three-Year Program Budget:: The initial program budget of $1.7 million was increased to $3 million due the high quality of proposals received.

Program Goals: The program encourages private companies to install PV while increasing the installation and operating experience with this emerging technology. Initial program goal was to install a total of 150 kilowatts (kW) of PV on non-residential and multifamily buildings.

Program Specific Results: PON 449 funded 11 projects for over $3 million. These buildings will provide 679 kW of capacity, more than four times the initial goal.

Baseline/Market Assessment and Evaluation Studies: N/A

Lessons Learned: TBD

Expanded SBC Program Planning: The goal of the commercial, industrial, and institutional (CI&I) PV program will be to:

- Create market demand of PV in the CI&I sectors.
- Improve supply and service infrastructure by introducing PV to main-stream market actors.
- Demonstrate innovate designs that increase awareness and demand for PV.

High Value Photovoltaics and Wind

Program Description: The High Value Photovoltaics and Wind Program is intended to foster markets for customer- and cooperative-owned wind systems and remote photovoltaic (PV) systems. The current New York market for these technologies is small and underdeveloped. This program seeks to identify market barriers, strengthen the market, and provide information on the future potential of these technologies, and gauge the need for any further assistance to stimulate the market.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

April 2000	November 2001
PON 524 Solicit implementation contractors	Contractors selected

SBC Three-Year Program Budget: $1.3 million.

Program Goals: The goal of the program was to demonstrate photovoltaic and wind electricity systems in high value applications that can be replicated with private investment.

Program Specific Results: PON 524 resulted in three contracts:

- AWS Scientific Inc.: Market development and demonstration program for small-scale wind energy systems. In addition to market development activities, the program provides 30% buydown of the installed cost of wind systems between 1 to 50 kW. To date, AWS has received over 200 calls of interest. Applicants have been screened and 20 site visits are planned.

- Great Brooks Enterprises: Identify and demonstrate usefulness of PV and hybrid PV systems. To date, Great Brooks Enterprises has held 4 workshops, published and distributed flyers, and installed 9 systems.

- Powerlight Corporation: Develop and install PowerGuard uninterruptible power supply (UPS) in 3 buildings in New York state. Each system will have 50 kW of PV and batteries capable of sustaining 100 kW of load for at least one hour.

Baseline/Market Assessment and Evaluation Studies: N/A

Lessons Learned: TBD

Expanded SBC Program Planning: TBD

Willow Plantation Development Program – Salix Consortium

Program Description: The Salix Consortium is a partnership of over 25 groups and organizations representing research institutions, farming, environmental groups, government and industry. Specific organizations include the U.S. Department of Energy, Niagara Mohawk Power Corporation (NMPC), Burlington Electric, the State University of New York (SUNY) College of Environmental Science and Forestry (ESF), and NYSERDA. The Consortium is sponsoring a seven-year, $16.0 million program to commercialize willow as a dedicated energy crop. The program will evaluate potential problems with scale-up when planting many acres of willow; determine costs associated with planting, maintaining, and harvesting willow for biomass supply; and determine the costs and benefits of co-firing willow or waste wood blends in a pulverized coal boiler. The program seeks to establish a private cooperative to manage the plantations and provide wood to biomass power plants.

Program Time Line: Dates on the following time line indicate when major program milestones occurred.

1998	1999	2000	2001
100 acres planted	300 acres planted	550 acres planted	700 acres planted

SBC Three-Year Program Budget: $878,000 in SBC funding.

Program Goals: The Consortium's goal is to help willow crops become a locally-produced source of renewable energy by simultaneously optimizing production systems, developing producer interest in participation, and expanding markets.

Program Specific Results: Between 1998 and 2000, over 700 acres of willow biomass crops were established in Western and Central New York. The first commercially harvested material is scheduled to be co-fired with coal at the Dunkirk Power Plant in Western New York in the winter of 2001-2002.

Baseline/Market Assessment and Evaluation Studies: N/A

Lessons Learned: N/A

Expanded SBC Program Planning: N/A

Environmental Monitoring, Evaluation and Protection

Program Description. The Environmental Monitoring, Evaluation, and Protection (EMEP) Program was designed to provide policy-relevant research in the following areas:

- Behavior, cycling, and interaction of primary and secondary pollutants related to electricity generation (*e.g.*, SOx, NOx, ozone, particulates, mercury, etc.);
- Environmental impact of electricity generation relative to other sources of pollution;
- Local versus regional sources of air pollution in New York State;
- Equitable pollution control strategies; and
- Mitigation of electricity generation impacts on environmental quality.

The program includes an aggressive outreach and technology transfer component and provides a forum for policy makers and scientists to share information on critical environmental research initiatives in New York. The program also supports New York companies in developing and commercializing instruments that measure pollutants associated with electricity generation.

The program is guided by a steering committee comprised of representatives from the New York State Departments of Environmental Conservation (DEC), Health (DOH), and Public Service (DPS); the U.S. Environmental Protection Agency (U.S. EPA); the New York Academy of Sciences; a university; a utility association; and three environmental/public interest groups. Also, a seven-member science advisory committee provides program support and periodic peer-review in critical disciplines.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

August 1999	August 1999	March 2000	February 2001	March 2001

PON 446 Round 1 of environmental quality project implementors	PON 444 Round 1 of instrumentation project implementors	PON 497 Round 2 of instrumentation project implementors	PON 540 Round 2 of environmental quality project implementors	PON 586 Round 3 of environmental quality project implementors

SBC Three-Year Program Budget: A total of $7.1 million was allocated for the program, including funding for six projects transferred to NYSERDA from Empire State Electric Energy Research Corporation.[36]

Program Goals: See Program Description.

Program Specific Results. Five Program Opportunity Notices (PONs) have been issued, resulting in 19 projects and 28 contract actions.[37] As of July 30, 2001, $15.6 million of external funding has been leveraged from $12.6 million of committed NYSERDA funds. Two major program conferences have been held. Over 20 papers have been published in peer reviewed journals. Monitoring data from EMEP projects are already being used to formulate new environmental policies (*e.g.*, acid rain control policies). Several comprehensive and strategic studies are underway which will be used to formulate future environmental policies, including actions to attain ambient particulate matter standards.

Project Highlights. Three of the nineteen projects are presented below to illustrate the types of research supported by EMEP and the value to New York State.

> **Long-Term Monitoring Program for Evaluating Changes in Water Quality in Adirondack Lakes.** The Adirondack Lakes Survey Corporation (ALSC) is monitoring Adirondack lakes to increase understanding of how well surface waters are responding to acid rain reductions. The data will be useful in evaluating the effectiveness of acid deposition controls called for under the Clean Air Act Amendments of 1990. This projects was one of six projects identified by the PSC in the original SBC order as being "critical to formulation of policy." The project receives support from the New York State Department of Environmental Conservation and the U. S. EPA (co-funding totals $4,431,071).
>
> The ALSC continues to be the cornerstone for information sharing, promoting dialogue among various groups including NYSERDA, U.S. EPA, universities, NYS DEC, the Adirondack Park Agency and other state and local organizations. Data from the project have already been used in formulating legislative proposals.
>
> **Analysis of Ozone and Fine Particles in the Northeast.** The University at Albany's

[36] These projects were identified in the New York State Public Service Commission's SBC order as being critical to environmental policy development in the State.

[37] More detailed project information may be found in the EMEP case study on pages 7-37 through 7-42 of the September 2000 New York Energy $mart℠ Program Evaluation and Status Interim Report.

Atmospheric Sciences Research Center (ASRC), in collaboration with the NYS DEC, is conducting a measurement study of ozone and fine particles ($PM_{2.5}$) in New York State. The project will provide the scientific foundation for the State Implementation Plan for compliance with $PM_{2.5}$ ambient air quality standard. In 2000, the U.S. EPA awarded $3.5 million to the project.

Instrument Development. Rupprecht & Patashnick Co, Inc., located in Albany, has developed an improved ambient particulate mass monitor which measures a variety of air contaminants under a wide range of operating conditions. This monitor has been highly successful. Over 150 units have been sold since its introduction to the market in the spring of 2000.

Information Transfer. The first EMEP Program conference was held in Albany on December 6-7, 1999. There were over 200 scientists, researchers, policy makers, state and federal government employees, and public-interest group members in attendance. The second conference was conducted September 24-25, 2001, and proceedings are scheduled to be published in a special edition of the journal *Environmental Pollution*.

More than 20 peer-reviewed papers have been published in scientific journals on research supported by EMEP Program funds. Three draft final reports have been received and are currently under peer review.

Five meetings of the Program Advisory Group and Science Advisors have been held to discuss program planning issues, and the progress of research projects. Some meetings have been attended by the principal investigators as well. Eight additional meetings of the Program Advisory Group have been conducted for RFP review and proposal evaluation.

Baseline/Market Assessment and Evaluation: A preliminary evaluation of the program was conducted and is reported as a Case Study in the September 2000 "New York Energy Smart Program Evaluation and Status Report."

Lessons Learned: The emphasis in EMEP on science/policy integration and on multimedia/multipollutant approaches has been confirmed by others to be essential and on target. Frequent consultation with external science and policy experts has validated the program, giving it considerable credibility at both the State and national levels As expected from the onset of the program, environmental research is a slow process, often taking many years to collect the necessary field data. Projects initiated at the beginning of the three-year SBC Program are now just beginning to reach final conclusions.

Expanded SBC Program Planning: In 2001, NYSERDA initiated a comprehensive planning effort to serve as a roadmap for environmental research in New York State over the next five years, with a focus on pollution associated with the generation of electricity. Potential users of the plan include NYSERDA, other New York State/regional/ national research funding organizations, the scientific community, public benefit organizations and policy makers. The plan emphasizes research that:

- Is policy relevant,
- Is inter-disciplinary and address multiple mediums and pollutants,
- Will be useable for New York State policy makers, and
- Takes advantage of existing national research plans to address regional/State needs.

Working groups of experts active in the targeted fields of research were formed to assist in the identification of critical gaps and research needs. Research needs were organized into the following categories, representing the major issues related to pollution associated with the generation of electricity:

- Atmospheric Deposition of Sulfur, Nitrogen, and Mercury, and Ecosystem Response;
- Air Quality and Related Health Research: Particulates (PM), Ozone and Co-Pollutants; and
- Crosscutting Topics.

The policy objectives are to develop**:**

- Scientific foundation to evaluate effectiveness of current and future mercury and acid rain control strategies;
- Scientific foundation to help identify alternative environmental protection and mitigation strategies to reduce the impacts of acidification and exposure to mercury in New York State;

- Scientific support for emerging multimedia environmental protection strategies, such as the total maximum daily load (TMDL) approach;
- Scientific foundation to develop and evaluate the effectiveness of pollution control strategies for primary and secondary particulate matter, ozone, ozone precursors and co-pollutants;

- Quantification of local sources versus regional transport of fine particles, ozone and co-pollutants;

- Assessment of the relationships between fine particles, ozone, and co-pollutants with health effects;

- Scientific support for emerging multi-pollutant/multi-media (soil, water, and air) environmental protection strategies.

Specific areas of study include: biogeochemical cycling of S, N, Hg; ecosystem impacts of S, N, and Hg species; factors limiting or promoting recovery of acidification; relationships among pollutants; role of local versus regional sources; relative environmental impacts of atmospheric deposition compared to other sources (*e.g.*, direct discharge into a water body); economic damage assessments and economic impacts of potential strategies; the concentrations, compositions, size distributions, fluxes and geographic variations and trends of atmospheric aerosols, co-pollutants and aerosol precursors; the fate and transport of primary and secondary particulate matter, ozone, ozone precursors and co-pollutants with respect to sources and receptors; and the relationship of atmospheric concentrations, compositions, and size to human health, visibility, and other environmental concerns.

EMEP Program Opportunity Notices to be issued in early 2002 will target the research areas prioritized through this planning effort.

Energy Efficiency R&D and Strategic R&D Programs

Program Description: The Energy Efficiency Research and Development Program includes R&D and associated information dissemination activities designed to increase the efficiency of end-use electric energy consumption (*i.e.*, reduce energy-input requirements per unit of output or service of end-use device) or reduce the demand for electricity in New York State. Projects address developing energy-efficient technologies that could be manufactured in New York, if the public benefit is compelling and near-term private return is inadequate to spur R&D investment, and projects in the major electric end-use energy sectors, (*e.g.*, residential, commercial, industrial, municipal).

The Strategic Research and Development Program will implement, demonstrate, and evaluate innovative electrical end-use technologies with demonstrated potential to play a critical role in improving New York State's air quality, electrical power demand factors, and reliability for end-use customers. Projects are intended to lead to self-sustaining markets for the demonstrated technologies after funding support is removed. Strategic R&D deals with technologies and activities that accelerate development of a sustainable market for emerging energy and environmental products of strategic importance to the State's energy and environmental future. Examples are ultra-clean and high-efficiency distributed power-generating technologies (under 1 MW) and electric transportation technologies.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

September 1998	October 1999	June 2001	August 2001

PON 438 Strategic and Energy Efficiency R&D project implementors Round 1	PON 509 Strategic and Energy Efficiency R&D project implementors Round 2	PON 612 Superconductivity PON close date	PON 608 Next Generation of Energy Efficient End-Use Technologies

SBC Three-Year Program Budget: The budget for the Energy Efficiency R&D Program was $5.8 million.[38] The budget for the Strategic R&D Program was $2.7 million.[39] The pre-approved Empire State Electric Energy Research Corporation (ESEERCO) projects were funded at $425,000.

Program Goals: Goals are to:

- Develop and commercialize next generation of high-efficiency products, and
- Support the development of technologies that provide long-term solutions to the State's energy needs.

Program Specific Results: Two rounds of competitive solicitations have been completed. For Energy Efficiency R&D, 66 proposals were submitted, with 24 approved. Under Strategic R&D, 28 proposals were received, with 14 approved. Together, the 38 projects are funded at $8.3 million and are linked to $21 million in co-funding.
Three pre-approved Empire State Electric Energy Research Corporation (ESEERCO) projects are also included in this program.[40] Two of these projects contribute certain tasks to Energy Efficiency and Strategic R&D projects. The third project is a micro-turbine demonstration. These projects have resulted in over $718,000 in co-funding.

As noted in Figure 12, the projects selected under the Energy Efficiency and Strategic R&D programs cover a broad spectrum of technologies and end-use sectors.

The selected Energy Efficiency projects are predominantly focused in three areas: heating and cooling, lighting, and meters and controls. The projects selected under the Strategic R&D Program are primarily focused on clean distributed generation and vehicle electrification. Several Energy Efficiency R&D projects are related to heating and cooling. For example, Brookhaven National Laboratory is developing

[38] Original program funding was supplemented with $155,000 during reallocation of Standard Performance Contract Program funds.

[39] Original program funding was supplemented with $445,000 during reallocation of Standard Performance Contract Program funds.

[40] Originally, four pre-approved ESEERCO projects were funded by the SBC. However, one project, Advanced Low-NOx Gas Turbine Combustor Development, was canceled due to lack of interest. This project was funded at $100,000 from SBC.

and commercializing residential heating systems which reduce power consumption for burners, pumps and circulating blowers by an average of 75% below conventional systems. These systems would also increase heating reliability since they will be capable of operating during power outages with only an automotive-type 12-volt battery supply. Various system components have been evaluated, and specific components will be submitted for UL listing. A limited production run of approximately 10 units will be conducted for the purpose of extended field trials and for distribution to potential wholesale customers.

Figure 12: Strategic and Energy Efficiency R&D Projects by Sector and Technology

Technology	Multiple*	Residential	Industry	Agricultural	Institutional**	Commercial	Transportation	Totals
	End-Use Sector							
Clean Distributed Generation	6	1		2				**9**
Lighting	6			1	1			**8**
Heating/Cooling	2	5	1					**8**
Controls/Meters/Management Systems		4				2		**6**
Vehicle Electrification and Batteries	1						2	**3**
Indoor Air Quality					1			**1**
Power Quality			1					**1**
Compressed Air			1					**1**
Cleaning Technologies			1					**1**
Totals	**15**	**10**	**4**	**3**	**2**	**2**	**2**	**38**

* Project impacts at least two sectors ** Includes municipal, schools and hospitals

Several lighting projects were also funded under Energy Efficiency R&D. The projects cover an array of technologies and span from product development, to demonstration, and to information dissemination. Examples include:

- Concord Lighting and Paraflex Industries are developing an energy-efficient high intensity discharge (HID) wallpack and floodlight for commercial and multifamily buildings. This project is focused on developing a high quality, low cost fixture that will make the HID technology economically attractive for residential and commercial customers.

- The Lighting Research Center will partner with the Energy Center of Wisconsin to demonstrate that proven CoolDaylighting™ techniques can reduce energy costs by as much as one-half within New York State classrooms. This project aims to overcome technical, economic and institutional barriers to the use of daylighting in schools.

- Several funded projects focus on disseminating lighting information. One project utilizes a two-pronged approach toward overcoming barriers that inhibit the adoption of energy-efficient lighting

in residential, commercial, and industrial markets. The project provides financial support for the National Lighting Product Information Program (NLPIP). In addition, funding has been provided to the Lighting Research Center to help companies evaluate product designs and catch potential deficiencies early in product development. One of the ESEERCO pre-approved projects supports the NLPIP effort.

A variety of projects using advanced metering technologies have also been selected under the Energy Efficiency R&D Program. For instance, the development of non-intrusive load monitoring system (NILMS) for identifying and disaggregating loads at commercial facilities has made significant progress under NYSERDA's statutory R&D program. One **New York Energy Smart**[SM] project will build upon initial successes by field testing the C-NILMS device and creating a billing system that provides commercial customers with detailed and affordable operating cost information, thereby allowing them to make more intelligent energy purchases and operational decisions.

Another metering project under the Energy Efficiency R&D Program focuses on reducing energy consumption and costs through submetering within housing cooperatives. This **New York Energy $mart**[SM] project will: develop a small scale accounting package to bill apartments and maintain payment records; identify appropriate advanced meters and develop sophisticated consumer-choice billing approaches; investigate conjunctional billing options; and develop an apartment display system for electric usage and cost.

A number of projects with less traditional technologies and methodologies have also been selected under Energy Efficiency R&D. For example, a project to demonstrate and evaluate the use of ultraviolet light for air disinfection to control the transmission of infectious disease was selected for funding. The project with Saint Vincents Hospital and the Harvard Medical School will be part of a six-city, multi-year field trial to study the efficacy of ultraviolet germicidal irradiation (UVGI) in controlling tuberculosis (TB) spread in homeless shelters. Results from existing studies show that significant energy savings and environmental benefits are associated with UVGI air treatment as compared to the traditional multiple air change method. One of the ESEERCO pre-approved projects mentioned above supports this effort.

Also, a project focused on improving industrial power quality (through mitigating voltage sags in industrial facilities) was selected under Energy Efficiency R&D. Voltage sags are momentary reductions in supply voltage, lasting from between one-half an electrical cycle to several seconds, that can occur 10 to 20 times as frequently as momentary power outages. These incidents are highly disruptive to manufacturing processes as they can cause equipment to shut down or malfunction, resulting in significant and costly process downtime. Devices are currently commercially available for very large and very small customer loads, however, there is no widely applicable economic solution for loads greater than about 20kVA. Utility Systems Technologies, Inc. recently developed a cost-effective voltage sag mitigation device. Under this project, this technology has successfully replaced the existing ferroresonant transformers at a Mohawk Paper mill in Cohoes (Albany County). This replacement will result in an

annual savings of approximately 130,000 kWh or about $10,000 in energy savings alone.
In the area of Strategic R&D, nine of the 14 selected projects deal with clean distributed generation. These projects are focused on the development, demonstration and field monitoring of innovative high-efficiency power generation technologies. The selected projects range from the demonstration of fuel cells within individual residences, to the development of advanced high-capacity power cells/batteries for use in computers, cellular phones and small transportation vehicles.

Under one Strategic R&D project, the Eaton Commercial Mixed-use Center and New York State Electric & Gas Corporation (NYSEG) investigated the potential for using combined heat and power (CHP) for this site. The Eaton Center is located in Norwich (Chenango County) contains 11 buildings occupied by small businesses. The study indicated that the CHP system would be technically and economically viable for reducing utility grid consumption and supplying hot water and heating for the Eaton Center and a new SUNY Morrisville building. In a second phase of the project, the micro-turbine CHP system will be installed and evaluated for several months. Once complete, this demonstration will show private developers that such systems are feasible and that they have an attractive payback. The system also has the potential to serve as the foundation for a district heating and cooling system for downtown Norwich.

Three Strategic R&D projects target vehicle electrification. One project involves the design and installation of a facility where long-haul truckers can plug into a power outlet while parked at a rest stop, which would eliminate the eight to ten hours of engine idling and emissions that currently occur when truckers take their mandatory safety breaks. The power stations would allow truckers to run appliances in their cabins while reducing their fossil fuel consumption. The initial phase of the project is focused on conducting a feasibility study prior to identifying and creating a demonstration site in New York. In this study, Niagra Mohawk Power Corporation will determine how many long haul trucks are currently equipped or are being retrofitted with the required power inverter. Potential pollution savings will also be estimated. Future efforts to design and demonstrate the technology at a major truck stop are dependent upon the results of the feasibility study.

Overall, the Energy Efficiency and Strategic R&D projects are on schedule.

Baseline/Market Assessment and Evaluation Studies: N/A

Lessons Learned: TBD

Expanded SBC Program Planning: The Energy Efficiency and Strategic R&D Program areas under the initial three-year program will be divided into two separate programs under the expanded program.

The Next Generation of Energy Efficient End-use Technologies Program issued a solicitation in August 2001. The solicitation sought projects that demonstrate and evaluate the next generation of end-use

technologies or technologies that reduce load and/or facilitate price responsive load management in buildings or manufacturing applications. Examples of targeted end-use technologies include advanced heat pump hot water heaters, alternative cooling technologies, ultra-low and self-powered heating systems, advanced lighting systems, ventilation strategies that optimize indoor air quality and electric energy efficiency, and electro-technologies for food processing, agriculture, materials processing, and re-manufacturing. Transportation and energy storage projects will no longer be eligible under this version of the PON because separate solicitations for those areas were created under the expanded program.

The Superconductivity Electric Power Applications Program issued PON 612 with a closing date of June 27, 2001. Superconductivity is defined as the *nearly zero* electrical resistance exhibited by certain materials when cooled to low temperatures. The expense and difficulty of cooling materials down to absolute zero temperatures prohibited any practical electric power applications. Recent advances led to the discovery and development of ceramic compounds that provide superconducting qualities at much higher temperatures. These materials are called "high-temperature superconductors" or HTS. Applications for HTS include high-efficiency power lines; high-efficiency power transformers, motors, power generators, and fault-current controllers. These applications are expected to develop rapidly over the next few years. The greatest need for HTS is in congested urban areas like New York City – where rights-of-way for additional power cables are limited, where customers are demanding higher quality and more reliable power, and where the power electricity distribution infrastructure is aging. HTS cables can deliver significantly more power than the existing conventional cables and do it through existing duct work with no need for additional excavations.

Goals of the Superconductivity Program include:

- Re-shaping the electric power industry by demonstrating HTS at the utility grid scale;
- Address New York State's unique electricity infrastructure needs;
- Yield energy and environmental benefits to New York; and
- Develop commercially viable HTS products, manufactured in New York, in three to five years after the completion of the project.

Enabling Technologies for Price-Responsive Load Management Program

Program Description: This program provides funding for technologies that enhance the ability of end-use customers to participate in emergency and economic electricity demand response programs. Such programs, developed by the New York Independent System Operator (NYISO) or other entities, provide incentive payments to end-use customers who curtail load which reduces the risk of blackouts and price spikes during summer peak load conditions. Such programs could also delay the need for new transmission and generation capacities.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

January 2001	November 2001
PON 585	PON 609

SBC Three-Year Program Budget: $1,000,000 from interest earnings.

Program Goals: Program goals are to:

- Facilitate participation in NYISO and other demand response programs;
- Reduce risk of blackouts, particularly in New York City; and
- Avoid price spikes.

Program Specific Results: PON 585 sought projects to develop and demonstrate technologies that enhance the capability of NYISO market participants to reduce electricity load from the utility grid in response to emergency and/or market-based price signals. Targeted technologies included communications and networking equipment and software, advanced metering, and controls for use in customer facilities. Proposals were required to have teams that included a NYISO market participant, technology vendors, and end-users. Each team was required to have an aggregated curtailable load of 100 kW or more. For each project, no more than 50% of the aggregated curtailable load could come from emergency generation. Demonstration projects were required to be installed and capable of dry-run testing prior to June 1, 2001, and be available for operation through September 15, 2001. The maximum amount of NYSERDA funding was set at $150,000 per project.

Seven proposals, representing $969,000 of SBC funding were selected to receive funding. An additional $1,035,000 in co-funding was made available by participating vendors, end-use customers, and load-serving entities (LSE's). Selected proposers included two LSE's: NYSEG and 1st Rochdale Cooperative. Other selected proposers consisted of XENERGY, eBidnergy.com, Applied Energy Group, U.S. Postal Service with APEX Environmental, and Enetics. A total of 242 end-use customers served by seven LSE's or curtailment service providers were represented in the project pool. One project was not contracted due to financial issues incurred by the primary end-use customer. Another project was a direct load control demonstration project. The remaining five projects, representing $661,000 in SBC funding and $759,000 in co-funding, were targeted for participation in the NYISO Emergency Demand Response Program (EDRP) and the Day-Ahead Demand Response Program (DADRP). These five projects enabled approximately 67 MW of load to be available for curtailment at 43 customer sites. During the four emergency events that were called by the NYISO in early August 2001, 27 customer facilities responded

to the emergency, together curtailing approximately 38 MW per hour during the emergency events. The remaining customers did not respond due to a variety of reasons. Two main reasons were: 1) the minimum participation threshold of 100-kW per individual facility, required by some LSE's, was too high for some facilities and (2) the NYISO's method for computing customer baseline load was not weather-sensitive and customers with weather-sensitive loads could not reach curtailment levels necessary to receive adequate payment from the EDRP.

Baseline/Market Assessment and Evaluation Studies: The program's impact on Summer 2001 demand reduction was evaluated by Neenan Associates. Results will be available at www.nyiso.com.

Lessons Learned: Specific lessons learned are as follows:

- Teams were able to aggregate significantly more than the 100-kW minimum threshold required in PON 585.
- The level of commitment on the part of the participating LSEs and CSPs was a key factor in project success.
- LSEs/CSPs should be explicitly required to provide curtailment data (under appropriate non-disclosure agreements) as part of the program evaluation process.
- Additional education on the mechanics of the NYISO programs is needed; experience with PON 585 revealed that the potential proposers' knowledge of NYISO programs varied widely.

Expanded SBC Program Planning: After taking into consideration the experience gained from PON 585, a second solicitation was issued, with a due date of January 9, 2002 (PON 609, $1 million funding, $150,000/project maximum). Major changes in this round of the solicitation included:

- Encouragement of participation in the NYISO Installed Capacity Special Case Resources Program.
- Changed the minimum aggregated curtailable load per team to 5 MW (for teams that are aggregating residential customers, the minimum is 0.5 MW).
- Required participation in the Fall 2002 evaluation of the program.
- Required that each proposing team include a letter of commitment from its NYISO market participant.

Distributed Generation (DG) Technologies and Combined Heat and Power (CHP) Applications

Program Description: DG is any small-scale generation technology that provides electric power at a site

closer to customers than central station generation. DG can be used for base-load generation, cogeneration, peak shaving, standby generation, and as a means to address utility power quality and reliability issues. DG, combined with CHP, also known as co-generation, can provide the consumer with a reliable energy supply option at prices that are competitive with the grid. DG/CHP systems can reach 80% fuel-use efficiency and can significantly reduce NOx and other air emissions.

DG technologies and CHP applications are in varying stages of development and many uncertainties remain to be addressed before becoming economically and commercially viable. A DG/CHP system needs to be tailored for size, application, end-user load profiles (electric and thermal), and site constraints. The thermal energy may be used in process heating, space heating, refrigeration, and space cooling. The coincident production and use of electrical and thermal energies could necessitate electric/thermal load changes to make DG/CHP an economic option.

A number of New York State end-use customers are expected to benefit from the use of DG/CHP technology. Benefits include energy cost savings, power reliability, air emission reductions, and reduced peak demand. In addition, a large number of New York State manufacturers could potentially participate in supplying critical components and subsystems such as power electronics, heat exchangers, and gas compressors. Also, commercialization of DG/CHP technology will lower installation costs, further reducing energy costs.

The program provides funding for (1) product development phases; (2) feasibility studies; and (3) demonstration phases. Eligible technologies include large turbines and micro-turbines, fuel cells, reciprocating engines, power inverters, power-conditioning equipment, energy storage technologies, and control systems.

Program Time Line: Dates on the following time line correspond to when RFPs or PONs were released, and when major program milestones occurred.

August 2000	March 2001
PON 554 (Exclusively for demonstration of CHP)	PON 536 (Demonstration and New product development)

SBC Three-Year Program Budget: N/A.

Program Goals: Goals of the program are to (1) demonstrate economic potential of DG/CHP systems, (2) increase awareness and adoption of DG/CHP systems, (3) speed up commercialization of DG/CHP systems, (4) create manufacturing jobs, (5) achieve energy cost savings, (6) enhance electricity system reliability, and (7) reduce air emissions.

Program Specific Results: PON 554 and PON 536 together resulted in a portfolio of projects with 42 demonstration projects that are expected result in an installed electric capacity of 44 MW leading to a peak demand reduction of nearly 32 MW by the end of 2002.

Baseline/Market Assessment and Evaluation Studies: A New York State CHP market potential study is being conducted for NYSERDA by Energy Nexus Group and Pace Energy Project, partially co-funded by U.S. DOE. Findings from this study become available in early 2002. The study addressed technical and market potential under various scenarios. A second project, also supported with U.S. DOE funding, will (a) develop a handbook to familiarize local officials with the technology so that CHP siting and permitting can be streamlined, (b) develop a geographic information system (GIS) tool to assist in locating beneficial CHP deployment sites such as near brownfields, constrained areas, and empire zones, and (c) evaluate the economic benefits of power quality, particularly in mission critical facilities such as financial institutions and hospitals.

Lessons Learned: TBD

Expanded SBC Program Planning: The planned program budget is $67 million. Program objectives will be to:

- Increase end-user awareness.
- Document performance characteristics and develop analysis tools that will enable energy service companies, performance contractors, and designers to predict system performance.
- Develop analysis tools to model and predict the environmental impact of DG/CHP systems.
- Support DG technologies with varying fuel sources including natural gas, bio-derived methane, propane, etc.
- Support various applications including load following, base load, peaking shaving, power quality, and grid support.
- Address institutional impediments, including the absence of applicable codes and standards for installation of fuel cells and micro-turbines.
- Support training of installers, service technicians, and the establishment of service centers.
- Demonstrate and evaluate opportunities for aggregation of DG system and the resulting impacts on

utilities, the ISO, and distribution system reliability and power quality.

OTHER PROJECTS

New York State Environmental Disclosure

Program Description: The PSC approved electric restructuring plans that included commitments to develop an environmental disclosure program. The tracking mechanism requires all jurisdictional load-serving entities (LSE's) in the State to disclose to their customers, on a label, the environmental characteristics of the electricity they are supplying. The New York State Department of Public Service (DPS), acting as administrator of this project, is responsible for combining data from two sources to produce the labels. The label, in turn, is derived from generation and consumption information provided by the New York Independent System Operator (NYISO) and by environmental emission data provided by the Environmental Protection Agency (US EPA), the New York State Department of Environmental Conservation (DEC) and other sources. The disclosure labels will reflect each retail supplier's actual purchases without any regional "default" except that imports will be assigned a regional fuel mix and average emissions rates unless the state of origin has a compatible tracking and environmental disclosure system.

Program Time Line: Dates on the following time line indicate when major program milestones occurred.

1998	1998
PSC adopts environmental disclosure reporting requirements	Tracking system established

Initial 3-year Budget: Funding for the program is up to $3 million in SBC funds.

Program Goals: The goal is to facilitate informed customer choice, which could, in turn, lead to improved environmental quality and resource diversity. The program also aims to encourage demand for environmentally-clean electricity.

Program Specific Results: Environmental labels are expected to be available to retail customers in early 2002.

Baseline/Market Assessment and Evaluation Studies: N/A

Lessons Learned: TBD

Expanded SBC Program Planning: TBD